David D. Celentano Chris Beyrer
Editors

# Public Health Aspects of HIV/AIDS in Low and Middle Income Countries

## Epidemiology, Prevention and Care

Springer

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Edited by

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ISBN: 978-0-387-72710-3 e-ISBN: 978-0-387-72711-0
DOI: 10.1007/978-0-387-72711-0

Library of Congress Control Number: 2008929616



Printed on acid-free paper

springer.com

To Laura Lynn, who has selflessly endured numerous prolonged separations and accompanying jet lag, grant writing and innumerable acronyms without complaint and with a lot of support.

David D. Celentano

In memoriam, Edward Louis Luther, 1960–1991

Chris Beyrer

# Preface

*Anyone who has the least ability to look into the future can already see the potential for this disease being much worse than anything mankind has seen before.*

*W. Cates, Newsweek, August 1985*

Those who know me say I'm prone to hyperbole, but I wish these words had been my typical exaggeration rather than what has come to be a tragic reality. This quote occurred in the *Newsweek* issue with Rock Hudson on the cover. Fewer than 12,000 AIDS cases had been reported to public health authorities. Over the intervening two decades, the disease has become the public health issue of our lifetime – affecting tens of millions worldwide. In Africa, HIV/AIDS has already had a negative demographic impact by erasing the mortality gains of the entire 20$^{th}$ century and creating a distorted population pyramid devoid of persons in their most productive years. On average, an individual in Southern Africa has returned to the life expectancy they would have had at the turn of the 19th century. No other health condition of our time is having, or has already had, such a profound public health impact.

This comprehensive book addresses the interdisciplinary aspects of the global HIV/AIDS epidemic in its entirety. Citing epidemiologic evidence from the latest UNAIDS surveys, its geographic analysis of the global patterns is both timely and complete. The initial section of the book summarizes the always evolving, state-of-the-art of the prevention/care/treatment continuum. The chapters delve into the overlapping layers of knowledge affecting HIV/AIDS, including the behavioral components of sexual and drug sharing practices, the evolving biomedical interventions both alone and in combination, treatment of those infected with HIV as a means of prevention, political will as a foundation upon which other approaches can be built, and social activism as the continued force keeping HIV/AIDS at center stage. Part One's review offers a foundation for Part Two, where issues in prevention and care are reviewed within the unique contexts of individual countries and regions. This section provides a careful analysis of how all of the different layers of HIV/AIDS can play a coordinated role in national programs to advance the prevention and care agenda.

The authors are all definitive leaders in the HIV/AIDS field. The editors have done a remarkable job in pulling together pithy and synthetic contributions which are aggregated in one resource for the field. Most of the authors have been involved for decades with the evolving efforts in the global HIV/AIDS epidemic, and their experience with proven successful programs on the ground adds to the credibility of their analyses.

The well-known HIV/AIDS successes in the arena of prevention are amply documented. The declining HIV prevalence in many parts of the world reflects a combination of better data (surveillance as a public health intervention), decreasing HIV incidence due to targeted interventions, and the first wave of preventable deaths before antiretrovirals were available in low-income settings. The 100% condom campaign in Thailand showed that a population-level, structural intervention involving both behavioral (decreased brothel attendance) and biologic (increased condom use in high-risk settings) interventions can have a measurable impact on reversing escalating HIV trends. In Uganda, the emphasis on the "ABC" approach to HIV prevention (which more appropriately should be labeled "ABC...Z" to include the full alphabet of HIV prevention interventions) was successful because of the involvement of political leaders from the outset. In Senegal, condom social marketing helped establish a behavioral norm among those most likely to transmit HIV infection. In Brazil, universal access to antiretrovirals had a multiple impact by both providing incentives for individuals to learn their infection status and prevention programs aimed at HIV-infected individuals. Finally, the most crucial recent scientific success in the arena of prevention has been an indication from results of trials that male circumcision can markedly reduce the risk of acquiring HIV infection.

There have also been prevention disappointments. Hopes for topical microbicides and prophylactic vaccines have not been realized; in fact, the HIV prevention trials with these agents have shown that – as with all science – experiments with new products must be framed for their "two-tailed" possibilities – both helpful and harmful. But valuable lessons have been learned which have already advanced our scientific approaches to future HIV prevention studies. Some scientific successes remain unrealized due to structural and societal failures, such as access and stigma. For example, simple regimens for the prevention of mother to child transmission are still reaching frighteningly few children in low and middle income countries.

We have also experienced tremendous advances and challenges in caring for those suffering from AIDS. Scientific progress in treating AIDS has meant that AIDS need no longer be a death sentence. For many in low and middle income countries, however, difficulties in financing and reliably accessing care have severely undermined the promise of a generation of progress.

So how should we proceed into the future to have the greatest public health impact on HIV/AIDS globally? Two mutually reinforcing directions are apparent for prevention: first, HIV prevention programs must be immediately enhanced by incorporating the most effective approaches available; and second, HIV prevention research must be accelerated by focusing on new strategies that can substantially improve the effectiveness of our current prevention efforts. In the arena of care, the successes and failures of treatment roll out in low and middle income countries and communities must be carefully monitored and studied.

Our current generation of HIV/AIDS leaders must play a greater advocacy role among international HIV/AIDS funders to coordinate prevention investments, policies and strategies. In short, public health experts need to work along program management experts to develop a "global prevention plan." This would be based on applying epidemiologic methods and emerging HIV testing algorithms to identify the highest risk transmission groups, and then directing prevention resources to these groups. Examples provided in this book show that this targeted public health approach is not only possible, but also able to be sustained and even scaled up. This focused strategy is relevant to both concentrated and generalized epidemics by directly addressing the situations that sustain HIV spread into new generations of transmission.

HIV prevention programs must rapidly scale up proven interventions to interrupt transmission among those most likely to transmit. The current evidence-base for HIV prevention approaches is strongest for male circumcision services for adult men. In addition, routine infant circumcision for requesting parents, reduction of sex/needle partners, needle exchange programs, promotion of male and female condoms, access to counseling testing for the general population, and antiretroviral therapy for HIV positive pregnant women and their infants are ready for pubic health primetime.

The best kept secret in HIV prevention is providing contraceptives to HIV-infected women who do not currently wish to become pregnant. Expanding family planning services to meet unmet need would reduce the number of unintended HIV-infected infants and orphans by decreasing the number of unintended pregnancies.

The "demand side" of prevention efforts also needs to be examined through greater investment in community mobilization for uptake of HIV/AIDS prevention and care services. Investments in HIV prevention and care create opportunities for strengthening health care systems within resource-poor settings. In the face of severely limited human resources in health care, evidence is emerging from Rwanda and other countries showing that HIV/AIDS investments have had a positive spin-off impact on the broader community, specifically through improvements in other preventive health services including immunizations, family planning and pre- and post-natal care. Developing better systems to measure the impact of HIV/AIDS investments not only on the overall health system, but also on broader economic development within countries, will be essential. For example, the building of long-term, sustainable capacities in the most heavily HIV-affected countries will allow services to be more broadly available, even as those infected with HIV live longer and have other health needs. Integrating specific program services (family planning/HIV, TB/HIV, malaria/HIV) is an important step both to provide comprehensive care as well as to address non-HIV/AIDS needs within communities.

In conclusion, this book is a wonderful resource for those wishing to understand the multiple aspects of the global HIV/AIDS epidemic. We still have a long way to go in addressing this public health priority. Despite the successes, more persons become infected with HIV everyday than we are able access with HIV/AIDS care and treatment programs. No scientific "magic bullet" is around the corner to provide a panacea for eliminating global HIV spread. The successes and failures documented in this book show we have evolved in positive directions, that we can learn from our disappointments, and that prevention and care together will be necessary to move ahead.

Willard Cates Jr., MD, MPH
Family Health International

# Acknowledgments

Many individuals graciously devoted substantial time and expertise to this effort. Teerada Sripaipan, Adrienne Shapiro, Catherine Sutcliffe, Amanda Latimore, Becky Genberg, Abby Rudolph, and Carla Zelaya helped tremendously with the final copy-editing and proof-reading- any remaining errors are the sole responsibility of the editors. Joe School, Director of Cartographic Services at the University of Maryland, Baltimore County's Department of Geography and Environmental Systems demonstrated endless good humor and patience as he and his staff worked to produce the country and regional maps found throughout the book. We think that his team's work really adds tremendous added value to this endeavor. The Kaiser Family Foundation was also tremendously helpful; painstakingly adapting a series of web based global HIV/AIDS maps for our use. Evonne Carroll Young, Web Development Manager kindly helped us with our initial request, while Shobana Ramachandran, a KFF Rosenfield Fellow, and Alicia Carbaugh, a Senior Policy Analyst for HIV Policy, spent considerable time and care reviewing the maps and suggesting revisions to improve their usefulness for our readers. Teresa Bailey, a Senior Interactive Designer with Velir Studios expertly translated colorful interactive maps to versions suitable for black and white text. Teresa worked painstakingly on this for us for months, pausing ever so briefly to deliver her beautiful baby girl. We are indebted to all for their persistent good cheer and for their insistence on delivering the very best product possible. Wendy Davis was the true lifeline of this project. From the initial proposal to the final copy editing of these many chapters, Wendy was on the job. It is always a challenging job keeping on top of all of these authors with deadlines, time zones and competing interests. It is clear to us that the book would not exist without Wendy's dedicated and devoted efforts. We are deeply in her debt! Thank you all.

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# Part I

## Introduction

# Chapter 1

# Epidemiology of HIV/AIDS in Low and Middle Income Countries: Where Global AIDS is and Where it is Going

David D. Celentano , Wendy W. Davis , and Chris Beyrer

## Introduction

### The Global AIDS Pandemic as of 2007

As of December 2007, UNAIDS estimated that the number of people living with HIV in 2007 was 33.2 million, including some 30.8 million adults, half of whom were women, and 2.5 million children under the age of 15 years (UNAIDS, 2007) (Figures 1.1–1.4).

Of those infected with HIV, 2.5 million (including 420,000 children) were infected that year, and 2.1 million people died of AIDS and its complications, including 330,000 children. While these numbers are staggering, the estimate of the total number of people living with HIV worldwide was 16% lower than the UNAIDS estimate of a year earlier, in December 2006 (UNAIDS/WHO, 2006). What could account for such a marked revision in the world's estimated HIV/AIDS figures? How much of this decline is an artifact of data collection and analysis, and how much represents a "real" decline in the global burden of HIV diseases?

At its simplest, the answer to both sides of this question is "data". The largest component of the downward revision was the more than halving of the estimates of the state of the epidemic in India, where a massive household survey that included anonymous HIV testing was conducted in over 100,000 households across the country. This study demonstrated that the oversampling of urban populations and of those at higher risk had likely skewed the estimate for Indian adults ot reproductive age too high. Because of India's



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0˙1, 

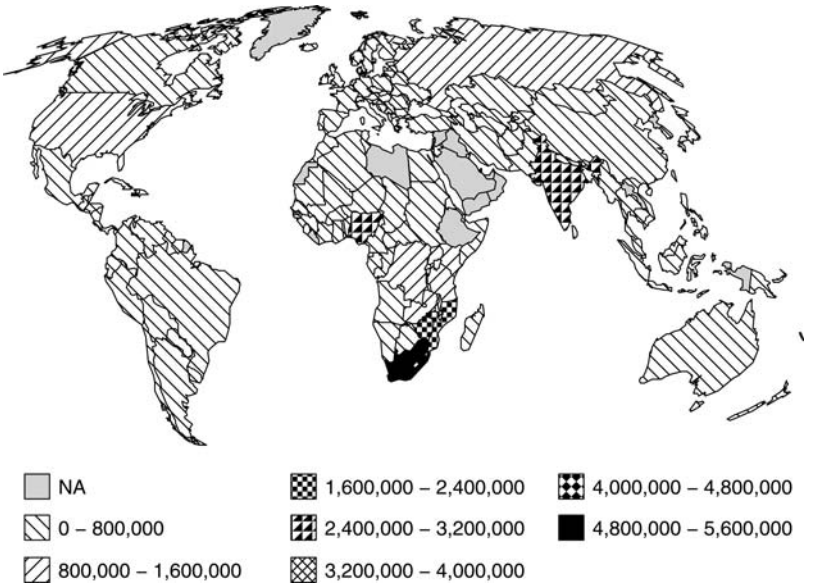


**Figure 1.1** People living with HIV/AIDS (adults and children), 2005.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: UNAIDS, *2006 Report on the Global AIDS Epidemic*, May 2006. Source for India: NACO/UNAIDS/WHO, "2.5 million people in India living with HIV, according to new estimates," Press Release, July 2007.
**Note:** Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

massive population, even a modest over estimate of prevalence yielded several million excess estimated HIV infections. But some of the reduction in the size of the international epidemic now being seen is likely to be due to real declines in numbers of new infections, as well as deaths due to AIDS. These declines are almost certainly due to behavioral risk reduction, such as has been seen in Kenya and Zimbabwe, and in Southeast Asia, most notably in Thailand and Cambodia. These changes, along with improved sentinel surveillance, and more reliable data from large national population-based health surveys, where the estimates showed that the prior figures exaggerated the current state of the epidemic, have all impacted the overall picture of AIDS as we now understand it in 2007 (UNAIDS, 2007).

Despite these gains, the HIV pandemic remains the highest priority infectious disease challenge to the world's health. New regions, including Central Asia and the Former Soviet Union, are in relatively early stages of their epidemics, and could face expanding epidemics if prevention programs are not implemented much more quickly than they now are. Each day, 6,800 new HIV infections occur, accompanied by over 5,700 deaths, two extraordinary numbers. Why are these numbers continuing to mount at a time when we have evidence-based prevention successes and proven therapies to lead to remarkable physical recovery from HIV infection? First, only a small percentage of the world's population has access to effective HIV prevention services (or, are willing to access them, for fear of stigma or discrimination if they are found

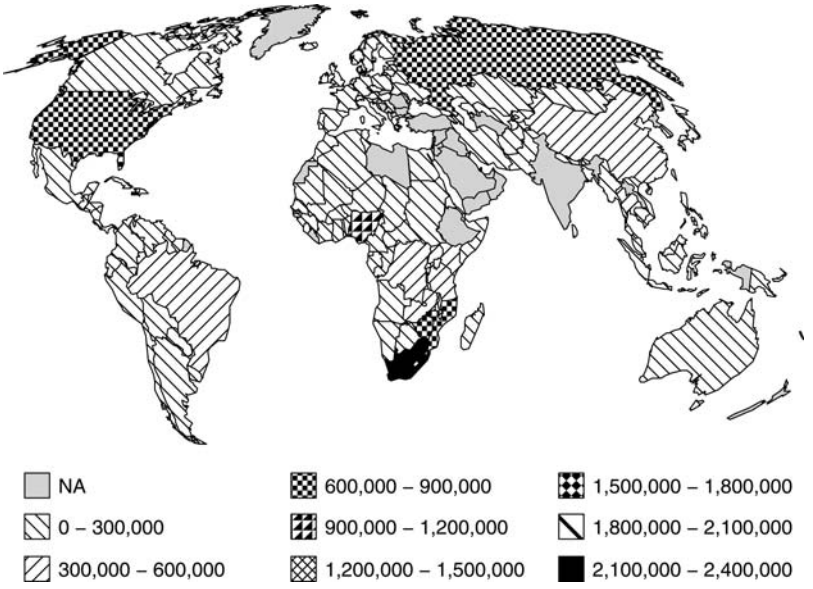


**Figure 1.2** Men living with HIV/AIDS (aged 15 and over), 2005.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: UNAIDS, *2006 Report on the Global AIDS Epidemic*, May 2006.
**Note:** Estimates for men were derived from estimates of HIV/AIDS among adults (aged 15 and over) and women (aged 15 and over). Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

to be HIV infected). Second, only a modest percentage of HIV infected persons indicated for treatment are able to get on effective therapy. While some remarkable scale-up programs have been reported, overall, most persons who need antiretroviral (ART) treatment cannot obtain it—it is either not available or it is economically out of the reach of the world's poor, who bear the brunt of the HIV/AIDS epidemic (Figures 1.5–1.7).

Where ART is available, it is often limited to one or two regimens only, not the many options for treatment open to patients and providers in the best-resourced settings—this limits the benefits of treatment considerably, and remains a challenge across the low and middle income countries affected by AIDS.

Globally, HIV incidence (the rate of new infections) is slowing in many regions of the world (with some marked exceptions, detailed below), yet HIV prevalence (the overall rate of infection in a population, including old and new infections) in many settings is growing. This paradoxical finding has a simple explanation: people with HIV infection live longer than they did in the past. This has occurred for two reasons: large segments of people living with HIV/AIDS (PLWHAs) have access to ART, and respond favorably to it; at the same time, older estimates of the time between HIV infection and the onset of clinical AIDS were grossly underestimated (the recent modeling of HIV disease shows that in Africa, the median time between becoming infected and the onset

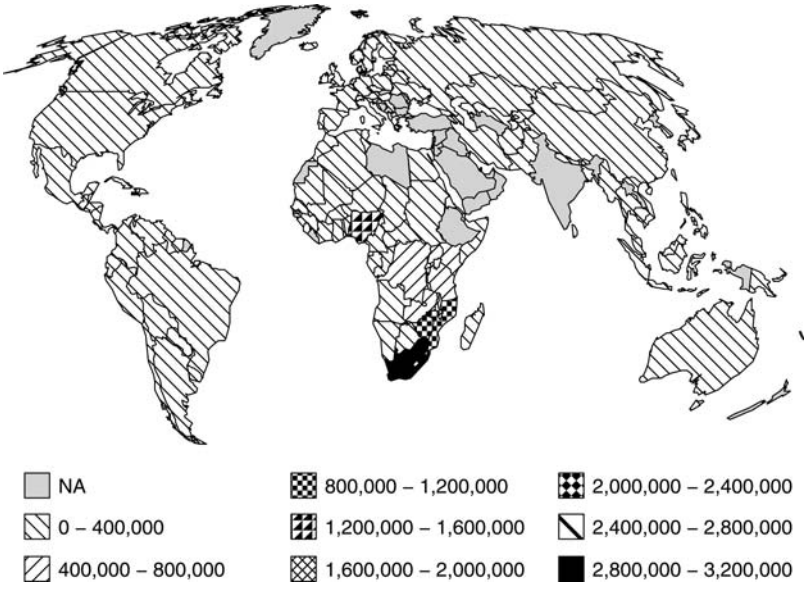


**Figure 1.3** Women living with HIV/AIDS (aged 15 and over), 2005.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: UNAIDS, *2006 Report on the Global AIDS Epidemic*, May 2006.
**Note:** Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

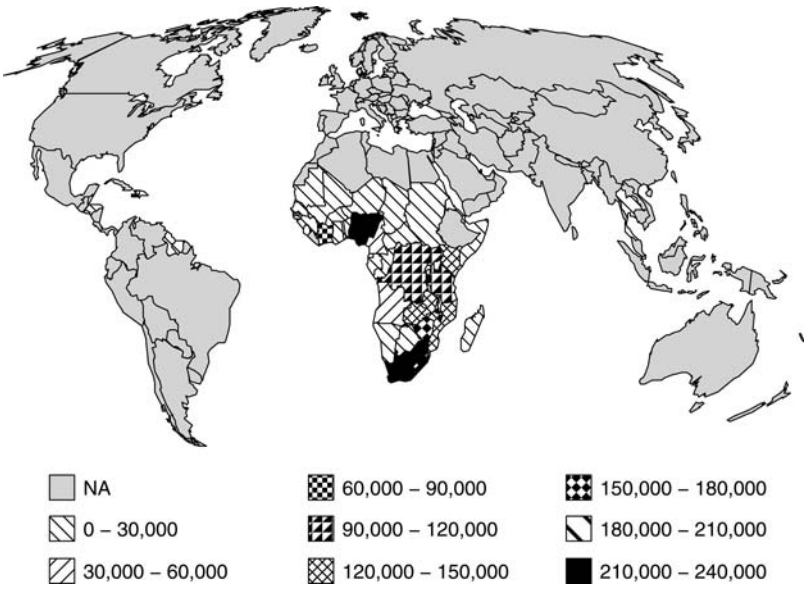


**Figure 1.4** Children (less than 15 years old) living with HIV/AIDS, 2005.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: UNAIDS, *2006 Report on the Global AIDS Epidemic*, May 2006.
**Note:** Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

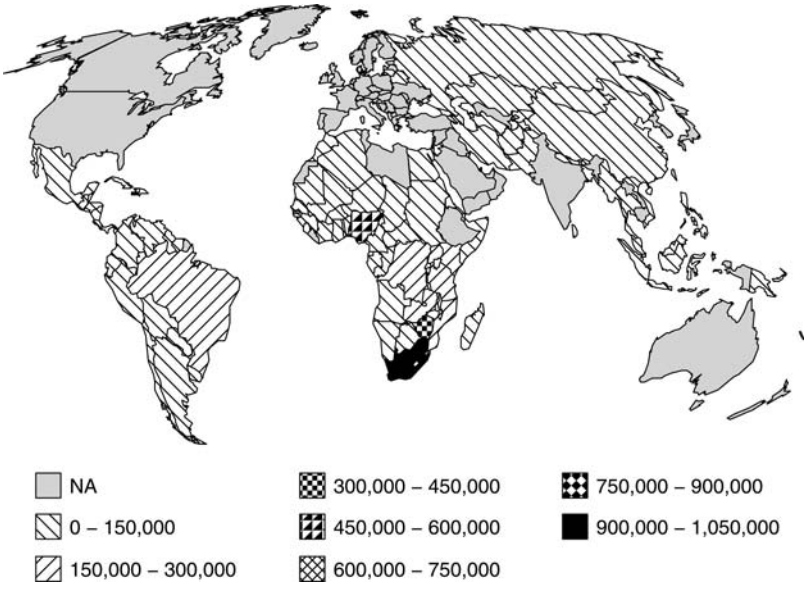


**Figure 1.5** Estimated number of people needing antiretroviral therapy, 2006.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: WHO/UNAIDS/UNICEF, *Towards Universal Access: Scaling Up Priority HIV/AIDS Interventions in the Health Sector, Progress Report*, April 2007.
**Note:** The estimated number of people with HIV/AIDS in need of antiretroviral treatment includes both those who are currently receiving treatment as well as those who are not receiving treatment, but who meet WHO treatment recommendation guidelines. Countries which are not considered to be low or middle income, or for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

of AIDS is now estimated at 11 years, not the 9 years formerly used) (UNAIDS, 2007).

UNAIDS/WHO refer to national or regional HIV epidemics as conforming to two broad categories: *generalized epidemics* occur when HIV infection is estimated at 1% or greater in the general population of reproductive age adults (generally adults aged 15–49), while *concentrated epidemics* occur when the population prevalence is below 1% in the general population, but where specific subpopulations (such as injection drug users [IDU], men who have sex with men [MSM], or female sex workers) are found to have prevalence rates of 5% or higher—and generally they are much higher. Overall, based on the most recent estimates derived from sophisticated statistical models, it appears that the HIV pandemic peaked in 2000, with stabilization overall, but a marked decline in prevalence in Sub-Saharan Africa that continued its downward trajectory from 2000 to the present day (UNAIDS, 2007). This reflects both a reduction in new infections (now estimated to have occurred in the late 1990s), attributed to both epidemiological factors and to the uptake of HIV prevention strategies and a decrease in the AIDS death rate due to the scale-up of ART treatments (since 2005). Globally, in 1990, 45% of the world's AIDS cases were among women, which gradually rose to parity in 1995, where the sex ratio has remained to this day.

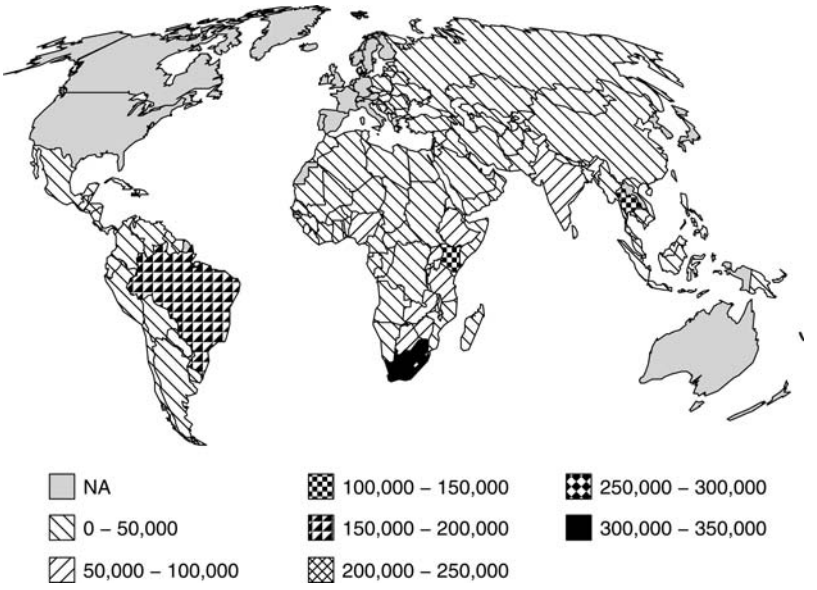


**Figure 1.6** Estimated Number of People Receiving Antiretroviral Therapy, 2006.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: WHO/UNAIDS/UNICEF, *Towards Universal Access: Scaling Up Priority HIV/AIDS Interventions in the Health Sector, Progress Report*, April 2007.
**Note:** The current estimates of the numbers of people receiving ARV therapy are based on the most recent reports received from the local ministries of health, WHO or UNAIDS country offices, or from reliable sources in the countries concerned, such as bilateral partners, foundations and nongovernmental agencies that are major providers of treatment services. Countries which are not considered to be low or middle income, or for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

While Sub-Saharan Africa remains the region hardest hit by the HIV/AIDS pandemic (home to two-thirds of adults and 90% of children infected with HIV, and the region accounting for 76% of the AIDS deaths in 2007), the adult prevalence is now estimated at 5% (with a range of 4.6–5.5%). However, this masks the significant sub-regional pandemics, which range from $<2\%$ in countries of the Sahel, to above 15% in southern Africa (where South Africa alone accounts for one-third of the incident infections and deaths in 2007). Other important regions include South and Southeast Asia (340,000 new infections) and Eastern Europe (150,000 incident cases), fueled by epidemics among IDUs and erosion of the health care system. Stable (and much lower) numbers are reported for the Latin America and Caribbean regions, America and Western Europe where the epidemics have shifted from predominately MSM to poor and minority populations and where MSM HIV rates, nevertheless, remain high. In particular countries, for example, Vietnam and Indonesia, the number of cases are mounting (Figure 1.8).

Of particular concern to the public health community is the course of the AIDS pandemic among young people, aged 15–24, as this particularly hard hit age group represents the economic future of the world and the most reproductively active segment of the population. The United Nations' 2001

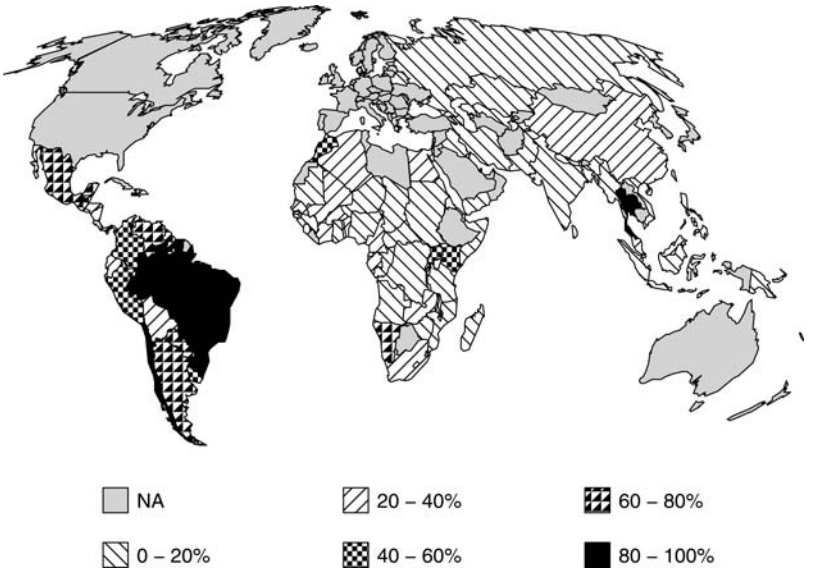


**Figure 1.7** Antiretroviral therapy coverage rate in low- and middle- income countries, December 2006.
Source: Adapted from the Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: WHO/UNAIDS/UNICEF, *Towards Universal Access: Scaling up Priority HIV/AIDS Interventions in the Health Sector, Progress Report*, April, 2007.
**Note:** The coverage rate is a measure of the number of people estimated to be receiving antiretroviral therapy divided by the total number of people estimated to need treatment. Countries which are not considered to be low or middle income, or for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

*Declaration of Commitment on HIV/AIDS* (the first UN Assembly devoted to the AIDS pandemic) made a goal of reducing HIV by 25% in young people. The WHO/UNAIDS Working Group on Global HIV/AIDS and STI Surveillance undertook an analysis of HIV prevalence in 35 countries whose national HIV prevalence exceeded 3%. Data from the 2007 UNAIDS report showed a decline in 11 of 15 countries where prevalence data from at least three years had declined since the turn of the millennium, significantly in five cases (Kenya, Botswana, Cote d'Ivoire, Malawi and Zimbabwe). No change was seen in post-conflict Mozambique, or in South Africa or Zambia. In 9 of the countries assessed, sufficient data on sexual behavior existed to address progress in meeting the UNGASS goals. In two countries, (Haiti and Kenya), significant risk reduction was noted, with mixed results (for one gender, for example) seen for other countries for specific behaviors (sex with a non-regular partner and condom use with a non-regular partner). The paucity of data and the meager results reported suggest that prevention programs have a long way to go to meet international goals.

The HIV pandemic has also been accompanied by a resurgence in the tuberculosis pandemic globally. Particularly in Sub-Saharan Africa, AIDS has undone the impressive gains shown in child survival. In addition, life expectancy has declined most dramatically in countries most affected by the HIV

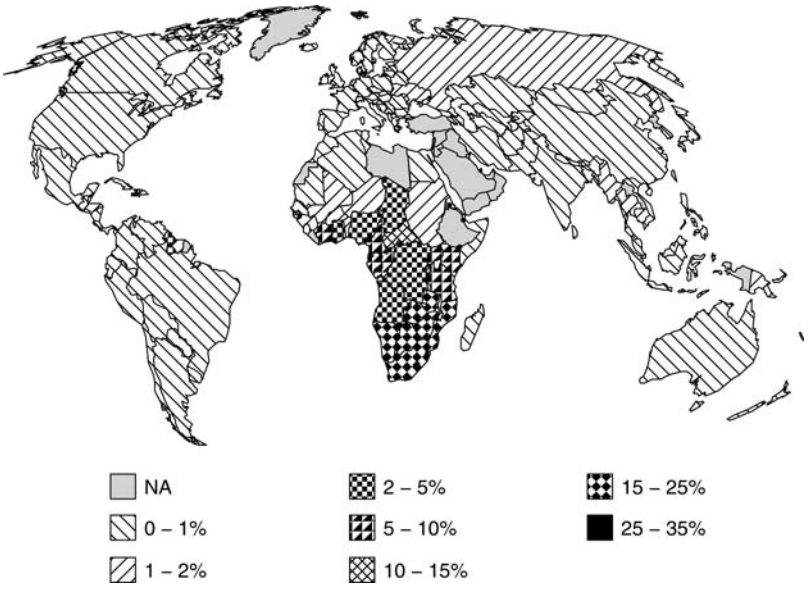


**Figure 1.8** Adult HIV/AIDS prevalence rate (aged 15–49), 2005.
Source: Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org.
Data Source: UNAIDS, *2006 Report on the Global AIDS Epidemic*, May 2006. Source for India: NACO/UNAIDS/WHO, "2.5 million people in India living with HIV, according to new estimates," Press Release, July 2007.
**Note:** Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

pandemic, distorting demographic profiles (Lamptey, Johnson, & Khan, 2006). Clearly, no segment of the world's population seems to have been spared the consequences of AIDS, including social and economic impacts, where HIV has exceeded the capacity of public health authorities and budgets to provide care in an equitable manner. Further, funds spent on HIV/AIDS poaches on the funds needed to treat other important and priority health problems, and the losses of significant medical personnel to death, overwork, and migration cannot be minimized. Finally, the political nature of health and governmental response have shaped both the response to the AIDS pandemic and its consequences in terms of morbidity and mortality.

### Sub-Saharan Africa

The devastation caused by AIDS in Sub-Saharan Africa, while commonly acknowledged globally, is hard to appreciate. It swamps the deaths caused by the great plague of 14th Century Europe and all of the war dead in the world in the 20th Century. It has torn apart economic gains from international aid programs from post-World War II to the present day despite trillions of dollars invested in the continent. The economic impact of reduced manpower will have long-lasting effects. Nevertheless, some gains over HIV have been made, and an international response to the pandemic is showing some hopeful signs.

National adult HIV prevalence in Southern Africa exceeded 15% in eight countries in 2007—Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. Most of the remaining countries in Southern Africa, however, have recently shown a stabilization in HIV prevalence (Asamoah-Odei, Carcia-Calleja & Boerma, 2004). The declining prevalence in Zimbabwe is a function of a very high death rate and a decline in HIV incidence, which is in part due to behavior change (Hallet et al., 2006), and of the massive out-migration of young Zimbabweans in the wake of that countries' economic collapse and political repression. Consistent condom use with non-regular partners has increased significantly in women in Manicaland, but not in men (Gregson et al., 2006), leading to a shift in HIV incidence.

While South Africa is home to the greatest number of HIV cases in the world, recent data suggest that the epidemic may have plateaued recently (Department of Health South Africa, 2007), as evidenced by antenatal clinic data, although significant regional differences continue to exist. However, rates in pregnant women may reflect behavior change (increased condom use with non-regular partners and partner reduction), deaths of spouses, or reduced fertility among HIV-infected women (thereby reducing the rate at which HIV infected women require antenatal care, biasing the numerator downwards).

### East Africa

The HIV epidemic in Uganda peaked in the early 1990 s and declined until early 2000 (UNAIDS, 2007). This is attributed to behavior change associated with an intensive national health education campaign with the strong backing of President Museveni (Asamoah-Odei et al., 2004). However, given the total fertility rate in excess of 6, this may indicate a growing incidence in the overall population. Recent data provide a worrisome picture for the future, where rises in risk behaviors have been reported in national surveys, suggesting caution (Kirungi et al., 2006).

Kenya has shown a remarkable shift in its HIV prevalence, declining from nearly 14% in the mid-1990 s to 5% in 2006 (UNAIDS, 2007). Hallett et al. (2006) reported a dramatic decline in the antenatal clinics from 28% in 1999 to 9% in 2003 among women 15–49 years of age. Declining trends have been reported in virtually all areas of this region (UNAIDS, 2007).

### West and Central Africa

The epidemics in West and Central Africa are smaller than those seen in other sectors in Sub-Saharan Africa, and national HIV prevalence rates appear to have reached a plateau. Nigeria has the most extensive epidemic in this subregion, although the epidemic is widely varying geographically across this large country—Africa's most populous. A Demographic and Health Survey conducted in Mai in 2006 suggests a decline in the national epidemic, where the HIV prevalence is estimated at 1.2%. The Central African Republic has the highest adult prevalence in this region, with women vastly outnumbering men, and again, showing wide regional variation.

### South and Southeast Asia

The Southeast Asian region has higher HIV prevalence than the rest of Asia and demonstrates wide divergence in its epidemics. Over the past several years, declines in prevalence have been reported in Cambodia, Thailand and Burma, although the data on the latter situation can be considered unstable and perhaps not valid. HIV has been reported in all Chinese provinces and autonomous regions, with about half of all infections attributed to IDU. MSM are viewed as an emerging epidemic risk group (Choi, Liu, Guo, Mandel, & Rutherford, 2003), and concern has been noted that female sex workers often have substance abuse problems. In 2007, India estimated that it has 2.5 million persons living with HIV, substantially less than the 2006 UNAIDS estimate of 5.7 million. The lower India rate is based on recent data—from the 2005–2006 National Family Health Survey, and an expanded national surveillance system. Virtually all the Indian states report concentrated epidemics in specific districts or risk groups, and the epidemic is not thought to have reached the general population as of yet. The Northeast Indian States of Manipur and Nagaland, both on the border with Burma, have distinct epidemics with high rates of HIV infection in IDUs, and the highest ANC rates reported in India.

In Vietnam and Pakistan, there are concerns with rising HIV infection rates associated with injection drug use. Increasingly, women are being counted among the epidemic numbers, a reflection of their male partners' risk. Indonesia, the most populous Southeast Asian country, has seen a major rise in HIV rates, attributed to shared injection equipment among IDUs and unprotected sex with sex workers. Thailand has shown a remarkable downturn in its HIV epidemic, from a peak in 1993–1994, as a result of a vigorous campaign against unprotected sex in commercial sex establishments. So too has been its response to the medical care needs of the HIV infected, where over 80% of adults in need of ART have access, and almost 90% of pregnant women at risk of transmitting HIV to their unborn children receive treatment during labor and delivery.

### Eastern Europe and Central Asia

Approximately 1.6 million inhabitants of Eastern Europe and Central Asia have HIV, with 150,000 new cases in 2007, and 90% of new cases occurring in the Russian Federation and Ukraine. Among the Central Asian epidemics, which are small in comparison to other affected regions, the epidemic in Uzbekistan is increasing at the fastest rate. While the Russian Federation epidemic appears to have reached a peak in 2000, cases continue to mount, particularly among IDUs. Heterosexual intercourse is also of growing importance. Meanwhile MSM in Ukraine appear to be a particularly hard-hit population. Remaining countries in this region demonstrate rather early epidemics which have the opportunity to be contained if prevention programs are rapidly put into place. The injection drug use driven epidemics of this region are of particular concern because one of the key drivers of HIV spread, heroin availability, has markedly increased, due almost entirely to enormous increases in heroin production and distribution from Afghanistan. The 2006 production of over 6,400 metric tons of opium base from Afghanistan is the largest the world has seen, and suggests the Central Asian States are likely to see cheap and widely available heroin flows for the foreseeable future.

### Latin America and the Caribbean

Two nations in the Caribbean dominate their neighbors in terms of HIV prevalence—the Dominican Republic and Haiti. Gaillard et al. (2006) suggest that behavior change in Haiti accounts for some of the declines recently seen in HIV prevalence among reproductive aged women (although mortality no doubt plays an important role as well). Recent prophylactic vaccine trials conducted in the Dominican Republic among female sex workers have seen few HIV seroconversions, suggestive of adoption of condom use with clients (Kerrigan et al., 2006). In other island nations, HIV has been stable over the past several years.

In Latin America, Brazil is home to about a third of HIV infections in this sub-region. As was seen in Asia, while the epidemic originated among MSM, it shifted to IDUs and then to their heterosexual partners. The recent leveling of the Brazilian urban epidemic is attributable to harm reduction, adoption of prevention strategies and mortality, especially among IDUs (UNAIDS, 2006). Other important epidemics are found in Mexico and Colombia, attributable to MSM and IDUs. In Peru, MSM infections predominate, as they do in several other low prevalence states in the region.

## Principal Themes in HIV and the Organization of This Book

The fields of investigation underlying HIV research on prevention and care have been quite interdisciplinary, each bringing their own scholarly approach and methods to the table. We can broadly characterize these three primary groups as epidemiology, prevention, and AIDS treatment. This book covers a number of key themes related to prevention and treatment first, which we acknowledge can be somewhat difficult to summarize, as the field is rapidly changing, with trial results sending researchers off on a number of new avenues. The first section of the book presents the current state of evidence from research and practice on the basic building blocks of HIV prevention and care. First, Tarakeshwar, Kalichman, Simbayi and Sikkema, prevention scientists, review what we know about primary and secondary prevention, and what obstacles exist in the application of known prevention strategies that have proven efficacy. Hoffmann, Mills and Gallant, who are well versed in the clinical management of HIV disease, review the basic package of HIV care. Mukherjee, from Partners in Health, reflects on the scale-up of HIV care in Haiti, Rwanda, Lesotho and Malawi, where a particular model of AIDS care has been developed, and speaks from vast experience at the challenges in developing a system of care in impoverished settings.

Next, Barnabas, Duerr, and Wasserheit from the HIV Vaccine Trials Network, summarize the current state of the AIDS prophylactic vaccine research effort, and review many of the obstacles and experiences we have had in the over 20 year effort to develop an AIDS vaccine. McGowan, a leader in the field of microbicide development, traces the early roots of microbicide work, reviews the mechanisms by which proposed microbicides might have their action, and comments on the recent trials that have been stopped early due to futility analyses (or, an inability to detect a difference in trial arms over a prolonged period

of time). Galvao and colleagues from Brazil present a compelling case study of how the unfolding AIDS epidemic in Brazil shaped the public's response, from initial government denial, to the emergence of civil society and interested insiders, to the concerted efforts to provide access to antiretroviral drugs to all in need at no cost. Bass, Gonsalves and Katana next take on the issues of advocacy, activism and community—key factors in many responses (and in some cases, the only effective voice) to local HIV epidemics. As they point out, vocal calls for equality, for awareness and against discrimination were needed to allow the AIDS issue to become noticed and given credence as a significant public health concern. Finally, Auerbach and Mulhern-Pearson, both from the San Francisco AIDS Foundation, take on the issues of outlining the political challenges and processes that impede or promote HIV prevention and care needs in the developing world. It has been clearly shown that political will is one of the most potent ingredients for a nationally effective HIV response, and political opposition can be the major brake in many countries. Witness the difference between the statements and policies of President Musuveni in Uganda and President Mbeki in South Africa.

The second section of the book presents regional reviews of these themes, either by sub-region or by individual country. Laga, Matendo and Buve from the Antwerp Institute of Tropical Medicine, consider Congo and Central Africa, widely believed to be the "birthplace of HIV". They review the epidemiology, prevention and care issues, and the local political processes important in forming a response to the epidemics by governments. Blattner and his colleagues from Nigeria and the University of Maryland, take on Nigeria and West Africa, while Weiss, Merle, Serwadda and Kapiga review the evidence from East Africa (comprising primarily Kenya, Tanzania and Uganda). McIntyre, De Bruyn and Gray from the University of Witwatersrand, review the complicated stories in Southern Africa, commenting upon the similarities and differences in epidemiology, prevention and care, and governmental response in the region most heavily affected by the AIDS epidemic. Finally, Simmons and colleagues from Ethiopia provide a picture of the HIV/AIDS situation in the Horn of Africa, with a focus on Ethiopia, but with reference to Somalia, Djibouti, Eritrea and Sudan. In each of these regional reviews, similarities and differences in the epidemiology, in governmental and civil society response to the epidemic and response are presented and discussed, to illustrate the diversity in experiences and to provide the backdrop to understand why the HIV epidemics in Africa are so varied.

Next we move to South and Southeast Asia. Each of the countries included in this volume have had quite different experiences with HIV. Zunyou Wu and his collaborators discuss the unfolding of the HIV epidemic in China, its roots in the blood scandals of the 1990s and the rapid rise of HIV among IDUs, and how Chinese society has rapidly changed its political stance towards HIV in recent years, rolling out a major HIV program based on harm reduction and contemporary drug abuse treatment, while also coping with a mounting population requiring HIV medical care. While some have feared that China could "explode" like Africa, it seems unlikely today that this will happen. Chariyalertsak, Aramrattana and Celentano review the history and response to HIV in Thailand, and provide the background to the widely acclaimed 1991–1995 "100% Condom Campaign" and the more recent disastrous "War on Drugs" of 2003, each of

which shaped government and societal views on HIV prevention and care. The rationale for the compassionate response to the heterosexual epidemic and the antipathy held for IDUs and MSM is also addressed.

Next, Beyrer and colleagues from the U.S. and Burma review the very different response to the HIV/AIDS epidemic by Burma, a neighbor of Thailand. The political oppression of the military junta in power in Burma for the past 40 years is the major theme of this epidemic of avoidance. While the UNAIDS reports reductions in prevalence among antenatal clinic patients, the data on which these statistics are based are suspect. Quan, Hien and Go review the situation in Vietnam, which is one of the few Southeast Asia countries experiencing a current rapidly escalating epidemic. Providing primary analysis of national sentinel surveillance data, the authors demonstrate that HIV among IDUs is the engine behind this epidemic. Nevertheless, with strong multinational financial assistance, Vietnam is rolling out a national response to HIV that may be in sufficient time to control their epidemic. In stark contrast to the experience in Vietnam, the recent political shift towards injection drug use and HIV/AIDS in Malaysia, as outlined by Kamarulzaman and Razali, is incredible. In this largely Muslim country with a long anti-drug stance, a shift in political will has allowed the widespread roll-out of harm reduction approaches to the IDU-associated HIV epidemic. The context for these changes forms the basis for this chapter. Finally, Solomon, Sivaram and Solomon, students of the India HIV epidemic, provide a summary of the widely varying HIV epidemics encountered in India, from the drug-fuelled epidemics of the Northeast, to the Hindi epidemics related to unprotected sex. The recent focus on evidence-based data on the HIV epidemic led Indian government officials to officially cut the HIV prevalence estimate 60%, which of course clearly demonstrates the power of data in statistical estimation.

Sharma, Lioznov and DeHovitz present data from the Russian Federation in the next section on Eastern Europe and Central Asia. The Russian epidemic took off following the breakup of the Soviet Union, and was primarily a function of injection drug use and unprotected sex. However, the response by the government can be considered to be behind the times, demonstrating how fiscal conservatism influences response. The experience in Tajikistan, Uzbekistan and Kyrgyzstan are carefully contrasted by Wolfe and colleagues. They demonstrate how lack of financial resources can be overcome by sectors of society outside of the government, and that an active response may be in part claimed as preventing the further development of this epidemic. Finally, Schottenfeld and Mokri carefully describe the recent epidemic of HIV in Iran, which is primarily associated with IDU. In a similar fashion as in Malaysia, the conservative government of Iran embraced the principals of harm reduction, which allowed for a compassionate response to the HIV prevention needs of IDUs. This experience is exceptionally limited in the world.

Finally, we end with a review of country responses to HIV epidemics in Latin American and the Caribbean. Konda, Caceres and Coates consider the evidence from Peru, which is a largely MSM epidemic. They describe the central role that bisexuality plays in this epidemic, and how advocacy and civil society played an important role in prodding a hesitant government (and religious institutions) to respond. This is contrasted with the situation in Brazil, where Bastos and colleagues address the key role of activism and advocacy taking the country

down a very different path—one where universal treatment was the goal in a society where HIV was affecting many segments of society. Rather than breaking patent laws, as is often asserted, Brazil worked to convince pharmaceutical manufacturers to lower costs to an affordable level. In the Dominican Republic, Kerrigan, Barrington and Moreno Montalvo describe the important epidemiologic factors underlying this island nation's epidemiology and its response to sex work. In a situation of extreme poverty, high-end international resorts, and low levels of education and knowledge about HIV, the epidemic took off—yet, it never reached the situation seen in Southern Africa. Finally, Koenig and colleagues describe their experiences with HIV in Haiti, describing the initial unveiling of the epidemic seen and reported by Pape and Farmer, the impact of the rapidly escalating epidemic of tuberculosis and the sheer will to provide access to treatment for the scores of patients with AIDS. Much has been learned about the approaches taken by educators and providers of HIV care in Haiti which has been replicated throughout the world.

We close this volume with a review of the experiences that low and middle income countries have had in responding to the AIDS epidemic. We consider the features that lead to a progressive, proactive response to HIV, and the necessary components of a successful program. We also highlight the immense gaps that remain if we are truly to have an important impact on further slowing this greatest of viral epidemics. It is certainly within our grasp, and the necessary elements exist; what has held us back as a global community are the many challenges raised by an epidemic spread through human sexual and drug using behaviors, affecting countries with limited public health systems, and by the very tenacious and difficult nature of our enemy—the HIV virus. Despite these challenges, the public health response to HIV/AIDS has been remarkable—and the authors you are about to read have all played significant roles in that response. HIV/AIDS is an unfolding story, and one that will likely be with us for decades to come at best, but it is also of story of remarkable scientific and human achievement.

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# Chapter 2

# HIV Prevention Needs: Primary Prevention and Prevention for People Living with HIV/AIDS

Nalini Tarakeshwar, Seth C. Kalichman, Leickness C. Simbayi, and Kathleen J. Sikkema

## Introduction

Chapter one of this volume provides an overview of the global scenario of HIV and AIDS. Available data suggests that the number of HIV infections has varied globally since 2000, with HIV rates in some countries such as Kenya and Malawi declining, while other countries such as Uganda and Thailand report setbacks in their previously declining rates of HIV infection. Moreover, HIV/AIDS seems to be gaining further ground in Russia and the most populous regions of the world including India and China. For a sustainable response to the epidemic, both prevention and treatment services need to be brought to scale simultaneously. Although 700,000 people began antiretroviral (ARV) treatment in 2006, around four million people became infected with HIV. As Kevin De Cock, the World Health Organization's (WHO) HIV/AIDS Director emphasized, "We cannot treat our way out of this epidemic. For every case going into treatment, six more are going to the back of the line." (Alcorn, 2007) This chapter provides a broad overview of primary prevention for at-risk populations and prevention interventions targeted to people living with HIV/AIDS.

## HIV Primary Prevention Targeted to Populations At-Risk

While many primary prevention approaches were first tested in the US where the diagnosis of AIDS was first publicly made known, more recently testing of these approaches has occurred in the low resource settings of Africa and



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_2, 

Asia. Importantly, even if a prevention approach is found effective in Kenya, it does not assure success in other African countries. However, it does suggest that the approach may be culturally transportable. Here, we have organized the description of the primary prevention programs according to their known effectiveness in resource limited settings.

## HIV Primary Prevention Approaches Found Effective in Resource Limited Settings

### *Voluntary, Counseling and Testing (VCT)*

Usually integrated within a hospital or a community clinic that provides HIV care, VCT enables interested individuals to learn their HIV status, learn more about HIV, and potentially gain access to HIV care and treatment, if available. In Kenya and Tanzania, VCT has been shown to decrease unprotected sex between tested couples and with non-primary partners (Sweat et al., 2000). With the advent of low cost combination antiretroviral (ARV) therapies in developing countries, VCT has been expanding as a prevention strategy in these settings. In Uganda, home-based prevention counseling and partner VCT was integrated with an ARV therapy program (Bunnell et al., 2006) to produce decreased sexual risk behavior among a cohort of HIV positive persons, thereby lowering risk of transmission to uninfected partners. VCT is being adopted widely in India as well (Dandona et al., 2005) in order to reach rural populations, including pregnant women (Rogers et al., 2006). Prevention of mother-to-child transmission (PMTCT) at HIV clinics is now being merged with VCT centers to provide an integrated system of counseling, testing, and treatment. However, stigma, poor health care infrastructure and limited access to health services necessitate modification of prevention approaches across different settings. Finally, independent of HIV testing, risk reduction counseling in sexual health clinic settings has shown promising effects in South Africa (Kalichman et al., 2007b; Simbayi et al., 2004).

### *Promotion of Condom Use*

As a primary prevention strategy, a core target group for condom promotion is commercial sex workers. The highly acclaimed 100% Condom Use Programme was initiated in 1989 in Thailand to target brothel owners, sex workers, and their clients to achieve 100% condom use in commercial sex. The principle of "No Condom, No Sex" for penetrative sex services was propagated through mass media and workplace programs while free condoms were made available in sex establishments. Condom use rates in sex work increased substantially, from 14% in early 1989 to over 90% in 1992 (Rojanapithayakorn & Hanenberg, 1996). While attempts have been made to replicate the Programme in other countries (Rojanapithayakorn, 2006), it remains to be seen whether and how these facility-based programs can be replicated for sex workers who are less organized, such as street-based sex workers or those who carry out their work in secret.

Couples where one of the partners is involved in a high-risk behavior are another group targeted for condom promotion. In many countries married women are at risk for HIV infection due to higher frequency of intercourse, lower rates of condom use, and the greater sexual risk behavior of their husbands (Clark,

2004). Couples' counseling that is integrated with VCT activities is reportedly effective in promoting condom use. In the VCT Efficacy Study (2000) in Kenya, Tanzania, and Trinidad, 586 couples (serodiscordant, seroconcordant, and HIV-unaffected couples) were randomly assigned to (a) a couple-based VCT emphasizing condom use or (b) a health information education intervention. Couples in the VCT arm of the trial significantly reduced unprotected sexual intercourse with their primary partner, when compared to those given health education. The HIV-risk among serodiscordant couples may vary across settings, however. A study by Mehendale et al. (2006) among a cohort of 412 such couples in Pune, India indicated that at 12 month follow-up, the HIV incidence among uninfected partners was 1.22 per 100 person-years (95% CI 0.45–2.66), which is much lower than rates reported in Africa. During the study, the couples were provided with routine pre and post-HIV test counseling, risk reduction counseling including condom use and provided with condoms. At the time of this writing, a community level trial of community-based VCT was being tested in South Africa, Zimbabwe, Tanzania, and Thailand. Project Accept is a community based VCT randomized trial in 32 communities in South Africa, Tanzania, and Zimbabwe and 14 communities in Thailand (Bertozzi et al., 2006). The community-level intervention is intended to remove barriers to VCT and make VCT routine and available, to engage the community through outreach, and to provide post test support. This trial has HIV incidence as its endpoint.

***Peer-Based Programs***

Based on Roger's diffusion of innovative theory (Rogers, 1983), peer approaches can use influential members of a community to disseminate information related to HIV and AIDS within community settings. Supported by evidence from the U.S. where diffusion-based interventions have resulted in greater condom use and lower unprotected sexual intercourse (Centers for Disease Control [CDC] AIDS Community Demonstration Projects Research Group, 1999; Sikkema et al., 2005), peer-based prevention has been applied outside the U.S. Recently, a two-arm randomized, controlled intervention trial of a peer-based diffusion of innovations approach was implemented among social networks of young men who have sex with men (MSM) in St. Petersburg, Russia and Sofia, Bulgaria (Amirkhanian et al., 2005). Of the 52 MSM social networks in these two sites, 25 participated in the peer-led intervention. At the 3-month follow up, experimental network members reporting unprotected intercourse (UI) declined from 71.8 to 48.4% and the percentage of those engaged in UI with multiple partners reduced from 31.5 to 12.9%. After 12 months, participants who had multiple recent sexual partners significantly reduced frequencies of UI and UAI. Little change was found in the control group networks. Kelly et al. (2006) reported similar findings with networks of Roma men in Bulgaria.

Another well-known endeavor is the Sonagachi project in Kolkata, India that targeted sex workers in this city's largest red-light district of Sonagachi. As the initial activity, influential sex workers are selected as leaders to diffuse messages of empowerment and advocacy. A randomized controlled trial of this model among 100 sex workers each in two urban communities showed that overall condom use increased significantly among sex workers in the intervention community (39%) compared with those in the control community (11%). In addition, proportion of sex workers reporting consistent condom use

increased by 25% in the intervention community compared to a 16% decrease in the control community (Basu et al., 2004).

The NIMH Collaborative HIV/STD Prevention Trial is testing the adaptation of the Popular Opinion Leader (POL) (Kelly et al., 1997; Sikkema et al., 2000) to multiple cultures and populations in China, India, Peru, Russia and Zimbabwe (Van Griensven & Kalichman, 2007). This intervention uses community identified peer leaders to serve as agents for change in their community. The community intervention's test of efficacy will include both behavioral and biological outcomes indices, with the goal of developing a prototype for technology transfer. In addition, global dissemination of the POL model was evaluated in a trial of distance communication transfer, with two-thirds of NGOs who received the experimental intervention of interactive distance learning computer training and individualized distance consultation adopting the intervention in their communities (Kelly et al., 2004). Most of the NGOs did not adopt the intervention with fidelity and use of core elements was selective. Unfortunately, minimal attention has focused on the implementation of community intervention approaches in practice, with little to no data available regarding its effectiveness on community members' risk behavior.

***STI Screening and Treatment***

Untreated sexually transmitted infections (STIs) and genital tract infections increase the risk for HIV transmission several-fold. Sex workers, clients, and their partners are usually a target group for HIV/STI prevention as they report higher rates of genital ulcerations and HIV (Van de Perre et al., 1985). Studies have found that STI treatment decreases both HIV and STI incidence (Ghys et al., 2002; Laga et al., 1994). In a study by Grosskurth et al. (1995) in Tanzania, the HIV risk ratio for adults in the community that was randomized to improved syndromic STI management was 0.58 ($p = 0.007$). Thailand's 100% Condom Use Programme discussed above had an STI service component for sex workers and resulted in a significant decrease in annual incidence of STIs, from 400,000 cases per year before the Programme to less than 15,000 cases per year since 2000 (Rojanapithayakorn & Hanenberg, 1996). However, there are reports of other large scale STI programs that have not produced a significant decrease in HIV transmission (Wawer et al., 1999). It is suggested that STI control programs may be most effective when initiated early in the course of the country's HIV epidemic and when sexual risk behaviors are high (Orroth et al., 2003).

***Multilevel HIV Prevention Interventions and Programs Taken to Scale***

Although the potential value of multilevel HIV prevention interventions is recognized (Zaric & Brandeau, 2007), there are few multilevel interventions for HIV prevention tested in developing countries. As discussed above, Thailand's 100% Condom Use Programme (Rojanapithayakorn &Hanenberg, 1996) and Uganda's social marketing for HIV prevention programs (Slutkin et al., 2006) offer examples of national efforts to scale up multilevel HIV prevention interventions. In a more recent example, Morisky et al. (2006) tested a multi-level HIV prevention intervention for female sex workers and sex work establishments in the Philippines. The study tested the effects of structural and social influence interventions on reducing STI and HIV risk behavior and included four conditions: manager influence, peer influence, combined manager-peer

influence, and control. Intervention effects were assessed at the establishment level in multilevel models because of statistical dependencies among women employed within the same establishments. Multilevel intervention groups demonstrated greater condom use, more HIV/AIDS knowledge, and less negative condom attitudes. Participants in the combination condition also reported more positive condom attitudes, more establishment policies favoring condom use, and fewer STIs. Participants exposed to the manager-only intervention reported fewer STIs, lower condom attitudes, less knowledge, and higher perceived risk than peer-intervention only participants. The findings therefore suggest that multilevel interventions may reduce risks for sex workers in developing countries.

There are also relatively few examples of coordinated multilevel programs taken to scale in developing countries. One example of such a program is South Africa's LoveLife program. LoveLife is a large scale coordinated media and social influence intervention that includes billboards, radio and television public service messages, community programs, and school-based life skills programs. The effort was launched in 1999 and is visible throughout urban and rural areas of South Africa. LoveLife represents a rare example of a multi-tiered HIV prevention campaign developed on a national scale. A range of methods were planned to evaluate the program including national household surveys and program monitoring. To date, the evaluation effort has encountered several significant challenges, and there remains limited data on the program's effectiveness (Pettifor et al., 2005, 2007).

## HIV Primary Prevention Approaches with Limited Effectiveness Data in Resource Limited Settings

### *HIV prevention for Substance Using Populations*

Alcohol use has long been identified as a determinant of risky sexual behavior. While alcohol use is declining in developed countries, it is rising in many resource-poor countries (Kalichman et al., 2007c; Saxena, 1997). Typically, alcohol prevention programs occur within a specific setting, such as bath houses or wine shops (Latkin & Knowlton, 2005; Sivaram et al., 2004) where the likelihood of alcohol use and sexual risk taking could be high or the programs may be directed towards individuals at risk of alcohol consumption, such as those in alcohol rehabilitation programs or youth in schools (Karnell et al., 2006). Given that unsafe sex in a given situation is not just related to alcohol consumption, reducing alcohol use may not eliminate the high risk behavior once it has been established. For instance, personality traits such as sensation-seeking have been shown to be related to alcohol use in sexual contexts (Kalichman et al., 2006).

Injection drug users (IDUs) are at high risk for HIV infection/transmission due to sharing of unclean needles. Further, those who are "heavy drinkers" are also more likely to share needles (Latkin & Knowlton., 2005). The harm reduction approach for IDUs, which uses a combination of needle exchange programs (NEPs; needles/syringes are distributed or exchanged), access to drug treatment and substitution and provision of counseling and condoms, has been implemented very successfully in Brazil. In the developed countries, NEPs in particular have been found to be effective in reducing needle sharing behaviors, drug treatment counseling and condoms. In most developing countries,

especially South Asia, IDUs have not been prioritized in HIV prevention efforts (Kawichai et al., 2006; Panda & Sharma, 2006). Nevertheless, preliminary evidence suggests that NEPs in developing countries also reduce drug risk behavior and HIV infection. Apart from NEPs, methadone maintenance or other drug substitution (if permitted by law) and behavioral change interventions are also used in HIV prevention for IDUs. A recent meta-analysis of 39 randomized-controlled trials of behavioral interventions reported that such interventions facilitate condom use, promote entry into drug treatment, and reduce IDU and non-IDU drug use and sex trading (Copenhaver et al., 2006).

***HIV Prevention for Men who have Sex with Men***

A recent meta-analytic review of behavioral interventions for MSM across the globe (Herbst et al., 2005) suggests that these interventions reduce the rates of unprotected anal intercourse, decrease number of sexual partners, and increase condom use during anal sex; their effect on biological outcomes, such as STD or HIV incidence is less clear. Nonetheless, MSM have been marginalized in HIV prevention activities in most developing countries (with the exception of Brazil). Due to the stigma of homosexuality in many African and Asian societies, most of these men are also married. In India, the existence of many gender identities and sexual partnerships and their fluidity makes it difficult to apply the western constructs of homosexuality and heterosexuality (Asthana & Oostvogels, 2001). Furthermore, a recent study with 2,388 Indian men attending STI clinics (Hernandez et al., 2006) found that while all men reported sex with women, 11% reported sex with three genders (women, men, and male-to-female transgender). Importantly, efforts are being made by researchers and policy makers across the globe to gather evidence and document the vulnerability of this group to HIV infection, so that interventions can be put in place.

***School-based Sex Education***

A review of 22 school-based sex and HIV education programs in developing countries by Kirby et al (2006) reported that most programs reduced risky sexual behaviors (measured as delaying sex, reducing frequency of sex, decreasing number of sexual partners, increasing condom use, and decreasing unprotected sexual intercourse). However, only 13 of the 22 programs were rated by the authors as meeting rigorous methodological standards. They recommend more widespread implementation and rigorous evaluations of these programs. Studies of programs that promote abstinence indicate that although these may delay the onset of sexual activity initially, they do not decrease the likelihood of STIs or unplanned pregnancies, and increase the likelihood of unprotected sex (Kirby, 1997).

## Future Directions for HIV Primary Prevention Research

Recent developments, especially important advances in biomedical research, provide support for optimism related to primary prevention of HIV infection. Interestingly, behavioral and social influences play a key role in the potential efficacy of most or all of these advances, underscoring the critical need to

utilize an interdisciplinary approach to HIV prevention that integrates biomedical, social and behavioral sciences.

### Bio-behavioral Intervention Approaches

A number of promising new HIV prevention approaches are being evaluated that have the potential to significantly reduce HIV transmission around the world (Bertozzi et al., 2006; Cohen, 2005; Global HIV Prevention Working Group [GHPWG], 2006). Biomedical interventions that are currently in late-stage trials include: male circumcision, microbicides, cervical barriers, herpes suppression, antiretroviral treatment (ART) to prevent sexual transmission, and HIV vaccines. However, none of these prevention methods are expected to be fully protective and thus a combination of existing approaches, including behavioral change, are needed to reduce global HIV/AIDS. And, of concern, is the potential for behavioral disinhibition, where advances or potential advances in biomedical approaches result in an increase in HIV risk behavior, undercutting or decreasing the impact of biomedical approaches tested in controlled clinical trials (Eaton & Kalichman, 2007).

Many of the current biomedical approaches being evaluated stemmed from observational studies that identified factors associated with HIV infection. For example, observational studies have documented that countries with higher rates of circumcision have lower rates of HIV infection (Weiss et al., 2000). Following the original randomized clinical trial to determine the efficacy of adult circumcision (Auvert et al., 2005), which demonstrated a more than 50% lower risk of subsequent HIV acquisition among men in South Africa, trials in Kenya and Uganda recently revealed an approximate halving of risk of HIV infection among men who were circumcised (Bailey et al., 2007; Gray et al., 2007), confirming circumcision as an efficacious method to prevent HIV acquisition among adult men.

In preparation for the implementation of circumcision as a preventive intervention, studies have documented its acceptability (Westercamp & Bailey, 2007; Ngalande et al., 2006) and cost effectiveness (Kahn et al., 2006). However, the data on behavioral disinhibition remain equivocal (Auvert et al., 2005; Agot et al., 2007; Kalichman et al., 2007a) and understudied. The behavioral impact of circumcision must be further examined, and the effectiveness of circumcision in a community setting without the influence of clinical trial methodologies determined. It remains to be seen whether circumcising men also reduces risk of transmission to women. In any event, both the WHO and UNAIDS recommend that given that male circumcision does not provide complete protection against HIV, it be considered as part of a comprehensive HIV prevention package that includes the provision of HIV testing and counseling services, treatment for STI, the promotion of safer sex practices, and the provision of male and female condoms and promotion of their correct and consistent use (WHO, 2007).

Data also suggest that herpes simplex virus type 2 (HSV-2) infection, which causes genital ulcers, increases the risk of HIV acquisition and transmission. HIV negative individuals infected with HSV-2 are considered up to three times more likely to contract HIV during sexual intercourse (Freeman et al., 2006). Ongoing research is evaluating whether treatment with acyclovir, a drug that

suppresses HSV-2, will reduce the incidence of HIV transmission (Bertozzi et al., 2006; GHPWG, 2006). It is estimated that 70% of adults in Southern Africa are infected with HSV-2 (Hogrefe et al., 2002), many of whom are women. If effective, acyclovir treatment of HSV-2 could have a significant impact on the HIV/AIDS epidemic. Within the framework of drug treatment as a preventive approach, trials are underway to determine whether daily pre-exposure of ARVs, which are used in the treatment of HIV disease, can also prevent HIV transmission.

Two other prevention approaches, microbicides and cervical barrier methods, may provide women with female controlled methods, which are needed for women who are negatively impacted by social or economic power imbalances. Since most infections in the female genital tract are thought to occur within the cervix or endocervix (Moench et al., 2001) and cervical barriers (e.g., diaphragms) cover the cervix, use of such barriers could reduce HIV risk among women. In addition, numerous microbicide candidates are in the research pipeline (GHPWG, 2006), with extensive research conducted to date regarding interest and acceptability of using microbicides. Lastly, an HIV vaccine is considered the long-term hope in the prevention approaches currently under development. Since vaccine development has faced numerous scientific challenges and remains within early stages of development it is unknown if or when HIV prevention vaccine will be available.

### Areas of HIV Prevention with Limited Research Currently Available

Several areas of significance for the prevention of HIV/AIDS have gone understudied and need further research. Evaluating structural or policy interventions, conducted at the population level, which address gender inequality, focus on education, housing, nutritional resources, and economic opportunities such as microfinance, access to credit and property rights is essential. A recent study showed that a structural intervention that combined microfinance and gender and HIV training reduced intimate partner violence among participating women in southern Africa (Pronyk et al., 2006). A greater understanding of the gendered dynamics of the epidemic is also needed, including new prevention strategies focused on men, especially those in high prevalence areas where women are disempowered. Reproductive health, including contraception and family planning services, should also be studied as a method of HIV prevention (Cates, 2006).

In regard to substance use and HIV risk, within the framework of drug treatment as HIV prevention, strong evidence has demonstrated that two opioid agonist medications, methadone and buprenorphine, are effective in treatment dependence on opioids (Sullivan & Fiellin, 2005; Tilson et al., 2006). Opioid agonist treatments are associated with reductions in the frequency of opioid use, fewer injections and injection risk-related behaviors, and lower rates of HIV prevalence and incidence (Sullivan et al., 2005), yet such treatment is limited in international settings.

Lastly, areas of future research that have received minimal attention include the relevance of mental health (e.g., depression, traumatic stress) in HIV risk behavior across culturally diverse settings, the impact on stigma and risk behavior among HIV negative individuals in relation to increased access to

ARV in their communities, and the differential impact of various testing strategies. Apart from VCT, the strategies that are currently being debated globally are Provider Initiated Testing and Counseling where health providers initiate HIV testing as part of their care, routine opt out testing where HIV testing is routinely recommended for all patients who come into the health clinic, and universal screening that attempts to test the population comprehensively. The latter could be mandatory, routine, or it may involve door-to-door or community by community VCT. Each of these approaches can be controversial. There are human rights concerns about potential abuse of aggressive testing and the absence of trained counselors and mental health support for tested patients in low resource settings. Operational research that compares VCT directly with each of these testing approaches is necessary to guide policy.

## Prevention for Known HIV Infected Populations

As HIV has been effectively treated to the point of being considered a chronic illness in the U.S., U.K. and Western Europe, there has been an increased focus on shifting HIV prevention resources from at-risk populations to infected persons. The first research trials that tested the efficacy of HIV transmission risk reduction interventions targeted to people living with HIV/AIDS were conducted in the U.S. well into the second decade of AIDS. The delay in addressing the prevention needs of infected persons apparently stemmed from multiple factors including early emphasis on vulnerable at-risk populations, denial of continued transmission risks among people who know that they are HIV infected, fear of negative social repercussions against already stigmatized people with HIV in the form of "blaming the victim", and HIV/AIDS having high mortality in a context of few effective treatments. With the advent of effective combination ARV therapies, everything in AIDS changed, including the willingness of researchers, program implementers, and policy makers to address sexual and drug use practices among people who know they are HIV positive. The first generation of prevention interventions for people living with HIV/AIDS were grounded in Social Cognitive Theory (Bandura, 1997) and were based on the same principles of behavior change as interventions that were targeted to at-risk populations.

Findings from two independent meta-analyses summarizing the overall effects of 15 clinical trials have demonstrated significant reductions in HIV transmission risks among infected persons (Crepaz et al., 2006; Johnson et al., 2006). In fact, all but one of the intervention trials indicated significant risk reduction. Crepaz et al. (2006) found that risk reduction was demonstrated in interventions delivered in small group formats as well as individual counseling. Interventions with skills building components were more efficacious than those which introduced explicitly trained new skills. Interventions that articulated a specific theoretical basis were also more effective than those that were not grounded in theory. Interventions that were longer in duration were more efficacious than briefer interventions, although interventions that were based on ongoing service activities were not as effective. Johnson et al. (2006) reported similar patterns in their findings. While Crepaz et al. (2006) examined the follow-up point that was furthest from the intervention and Johnson et al.

(2006) analyzed the follow-up that was most proximal to the intervention, the two reviews together provide strong support for both the short-term and longer-term efficacy of prevention interventions on people living with HIV/AIDS.

There are several advantages to targeting HIV prevention interventions to people living with HIV infection. Individuals who are known HIV positive are at definite risk for HIV transmission when they engage in unprotected intercourse with an uninfected partner. Unlike prevention approaches that target populations at-risk, which require reaching large numbers of individuals, reducing HIV transmission risk behaviors among a small number of people with known HIV infection can avert entire subepidemics. For example, Kalichman et al. (2001b) showed that a small group risk-reduction intervention for men and women living with HIV/AIDS resulted in lower HIV transmission rates from male participants to male and female uninfected partners compared to the control condition. Specifically, among HIV positive men with uninfected male sex partners in the risk reduction intervention group, the rate of HIV transmission at the 6 month follow-up was one fifth that of men in the control group. This translation of experimental effect size to a public health benefit likely generalizes to other HIV prevention interventions targeting infected populations. Further mathematical modeling supports the population level impact of risk reduction among infected persons, where disclosing HIV status to sex partners by infected persons can reduce the risk of HIV transmission by as much as 40% (Galletly & Pinkerton, 2006). Targeting HIV prevention to infected persons can therefore be effective and cost-effective.

Another potential advantage of targeting HIV prevention to infected populations is the ability to integrate HIV prevention with HIV treatment and care. HIV infected persons who receive ARV therapy have regular contact with health care providers, affording opportunities for repeated delivery of prevention services. In the U.S., a randomized trial has demonstrated the effectiveness of provider delivered messages in reducing HIV transmission risk behaviors in clinical settings (Richardson et al., 2004). Finally, targeting people living with HIV for prevention may have generalized health benefits. Several factors influence HIV risk behavior across populations, such as negative affect, lack of social support and substance use, are also related to adverse health behaviors, including treatment non-adherence. Intervening at the level of underlying causal influences of HIV transmission risk behaviors can therefore filter across to other health-related behaviors.

Studies demonstrating that at least one in three people living with HIV infection continue high risk behaviors coupled with the promise of early HIV prevention interventions targeted to people living with HIV/AIDS, has brought the U.S. Centers for Disease Control (CDC) to make risk reduction for infected populations the center piece of its HIV prevention policy (CDC, 2003). These policies have driven funding streams to support community and clinical programs implementing what the CDC has termed "Prevention for Positives" and there are now several packaged and marketed HIV prevention interventions for people living with HIV.

Unfortunately, few studies have examined HIV transmission risks among people with HIV in developing countries. However, studies have indicated that continued high risk sexual behaviors are prevalent among people living with HIV/AIDS in India (Rabori, Gupta, Pandey et al., 2005), Uganda

(Bunnell et al., 2006), and Botswana (Kalichman et al., 2007d). Although HIV prevention research with HIV infected persons in developing countries is just emerging, the challenges to conducting this research are apparent. Here we examine three significant challenges to establishing HIV prevention for infected persons in developing and transitional countries; stigmas and discrimination, unmet mental health needs, and access to treatment and care services.

### AIDS Stigmas

One of the most serious obstacles in the fight against HIV/AIDS the world over has been AIDS-related stigmas (Deacon et al., 2004; Shisana et al. 2005; Simbayi, 2002; UNAIDS, 2006a,b). HIV infection, as with other STIs, is widely perceived as the result of sexual excess and low moral character. At the time when those infected have the greatest need for support, people with HIV/AIDS who reveal their HIV status are often subjected to discrimination.

HIV stigmas are pervasive in many developing countries. For example, 26% of South Africans indicate that they would not be willing to share a meal with a person living with AIDS, 18% are unwilling to sleep in the same room with someone with AIDS, and 6% would not talk to a person they knew to have AIDS (Shisana et al., 2005). In a study of people living in a Cape Town township, individuals who had not been tested for HIV held significantly greater AIDS-related stigmas than individuals who had been tested (Kalichman & Simbayi, 2003). Individuals who were not tested were also more likely to believe that people with AIDS must have done something wrong to have AIDS and were more likely to endorse that they would rather not be friends with someone who has HIV/AIDS. Disclosure of HIV is necessary for accessing care and prevention services.

Throughout Asia, stigmas interfere with disclosure to health service providers (Yoshioka & Schustack, 2001) and can be perpetuated by social structures and policies. For example, in India, the Indian Supreme Court ruled in 1998 that a person with HIV/AIDS does not have the right to marry and start a family, events of utmost importance in Indian culture (Ekstrand et al., 2005). Pre-marital HIV testing policies and other mass screening programs can also support AIDS stigmas when they are not accompanied by enforced anti-discrimination laws.

Culturally held stigmas can become internalized for some people living with HIV and these internalized stigmas likely pose problems in coping, disclosure, and perhaps practicing safer sex (Lee et al., 2002; Parker & Aggleton, 2003). AIDS stigmas that interfere with HIV prevention and diagnosis can also create barriers to treatment and can become internalized by people living with HIV/AIDS. Internalized stigmas have only recently been examined in developing countries. One study examined the prevalence of discrimination experiences and internalized stigmas among HIV positive men and HIV positive women recruited from AIDS services in Cape Town South Africa (Simbayi et al., 2007). Anonymous surveys found that 40% of people with HIV/AIDS had experienced discrimination resulting from having HIV infection and one in five had lost a place to stay or a job because of their HIV status. More than one in three HIV positive persons indicated feeling dirty, ashamed, or guilty

because of their HIV status. Similar patterns of internalized stigma have also been observed in Swaziland (Simbayi et al., 2007).

AIDS stigmas can directly interfere with HIV prevention for people with HIV by inhibiting HIV status disclosure, particularly disclosure to sex partners. Research has shown that disclosing HIV status to sex partners is among the strongest predictors of sexual risk reduction among people who have HIV (Galletly & Pinkerton, 2006). In a study in Botswana, nearly all, 91%, of HIV positive persons who only have one sex partner indicate that they have disclosed their HIV status to that partner whereas only half of persons with more than one sex partner indicate having fully disclosed their HIV status to their partners (Kalichman et al., 2007d). In South Africa and Swaziland, more than one in three people living with HIV/AIDS indicate that there are people in their life that they conceal their HIV status from and in both countries concealing HIV from others was closely associated with internalized stigmas. In India, HIV status disclosure is also impaired by stigmas (Ekstrand et al., 2005). However, when people with HIV in India can disclose and experience a positive outcome from the disclosure, there are clear quality of life benefits (Chandra et al., 2003). HIV stigmas therefore inhibit HIV status disclosure, including disclosure to sex partners, and create a significant barrier to HIV prevention efforts targeted to people living with HIV/AIDS.

### Unmet Mental Health and Coping Needs

Although previous research has shown a strong association between HIV/AIDS and depression in Africa, much of this research predated the availability of ARV treatment. However, it appears that depression is persistent among people with HIV/AIDS even in the ARV era (Kaaya et al., 2002; Olley et al., 2004, 2005). The considerable amount of psychological distress reported by people infected with HIV is at least in part accounted for by internalized AIDS stigmas discussed above (Olley et al., 2004, 2005; Wight, 2000). Depression is also part of the expected emotional reaction to learning one is infected with HIV. Of course, depression is widely considered a predisposing risk factor for HIV infection among at-risk populations. In India, the predisposing effects of emotional distress on behavior are a recognized risk factor for HIV that carries over to infected persons (Chandra et al., 2005). In addition, research in China indicates that many people with HIV who experience depression do not seek mental health treatment because of AIDS stigmas (Jin et al., 2006). Thus, it is likely that pre-HIV depression persists and is probably exacerbated following an HIV diagnosis. The association between HIV/AIDS and depression has implications for the clinical management of AIDS and has important implications for preventing the spread of HIV.

### Access to Treatment and Care

While the rollout of ARV treatment in developing and transitional countries presents an unprecedented opportunity for prolonging the lives of people living with HIV/AIDS, treatment expansion is also linked to HIV prevention opportunities. There is a great deal of excitement, for example, about the potential for reductions in HIV transmission resulting from reduced viral load in genital secretions (Vernazza et al., 2000). Bringing HIV replication to a point

of undetectable HIV RNA in blood plasma is the hallmark of effective ARV treatment and is associated with parallel reductions of virus in semen and vaginal secretions. In Uganda, for example, where Quinn et al. (2000) observed a dose-relationship between an infected partner's blood plasma viral load and the risk of HIV transmission to their uninfected partner; more than 50% of infections occurred in couples with partners who had higher blood plasma viral loads. Unfortunately, the strongest correlation observed between blood plasma viral load and semen viral load is .67 (Gupta, et al., 1997), with most studies reporting correlations closer to .40 (Eron et al., 2000) and some studies reporting virtually no association between the two plasma compartments (Kalichman et al., 2001a; Medeiros et al., 2004). Thus, at best only 45% of the variability in genital secretion viral load can be accounted for by blood plasma viral load. It is clear that ARV regimens are not fully suppressive of HIV replication in reservoirs that harbor the virus and that non-adherence to treatment regimens and co-occurring STI/urethritis negate any reduction in genital secretion viral load that could occur with ARV treatment (Cohen, 2003; Cohen & Hosseinipour, 2005).

A belief that ART can offer protection against the spread of HIV in the U.S. and Europe has been associated with reductions in condom use (Crepaz et al., 2006). In developing counties, however, there is no evidence that access to HIV treatments increases HIV transmission risk behaviors. For example, a study conducted in Cote d'Ivoire compared HIV-related risk behavior among sexually active persons treated with ARVs and sexually active non-ARV treated respondents (Moatti et al., 2003). This study found that access to ARV treatment was not associated with an increase in HIV-related risky sexual behavior. In fact, only 18% of patients receiving treatment reported unprotected intercourse over the previous 6-months compared to 82% of patients who were not receiving treatment. Similarly, Bateganya et al. (2005) found that patients receiving ARV treatment in Uganda were more likely to have disclosed their HIV status, used condoms consistently, and received treatment for an STI than patients not receiving therapy. Additional research in Uganda has shown similar results (Bunnell et al., 2006). In a qualitative study conducted in a Cape Town township, Levy et al. (2005) found that the availability of ARV treatment has facilitated HIV prevention efforts through energizing HIV/AIDS health education efforts. The study found that HIV testing, condom use, and female condom uptake were all positively influenced by the availability of ARV treatments.

As mortality among HIV-infected men and women reduces worldwide, there is greater recognition of their reproductive health needs. Studies in the U.S. and Africa have shown that many HIV-infected women choose to have children even after learning of their infection (Chen et al., 2001; Nebie et al., 2001; Oladapo et al., 2005). Although there may be medical risks associated with pregnancy, for many women in Asia and Africa, psychosocial factors (e.g., partner and family influence, societal norms about fertility) outweigh these risks. Of course, there may also be other factors, such as stigma, parental disease status, and fear of a child being orphaned, that conflict with the desire to reproduce (Myer et al., 2005). An urgent need exists for providers with sufficient expertise to counsel and empower infected men and women to make informed and safe decisions regarding their desires for reproduction. In addition, little is known about the application of assisted reproductive technologies such as sperm

washing and intracytoplasmic sperm injection (ICSI), found to be successful in developed countries (Mencaglia et al., 2005; Sauer, 2005), to serodiscordant or seroconcordant couples in developing countries interested in having children.

Lack of treatment access and the clinical contexts within which prevention services may be delivered to infected persons can present challenges to prevention. It is unlikely that ARV treatment centers in most developing countries will be able to serve as feasible delivery points for HIV prevention services. Resource rich countries often experience difficulty in delivering HIV prevention services in clinical settings. Clinics that specialize in HIV care and treatment are busy and medically focused. In places with extreme AIDS stigma many people avoid testing for HIV, often testing only after they become ill with advanced stage illnesses. Health care providers have very limited time with their patients, making provider delivered prevention unrealistic no matter how brief the approach. Although HIV prevention-dedicated counselors could potentially be placed within treatment settings, constraints on clinic space will be quite limiting. The challenge to implementing HIV prevention in clinical care settings in developing and transitional countries remain daunting and will require careful consideration before allocating such resources.

### Future Directions for HIV Prevention with Infected Populations

There is clearly interest in scaling up HIV prevention efforts targeted to people living with HIV/AIDS in developing countries. While there are great advantages to aiming prevention strategies to people who know they are HIV infected, there are also dangers. Any efforts to target people with HIV for prevention must guard against the potential for placing the burden of prevention on the shoulders of those infected. In every country in the world the majority of HIV infected persons do not know that they are infected. Targeting HIV prevention toward those at highest-risk will surely engage unknown infected persons. Addressing the mental health and substance use treatment needs of infected persons will likely have far-reaching HIV preventive benefits. The needs for generalized HIV prevention efforts are especially critical in settings with generalized HIV epidemics. In many ways, it seems easier to allocate prevention efforts to those who are known HIV infected. The challenge we face is to destigmatize AIDS to allow for comprehensive care and prevention services to those infected while not diminishing resources directed toward prevention with at-risk populations.

## Conclusions

Understandably, the pre-existing problems related to access to health care in low resource settings exacerbates the difficulties of providing effective HIV prevention and care. The stigma tied to HIV/AIDS poses another significant stumbling block. Moreover, there is an urgent need for collaboration among researchers, policy makers, and public health administrators to develop “best practice” models of HIV prevention, identify ways to contextualize these models to “real-world” settings, and plan to scale-up these models based on evidence. As resources are not unlimited, cost-effectiveness of models also needs

to be examined (Bertozzi et al., 2006). The situation is rather hopeful as noteworthy efforts have already been made in the developed and developing world in the delivery of HIV primary prevention programs and HIV care and treatment services to those who are infected, and promising efforts are underway.

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# Chapter 3

# Future of HIV/AIDS Care in Low- and Middle- Income Countries

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## Introduction

Subsequent chapters in this book describe the great successes in bringing HIV care to hundreds of thousands in Africa, Asia, Eastern Europe, and Latin America. Antiretroviral therapy (ART) rollout has brought new hope and transformed lives in all of these regions. These accomplishments have required overcoming considerable challenges and skepticism, both of which persist. Thus continued success of ART rollout and its long-term contribution to improving health and longevity is not assured, but depends on our ability to address significant ongoing and new challenges, which include maintaining and strengthening political will, expanding international financing, improving integration of HIV care services into national health care programs, training and retaining health care workers, improving prevention efforts and diagnostic programs, and refining ART monitoring and regimen selection. Some of these issues are addressed in other chapters. In this chapter we focus on clinical challenges in expanding HIV care in low and middle-income countries.

## Background

### HIV Pathogenesis

A basic understanding of HIV pathogenesis is valuable to understand clinical aspects of HIV care. The hallmark of HIV infection is infection of CD4 lymphocytes and a slow and relentless decline in the level of CD4 cells or CD4 count. CD4 cell destruction undermines the cell-mediated immune system, of which CD4 cells are the central mediators. The mechanism of CD4 destruction remains unclear but is unlikely to be a direct result of HIV infection, as the



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_3, 

total number of cells infected at a given time is low. Rather, immune activation may induce apoptosis (programmed cell death) of CD4 cells (Alimonti et al., 2003; Espert et al., 2006). The rate of CD4 decline is highly variable and is dependent on multiple factors, including HIV clade or subtype (Laeyendecker et al., 2006), the level of plasma HIV RNA (viral load), co-infections, nutritional status, and other unidentified factors (Rodriguez et al., 2006; Sterling et al., 2001; Mellors et al., 1996). Within this wide variation, the median time, in industrialized countries, from infection to a CD4 of less than 200 cells/mm$^3$ is approximately eight years (Fauci et al., 1996).

As the CD4 count declines, infections normally controlled by cell-mediated immunity increase in frequency. Notable pathogens include *Mycobacterium tuberculosis* (TB), non-tuberculosis *Mycobacterium* species, *Pneumocystis jiroveci* pneumonia, *Cryptococcus neoformans*, cytomegalovirus (CMV) and other herpesviruses, endemic mycoses such as *Histoplasma capsulatum* and *Penicillium marneffei*, and *Streptococcus pneumoniae*. When the CD4 count drops below 200 cells/mm$^3$, the risk of infection by these organisms rises significantly. Because of the strong association between infection and immune function and the rarity of most of these pathogens among individuals with normal immunity, the infections they cause are referred to as opportunistic. Opportunistic infections (OIs) and malignancies associated with severe immunosuppression are referred to as AIDS-defining illnesses or AIDS indicator conditions. They typically occur when the CD4 count is less than 200 cells/mm$^3$, and are used for clinical staging of HIV disease (Bartlett & Gallant, 2007).

The HIV lifecycle begins with viral entry into a CD4 cell via interactions between the viral surface proteins, gp120 and gp41, and cell surface receptors, which include the CD4 receptor and one of two chemokine coreceptors, CCR5 and CXCR4. After entry, HIV nucleic acid, in the form of RNA, is transcribed into a double strand of DNA by the HIV reverse transcriptase enzyme. After transcription, HIV DNA complexes with the HIV integrase enzyme and other host and viral factors and is transported into the nucleus, where the pro-viral DNA is integrated into the host genome. Host transcriptional and translational machinery produces HIV transcripts and proteins. However, for packaging into a mature infectious virus, cleavage of HIV structural proteins must occur, a function fulfilled by the HIV protease enzyme. ART agents have been developed that target most of these stages in the viral lifecycle. Agents currently available in low and middle-income countries target either the HIV reverse transcriptase (nucleoside reverse transcriptase inhibitors [NRTIs] and non-nucleoside reverse transcriptase inhibitors [NNRTIs]) or the HIV protease (protease inhibitors [PIs]) (Hanna & Hirsch, 2005).

## HIV Care in Industrialized Countries

The goal of ART in industrialized countries is maximal suppression and prevention of HIV replication, resulting in improved immune function, prevention of HIV-associated morbidity and mortality, and a high quality of life (DHHS Panel, 2006). Today, life expectancy of adherent HIV-infected individuals with access to ART and expert care is getting closer to that of HIV-uninfected individuals (Walensky et al., 2006; Lewden et al., 2007; Lohse et al., 2007). However, achieving a near normal lifespan has required the availability of simple,

convenient, well-tolerated ART regimens with minimum long-term toxicity, as well as the availability of intensive laboratory monitoring. In addition, it has required the availability of multiple drug combinations with little or no cross-resistance, so that patients have treatment options in the event of failure and resistance. In industrialized countries, it is now possible to treat HIV infection with a once-daily regimen consisting of a single coformulated tablet that contains three antiretroviral agents, tenofovir, emtricitabine, and efavirenz (Hammer et al., 2006), and there are several other simple, once-daily regimens available as well. Other simple regimens with limited or no cross-resistance are available if resistance emerges on the initial regimen, although treatment failure is now uncommon in adherent patients. Even patients who have failed multiple regimens now have excellent treatment options because of the continued introduction of new agents with unique resistance patterns or novel mechanisms of action. Sustained suppression of HIV replication is now an achievable goal for most HIV-infected patients in the developed world.

### HIV Care Goals in Low- and Middle-Income Countries

HIV care in low- or middle-income settings has been expanded using a public health oriented rollout of ART geared to reaching many people quickly (Chapter 28). Although great success has been made (Calmy et al., 2006; Stringer et al., 2006; Ferradini et al., 2006; Braitstein et al., 2006), few HIV care programs have formulated clearly articulated programmatic goals or evidence-based strategies for ART monitoring and management. Understanding the specific goal of an HIV care program helps to determine the best approaches to care and monitoring to achieve that goal.

## HIV Care to Reduce Transmission

### Education and Risk Reduction Among HIV-Infected

Among those not infected with HIV, current evidence suggests that HIV testing programs (e.g. voluntary counseling and testing [VCT]) do not sufficiently change behavior or reduce risk of contracting infection (Sherr et al., 2007). In contrast, among HIV-infected individuals, research from industrialized countries suggests that awareness of being HIV-infected does reduce the risk of infecting others (Marks et al., 2006). Thus, an important component of HIV care is education and counseling of HIV-infected individuals regarding risk of transmission and risk reduction. While a simple concept on an individual level, further evaluation of the impact of education and specific counseling techniques on sexual behavior and risk of transmission is needed.

### Treatment with ART to Reduce Transmission

Full suppression of viral replication is thought to reduce the infectiousness of an HIV-infected individual. This is supported by data demonstrating that ART reduces perinatal HIV transmission (Connor et al., 1994) and by the observation that lower plasma HIV RNA levels are associated with lower transmission risk (Quinn et al., 2000). Whether ART can be effective at reducing sexual

transmission of HIV is specifically being evaluated in an ongoing study (HPTN 052; www.hptn.org). However, in resource-limited countries, only those with advanced HIV infection and significant immune dysfunction are currently being treated with ART. Thus the majority of infected individuals have uncontrolled viremia and can transmit HIV to others. As a result, the role of ART in controlling the spread of HIV is minimal.

Another approach for prevention with ART is to treat patients with primary HIV infection (within the first three months). Such patients tend to have very high viral loads, and it is estimated that as much as one-third of transmission occurs during the first months of infection (Pilcher et al., 2004; Wawer et al., 2005). However, this approach is limited by the logistical complexity of identifying individuals within days or weeks of infection and immediately initiating ART. Diagnosis is also dependent on the use of polymerase chain reaction (PCR) assays, which directly detect and quantitate HIV in plasma. However, these are expensive and not readily available in low and middle-income settings.

### Prevention of Mother-to-Child Transmission (PMTCT)

The greatest prevention success has been achieved by administering ART for prevention of mother-to-child transmission (PMTCT) during and after childbirth. The effectiveness of using ART for PMTCT has been recognized since 1994 (Connor et al., 1994). The use of rapid HIV tests and single-dose nevirapine during labor significantly reduces the risk of HIV transmission, even when a woman's first contact with health care is after the onset of labor. Despite the simplicity of this intervention, uptake is low, ranging from 20% to 95% for testing, and much lower for use of combination ART (Kebaabetswe, 2007; Creek et al., 2007; Manzi et al., 2005; Perez et al., 2004; Temmerman et al., 2003). Barriers to implementing PMTCT include fear of HIV diagnosis and its accompanying stigma, the need to notify sexual partner in some settings when agreeing to be tested, loss to follow-up, inadequate care providers, lack of prenatal care, and weak healthcare infrastructure (Kebaabetswe, 2007). A concern specific to nevirapine-based PMTCT that has slowed incorporation into health programs in some areas is the risk of generating nevirapine-resistant HIV in both mother and infant by giving nevirapine without other ART agents. The long term clinical implications of single-dose nevirapine PMTCT for both mother and infant are unclear (Lockman et al., 2007), and this issue continues to be a subject of considerable study and debate.

Following delivery, uninfected infants remain at risk for HIV infection via breast feeding. In industrialized countries, HIV-infected mothers are instructed to use formula feeding, eliminating the risk from breast milk transmission. In low- and middle-income countries cost, supply chains, lack of safe drinking water to mix formula, and cultural barriers have lead to disappointing results with formula feeding. Current studies suggest that a strategy of exclusive breastfeeding for the first 6 months of life has a lower risk of transmission than the combination of breast milk and other foods (Coovadia et al., 2007; Coovadia, 2004). Continued use of ART by the mother following delivery and through-out breast feeding is the most efficacious way to prevent HIV transmission after delivery (Arendt et al., 2007). However the optimal operational strategy for

minimizing mother to child transmission following delivery still needs to be determined.

## Medical Care of HIV Infection

### Identifying People in Need of HIV Care

A major obstacle to providing care to HIV-infected individuals is the failure to diagnose HIV infection. Only 10% of adults in Africa have been tested for HIV, leaving most HIV-infected individuals undiagnosed. Because most testing occurs in health care settings, individuals with symptoms suggestive of HIV disease are more likely to be tested. As a consequence, the fraction of HIV-infected individuals tested is greater than the fraction of the total population tested. Nevertheless, only a small fraction of HIV-infected individuals have been identified (an estimated 20% in Africa). As a result there are 20 million HIV-infected individuals living in Africa who are unaware that they are infected (WHO, 2007). For undiagnosed individuals the best HIV care systems provide no benefit. Those who do know their HIV status often learn of it during an episode of severe and potentially life-threatening illness. Late diagnosis is reflected in both the high HIV-related mortality in many low and middle-income countries and the low median CD4 count at ART initiation (Braitstein et al., 2006; DART, 2006; Ferradini et al., 2006; Spacek et al., 2006b). There are multiple reasons for low uptake of testing, including lack of perception of risk, fear of diagnosis and the accompanying stigma, limited access to testing centers, and limited access to care (Shisana et al., 2005; Fabiani et al., 2007; Matovu et al., 2005; Day et al., 2003).

New strategies are needed to assure diagnosis of a much larger proportion of HIV-infected individuals. The standard approach used in much of the world is the use of VCT units that provide all diagnosis of HIV for clinic patients, hospitalized patients, obstetric patients, and anyone else interested in being tested. While this system has the strength of potentially engendering self-efficacy through counseling, low uptake leads to failure to bring about testing for the majority of those infected. As a result, other options are being advocated, such as opt-out testing (HIV testing offered to all patients in health care settings and performed unless specifically declined), universal household VCT, and universal mandatory testing. Standard opt-out testing, which is being piloted in several countries, offers voluntary HIV testing to all patients in healthcare settings. Healthcare based opt-out testing has been shown to markedly increase the number of ill patients receiving HIV diagnoses and referrals into HIV care programs. (Nakanjako et al., 2006) but is limited in that it is dependent on patients developing medical problems that bring them into the healthcare setting. An approach that avoids the need for acute medical needs is universal household VCT. A program of universal household testing was launched in Lesotho in 2005 with the ambitious plan of offering testing to everyone over the age of 12 years. Another approach is to require testing for school entrance and for obtaining government documents and licenses. Such an approach, although it would expand HIV testing to healthy individuals, is not being advocated here

because of its involuntary nature (Venter, 2007). An approach more compatible with individual autonomy and privacy is voluntary opt-out testing beyond healthcare settings (schools, workplace, etc.) to increase testing of individuals without a need to interface with healthcare systems.

Certain populations have profited less from the global ART scale-up than others. For example, children have recently been highlighted as a priority by the WHO because ART-eligible children are less likely to be reached by care programs than adults. Rural inhabitants of impoverished countries are another group whose needs are not being met. For many reasons, it is more difficult to provide effective care in rural settings, but novel programs are developing successful strategies, such as home visits by mobile healthcare workers or mobile clinics that visit local villages at regular intervals. Since many of the neediest patients in impoverished countries live in rural areas, improving rural care programs must be a priority.

## Introduction to Antiretroviral Therapy

The goal of care once HIV has been diagnosed is to maintain or restore normal health and function and to reduce the risk of transmission to others. This requires addressing both the medical and social or psychological needs of infected individuals. From a medical perspective, a major transition occurs when the CD4 declines to a level at which the patient is at risk of HIV-related illness. Individuals with high CD4 counts ($>$350 cell/mm$^3$) have modestly increased risk for some diseases, such as tuberculosis (TB), herpes simplex and zoster, and possibly bacterial pneumonia, but overall risks for infectious and most non-infectious diseases are similar to those in the non-infected population (Stein et al., 2007). Thus a threshold of 350 CD4 cells/mm$^3$ is used as part of the ART initiation guidelines in many industrialized countries (Hammer et al., 2006).

When the CD4 count falls below 200 cells/mm$^3$, the risk of OIs increases dramatically, and the use of antimicrobial agents for primarily prophylaxis against OIs improves survival. The WHO and many national guidelines have used a CD4 count of less than 200 cells/mm$^3$ or the presence of AIDS-defining illnesses usually only seen at CD4 counts less than 200 cells/mm$^3$ as criteria for HAART initiation (WHO, 2006b). The lower CD4 count was selected mostly to conserve resources while providing ART to those individuals most likely to benefit in the short term. However, TB and bacterial infections are leading causes of mortality in low and middle-income countries and often occur at CD4 counts above 200 cells/mm$^3$ (Danel et al., 2006b). In addition, initiating ART at lower CD4 counts increases the risk of immune reconstitution reactions (see below). Earlier initiation of ART may reduce morbidity and mortality, and it may also be more cost-effective (Badri et al., 2006a).

Industrialized country guidelines also recommend frequent monitoring of response to ART, measuring viral load and testing for resistance to ARVs if the viral load does not become or remain completely suppressed. If resistant mutants are identified, another set of agents to which the virus is sensitive should be used. For reasons of cost and availability, the WHO recommends less intensive monitoring for low- and middle-income countries. The WHO HIV/AIDS Program ART recommendations are an excellent resource for current and rapidly evolving recommendations regarding details of ART (WHO, 2006b).

### Comprehensive Care Packages

Recommended care for HIV-infected individuals in industrialized countries includes provision of comprehensive services, including medical, obstetric, mental health, and social services. A similar comprehensive approach has been advocated by clinicians and researchers in low-income settings. A "basic preventive care package" that includes trimethoprim-sulfamethoxazole prophylaxis (given to prevent *Pneumocystis* and bacterial infections but also found to significantly decrease rates of malaria), safe drinking water, and insecticide-treated bednets has been studied in Uganda and shown to be beneficial (Mermin et al., 2005; Mermin et al., 2006). Other interventions that have been or are being evaluated currently include isoniazid prophylaxis (for treatment of latent TB infection), food supplementations, micronutrients and vitamin A supplementation, various vaccination strategies, and family HIV counseling and testing.

Different combinations of services may be more appropriate in different settings. In each setting, however, the overall goal is to address basic needs, endemic infections, AIDS-defining illnesses, HIV treatment, PMTCT, and testing and care of family members for HIV and TB. Basic needs may include food packets, micronutrient supplementation, and clean water. Prevention of endemic illnesses may include insecticide-treated bed nets to reduce malaria infection (Mermin et al., 2006). Prevention of AIDS-defining illnesses includes prophylaxis with trimethoprim-sulfamethoxazole and isoniazid and active case finding and management of TB disease. HIV treatment includes ART, PMTCT, and mental health services. Introducing these services requires coordination of care and integration of services that are rarely provided as a package to the general population. Determining optimum comprehensive packages, delivery systems, and methods of service integration to prevent unnecessary duplication of services with parallel programs is an extremely important area in need of further research and greater investment, as comprehensive care would transform current HIV and TB care if appropriately implemented. In the many areas where lack of access to food, transportation, or safe drinking water are major barriers to successful HIV care, comprehensive care package are essential to maximize the benefit of providing HIV services.

### Challenges of Opportunistic and Endemic Illness

Understanding opportunistic disease epidemiology in low-income countries has been hampered by limited diagnostic facilities in many areas. Much of what we know about the epidemiology and natural history of OIs comes from a few research studies that made use of diagnostic testing not generally available in low-income clinical settings (Micol et al., 2007; van Oosterhout et al., 2007; Kisenge et al., 2007). However, the most notable OI in low and middle-income countries is TB (Corbett et al., 2002). In these areas, TB is the leading cause of mortality and morbidity (Lawn et al., 2006; Badri et al., 2006b). TB accounts for 40–60% of hospitalizations for respiratory complaints and 38–47% of deaths among HIV-infected individuals in Africa (Corbett et al., 2006). This is a result of hyperendemicity, high prevalence of latent TB, late diagnosis of TB among HIV-infected individuals, and understaffed TB control programs with low rates of completion of TB treatment.

Because of the hyperendemicity of TB around the globe, effective control of tuberculosis is the single most important intervention after provision of ART that could significantly reshape the picture of HIV disease in low and middle-income countries. Unfortunately, the current tools for prevention, diagnosis, and treatment are inadequate: sputum smears from symptomatic individuals presenting to healthcare facilities lack sensitivity, and six-month therapy for TB is often delivered by understaffed national TB control programs with low rates of completion of therapy. The sputum smear is limited because it can only detect pulmonary TB and is less than 50% sensitive even for this diagnosis (Getahun et al., 2007). Furthermore, because it is time consuming to analyze the specimens and often challenging to obtain three morning sputa from consecutive days, testing is often not initiated or not fully completed. Thus, the diagnosis of TB may be delayed until the patient has advanced TB disease, which also results in greater transmission to others.

Prevention of TB reactivation can be achieved by use of isoniazid preventive therapy (Golub et al., 2007); however there are current concerns regarding the operational feasibility of scaling up implementation, potential drug toxicities, the risk of giving single-drug therapy to patients with unrecognized active TB thereby promoting the development of isoniazid-resistant TB, and the duration of the protective effect after completion of isoniazid treatment, especially in immunocompromised individuals who are repeatedly exposed (Bucher et al., 1999; Whalen et al., 1997).

Several changes could lead to earlier diagnosis and improved treatment success. The first is to increase active case finding, screening of individuals presenting to clinics and non-medical settings for TB symptoms, to identify and treat TB disease much earlier in its natural history (Wood et al., 2007; Corbett et al., 2007). Distinguishing TB from other illnesses is complex, but ongoing research seeks to describe the frequencies of different infectious complications in HIV patients, and to develop evidence-based algorithms for determining when patients have TB versus other illnesses (Mills et al., 2007)

Coupling active case finding with improved diagnosis of both active and latent TB could revolutionize HIV and TB care. New techniques for diagnosing both latent TB infection and TB disease are being investigated. For example interferon response-based assays are being tested for the diagnosis of latent infection, and a lipoarabinomannen antigen urine test shows some promise for active TB disease (Boehme et al., 2005). Techniques for assessing resistance to standard TB drugs are also advancing (Park et al., 2002).

Further adding to the complexity of treatment of TB and HIV are overlapping drug toxicities and interactions. Three of the four agents in standard TB therapy can cause liver toxicity, which is also common with ART (Nunez & Soriano, 2005). Partly because of toxicity and partly because of concerns about immune reconstitution inflammatory syndrome (IRIS, see below), ART is often deferred, typically for two months until the initial (intensive) phase of TB treatment is complete. However, delay in ART initiation may lead to further immunologic decline and poor clinical outcomes, including increased mortality (Badri et al., 2006b; Lawn et al., 2006), leading some experts to favor simultaneous initiation of ART and TB treatment or a shorter delay in ART initiation. Ongoing studies will hopefully shed light on the optimal timing of ART initiation among individuals with newly diagnosed TB and HIV.

Even more vexing is the induction of hepatic metabolism of PIs and, to a lesser extent NNRTIs, by rifampin, a critical component of standard TB therapy. As a result, PIs cannot be used, as the doses required to overcome the interactions with rifampin would be excessively toxic. Rifabutin, which is used as an alternative to rifampin in industrialized countries and which can be combined with PIs, is not available in most low and middle-income countries because of its cost. NNRTI levels are also reduced by rifampin; however good outcomes have been reported from Thailand and Africa among patients receiving TB treatment and standard doses of NNRTI-based first-line HAART (Manosuthi et al., 2006; Van Cutsem et al., 2007).

Other important OIs in addition to TB are bacterial pneumonia, bacteremia, cerebral toxoplasmosis, cryptococcal meningitis, *Pneumocystis jiroveci* pneumonia (PCP), Kaposi sarcoma (KS), and *Candida* esophagitis. Locally endemic diseases are important in certain regions, such as *Penicillium marneffei* in South East Asia and chronic hepatitis B in parts of Asia and Africa (Hoffmann et al., 2007; Sirisanthana, 2001; Hoffmann & Thio, 2007).

KS, an angioproliferative tumor caused by human herpes virus 8 (HHV-8) infection, is another important HIV-associated illness that is common in many low and middle-income countries. Tumors may be cutaneous, subcutaneous, or visceral and may lead to debilitating lymphedema, gastrointestinal bleeding or obstruction, and pulmonary disease. Mortality without ART is 90% (Holkova et al., 2001). KS is especially common in Africa, where 7–18% of individuals with AIDS have KS lesions (Parkin, 2006). KS is far less common in Asia, Eastern Europe, and Latin America. Treatment with ART can lead to reversal, especially when lesions are primarily cutaneous and small.

Immune reconstitution inflammatory syndrome (IRIS) is an exaggerated immune response to antigens from active or past infections that occurs following initiation of ART, as the HIV viral load is suppressed and CD4 increases from a low nadir (usually $<50$ cells/mm$^3$) (Hirsch et al., 2004). In some cases the presence of the underlying infection is already known at the time of ART initiation ("paradoxical worsening"), while in other cases the infection is only diagnosed (or suspected) when ART is begun and symptoms emerge or worsen on therapy ("unmasking"). High rates of endemic illness, OIs, and the low CD4 count at ART initiation in many ART rollout programs has led to high rates of IRIS in low and middle-income countries (Lawn et al., 2007), and some of the excess early mortality seen in the first 3–6 months after ART initiation is likely due to IRIS. Most troubling has been potentially fatal IRIS associated with TB and cryptococcal disease, especially meningitis, often due to the increased inflammatory response in the meninges leading to increased intracranial pressure. IRIS associated with chronic hepatitis B infection may present as acute hepatitis, but is rarely fatal.

IRIS can be difficult to diagnose, as there are no specific tests for it, and difficult to treat, because there is no clear consensus on management, although clinical trials are ongoing. A long, tapering course of systemic corticosteroids (along with continuation of ART whenever possible and continuation or initiation of specific therapy directed against the OI) can be required to suppress the pathogenic immune response to the pathogen. Because IRIS typically occurs during the first few months of ART, patients require close monitoring during this time interval. There should be a high index of suspicion for IRIS in patients

recently started on ART who present with fever, night sweats, weight loss, lymphadenopathy or lymphadenitis, soft tissue masses and/or abscesses. Because it most often occurs in people who start ART with advanced immunosuppression, avoidance of IRIS is one potential advantage of starting ART at earlier stages of disease (i.e. when patients still have CD4 counts $> 200$ cells/mm$^3$). The hope is that rates of OIs and IRIS will decline in low and middle-income countries, similar to the decline observed in industrialized countries, as ART reaches more people at earlier stages of disease (d'Arminio et al., 2005).

### Antiretroviral Therapy: First-Line Regimens

Successful role-out of ART has been achieved through a public health approach (see Chapter 4) using mid-level providers, clinical algorithms, and clearly defined sequencing of first and second-line ART regimens. The first-line regimen that paved the way for initial ART role-out was the combination of stavudine, lamivudine, and nevirapine, which is widely available in inexpensive, generic coformulations. However, the significant side effects of stavudine (lactic acidosis, atrophy of subcutaneous fat, and peripheral neuropathy) has led to a move toward other regimens (Geddes et al., 2006). Another widely used combination is zidovudine, lamivudine, plus either nevirapine or efavirenz, the latter being the preferred regimen for many PEPFAR sponsored programs. Zidovudine-based regimens are associated with less long-term toxicity than stavudine-based regimens, although zidovudine can cause anemia, lactic acidosis, and fat atrophy, and is more likely to cause early gastrointestinal distress than stavudine.

In addition to the potential for long-term toxicity, the use of stavudine and zidovudine can result in significant cross-resistance that can limit subsequent treatment options. Stavudine and zidovudine are both analogs of thymidine, a nucleic acid building block of DNA, and thus are referred to as thymidine analogs. Resistance mutations selected by stavudine and zidovudine are known as thymidine analog mutations (TAMs). TAMs cause resistance to stavudine and zidovudine as well as cross-resistance to other NRTIs, including those typically used in second-line regimens, such as didanosine, tenofovir, or abacavir. The degree of NRTI resistance and cross-resistance increases as TAMs accumulate, but since viral load testing is not typically available in resource-limited settings, it is often impossible to identify virologic failure early enough to prevent significant NRTI resistance that can compromise the effectiveness of second-line therapy (Sungkanuparph et al., 2007; Gallant, 2007).

It is now recognized that there are better options for initial therapy, specifically using NRTIs such as tenofovir, abacavir, or possibly even didanosine, which do not select for TAMs and, at least in the case of tenofovir and abacavir, are associated with less long-term toxicity. However, these drugs are more expensive than the thymidine analogs and have not been widely used for initial therapy in low and middle-income countries to date.

Transmitted resistance can undermine the effectiveness of a first-line regimen. In industrialized countries approximately 8% of individuals who are newly infected are infected with HIV with reduced susceptibility to at least one ART agent (Ross et al., 2007). There is currently little transmitted resistance in low- and middle-income countries (Derache et al., 2007); however, poorly managed ART programs with frequent interruptions in ART delivery could lead

to high levels of transmitted resistance. Resistance among ART-naïve individuals will need to be carefully monitored by sentinel national and international monitoring programs.

In addition to toxicity and resistance profiles, considerations for selecting a first-line regimen include (1) laboratory monitoring requirements, (2) cost, (3) availability, (4) ability to tolerate temperature extremes during transportation and storage, (5) tolerability and severe side effects, (6) drug-drug interactions with other commonly used medications and (7) safety during pregnancy. When taking these considerations into account, each agent and combination of agents has both advantages and disadvantages. Furthermore, experience with some agents, such as tenofovir and abacavir, is still limited in many low and middle-income countries. Thus program monitoring and clinical trials will continue to provide valuable information on side effects and effectiveness of a variety of treatment strategies.

### Antiretroviral Therapy: Second-Line Regimens

Second-line regimens are used after failure of first-line regimens with presumed resistance. Unfortunately, failure of first-line regimens is inevitable for some patients. Failure and emergence of resistance occur during periods of inadequate adherence, illness, or interruptions in drug supply. Individuals at greatest risk for resistance are those taking enough medication to partially suppress viral replication and place selective pressure on HIV, but not enough to fully suppress the viral load to undetectable levels. The precise level of adherence required to maintain suppression of HIV varies by ART regimen; however, adherence of at least 90–95% is generally accepted as a minimum requirement for most of the regimens available in low-income regions (Bangsberg et al., 2006; Bangsberg, 2006). Once resistant mutants emerge, they remain permanently archived in resting CD4 cells and can rapidly re-emerge if the same agents are restarted (Finzi et al., 1997; Haggerty et al., 2006).

Ideal second-line regimens would have little or no cross-resistance with agents used previously. Where available, protease inhibitors are typically used as the cornerstone of most second-line regimens. In patients initially treated with NNRTI-based regimens, no protease resistance would be expected. However, there is the potential for considerable cross-resistance between the NRTIs currently used in first-line regimens and those used in second-line regimens. The use of non-thymidine analog NRTIs (tenofovir, abacavir, or didanosine) for first-line therapy may help to maintain effective NRTI options for second-line regimens, as discussed above.

Second-line therapy ideally includes a PI that is pharmacologically "boosted" with a low dose of ritonavir, another PI that is poorly tolerated at full dose, but is widely used at low doses for its inhibitory effect on the metabolism of other PIs. Because of their high genetic barrier to resistance, boosted PI-based regimens may be effective even in the presence of high-level NRTI resistance, an extrapolation from studies demonstrating efficacy of lopinavir/ritonavir monotherapy in treatment naïve patients (Campo et al., 2005). However, these studies are small and inconclusive, and the strategy has not been studied in NRTI-experienced patients. The availability of drugs with novel mechanisms of action, such as integrase inhibitors and entry inhibitors,

may offer the possibility of second-line regimens that have no overlapping resistance with first-line regimens. However, these drugs, only recently approved in the developed world, are not currently available or affordable in low and middle-income settings.

### Side Effects and Toxicity

The most common serious adverse events of medications used to treat HIV and OIs are lactic acidosis, pancreatitis, anemia, neutropenia, kidney disease, peripheral neuropathy, hypersensitivity reactions, and liver injury. The risk of some of these events increases when ART is used in conjunction with TB therapy or when co-infections, such as hepatitis B, are present (Hoffmann et al., 2007). Furthermore, some agents have an increased risk of severe side effects in certain populations. For example, nevirapine-induced hepatic necrosis is considerably more common among women who start nevirapine-based ART with CD4 counts above 250 cells/mm$^3$ (Sanne et al., 2005). (This does not apply to use of single-dose nevirapine for PMTCT. Furthermore, switching to nevirapine after the CD4 count has risen above 250 cells/mm$^3$ on a non-nevirapine-containing regimen appears to be safe [Wit et al., 2007]).

Lactic acidosis and symptomatic hyperlactatemia have emerged as important complications of ART. This condition is associated primarily with stavudine; rates greater than 20 per 1000 patient-years have been reported from some African ART programs (Bolhaar & Karstaedt, 2007). Zidovudine can also cause lactic acidosis, although it occurs less frequently. Patients with lactic acidosis have a high mortality (20–40%) (Bolhaar & Karstaedt, 2007; Coghlan et al., 2001). In programs in which stavudine use is continuing, significant morbidity and mortality can be reduced by point of care lactate testing and clinical algorithms (Schutz et al., 2007). It will be important to evaluate the impact of lower-dose stavudine (30 mg twice daily) on the incidence of lactic acidosis and other stavudine-associated toxicities.

Pancreatitis is a severe and potentially fatal inflammation of the pancreas that presents with abdominal pain, nausea, and fever. Pancreatitis is most strongly associated with didanosine. The combination of didanosine and stavudine, which is no longer recommended, further increases the risk of pancreatitis.

Peripheral neuropathy can be a severe, although not fatal, toxicity associated with stavudine and didanosine. It is believed to occur as a result of mitochondrial toxicity and can progress to potentially crippling lower extremity pain if the offending agent is not stopped. Neuropathy is gradually reversible after discontinuation of therapy, provided the causative agent is stopped before it becomes severe (Bartlett & Gallant, 2007).

Concerns that zidovudine would cause even greater anemia in low and middle-income countries than in industrialized countries because of higher background rates of anemia led to the widespread use of stavudine rather than zidovudine in early ART rollout programs. Zidovudine-associated anemia usually can be managed with substitution of another agent. In rare cases it can be life threatening or requires transfusion, which is often not readily available in resource-poor settings. Clinical experience and studies evaluating anemia in ART rollout programs suggest that this toxicity has not been as much of a problem as anticipated (Hoffmann, unpublished data; Danel et al., 2006a).

Zidovudine can also cause neutropenia. Most individuals do not appear to be at higher risk of infection during neutropenic episodes and recover from neutropenia without adverse sequelae. However, because profound neutropenia can increase the risk of severe infections, optimal laboratory monitoring schedules need to be determined for individuals receiving zidovudine.

Abacavir is an NRTI with a number of advantages in developing world settings: it requires only once-daily dosing with no food restrictions, it is a component of triple-NRTI regimens that may be useful in certain clinical settings in which NNRTI or PI-based regimens are undesirable, and it is generally well-tolerated compared to other NRTIs, which have more significant long term side effects. It also does not select for TAMs, which cause cross-resistance to other NRTIs. However, abacavir is associated with the abacavir hypersensitivity reaction (ABC HSR), which presents with a febrile, flu-like illness during the initial weeks of therapy. It can be fatal, especially if a patient is "rechallenged" with abacavir after having experienced HSR. There has been concern about use of abacavir in resource-poor settings, where management of ABC HSR can be difficult, and where the symptoms can be confused with those of other common febrile illnesses, such as malaria, TB, and bacterial infections. There may also be a greater danger of serious or fatal rechallenge reactions in settings where previous ABC HSR is not well documented. However, the risk of ABC HSR may be lower in some resource-limited settings. In clinical studies conducted in industrialized countries, ABC HSR occurred among 5–9% of subjects and was strongly associated with the HLA B*5701 allele (Martin et al., 2004). Presence of this allele follows racial patterns and is present in a higher proportion of Caucasians than people of African descent (Hughes et al., 2004). Further studies are needed to better determine the geographic distribution of HLA B*5701 and the typical presentation of ABC HSR among patients in Africa, Asia, and Latin America.

Tenofovir has been found to be safe and well tolerated in high income countries (Gallant et al., 2006). However it has been associated with acute and chronic renal failure, usually in the presence of other renal disease. A different spectrum of underlying diseases that predispose to renal injury in low-income countries may change the frequency of tenofovir-associated renal dysfunction. Results from ongoing studies will hopefully clarify the renal safety of tenofovir in these settings. If tenofovir proves to be safe in initial studies in Africa and Asia, it may be an optimal agent to include in first-line regimens, given its tolerability, favorable toxicity profile, and lack of selection of TAMs.

Longer term use of ART may be associated with several metabolic toxicities. These including lipoatrophy (peripheral fat loss), lipohypertrophy (accumulation of visceral fat), hyperlipidemia, and insulin resistance (Morse & Kovacs, 2006). These complications usually occur after a longer period on ART (greater than one year) and are associated with a variety of agents. Stavudine and zidovudine are most strongly associated with lipoatrophy. Metabolic complications may be contributing to increased cardiovascular disease among HIV-infected individuals in industrialized countries (Obel et al., 2007). As ART rollout programs mature, there may be an increase in diabetes, myocardial infarction, and stroke in low and middle-income countries.

Any discussion of ART-induced side effects and toxicity must be tempered by the frequent absence of background measurements of hemoglobin,

neutrophil counts, kidney function, and liver enzymes. In many regions of ART rollout, multiple infectious and non-infectious causes of anemia, neutropenia, renal dysfunction, and hepatitis are present, and many patients likely have these conditions without ever having been diagnosed. Thus many laboratory abnormalities observed on ART may be unrelated to the drugs themselves. Background rates of some symptoms and laboratory abnormalities may be nearly as high as the rate observed during therapy for some complications such as hepatotoxicity (Hoffmann, unpublished data).

### HIV Care Monitoring

In industrialized countries, frequent monitoring of CD4 count, viral load, hemoglobin, leukocyte count, liver enzymes, and renal function is the standard of care. The absolute CD4 count is the most important criterion for initiation of ART and prophylaxis for OIs (DHHS Panel, 2006). Furthermore, continued decline of CD4 count after ART initiation can be evidence of treatment failure, suggesting problems with adherence or drug-drug interactions. Despite a concerted effort, accurate clinical and laboratory predictors of CD4 count have not been identified. The sensitivity and specificity of markers such as weight loss, OIs, hemoglobin, and total lymphocyte count are poor (Spacek et al., 2006a; Dieye et al., 2005; Mbanya et al., 2007). Large public health ART programs need improved immunologic testing to deliver on the promise of HIV care to all patients enrolled in their clinics. Fortunately, CD4 assay systems are becoming more widely available in many ART programs.

The viral load (plasma HIV RNA level) is the best measure of response to ART. A fully suppressed (undetectable) viral load is expected within several months of starting ART. Failure to fully suppress viral replication within this time frame or a rise in viral load after suppression indicates inadequate response to therapy. This may occur because of poor adherence, emergence of resistance mutations (either from poor adherence or selection of pre-existing mutants), drug interactions, or malabsorption. An elevation in viral load calls for intervention such as adherence counseling, treatment support, and/or a change in ART regimen. Unfortunately, viral load testing is far less available than CD4 monitoring in low- and middle-income ART programs. Furthermore, there are no clinical or laboratory markers that are useful surrogates for viral load. For example, the CD4 count can decline or fail to rise despite complete virologic suppression, and it can remain stable or even rise despite virologic failure (Hosseinipour et al., 2007; Basenero et al., 2007; Moore et al., 2006).

The importance of viral load monitoring is marginal for programs offering only first-line treatment, since failure to suppress HIV replication may not lead to a regimen change. Without options for second-line therapy, accumulation of high-level resistance during non-suppressive therapy is of less concern (except for the possibility of transmission of resistant virus to others). However for programs with treatment options beyond first-line, the ability to measure viral load is important in order to identify treatment failure early, before the accumulation of extensive drug resistance that may result in cross-resistance to components of second-line regimens. This is especially true in the case of thymidine analog-containing regimens, since resistance to these drugs is cumulative with continued viral replication and ultimately affects the response

to all other NRTIs. Viral load monitoring would be less imperative in patients taking regimens containing non-thymidine analog NRTIs plus NNRTIs, since the resistance patterns associated with failure of such regimens are predictable and non-progressive.

Advances in the technology of virologic monitoring, including ELISA-based tests and qualitative tests, are expected in the coming years that will increase the feasibility of routine use of HIV RNA monitoring in ART rollout programs (Ayele et al., 2007). However, studies are needed to determine how frequently to monitor viral load and how best to interpret the results. No published studies have evaluated the optimal timing of viral load monitoring, although six months is a commonly used interval in developing countries. Whether this is frequent enough to avert development of high-level resistance caused by non-suppressive therapy and to anticipate immunologic decline is unknown. Work is ongoing to define the sequence and timing of resistance evolution (Sungkanuparph et al., 2007; Marconi et al., 2007).

Where viral load assays are available and obtained at appropriate time intervals, optimal interpretation of results is unclear. In industrialized countries, any detectable viral load is an indicator of possible treatment failure and may lead to resistance testing, more intensive follow-up, and/or a change in regimen. Limited regimen choices in ART rollout programs mean that switching regimens unnecessarily may compromise long-term options. In addition, resistance testing, which helps guide decisions on regimen change in industrialized countries, is not available in ART rollout programs. (In the future, simple and less costly assays for specific resistance mutations may become available using techniques such as real time PCR [Detsika et al., 2007]). Thus other definitions of virologic failure need to be tested. For example, a single elevation of viral load above 1000 copies/mL may not predict resistance. However, two or more sequential viral loads above 1000 copies/mL may be a more valid indicator (Hoffmann et al., 2006). The WHO currently recommends a cut-off of greater than 10,000 copies/mL to define virologic failure on ART, although this would not be an acceptable threshold in industrialized countries, as patients with viral loads this high could already have developed significant drug resistance (Nettles et al., 2004; Sturmer et al., 2007). Determining the best definition of virologic failure is important to differentiate individuals who may do well with improved adherence and without a change in regimen from those who require change to second-line therapy to re-suppress viral replication.

Laboratory monitoring can also be crucial for assessing for toxicity. For example, use of point-of-care lactate monitors for symptomatic patients has reduced mortality from lactic acidosis in one ART program (Schutz et al., 2007). Other toxicities, such as neutropenia, hepatotoxicity, and renal dysfunction, may occur with minimal symptoms. For these conditions, routine laboratory monitoring can identify a problem before severe complications occur. Laboratory testing once or twice within the first 12 weeks after ART initiation and at regular intervals subsequently may be sufficient to identify problems. Anemia is a toxicity that can often be identified by symptoms and physical examination. However, routine measurement of hemoglobin may also identify a problem before severe anemia occurs. Lipids and blood sugar are routinely measured in industrialized countries where therapies are available for management of

hyperlipidemia and diabetes. Where resources are available for measurement and management, routine testing will need to be considered.

### Maintaining Successful HIV Care: Loss to Follow-Up and Adherence to Antiretroviral Therapy

The long-term success of HIV care requires life-long, ongoing contact between the HIV-infected individual and the healthcare system. Intermittent care or loss of contact with the health care system is associated with worse prognoses. Unfortunately, loss to follow-up is very common in some ART programs in both industrialized and low-income countries. Published studies report loss to follow-up among 25–60% of individuals initiating HIV care (Karcher et al., 2007; Arici et al., 2002; Nacher et al., 2006). Individual factors that increase loss to follow-up in industrialized countries include unstable housing, mental illness, drug abuse, recent clinic enrollment, not having an AIDS-defining illness at enrollment, and personal beliefs regarding HIV (Lanoy et al., 2006). Little work has been reported on this issue in low- and middle-income countries, but maintaining follow-up is essential for future ART program success. Further research is needed both to characterize loss to follow-up in HIV care settings and the consequences to the individuals who do not return for care, to identify program and individual predictors, and to evaluate operational programs to reduce loss to follow-up.

With suboptimal adherence, ART eventually fails, often leading to the emergence of drug-resistant virus. All successful ART programs provide some form of adherence counseling and support, either by specially trained adherence counselors, nurses, or clinicians. The proportion of patients with greater than 95% adherence in low-income ART programs varies between 55% and 90% (Bell et al., 2007; Mills et al., 2006; Eholie et al., 2007; Nachega et al., 2004; van Oosterhout et al., 2005; Danel et al., 2006a).

Some factors associated with reduced adherence include lack of self efficacy (the belief that one's decisions and actions can influence one's future outcome), cost to the patient of ART, clinic visits, or transportation to a clinic site, the need for travel to obtain health care, lack of support from family or friends, side effects, recommendations by family members or alternative healers to stop ART, food insecurity (ART often increases appetite and may be easier to tolerate when taken with food), depression, substance abuse (alcohol, illicit drugs), suspicion of medications, complicated regimens, frequent dosing, lack of acceptance of HIV status, lack of understanding of importance of adherence, and forgetting to take medications (Castro, 2005; Chesney, 2003). Simple, once daily regimens, good social support, and feelings of self-efficacy are associated with better adherence.

The first step for improving adherence has been the provision of free ART. Reducing travel costs is another important step. In addition, in an effort to improve adherence, some programs have a structure of directly-observed therapy (DOT), taken as a model from TB control programs, and provide "DOT-ART" with community health workers, family members, neighbors, or others monitoring the taking of each dose and providing emotional support and reminders (Farmer et al., 2001; Behforouz et al., 2004). Cellular telephone technology is also being used in a variety of ways, including phoned reminders, calling in by

patients to report taking medications, and contact of the health team by village-level care assistants if an individual on ART reports difficulty with adherence or side effects (Chang et al., 2007). In addition, some programs have encouraged patients to use the alarm feature on their cellular telephones as a reminder to take medications. Fine tuning of available approaches and the development of additional approaches are needed to increase the proportion of individuals who will receive lifelong benefit from the limited array of ART agents available in most low-income countries.

### Injection Drug Use

Injection drug users (IDUs) are often marginalized, stigmatized, and excluded from health care services. Furthermore, injection drug use is associated with impulsive behavior and lack of foresight. These characteristics hinder high-levels of adherence to ART and lead to increased treatment failure and interruption (Morris et al., 2007). However, with good adherence IDUs can do well on ART and do not require any special adjustment of ART regimens (efavirenz- and nevirapine-containing regimens reduce methadone levels, requiring adjustment of methadone dose) (Clarke et al., 2001). Success has been achieved with directly observed ART, especially when linked to methadone maintenance programs (Lucas et al., 2006). Making methadone and buprenorphine more widely available and linking drug cessation programs with HIV care are major challenges in areas where injection drug use is an important part of the HIV epidemic, such as in South East Asia.

### Structured Treatment Interruption

Structured treatment interruption is the practice of stopping and restarting ART based on specified criteria, such as predetermined time intervals, or more commonly, CD4 count thresholds. Several studies have evaluated structured treatment interruption as a drug-sparing technique that reduces time of exposure to ART agents and potential side effects. The results of the largest study, the SMART trial, in which ART was stopped when the CD4 count rose above 350 cells/$mm^3$ and was restarted when it fell below 250 cells/$mm^3$, were unexpected, as the subjects in the interruption arm not only experienced greater HIV-associated morbidity and mortality, but also higher rates of liver, cardiac, and renal disease than the continuous treatment group (SMART Study Group, 2006). The results of this study and others have also led to a loss of interest in structured treatment interruption in industrialized countries.

Despite these concerns, there may still be a rationale for this approach in resource-limited countries, where such a strategy might allow treatment of a larger proportion of the HIV-infected population or allow for novel administration and adherence-enhancement strategies. A recent study of various structured treatment interruption strategies in Uganda suggested that a 5-days-on, 2-days-off pattern was as effective as standard continuous therapy in patients on first-line ART (Reynolds, unpublished data), suggesting the possibility of workplace-based ART programs that might facilitate adherence.

In the case of CD4-guided treatment interruption approaches, higher CD4 count thresholds for initiation and interruption of therapy would be necessary

in light of the data from developed countries discussed above and because many of the most common and serious complications in developing countries (e.g., TB and serious bacterial infections) can occur at relatively high CD4 counts (Danel et al., 2006b). Treatment interruption strategies may also require more intensive laboratory monitoring and more complex clinical algorithms. They cannot be recommended in any setting for routine use at this time, but there is a rationale for continued study of these approaches in resource-limited settings.

## System-Level Challenges to Successful HIV/AIDS Care Programs

### Insufficient Diagnostic Capacity

An additional and sometimes overlooked aspect of expanding laboratory access is maintaining high quality-control standards, as inaccurate tests are no more useful than no tests at all. Unfortunately, even when laboratory analysis is available, quality-control is often not as rigorous or dependable in low- and middle-income countries as it is in industrialized countries (Mfinanga et al., 2007). Unavailable or unreliable diagnostic testing compromises patient care, leads to unnecessary or ineffective treatment, and fosters the belief that laboratory testing is unnecessary and unhelpful. Continued dedication to identifying simpler and more reliable test platforms and operational systems for expansion of laboratory services is a vital component of successful ART rollout.

### Healthcare Staffing Crisis

There is a profound shortage of health care professionals in many low-income countries with high burdens of HIV infection. A 2006 WHO report identified 57 countries, 36 of them in sub-Saharan Africa, which had such critical shortages that they could not provide basic healthcare (WHO, 2006a). More than 4 million more health professionals are urgently needed in these countries. In fact, Sub-Saharan Africa accounts for about a quarter of the global disease burden, but has only 3 percent of the health workforce, according to the WHO.

Multiple factors contribute to the shortage of health care providers in low-income countries. These include a paucity of medical, nursing, pharmacy, dental, and other health professionals, early death and/or disability of medical professionals, often due to HIV/AIDS, underpayment of health professionals so that they leave the profession for more lucrative local jobs, and migration of health care professionals to countries where they find more lucrative and less distressing job opportunities. Multiple strategies for solving this problem are being developed through the WHO's Global Health Workforce Alliance (GHWA) which is using a "Treat, Train, Retain" model to improve health care worker retention in low-income countries. Furthermore, international agencies are helping to bolster health care worker salaries in some countries to reduce migration to wealthier countries. In addition, the use of mid-level providers, nurses, and associated healthcare workers is being adapted from primary health care initiatives. Scaling up the training of mid-level health care workers in HIV/AIDS care is an essential undertaking.

Many ART programs worldwide have adopted the use of lay workers, often HIV-infected patients themselves, as health educators and adherence counselors/motivators to further bridge the gap in healthcare worker supply. Peer educators are used as adherence counselors, and may also serve to decrease the stigma associated with HIV infection and to sensitize the surrounding community to the new reality of HIV infection as a treatable disease. Importantly, involvement of lay workers allows scarce and overburdened health professionals in many developing countries to maximize their utility. It is vital to appropriately compensate and credit lay people working in ART programs. Use of lay workers as uncompensated or minimally compensated volunteers can have a negative impact on perceptions of the work they are doing, such as adherence counseling, and can lead to high turnover and a lack of professionalism.

### Drug Shortages and Stock-Outs

Interruptions in the supply of HIV and TB medications can have devastating effects on morbidity, transmission of disease, and acquisition of resistance. Several countries have experienced drug shortages or stock-outs in the first several years of the ART scale-up, with serious consequences. These have stemmed from a multiplicity of factors, including cash-flow problems, drug expiration due to poor management of available stock, apparent corruption, and difficulties in negotiations between the various agencies involved in drug procurement. In the future, systems to ensure adequate supply and flow of appropriate drugs must be developed and strengthened.

### Infection Control Issues

Unfortunately, any HIV/AIDS Care program that brings patients together for clinical care risks enhancing transmission of infection, particularly TB and other airborne infections, among patients. Strategies to minimize the transmission of infections among HIV-infected patients in clinical settings are becoming increasingly important, particularly in light of recent reports of extremely-drug resistant tuberculosis (XDRTB) in HIV-infected patients in South Africa, which apparently spread from patient-to-patient in healthcare settings. (Gandhi et al., 2006)

## Conclusions

HIV care programs have succeeded in Africa, Asia, and Latin America despite substantial challenges, thanks to the vision, perseverance, and dedication of thousands of health care providers, policy makers, and people living with HIV. Further rollout of HIV care and continued success of current programs raises further challenges, some of which have been outlined in this chapter (Table 3.1). Most important is identifying more of the HIV-infected population for HIV care, provision of ART and PMTCT, and the development of monitoring capability and initial ART regimens that will maximize years on first-line therapy while leaving options for effective second-line therapies. Even more important is a renewed commitment to prevention. HIV care is unsustainable if rates of HIV infection remain at current levels in southern Africa and elsewhere. Proven

**Table 3.1** Major challenges facing ART roll-out in low and middle income countries.

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|---|
| • Identifying HIV-infected individuals |
| • Making care accessible for patients, including rural inhabitants and children |
| • Increasing availability of inexpensive and accurate CD4 count and viral load testing |
| • Determining optimal frequency of virologic monitoring and defining treatment failure |
| • Changing to first-line regimens that are less toxic and are less likely to cause cross-resistance to second-line regimens |
| • Expanding options for second-line regimens, including drugs without cross-resistance to agents used in the first-line regimen |
| • Improving diagnosis of TB and options for simultaneous treatment of TB and HIV |
| • Maintaining high levels of adherence and reducing loss to follow-up |
| • Addressing critical deficiencies in healthcare provider staffing and laboratory diagnostic capacity. |

prevention strategies such as male circumcision, condom use, PMTCT, and reduction of concurrent partners must become part of HIV prevention programs in all high incidence countries.

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# Chapter 4

# HIV/AIDS Care: The Minimum Package and Scaling Up

Joia Mukherjee

## Introduction—The Movement to Bring ART to Developing Countries

As recently as 2002, experts argued that prevention should take priority over treatment for HIV/AIDS in Africa based on cost effectiveness considerations. However, cost effectiveness analyses failed to take into account arguably the most important reason for implementing widespread HIV treatment—treating the sick. Twenty years into the epidemic, fewer than 5% of people worldwide who required treatment had access to antiretroviral drugs (ARVs) (WHO, 2002). Additionally, many prevention programs were failing and those that were successful were not being taken to scale.

In 2002, the unchecked spread of HIV and mounting death toll among those who were already infected had widespread and serious effects on the communities most heavily burdened by HIV; ranging from orphaning to famine and from stigma to professional burnout. Where it was available, antiretroviral therapy (ART) resulted in a 80% reduction in mortality (WHO, 2002). Many argued that prevention efforts alone were unlikely to succeed in high prevalence settings unless AIDS treatment was made available and combined with evidence-based prevention such as the use of condoms, ART to prevent maternal to child transmission, the treatment of sexually transmitted diseases, and education linked to knowledge of one's status.

Activism, largely led by people living with HIV, to bring highly active retroviral therapy (HAART) to the countries with the highest burden of AIDS took center stage at the International AIDS Society in Durbin, South Africa in 2000. In 2001, the United Nations General Assembly Special Session on AIDS called for massive increases in aid to help poor countries cope with the AIDS



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_4, 

pandemic. Thus, in 2002, the Global Fund to Fight AIDS, TB and Malaria (Global Fund) was created—a repository for donor funds which was independent of the United Nations system and served as a financing mechanism for country driven proposals to treat these three pandemic diseases.

As funding for AIDS care in developing countries began to become a reality, the search was soon on for effective models of financing, delivery and provision of quality care. Our group, Partners In Health with its sister organization Zanmi Lasante, has developed one such model. In 2001, we published a small descriptive study of the first 60 patients in rural Haiti whom we had treated with ART (Farmer et al., 2001a). These patients were started on ART based on clinical criteria alone as there was no access to CD4 count or viral load. ART was initiated in patients who had recurrent or refractory opportunistic syndromes—such as seizures (thought to be secondary to toxoplasmosis), chronic enteropathy or weight loss. When patients with HIV presented with a treatable opportunistic infection (OI), most commonly tuberculosis (TB), the OI was treated first to reserve ART for those who were otherwise untreatable.

To provide maximum support for patients on ART and to minimize the development of antiretroviral resistance, community health workers provided accompaniment—i.e. adherence and social support. While ART was feasible to deliver in a resource poor setting such as rural Haiti, even without the laboratory tests that were standard in developed countries, we argued that ART could not be given alone; that there is some "minimum package" which addresses HIV prevention, treatment and care of affected families. Prevention must move beyond just education and condom promotion to include a broader set of interventions such as the prophylaxis of those with occupational exposure, prevention of mother to child transmission (PMTCT) and the diagnosis and treatment of sexually transmitted diseases (STDs). HIV treatment includes the diagnosis and treatment of OIs as well as the provision of ART. Further, a minimum package should also address the social consequences of the epidemic, particularly the care of families and children affected by HIV. With new funds and attention to increased access to ART for people living in resource poor settings, it is also important to consider what constitutes the minimum package of care which will serve patient and community and allow for successful scale up.

Since 2001, many other HIV/AIDS treatment programs have been implemented in resource poor settings. These programs have been funded by a variety of agencies and governments, each with their own particular philosophy. For example, the Clinton Foundation approach has been to take a business model and work on reducing drug costs through partnering with governments and assisting them in negotiations. The Global Fund has used a funding support approach based on country-driven proposals and covers an enormous number of countries. The President's Emergency Plan for AIDS Relief (PEPFAR) is highly targeted, working in 15 core countries, 12 of them in Africa. PEPFAR has used a vertical model of care and treatment delivery with considerable control leveraged through the State Department where the program resides. In addition to these large programs, many individual countries have developed their own care models as well. Indeed, some of the leaders in providing care to citizens have been states like Brazil and Thailand, which early on became involved in ARV manufacture as well as treatment and care. Their efforts have inspired many other states to commit to universal access. And both, it should be

noted, were first successes in prevention services before they became leaders in treatment.

Through the implementation of funded programs, several lessons have been learned about what are the minimum requirements to successfully start and scale up HIV treatment. This chapter will detail elements of one approach to the scale up of a "minimum package", that of Partners in Health programs in Haiti, Rwanda, Lesotho and Malawi. This package which has provided a framework for others implementing an HIV strategy in similar settings, consists of VCT linked with primary health care, and includes addressing the financial barriers to access to care, the diagnosis and treatment of OIs particularly TB, the provision of ART with a strategy for adherence and the provision of social support to the vulnerable. The chapter ends with a discussion on lessons learned for scaling up HIV prevention, care and treatment through the public sector.

## Partners in Health's "Minimum Package"

### Voluntary Counseling and Testing

Uptake of VCT is the critical first step to truly scaling up a comprehensive HIV program. Lack of uptake in VCT programs has been ascribed to a variety of reasons including stigma, lack of treatment availability, a paucity of counselors, long wait times, and fees (Van Dyk & Van Dyk, 2003; Nuwaha, Kabatesi, Muganwa, & Whalen, 2002). Education about the benefits of knowing ones status (treatment, protecting the partner or child) is critical as is developing a place for tests and results to be given privately. Additionally, VCT should be integrated with other services—primary care (Walton et al., 2004), TB (Chimzizi et al., 2004), women's health etc. Patients are most likely to seek care when they are ill, not to seek testing for HIV per se. As part of the evaluation of the ill patient, HIV testing may be offered by the clinician, if indicated. This strategy, sometimes called "opt out" or "routine offer" HIV testing, has been found to be acceptable in many settings, particularly when ART is available (Westheimer et al., 2004).

Because HIV is often a disease of the poor and marginalized, perhaps the most important element of the minimum package is the provision of free testing and treatment. TB control has long been considered a public good and services have been provided for free. Recent literature on HIV scale up has documented that user fees are a significant barrier to seeking an initial diagnosis of HIV, obtaining laboratory evaluations, and attending follow up appointments (Russell, 2004). Data from Senegal (Laniece et al., 2003) and Botswana (Westheimer et al., 2004) indicate "cost sharing" is detrimental for long term adherence to ART. Additionally, significant "out-of-pocket" expenses such as payment for transportation to and from clinic inhibit ability to adhere to necessary medical visits and prescribed medication (Rowe et al., 2005).

### HIV and AIDS Treatment

Once patients are identified as having HIV, a social and clinical evaluation should be undertaken. Social workers, psychologists or lay counsellors play an important role in a patient's acceptance of the result, their communication

or disclosure to family members and their comfort with the follow up plan. Additionally, social support staff can identify the structural barriers to adherence such as a lack of transportation fees, water or food and develop strategies to address them. In the setting of "opt out" VCT services, post test counselling is critical to the patient's well being and ideally continues for the lifetime of engagement with the patient.

The necessary initial medical evaluation of the newly diagnosed patient includes some type of staging. CD4 count is increasingly available in resource poor settings, yet, even in the absence of this test, clinical staging can help prioritize those who need ART most urgently. Patients with significant immune suppression determined by a CD4 count less than 200 or clinically WHO stage III-IV should be given co-trimoxazole for the prophylaxis of pneumocystis pneumonia and bacterial infections.

Perhaps the biggest challenge in the initial decision of when to start ART is evaluating the patient for TB. Because TB is the most common OI in developing countries and starting ART without treating underlying TB can result in serious immune reconstitution syndromes, ruling out active TB or finding and treating the infection is a key first step of ART initiation. Many patients with HIV tuberculosis co-infection are smear negative and smear microscopy is the cornerstone of TB diagnosis in developing world settings. All patients being considered for ART should have a careful history and physical exam focused on determining whether or not there is active TB. Chest X ray in this setting can be very helpful as is mantoux test. The diagnosis and treatment of TB as well as other OIs is an important part of the minimum package.

### Adherence Support

Adherence to ART delays both the progression to AIDS (de Olalla et al., 2002; Bangsberg et al., 2001) and the development of ARV resistance (Bangsberg et al., 2000). Much of the medical literature on adherence to ART is focused on measuring the individual patient's ability to take ART as prescribed (Lucas, Chaisson, & Moore, 1999). The underlying assumption in much of this body of work is that once the medicines are prescribed the patient has regular and reliable access to the medications. Some authors have described risk factors for non-adherence such as active drug use that are more common in poor populations (Steiner & Prochazka, 1997). Because of the links between such risky behaviors and poverty and non adherence, when ART was introduced in resource poor settings, there was widespread fear that adherence would be a major problem and promote widespread resistance to ART (Harries et al., 2001; Frater et al., 2002). Data from resource poor settings has actually shown comparable or better levels of individual adherence than what is seen in North American and European populations (Orrell, Bangsberg, Badri, & Wood, 2003; Weiser et al., 2003). However, in resource limited settings, there are a multitude of structural barriers which prevent access to health care and the regular supply of ARVs. These factors affect the patient's ability to take medications as prescribed by the health care provider.

The support of adherence is a critical aspect of all countries in resource poor settings (and should serve as a lesson to developed countries where poor adherence has led to high rates of resistance). An adherence strategy is an important

part of the minimum package. In Haiti, our program, the HIV Equity Initiative, employs trained community health workers. Community health workers provide community based active case finding for HIV and TB and a link between the patient, family, community and clinic. Their daily role is to give psychological support and daily directly observed therapy to HIV patients requiring ART (Farmer et al., 2001a,b).

In some countries there has been a focus on the idea of treatment preparedness which involves people living with HIV/AIDS and others in civil society in educating people about the benefits of treatment, the concept of long term treatment and engaging governments in supporting the right to care and treatment. In their report from 2005, the International Treatment Preparedness Coalition reported some of the most significant barriers to treatment include the out of pocket cost for ART—8 dollars per month in Nigeria with PEPFAR funded programs, as well as the cost of diagnostic tests and the treatment of OIs. In addition, transportation costs in all countries continue to be a major barrier to care resulting in irregular and interrupted treatment (ITPC, 2006).

### Social and Economic Support

Recognition of the social and economic stressors on patient and community is an important element of the minimum package. Orphans and vulnerable children make up a significant proportion of those affected by AIDS. Without assistance, these children often lack access to education and frequently suffer from malnutrition and disease. Aiding such children is a critical component of prevention HIV in the next generation and in mitigating the human toll of HIV on the community at large. For those suffering from HIV, lack of food has been associated with poor adherence to ART and provision of food and micronutrients have been shown to improve outcomes (Ndekha, Manary, Ashorn, & Briend, 2005; Villamor et al., 2005; Fawzi et al., 2004). Many families throughout the developing world spend more than 50% of household income on food, and both food production and wage earning are adversely affected when an adult has AIDS (Rutengwe, 2004; Smith Fawzi et al., 2005). Depending on the context, other social supports such as job creation, income generating activities and assistance with shelter have an important role to play.

## Strengthening Health Systems and Scale Up

There is much talk of the attention to HIV scale up siphoning money from other needed public health interventions, but the reality on the ground suggests that existing health infrastructure is weak to non-existent. If HIV testing, treatment and care are provided in the public sector, the flow of money, attention to procurement of medications and diagnostics, and training of health workers can serve to strengthen existing systems. The public health sector is ideally positioned to provide health care to the poorest communities. However, in many poor countries, public clinics stand empty or underutilized. This is not because people have lost faith in the public sector per se; it is because the health budgets of poor countries cannot provide either a decent wage for health workers or the tools (including essential drugs, gloves, needles, and proper waste disposal)

that are necessary for a clinic to function. Both staff and community become demoralized. Empty clinics offer neither an avenue for prevention nor one for HIV case-detection. NGO-public sector partnerships that can provide essential drugs and incentives to staff will help revitalize the clinics and improve both the utilization of services and the overall health of the community.

### HIV care as a Model to Strengthen the Health System

The model Partners in Health has used for scaling up HIV care in Haiti was not designed to provide free-standing, NGO-managed HIV counseling and testing, treatment and care but was established to integrate access to HIV care within the setting of the public, primary CARE clinic. With this as a goal, we identified four main entry points for identifying HIV-positive persons through HIV VCT: (1) routine offer of testing to those presenting for primary care whose symptoms suggest HIV/AIDS, (2) testing among those being evaluated or treated for TB, (3) offering HIV testing to women in the context of broad based women's health services that include antenatal, obstetrical care and family planning and (4) offering testing to those diagnosed with an STD. The goal of our integrated approach is to move towards a comprehensive health program whose basis is these four pillars of good HIV prevention and care.

The first pillar is the provision of culturally appropriate HIV prevention and care, including VCT that is linked with the delivery of primary health services. The reason for offering VCT in the context of primary health care is that basic health concerns mobilize more people to attend clinics than does the desire to know one's HIV status (Kosko & Becker, 2000). Patients presenting with a variety of symptoms, from fever to diarrhea, may have HIV. In addition, integrating VCT into primary health care decreases the perceived stigma of HIV/AIDS, in that patients need not declare that they have an HIV risk factor to present for care (Roeloffs et al., 2003). Thus, all patients who are seen for primary health care services are questioned for social and epidemiological risk factors for HIV, e.g., status of partner, status of parents, history of migration for work, or domestic service. Those patients with a risk factor are additionally screened for HIV (Phillips & Fernyak, 2000). Counseling patients prior to performing HIV testing is a challenge. The constraints of time and space within the busy clinic setting must be balanced against the need to ensure appropriate patient privacy and participation in the decision-making process (Coovadia, 2000; Harris et al., 2003). The reality for busy clinics in the developing world is that pre-test counseling is brief so as to minimize disruption of the flow of patient services. For this reason, in our clinics in Haiti, the same practitioner (nurse, social worker, or physician) who sees the patient for the presenting complaint provides the counseling in the same session and directly refers the patient to the lab for rapid HIV testing (Wilkinson et al., 1997). It is very important that the test result be available on the same day of the initial visit because returning at a later date presents a considerable difficulty for many patients.

The second pillar of integrated HIV prevention and care is improved TB case-finding and treatment (Sivaram & Celentano, 2003). Because TB is the most common OI in HIV patients worldwide, all HIV patients should be screened for both active and latent TB, just as all active TB patients should be tested for HIV (Banerjee, Moyo, Salaniponi, & Harries, 1997). When the two services are provided together, a larger number of individuals with HIV and

TB co-infection will be identified, and this population may enter into treatment sooner with improved outcomes for both diseases.

The third pillar is comprehensive women's health services. Included among these services are family planning and safe motherhood (Tay & Emmanuel, 2003). The acceptance of HIV testing among pregnant women is greatly enhanced by the provision of ARVs and also by the availability of antepartum, maternity, and postpartum care. Preventing HIV transmission from mother to child in this setting will, of course, improve women's health in a far broader sense (Segurado et al., 2003).

Finally, the fourth pillar is the diagnosis and treatment, preferably through algorithms reflecting local epidemiology, of all STDs (Kahn, Moseley, Thilges, Johnson, & Farley, 2003). Numerous studies have shown that improving care for STDs will diminish the risk of acquiring HIV (Weinstock et al., 2002). Additionally, the detection and treatment of STDs is an important avenue for providing HIV testing and prevention messages (Day et al., 2002).

### Adaptation of the Model

There are many programs now throughout Africa to treat HIV/AIDS, yet the numbers of people with access to this therapy in rural areas remains limited. Additionally, health infrastructure to provide basic health services is severely limited providing little foundation for developing comprehensive services. Furthermore, new monies for HIV as a vertical program have resulted in a "drain" of workers from the public sector into better funded NGO-led projects. Based on the experience of Partners in Health in Haiti and a strong commitment to the integration of HIV with primary health care, in the spring of 2005, at the invitation of the Rwandan government, Partners In Health started a project in 2 districts in eastern Rwanda. These districts are home to almost half a million people and not a single doctor. PIH's intervention in Rwanda consciously replicates the model that has proven successful in central Haiti. Using the model of community health workers, care that is decentralized to the health center level, the abrogation of user fees, support of public sector salaries and HIV testing in primary care clinics through "opt out" testing, the project was able to enroll more than 1000 patients on ART in the first year and to test over 30,000. This model has been adopted by the Rwandan government and an effort is underway to make comprehensive HIV care in primary health centers the standard model for rural care delivery. Since 2005, Partners In Health's model has been implemented in 6 sites in Rwanda, 4 in Lesotho and 1 in Malawi and will be expanded in each country in partnership with the respective Ministries of Health.

## Health Systems and Work Force Constraints

Because of new money for HIV prevention, care and treatment in resource poor settings and the reality that there are few trained health professionals who can administer these programs, what we are facing today in developing countries has been called the "Health Care Worker Crisis." Yet to proffer a simple equation such as *AIDS money is greater than the capacity of professionals to use it*, is but a pinhole view of a much larger landscape. In fact, the AIDS pandemic

has done nothing if not lay bare the fact that health systems in Africa, from personnel, to supplies, medicines to physical infrastructure, were never adequate to deal with the burden of disease. AIDS is a lens through which we see that reality. Not only by its overwhelming death count, but also by the fact that it is a chronic disease that foments other diseases, most notably TB. People in poor countries understand this. In Rwanda, our patients offered the phrase "Imboni Ibibazo", a lens through which we see the reality and larger context.

Today developing countries bear 90% of the global burden of disease with only 20% of the GDP. Only 12% of all health expenditures are going to stem this tide, $351 billion out of a global total of $3.2 trillion (Gottret & Schieber, 2006). Africa is particularly burdened. While it bears fully one quarter of the world's disease burden, it has but 3% of the global health workforce who are paid with less than 1% of global health expenditures. Approximately 60% of all health expenditures in poor countries are out of pocket, paying private pharmacies or clinics for inadequate treatment (Gottret & Schieber, 2006). For the global, infectious pandemics of HIV, TB and malaria, clearly care should be delivered within the public sector and seen as a public good rather than being commoditized in countries where people can little afford to pay for food to keep their families nourished.

Care must also be decentralized. Many Africans in need of therapy live in rural areas far from capitol cities. For such populations, access to HIV testing and treatment as well as the diagnosis and treatment of TB, STDs and provision of women's health services must be delivered at the community level. Such national and large scale challenges can only be handled by a functioning public health system down to the level of the health post. No NGO has the capacity to perform national scale up. It is also in this context that community health workers can extend greatly the reach of health centers; providing not a replacement to trained health workers but an extension of case finding, treatment, social support and solidarity. Community health workers in the experience of Partners in Health projects in Haiti, Rwanda, Lesotho and Malawi as well as in TB projects in Peru and Russia serve an important role in adherence, monitoring and evaluation. These workers, however, must be paid if they are to perform this critical task for the long term.

The public sector is absolutely inadequately resourced to perform these basic services. The majority of aid that was given to post-colonial Africa was in the form of loans with conditions that the money be spent building market economies rather than investments in the public sector. Such conditions (called Structural Adjustment) resulted in massive disinvestment in health and education sectors. National health budgets were set at extremely low levels (on the order of two to five dollars per capita) and constrained by limits on the number of and compensation for public employees, leaving little money for essential medicines or building and maintenance of health infrastructures. Countries finding themselves under such fiscal conditions have few options for responding to escalating public health needs. User fees for health were imposed at the behest of the World Bank and International Monetary Fund. But in extremely poor often non-cash economies, such fees usually about twenty five cents (equivalent to USD 20 based on per capita income) serve as an enormous barrier to care. As a result of lack of staff, poor infrastructure, absent medicines and supplies and user fees many public clinics stand empty in the midst of

the worst epidemics in the history of man kind. In countries without user fees where such clinics are full, such as Malawi, it is not uncommon to see rows and rows of beds with the sick and dying who are untreated and health professionals who are despondent. Understandably, not only is the death toll and number of orphans skyrocketing but the "brain drain" of the professionals needed to deal with this crisis continues.

New money for HIV/AIDS, particularly through the Global Fund as well as PEPFAR gives us the opportunity to treat and prevent HIV. But can it have a wider impact? An impact beyond simply getting AIDS patients on to treatment? In our view the answer is yes. Unequivocally, yes. However, the money must be used strategically—not just funding "vertical" HIV programs in a silo, but by supporting the fundamental building blocks of a public health system that can then be assumed by governments. Moreover, HIV programs do not work in a vacuum. The lion's share of people presenting to clinic, especially in rural areas, where people routinely walk three, six or even eight hours to reach a clinic, come because they are sick, not because they want to know their HIV status. Therefore, if clinics are not reliable, trusted facilities that provide decent, accessible diagnosis and treatment of common disease, few HIV tests will be done.

But there are constraints to the funding that prevent our project and many others from strengthening health systems in the context of HIV program implementation. The most significant of these is the notion, rooted in the Foreign Affairs act, that PEPFAR can not help to compensate public sector workers. The reality is that if we as NGOs expect to be trainers to develop a system that the government can assume, it is imperative that the responsibility and the funding for these programs are gradually moved to the public sector. In a poor country with a growing economy like Rwanda, it is possible to imagine that with time, the government will be able to cover much of this cost. African leaders signed a pledge in Abuja, Nigeria in 2003 to commit 7% of their GDP to health. However, in countries like Haiti, the reality is that even 7% of GDP will not cover the cost of real health systems and international donor money must help to build structures that can tackle not only HIV but the total 90% of the global disease burden. The focus on AIDS can and should be used, rather than simply to treat people with HIV, but also to build health systems that will be sustained for generations to come.

## Conclusions

HIV care can be scaled up even in the world's poorest and most heavily burdened settings. A minimum package that links VCT to health services, provides diagnosis and treatment of OIs and ART to people living with AIDS, addresses the financial barriers to care and provides an adherence strategy will be successful. Strengthening health systems is critical for scaling up HIV widely, in the public sector and for the long term. Additionally, significantly improved attention to and funding for TB diagnosis, treatment and control is needed. While there is no formula for successful scale up, given the magnitude of the epidemic and the population most affected with the disease; it is logical that, like TB prevention and treatment, AIDS prevention and treatment should be seen as a public good and ensconced in the public sector. Linkages of a

comprehensive AIDS program with HIV prevention as well as needed primary health, women's health and TB control efforts will help strengthen rather than weaken health systems.

## The Challenge of Tuberculosis Control in the HIV Pandemic

In 2006, there were 9.2 million new cases of TB worldwide (WHO, 2008). With the advent of multi-drug therapy in the 1970 s, the treatment of TB with a "short course" of drugs was possible, and TB became the first disease whose treatment (and not only prevention) was adopted by the public health community. Since that time, TB treatment has been under the purview of national governments using the recommended "DOTS" strategy (Directly Observed Therapy Short Course), a course of six to eight months of therapy with multi-drug regimens and observed therapy to prevent the development of resistance. However, as with any infectious disease, resistance to antibiotics develops, and this has been the case for TB since the first anti-tuberculosis drug, streptomycin, was discovered in 1945.

Multi-drug resistant tuberculosis (MDR-TB) is defined as a strain of TB that is resistant to the most potent drugs, isoniazid and rifamipin. In addition, some strains of TB have developed resistance to an even broader array of drugs and have been dubbed extensively drug-resistant (XDR), defined as MDR with additional resistance to a fluoroquinolone and an injectable drug. When the TB organism is replicating in the body in the presence of low levels of drugs due to irregular or inadequate treatment, resistant mutants of TB are selected. Once an individual has a strain of drug-resistant TB, he or she may transmit the strain to others.

XDR-TB has already been found in 28 countries on six continents, including all of the G8 countries. There has been great progress made in recent years to address the emergence of MDR-TB, but the existing plan to fight this disease will need to be broadened and strengthened to tackle XDR-TB and HIV co-infection (Gandhi et al., 2006).

Several issues have converged to draw attention to the specter of resistant TB. First, people with HIV are exquisitely sensitive to contracting TB, developing active and progressive TB infection and dying if the correct anti-tuberculosis drugs are not given promptly. What sparked the current global concern over XDR-TB is that in the South African province of KwaZulu-Natal, where HIV prevalence is high and immunity to TB is weak, these highly resistant (XDR) strains were transmitted from person to person. The linkages between TB and HIV programs are critical, and all persons with HIV should be carefully screened for TB. Similarly, all individuals presenting with TB should be offered an HIV test and the barriers to HIV testing (both logistical and financial) should be minimized. In addition, HIV treatment with HAART improves the immunity of people living with HIV and decreases their likelihood of developing active TB if they are exposed to a TB strain of any kind. This therapy has been terribly delayed in resource-poor countries due to insufficient resources and lack of political will. Redoubling the effort to effectively diagnose HIV and treat and retain those who need ART is needed to impact individual mortality from TB and the spread of drug-sensitive and drug-resistant TB.

Furthermore, the spread of XDR-TB is a consequence of a woefully inadequate health care infrastructure, one that is insufficient to prevent the spread of XDR-TB, facilitate its prompt detection, and administer its appropriate treatment. In dilapidated clinics and hospitals, TB easily spreads in crowded and poorly ventilated wards. The severe shortages of health workers caused by poor pay, immigration to other countries (so-called "brain drain"), and attrition from AIDS sap the manpower needed to address this epidemic. Investments in health workers and health facilities are fundamental to any effort battling TB and HIV/AIDS. Finally, diagnostic capacity is needed. Almost nothing has been invested towards providing laborato-

ries in resource-poor settings, such facilities have been deemed too costly by the conventional public health approach. Yet drug resistance can only be diagnosed by culturing the TB organism. Safe and modern laboratories must be built and technical staff trained to find XDR and facilitate its treatment and control. Our world is gripped with two interrelated pandemics, HIV and TB, and the prevention, control and treatment of these diseases require long-term, community-based therapy. Such ambulatory treatment assures adherence to and completion of the prescribed treatment, improving outcomes and preventing the development of resistance. It also decreases the concentration of infectious people in congregate settings. Community health workers are best suited to provide this type of therapy, but this class of health workers does not exist in most places in the world and where they do, they are often asked to serve as volunteers, resulting in high attrition rates and the need for constant recruitment and training. As with AIDS treatment, developing a global cadre of health workers of this type is critical to tackling the TB epidemic.

In South Africa, death rates among people living with HIV who acquire XDR-TB are high (Gandhi et al., 2006). This is not because XDR-TB is untreatable, but rather because in most places, patients infected with XDR-TB have not been promptly diagnosed and correctly treated. This failure to provide services has led to the myth that XDR-TB is untreatable or a death sentence. Partners in Health has been successfully treating MDR-TB since 1994 in Haiti, Peru, Russia, and most recently in Rwanda and Lesotho. Socios en Salud, a Partners in Health "sister organization" in Peru, arguably has more experience in MDR-TB than any other organization in the world, having treated over 10,000 cases of MDR-TB. As early as 1996, Partners in Health documented high levels of resistance in some of these cases, which would now by definition be labeled XDR-TB. In Peru, however, the highly resistant nature of many of the strains did not garner the same type of media attention because of the low prevalence of HIV. In such settings, the spread is not as rapid as in southern Africa, where a high proportion of the population has HIV and has not received ART.

Treatment is possible but it depends on prompt diagnosis and timely administration of appropriate therapy and sustained treatment for two years. This requires health care workers who are trained to have a suspicion for drug-resistant TB, HIV testing linked to TB control efforts, a laboratory that is capable of making the diagnosis, health care workers that can prescribe and follow up the treatment for both XDR-TB and HIV, and a cadre of community health workers that can assure adherence to the drugs in the community. If hospitalization is needed, the treatment and control of XDR-TB require hospital wards with adequate ventilation and staffing.

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# Chapter 5

# HIV/AIDS Vaccine Research

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## Introduction

The scale of the HIV epidemic in the last 25 years has been staggering: today there are 39.5 million people living with HIV, with more than 4 million new infections occurring every year (UNAIDS, 2006). The majority of new HIV infections worldwide occur in developing countries, where the brunt of the epidemic lies and one in four people are infected in the most severely affected regions. Many of them are young adults in their economically most productive years (UNAIDS, 2006). Here the scale of the pandemic threatens the very fabric of society.

In tackling the burden of infectious diseases, effective vaccines are the only measure that has resulted not only in significant inroads into disease elimination and control but also disease eradication. While the best examples of vaccine successes are for viral infections such as polio and measles, vaccines against a range of other bacterial and viral pathogens have resulted in more than 98% reduction in diseases such as diphtheria, tetanus, Haemophilus influenza type b, measles, mumps, and rubella in the US and several other countries (Frazer et al., 2006). The quest for an HIV vaccine dates back more than 20 years, almost as long as the HIV pandemic itself, with the first HIV vaccine trial opening in August 1987 at the U.S. National Institutes of Health (NIH) Clinical Center in Bethesda, Maryland (NIAID, 2005). Since then, successive candidates have reflected the growing understanding of HIV biology and immunology, and the field has expanded upon traditional vaccine approaches to meet the unprecedented challenges of HIV infection. This concerted effort in vaccine development is particularly critical in developing countries because of the staggering momentum of the epidemic.



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_5, 

HIV vaccine development and evaluation present unique challenges in the developing world. The history, immunological underpinnings, early clinical trials, and current pipeline in HIV vaccine development and evaluation have recently been reviewed (Duerr et al., 2006; Letvin, 2006; McMichael, 2006; Singh, 2006) and will not be covered here in detail. It is the remit of this chapter to highlight the salient HIV vaccine development and evaluation issues specific to developing countries. Further, this chapter will focus on preventive vaccines, rather than therapeutic vaccines, as the latter are in early stages of development and evaluation. Also, it is likely that demonstrating therapeutic vaccine efficacy among individuals with an immune system compromised by HIV will be more challenging than demonstrating preventive vaccine efficacy among individuals with an intact immune system.

## Strategies for HIV Vaccine Development for Developing Countries: HIV Vaccine Design

In designing candidate HIV vaccines, four issues set developing countries apart from industrialized country contexts. First, HIV subtypes found in most of the developing world are rarely the predominant subtype found in industrialized countries and are often a diverse mixture. Second, pre-existing immunity to a variety of vaccine vectors is higher in many developing country populations than in industrialized country populations as a result of wild-type infection or previous immunization. Third, the background prevalence of infectious diseases and other modifiers of immune responses are often higher in developing countries, complicating evaluation of the safety and efficacy of candidate vaccines. Finally, logistic and delivery challenges in the developing world mandate design of simple vaccine regimens. The implications of these four developing country issues will be discussed in the context of HIV vaccine development.

### Viral Diversity in Developing Countries

HIV's extraordinary genetic diversity, which has evolved in less than a century, presents a substantial challenge to vaccine development (Korber et al., 2001). To classify this diverse virus, groups of isolates with sequences that cluster together are referred to as subtypes, or clades, named subtypes A, B, C, D, F, G, H, J, and K (Letvin, 2006). Circulating recombinant forms (CRFs) contain genome sections derived from different subtypes and are epidemic strains that contribute further to the diversity of HIV (Korber et al., 2001). Infections with HIV-1 clade B are predominant in most of the Western hemisphere, clades A and C viruses in sub-Saharan Africa, and clades B, C, and CRF 01_A/E in Asian countries (Singh, 2006).

Increasing viral diversity arises due to both accumulated mutations within subtypes and the introduction of new subtypes as circulating recombinants (Korber et al., 2001). Thus, a key challenge in designing an HIV vaccine for developing countries lies in both the large number and the specific types of circulating clades, which differ from the dominant clade in industrialized nations (Figure 5.1). Further, in developing countries with high HIV-1 prevalence and

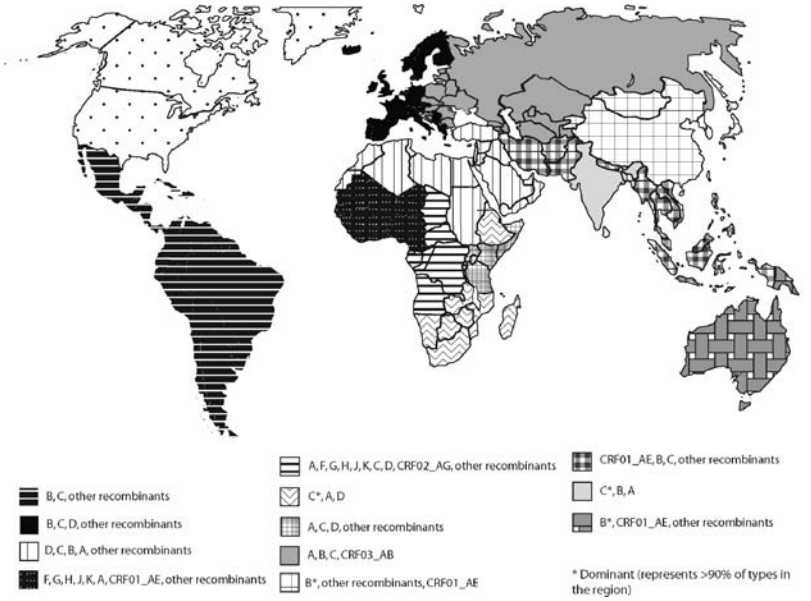


**Figure 5.1** Regional distribution of HIV-1 subtypes and recombinants in 2004. Adapted with permission from Duerr et al. (2006).

multiple subtypes, novel, complex recombinants present further challenges to clade-specific vaccines. The diversity of HIV genotypes is ever increasing—so much so that it is even outgrowing the usefulness of the current classification system (Korber et al., 2001). These viral diversity factors, combined, raise questions about choice of vaccine insert and make cross-clade protection an important outcome in the development of HIV vaccines, particularly for developing countries.

***Approaches to Cross Clade Protection: Broadly Neutralizing Antibodies***

While many successful vaccines elicit neutralizing antibodies, the generation of broadly neutralizing antibodies against HIV is an enormous, and as yet unmet, scientific challenge. Antibodies capable of neutralizing HIV are largely directed against the viral outer lipid coat, which is embedded with spikes that are used to gain entry to host cells. However, neutralizing antibodies face several challenges. First, the envelope gene (Env), the gene associated with this outer coat, shows substantial sequence variation between subtypes and within individuals. In addition, much of the exposed surface of the HIV spike is shielded from the immune system by a glycan surface produced by host cellular mechanisms which the immune system generally does not recognize. Further, the virus is able to block immunologic detection of active virus within the spike protein, redirecting immune responses instead to non-mature or inactive forms of the virus. Finally, the virus is also able to undergo "conformational masking" in which the presence of neutralizing antibodies, which could potentially bind with envelope receptors, induces a reaction that allows receptor binding of the virus while simultaneously resisting neutralization (Douek et al., 2006).

However, "proof of principle" exists for an antibody-mediated approach to HIV vaccine development. A small number of monoclonal antibodies (b12, 2F5, 4E10, and 2G12) that recognize conserved parts of HIV glycoproteins (i.e. parts that do not mutate or change) and, therefore, have cross-strain activities have been identified from HIV-infected individuals (Burton et al., 2005). Combinations of these antibodies show potent cross-clade neutralization against clades A, B, C, and D in vitro (Ferrantelli et al., 2004). Moreover, in vivo support of this concept is provided by passive immunization studies (in which individuals are given antibodies, as opposed to a vaccine) on combinations of these antibodies, which prevented infection in animal models of sexual and mother-to-child transmission (Ferrantelli et al., 2003; Veazey et al., 2003).

Characterization of structures recognized by these broadly neutralizing antibodies could lead to the development of polypeptides or small molecules that mimic these epitopes (viral protein fragments which stimulate the immune system to produce antibodies) and, when used in vaccines, could induce broadly neutralizing antibodies. This approach offers unique advantages, as it is anticipated that only neutralizing antibodies will produce sterilizing immunity. Although we have been unsuccessful to date in developing vaccines that elicit neutralizing antibodies, other approaches, such as the induction of T-cell immunity, may prevent or modulate HIV disease even if they do not prevent acquisition.

***Approaches to Cross-Clade Protection: Cellular Immunity***

T-cell immunity with multiple effector functions is likely to be crucial for control of HIV progression, as has been shown for other chronic viral infections (Douek et al., 2006). For candidate vaccines to elicit cytotoxic cellular immunity by stimulating production of cytotoxic T lymphocytes (immune system cells that can destroy virus-infected cells and which are commonly referred to as CTLs), antigens (also known as epitopes) must be presented in conjunction with human leukocyte antigen (HLA) class I (protein marker molecules that exist on the surface of all cells and identify the cell as "self," thus preventing attack from the immune system). Compelling evidence of the importance of CTLs (or CD8+ T cells) in controlling HIV replication came from animal models: monkeys depleted of CD8+ cells were unable to control simian immunodeficieny virus (SIV) replication but viral suppression returned coincident with the reappearance of SIV-specific CD8+ T cells (Schmitz et al., 1999). In addition, T helper cells, which recognize antigen presented in the context of HLA class II (protein marker molecules found on antigens), assist CTLs in these functions and it is likely that both are crucial for HIV vaccines (Fischer et al., 2007).

Vaccines utilizing DNA plasmids and viral or bacterial vectors, which target T-cell immunity, contain HIV inserts that are expressed after vector uptake by antigen presenting cells. The question of which insert to use revolves around two decisions: which viral gene and which sequence of that viral gene. The viral genes Env, Gag, Pol, Nef, and Tat are the most commonly used as they represent immunodominant, relatively conserved HIV epitopes. Circulating HIV-1 subtypes differ from one another by roughly 15% in Gag compared to about 25–35% in Env (Gaschen et al., 2002; Kandathil et al., 2005). Gag is usually included in vaccine designs because it seems to be the most immunogenic

(McMichael & Hanke, 2003). Nef is often included, as is Env, despite Env being the most variable (McMichael & Hanke, 2003). T-cell vaccine constructs containing these genes in a variety of combinations do not prevent SIV infection in animal models, but appear to lead to suppressed viral load and amelioration of the clinical course (Schmitz et al., 1999).

Decisions about which gene sequence to use (for the viral gene) center primarily around vaccine coverage of HIV clades. Many vaccine candidates contain clade-specific inserts, often using a sequence from the country in which the vaccine will be tested. In an effort to provide maximal coverage of circulating strains, some vaccines incorporate consensus sequences; these are sequences constructed for a selected region by choosing the base pair most commonly found at each position. Even more general consensus sequences can be built using consensus sequences for individual subtypes to generate a consensus sequence of all subtype consensuses (Gaschen et al., 2002). In addition to consensus sequences, ancestral or center-of-tree sequences have been developed to reduce the "distance" between the immunogen sequence and the infecting (challenge) virus isolates (Gao et al., 2004; Mullins et al., 2004). Further approaches in development include producing mosaic proteins or genes encoding these proteins, assembled from fragments of natural sequences via a computational optimization method (Fischer et al., 2007).

Whether multiple inserts from different clades or single ancestor, consensus, or mosaic sequences will be able to confer broad protection is not known. It is possible that protective immunity could be induced to highly conserved epitopes contained in naturally occurring or constructed sequences, especially for genes other than Env. If this were the case, a vaccine containing only clade B sequences, for example, might induce broad immunity and confer protection in regions with other subtypes, such as clade C, A, or circulating recombinants. A more "matched" approach is also being studied; planned trials will test the efficacy of a vaccine construct containing conserved genes (Gag, Pol, and Nef) from clade B HIV, as well as envelop genes from HIV subtypes A, B, and C in regions where HIV clades A, B, and C predominate. Both approaches aim to overcome the substantial viral diversity of HIV in developing countries.

## Vaccine Vector

### *Pre-existing Immunity and Vaccine Constructs*

Live recombinant viral and bacterial vectors have been explored as novel approaches for delivering HIV immunogens. This "Trojan horse" approach aims to elicit cellular immunity through presentation of HIV epitopes in conjunction with HLA and has shown promise in animal models and early clinical trials (Duerr et al., 2006).

The choice of vaccine vector is important because pre-existing antibodies to vectors may dampen the response to the vaccine. Candidate vectors that are immunogenic in industrialized countries may be less so in developing countries because much of the population has had prior exposure to the vector, either though infection (e.g., adenovirus serotype 5) or immunization (e.g., vaccinia). An example of the latter is in Brazil, where smallpox vaccination continued until 1975.

The recombinant Adenovirus vectors are a good illustration of this problem. The candidate HIV vaccines based on replication-incompetent recombinant Adenovirus serotype 5 (rAd5) were shown to be highly immunogenic in animal models and in humans (Letvin, 2005). While rAd5 HIV vaccines can elicit HIV-specific T-cell immune responses in humans, high levels of pre-existing immunity to the rAd5 vector, as found even among children in many developing countries, can decrease the immunity of these constructs. Strategies to combat this problem include heterologous prime-boost approaches (i.e. a class of strategies in which two different antigens are used, one to prime an immune response and the other to boost that response) that rely on priming with DNA or other viral vectors prior to an Ad5 boost (Lemckert et al., 2005). Other approaches under study include the use of naturally occurring adenoviruses of rare serotypes, such as human adeno serotype 26 or 35, or chimpanzee serotypes (Letvin, 2005), and the construction of chimeric adenoviruses in which the immunogenic regions of the Ad5 hexon are replaced with analogous regions from rare adeno serotypes (Roberts et al., 2006). If safe and immunogenic in individuals with high levels of pre-existing antibodies to adenovirus serotype 5, these novel candidate vaccines would move forward to efficacy testing in developing countries.

We have also learned from results of an Ad5 HIV vaccine trial, which were presented in November 2007, that it is possible that prior immunity to a vaccine vector may be associated with an increased risk of HIV acquisition. Vaccinations in two phase IIb trials of the Merck Ad5 HIV-1 gag/pol/nef were stopped early when review of interim analyses of the STEP study found that the vaccine was not effective in preventing HIV acquisition or in reducing HIV viral load among participants who acquired HIV infection (HVTN, 2007). Among participants with preexisting Ad5 immunity, more HIV infections occurred among those participants who received the vaccine compared to those who received placebo. Among men with high Ad5 titers ($>$200 units), 21 of 392 vaccinees and 9 of 386 placebo recipients acquired HIV compared to 28 of 522 vaccinees and 24 of 536 placebo recipients among men with low Ad5 titers ($<$200 units). All participants are being informed whether they received the placebo or vaccine and were encouraged to continue follow-up in the study. Further analysis will provide additional insight into the role and potential mechanisms of the Ad5 vector in susceptibility to HIV infection given preexisting Ad5 immunity.

The challenge for vaccinia virus vectors is slightly different. While it is likely that response may be attenuated among those with pre-existing immunity, the only source of this vaccine-induced immunity is previous smallpox vaccination (which was discontinued in most countries in the late 1960s or early 1970s). Thus prior immunity poses a problem only in certain circumstances, such as in Brazil where smallpox vaccination continued until 1975 or in special populations that continue to receive smallpox immunizations (e.g., U.S. first responders).

### Special Safety Considerations

The high proportion of HIV-infected individuals in many communities in the developing world means that, in settings in which routine pre-immunization HIV testing is not feasible, many individuals receiving the HIV vaccine will

be immunocompromised. This raises special considerations in vaccine design. Specifically, in this context, vaccine safety in immunocompromised individuals must be assured, as a successful vaccine could be rapidly rolled out and unknowingly administered to HIV-infected individuals with little access to health care. Live attenuated vaccine vectors could cause infections in the immunocompromised, resulting in morbidity and possibly even death. For example, safety concerns have been raised about vaccinia virus, the prototype viral vaccine vector, following a case of disseminated vaccinia and fatal encephalitis in an immunosuppressed HIV-infected individual (Letvin, 2005). This highlights the rationale for avoiding replication-competent, live, attenuated vectors in development of HIV vaccines despite the excellent immunogenicity that has been seen using this approach in design of vaccines for other pathogens.

### Vaccine Schedules and Regimens

A practical concern regarding candidate HIV vaccines is whether they will be feasible to administer in developing countries. For ease of delivery, simple regimens would be advantageous, even in industrialized countries that have the capacity to deliver complex vaccine regimens. The following factors must be considered in the vaccine schedule: (1) maintaining the cold chain, (2) the number of doses, (3) method of administration, (4) combination regimens for prime boost strategies, and (5) record keeping. Regimens that achieve high coverage in industrialized countries may fail in the developing world due solely to inadequate infrastructure.

In developing countries, vaccine delivery would be more efficient and economical if all vaccines were temperature stable (Levine, 2003). Most recommended vaccines require storage temperatures of 35–46°F (2–8°C) and must not be exposed to freezing temperatures (CDC, 2003). Maintaining these temperatures over the course of vaccine transportation, storage, and delivery, and monitoring the temperature are challenging in settings without reliable power sources. While a temperature-stable vaccine would be ideal, the ongoing challenge to maintain the cold chain to deliver vaccines in developing countries is being met in part by the Expanded Program for Immunization (EPI), which has made 2000 vaccine refrigerators available in Ethiopia (where 65% EPI vaccine coverage has been achieved) and 124 solar medical refrigerators available in Eritrea (where EPI vaccine coverage is 44%) (Jenkins, 1996).

In addition, optimal regimens call for as few doses as are necessary to stimulate immunogenicity, and would likely be administered with a syringe and needle approach. Simplified regimens, using fewer doses, are likely to boost coverage in any setting by minimizing the need for return visits and by allowing HIV vaccine delivery resources to be used to vaccinate more at-risk individuals in a shorter time. These considerations are particularly important in developing countries. While needle-free specialized devices (e.g. jet injectors with a disposable cap to prevent transmission of blood-borne diseases) are used to deliver DNA vaccines, they are relatively expensive and require transfer of the vaccine from the vial using a needle or special adaptor (Levine, 2003).

In summary, the development of candidate HIV vaccines for developing countries presents several specific challenges compared with those encountered in designing HIV vaccines for industrialized countries. These challenges

include a greater diversity of HIV subtypes that continues to increase; higher rates of pre-existing antibodies to viral vectors; higher prevalence of immune compromise due to HIV, much of which is undiagnosed; and limited health care resources. Accounting for these differences early in vaccine design and development is crucial to ensure that an effective vaccine can turn the tide of the HIV pandemic in countries at greatest risk.

## Strategies for HIV Vaccine Testing and Regulatory Approval in Developing Countries

Current HIV vaccine candidates and "second generation" vaccines in the development pipeline that are safe and immunogenic have move into large scale efficacy trials. These clinical trials are crucial to support the licensure and availability of effective HIV vaccines. To date, phase 1 and early phase $2^1$ vaccine testing has been done in industrialized countries, followed by or parallel to safety and immunogenicity testing in developing countries. Initial vaccine evaluation in industrialized countries is important for technical and political reasons. It ensures that the transition from animal models to human trials is done with rigorous safety evaluation, allows vaccine development to move forward consistent with a range of regulatory requirements, and mitigates concerns that participants in developing countries are "guinea pigs" for international pharmaceutical companies or researchers based in industrialized countries. For example, in India, regulatory agencies have not been willing to approve initial safety testing of candidates that have not undergone prior evaluation in an industrialized country (AAV vector, 2005). In developing countries, establishing vaccine safety and continuing to look for rare adverse events in advanced clinical trials are essential to maintain trust and scientific collaboration among scientists, pharmaceutical companies, and developing country populations.

Following successful phase 1 and early phase 2 trials, advancement into efficacy trials, almost by definition, must involve participants and investigators in developing countries, because it is in these countries that the majority of the target population for a preventive HIV vaccine lives. Conducting efficacy trials in developing countries is essential for several reasons. These reasons include the ability of these trials to: (1) provide population-specific data and information to the communities participating in the trial; (2) build relationships and trust among at-risk communities, opinion leaders, and public health providers; and (3) provide opportunities to learn about local operational and sociocultural challenges of HIV vaccine delivery. However, the conduct of HIV vaccine efficacy trials in developing countries, compared to industrialized settings, carries with it three key challenges. First, the populations of highest priority for participation in developing countries are likely to be particularly vulnerable due to their socioeconomic and educational status. Second, the burden of infectious diseases and other modifiers of the immune response (such as malnutrition) in developing countries present potential confounders for evaluating vaccine efficacy. Finally, existing capacity to conduct HIV vaccine efficacy trials in developing countries lags behind the capacity needed to evaluate current candidates and those in the pipeline.

### Efficacy Trials in Developing Countries

There are several clear reasons for conducting efficacy trials in developing countries. One of the most compelling is that more than 95% of adults and children newly infected with HIV live in the developing world (UNAIDS, 2006) (Figure 5.2). Demonstrating efficacy in developing countries is critical, as these countries represent the primary regions where an efficacious HIV vaccine must be deployed.

Advanced clinical development of HIV vaccines, including efficacy trials, requires a study population with sufficient HIV incidence to generate meaningful and interpretable results with a feasible sample size, within a reasonable time frame, and at a feasible cost. Therefore, trials should generally be conducted in populations with an annual HIV incidence of at least 2%. For example, in an endpoint-driven HIV vaccine trial that enrolls 3000 participants and requires 120 incident HIV cases to have 80% power to detect a true vaccine efficacy of 45%, it would take 33 months to accrue those 120 HIV infections in a population with an annual HIV incidence of 4%, compared to 47 months with an incidence of 2% (HVTN, 2006a). In addition to the time to accrue cases, HIV incidence also affects the size of trials. In Thailand, the baseline HIV incidence was found to be 5.6% among injecting drug users (IDUs) and $<1\%$ in the general population: two efficacy trials have been implemented in Thailand, one in each population, enrolling 2500 participants among IDUs and

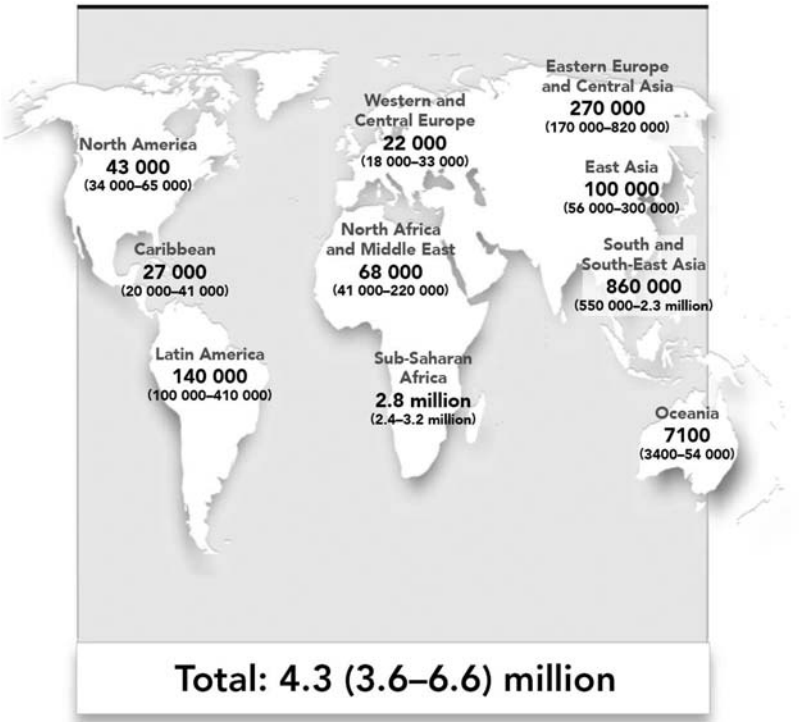


**Figure 5.2** Estimated number of adults and children newly infected with HIV in 2006. Reprinted with permission from (UNAIDS, 2006).

**Table 5.1** Comparison of 2 HIV vaccine trials in Thailand among different populations.

| HIV vaccine trial | Trial among IDUs in Thailand | Trial among the general population in Thailand |
|---|---|---|
| HIV incidence | 5.6% | <1% |
| Population | IDU | General population |
| Sample size | 2500 | 16,000 |
| Expected HIV seroconversions | 212 | 130 |
| Follow-up time | 36 months | 36 months |

16,000 participants in the general population (see Table 5.1) (Excler, 2006). The trial among IDUs expected 212 HIV cases in the absence of vaccine efficacy, and 164 were observed in the trial over 36 months of follow-up (Pitisuttithum et al., 2006). In the general population trial, 130 HIV cases are expected over 36 months of follow-up (NIH, 2007). These examples illustrate the pivotal role that HIV incidence plays in determining the duration of study to accrue the required number of cases and the scale of vaccine trials in terms of sample size required (Ferrantelli et al., 2006).

However, often HIV incidence data are not available. While cohort methods to determine HIV incidence are the gold standard, they require longitudinal follow-up of populations and are time-consuming and expensive. Methods that identify recent HIV infections, such as the BED capture enzyme immunoassay (BED CEIA), may be useful in estimating HIV incidence from a single cross-sectional survey (McDougal et al., 2006). Using both the BED assay and conventional cohort analysis, the incidence of HIV was estimated for the AIDSVAX B/B vaccine trial, the first efficacy trial of an HIV vaccine. The cumulative, annualized HIV incidence in the cohort was 3.10 cases per 100 person-years (95% CI, 2.57–3.63) and the corresponding BED-estimated incidence compared well at 2.91 (95% CI, 2.30–3.53) (McDougal et al., 2006). This trial, conducted in North America and the Netherlands, achieved the required incidence for an efficient HIV vaccine trial by recruiting primarily men who have sex with men (MSM) and enrolling very few women (only 6% of the trial participants) (Erickson, 2004; McDougal et al., 2006), who have a lower incidence of HIV estimated to be less than 1% in the U.S. (Rosenberg & Biggar, 1998). Evaluating vaccine candidates in women is important because vaccine efficacy may differ by sex (Stanberry et al., 2002) and because incidence among women is higher in developing countries, efficacy trials there are essential to assess vaccine efficacy in women. Communities where the incidence of HIV is at least 2% among young adults in the general population, as is found in developing countries (Gouws et al., 2002; Mbizvo et al., 1996), will allow recruitment from the general population.

### Priority Populations for HIV Vaccine Efficacy Trials

In addition to the pragmatic considerations discussed above for focusing on high HIV incidence populations for vaccine efficacy trials, inclusion of specific risk groups also facilitates evaluation of whether candidate vaccines are equally

efficacious across demographic factors and different modes of HIV transmission. In developing countries, inclusion of these priority populations—women, adolescents, IDUs, sex workers and MSM—in preventive HIV vaccine trials is frequently accompanied by the challenges of working outside traditional clinical trial settings and with highly vulnerable populations. Below, we discuss some of the challenges of working with these vulnerable populations in developing countries, as well as ways to avoid social harms and collect interpretable data in HIV prevention trials.

***Women***

The United Nations estimated that of the 4.3 million new HIV infections in 2006, almost half occurred in women (UNAIDS, 2006). This underscores the need to demonstrate candidate HIV vaccine safety, immunogenicity, and efficacy in women, as well as in men. Notably, in sub-Saharan Africa, where the epidemic is largely heterosexual, women account for 59% of prevalent adult HIV infections (UNAIDS, 2006). This contrasts with the HIV epidemic in North America and Western and Central Europe, where the main risk factor for HIV remains unprotected sex between men (UNAIDS, 2006). The feminization of the epidemic has also been seen in the Caribbean, Latin America, Asia, and Eastern Europe/Central Asia, where the proportion of women infected has increased steadily since 1990. Further, women are infected at a younger age than men. In South Africa, for example, women aged 15–24 years are four times more likely to be HIV-infected than are their male counterparts (Shisana et al., 2005). In 2005, HIV cross-sectional prevalence among young South African women was 15.5%, compared with 4.8% among young men (Pettifor et al., 2005b). Figure 5.3 shows the rapid rise in cross-sectional HIV prevalence with age in South Africa, to ∼10% in 18-year-old women and 2% in 18-year-old

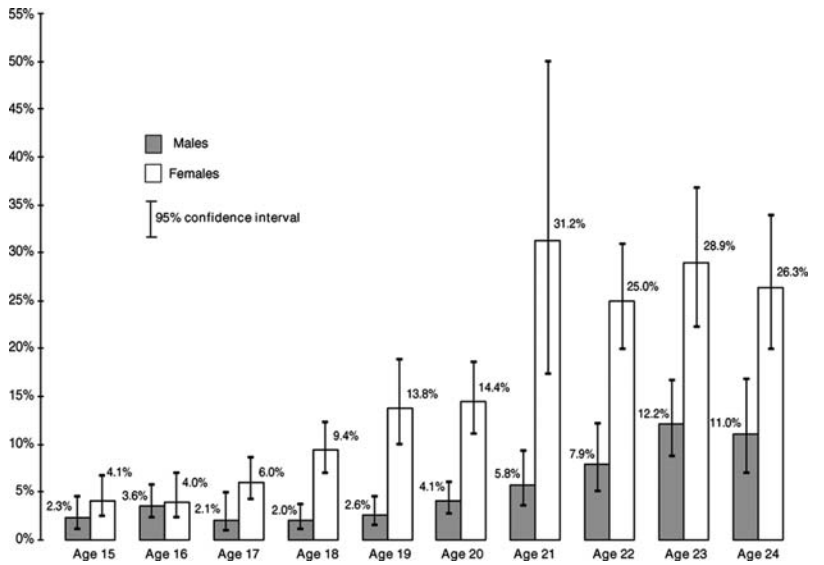


**Figure 5.3** HIV prevalence by age and sex among 15- to 24-year-olds, South Africa, 2003. Reprinted with permission from (Pettifor et al., 2005b).

men (Pettifor et al., 2005b). In contrast, in the U.S., more young men are currently infected than young women (Rosenberg & Biggar, 1998), although the incidence of HIV among young women is increasing due to heterosexual transmission (Karon et al., 2001).

Both biological and behavioral factors conspire to place young women at greater risk for acquisition of HIV infection than men. The transmission of HIV from male to female has been estimated to be two to three times higher than from female to male (Carpenter et al., 1999), although this finding has not been reported consistently (Gray et al., 2001). Biologically, young women are at particular risk for infection compared to older women because the immature cervix has a larger area of cervical ectopy, which is rich in HIV target cells, and the immature genital tract is more susceptible to trauma (Coombs et al., 2003). Behavioral factors, such as early sexual debut and partnering with older men who may supply money, clothes, or other items for sex, put young women at increased risk for HIV (Gregson et al., 2002; Pettifor et al., 2005b; Pettifor et al., 2004).[2]

In addition to biology and behavior, the dynamics of HIV infection has also been found to differ according to sex. Following acute HIV infection, a level of viremia is established—the set-point viral load—which has been correlated to the subsequent rates of HIV disease progression and inversely correlated with AIDS free survival (Mellors et al., 1995; Vlahov et al., 1998). Among HIV-1—infected women, viral loads tend to be lower than among infected men, which is possibly due to the effect of estrogens acting to negatively down regulate HIV replication (Sterling et al., 1999). However, HIV viral load was found to increase more rapidly over time among women than among men, with no differences in viral load found after seven years (Sterling et al., 1999). Differences in set-point viral load by sex are relevant for trials of CTL mediated vaccine, in which candidate vaccines aim to decrease set-point viral load and provide a further reason for trials to enroll women, as well as men.

While women in developing countries represent a priority population for HIV vaccine evaluation, they face specific challenges to participating in HIV prevention trials. Low female literacy rates in developing countries, and the fact that in some countries women require their husband's permission to participate, make obtaining informed consent a challenge (Mills et al., 2006). As is the case in industrialized countries, participation may also be limited by practical concerns such as childcare and transportation. For all priority populations, access to healthcare may be severely limited. Therefore, during routine physical examinations, trial staff may detect diseases for which treatment may not be available (Fitzgerald & Behets, 2003). Also, physical and sexual violence against women is, unfortunately, common in some parts of the developing world (Dunkle et al., 2004; Jewkes et al., 2002). In 1395 interviews with women attending antenatal clinics in Soweto, South Africa, 30.1% reported physical/sexual partner violence from a male partner in the last 12 months (Dunkle et al., 2004) compared to 11.1% of women attending emergency rooms in Denver, Colorado (Abbott et al., 1995). These challenges and concerns, and how they are addressed, are real and pressing issues not to be disregarded due to the ethical complexity (Fitzgerald & Behets, 2003).

Several practical solutions have been offered as starting points by Fitzgerald and Behets (2003). They suggest that researchers and community members try

to develop feasible approaches before studies begin. For example, women's groups and counselors can be identified to help women experiencing domestic violence. Further, clinical sites can set up referral systems for healthcare provision to trial participants (Fitzgerald & Behets, 2003). It is also important to ensure that informed consent is obtained in a manner that is sensitive to gender and social issues and to provide childcare at sites where recruitment of women is a priority (Mills et al., 2006). These strategies to enroll women can help ensure their participation and retention, as well as the ability of the trial to collect interpretable data.

***Adolescents***

Adolescents and young adults are at substantial risk for HIV infection. Demonstrating HIV vaccine efficacy in this group is important because, worldwide, 40% of new HIV infections are in 15- to 24-year-olds (UNAIDS, 2006). It is precisely these cases that would be prevented by vaccination before sexual debut (Cardinali et al., 2007). Vaccination after the age of sexual debut will fail to prevent some cases in sexually active teens, making the age at vaccination an important characteristic of proposed immunization strategies. To answer research and regulatory questions prior to the implementation of adolescent immunization strategies in developing countries, data are needed on vaccine safety, immunogenicity, and efficacy in this priority population.

While it is likely that safety and immunogenicity profiles in adolescents will be similar to those seen in adults, some parameters may differ (Jaspan et al., 2008). The immune response may be more robust among adolescents than adults, as has been observed with the hepatitis B and human papillomavirus (HPV) vaccines. With the HPV vaccine, the magnitude of the immune response among adolescents seen to date has been 1.7- to 2.7-fold greater than that among adult women (Block et al., 2006). Alternatively, adolescent immunization may occasionally result in increased incidence of adverse events. For example, rubella vaccination has been associated with higher rates of autoimmune arthropathy (joint disease), which is thought to be linked to the high levels of sex hormones during adolescence (Howson & Fineberg, 1992). However, the resulting athropathy is usually short lived and chronic arthritis has only rarely been documented (Schattner, 2005).

Finally, the development and licensure in 2006 of a highly efficacious HPV vaccine highlights several issues about the roll-out and scale-up of vaccines to prevent sexually transmitted infections. As with the HPV vaccine, it is likely that most of these vaccines will produce their optimal effect when administered to adolescents prior to coital debut. Some have raised concerns that immunization of pre-adolescents and adolescents with HPV vaccine may encourage sexual activity, although this effect has not been observed to date (Colgrove, 2006; Daley et al., 2006; Kahn, 2005; Kahn et al., 2005; Lazcano-Ponce et al., 2001). Although experience with the measles and hepatitis B vaccines clearly supports the improved coverage obtained with school vaccination requirements, there is ongoing controversy about making HPV vaccination mandatory for middle school (Averhoff et al., 2004; Colgrove, 2006; Hinman et al., 2004). These issues likely presage similar challenges for HIV vaccines. Lessons learned include the need to identify and address social, ethical, and political concerns early and consistently.

Successfully recruiting and retaining adolescents into trials in developing countries will involve engaging with at-risk youth living under challenging social circumstances. These conditions include poverty, homelessness, drug abuse, and forced or transactional sex, which can lead to partnerships between younger women and older men. Young women with older partners are often at increased risk of HIV infection. For South African women who are 15–19 years old with a partner 5 years or more older, the adjusted odds ratio (AOR) for HIV infection was 3.2 (95% CI, 1.2–8.3) compared to women with partners less than 5 years older (Pettifor et al., 2005b). Also, transactional sex increases the likelihood of HIV infection. In a survey of South Africans 15–24 years of age, those who had ever engaged in transactional sex were 1.86 times (95% CI, 1.10–3.12) more likely to be HIV infected (Pettifor et al., 2005a). Intimate partner violence was also found to be strongly associated with risk factors for HIV infection[3] (Jewkes et al., 2006). Trials among adolescents in developing countries must find ways of addressing the challenges that place young women at greater risk for HIV infection.

Investigators around the world are beginning to build the information base and infrastructure to recruit and retain adolescents in HIV vaccine trials. For example, researchers at the Perinatal HIV Research Unit in Soweto and the Desmond Tutu HIV Center in Cape Town, South Africa, have been working with adolescents and key stakeholders (Jaspan et al., 2008). At the Desmond Tutu HIV Center, 356 (73%) of 510 randomly selected adolescents took part in a survey estimating their willingness to participate in HIV vaccine trials (Jaspan et al., 2006). The median age of participants was 15 years and 79% indicated willingness to participate in HIV vaccine trials, demonstrating the feasibility of engagement with adolescents (Jaspan et al., 2006). Similar efforts are underway in the U.S., where the Adolescent Trials Network is building capacity and links to at risk youth through the "Connect to Protect" project (Adolescent Medicine Trials Network, 2007).

Trial designs must incorporate regulations and guidelines geared towards protecting adolescents and specific for the country in which the vaccine will be tested. Generally, country-specific regulations give the age at which minors may consent to participate in research without parental permission, although guidelines are still being developed in many countries (Jaspan et al., 2008). Most countries require that minors and children have the proxy consent of a parent or guardian, in addition to their own assent, to ensure the protection of the rights and interests of the minor. This requirement means that trials among adolescents must seek parental permission, possibly introducing additional challenges (Jaspan et al., 2008).

A major challenge in enrolling young adolescents in HIV or sexually transmitted disease (STD) vaccine efficacy trials occurs when eligibility is based on sexual activity or other risk behaviors. Teens may be unwilling to participate if information about these behaviors will be shared with their parents. Several models exist for parental consent in trials such as these. One strategy is to separate screening for the trial from obtaining the consent for the trial, during which the adolescent's risk behavior is not disclosed. Alternatively, parents can waive their rights to access the adolescents' private information. Despite these challenges, trials of vaccines to prevent STDs among young men and women have successfully recruited and retained adolescents, most recently for multi-

center studies of HPV vaccines (Block et al., 2006; Lehtinen et al., 2006). Also, families have been successfully recruited and retained in pilot HIV prevention projects in Trinidad and South Africa (attendance was over 90% over 12–13 weekly sessions) (Baptiste et al., 2006). At trial sites that expand from adult participants to include adolescents, community advisory boards must also be expanded to include youth and their caregivers, as has been done at several vaccine trial sites in South Africa (Jaspan et al., 2008). These projects demonstrate that youth-friendly care in at-risk neighborhoods can identify and recruit at-risk youth for participation in trials.

***Transmission Mode Priority Groups***

Different HIV risk behaviors and transmission modes dominate in different regions of the world. In the U.S., in 2005, 43% of newly diagnosed AIDS cases occurred among MSM (5% of these MSM also reported injecting drug use). An even higher proportion of prevalent infections were due to homosexual transmission (CDC, 2007). In Latin America, in 2005, 26% of HIV infections were among MSM, while 19% were among IDUs (Figure 5.4) (UNAIDS, 2006). In contrast, the vast majority of HIV infections in sub-Saharan Africa are associated with high-risk heterosexual sex. In Eastern Europe and Central Asia, in 2005, two-thirds of prevalent HIV infections were due to needle sharing among IDUs. In South and Southeast Asia (excluding India, where heterosexual sex is also the leading transmission mode), in 2005, half of prevalent HIV infections occurred in sex workers and their clients.

The transmission risk of these groups differs biologically and in absolute magnitudes. HIV transmission as a result of trauma to the anal mucosa has been estimated to result in 0.84 secondary infections per partner, compared to 0.31 secondary infections per partner for male-to-female transmission (and 0.14 secondary infections per partner for female-to-male transmission) (Pinkerton et al., 2000). Grassly and colleagues estimated that the risk of HIV transmission associated with needle sharing was seven times greater than sexual transmission (Grassly et al., 2003). While there are limitations in the methods used to estimate transmission probabilities, these examples do illustrate the increased HIV transmission efficiency associated with anal intercourse and parenteral

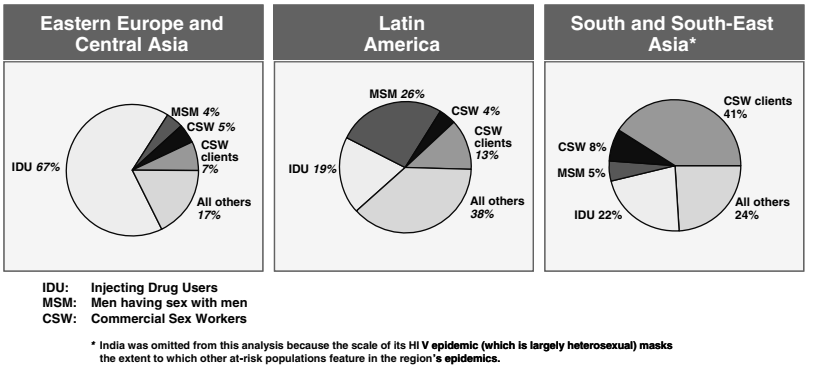


**Figure 5.4** Proportions of HIV infections in according to transmission mode, by region, 2005. Reprinted with permission from (UNAIDS, 2006).

transmission. In light of these differences, vaccine efficacy must be demonstrated across different transmission modes, particularly those responsible for the majority of new HIV infections in developing countries with emerging HIV epidemics.

Efficacy trials among IDUs provide excellent examples of the opportunities and challenges of testing candidate vaccines in the context of parenteral transmission and frequent hepatitis B and C co-infection (Schiffer et al., 2007). Vaccine trials among IDUs must deal with the realities of political and social marginalization and legal sanctions. Similar to other priority groups discussed, IDUs may have limited access to healthcare and other resources.

Successful trials among IDUs illustrate how these challenges can be overcome. In Thailand, the AIDSVAX B/E trial, conducted among 2546 IDUs, retained 94% of the enrollees (Pitisuttithum et al., 2006). Despite failure to demonstrate any protection from the vaccine over 36 months, the study demonstrated that IDUs can be recruited, retained, and followed up successfully. Also, counseling was found to decrease risk behaviors. Towards the end of the trial, the Thai government initiated a "war on drugs," triggering concerns that trial participation would result in social harm to the trial participants (Pitisuttithum et al., 2006). However, trial data indicated that $<2\%$ of participants reported study-related social harms. This may have been because the anti-drug campaign targeted methamphetamine users rather than heroin users, the population recruited into the trial (Pitisuttithum et al., 2004). This case illustrates how changing legal sanctions can affect ongoing trials and underscores the need for continued efforts to minimize possible social harms.

Trials among MSM and sex workers also represent an area that may be fraught with legal and social challenges. In Jamaica, Human Rights Watch reported widespread violence and discrimination against MSM living with, and at risk for, HIV/AIDS and against their peer educators (Schleifer, 2005). Similarly, sex workers are also often socially marginalized and may have little access to health care. And while education as part of the trial encourages condom use, sex workers may have additional concerns including violence from clients when negotiating condom use (Mills et al., 2006). The realities of working with sex workers may be politicized, as well. In Cambodia and Cameroon, tenofovir prophylaxis trials to prevent HIV acquisition among sex workers were suspended in response to a statement from the Cambodian Prime Minister (Page-Shafer et al., 2005). Concerns were also raised by a group representing sex workers, in Cambodia, regarding the lifelong provision of antiretroviral therapy for participants who seroconverted during the trial (Cohen, 2005). Despite these experiences, successful prophylactic trials among sex workers in Ghana and Malawi using tenofovir continue (Cohen, 2005).

### Potential Confounders of Vaccine Efficacy in the Developing World

Candidate HIV vaccines may act in two ways. First, they may confer sterilizing immunity or a proportion of infectious challenges may be limited by vaccine-induced immunity. Second, candidate vaccines may alter the course of HIV infection by reducing the set-point viral load. In developing countries, the high burden of infectious diseases or other disorders that modify the immune response may increase susceptibility to HIV infection, increase set-point viral

load, or alter vaccine response, rendering vaccine efficacy difficult to detect. Observational studies support the exploration of three types of confounding factors in developing countries when estimating vaccine efficacy: 1) infections such as chancroid may facilitate HIV acquisition and reduce detectable vaccine efficacy in preventing infection; 2) infections such as herpes or malaria, particularly during acute episodes, may increase HIV viral load, making the effect of a CTL-mediated vaccine that reduces viral load difficult to detect; and 3) infections, such as tuberculosis (TB), may dampen the immune response, making vaccine immunogenicity difficult to detect. In addition to the effects on vaccine-induced immunity, understanding the effect of STDs is further complicated because STDs share the sexual transmission route with HIV making exposure difficult to control for.

Apart from infectious diseases, the impact of malnutrition on the immune system may reduce response to the vaccine and may also render individuals more susceptible to infections. While the effect of malnutrition on immunogenicity to candidate HIV vaccines is not yet known, an association between malnutrition and a decreased response to measles vaccination was seen in Uganda. After measles immunization, lower measles antibody levels were seen among HIV-positive children with stunting compared to those without (Waibale et al., 1999). Also, among malnourished hemodialysis patients, a lower response to hepatitis B vaccination was seen (12% of patients with serum albumin levels between 3 and 3.5 g/dL produced antibodies to hepatitis B vaccination) compared to hemodialysis patients with higher serum albumin levels (81.2% of those with serum albumin levels between 4.5 and 5 g/dL) (Fernandez et al., 1996).

***STDs: Increasing the Acquisition of HIV***

STDs are important risk factors for HIV-1 acquisition (Fleming & Wasserheit, 1999; Sexton et al., 2005). Multiple, well-designed cohort and nested case-control studies from four continents suggest that there is a 2- to 5-fold increased risk of HIV acquisition associated with STDs, and that genital ulcer diseases are generally associated with slightly higher risk estimates than discharge syndromes (Fleming & Wasserheit, 1999). A recent meta-analysis and meta-regression of the impact of all STDs on HIV acquisition found a 2- to 3-fold increase in risk of HIV-1 acquisition with an intercurrent STD (Sexton et al., 2005). For herpes simplex type 2 (HSV-2), a recent meta-analysis of longitudinal studies estimated that the risk of HIV-1 infection among HSV-2 infected individuals was three times that among HSV-2–uninfected individuals: for men the relative risk (RR) was estimated to be 2.7 (95% CI, 1.9–3.9) and for women the RR was 3.1 (95% CI, 1.7–5.6), adjusting for age and sexual behavior (Freeman et al., 2006). This 3-fold increase in risk of HIV-1 acquisition among individuals with HSV-2 suggests that in much of the developing world, where HSV-2 prevalence is high, a substantial proportion of HIV infection may be attributable to genital herpes.

In 1999, the World Health Organization (WHO) estimated that there were 340 million new cases of curable STDs among adults, 90% of which occurred in developing countries (WHO, 2001). As is the case with HIV, lack of access to care as well as social and economic factors probably account for much of

the difference in STD disease burden between developing and industrialized countries. Among these STDs, HSV-2 stands out because its chronic course and relatively high transmission probability result in an epidemic that can be sustained in the general population, not only in high-risk groups. This has resulted in high HSV-2 prevalences in many developing countries where HSV-2 is thought to be an important factor, particularly in generalized HIV epidemics, to fuel the HIV epidemic (Auvert et al., 2001; WHO & UNAIDS, 2007). High HSV-2 seroprevalence has been reported in adult sub-Saharan African populations with ranges from 30–80% in women and 10–50% in men (Weiss, 2004). On other continents, HSV-2 seroprevalence is generally lower than in sub-Saharan Africa, but still substantial. In Latin America, where most HSV-2 seroprevalence studies have enrolled women, sero-surveys in Mexico City, Costa Rica, and Brazil report prevalences $\geq$30% (Carvalho et al., 1998; Oberle et al., 1989). This data is in comparison to the U.S., where the overall age-adjusted HSV-2 seroprevalence for persons 14–49 years of age was 17.0% (95% CI, 15.8–18.3%) between 1999 and 2004 (Xu et al., 2006). The high prevalence of STDs, particularly HSV-2, in developing countries suggests that it will be important to collect data on the incidence of STDs during HIV vaccine trials to ensure that a vaccine effect will not be obscured by intercurrent STDs.

***Infectious Diseases: Impact on Set-Point HIV Viral Load***

STDs may also increase HIV-1 viral load in blood and genital secretions (Fleming & Wasserheit, 1999; Sexton et al., 2005). Plasma HIV viral load has been reported to increase with genital ulcer disease (GUD), urethritis, HSV-2, cervicitis, syphilis, and pelvic inflammatory disease (Buchacz et al., 2004; Galvin & Cohen, 2004; Price et al., 2003). Several studies suggest that HSV-2 may increase the replication of HIV-1 (Corey et al., 2004).

The relationship between HSV-2 infection and increased HIV viral load may vary by stage of HIV infection. In the Rakai community randomized controlled trial in Uganda, an increase in viral load was found among HSV-2–seropositive subjects (4.56 log10 copies/mL) compared to HSV-2–seronegative subjects (4.06 log10 copies/mL) across all stages of HIV disease. However, this increase was statistically significant only for those with incident HIV infections (Gray et al., 2004).[4] In contrast, Duffus and colleagues found that HIV viral load among individuals with chronic HIV infection was 0.3 log copies/mL higher in persons with HSV-2 than in those without HSV-2 infection ($P = 0.014$) (Duffus et al., 2005). Studies in Kenya have demonstrated increased HIV-1 viral load in blood and cervicovaginal secretions associated with gonococcal and chlamydial cervicitis and pelvic inflammatory disease (Anzala et al., 2000; McClelland et al., 2001). Investigators in Malawi have demonstrated increased HIV-1 RNA in semen among men with urethritis or trichomoniasis (Cohen et al., 1997; Price et al., 2003). Among men co-infected with HIV and syphilis in San Francisco and Los Angeles, syphilis was associated with significantly higher HIV viral load (by a mean of 0.22 log copies/mL) and significantly lower CD4 cell count (Buchacz et al., 2004).

Other infectious diseases may act similarly. In Malawi, HIV-1–infected individuals were also found to have higher HIV-1 viral loads during acute malaria episodes than individuals without acute malaria (Hoffman et al., 1999; Kublin et al., 2005). Like HSV-2, acute malaria has been shown to increase HIV-1

replication (Xiao et al., 1998). Finally, an observational cohort study of HIV-infected adults in South Africa found that those with an episode of TB disease ($n = 30$) had an increase in HIV-1 viral load (0.24 log10, 95% CI -0.01–0.50 log10 copies/mL; $p = 0.06$) compared to individuals without TB ($n = 56$) (Day et al., 2004). Thus, in efficacy trials of CTL-mediated HIV vaccine candidates, where the primary endpoint is set-point HIV viral load, results may be confounded by interactions with any of these concomitant infectious diseases, all of which will be more common in developing countries than in industrialized nations.

***Infectious Diseases: Impact on Detection of an Immune Response***

Among both HIV-negative and -positive individuals, the immune response to TB seems to be a balance between proinflammatory and immunosuppressive mechanisms (Lawn et al., 2005). Dominance of immunosuppressive effect may obscure immune responses to candidate vaccine in participants with active TB disease. Helminth infections, such as tapeworms and roundworms, may also decrease T-cell responses: in mice, *Schistosoma mansoni* infection, a parasitic infection caused by flatworms, suppressed T-cell immune responses to an HIV vaccine compared to results in uninfected mice (Da'Dara et al., 2006). The complexity of these interactions among infectious diseases highlights the need for field studies to elucidate these relationships, particularly in intervention studies conducted in developing countries (Abu-Raddad et al., 2006; Excler, 2006).

## Research Capacity and Operational Issues at HIV Vaccine Efficacy Trial Sites in Developing Countries

The need to build, sustain and expand the limited research capacity that currently exists in most developing countries is fuelled by the growth in the number of promising vaccine candidates discussed earlier, the changing risk of HIV over the course of trial preparation and implementation, and the expanding array of effective HIV prevention interventions that, ethically, must be made available to all trial participants (Excler, 2006; Wasserheit, 2005). The trial itself may change participants' behavior simply as a result of participants being observed in the study (the Hawthorne effect), or behavior may change through trial-sponsored HIV risk reduction counseling and condom promotion. Ethical research requires that these standard interventions are routinely provided to all vaccine trial participants. HIV intervention trial preparedness studies have often observed a decline in HIV incidence. In such a cohort study among 3628 Kenyan sex workers, a 90% decrease in HIV incidence was observed over 3 years, with most incident cases occurring in the first 6 months, and a concomitant decline in reported high risk sexual behavior was also observed (Baeten et al., 2000).

New and emerging HIV prevention interventions are likely to drive additional decreases in HIV incidence. Growing access to ART in developing countries will further reduce HIV incidence. The results of recently completed trials demonstrating at least a 50% reduction in HIV incidence following male circumcision (Bailey et al., 2007; Gray et al., 2007) suggest that HIV incidence will continue to fall in many developing countries as this intervention and

further breakthroughs (e.g., HSV-2 treatment and microbicides) become widely available. Indeed, the advent of a partially effective HIV vaccine itself will also reduce HIV incidence. While these advances are triumphs in the battle against the HIV pandemic, they result in ballooning HIV vaccine trial sample sizes and place additional pressure on development of trial capacity in the developing world. Finally, HIV vaccine trials must share the limited developing country site capacity with efficacy trials of other HIV prevention interventions that are being tested in the same priority populations. Thus, to clearly demonstrate vaccine efficacy in the context of falling HIV incidence, the need for HIV vaccine trial capacity must expand.

In tangible terms, expanding vaccine trial capacity means establishing trial sites that will ensure the safety of participants and produce trial results to the standard and quality necessary to support vaccine licensure. For the sites, participating in vaccine trials helps strengthen their research capacity and builds clinical, laboratory, and regulatory infrastructure and expertise. The specific challenges of expanding trial sites in developing countries include: (1) limited existing research capacity, health facilities, and regulatory infrastructure; (2) the need to protect vulnerable groups; and (3) considerations about whether or not feasibility studies will be undertaken at that site.

***Research Capacity at Sites***

The complexities of running and coordinating international multicenter trials are immense—as reflected by investigators participating in an HIV-1 canarypox vaccine trial (HIVNET 026) conducted in the Caribbean and South America—and highlight some of the cross-cutting and site-specific challenges (Cleghorn et al., 2007). In HIVNET 026, the complexities of an international multicenter trial included establishing infrastructure to meet Good Clinical Practice (GCP) standards (FDA, 2004a), setting up formal community advisory boards, and establishing ethical and regulatory review procedures in countries where these had not previously been formalized. In addition, laboratory procedures had to optimize the quality of specimens requiring processing and shipment to central laboratories (Cleghorn et al., 2007). Laboratory procedures have since been standardized according to Good Laboratory Practice (GLP) guidelines (FDA, 2004b). Done in a coordinated manner, standardization of techniques and procedures will foster comparability between trials (Ferrantelli et al., 2006). The experience of the HIV Vaccine Trials Network (HVTN) suggests that multiple steps are essential in order to establish these systems and infrastructure (Figure 5.5), and the time required from site identification to trial implementation generally ranges from approximately 6 months for sites with previous trial experience to 18 months for sites with no previous trial experience (HVTN, 2006b).

Working in resource-poor settings raises other practical challenges. High illiteracy rates have been addressed by using educational videos rather than written text. This technique resulted in good comprehension of informed consent materials among volunteers in HIV clinical trials in Port-au-Prince, Haiti (Joseph et al., 2006). Trial sponsors have responded to limited opportunities for healthcare by assuring access to antiretrovirals for participants who acquire HIV during an HIV vaccine trial (Fitzgerald et al., 2003; IAVI, 2007). The shortage of skilled staff in developing countries necessitates ongoing training.

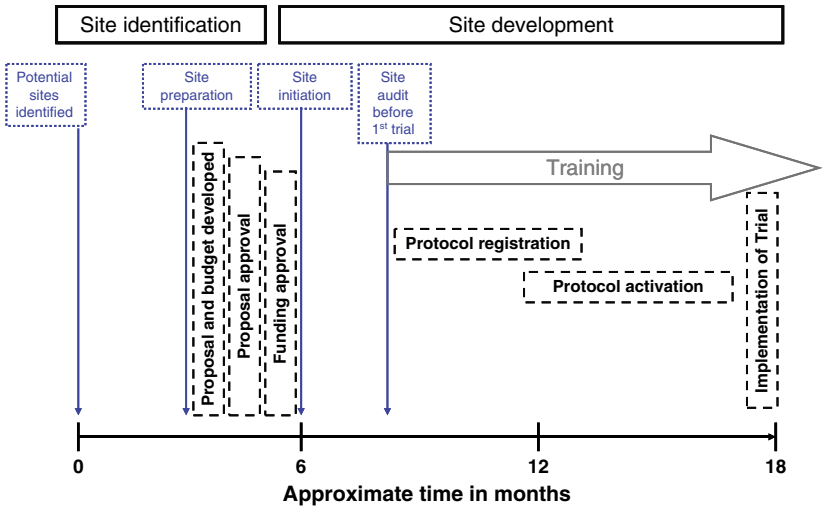


**Figure 5.5** Timeline for HVTN site development adapted from the HVTN Aug 2005–July 2006 Evaluation Report (HVTN, 2006b). Between potential site identification and trial implementation, the HVTN describes 3 main phases for site identification and development. The first is Site Strategic Planning (not shown), which involves review of the vaccine pipeline, enumeration of anticipated trials linked to candidates, and assessment of trial capacity required for those trials. The second phase is Site Identification, during which identified potential sites are reviewed and a proposal and budget are developed. The proposal reviews the epidemiology of HIV in the country and requires data or estimates on HIV incidence, potential ability to recruit and retain priority participants, and care for participants infected with HIV during the trial. The third phase, Site Development, occurs after the proposal is approved. During Site Development, funding is established, the first protocol to be conducted at the site is registered and activated, and the trial is implemented. Training is an important component from the start of site development onwards, and it continues for the duration of the trial.

The mobility of skilled staff has been noted in Thailand, and expanded opportunities for ongoing learning and advancement have been promoted to retain these valuable workers (Chuenchitra et al., 2005).

Many of the challenges of building HIV research in developing countries have been, and continue to be, addressed by many international and national agencies (such as the NIH, Centers for Disease Control and Prevention (CDC), International AIDS Vaccine Initiative (IAVI), Walter Reed Army Institute of Research, Center for HIV-AIDS Vaccine Immunology, and the European Union) with leadership, training, and substantial investments to increase research site capacity. In addition, WHO and the Joint United Nations Programme on HIV/AIDS (UNAIDS) have taken the lead in brokering international issues, such as standardizing ethical guidelines and reviewing the scientific aims of research plans.

***Protecting Vulnerable Populations***

The priority populations described in Section 5.2.2.—women, IDUs, sex workers, MSM, and adolescents—are vulnerable, and care must be taken to ensure that volunteers in these groups make decisions about participation without

coercion. The challenges described above, particularly illiteracy and poor access to healthcare, introduce unique ethical issues for vaccine efficacy trials in developing countries. Education and informed consent approaches must be adapted for illiterate volunteers (Fitzgerald et al., 2002) and access to healthcare may need to be provided (Fitzgerald & Behets, 2003). However, investigators have the added responsibility of evaluating these strategies to protect trial participants by monitoring the impact of risk reduction interventions and evaluating comprehension of education programs and informed consent. Efforts to protect vulnerable populations draw upon strong relations with community advisory boards and advocacy groups, and adherence to the guidelines set by local and international regulatory bodies (South African Medical Research Council, 2004).

***Feasibility Studies in Developing Countries***

Whether or not feasibility studies are initiated to prepare sites for vaccine efficacy trials is a debated question. On one hand, feasibility studies in developing countries may serve to train clinical and laboratory site personnel and may provide the opportunity to establish normal laboratory values for screening tests. Also, HIV seroconverters could be followed to document key features of the clinical course of HIV infection, such as viral load set point, CD4 levels, and symptoms that may be altered by the vaccine (Excler, 2006). Lastly, feasibility studies may provide the opportunity to ensure that trial inclusion and exclusion criteria are clinically relevant and that reported adverse events can be interpreted using the routinely collected laboratory data (Excler, 2006). However, these studies themselves often require many months to develop and implement, and because many factors change during the course of the study, some experts feel that their value is not worth the delay. An alternative approach is gradual implementation of efficacy trials with GLP and GCP in place and with substantial ongoing technical and other support. Successful trials have been launched using both approaches: the Thai trial was preceded by feasibility studies (Pitisuttithum et al., 2006), while the STEP trial was launched at some newly developed international sites after extensive site preparation and with in-depth site support.

## Conclusions

As strategies for developing vaccines against HIV infection move beyond the boundaries of traditional vaccine development, so do testing and regulatory approval strategies. In both areas, designing and evaluating HIV vaccines for developing countries present unique challenges that must be addressed. An ideal HIV vaccine candidate for the developing world would offer protection against the multitude of HIV viral subtypes and recombinants found in those regions, be safe and efficacious against a background of modulators of the immune response, and be straightforward to administer. Finding such a vaccine will require an unprecedented level of collaboration among researchers, at-risk communities, regulatory authorities, and governments in developing and industrialized nations to address the challenges discussed above. This is a daunting task, but it holds the promise not only of an effective vaccine for the most

devastating pandemic of our time, but also of greatly improved capacity to respond to future pandemics which, like HIV, could emerge in and ravage developing countries.

## Notes

1. NIAID definitions for phase 1, 2, and 3 trials:
   Phase 1 vaccine trial: a closely monitored clinical trial of a vaccine conducted in a small number of healthy volunteers. A phase 1 is designed to determine the vaccine's safety in humans, its metabolism and pharmacologic actions, and side effects associated with increasing doses.
   Phase 2 vaccine trial: controlled clinical study of a vaccine to identify common short-term side effects and risks associated with the vaccine and to collect information on its immunogenicity. Phase 2 trials enroll some volunteers who have the same characteristics as persons who would be enrolled in an efficacy (phase 3) trial of a vaccine. Phase 2 trials enroll up to several hundred participants and have more than one arm.
   Phase 3 vaccine trial: large controlled study to determine the ability of a vaccine to produce a desired clinical effect on the risk of a given infection, disease, or other clinical condition at an optimally selected dose and schedule. These trials also gather additional information about safety needed to evaluate the overall benefit-risk relationship of the vaccine and to provide adequate basis for labeling. Phase 3 trials usually include several hundred to several thousand volunteers (NIAID, 2005).
2. In a sample of 4393 sexually active women aged 18–35 in Harare, Zimbabwe, an association was found between early age of sexual debut and increased risk of HIV infection (relative hazard 1.30; 95% CI, 1.1.3–1.50) (Pettifor et al., 2004). In a cross-sectional national household survey among 11,904 South African youth age 15–24 years, young women age 15–19 years whose partners were 5 or more years older were significantly more likely to be infected with HIV, compared to women with a partner the same age or younger (AOR = 3.2; 95% CI, 1.2–8.3) (Pettifor et al., 2005b).
3. In their study of 1295 women age 15–26 in rural South Africa, Jewkes and colleagues found that intimate partner violence was strongly associated with risk factors for HIV infection (including number of partners) (Jewkes, 2006).
4. HIV-1 RNA levels were determined for 256 participants with incident HIV-1 infection and compared to levels in 1293 participants with prevalent HIV-1 infection, according to HSV serostatus (Gray et al., 2004). The increased HIV-1 viral load associated with HSV-2 seropositivity was found at 5 and 15 months after HIV-1 seroconversion (Serwadda et al., 2003).

## Acknowledgement

The authors are grateful to Katie Skibinski for technical and editorial assistance with the chapter.

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# Chapter 6

# Microbicide Development

Ian McGowan

## Preface

The increasing femininization of the AIDS pandemic demands that we develop new approaches to HIV prevention that allows women to take control of their reproductive health. In the absence of effective HIV vaccines the two most promising approaches are pre-exposure prophylaxis with antiretrovirals (PREP) or topical application of microbicides. Microbicides are products that can be applied to vaginal or rectal mucosal surfaces with the goal of preventing, or at least significantly reducing, the transmission of sexually transmitted infections (STIs) including HIV-1. Currently, seven candidate microbicides are in clinical development and three products are being evaluated in large-scale phase 2B/3 effectiveness studies. Initial data from these trials will be available within the next 1–2 years and it is feasible that there could be one or more licensed microbicides by the end of the decade. The first generation of surfactant microbicides had a relatively non-specific mechanism of action. However, subsequent candidate microbicides have been developed to target specific steps in the process of viral transmission. The purpose of this article is to provide an overview of microbicide development, an update on the candidate pipeline, and a discussion of both the challenges involved in conducting microbicide trials in the developing world and also how microbicides might integrate into the broader biomedical prevention landscape.

## Introduction

As of December 2006, UNAIDS estimates that approximately 39.5 million people are living with HIV/AIDS. Approximately 2.9 million people died from HIV-1 infection in 2006, and an additional 4.3 million were newly infected



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_6, 

(Fauci, 2006; UNAIDS, 2006). These broad-brush strokes describe a pandemic that continues to be one of the major global health challenges of the 21st century. The vast majority of HIV-1 infection is transmitted sexually. Condoms provide a highly effective means of preventing HIV-1 infection but in many situations they are not used. Individuals may not be able to negotiate their use, condoms may not be available, or couples may choose not to use them. Microbicides may offer an important alternative means of HIV-1 prevention in these situations. Zena Stein first proposed the concept of a topical "virucide" that might block HIV-1 transmission in 1990 (Stein, 1990). This idea grew out of the reproductive health research community and not surprisingly one of the first products to be considered as a microbicide was the spermicidal agent nonoxynol-9. Unfortunately, this agent was subsequently shown to be neither safe nor effective (Hillier et al., 2005; Van Damme et al., 2002) as a microbicide and development for this indication was terminated although it is still marketed as a spermicide. Despite this disappointing start, the field continued to evaluate microbicide candidates. The first generation of microbicides included agents that were primarily surfactants, like nonoxynol-9, or products that enhanced vaginal defenses through mechanisms such as maintenance of vaginal acidity. Increasingly, the microbicide pipeline is linked to a growing understanding of the pathogenesis of HIV-1 transmission and the identification of viral and cell receptor targets (D'Cruz & Uckun, 2004).

## Mucosal Transmission of HIV-1 Infection

Sexual transmission of HIV-1 is initiated when semen containing cell-free or cell-associated virus is deposited in the vagina or rectum or when virus passes from these compartments to the insertive partner. The exact mechanism of viral transmission remains uncertain and may well involve multiple pathways. The vaginal epithelium is a stratified squamous epithelium that does not possess a traditional receptor for HIV-1 but the vaginal tissue underlying the epithelium contains multiple targets for the virus (Figure 6.1). These targets include mucosal Langerhans cells (dendritic cells expressing the HIV-1 CD4 receptor and the CCR5 co-receptor) T cells, and macrophages. Passage of virus from the lumen to the cellular targets may be facilitated by binding of virus to dendritic cell projections that extend into the epithelial compartment with subsequent presentation to subepithelial target cells (Shattock & Moore, 2003). A more mundane, but equally likely explanation is that virus accesses the subepithelial space through epithelial breaks caused by local trauma and/or STIs. This would help explain the increased risk of HIV-1 transmission associated with the presence of concomitant STIs such as HSV-2 infection (Corey et al., 2004). The morphology of the genital tract epithelium changes at the endocervical junction where the stratified squamous epithelium transitions to a single layer of columnar epithelium (Figure 6.2). This area is probably much more vulnerable to HIV-1 infection. Following initial infection, local viral replication is followed by dissemination of virus to the regional lymph nodes at which point systemic infection is established. Animal models have suggested that initial infection can occur within 1 hour of exposure and dissemination within 24 hours (Hu et al., 2000).

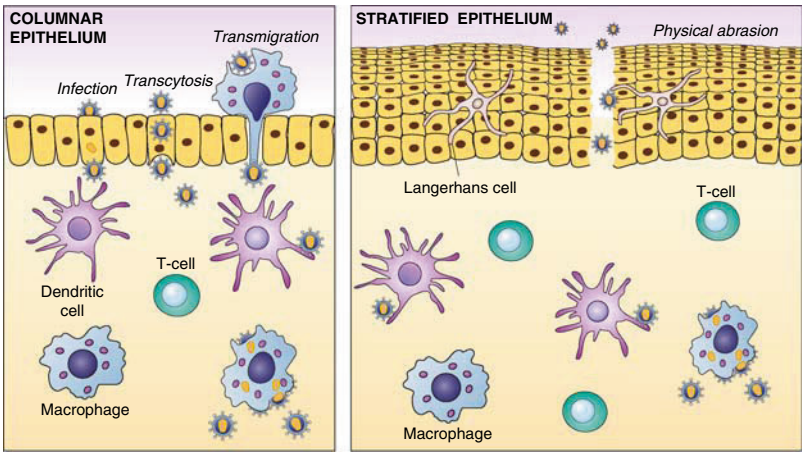


**Figure 6.1** Mucosal transmission of HIV-1 probably occurs through multiple pathways. Target cells in the sub-epithelial area include CD4+ lymphocytes, macrophages, and dendritic cells. Mucosal inflammation and epithelial disruption secondary to STIs increase the risk of HIV-1 transmission through recruitment of additional target cells.

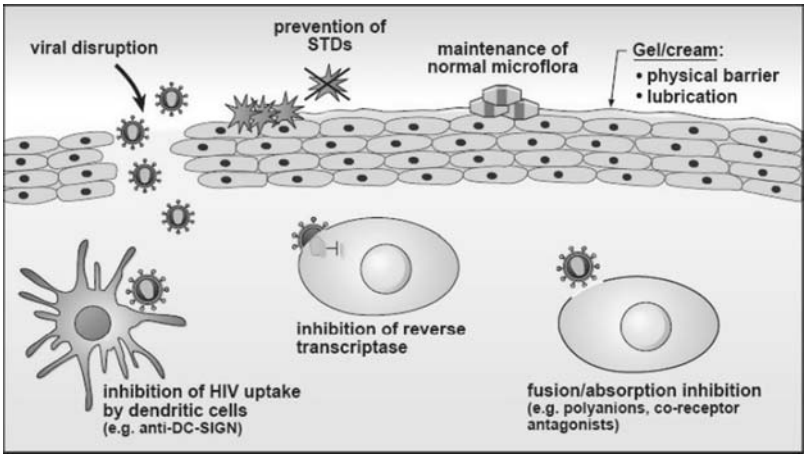


**Figure 6.2** Microbicides can prevent or significantly reduce the risk of HIV-1 transmission through several mechanisms. Vaginal defense enhancers restore the vaginal pH to establish an acid environment hostile to STIs including HIV-1 or attempt to colonize the vagina with lactobacilli. Surfactant or detergent microbicides disrupt the viral envelope and inactivate the virus. The fusion or entry inhibitors block viral epitopes or cellular receptors so that HIV-1 is unable to infect target cells. The reverse transcriptase (RT) inhibitors are absorbed into the mucosa and create a zone of antiretroviral activity that inhibits viral replication.

A successful microbicide will have to address these challenges. In particular, it will have to (i) out distance the virus (protect mucosal surfaces at risk of HIV-1 transmission), (ii) outlast the virus (provide an adequate therapeutic

window such that virus cannot infect once local concentrations of a microbicide fall below a therapeutic level), and (iii) prevent dissemination of infected cells from the local mucosa to the regional lymph nodes. Whilst these challenges may seem insurmountable, they are compensated for by the fact that HIV-1 infection is a relatively inefficient process and that the female genital tract is a relatively small anatomical area to protect. The rectal compartment is a more challenging problem. A single layer of columnar epithelium lines the rectosigmoid. Anal intercourse is often associated with local mucosal trauma and the subepithelial lamina propria is rich in target cells. Many of these cells have an activated phenotype, which makes them extremely susceptible to HIV-1 infection (Poles et al., 2001). This helps explain why receptive anal intercourse carries the highest risk of HIV-1 transmission. It is not clear which region of the rectosigmoid will require protection. This is clearly a larger area to protect than the female genital tract. However, gastroenterologists routinely prescribe topical agents to patients with inflammatory bowel disease who have left sided colitis (Haghighi & Lashner, 2004) and so there is a foundation of formulation science that may transfer to rectal microbicide development. Despite these challenges, two recent macaque infection studies have shown that topical application of either cyanovirin-N or tenofovir can significantly reduce the incidence of infection following rectal exposure to an RT-SHIV or SIV respectively (Shattock, 2006; Tsai et al., 2003).

## Microbicide Development

With the possible exception of Gilead Sciences, Inc., Foster City, California, no medium to large pharmaceutical company has an active research and development (R & D) program devoted to microbicides. While this unfortunate situation continues, microbicide R & D is being undertaken by a network of academic centers and small biotech companies working with funding from United States government agencies such as the National Institutes of Health, the Centers for Disease Control, the United Kingdom Medical Research Council, and philanthropic sponsors such as The Bill and Melinda Gates Foundation. Given the inherent costs of drug development, and the significant microbicide pipeline (Table 6.1), the microbicide research community is heading towards a major funding crisis. It is hoped that the current batch of clinical trials (Table 6.2) may generate positive data that will encourage the pharmaceutical industry to become more engaged in this critical aspect of HIV-1 prevention research.

Microbicides for HIV-1 prevention need to be safe, effective, affordable, and acceptable. Nonoxynol-9 was found not to be suitable as a microbicide because of its ability, when used frequently, to disrupt genital epithelium and enhance the risk of HIV-1 acquisition. Future microbicides should not cause epithelial damage, local irritation, or disruption of local ecology, should have a high selectivity index, and for certain classes, a high genetic barrier to resistance. Guidance documents for the preclinical and clinical phases of microbicide development have been published (Lard-Whiteford et al., 2004; Mauck et al., 2001; US Food and Drug Administration, 2006).The portfolio of preclinical studies that would need to be conducted for the U.S. Food and Drug

**Table 6.1** Preclinical requirements for microbicide development.

| |
|---|
| • 10-day vaginal irritation test in rabbits |
| • PK studies to determine systemic absorption |
| • Genetic toxicology studies |
| • General toxicology studies |
| • Safety pharmacology studies |
| • Reproductive toxicology studies |
| • Carcinogenetic studies |
| • Hypersensitivity and photosensitivity studies |
| • Condom integrity studies |

Administration (FDA) to consider licensing a microbicide for the prevention of HIV-1 transmission are listed in Table 6.1.

Clinical evaluation of systemic absorption is an important consideration especially for the reverse transcriptase (RT) inhibitor class of microbicide candidates. Single and multiple doses of both the parent drug and metabolites should be measured. These data should be correlated with the presence or absence of epithelial disruption, which has the potential to increase drug absorption. If drug absorption is detected in females then penile absorption should also be assessed. Pregnant or lactating females, and subjects with renal or hepatic impairment should be excluded from early phases of microbicide development. Studies should also collect data on concomitant medications. Additional evaluation of absorption may be warranted in Phase 2. Indications might include determining pharmacokinetic (PK) parameters in special populations (renal and hepatic impairment), drug interaction studies, pharmacodynamic effects on other viruses (e.g. tenofovir and hepatitis B virus), and rectal absorption studies.

Clinical safety monitoring will be driven by data from nonclinical studies but would normally include general physical assessment, gynecological examination, and laboratory testing. The frequency of evaluation will be higher in phase 1/2 studies to provide an early detailed assessment of product safety profile. Based on guidance from the International Committee on Harmonization (ICH), a product safety database should have follow-up data on 300–600 subjects with 6 months of drug exposure and 100–200 subjects for 12 months. Given the magnitude of microbicide efficacy studies, this requirement is unlikely to be a problem. Hybrid Phase 2 / 2b (3) studies may be used to accelerate development timelines.

In this approach the first phase of the study would involve detailed safety monitoring (monthly evaluations including colposcopy). Following review by a data and safety monitoring board (DSMB), the study would then move into the next phase where the intensity of safety monitoring would be significantly reduced (quarterly evaluations and no colposcopy). Microbicide development is beginning to explore the concept of combination microbicides. This aspect of drug development is covered in section 300.50 in the Code of Federal Regulations (CFR). It is important to ensure that each component is contributing to activity and that two products (or more) are not more toxic than the individual product. Given two products (A and B) the trial design would be A vs.

B vs. AB vs. vehicle and the trial outcome would need to demonstrate AB > A and AB > B. Unfortunately, the regulatory requirement to independently assess microbicide effectiveness for components of a combination product may result in significant delays in completing the clinical trials needed to license combination products (Coplan et al., 2004).

## The Microbicide Pipeline

It is estimated that there are approximately 60–80 candidate microbicides in development. The majority of these are in preclinical evaluation and most have only been evaluated in vitro. Only seven products are undergoing clinical development and three products have advanced to Phase 2B/3 effectiveness studies (Alliance for Microbicide Development, 2006). Microbicides can be classified by their primary mechanism of action. Vaginal defense enhancers help maintain the vaginal pH in an acid range or facilitate colonization of vaginal flora with lactobacilli. Surfactants or detergents disrupt microbial cell membranes. Entry or fusion inhibitors target viral epitopes or cell receptors (CD4, CCR5, CXCR4) to prevent the sequence of viral binding, fusion, and entry that leads to cell infection. Current replication inhibitors work by inhibiting HIV-1 RT and preventing viral replication. Some are already licensed for the treatment of chronic HIV infection. Others have poor oral bioavailability and are being exclusively developed as topical microbicides. Finally, some products such as Praneem, an Indian polyherbal microbicide, have no clear mechanism of action. The current and potential microbicide pipeline is summarized in Tables 6.2 and 6.3. Products that have been evaluated in animal models or human studies as potential microbicides are discussed in more detail below.

## Formulation Science

Initial formulation of microbicides was based on product availability and the current range of microbicides in late stage clinical development are all gel formulations. Other options include foams, suppositories, films, and vaginal rings (Garg et al., 2003a, b; Neurath et al., 2003; Woolfson et al., 2006). To some extent the choice of formulation is driven by the chemical characteristics of the microbicide candidate, consumer preference, performance characteristics of the final product, and economic considerations. Most microbicide studies now include detailed acceptability assessments of both female and male participants (Mantell et al., 2005; Severy et al., 2005). Microbicide development now often includes assessment of rheological properties of candidate formulations (Owen et al., 2000) and in vivo imaging studies of gel coverage (Barnhart et al., 2004; Pretorius et al., 2003). Although the majority of studies have focused on vaginal microbicides, parallel rectal microbicide studies are now ongoing.

**Table 6.2** Microbicide pipeline by class of action.

| Stage of development | Membrane disruption | Defense enhancers | RT inhibitors | Entry/Fusion inhibitors | | Uncertain mechanism |
|---|---|---|---|---|---|---|
| **Clinical*** | | MucoCept | Tenofovir | Carraguard™ | Cellulose acetate phthalate | Praneem™ |
| | | Acidform™ | TMC-120 | VivaGel™ | Invisible condom™ | |
| | | Buffergel™ | UC-781 | | PRO-2000 | |
| | | | Carraguard™ -MIV-150 | | | |
| **Preclinical Discovery** | β-cyclodextrin | | MC1220 | C85FL | ICAM-1 | Sodium rutin sulfate |
| | Nisin | | C-731, 988 | K5-N, OS(H) & K5OS(H) | B12, 2G12 | SPM8CHAS |
| | Retrocyclins | | PHI-236, | SAMMA | 2F5, 4E10 | BIL |
| | Octylglycerol | | PHI-346 | Novaflux | CD4 IgG2 | PSMA / PEHMB |
| | Lactoferrin | | PHI-443 | Porphyrins | T20 | Magainin |
| | | | | PSC RANTES & | T-1249 | PVAS |
| | | | | RANTES analogues | SCH-C, D | ZCS |
| | | | | BMS-806 | UK-427, 857 | |
| | | | | BMS-378806 | AMD3100 | |
| | | | | CMPD167 | SFD-1 | |
| | | | | Cyclotriazadisulfonamide | Bicyclams | |
| | | | | Aptamers | Zinc finger inhibitors | |
| | | | | ADS-J1 | siRNA | |
| | | | | Zinc-carageenan | Griffithsia | |
| | | | | Plant lectins | Scytovirin | |
| | | | | Polystyrene sulphonate | Soluble DC-SIGN | |
| | | | | | Nanobodies™ | |
| | | | | | C52L | |

*Microbicide candidates with planned, ongoing, or completed human clinical trials.

**Table 6.3** Status of vaginal microbicide effectiveness studies as of February 2007.

| Product | Sponsors | Anticipated or actual enrollment | Sites | Status | Outcome |
|---|---|---|---|---|---|
| Nonoxynol-9 (N-9) | Columbia Laboratories / UNAIDS | 765 | Benin Côte d'Ivoire South Africa Thailand | Completed Q2 2000 | Increased risk of HIV infection women exposed to N-9 |
| Savvy® | Cellegy Pharmaceuticals Inc. / FHI | 2142 | Ghana | Stopped prematurely Q4 2005 | HIV seroincidence too low to complete trial |
| | | 2152 | Nigeria | Stopped prematurely Q3 2006 | Interim analysis showed no efficacy |
| Carraguard® | Population Council / Gates Foundation | 6299 | South Africa | Enrollment completed Q3 2006 | Preliminary data anticipated Q1 2008 |
| Tenofovir Gel | USAID/LifeLab/Gilead Sciences | 980 | South Africa | Enrolling | Preliminary data anticipated Q3 2010 |
| Ushercell (Cellulose sulfate) | Polydex Pharmaceuticals / CONRAD / USAID / Gates Foundation | 2574 | Benin India South Africa Uganda | Stopped prematurely Q1 2007 | Increased risk of HIV infection with use of cellulose sulfate |
| | Polydex Pharmaceuticals FHI / USAID | 2160 | Nigeria | Stopped prematurely Q1 2007 | Interim analysis showed no efficacy |
| PRO 2000/5 (0.5 % & 2%) | Indevus Pharmaceuticals, Inc. / MDP MRC (UK) | 9673 | South Africa Tanzania Uganda Zambia | Enrolling | Preliminary data anticipated Q4 2009 |
| PRO 2000/5 (0.5%) | Indevus Pharmaceuticals, Inc. / NIAID | 3220 | USA Malawi South Africa Tanzania Zimbabwe Zambia | Enrolling | Preliminary data anticipated Q2 2009 |
| BufferGel™ | ReProtect LLC / NIAID | | | | |

Note: Q refers to quarter.

## Challenges of Conducting Microbicide Trials in the Developing World

### General Issues

Early phase development of candidate microbicides is routinely conducted in North America or Europe. Phase 1 and 2 clinical studies are traditionally undertaken in populations at low risk of HIV infection and these participants can be readily recruited in the developed world. In contrast, effectiveness studies (Phase 2B/3 studies), where HIV seroconversion is the primary endpoint, need to be conducted in populations with an annual incidence of new HIV infections of about 3%. Such populations can only be found in the developing world. As a consequence the majority of Phase 2B/3 research is conducted in the developing world and most trial sites are located in Sub-Saharan Africa. Microbicide research is focused on conducting clinical trials that will provide the basis for approval by regulatory agencies such as the FDA in the US or the European Agency for the Evaluation of Medicinal Products (EMEA) in Europe. To meet this requirement, these studies have to be conducted at the same level of regulatory rigor demanded from pharmaceutical trials based in the US or Europe. This reality has significant implications for microbicide research conducted in the developing world and is discussed in more detail below.

#### *Research in Resource Poor Environments*

It is clear that appropriate populations for Phase 2B/3 research can be identified in the developing world. However, often there is limited or absent clinical research infrastructure to support such microbicide research. Basic structural requirements include a clinical examination area, laboratory support, pharmacy, and storage area for regulatory documents. More importantly, there is a critical need for local clinical staff with adequate training to conduct regulatory grade research. In addition, sites need to develop a mechanism to integrate the local community into the research program though the development of groups such as community advisory boards. The development model that has evolved is for a graduated mentorship program. New sites are identified and research centers are established through upgrading existing buildings or in some cases building new structures for clinical research. Staff are recruited and provided with appropriate training in research methodology including the Good Clinical Practice (GCP) standards required by regulatory authorities. Sites are then ready to undertake preparedness studies that might include recruitment of the type of participants required for Phase 2B/3 research, screening for STIs, pregnancy, and HIV seroincidence. Such studies are important in training staff and critical in providing contemporaneous estimates on HIV seroincidence that will ultimately determine whether a site has an appropriate profile for participation in late stage microbicide trials.

#### *Logistics*

Many of the endpoints in microbicide trials involve the use of laboratory techniques and/or shipping samples to centralized laboratories located in the US or Europe. This requires that sites receive training and demonstrate proficiency in a range of laboratory techniques. Its also requires that sites have ongoing access

to the reagents and equipment needed to perform these assays. Clearly establishing and maintaining this level of functionality over time can be challenging. A major problem is retention of skilled staff for the duration of the study. These same issues relate to the clinical aspects of trial execution. Communication between sponsors and sites can be problematic in regions where Internet and telephone access may be limited or intermittent. Despite all of these potential pitfalls many sites have been able to develop the required level of expertise, quality assurance, and quality control to conduct regulatory grade microbicide research.

***The Impact of High HIV Prevalence on Trial Sites***

HIV prevalence rates of 30–40% are not uncommon in Sub-Saharan Africa. A consequence of this is that when women are screened for Phase 2B/3 microbicide studies a significant number will be found to be HIV seropositive. In many cases this will be the first time a women finds out about her HIV status. This process place huge stress on clinic staff that have to conduct pre and post-test counseling and arrange referral of seropositive women to medical services. In many situations local care may be very limited although initiatives such as the President's Emergency Plan for AIDS Relief (PEPFAR) has provided more options for accessing antiretroviral therapy (ART) in Sub-Saharan Africa.

***Co-morbidity in Microbicide Trials***

Microbicide trials are designed to characterize the safety and efficacy of microbicides. However, when these trials are conducted in the developing world, the participants are potentially exposed to adverse events associated with both study product as well as diseases that are prevalent in the local community such as malaria, tuberculosis, and gastrointestinal infections. This can present a challenge for the trial sponsors in interpreting safety data but also for the research clinicians who need to find mechanisms to provide treatment for women enrolled on the study. Participants bringing sick children to the trials site only amplify this problem further. In the developed world, participants can routinely access health care outside the clinical research facility but in the developing world the trial site may be the only source of health care. Unfortunately, trials sites may lack the staff or resources to provide generic health care and often sponsors such as the National Institutes of Health (NIH) may not allow their research funds to be used to support this type of clinical activity.

***Limited Health Care Workers***

As mentioned above, a critical component in the development of trial site capability is the identification, training, and retention of skilled clinical trial staff. Unfortunately, once such individuals are fully trained they are very marketable and may migrate to other clinical trial networks within the region or to more lucrative positions in the private sector. In some situations there are simply very few in-country physicians and nurses. This gap can be transiently circumvented by the use of expatriate staff but does little to develop the long-term viability of clinical sites.

***Provision of HIV Care***

Phase 2B/3 microbicide trials enroll HIV seronegative participants. However, HIV seropositive individuals will be identified during the screening process.

In addition, a number of participants will be anticipated to seroconvert during phase 2B/3 studies. It is the responsibility of the local trial site to identify local resources to provide clinical care to these people. The individuals who screen out prior to enrollment may have long-standing HIV infection and meet the requirements for initiation of ART. In contrast, individuals who seroconvert during the study may not require ART for many years after the initial infection. This presents the sponsors with two divergent problems. Firstly, the sponsors need to have the ability to provide real time access to ART to individuals with HIV infection who need to initiate treatment. Secondly, they need to have a mechanism whereby individuals, who seroconvert on study can be provided with ART at some point in the future (Kim et al., 2005). This may be long after the study has been completed. Providing real time access to ART is perhaps the easier of these two problems. Initiatives such as PEPFAR and the Global AIDS Fund have increased the availability of ART in the African Sub-Continent. More importantly, microbicide sponsors are using local availability to ART as a criterion for site selection. From an operational perspective developing a mechanism to provide access to ART years after an individual seroconverts is more challenging. Some sponsors have created foundations and others have provided access to private health insurance programs to address this need. Optimistically, it might be hoped that access to ART in Africa will be even more widespread in 5–10 years time.

***Financial Incentives to Participate in Clinical Trials***

Most studies will provide participants with reimbursement for expenses associated with involvement in clinical studies. The intent is to cover items such as travel costs, parking, and childcare. The level of reimbursement is closely monitored by local Institutional Review Boards (IRBs) to avoid the possibility of financial inducements to participate in clinical research. Unfortunately, even very modest levels of reimbursement might be considered as providing inappropriate inducement for participants in the developing world. Financial inducements can be quantified and hopefully avoided but more subtle pressures persist such as the availability of healthcare to participants. Ultimately, this is a difficult problem and best addressed by local research staff that are optimally positioned to determine ethical equipoise.

***Suspicion of Clinical Trials***

Clinical research has not always been conducted under the most ethical circumstances. The extreme depravity of the experiments carried out in the Nazi concentration camps represents the most shocking example of medical malpractice in recent history but other examples of abuse can be found in the Tuskegee syphilis studies. As a response to these activities a series of reports including the Nuremberg code, the Belmont report, the Declarations of Geneva and Helsinki helped define a concept of Good Clinical Practice (GCP) whereby the conduct of clinical research placed the rights of human participants as the most important aspect of the research process. A key element of GCP is to ensure that study participants give informed consent to participate in the studies proposed. GCP is a non-negotiable aspect of clinical research conducted in the developing world.

Despite these safeguards, local communities can often harbor suspicion about the nature of clinical research and the motivation of the scientists conducting the research. These suspicions are exacerbated by the reality that most research in the developing world is funded by governments and/or philanthropic foundations based in the developed world. Community doubts and suspicions can be significantly diminished by outreach activities into the local community and focused education on the research process. Unfortunately, when problems arise in clinical research the local community can quickly revert to a position of hostility towards ongoing studies. Two recent studies illustrate this point and both relate to HIV prevention research.

In August 2004 a Cambodian PREP study of tenofovir was stopped prior to enrollment of any participants, and in February 2005 a second PREP study was closed prematurely in Cameroon (Grant et al., 2005; Mills et al., 2005). In both cases the premature termination probably resulted from community concerns about the adequacy of informed consent and the availability of ongoing treatment for study participants who seroconverted. These concerns subsequently lead to political intervention and the closure of the studies. In February 2007, two Phase 3 studies of the vaginal microbicide, cellulose sulfate (CS), were stopped. Both studies planned to enroll approximately 2,000 women. The first study was based in Benin, India, South Africa, and Uganda.

The second study was based in Nigeria. A scheduled interim analysis of the trial data from the first study demonstrated a disproportionate number of cases of HIV infection in the CS arm of the study leading to premature closure of the study. Amongst the 1,425 women enrolled in the study there were 41 seroconversions; 25 were in the cellulose sulfate arm and 16 in the placebo arm. The difference was not statistically significant but clearly the product was not working to prevent HIV infection. A subsequent analysis of the data from the second study did not show the same problem but did not suggest that CS had any efficacy as a HIV microbicide and so the second study was also stopped. Subsequently, the local media characterized the studies as using South African women as "guinea pigs", suggested that hundreds of women had become infected on the study, alleged that informed consent was inadequate, and that no provision had been made to provide treatment for women who needed antiretrovirals (Ramjee et al., 2007).

These cases are interesting because they illustrate how quickly communities, the media, politicians, and in country regulatory agencies can move from enthusiastic support for research to a position of antipathy and suspicion. It is unfortunate, but necessary, that Phase 2B/3 HIV prevention trials are conducted in countries with a high incidence of new HIV infections. This can lead to a misperception that the sponsors are conducting trials that facilitate HIV infection. In fact the contrary is true. When HIV prevention studies are conducted the study participants almost always have a decreased risk of HIV acquisition compared to community members not enrolled in the study. The impact of repeated safer sex counseling, screening for sexually transmitted infections, and the provision of condoms can all lead to a lower HIV incidence rate in the study participants.

## Study Specific Issues

In addition to the challenges discussed above, there are a number of issues related to the conduct of clinical trials that have a critical role in the success or failure of microbicide trials. These are generic to most trials but can be exacerbated in the context of developing world trial activity.

### *Retention and Adherence*

Retention rates and adherence patterns can affect a clinical trial's outcome. Retention can be defined as the proportion of patients who are evaluable for the primary study endpoint. Poor study retention could profoundly affect a study's ability to demonstrate product efficacy. As a general rule the ratio of study endpoints to lost to follow up rate (LFUP) should be greater than one. For example in HPTN-035, an ongoing Phase 2/2B efficacy study of PRO2000 and BufferGel sponsored by the NIH, it has been estimated that the study will need to accrue 192 endpoints (new HIV infections) to demonstrate efficacy. Consequently, there should not be more than 192 participants lost to follow up. With an enrollment base of 3,220, retention rates will have to be $> 94\%$. This is clearly a major challenge for study execution. There can be difficulties in tracking down participants and the exercise can be costly and/or time consuming. However, ongoing studies have been able to meet these demanding retention rates.

Adherence is another important aspect of clinical trial conduct. Adherence can be defined as the proportion of participants who comply with the clinical trial protocol in terms of using the study product. In a study where microbicides were meant to be used in a coital fashion this would mean that the participant used study product for each sexual act. Non-adherence can be due to a number of causes. Clinicians may ask the participant to stop taking product because of an adverse event or because she is pregnant. The participant may decide herself to stop taking product. As the number of participants off product increases, the ability to demonstrate product effectiveness falls. Put more directly, when 25% of participants are off product, the sample size needs to double to allow the study to demonstrate effectiveness. This course of action is clearly not possible and so the impact of non-adherence is to lead to study failure.

The most stringent approach to trial analysis is to use an intention-to-treat (ITT) analysis. This is obviously the approach most impacted by non-adherence. An On-Product analysis is less conservative and may allow demonstration of effectiveness when the ITT analysis does not demonstrate effectiveness.

### *Pregnancy*

Pregnancy is a major challenge in the execution and analysis of microbicide clinical trials. Microbicide efficacy studies require sexual activity and pregnancy is one natural consequence of sexual activity. Unfortunately, pregnancy may affect participant retention and the power of the study to demonstrate an effect. An important issue, which has recently emerged, is the concept of a chemical pregnancy. This is an event in which a woman has a positive pregnancy test, in the absence of clinical symptoms, which does not progress to parturition. This is partly a consequence of the use of exquisitely sensitive human chorionic gonadotrophin (hCG) tests that are used in many studies.

A significant proportion of chemical pregnancies never proceed to delivery. A recent NIH sponsored site preparedness study (HPTN-055) followed cohorts of women for one year. In this study there were 105 pregnancies but only 32 (30%) reached the third trimester. Again, these data suggest there is a natural attrition rate for women getting pregnant and over zealous identification of very early pregnancy (with the implied cessation of clinical trial participation) may be unnecessary and damaging to the integrity of microbicide clinical trials. The counter argument is that the first trimester is the most vulnerable period for teratogenicity and so it could be argued that this level of ascertainment is appropriate. One possible pathway through this challenging area is to ensure that reproductive toxicology is completed before efficacy studies are initiated. In this setting it would be possible to continue study drug administration during pregnancy.

A more practical approach is to optimize the use of contraception among trial participants. Contraceptive technology varies in the ideal and typical pregnancy rates. Implantable hormonal methods are the most effective means of avoiding pregnancy with a 0.05% pregnancy rate in the first year of use. In contrast, condoms have an ideal rate of 2% but a typical rate of 15%. In HPTN-055, only 33% of the women were using implantable contraceptives at baseline suggesting that significant improvements in contraceptive behaviors are needed. Pregnancy remains one of the most important challenges in microbicide development and clearly innovative approaches to addressing this issue are needed.

***Antiretroviral Resistance***

Roughly $10^{11}$ new viral particles are formed daily in individuals with untreated chronic HIV infection. HIV-1 is known to have an error prone RT enzyme which leads to the production of $10^{9}$–$10^{10}$ potentially drug resistant mutants each day. Given these facts about the HIV-1 viral life cycle, there is a significant theoretical potential for the selection of resistant mutants when antiretroviral microbicides are used in individuals with HIV infection. Standard genotyping methods are unlikely to identify mutant genomes if they are present at low frequency and more sensitive methods are prohibitively expensive for all but the most preliminary studies. As antiretroviral therapy is introduced to Africa it is inevitable that resistance will be seen in communities where drugs are being used. The magnitude of the problem is uncertain but mathematical models of both treatment of chronic infection (Blower et al., 2005) and antiretroviral prophylaxis of HIV negative populations in the developing world (Abbas et al., 2007) give grounds for cautious optimism.

In contrast, studies looking at women who received nevirapine to prevent mother-to-child transmission of HIV infection are less encouraging. Women treated with nevirapine monotherapy in whom resistance was detectable, as well as in those in whom it wasn't detectable, had statistically significant worse clinical outcomes than those never treated. These data suggest that for women, in whom resistant virus could not be detected by standard methods, there was a high likelihood that some degree of resistance had developed and that this had impacted their response to subsequent nevirapine containing therapy (Cunningham et al., 2002; Eshleman & Jackson, 2002).

Key questions for the microbicide research community are (1) What are the virological and clinical sequelae of exposure to an RT microbicide, such as tenofovir, in HIV negative individuals who seroconvert and (2) Will a drug like tenofovir protect an individual if they are exposed to a resistant virus containing the K65R mutation. These phenomena may well occur in ongoing and future effectiveness studies of tenofovir gel and it is critical that long term data are collected on these individuals.

## Microbicides as Part of the Broader Prevention Agenda

Despite more than twenty-five years of health education and the widespread availability of condoms the AIDS pandemic continues. In this setting, a range of behavioral and biomedical interventions have been developed as possible approaches to HIV prevention. Behavioral interventions such as counseling have had limited success (Koblin et al., 2004) and so attention is currently focused on biomedical approaches including circumcision, PREP, treatment of serodiscordant couples, the use of acyclovir, vaccination, and microbicides. It now appears that male circumcision is associated with a 50% reduction in the risk of acquiring HIV infection (Auvert et al., 2005; Bailey et al., 2007; Gray et al., 2007; Sawires et al., 2007). PREP, treatment of serodiscordant couples, the use of acyclovir, vaccination, and microbicides are still in the Phase 2B/3 stage of development. However preliminary results from these trials will start to emerge in late 2007. Any evidence of efficacy in these studies will have important implications for the design of future prevention trials.

As an example, the observation that circumcision reduces the risk of HIV acquisition has suggested that all male subjects in prevention trials should be offered circumcision in addition to any other intervention. This will then likely decrease the incidence of new HIV infections in the study population and the study sample size will have to be increased and/or participants studied for a longer period of time to determine whether an intervention works. The impact of circumcision on microbicide trials is less clear. Women enrolled in the study may have multiple male sexual partners and the logistics of identifying, counseling, and providing circumcision would be very challenging.

A more likely research scenario is that an efficacy signal will be seen in another microbicide trial. At this time the degree of clinical equipoise that allows randomization to a placebo arm will have been lost or significantly reduced and it may be necessary to consider redesigning ongoing studies to replace the placebo arm with an active compound. Again, as with circumcision, the net result will be to reduce the power of a study to detect a significant result. The next five years will prove to be a fascinating period in the design of intervention trials.

## Future Directions in Microbicide Research

Microbicide research is undergoing a period of rapid evolution. It is hoped that proof of concept data for first generation products will be available within the

next 1–2 years. Meanwhile, research is ongoing to identify new pipeline candidates, improve formulations, and develop combination products (Veazey et al., 2005). A critical step will be to develop products that do not have to be used in a coitally dependent fashion. The RT-inhibitor group of products may be suitable for this indication and the development of ring delivery systems may allow products to be administered on a monthly basis. Currently microbicides and vaccines are viewed as two very different modalities of HIV prevention science. However, microbicides may be used to deliver immunogens topically and effectively function as mucosal vaccines.

Another, more intriguing, possibility is that microbicides may prevent viral infection but allow priming of the local immune system by live virus. This phenomenon has been seen in non-human primate studies (Shattock, 2006) and it is conceivable that it may occur in ongoing Phase 2B/3 effectiveness studies. Whether such immune responses would protect against infection in the absence of a microbicide is an important scientific question and warrants evaluation in animal models. A more mundane, but critical, issue is to find ways to reduce the cost of production for second and third generation microbicides candidates. One innovative approach is to use plants to generate microbicidal peptides such as cyanovirin (Sexton et al., 2006). There is now breadth and depth to the development pipeline although there is concern that some of the candidates may not be economically viable in the developing world because of the cost of production of these candidates.

First generation products are still being evaluated in effectiveness trials. It is hoped that these studies will demonstrate a significant, albeit modest, efficacy against HIV-1. Results from the Population Council's Phase 3 study of Carraguard will be available in early 2008 with data from the HPTN-035 study (Pro-2000 and BufferGel) in 2009 and the United Kingdom Microbicide Development Program of Pro-2000 in 2010. It is hoped that subsequent antiretroviral microbicide candidates will have increased potency. The CAPRISA 004 study will evaluate the efficacy of tenofovir gel when used in a coitally dependent fashion in a 980 participant study. A second study, the NIH sponsored MTN-003 or VOICE (*V*aginal and *O*ral *I*nterventions to *C*ontrol the *E*pidemic) study will start in 2008. This study will randomize 4,200 women to receive a microbicide gel (1% tenofovir gel or placebo) or a tablet (Viread®, Truvada®, or placebo). In contrast to the CAPRISA 004 study, the VOICE study will use gel on a daily basis. The VOICE study is powered to compare placebo versus active agent in both the oral and topical arms but has more limited power to compare oral versus topical therapy.

## Conclusions

The developing world desperately needs an HIV-1 vaccine. However, despite more than 20 years of research, and a current annual research budget of more than USD 600 million there is no evidence to suggest that any of the current candidate vaccines are likely to provide sterilizing immunity against HIV-1 (Duerr, Wasserheit, & Corey, 2006). The closure of two Phase 2B studies of the Merck MRKAd5 HIV-1 gag/pol/nef trivalent adenovirus vaccine (HVTN 502 & 503) in October 2007 for lack of efficacy has been another major setback in the

field. In addition, Padian et al. recently published the results of an innovative study to investigate whether the use of cervical diaphragms and lubricant gel might reduce HIV infection (Padian et al., 2007). Unfortunately, this study, which enrolled almost 5,000 women, also did not demonstrate efficacy.

Microbicides still have the potential to be a major component of the biomedical HIV-1 prevention portfolio. Despite a disappointing experience with nonoxynol-9 and more recently cellulose sulfate, the microbicide research community continues to grow and mature. The focus is now on the development of candidates that target specific stages of viral infection that can be scaled up at an economically viable cost. The future probably lies in combination microbicides delivered in a coitally independent fashion. The critical challenge will be to find sufficient financial resources to accelerate microbicide development.

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# Chapter 7

# How the Pandemic Shapes the Public Health Response – the Case of HIV/AIDS in Brazil

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## Introduction

The world wide HIV/AIDS epidemic has been marked by a few notable successes at the national level. These have included Thailand's 100% Condom Campaign, Senegal's social marketing of condoms, Uganda's ABC Program and Brazil's provision of universal antiretroviral therapy (ART) access. As the struggle to roll out comprehensive coverage of ART unfolds, Brazil's process can provide a model for middle income countries and can identify for low income countries structural elements which have been essential to establishing a system of widespread care and prevention.

This chapter provides an overview of over two decades of the HIV/AIDS epidemic in Brazil and the ensuing national response. In historical terms, the Brazilian national response could be viewed as somewhat surprising. In less than a decade, the country moved from denial in the early 1980s, a time in which most healthcare professionals did not recognize the appearance of a new and urgent public health issue (Parker, 1997), to having a national program considered to be exemplary for other developing countries, receiving international acclaim and achieving a level of approval that has rarely been seen in public health initiatives. Despite the undeniable success of the national response to the HIV/AIDS epidemic, Brazil now faces significant challenges to the long-term sustainability of the program.

In the last several years, many countries that initially refused to accept the HIV/AIDS epidemic as an important public health issue have revised their policies. What differentiates the Brazilian response is the speed at which this initial scenario was reversed. At the time, some local activists considered the response of the Brazilian government to be overly timid. Two decades later, with the benefit of hindsight, it is possible to realize that several measures that were



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_7, 

implemented in the early 1980s, after the first cases of AIDS in the country were diagnosed, were of crucial importance for the development of a comprehensive prevention and treatment program.

Arguably, the most notable characteristic of the Brazilian response to HIV/AIDS has been the integration of prevention, treatment, and defense of the rights of HIV-infected individuals. Recently, the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) stated that the comprehensiveness of the response was responsible for keeping the HIV/AIDS epidemic under control in Brazil (UNAIDS & WHO, 2006). This model for fighting the epidemic challenged the false dilemma of "prevention versus treatment" that prevailed until the end of the 1990s in the international discussion (Schechter & Kallas, 2006), of which one of the most incisive examples was the 1997 World Bank publication "Confronting AIDS" (World Bank, 1997). Another important characteristic of the Brazilian response to the HIV/AIDS epidemic was the early and active involvement of people living with HIV/AIDS (PLWHA) and of society at large to advocate for prevention and treatment, including universal access to antiretroviral drugs.

An important part of the history of the epidemic in Brazil is the involvement and participation of healthcare professionals and others in structuring and shaping a response. Few other countries have had such constant and active participation of healthcare professionals in confronting an infectious disease epidemic. Physicians engaged in public protests and demonstrations to demand greater commitment from the government and in meetings of non-governmental organizations (NGOs) to define strategies for action. In addition, public health servants, PLWHA, social scientists, healthcare professionals, international cooperation agencies, United Nations (UN) agencies, the business sector, and religious institutions, have also actively impacted Brazil's response. Despite the strength of its collaborative efforts, Brazil may be best known for its policy of ensuring free and universal access to antiretroviral therapy (ART). This policy, which is increasingly recognized as a central element of any public health response to the HIV/AIDS epidemic (Gilks et al., 2006; WHO, 2006) has brought international recognition to the country as a model in the fight against the epidemic.

How did Brazil, with its social inequalities, attain this high level of collaboration, which has been recognized internationally? What made Brazil challenge international agreements on intellectual property rights to ensure free and universal access to ART? Throughout this chapter we examine some of the factors that allowed Brazil to come to the forefront in the fight against HIV/AIDS, in particular the championing of universal access to treatment, and the framing of these policies within a human rights context. We will also review how these main features of the Brazilian national response have inspired global changes, as well as some of the challenges for the long-term sustainability of the response.

In order to understand the Brazilian response to HIV/AIDS, in particular the 1996 law that made it mandatory for the government to provide free and universal access to antiretroviral drugs (ARVs) through the public health system, it is necessary to examine a number of issues that involve human rights. The first relates to the period in which the initial AIDS cases in the country were identified, the early 1980s, a time when the nation was just emerging from over twenty years of military dictatorship. At that time health issues at large were becoming increasingly politicized, with the development of important initiatives,

such as the Movement for Sanitary Reform that fought for changes in the public health system (Teixeira, 1997). These initiatives built on progressive public health and social medicine policies which had been in place since the 1960s in Brazil (Paiva et al., 2002; Waitzkin et al., 2001) and contributed to the creation, in 1988, of the Unified Health System, better known as SUS (Sistema Único de Saúde). The universality and gratuity inherent to SUS were key elements in the construction of the Brazilian response to HIV/AIDS. Another key factor was the involvement of experienced activists who had fought the military regime, including former political exiles. Some of these individuals were active in both governmental and non-governmental organizations.

## The Changing Face of the Epidemic in Brazil

It has been estimated that over 600,000 Brazilians are presently infected with HIV and 180,000 are on therapy and receive ARVs from public health dispensaries. The first cases in Brazil were identified in 1982, when seven men who have sex with men (MSM) were diagnosed as having AIDS. From 1980 to June 2006, 433,067 AIDS cases were reported to the Ministry of Health (MoH); of these, approximately 67% were men and 33% were women. By 2006, approximately 180,000 of the individuals diagnosed as having AIDS had already died (Brazil, 2006a).

Since the early 1990s, marked changes have occurred in the epidemic, progressively affecting heterosexual men, females, individuals of lower income and with fewer years of formal education, and reaching smaller cities throughout the country (Brazil, 2002; Portela & Lotrowska, 2006). In the early 1980s, the vast majority of HIV-infected individuals were well-educated men, aged between 20 and 44 years, with male homosexual sex and needle sharing between intravenous drug users (IDUs) as the main routes of transmission. Over time, however, the epidemic has shifted into the general population. Accordingly, the male/female ratio of newly diagnosed AIDS cases fell from 15.1:1 in 1986 to 1.5:1 in 2005 (Brazil, 2006a,b; Levi & Vitória, 2002).

HIV/AIDS mortality peaked in 1995, reaching 9.7/100,000 inhabitants. As was the case in the developed world, there was an initial precipitous drop in mortality immediately after the implementation of highly active antiretroviral therapy (HAART), followed by a relative stabilization of these rates, which have remained at around 6.4/100,000 since 1999. The median survival time after a diagnosis of AIDS increased from 5 months in 1989 to nearly 5 years in 2002 and the occurrence of common HIV-related opportunistic infections declined by between 60 and 80% in the same period. According to official government estimates, from 1996 to 2004 the policy of universal access to ART has prevented 90,000 deaths, and over 600,000 AIDS-related hospital admissions have been averted, resulting in savings of more than USD 1.8 billion in that period (Levi & Vitória, 2002; Teixeira et al., 2003).

## Two Decades Building the Response to the Epidemic

In the beginning of the 1980s, when the first articles started to appear in the Brazilian lay press on a new disease that was being increasingly reported in

the United States, there was almost no reaction from the public health sector or from organized sectors of civil society (Galvão, 2000; Villela, 1999). These articles were often discriminatory and/or exclusionary: "Cancer in homosexuals researched in the U.S." was the headline of one of the first stories published by a Brazilian newspaper (Jornal do Brasil, 1981). The situation remained virtually unchanged even after the first AIDS cases were reported in the country. Reports describing the "gay cancer" and the "gay plague" and the prejudice and discrimination associated with these labels contributed to the mobilization of specific sectors of society, particularly the few organized gay groups then in existence, which started to produce and to disseminate information as early as 1983 (Galvão, 2000; Teixeira, 1997).

Another important initiative in the early 1980s was the struggle to improve the quality of the blood supply in the country which united groups of hemophiliacs, academicians, public health officials, and politicians. Existing laws that regulated collection and distribution of blood products were entirely inappropriate. Additionally, health authorities had limited means at their disposal to enforce the few regulations that existed. As a consequence, even in large urban centers such as São Paulo and Rio de Janeiro, unscreened blood products were frequently used. As a result, recipients of blood or blood products were at high risk for acquiring HIV, as well as viral hepatitis and Chagas disease, for example. The well-known Brazilian dissident Herbert de Souza, better known as Betinho, was one of the founders of the Brazilian Interdisciplinary AIDS Association (ABIA), a NGO founded in Rio de Janeiro in 1986 that played a crucial role in the promotion of blood safety in Brazil. Betinho was one of the first public figures to announce that he was HIV infected as a result of blood transfusions received for hemophilia in Canada several years before, while living in that country as a political refugee. His two brothers, also well known public figures in their own right, were also hemophiliacs and HIV positive.

In 1988, Betinho, as ABIA's president, launched a massive campaign entitled "Save the Blood of the Brazilian People". The campaign involved health professionals, politicians, hemophiliac organizations, and public health academics, among others. The campaign was instrumental in bringing pressure to Congress, which in 1988 determined, as part of a newly approved Constitution, that blood could no longer be used as a commodity, leading to substantial improvement in the quality of the blood supply (Galvão, 2005a). Betinho died in 1997. His brothers died in the mid 1980s (Galvão, 2005b).

In the late 1980s and early 1990s, the involvement of civil society continued to grow and diversify, engaging people living with HIV/AIDS (PLWHA), gays, sex workers, feminist organizations, and religious groups. During the 1990s, legal challenges to the government, arising from civil society and based on the newly established rights to health care enshrined in the 1988 Brazilian Constitution, helped to forge the path to what would become the hallmark of the Brazilian response, universal access to ART.

## The 1980s

The 1980s in Brazil were marked by a return to democracy, after more than 20 years of military rule. For the health care sector, it was a period of major

transformation, culminating with the enactment of the new Constitution in 1988. Article 196 of the Constitution states:

> It is the duty of the State to guarantee that all citizens have the right to health. The State should enforce social and economic policies that aim to reduce the risk of disease and other aggravations, and should promote universal and equalitarian access to actions and services for the promotion, protection, and recovery of health (Brazil, 1988).

Several years later, this article turned out to be of great importance in the struggle to ensure universal access to free ART in the public health system.

The first actions to fight the AIDS epidemic in Brazil started in the early 1980s (Galvão, 2002a). These included the pioneering work of gay groups as early as 1982 and 1983 distributing leaflets with the scant information then available on the disease and on how to prevent it; the creation, in 1983, of the first governmental AIDS program in the state of São Paulo (Teixeira, 1997); and, in 1985, the organization in São Paulo of the first NGO exclusively dedicated to HIV/AIDS, the Support Group for the Prevention of AIDS (GAPA). On May 2, 1985, the MoH issued ordinance 236 establishing "guidelines for the establishment of a program to control AIDS" (Brazil, 1985). In the following year, ABIA was founded. ABIA has since strived to interact with international NGOs involved with AIDS policies with a view to critically analyze public health policies related to HIV/AIDS.

In 1986, reporting of AIDS cases became mandatory. In 1988, the public health system of the state of São Paulo started to distribute the only ARV then approved for clinical use, zidovudine (AZT) (Brazil, 1999; Passarelli, 2001); in the same year, the federal government conducted its first national AIDS media campaign. Also in 1988 the first anonymous and free voluntary counseling and testing (VCT) sites were created. In the following year, the Group for the Valorization, Integration and Dignity of People with AIDS (Pela VIDDA Group) was founded in Rio de Janeiro, giving voice to those living with HIV/AIDS in the country. Thereafter, groups of PLWHA were created around the country giving body and voice to the demands and needs of HIV-infected individuals (Daniel, 1989). In a relatively short period of time, national forums and networks of PLWHA were created, contributing to the maintenance and expansion of the rights of HIV positive individuals. Through political pressure, NGOs representing PLWHA acquired voting member status in governmental bodies responsible for formulating national health policies, such as the National Health Council (Conselho Nacional de Saúde) and the National AIDS Commission (Comissão Nacional de AIDS), as well as their State and Municipal counterparts.

In the 1980s, Brazil also played a pioneering role with the introduction, albeit in a limited scale at the time, of harm reduction programs, including needle exchange programs (Burrows, 2006; Fonseca et al., 2006). The first harm reduction project was launched in December of 1989, by the municipal AIDS program of the city of Santos, São Paulo and generated heated public debate. Eventually, the police determined that it had to be discontinued. Nonetheless, arguably as a result of the debate, the Brazilian National AIDS Program (NAP) soon after adopted harm reduction as an official strategy, including it as part of a loan agreement with the World Bank (see below).

The establishment of the first shelter for HIV-infected individuals (Brenda Lee Shelter) in the state of São Paulo in 1985 initiated a new form of support to PLWHA in Brazil. As increasing numbers of individuals became ill, many of whom were poor or had been abandoned by their families, there was an acute need for shelters and hospices. Brenda Lee, a transvestite who had managed a combined boarding house and venue for transvestite shows, transformed her establishment into the first AIDS-related shelter in Brazil. Initially the shelter catered to HIV-infected transvestites, but eventually it offered shelter to men who were not transvestites. Other forms of direct assistance to PLWHA also appeared in the mid-1980s, especially in São Paulo and Rio de Janeiro, through a variety of organizations, many of which were associated with the Catholic Church or the Afro-Brazilian religion *Candomblé* (Galvão, 1997). Home care was also introduced. These organizations provided a vast array of services, such as provision of groceries, free medical care, and transportation to and from hospitals. With the introduction of more potent drugs in the mid to late 1990s, and the return to health and increase in life expectancy that followed, many shelters and organizations that provided homecare adapted their activities to this new reality. Nonetheless, as the epidemic moved into poorer segments of the population, shelter services continued to play a crucial role for many PLWHA in Brazil.

In 1987 the Institute of Religious Studies, an NGO that was created in São Paulo in the 1970s but later relocated to Rio de Janeiro, started a project called Religious Support against AIDS that aimed to raise awareness of the epidemic among various religious denominations. At present, many religious groups are involved in the fight against the epidemic, offering a vast array of services, including shelters for PLWHA.

In essence the Brazilian response to the HIV/AIDS epidemic in the 1980s was notable for the early, continuous, and active involvement of civil society, governmental sectors and academia in the design of public health policies and the care of PLWHA (Bastos & Coutinho, 1999), coupled with media campaigns characterized by direct and unprejudiced messaging. The latter, in particular, remains a prominent feature of the Brazil NAP (Okie, 2006). Also, in the Brazilian case, the HIV/AIDS epidemic had an important role in promoting greater visibility, and consequent empowerment, of groups that fought for their civil rights, such as gay men, lesbian, sex workers, and transgender (Galvão, 2000).

## The 1990s

The 1990s were a period of new initiatives against the epidemic, including broadening societal response to AIDS, with increasing participation of the women's movement and of organizations representing sex workers and transvestites, as well as the private sector (Berkman et al., 2005).

In 1990, a group of PLWHA, *GIV* (Incentive to Life Group), was founded in São Paulo. Since 1991, *Pela VIDDA* has organized an annual national meeting called *Vivendo* ("Living"), entirely devoted to the exchange of experiences between PLWHA, which attracts over one thousand participants each year. Additionally, national meetings of NGOs working with HIV/AIDS, which are regularly held, have become important venues for articulating strategies, sharing experiences, and empowering people and organizations working with HIV/AIDS in Brazil.

In 1988 medicines to treat opportunistic infections began to be distributed through the health system, and in 1991, AZT began to be offered. Societal pressure also led a small but growing number of State and Municipal governments to distribute ARVs in their public health systems. However, not all who needed these drugs received them. This led several lawyers and doctors to work together on lawsuits for individual patients (Scheffer et al., 2005). This process culminated on November 13, 1996 with passage by the National Congress of a law (Brazil, 1996a) mandating the provision of free and universal access to ART through the public health system to all those who qualified for treatment under national guidelines. According to the law national guidelines were to be developed and routinely updated by an independent group of specialists.

Another key event in the 1990s was the loan agreement between the Brazilian Government and the World Bank that established the "Project for the Control of AIDS and STDs," better known in Brazil as "AIDS I" (World Bank, 2004). AIDS I represented a new way of managing the epidemic, with close collaboration between governmental and non-governmental sectors being one of its central features. AIDS I brought profound changes to the scope of activities and to the modus operandi of NGOs (Galvão, 2000). These changes, in turn, reflected changes in global strategies for confronting the epidemic (Parker, 2000), as well as particular features of the Brazilian response (Galvão, 2000). The availability of funds from the loan agreement with the World Bank, combined with a decrease in funds from other international donors, made the national AIDS program the main funding source for most HIV/AIDS NGOs.

Between 1993 and 2007, three loan agreements were signed between Brazil and the World Bank. These loans, which could not be used to purchase ARVs, were used to foster preventive measures, epidemiological surveillance, institutional development, including training of personnel, purchase of equipment and support for the creation of a network of services. The first loan, which covered the period 1993–1998, was for USD 160 million. The second loan, covering the period 1999–2003, was for USD 165 million. In October 2003, the Brazilian Senate approved a third loan, for USD 100 million (Brazil, 2003), to support activities from 2004 to 2007. At present, a fourth loan is being negotiated.

The loan agreements between Brazil and the World Bank were of fundamental importance for the expansion of prevention activities carried out by the NAP and by NGOs (World Bank, 2006). Although the NAP had the political power to implement potentially successful prevention and treatment policies, only NGOs had the necessary legitimacy and on-the-ground expertise to respond to the particular needs of specific communities, such as indigenous populations, IDUs and sex workers, or to establish collaborations with labor unions and popular movements such as the Landless Worker's Movement or youth groups such as the Girl Scouts. These collaborations allowed for the delivery of targeted messages that could resonate within each community.

In the 1990s, there was a significant increase in the number of NGOs dedicated to various aspects of the response to HIV/AIDS. Concomitantly, there was a marked increase in activities that allowed for communication, exchange of experiences and cross-fertilization between these NGOs. One of the highlights of this period was the establishment, in 1994, of the National Network of HIV Positive Persons (RNP+). An association of individuals rather than of organizations, RNP+ is made up exclusively of HIV-infected persons. In 2004,

the National Positive Women Citizens Movement was also created (Brazil, 2006b). As previously mentioned, these networks and forums, through their campaigns and representation in governmental bodies responsible for formulating health policies, played a fundamental role in the struggle to ensure continuous universal access to treatment.

Collaborations between governmental and non-governmental organizations have been crucial for the development of more effective prevention campaigns. According to the NAP, between 1998 and 2001, a total of 1,681 projects were funded, involving 686 civil society organizations, with a total spending of USD 30 million (Brazil, 2002). Despite concerns about the growing financial dependency of many NGOs on governmental funds that can potentially limit their ability to criticize government decisions, the close collaboration between NGOs and NAP is considered by many to be one of the main strengths of the Brazilian response to the HIV epidemic.

## The Brazilian Response in the New Millennium

In recent years, international praise for the Brazilian response to the epidemic has been largely based on its policies of universal and free access to ARVs (Cohen, 2000). In Brazil, local production of generic drugs started in the 1970s because laws then in existence allowed the government and private manufacturers to make generic versions of medications without infringing upon international intellectual property laws. This situation changed in 1996, when a new intellectual property law was approved by Congress (Brazil, 1996b). The new law was in compliance with terms agreed upon in 1994, the year that Brazil joined the World Trade Organization (WTO). Thus, until 1996, pharmaceutical patents, whether processes or products (Orsi et al., 2003), were not recognized in Brazil, allowing government and private drug manufacturers to produce generic versions of ARVs that were in existence prior to 1996 without infringing upon international intellectual property laws. In 1994, Zidovudine became the first generic ARV drug to be produced in Brazil (Passarelli, 2001).

In February 2001, the WTO accepted a request from the United States to hold a hearing to decide if intellectual property laws in Brazil were in accordance with international trade agreements (Viana, 2002). This request was based on the prospect of compulsory licensing of ARVs, because Brazil had threatened to implement a compulsory license for two ARVs whose prices, Brazil argued, were exorbitantly high. The two drugs were Nelfinavir, manufactured by Roche under the brand name Viracept, and Efavirenz, manufactured by Merck under the brand name Stocrin (Galvão, 2002b). In an unusual move, Brazil ran an advertisement in major U.S. newspapers, including The New York Times, which read:

> Local manufacturing of many of the drugs used in the anti-AIDS cocktail permits Brazil to continue to control the spread of AIDS. The drugs industry sees this as an act of war. We see it as an act of life. (The New York Times, 2001).

In June 2001, the United States withdrew its complaint against Brazil (Ashraf, 2001).

Given that international trade agreements allow for compulsory licensing of drugs in cases of national emergency, Brazil has successfully used this prerogative as an instrument to bargain for better prices for drugs registered after the 1996 law came into effect. It should be mentioned that sometimes agreements are reached more rapidly and amicably, while at other times discussions are more difficult, involving the possibility of implementing a compulsory license. This was the case in 2005 during negotiations with Abbott Laboratories (Kaiser Network, 2005) for the reduction of the price of their protease inhibitor (Lopinavir/ritonavir, Kaletra®), and in 2006 with Gilead, for the reduction of the price of their drug Tenofovir (Kaiser Network, 2006). After tense negotiations, agreements were signed with both pharmaceutical companies (Brazil, 2005). In May 2007, Brazil issued its first compulsory license for an ARV (Brazil, 2007). Under its terms, Brazil will, at least initially, import generic efavirenz, rather than produce it locally, at prices lower than those offered by the patent holder (Cohen, 2007; Ford et al., 2007); when this first license was issued approximately 75,000 patients were using efavirenz (Ford et al., 2007). The issuance of the first compulsory license to import a generic drug rather than to produce it locally indicates that Brazilian policies to ensure universal access to treatment continue to evolve.

## Prevention

Early and active involvement of civil society is one of the hallmarks of the Brazilian response to the epidemic. In 1983, gay groups in São Paulo, such as Outra Coisa (Something Else) and Somos (We are), were responsible for the first activities aimed at preventing HIV transmission. Subsequently, many other gay groups emerged throughout the country, and most of them are still active today. Starting in 1990, groups of sex workers began to develop preventive activities, with special emphasis on peer education and on training on how to negotiate the use of condoms and on how to share information on AIDS with colleagues and clients. Equally important was the involvement of several feminist groups, which also started in earnest in the early 1990s. The HIV/AIDS epidemic also played an important role in the foundation of the first associations of transvestites, which took place in the early 1990s.

Another hallmark of the Brazilian response has been the early implementation of effective public health policies, such as free distribution of condoms and needle exchange programs, which are considered to be fundamental interventions to reduce the risk of transmission of HIV infection. These two components of the national response have played important roles in national and international debates on prevention strategies (Okie, 2006; Paiva et al., 2006; Fonseca et al., 2006; Burrows, 2006). Despite fierce opposition from important stakeholders, such as the Catholic Church, distribution of condoms and needle exchange have been essential components of the Brazilian response (Bristol, 2006; Okie, 2006; Rohter, 2005). For example, in the past few years, aid money from the U.S. government has been conditioned on the acceptance of the so-called ABC (Abstinence, Be faithful, use Condom) strategy, "with a strong emphasis on A and B, over C" (Lancet, 2006). Critical analyses of the ABC approach, based on empirical findings, both in its domestic version

(Santelli et al., 2006) and as applied internationally (Cohen et al., 2005) have been published. So far, Brazil is one of the few countries that have refused to receive money for AIDS programs that would have to be used according to the principles of the ABC strategy (Lancet, 2005; Okie, 2006).

## Treatment and Care

In the late 1980s and early 1990s, lawsuits against local health authorities demanding access to ARVs were common. These lawsuits were instrumental in forcing the government, at the federal and at the state level, to position itself with regards to access to treatment. In 1996 a law was passed in Congress making it mandatory for the government to provide free and universal access to ARVs through the public health system to all those who qualified for treatment under locally developed guidelines. In 2005, the Brazilian NAP released a publication entitled *Remédio via Justiça* (Medicine via Justice), which tracks the history of access to ART through judicial actions (Scheffer et al., 2005).

The 1996 law made Brazil the first developing country to provide free and universal access to ARVs. This policy brought international recognition to the country as a model in the fight against the epidemic as well as to the forefront of the international battle to insure access to treatment in developing countries (Galvão, 2002b; Levi & Vitória, 2002; Teixeira et al., 2003). The battle for access to treatment has been increasingly defined as a human rights issue (Galvão, 2005a). In fact, the connection between human rights and health, and HIV/AIDS in particular, is increasingly seen as one of the most important debates in the new millennium. In 2001, a few key events reinforced the importance of addressing HIV/AIDS as a human rights issue. In April, the United Nations Human Rights Committee approved a resolution entitled "Access to Medications in the Context of Pandemics such as HIV/AIDS" (United Nations, 2001) that had been proposed by the Brazilian delegation. At the Fourth World Trade Organization Ministerial Conference in Doha, Qatar, in November of that same year, a declaration was approved allowing for compulsory licensing of key drugs in cases of national public health interest (WTO, 2001). This proposal was also initiated by Brazil.

Brazil has sought to combine domestic production of some ARVs, both by public and privately owned laboratories, with the purchase of others, seeking the lowest prices through negotiations with international pharmaceutical companies. According to the Brazilian NAP, local production of drugs made the policy of universal access to treatment feasible (Brazil, 2002; Levi & Vitória, 2002). Official figures show that between 1996 and 2002, local production of drugs saved the public health system over two billion USD (Brazil, 2001) and contributed for a 70% decrease in mortality rates in cities such as São Paulo and Rio de Janeiro (Teixeira et al., 2003). These impressive figures have bolstered arguments favoring access to treatment and have strengthened a national commitment to maintaining the policy of universal access.

Virtually all ARVs used in the country are bought by the Federal Government and dispensed free of charge at public health facilities; in 2005 the costs of drugs was approximately USD 400 million (Greco, & Simão, 2007). Viral load measurement, CD4 lymphocyte counts, and laboratory monitoring are

also available at no cost. At present, approximately 180,000 patients receive ARVs through the public health system (Brazil, 2006b). Treatment is provided through a network of services supported by Federal, State and Municipal funds, which includes 397 hospitals, 79 daycare clinics; 58 homecare facilities, and 422 outpatient clinics (Brazil, 2006b). These services are supported by over 70 laboratories dispersed throughout the country, which are capable of performing necessary patient monitoring. In addition, there are currently over 380 government-sponsored VCT sites.

To evaluate the quality of care provided by the public health system, a study involving a nationally representative sample of 336 services in seven states was performed. This study showed that ARVs were available in adequate amounts and without stock-outs in over 95% of the services. On the other hand, CD4 cell counts and plasma viral load were measured with the frequency recommended by the national guidelines in only 59% and 41% of the services, respectively. Additionally, there were considerable variations in access to laboratory tests needed to monitor therapy and to drugs for the treatment and/or prophylaxis of common opportunistic infections (Melchior et al., 2006). The impact of these disparities on patient outcome remains to be determined.

## Final Comments

Throughout this chapter, we have attempted to illustrate the main features of the Brazilian national response, including civil society involvement and universal access to free treatment. Brazil's early and effective implementation of prevention contained the epidemic and helped make universal access to treatment feasible. While the Brazilian approach has inspired global changes, countries facing generalized epidemics who are implementing treatment without the same focus on prevention may find that prevention failures make treatment less feasible in the longer term.

Further, the Brazilian response, despite its undeniable and impressive success in the prevention and treatment of HIV/AIDS, now faces a number of challenges to its long-term sustainability (Grangeiro et al., 2006; Greco & Simão, 2007; Schechter 2007). However, it can be argued that these challenges only exist because Brazil dared to respond to the epidemic in unprecedented ways, such as linking prevention and treatment, and refusing to capitulate even when confronted with opposition from players such as the Catholic Church, the pharmaceutical industry, or the U.S. government. A primary challenge confronting the Brazilian response to the epidemic is how to ensure its long-term sustainability. Internal budgetary pressures may jeopardize the country's ability to continue to distribute free drugs due to the increasing number of individuals in need of treatment. This, in turn, necessarily leads to discussions on how to further reduce drug prices and treatment costs.

Available data indicate that median survival time for AIDS patients has increased substantially, that rates of virologic response are comparable to those reported from developed countries, that approximately one third of those currently on treatment are on their second line regimen or beyond, and that untreated co-morbid conditions are relatively common. Additionally, there are data to suggest that in Brazil, similar to what has been reported from developed countries,

the large scale use of HAART has been associated with changes in mortality patterns among HIV/AIDS patients. In particular, the frequency of cardiovascular diseases, diabetes mellitus and other potentially preventable conditions has increased significantly faster as underlying causes of death among HIV-infected individuals as compared to the general population (Pacheco et al., 2007). These changes in mortality patterns may be attributed at least in part to HIV-infected individuals now living longer, and thus having longer periods of time at risk for chronic conditions associated with aging, as well as an association between certain ARVs, time on therapy, and risk for cardiovascular conditions and diabetes mellitus.

Nationwide, more than two thirds of the estimated number of HIV-infected individuals do not presently need ART, but are likely to require it in the future. Thus, in the coming years not only will the number of patients in need of ART increase substantially, but there will also be a considerable increase in the number of patients requiring more complex regimens. Additionally, these patients will have co-morbidities that impact their prognosis and whose treatment might be complicated by drug–drug interactions. As a consequence, Brazil will need to expand its network of treatment facilities, increase its capacity to manage more complex clinical conditions and to prevent, diagnose, and treat co-morbidities and treatment-related complications. In order to best allocate finite resources, Brazil will have to decide the proper balance of sophistication that will be required in terms of facilities, e.g., primary care units versus quaternary care university hospitals, and healthcare workers, e.g., physicians specialized in HIV care versus physician assistants (Schechter, 2007).

At the local level, active involvement of civil society in continuing debates concerning potential advantages and disadvantages of compulsory licensing of drugs is of paramount importance. Equally important, is Brazil's role in international debates on how to reconcile the need for scientific innovation, respect to intellectual property rights, and access to ART as a human rights issue. In parallel, Brazil needs to continue to invest in the quality of care provided to patients and on mechanisms to guarantee that marginalized sectors of society have access to diagnosis and treatment through the public health system.

The Brazilian guidelines for ART are based on an individualized approach to treatment and on an open formulary, as opposed to the simplified approach recommended by the World Health Organization (WHO). In the individualized approach, patients can start ARV treatment with a regimen containing drugs drawn from a list of all approved drugs, which currently includes approximately 20 drugs, leading to dozens of potential permutations. In contrast, in countries which adopted the WHO recommendations, only two to four ARV regimens drawn out of a limited list of 1st line options, that includes five or fewer drugs, are available to initiate treatment. There are no published critical analyses on the operational, programmatic, and economic implications of the option for individualized therapy as opposed to the simplified approach recommended by WHO (Schechter, 2007). However, available data clearly indicate that in Brazil the median survival time in the HIV-treated population has increased substantially, that rates of virologic response are comparable to those reported from developed countries, and that there has been a steep increase in HIV-unrelated conditions as causes of death, many of which are preventable and treatable. More studies on the effectiveness of current policies will be essential

for planning how to meet future demands. Accordingly, one of the main lessons that may be learned from the Brazilian experience is that operational research should be an integral part of programs of access to treatment, if their long-term sustainability is to be ensured.

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# Chapter 8

# Advocacy, Activism, Community and the AIDS Response in Africa

Emily Bass, Gregg Gonsalves, and Milly Katana

## Introduction

AIDS is the most politicized disease of the 20th and 21st centuries. The visual chronicle of the epidemic is one of public expressions of grief, pride and rage on the part of those infected and affected by the disease. There is October 11, 1992 when the New York chapter of the AIDS Coalition to Unleash Power (ACT UP, 1992) and 8,000 supporters scattered the ashes of ashes of friends, family and loved ones on the White House Lawn, many wearing ACT UP's symbol: a stark pink triangle on a black background, captioned "silence equals death. (ACT UP, 1992)" Nearly eight years later, on July 9, 2000, on the eve of the 13th International AIDS Conference, thousands marched through the streets of downtown Durban, South Africa, singing, *toi-toi*-ing, and wearing shirts reading "HIV positive," to demand access for AIDS treatments, including highly active antiretroviral therapies (ART), in South Africa and throughout the developing world.

These and many, many other public demonstrations, protests, acts of collective civil disobedience and individual courage have been staged in order to shift HIV/AIDS out of the shadows into the harsh glare of the global spotlight. These collective and singular acts have drawn attention to the issues of homophobia, racism, poverty, gender inequity, crumbling health care infrastructure, oppressive trade policies and greed which help to fuel the epidemic.

A chapter such as this one, charged with exploring the contribution of community activism and advocacy to the public health response to the epidemic, can start by acknowledging the global sense of community which exists among activists who have joined in the struggle for the right to health and life. This sense of community cuts across language, nationality, economic status or



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_8, 

sexual orientation. It is grounded in a fundamental belief in the human rights to health, dignity and self-determination.

This global community is, of course, comprised of a myriad array of national, local and village-based organizations, groups and individuals. Taken together, the global community of AIDS activists and, more importantly, highly context-specific local efforts have shaped, and continue to influence, the public health response to the HIV/AIDS epidemic as much as any of the international normative agencies: World Health Organization (WHO), the Joint United Nations Program on HIV/AIDS, etc.

Understanding the history of this movement is essential to any analysis of the successes, failures and continuing challenges of public health responses to the global pandemic. That being said, a single chapter cannot hope to tell the full history of these protests and the million other acts of bravery and strategic resistance performed by small and large groups of committed individuals who refused to die in silence.

Instead, this chapter aims to map out one portion of this history, and that in a relatively abbreviated manner. Specifically, we follow the arc of events related to the development of, and global campaign for access to highly active antiretroviral treatment. This fight, which goes on today, also encompasses issues of health care worker shortages, access to prevention, research and many other related struggles. We chart a relatively narrow path, one which leads from the scattering of ashes on the White House lawn, to the streets of Durban, to the halls of the United Nations (U.N.), to the cement-floored waiting room of a bare bones clinic in Rakai, Uganda or any of the other disease-ravaged communities around the world.

We have narrowed the path by focusing on the ways that activist and advocate movements around the world helped expand access to affordable antiretroviral medications (ARVs) regardless of the color of their skin, the size of their pocketbook, or the continent of their birth. This focus leaves out or glosses over many other inextricably linked related elements of the AIDS activist movement, including work on prevention, on accelerating research, on stigma, on the rights of sex workers and injection drug users (IDUs), the list goes on and on.

However, the principles which formed the bedrock of local, national and global community activism around AIDS treatment access are also the foundation of these related efforts. Understanding the way that one particular set of challenges were framed and, frequently, overcome will provide insights into the strategies, obstacles and opportunities of many other related campaigns.

The first section of this chapter will provide a brief and necessarily cursory overview of the history of the global treatment access movement. The second section looks more specifically at the contours of this movement in sub-Saharan Africa. The final two sections examine the challenges that have emerged as AIDS treatment programs have started to "roll out" around the world.

At the outset of this discussion, we acknowledge the foundation for all AIDS activism: that silence equals death. None of the subsequent victories or enduring struggles would be possible without the original demand that the world acknowledge the faces and voices of people living with HIV/AIDS. We dedicate this work to those named and unnamed who have fought these struggles and continue to fight them today.

## Growth of a Global Movement: 1999–2004

### Overview

The five-year period between 1999 and 2004 was one of stunning activity in the field of global AIDS. At the beginning of this time period, racially-tinged skepticism about the feasibility of providing ARVs to people in developing countries, particularly Africa, was rampant. Then head of the U.S. Agency for International Development (USAID) Andrew Natsios notoriously opined to the Boston Globe that many Africans "do not know what Western time is" and so could not be expected to take ARVs on the schedule required (Russell, 2001). By 2004, however, USAID would be one of several U.S. institutions funneling millions of dollars to AIDS treatment programs in fifteen target countries through the U.S. government's President's Emergency Plan for AIDS Relief (PEPFAR), one of several funding streams to support AIDS treatment and care that emerged in this time period.

This section reviews this time period and explores the forces that slowed global action on treating AIDS, and the activist-driven campaigns that shifted the paradigm regarding poor people's access to ARVs from *if* to *how*. For more in-depth information, there are several excellent chronicles of these various issues (Berhman, 2004; D'Adesky, 2004; Smith & Siplon 2006).

### The Early 1990s: Urgency, Omissions and Overlooked Warnings

In 1992 when American activists were dropping the ashes of AIDS casualties on the White House lawn, the world still had a relatively limited view of the scope of the AIDS epidemic. Many public health experts viewed HIV as a disease primarily afflicting IDUs, homosexuals, and people requiring blood transfusions or other blood products. In spite of early warnings from activists including South African researcher Zena Stein, there was also relatively little attention given to women's vulnerability to HIV, or the possibility of a heterosexually-driven epidemic (Stein, 1990).

Activists in the U.S. and Europe lobbied governments to accelerate research on medications to fight the virus. There was a four-year gap between U.S. Food and Drug Administration's approval of AZT, the first antiretroviral drug to fight HIV, in 1987 and the approval of the second medication, didanosine (ddI), in 1991. Activists developed scientific literacy and became lay immunologists, virologists and regulatory experts in groups like the ACT UP Treatment and Data Committee, and used these skills to formulate precise, hard-hitting demands about accelerating clinical trials and approval of potentially promising therapies.

The struggle to find medications was primarily located in the developed world, where the scientific and human resources for drug discovery were also concentrated. At the same time, the relatively blinkered focus of public health responses on a few "high risk" groups meant that other epidemics, including those in women, children and people living in developing countries were either denied or neglected. In 1992, for example, a World Bank report *Impact on AIDS in Africa*, stated, "No one doubts the enormous toll that an AIDS death inflicts on surviving household members. But the long-run aggregate impact of the epidemic [in Africa] is uncertain (Over, 1992)".

Statistics showing exponential increases in AIDS rates in Africa only partially countered this initial equivocation, which was so disastrous in hindsight. In 1994, 25% of South African women clients at STD clinics had HIV, a staggering increase from the one percent prevalence rate recorded in that population in 1988 (UNAIDS, 2004). Epidemiological models foretold tens of millions of infections in developing countries without immediate action (Ainsworth, 1998). These reports were met with skepticism and concern that Africa's AIDS statistics were being inflated in a manner that would stigmatize and blame sub-Saharan African countries for a disease that was first diagnosed in the West (AIDS in Africa, 1993).

As in the U.S. under the Reagan administration, hesitation, silence and denial on the part of political leaders in Africa and other developing countries helped HIV/AIDS rates to soar, and made the outspoken protests and demands of people with HIV and their allies essential in galvanizing a credible response.

## The Dawn of the HAART Era and the Growth of Global Treatment Activism

In 1996, a new activist campaign emerged alongside entrenched battles to break the silence, reduce stigma and accelerate research. The turning point came when a new class of drugs, called protease inhibitors, was added to the AIDS treatment armamentarium. At that year's International AIDS Conference in Vancouver, participants filled the halls to hear reports of dropping viral loads, increased CD4 cell counts and improved clinical outcomes in clinical trials of HAART that combined experimental protease drugs with older medicines like AZT and ddI.

At that same meeting, HIV positive activist and ACT UP member Eric Sawyer took the podium to deliver a blistering condemnation of global inequities in access to the new drugs and to all life-saving medications. "I am afraid that you all will miss the real message from this conference. I speak especially to the media, who have started the spin that the "the cure is here, let's dance," he said in a plenary speech at the opening ceremony. "The headlines that PWAs (people with AIDS) want you to write from this conference would read: 'Human Rights Violations and Genocide continue to kill millions of impoverished people with AIDS.' That is the truth about AIDS in 1996. (ACT UP, 1996)".

As Sawyer and his audience members knew, the new medications came with a flood of glossy advertisements targeting consumers in the U.S. and Europe and an equally hefty price tag. In 1996, the annual cost of a HAART regimen was in the tens of thousands of dollars, a cost that put the drugs in the realm of fantasy for poor people in Africa, Asia and Latin America. There were access issues in developed countries, too: in the U.S., people without health insurance, and those individuals whose incomes were too high to qualify for AIDS Drug Assistance Programs, yet too low to absorb the costs of the medications all faced access issues.

American activists like Sawyer were by no means the only ones to take note of, and take action on, the issue of drug access. Activists in Brazil, Thailand, South Africa and elsewhere around the world refused to accept the status quo,

that the drugs were too expensive, and demanded radical shifts in national public health strategies for dealing with the epidemic.

Brazil was a notable country in which activist groups in civil society pressured the government to take activist stances itself, ultimately forming a coalition of non-governmental organizations (NGOs), policy makers, scientists and pharmaceutical manufacturers which would prove to the world that it was possible for a less-developed nation to effectively address its AIDS crisis.

At the outset of this campaign, Brazilians living with HIV/AIDS used the Brazilian constitution as a cornerstone for arguing for access to life-saving AIDS medications. To these activists, the constitutional statement that "health is the duty of the state and a right of the citizen" signaled a clear obligation on the part of government to provide ARVs to all HIV positive Brazilians. A broad coalition of civil society groups worked together to pressure the government to acquiesce to these demands, and to negotiate a World Bank loan to fund the Brazilian government's National AIDS Program.

In November 1996, the Brazilian government launched a program of universal access to AIDS drugs for all HIV positive Brazilians. Then, in 1998, the government began working with national pharmaceutical manufacturers to develop generic versions of some costly medications, a step which brought dramatic cost savings to the government, and drew the ire of the pharmaceutical industry and the U.S. government.

Today, Brazil is recognized internationally for its successes in providing comprehensive AIDS care to its population. Many activists from civil society groups and the broader social movement have worked within the health ministry and helped to shape and guide policy formation. Analyses of the success of Brazil's AIDS program frequently focus on the critical role of cooperation between government and the mobilized populace. This collegiality was hard-won. "The AIDS program as a whole works very well, and I'm very supportive of that, but I always like to repeat, it is so because we were there first," explained Ezio Tavora dos Santos Filho, director of Grupo Pela Vidda (For Life), an AIDS NGO in Rio de Janeiro in a 2003 interview. "The community activists were there before to push the government to do something. People were dying like flies. We just hated the government. If I went to any hospital to say I had AIDS, they would put me out the door."

As Tavora suggests, strategies of direct confrontation, negotiation, collaboration and partnership, have been one of the defining characteristic of the AIDS movement that its many and diverse members have been able to utilize, simultaneously or in sequence.

As inspiring as Brazil's story was it was not a solution that could be replicated worldwide. Many poor countries lack the infrastructure and expertise to manufacture generic versions of life-saving medications. In these countries, the cost of HAART regimens kept the drugs out of the hands of all but a handful of wealthy elites.

South Africa's Treatment Action Campaign (TAC), founded in 1998, was one of the strongest developing-country led movements to develop and advance an agenda for dropping drug prices and bringing HAART and drugs for opportunistic infections to the epicenter of the epidemic in southern Africa. TAC was an outgrowth of the country's National Association of People Living with HIV/AIDS. In its first statement, issued on 10 December 1998, TAC announced

its intention to "draw attention to the unnecessary suffering and AIDS-related deaths of thousands of people in Africa, Asia and South America. These human rights violations are the result of poverty and the unaffordability of HIV/AIDS treatment," (TAC, 1998).

Like Brazilian activists, TAC clearly situated AIDS treatment access as a human rights issue. Lack of access to life-saving medications violated the individual's right to health. National governments bore the critical responsibility to safeguard and make good on this right. But they were not alone. In an era of multinational corporations and far-reaching international trade law and policy, other governments and trade agencies also bore a responsibility for upholding human rights. And so the right of people in developing countries to have the same access to medications as their wealthier counterparts was also asserted explicitly and implicitly by developing country activists.

Starting in 1999, the U.S. group Health GAP (Global Access Project) emerged as a powerful American ally for activists working in South Africa, Brazil and Thailand, where in the late 1990s, activists mobilized around the cost of AIDS drugs and challenging the patent status of key ARVs such as ddI. Founded by activist physician Alan Berkman, HIV-positive activist Eric Sawyer and other groups of North American activists dedicated to securing access to life-saving medications for people in the global South, Health GAP focused on applying pressure to multinational corporations and the U.S. government, whose pricing practices and policies were major barriers to expanding AIDS treatment access worldwide. So, for example, one campaign launched in 1999 drew attention to presidential candidate Al Gore's role, as vice president of the U.S., in pressuring South Africa to waive its right to manufacture or import life-saving medications, an issue that was also the substance of a lawsuit brought against South Africa by more than forty pharmaceutical companies (Health GAP, 1999).

The energy of the global and national movements in Thailand, Brazil, South Africa, the United States, France, and many other countries found a dramatic outlet at the 13th International AIDS Conference in Durban, South Africa. The Durban meeting was the first time that this major AIDS gathering had been held in a developing country and many who attended remember the five day event as a time of palpable change, filled with moments of public outrage, jubilant resistance and articulate statements by clinicians like Paul Farmer and Praphan Phanupak, an early proponent of treatment access in Thailand, about the morality and feasibility of AIDS treatment in resource-poor settings. At a demonstration staged outside of a World Bank meeting on the Durban seaside, HIV-positive Malawian treatment activist Chatinkha Nkhoma told a cheering crowd, "I am not going to die silently. I am going to die fighting."

By the time the five day meeting had concluded, it seemed that it would no longer be possible to argue that treatment for people with AIDS in Africa was unfeasible. This heady sense was both fact and, sadly, fiction.

## Linking Global and Local Campaigns

If the 2000 Durban conference provided an infusion of energy into the global AIDS treatment access movement, it did not provide all of the answers. There was a growing recognition that it was morally untenable for the majority of the world's HIV positive people to die without access to ARVs. But the cost of

these drugs remained prohibitively high for both individuals and governments in the vast majority of developing countries.

As the previous section illustrates, the contours of the issues took different forms in each country. Activists in Brazil, Thailand and South Africa developed their agendas for action around relevant domestic pressure points. Many other countries took similar, locally-tailored actions.

There was also a global agenda, which included two main foci: one targeting the pharmaceutical industry itself, and the other focused on the harmful impact of trade policies developed by the U.S. government and the World Trade Organization (WTO) which curtailed countries' abilities to manufacture or import life-saving medications. Activists argued that these trade policies helped protect the financial interests of the pharmaceutical company, whose patents on medications were a form of intellectual property. One focus of campaigns in 2000 and 2001 was the Trade-Related Aspects of Intellectual Property Rights (TRIPS) agreement, an international agreement administered by the WTO, which specifies countries' rights and responsibilities with regard to patented intellectual property, including medications, vaccines, seeds and other commodities required for life and health in rich and poor nations alike.

In the run-up to a November 2001 WTO ministerial in Doha, Qatar, Health GAP and collaborators including Oxfam and the Third World Network gathered 32,000 signatures from 163 countries and territories to a petition asking that the WTO recognize countries' rights to prioritize national public health over intellectual property and patent concerns. Simply put, this was a fight to ensure that TRIPS allowed for a country's right to import or manufacture cheaper versions of life-saving medications, instead of being restricted to using only the costly, patented versions of these drugs being marketed by the pharmaceutical industry.

Activists counted the campaign around the Doha meeting as an important victory, since the WTO clarified the overriding importance of countries' public health emergencies, and issued a separate "Declaration on the TRIPS agreement and public health."

The campaign around TRIPS is one example of the way in which AIDS treatment access was advanced by the work of a global community. Using email, conference calls and the occasional face-to-face meeting, activists from multiple countries found common cause, developed a common agenda and executed a coordinated series of actions and demands.

While the Doha declaration safeguarded countries' right to import or manufacture cheap medications, the question remained: where would cheap medications come from? The search for answers to this question propelled the other arm of global activism in 2000 and 2001 which mounted campaigns to pressure drug companies to drop their prices, and also sought credible and reliable sources of generic medications for a global market.

India, in particular, played a pivotal role in changing the pricing landscape[*1], starting in 2001, when generic manufacturer Cipla offered to supply Medicins

[*1] Domestic generic manufacturing of ARVs has not translated into rapid access for the growing number of people living with HIV/AIDS in India; and starting in 2005, the supply of these medications by manufacturers such as Cipla and Ranbaxy has come under threat by new efforts to change Indian legislation to restrict production of generic versions of some medications.

sans Frontiers (MSF) with triple combination therapy for roughly USD 350 a year, and offered the same drugs to poor governments for roughly USD 600 per year (Médecins Sans Frontiéres & Cipla 2001). In addition to creating a supply of cheaper medications, these generic manufacturers brought competition to the global marketplace, driving down the costs of all ARVs, not only generics (Medicins Sans Frontieres, 2001a).

But even at USD 1 per day, this left the drugs out of the reach of the vast majority of people who needed them; and price reductions prompted new protestations from drug companies that even if drugs were delivered by the truckful, many African countries would lack the infrastructure to supply them.

As early as 1999, however, there were a scant handful of programs, such as programs run by Partners in Health in Cange, Haiti, and MSF in Khayeltitsha, South Africa, that gave specific and practical rebuke to the notion that the drugs could not be delivered to poor people in settings where running water, electricity and paved roads were in scarce supply.

Community involvement was a hallmark of these early programs. In Haiti, the program established by Paul Farmer's Partners in Health Program used recruited community members to act as treatment *accompagnateurs,* following up on clients to ensure that they were taking their medications daily, as scheduled. In Khayelitsha, a township outside of Cape Town, members of TAC worked with clinic staff to raise awareness of ARVs in the surrounding communities, and served as peer leaders and treatment literacy trainers as the program expanded. These arrangements were not a function of budget constraints or staffing shortages, but rather a reflection of the principle, central to the AIDS activist movement from the outset, that people with HIV/AIDS were experts in and joint owners of the health care strategies needed to keep them alive.

As we discuss, the expansion of treatment programs through national efforts would, in some instances, move away from this social-justice based model to a more medicalized approach in which doctors and nurses provided the care to a more passive patient body.

## Half-Full or Half-Empty: Partially Funded War Chests and an Era of Change

If the first era of the AIDS treatment activist movement was defined by struggles to overcome resistance to treating AIDS in poor people, and to removing trade and cost obstacles to obtaining medications, then the second era focused on influencing financing mechanisms which did, ultimately emerge, to fund AIDS treatment on a large, if not global, scale.

One early initiative, the UN funded "Accelerating Access Initiative" (AAI) which was launched in 2000, drew criticism from many quarters for its slow pace and failure to deliver on early promises to slash drug prices in partnership with pharmaceutical companies. For example, the international NGO Oxfam tracked drug prices in Uganda, an AAI country, from 2000 to 2002 and saw no substantial reduction in cost until the country started importing generic medications, a step that was taken outside of AAI activities.

While the AAI program made it appear as if UNAIDS had taken action on ARV access, in reality, it provided access for only a relatively small number of individuals. What was needed, activists argued, was a substantial source

of new money which countries could use to support locally-developed programs addressing HIV/AIDS and other diseases which thrive within poverty conditions.

The first such mechanism to emerge was the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), which was announced in June 2001, at the U.N. General Assembly "Special Session on HIV/AIDS" (UNGASS). UNGASS was the first meeting of its kind to consider a specific disease. At this meeting, Secretary General Kofi Annan announced the creation of a global "war chest" to fight three major diseases associated with poverty: AIDS, tuberculosis and malaria, and called for governments, the pharmaceutical industry and other donors to meet the estimated financing need of USD 7–10 billion per year. Activists and advocates had been pressuring the governments of wealthy nations as well as international public health entities like the WHO and UNAIDS to create such a common fund for months prior to this announcement. The Global Fund was another success on the part of the AIDS activist community working at the global level.

At its inception, the Global Fund was envisioned as a lean, multilateral funding mechanism that would respond to proposals from developing countries, who were enjoined to create "country coordinating mechanisms" (CCMs) inclusive of civil society in order to access these funds. In an ideal scenario, this type of mechanism would allow for country-driven proposals that reflected the priorities and expertise of a wide variety of stakeholders including advocates, civil society groups, physicians, public health officials and ministers of finance. The fact that the Global Fund offered "new" money meant that poor nations would not have to borrow funds from other critical and cash-strapped programs to meet the goals set out in their proposals.

As laudable as these goals were, they were compromised from the outset by a funding shortfall. Prospective donors failed to meet the funding benchmarks set forward by Kofi Annan and argued vociferously for by economist Jeffrey Sachs and many others. One year after its creation, the Global Fund had garnered just USD 2.1 billion in pledges to be delivered over 5 years. This gap between projected needs and available funds would only widen in the years that followed.

Advocates responded to the hamstrung Global Fund with redoubled calls for increased funding, often targeted at the U.S. government, which has been consistently one of the lowest donors in terms of donation as a proportion of gross national product. In developing countries, activists pressured their governments to involve people living with HIV/AIDS in developing the proposals, and to include ambitious targets for expanded treatment programs. These local campaigns were supported by global-level advocacy, so that after the first call for proposals to the Global Fund yielded a disappointing number of treatment-focused initiatives, civil society groups worked from within and outside the Global Fund structure to urge its technical review panel to actively solicit proposals for ARV treatment.

As the struggles to fill the Global Fund war chest continued, the U.S. moved to create a funding stream of its own. In January 2003, U.S. President George W. Bush announced the creation of a bilateral fund known as the President's Emergency Plan for AIDS Relief (PEPFAR) which would be administered by the U.S. government in fifteen target countries, with specific goals for numbers

of people on ARVS, numbers of infections averted, and numbers of orphans and vulnerable services provided by these programs.

Eleven months later, on World AIDS Day 2003, the WHO announced its "3 by 5" initiative which set a target of starting three million people on ART by 2005. Unlike PEPFAR and the Global Fund, "3 by 5" was not a funding source; however this initiative provided additional political leverage for activists and advocates pressuring governments to set and meet enrollment goals for new ARV programs.

## Advocacy, Activism and the African Context

### Overview

This section moves from the large canvas of the global AIDS treatment access movement to a closer consideration of how advocacy and activism have shaped the AIDS response in sub-Saharan Africa.

While there is no single "African" AIDS movement, there are some critical themes which emerge in considering the work of some of the long-standing groups active on the continent. These include: connecting treatment literacy with social change mobilization; connecting the AIDS epidemic with gender inequalities; and connecting grassroots activism with the full spectrum of people infected with and affected by HIV given the legal, legislative and language challenges which can place many individuals beyond the scope of grassroots African activists.

### Models of African Activism and Advocacy

The AIDS activist movement has long situated the demand for life-saving medications in the context of a broader social justice agenda. This social justice agenda tackles human rights violations against marginalized and criminalized groups, gender-based violence, and the structural violence of global trade policies and economies which concentrate wealth in the hands of an industrialized elite at the expense of millions of peoples lives, homes and health. African AIDS activism is studded with examples of groups turning the proposal that HIV/AIDS treatment access serve as a "wedge" issue for breaking open airtight injustices into a practical reality.

The most familiar example of this work is the South African TAC, which has been and continues to be a global model for AIDS activism and advocacy. Nominated for the Nobel Peace Prize, TAC leaders and members have influenced global thinking and have helped to secure critical victories in South Africa, including a coordinated legal challenge to secure access to mother to child transmission therapies and pressurizing multinational pharmaceutical corporations to drop the lawsuit against South Africa's draft constitutional language regarding compulsory licensing and parallel importing.

These legal challenges, which have been led by TAC with lawyers from the AIDS Law Project acting on their behalf, have been linked to grassroots mobilization. One of the tremendous strengths of the TAC has been its ability to connect these legal struggles in the halls of power to the struggles of people living with HIV/AIDS in the townships and rural areas of the country. "Treatment

literacy" has provided a critical bridge between TAC's work on the national and community-level fronts. This term encompasses a range of activities all aimed at educating people with HIV and their allies about their bodies, immune systems, viruses and about the medications that can help save their lives.

The fundamental logic for this work is simple: knowledge is power. When people understand their bodies and the diseases that threaten them, they are better equipped to adhere to medications that can help them, and to advocate for the health of themselves and their families. As radical as this proposition was when made by a group of largely white gay male activists in the mid 1980s, it becomes downright revolutionary when embraced by communities with low or no literacy, which exist on the subordinate end of the steep hierarchy of most developing country health systems.

TAC's treatment literacy campaigns have been echoed and refined in many other settings, including women-focused initiatives such as the "Women at Durban" conference in 2000, a five day gathering which gave HIV positive South African women, unable to afford registration for the international AIDS conference, a chance to learn about and discuss their health issues with each other and with experts attending the main conference. "A Focus on Women" was a similar meeting held in Kampala, Uganda in 2001.

In Uganda and Rwanda, demands for access to treatment were made by women, for women, in campaigns which underscored the ways that gender inequalities, domestic and sexual violence (including forced sex within marriage), and socioeconomic barriers to women's independence drive the AIDS epidemic in women, and necessitate gender-specific responses. These groups do not argue that women are more deserving of treatment than men, or that programs should focus exclusively on women, but they do stress the importance of seeing any AIDS response in the context of larger, structural issues.

They are important cases to keep in mind at this point in the AIDS epidemic, when a medicalized model for AIDS treatment provision often reserves the role of educating patients about medications for doctors and trained clinicians. Asking clinicians in resource-constrained settings to provide this information is often unfeasible. More importantly, it un-couples the critical act of sharing information about how medications work; how the virus effects the body; and what can be done about it from the equally critical act of making people experts on their own bodies and health and, by extension, advocates for themselves and others. TAC's Deputy Director Sipho Mthathi has said, "HIV is an entry point. We want to ensure a better society and equality." (Friedman & Mottiar, 2004)

While there are commonalities between home-grown treatment literacy efforts in Uganda, South Africa, Kenya and other countries, there are striking differences in the corollary efforts to move from knowledge to power to access. These differences relate to a number of factors including, though not limited to, the extent to which free-speech and citizen protests are tolerated by the government (arguably an index of the strength of the country's democracy) and the extent to which the government itself has taken an active role in the AIDS response.

In South Africa, for example, TAC's strategic and, at times, confrontational response to government inaction drew on the strengths and tactics of the anti-apartheid movement and took place in the context of the post-apartheid constitution which placed a premium on rights of assembly, equality and free speech.

In Uganda, while the government of President Yoweri Museveni has received plaudits for its proactive AIDS response, public demonstrations by political opponents of the President have been met with harsh responses and the government denied an early request for a peaceful demonstration for AIDS treatment access. People with HIV and their allies who spoke out in the late 1980s and early 1990s recall being asked personally to remain silent on the issue, since their criticisms reflected badly on the government and its health ministries.

The situation in Uganda shifted when Museveni became involved in HIV/AIDS, launching his renowned and highly-effective campaign to raise awareness of and national responses to his country's AIDS epidemic. At that point, groups which had been requested to remain below the radar were able to establish resource centers with government support, if not direct financing. In a model which is strikingly different from the confrontational style of TAC in South Africa, Ugandan groups like the AIDS Service Organization (TASO), the National Community of Women living with HIV/AIDS (NACWOLA) and the national Network of PHA (NGEN+) have worked in collaboration and negotiation with the government.

This strategy has worked well at times when government and civil society agendas aligned, and has been more challenging when crises have emerged. One such moment came in 2002, when President Museveni made provocative and equivocal comments on condom use as a prevention strategy in a plenary speech to the International AIDS Conference in Bangkok. Ugandan AIDS activists at the conference held their own press conference to denounce what they saw as the president's retreat from an earlier, unequivocal stance on comprehensive AIDS prevention as part of the country's AIDS response.

Just across the border, in Rwanda, a network of organizations representing women who had survived the genocide, including many who had been raped and deliberately infected with HIV, reached out to overseas allies with requests for assistance in securing treatment. They were ultimately successful in launching a treatment program known as Women's Equity in Access to Care and Treatment (WE-ACTx) which was closely-coordinated with the government yet used the infrastructure and expertise of these allies to bring testing, treatment and care services to the women.

In Rwanda, there has been less division between civil society and government agendas, and more of a concerted effort on the part of the government to coordinate all of the AIDS-related activities happening in country, an emphasis that some observers link to the country's experience of international NGO desertion during the genocide.

As these brief examples indicate, public health responses in Africa, as in the rest of the world, have been shaped by a complex interplay between organizations of people living with HIV/AIDS, national governments, and international donors. Given this reality, public health professionals must understand the context-specific ways in which civil liberties, economics, and politics influence the civil society AIDS response in whatever country they are working in.

In addition to organizing locally to exert different forms of pressure on governments, African AIDS activists and advocates have also acted on regional and global levels. Founded in year 2002, the Pan-African Treatment Action Movement (PATAM) provided a platform for regional statements on treatment access, and for calls for action directed at the Southern African Development

Community, the African Union and other associations. PATAM has also supported activists in developing countries who are coping with the implications of their country's need to be compliant with "TRIPS", an international intellectual property agreement, which restricts the manufacturing or procuring of generic medications.

African AIDS activists have also obtained places on the country coordinating mechanisms; have made a case for treatment literacy; and have participated in the global work of the International Treatment Preparedness Coalition (a coalition of now over 1,000 individuals from over 125 countries, which sprang out of a meeting of treatment activists in Cape Town in 2003), which uses teams of country-level civil society members to monitor and compile information on progress and challenges in ARV roll out.

## Temporary Miracles, Partial Victories

Where mobilized communities, sufficient financial resources, collaborative governments and donor agencies have converged, the results of treatment roll out have been dramatic and, to many observers, thrilling. The return to health, the reinvigoration of families, the jump-starting of a child's growth when he or she starts on ARVs, these all appeared nothing short of miraculous when they took place in the U.S. and Europe in the mid 1990s, and the effect is, if anything, amplified in developing countries.

When an AIDS treatment program opens its doors, starts people on treatment, and provides them with the support to stay on treatment and return to work and life, it is a great victory, albeit one that rests on the shoulders of countless activists who did not live to see the day that the drugs came to their country. And in the early days of AIDS treatment roll out in Africa, the interval of 2004–2005 in many countries, it was possible to see these programs and to feel for an instant that the movement had achieved its goals.

Such feelings cannot last. The funding shortfall which has dogged the Global Fund since its inception, and the politicization of PEPFAR funds, which had mandated earmarks for abstinence-only programming and restricted programming to sex workers, youth and other high risk groups are part of the harsh reality of the treatment era. So, too, is the recognition that the programs that were being implemented were, more often than not, ones that did not achieve the paradigm shift that had been hoped for in the first decade of the global treatment access movement.

As discussed, a central tenet of the advocacy and activism of groups from Uganda, South Africa, and Rwanda to Haiti, Ukraine, India and Vietnam was that people living with HIV/AIDS be recognized as experts in their own right and as partners in realizing a vision of health which encompassed not only medications but also interventions aimed at the enduring structural issues of gender, poverty, and social marginalization. People with HIV/AIDS have been joined by an eloquent chorus of physicians, nurses, and other frontline providers, all arguing that interventions not be limited to the medications which fight a specific disease.

These efforts have met with some success. For example, at WE-ACTx and other innovative programs like Reach Out Mbuya in Kampala. Uganda, ARVs are provided in the context of programs addressing gender-based violence,

income generation, school fees for young people, literacy, psychosocial support and a range of other issues that have not traditionally entered the clinic. But for every instance of a holistic, community-based approach to AIDS care such as these, there are ten, if not one hundred, more examples of traditional clinics which, since the advent of programs funded by the Global Fund and PEPFAR, have begun to deliver ARVs without the constellation of services and the involvement of community members.

This is, in part, a function of the goals of a social movement being implemented by the mainstream. While Paul Farmer and his colleagues in Haiti were in the vanguard, and MSF doctor Eric Goemaere and his team and TAC collaborators were pioneers in Khayelitsha, South Africa, neither program sought to accomplish the kind of massive, target-driven enrollment of people on treatment that is both in order to meet the global need, and a feature of larger initiatives like PEPFAR and the Global Fund.

It is difficult to measure, in these early days, the consequences of target-driven programs which simply provide ARVs without a community context that provides the individual and his or her family with support for remaining on therapy, and, potentially, with resources to address other enduring issues like poverty, hunger, lack of clean drinking water which compromise AIDS treatment and quality of life. This disjuncture between the principles of the AIDS activist and advocacy movements in Africa and around the world, and the reality of the access that the movement's hard-fought battles have secured, is a driving force in the evolution of AIDS activist and advocacy movement(s) today.

## New Struggles and Structural Challenges

### Overview

This section explores challenges and activist campaigns that have emerged since 2005, in the time period when AIDS treatment programs began to "roll out" in many countries in Africa and around the world. Every country's AIDS treatment program has taken a slightly different form and so many of the activist issues related to roll out have been, once more, highly localized. Countries have grappled with specific questions about the availability of second-line treatment for drug resistant viruses, pediatric formulations, condom provision in PEPFAR-funded programs, and staffing of health clinics in the context of an overwhelming health care worker shortage in the developing world. These issues have global aspects, but their solutions are often rooted in local policy.

### Addressing Implementation

The advent of AIDS treatment programs has brought issues around health care infrastructure, human resource crises and other endemic defects of developing country health care systems into sharp relief. The movement which argued for universal access to HIV/AIDS medication is now broadening its focus. Many implementation challenges cannot be accomplished by an exclusive focus on HIV/AIDS since many of the hurdles to successful, sustainable programs are systemic and structural. Activists in developing and developed countries who

have fought for AIDS treatment access are now looking at broadening their campaigns and engaging with issues that were not present, or not often present, on the agenda during the first decade of the fight for global treatment access.

First and foremost among the systemic obstacles to implementation of AIDS programs is the state of health systems in developing and transitional countries, which in many countries hardest hit by the epidemic are either decaying, as in Eastern Europe and Central Asia, or have never been adequately supported and are have difficulty providing basic primary care services in general, as in many countries in sub-Saharan Africa.

The tension between supporting an integrated district-based health systems planning model and AIDS treatment programs, which largely have depended on a vertical approach to maximize the initial speed of service delivery, made collaboration between advocates for HIV/AIDS and health systems difficult at first. Neither set of advocates were willing to sacrifice cherished beliefs about the way AIDS treatment should be implemented or the way health systems need to function more generally.

However, common ground has developed particularly around the issue of human resources for health, which largely has centered on the shortage of trained health care workers in developing countries. Collaboration between activists from both HIV/AIDS and health systems arenas has been active around this topic and there have been several initiatives directed at the U.S. government, U.N. agencies and the Global Fund to support the training and retention of health care workers in the global South.

Raising the overall quality of health care and strengthening general health care systems is a long-term task. Intransigent problems with preventing maternal mortality, with childhood diarrheal diseases, with delivering polio vaccination continue to underscore the ways in which gaps in access and basic services can endure for decades, even after solutions have been identified. For a movement which took urgency as its first principle, AIDS drugs needed to be delivered yesterday; this long-term timeframe for addressing health systems issues is a new one. Striking a balance between this short term goal of treating millions of people in urgent need of ART with the longer term requirement of integrating AIDS treatment in a sustainable primary care model in the public sector has proved challenging.

One nuanced approach was developed out of a 2006 meeting between leading AIDS activists and experts on health systems who met in Cape Town, South Africa. This group proposed advocating for a new way of planning AIDS treatment programs. This approach would require an explicit assessment and evaluation of which components of AIDS treatment programs can be integrated into general health systems and which require vertical implementation in the short to medium term, while including specific steps for integrating all vertical components into the general health system in the long term. Importantly, the discussions stressed the flexibility needed in planning, particularly when initial decisions about which components of AIDS treatment programs should be integrated into the general health system and which should be vertical, may have unforeseen, deleterious consequences.

Continued dialogue between advocates for AIDS treatment and advocates for strengthening health systems is vital at all levels, from the global level where policy debates are being played out in discussions among U.N. agencies

and national governments, to the local level, where day-to-day decisions about health care are made.

The AIDS activist movement faces other dichotomies as well such as the putative opposition of treatment and prevention. This was a familiar feature of the discourse in the pre-roll out era, when public health officials and policy makers argued that limited resources should be funneled towards prevention as a more cost-effective strategy for addressing the epidemic. The activist movement helped to shift this discourse by stressing the ways in which treatment programs strengthened and served as an integral part of prevention efforts, by providing incentives for testing, reducing stigma, and possibly reducing infectiousness of people living with HIV once on ARVs.

Ironically, the emphasis on ARV roll out as a key element of the AIDS response re-invigorated this dichotomy. AIDS activists raised alarms about underfunding of prevention programs and inefficient separations between prevention and treatment interventions as well as ARV programs missing the opportunity to provide prevention education and prevention programs operating in parallel to treatment offerings. Here, too, activists are working with innovative clinicians and public health professionals to dismantle this dichotomy. Programs that focus on family-based care, including testing, treatment and medical services for HIV infected adults, their partners and their children are demonstrating the value of integrating prevention, treatment and care into a single offering. In many of these programs, community health workers or outreach volunteers play a key role in following up clients.

All of this work has moved activists from relatively specific goals around price reductions and creation of funding streams to a more direct engagement with what Paul Farmer has called the "structural violence" (Farmer, 2003) which drives the epidemic, the confluence of social, economic and political factors that puts people at risk not only for HIV/AIDS, but many other chronic and acute health conditions and non-health related morbidity and mortality.

The realm of prevention is a particular focus for work that targets structural issues, as well as individual risk factors, with activists joining social scientists who have long argued that, just as the success of scaling up AIDS treatment is inseparable from the fate of health systems, HIV prevention must be re-envisioned within a larger framework that confronts the social determinants of health. This means moving away from a narrow series of interventions, which include HIV testing [whether it is voluntary counseling and testing (VCT) or provider initiated testing and counseling (PITC)], condom promotion and distribution, behavioural change, and where politically sanctioned, syringe exchange, to an approach that engages with living and working conditions, educational opportunities, food security, housing status, access to health care, unemployment, water and sanitation, and crime prevention for poor communities.

The reality for many communities in the global South is that the interconnectedness between the lack of HIV treatment and the state of their local clinic, and the risk of HIV transmission and the number of rapes in their communities, for instance, does not have to be illustrated- it is experienced daily. The taxonomies of donors and politicians have little relevance to the lives of the most poor and marginalized; their social, economic and political status is one that consigns them to almost total deprivation from basic social and economic rights. In the context of this kind of deprivation, "simultaneous consideration

of various social 'axes' is imperative in efforts to discern a political economy of brutality," states Farmer (2003). Farmer makes this point to describe how to craft a rigorous critical analysis of human suffering, but millions of people lie at the intersection of these multiple vectors of brutality, each bearing down on them at once. The response to this terror can't be parsed. In this setting specialization is a luxury.

The future of AIDS advocacy resides in communities in developing and transitional countries. What is perhaps most unnerving for donors and politicians is that treatment activists from developing countries have demanded, as a right, an intervention, specifically ART, which until less than a decade ago was for Northerners or for those with the resources "to purchase health and vigour," as Edwin Cameron so aptly noted in his plenary speech to the International AIDS Conference in Durban, South Africa in 2000 (Cameron, 2000). These activists haven't been concerned with the opinions of experts who have declared that treatment isn't cost-effective or feasible in the developing world, they have claimed a right they view as inalienable and one which has been denied to them by their own leaders, donor nations and pharmaceutical companies. As these activists take up a broader call to support a more general right to health and a focus on the social and economic factors that drive HIV risk, implicit questions about global and national governance are becoming increasingly explicit: why don't we have access to treatment and basic health care, why must we live in the conditions in which we suffer so terribly? These kinds of questions are not ones that leaders necessarily want to hear, but the AIDS epidemic has once again exposed fundamental inequalities and provoked a worldwide social movement to address them.

## Conclusion: An Uncertain Future

The history of AIDS advocacy and activism is still being written; and this chapter concludes at what may well be remembered as a pivotal moment in the struggle. Community groups, global networks of activists, brave individuals, committed physicians, nurses, counselors and most importantly people living with HIV/AIDS have succeeded in changing for good assumptions about what is financially feasible and morally tolerable in regards to the AIDS response in poor countries.

Attitudes have changed, as has rhetoric. And there is slow progress in the delivery of services: the number of people on ARVs has increased from an estimated 230,000 in 2001–2000 to more than 2.5 million today. But these shifts have only uncovered deeper faultlines of global inequity: around gender, poverty, trade and the ability of poor countries to provide adequate health care services to their citizens.

If the future of AIDS advocacy lies in the rise of a broad-based movement for healthcare and social justice, the fate of AIDS advocacy is not assured. The political space for AIDS advocacy is absent in some countries, small in others, and there are forces directly or indirectly working to constrict what room is available for advocacy in many places. In particular, the intolerance of dissent and the rise of parastatal NGOs (fully or partially state-owned) in developing countries, and the role of donors, U.N. agencies and international NGOs in

suppressing advocacy work, means that many of the gains made by the AIDS movement are in danger of retrogression and the key advocacy work ahead may never be realized. Whether it is the arrest of AIDS activists in China or Russia, or more subtle harassment and intimidation of activists elsewhere in the world, government intolerance for dissent and criticism on HIV/AIDS and related issues is widespread.

The notion of a "civil society" voice has also become complicated by the infusion of new HIV/AIDS funding. For example, the Global Fund requires that countries institute CCMs which include civil society representation. These CCMs review and approve grants which are sent to the Global Fund secretariat for consideration, and make determinations about whether there should be a single, primary recipient of funds, or whether it is appropriate for separate applications to be made by civil society organizations. In practice, the representative structure of the CCM creates many challenges. Civil society organizations which may find themselves in competition for the same donor resources must select a limited number of representatives to sit on the CCM; these key players must then work to put aside differences and develop a united agenda.

Such efforts are further complicated by the fact that many governments, often with the help of U.N. agencies, have set up parastatal NGOs, some supposedly representing people living with HIV/AIDS or AIDS organizations, which more often are representatives or enforcers of state interests among civil society or are passive political actors in return for government funding. In one of the more public examples of this profiteering, an audit of Uganda's Global Fund grant management identified instances in which members of parliament had established "briefcase" NGOs ostensibly serving people with AIDS, and received sizeable Global Fund grants, with no documented record of services provided. This discovery led to the temporary suspension of funds in 2005.

There are also examples of countries and programs where Global Fund grants have accomplished their intended purposes. The uneven nature of roll out with these funds, however, has created tensions for groups that have advocated for more resources, and for more responsibility towards the AIDS crisis on the part of national governments. These groups have argued that country-driven programs are the only way to effectively respond to HIV/AIDS; and yet graft and inefficient use of Global Fund resources underscores that channeling resources through a single structure may not necessarily produce the desired results. This is true for both government and civil society grantees, since both are subject to inefficiency, red-tape, and, potentially, corruption, diversion and misuse of resources.

Donor governments, just like their counterparts in developing countries, do not always respond well to criticism and may crack down on NGOs who object to their policies. After the 2002 International AIDS Conference in Barcelona, Spain, in which American activists, interrupted the speech of the U.S. Secretary of Health and Human Services, several members of Congress called for investigations of the NGOs involved in the demonstration. U.S. government policies on substance use, prostitution, the immigration status of HIV positive and lesbian, gay, bisexual and transgender people, also influence the kind of work that can be done with funding from the U.S. Large foundations can also skew the terrain of advocacy in the developing world, through massive support for certain kinds of work and not others.

U.N. agencies while offering strong support for the role of civil society in the HIV/AIDS epidemic, acknowledge that government members are their primary constituency. Thus, for instance, policies on substance use by the U.N. Office on Drug Control (UNODC) reflect the U.S. and Russian bias against harm reduction, despite evidence supporting the role of syringe exchange and other harm reduction programs in combating the epidemic. In developing countries, the support of civil society by U.N. agencies is weak and the primary relationships of U.N. officials on HIV/AIDS are with the governments themselves, thus further isolating those groups who are willing to speak out.

Finally, NGOs in developed countries, often unwittingly end up working against the social, economic and political changes that are necessary in developing countries to combat the epidemic. There is actually a substantial literature in other fields, such as famine and disaster relief and humanitarian assistance, which documents how international NGOs end up perpetuating the crises they were meant to ameliorate.(De Waal, 1998) (Hancock, 1989)

The Indian author and activist Arundhati Roy, in a harsher assessment of the situation notes, "a whole industry of development experts, academics and consultants [that] have built an industry on the back of global social movements in which [we] are not direct participants." (Roy, 2004) How does this happen? While there is no space for a full analysis here, the criticisms levelled at international NGOs are that they often are:

- Largely unaccountable;
- Self-justifying, pursuing organizational survival and expansion;
- Proxies for policies of the major industrialized countries;
- Privileging generalized, international responsibility instead of specific, local political accountability;
- Privileging technical skill and experience over local knowledge;
- Promoting "development" or assistance instead of social change.

AIDS advocates have made enormous contributions to the fight against the epidemic, often in difficult circumstances. In 2006, the British reporter Sarah Boseley writing about the International AIDS conference in Toronto stated: "The Gates Foundation, the U.N. agencies and many of the delegates are upbeat about what is being done, and are optimistic about the future. There is a lot of funding, a lot of goodwill from donor governments and a lot of commitment from many developing world governments too. That's a result of [. . .] passionate and political advocacy [. . .]. But perhaps it is no longer needed." This too is the conventional wisdom after more than a quarter century of HIV/AIDS, but in the context of 5 million new infections and 3 million deaths from AIDS in 2005 alone, perhaps the optimism that Boseley reports and the elegy she begins for AIDS activism is a bit premature.

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# Chapter 9

# Political Challenges to Mounting and Sustaining a Public Health Response to HIV/AIDS in Developing Countries

Judith D. Auerbach and Courtney Mulhern-Pearson

## Introduction

In June 2001, at the United Nations General Assembly Special Session on HIV/AIDS (known as "UNGASS"), 189 Member States signed a Declaration of Commitment on HIV/AIDS. By all accounts, this was a turning point in the global response to the HIV/AIDS pandemic. The Declaration specified national, regional, and global goals and targets related to preventing new HIV infections, expanding HIV/AIDS care and treatment, and mitigating the social and economic impacts of the pandemic. In subsequent years, reports by the Joint United Nations Programme on HIV/AIDS (UNAIDS), as well as by other global health, research, and advocacy organizations, documented progress, or lack thereof, in meeting the 2001 UNGASS goals and targets.

Five years later, in early-June 2006, at the U.N. General Assembly 2006 High Level Meeting on AIDS, Member States unanimously adopted a new Political Declaration on HIV/AIDS reaffirming and strengthening commitments made in 2001. These declarations were not adopted without significant struggle. Member States fought with each other and with a significant representation of civil society organizations over everything from specific terminology [e.g., whether to include and identify specific "vulnerable groups" such as gay and other men who have sex with men (MSM), injecting drug users (IDUs), and commercial sex workers] to the kinds of HIV prevention interventions to endorse and promote (e.g., abstinence-only versus comprehensive sex education), to the quantitative targets for anti-retroviral treatment (ART) scale-up. These struggles reflected many of the political challenges developing countries and regions face in attempting an appropriate, effective, and sustained public health response to HIV/AIDS.



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_9, 

In this chapter, we describe a number of these challenges: political and social will; financing; infrastructural and human resource capacity; and laws, policies, and regulations. As will be apparent, our construct of "political" challenges includes social and economic challenges, as cultural, financial, human resource, and infrastructure issues become political when policy-makers have to make tough choices about them, including their prioritization.

## Political and Social Will

In documenting the national "success stories" in the AIDS pandemic, particularly with respect to HIV prevention, analysts invariably identify strong political leadership and commitment as a key factor (UNAIDS, 2001). In places as diverse as Thailand, Uganda, Brazil, and Senegal, the involvement of high-level political leaders early in the respective epidemics was essential to the promotion and adoption of behavioral change at the individual level (e.g., delaying the onset of sexual activity, reducing the number of sex partners, reducing visits to sex workers, and increasing condom use) that had an impact on reducing infection rates at the population level. Leaders in these countries were effective in rallying and coordinating relevant government ministries (e.g., health, labor, development, education, justice, etc.) and in engaging civil society (nongovernmental and community-based organizations, religious institutions, educational institutions, etc.) to collectively combat their epidemics.

In Thailand, for example, these efforts involved significant AIDS awareness and education campaigns to mitigate the social stigma attached to HIV and the people who acquired it, and the adoption of a society-wide sense of shared responsibility, themselves accompanied by the development, implementation, and dissemination of HIV prevention and care services country-wide (Phoolcharoaen et al., 1998). Political leaders in Thailand and other countries with strong responses understood that there was little point in raising the collective consciousness of citizens to tackle the HIV/AIDS problem if services and access to them were not provided. (As we will note later, sustaining this commitment to providing services has proven difficult.)

Conversely, in places with little or no political leadership on HIV/AIDS, including those characterized by abject denial of the problem among high-level officials, HIV epidemics have flourished. South Africa is perhaps the starkest example of this. Notwithstanding that his country has the highest HIV/AIDS prevalence rate in the world, President Thabo Mbeki has publicly denied the connection between HIV and AIDS, claimed that he knew no one who had died from AIDS, and asserted that ART is unnecessary and toxic (de Waal, 2006). The roots of President Mbeki's denialism have been traced by some analysts to a strong pro-Africanist, anti-Western philosophy borne of the struggle against apartheid (Cameron, 2005; de Waal, 2006). His recalcitrance on the issue, fully supported and expressed by his Health Minister, has significantly hampered South Africa's response to the epidemic. Paradoxically, the public denials continue even while South Africa has developed plans and strategies for expanding HIV prevention and treatment programs. But the plans have frequently not been translated into action. Civil society organizations, particularly the Treatment Action Campaign, have continuously had to battle the government to make

ART available, most famously in an ultimately successful Supreme Court challenge to the government to provide neverapine to pregnant women and their offspring to prevent mother-to-child transmission of HIV infection (Cameron, 2005; de Waal, 2006).

Some countries that originally resisted acknowledging emerging HIV/AIDS epidemics eventually have come around. For many years, a number of Eastern European and Central Asian nations denied the existence of a problem or paid it virtually no attention (World Bank, 2003). Given the social and economic upheaval in these regions following the collapse of Communism and the Soviet empire, HIV/AIDS (and public health generally) was not considered a priority relative to other resource demands. Moreover, the stigmatized nature of AIDS and the people who have it or are most at risk of acquiring it, allowed political leaders to avoid responding. But, eventually, the precipitous rise in HIV/AIDS (and tuberculosis) cases, forced governments in the region to act. Much of the shift in mindset resulted from accumulating epidemiological and demographic data that indicated the HIV/AIDS epidemics in Eastern Europe and Central Asia would spread from an initial concentration in well-defined at-risk populations, in particular, IDUs and sex workers, to broader diffusion in the "general population" (World Bank, 2003). Now, countries throughout the region have national HIV/AIDS plans and many receive resources from the Global Fund and the World Bank to address their HIV prevention, care, and treatment needs.

## Financing a Sustained Response

The financial cost of the AIDS pandemic is enormous, as is the expense of mounting an effective global response. The key challenge lies in being able to sustain so huge a financial commitment over the long-haul, and to not have it deplete resources for other health, social, and security needs in low- and middle-income countries that are trying to develop their economies and improve the well-being of their citizens (Council on Foreign Relations and Milbank Memorial Fund, 2004; Garrett, 2007).

UNAIDS estimated that in 2005, USD 11.6 billion was required to address the HIV/AIDS epidemic in low- and middle-income countries, which was USD 3.3 billion above what was available that year (UNAIDS, 2004). Funding needs are projected to rise to between USD 20 and USD 23 billion annually by 2010 (United Nations, 2006), but it is estimated that only about USD 10 billion will be made available in 2007 (Piot, 2006). The financing gap is growing as a result of a number of things, including the increasing number of people in need of HIV treatment, the high cost of treatments (particularly second-line therapy which is necessitated when people experience drug failures in their first regimens), and the expense of scaling up prevention, treatment, and care programs.

Meeting these costs requires significant commitment of resources from countries themselves, as well as from donor governments, multilateral organizations [such as The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the World Bank, and UNAIDS], and from private organizations [including foundations, corporations, and international non-governmental organizations (NGOs)]. Developing countries currently provide about one-third of global AIDS spending from their own budgets (UNAIDS, 2006a).

The remainder comes chiefly from donor nations. Overall, it is estimated that about 80% of Africa's HIV/AIDS programs are funded by international sources (de Waal, 2006).

While the amounts donor nations contribute are generally quite generous, the circumstances of assistance can be problematic. First, most donors operate with short timeframes for assistance; usually funds are committed for only a few years at a time. Global Fund grants, for example, are given for a maximum of five years, with only two years's funding committed up front, and the rest contingent upon performance. Countries must then re-apply for continued funding. Similarly, awards to focus countries under PEPFAR are for five years. This prevents the kind of long-range financial planning necessary for implementation and scale-up of necessary programs.

Second, funding from donor governments and other external sources often comes with strings attached, which generally reflect the donors' priorities, rather than the recipients'. These strings may be related to administrative requirements and good financial practices or to ideological agendas. The Global Fund, for example, operates with a performance-based system, in which recipients receive funds incrementally in accordance with how well they are showing progress toward stated goals and with proven programmatic need. The system is meant to impose a new standard of accountability on developing countries receiving aid. Indeed, the Global Fund has provided less money than requested and even cancelled grants when countries, even high profile, high prevalence ones, like South Africa, have been found to under-perform (Feachem & Sabot, 2006). Some claim that this approach is too harsh, when there exists no systematic way to deal with country-level failures to live up to the implementation and scale-up targets to which countries have committed in their funding applications. Rather than pulling the funds, these analysts argue, donors should develop a way to assist countries to improve their performance (International Treatment Preparedness Coalition, 2006). In response to these concerns, UNAIDS, in collaboration with major donors, developed a mechanism (Global Joint Problem Solving and Implementation Support Team, or GIST) to deal with implementation bottlenecks in Global Fund and other country grants, chiefly by providing management and technical assistance (International Treatment Preparedness Coalition, 2006).

PEPFAR funding is contingent on the adoption of policies that reflect a socially-conservative and religiously-based ideological agenda characteristic of the current presidential administration in Washington, D.C. Of the amounts available for HIV prevention activities, a mandatory 33% must be spent on abstinence-only programs, which by all credible scientific accounts, are not evidence-based and have no proven effectiveness (amfAR, 2005; Santelli et al., 2006). Regulations also require that any organization receiving PEPFAR funds must have an official policy opposing prostitution and the trafficking of women ("The Prostitution Pledge," 2005). While few would take issue with human trafficking, "prostitution" is a broad, undefined term that could include transactional sex that for many women and young men is a means of survival. Moreover, requiring organizations that work with sex workers to have a policy that condemns the very people they serve dramatically undermines the credibility and trust such organizations have cultivated, thus compromising their ability to do effective HIV/AIDS work Thus, the requirement has forced many NGOs

committed to AIDS work in developing countries to do a very uncomfortable ethical calculus: is it better to reject the regulation and forgo the funding to make a moral and political point, or to bite the bullet and sign the "prostitution pledge" in order to be able to provide much-needed programs and services? (Howley, 2005). One country, Brazil, abjectly refused U.S. assistance through PEPFAR because of the so-called "prostitution pledge."

U.S. law also precludes the use of government funds to support needle exchange programs for HIV prevention among IDUs, even though these programs have been demonstrated time and again, in a range of settings, to be highly effective (NRC & IOM, 1995; IOM, 2006). So recipient countries are prohibited from providing sterile syringes to at-risk drug users in countries where injecting drug use fuels the epidemic, such as Vietnam, one of PEPFAR's 15 "focus countries." A recent Institute of Medicine mid-course evaluation of PEPFAR criticized the U.S. ban on funding sterile needles and syringes and the abstinence-only funding requirement for hindering the effectiveness of the program in reaching its prevention, care, and treatment goals (IOM, 2007).

Third, donor funding often is tied to numerical targets, which can include for example, increasing the number of people receiving antiretroviral therapy, increasing the number of young people exposed to abstinence-only education programs, or decreasing the number of pregnant women diagnosed with HIV or AIDS (Garrett, 2007). This has produced a drive within recipient countries to meet the targets for the targets' sake, rather than an emphasis on actually reducing and mitigating the epidemic. As a result, countries may choose to select HIV prevention and care strategies that can produce the desired numbers quickly instead of choosing methods that may be more effective but that take longer to reach the targets. Moreover framing and reporting country-specific targets in terms of absolute numbers can mask inequities in who is and is not being reached. For example, IDUs often are excluded from ART treatment programs, and gay men often are excluded from sexual risk reduction programs for political and social reasons, even though these groups may be disproportionately affected by HIV/AIDS in their communities.

Even where countries have done their best to finance the response to their own epidemic, the costs are becoming so overwhelming that this commitment becomes untenable. Brazil, the first developing country to guarantee free AIDS treatment to all HIV-infected citizens regardless of their ability to pay, is a case in point. In fashioning its program, the Brazilian government engaged in difficult, but ultimately successful negotiations with drug manufacturers to receive the lowest prices outside of Africa for name-brand drugs. But, as is the case in the developing world, many patients in Brazil who survived their illness for many years have become resistant to their original drug regimens and now need to turn to "second-line" therapies which are much more expensive. The skyrocketing cost of these drugs threatens to bankrupt the highly effective Brazilian program. [By providing universal access to ART, combined with aggressive HIV prevention activities, Brazil cut its HIV prevalence rate from about 20% of the adult population in the early 1990s to just 0.6% today (Lakshmanan, 2007)].

Finally, the establishment of AIDS-specific funding streams and programs has some potentially deleterious effects. In Russia, for example, AIDS centers have been separated from the rest of the Soviet-designed health care system and starved for funds because of the stigma associated with HIV/AIDS and

the drug-using populations most affected (Brown, 2006). More generally, the massive influx of AIDS-specific donor assistance has resulted in a shift in developing countries' limited human and financial resources towards AIDS services, sometimes at the apparent expense of other, equally significant health problems, such as malaria, tuberculosis (TB), and maternal mortality (Garrett, 2007). None of these health issues, including AIDS, happens in isolation, many are interactive, such as HIV and TB. Recognizing this, a vigorous debate has ensued within the global health community about whether it is time to re-think what has been called "AIDS exceptionalism" (Bayer, 1999) and look towards a more integrated health approach (UNAIDS, 2006b; Garrett, 2007; Farmer, 2007). AIDS remains unique in its impact on individuals and societies—including the ways in which it is still stigmatized—so, it becomes a political challenge to determine how best to develop a more robust public health system while maintaining some special focus on HIV/AIDS, and how to allocate resources meanwhile.

## Building and Sustaining Infrastructural and Human Resource Capacity

Even if the financial constraints and challenges noted above were not operating, most developing countries do not have the infrastructural, institutional, and human resource capacity to respond adequately to their HIV/AIDS epidemics. Meeting the prevention, care, treatment, and support needs of people vulnerable to or affected by HIV/AIDS requires education, health care, transportation, and communication systems that often do not exist, or are extremely limited, in resource-constrained settings (UNAIDS, 2006b).

The dearth of adequate health care infrastructure, hospitals, clinics, service centers, equipment, and delivery systems, is a huge impediment to meeting the HIV prevention, treatment, care and support goals set by nations and donors (Council on Foreign Relations & Milbank Memorial Fund, 2004; Garrett, 2007). Basic infrastructure needs include the ability to procure and transport goods and services, including AIDS medications, HIV testing kits, and other diagnostic technologies (e.g., for measuring CD4 counts and viral loads); stable electricity and telecommunications services; and proper sanitation. This means banks, roads, cars and trucks, refrigerators, telephones and computers, and clean water, all of which are in short supply in developing countries. ART procurement, commodity security, and supply chain management arguably are more challenging than is the case for other essential medicines, given the rapidly changing HIV/AIDS treatment regimens, among other things (IOM, 2005a). All of these challenges are particularly acute where populations are geographically dispersed and where many people live in remote areas, as characterizes most of Central Asia, an area increasingly affected by HIV/AIDS. For example, about 80% of Tajikistan's territory is mountainous and remote, making the provision of health care services quite difficult (World Bank, 2003).

By most accounts, the most acute capacity issue relates to human resources. Healthcare worker shortages present a significant barrier to mounting an effective and sustained response to HIV in developing countries. A 2006 report from the World Health Organization (WHO) estimates a shortage of more than

4 million health care workers in 57 developing countries (WHO, 2006). The report also finds that in Africa there is an average of 2.3 health care workers per 1,000 people, compared with 18.9 per 1,000 people in Europe and 24 per 1,000 in the Americas (WHO, 2006). These dramatic numbers highlight a significant impediment to getting needed treatment and care to the two million people living with HIV in developing countries, and can result in lower-quality care in many places (Dare et al., 2006).

A number of forces contribute to the acute shortage of health care workers in developing countries. First, is the "brain drain" phenomenon. Facing poor working and living conditions in their own countries, large numbers of health-care workers, doctors, nurses, pharmacists, etc., are moving to developed countries where they can work in better-equipped hospitals and gain greater financial reward. Swaziland, for example, loses 100 nurses annually out of a national nursing workforce of 800 ("Swaziland," 2006). Pharmacists play an important role in resource-poor countries because they are generally more accessible than physicians and they offer free consultations. Their out-migration has a serious impact on the logistics of ARV accessibility and takes a toll on people who rely on their consultation to ensure rational use of ARVs (IOM, 2006). The brain drain problem occurs within countries, as well, where rural health care workers migrate to more desirable urban locales, resulting in pronounced urban-rural imbalances and disparities in access to care (IOM, 2005a).

The AIDS pandemic itself also directly contributes to the health worker shortage. An estimated 16% of South African healthcare workers are HIV-positive (Shisana et al., 2004). Health care workers with HIV/AIDS often work reduced numbers of hours or days due to illness, further straining workforce capacity (IOM, 2005a). In addition, healthcare workers in countries with high HIV/AIDS infection rates are often responsible for the care of their own family members, pulling them away from their professional duties (Medecins Sans Frontieres, 2006).

An additional factor in the health worker shortage is the lack of adequately funded, high quality, and accessible tertiary education in many developing countries (IOM, 2005a). In Swaziland, for example, enrollment in healthcare training sites is low despite the fact that hundreds of applications are received annually. A combination of factors, including cost, lack of teaching staff, and an absence of practical training opportunities, have contributed to this situation ("Swaziland," 2006). Preservice training for nurses, physicians, and other medical professionals, is seriously underfunded and contributes to limited teaching capacity and curriculum gaps, leaving graduates often unprepared for the demanding work of health care (IOM, 2005a).

The health worker shortage is proving particularly harmful for children infected with HIV. While children make up approximately 6% of all people with HIV/AIDS, they accounted for 13.5% of the AIDS deaths in 2005 (Global AIDS Alliance, 2006). Globally the number of children receiving HIV treatment remains much lower than that of adults: only 4% of the roughly 1.3 million people now on treatment are children (Global AIDS Alliance, 2006). A number of things complicate the situation for children with HIV/AIDS in developing countries. Their infections often are not diagnosed, and even when they are, there is a dearth of programs specializing in pediatric treatment. ART is actually more expensive for children than for adults; the annual treatment cost

for a child can be as much as USD2,000, compared to USD150 for an adult. Consequently, children often cannot access the pediatric formulated ARVs and it becomes necessary to break adult drugs into pieces to try to get the right dose (Global AIDS Alliance, 2006). All of this is compounded by a shortage of pediatricians and other health care workers who are properly trained in diagnosing and treating children with HIV/AIDS (Elizabeth Glaser Pediatric AIDS Foundation, 2006).

Key governmental and non-governmental organizations have recognized that limited human resource capacity is a major obstacle to treatment scale-up, and have issued reports recommending initiatives to redress the problem (PEPFAR, 2006; UNAIDS, 2006b; IOM, 2005b). These include providing scholarships for rural students, retaining doctors in rural areas, and providing health care to health workers training lay, community members (known as "accompagnateurs", or "health companions", in Haiti) to providing a broad range of drug distribution, disease observation and reporting, clinical referrals, and social support services (Dare et al., 2006); and developing a "Peace Corps for Health" among U.S. health workers who would be deployed to developing countries (IOM, 2005; Mullan, 2007).

## Legal and Regulatory Barriers

There are a host of legal, policy, and regulatory issues that make it difficult for developing countries to implement and scale up HIV/AIDS prevention, treatment, care, and support programs. Some of these are internal, and some are a function of bilateral and multilateral agreements to which particular countries are party. Chief among these obstacles are rules and agreements governing the procurement of commodities, such as ARTs, condoms (male and female), and nutritional support for children and adults (UNAIDS 2006b; World Bank, 2003; International Treatment Preparedness Coalition, 2006).

The high cost of AIDS medications, mentioned earlier, is in great part a reflection of the political balance struck by many countries between the intellectual property rights of pharmaceutical companies and the public health needs of making the drugs as affordable as possible. In great part as a result of civil society and activist pressure, the price of first-line ARVs has dropped precipitously since the year 2000. Countries with drug manufacturing capacity, such as India, Thailand, and Brazil, began producing generic versions which made the market much more competitive and resulted in decreased prices (Medecins Sans Frontieres, 2006). But, the ability to produce and purchase cheaper, generic drugs, particularly for second-line therapy, has been hampered by patent rights protected by the World Trade Organization (WTO) Agreement on Trade Related aspects of Intellectual Property Rights (TRIPS) effective in 2005. Countries that are party to the TRIPS agreement have some flexibility in how they interpret the requirement that they grant patents on medicines, and are allowed to take into account their public health needs. This has enabled a number of developing countries, including Nigeria and Cameroon, to purchase generic ARVs at much lower prices than name-brand drugs (Martinez, 2006). But, countries are under significant pressure from pharmaceutical companies and other governments (in

particular the U.S.) to approve patent applications that protect the companies' sole rights to manufacture certain drugs (Ford et al., 2004).

A country's own laws and policies also may pose significant challenges to a public health response to AIDS. One area in which this has been perhaps most clear is the tension between drug control and harm reduction. Most countries, developed and developing, have strict laws and policies related to the sale, acquisition, and use of illicit drugs. At the same time, drug use, particularly injecting drug use, is a key driver of HIV/AIDS epidemics in many countries, especially in Asia and Eastern Europe (IOM, 2006). At this point, there are a number of HIV prevention strategies for IDUs with proven effectiveness. Key among these are needle and syringe exchange programs and substitution therapy (e.g., methadone or buprenorphine). Numerous studies have demonstrated the effectiveness of these interventions in driving down existing and emerging epidemics in drug using populations around the world (See IOM, 2006). But, evidence notwithstanding, many nations have resisted implementing harm reduction interventions because they provide assistance to active drug users rather than taking a "zero-tolerance" approach. Drug-users are arguably the most marginalized and stigmatized population everywhere. Laws against drug use and drug users in many countries are extremely punitive.

Some countries, if left to their own devices, would be inclined to support harm reduction approaches to ameliorate their HIV/AIDS epidemics. But many are poor countries who depend on foreign assistance for addressing their public health needs (OSI, 2006). The messages they hear from the international bodies charged with developing and monitoring compliance with United Nations drug conventions, the United Nations Office of Drugs and Crimes (UNODC) and the International Narcotics Control Board (INCB), focus much more on drug diversion than on public health strategies. In a number of instances, UNODC and INCB have publicly contradicted or sought to thwart recommendations based on the scientific evidence demonstrating the effectiveness of opiate substitution therapy and syringe exchange for HIV prevention among IDUs (Csete & Wolfe, 2007).

A number of countries that originally rejected harm reduction approaches, particularly needle and syringe exchange programs, including those with the most severe anti-drug laws, have changed their position and their policies in light of burgeoning HIV infection rates. For example, Iran, where an estimated 62.3% of HIV cases in 2005–2006 were attributable to injection drug use, and where people convicted of drug trafficking can be subjected to flogging, imprisonment, or even execution, has separated its drug control efforts from public health measures to help drug users and to prevent HIV infections (IOM, 2007). NGOs in Iran began operating substitution treatment programs in 2000, and pilot needle exchange programs were initiated in prisons in 2005 (Nissaramanesh et al., 2005). In early 2005, the head of the Iranian judiciary issued an executive order reminding judges that harm reduction measures were intended to protect the public health and well-being and should not impede nor interpret as criminal the work of drug substitution and syringe exchange programs (IHRD, 2006). Malaysia, where an estimated 75% of registered HIV cases are attributed to injecting drug use, and which is known for its extremely punitive drug polices, has taken a similar approach (IHRD, 2006). In response to the growing

HIV epidemic among IDUs, the Malaysian government initiated pilot substitution therapy and syringe exchange programs in 2005 and 2006. This shift in great part resulted from advocacy among influential Malaysians for harm reduction, based on both public health and religious grounds (IHRD, 2006).

## Conclusion

HIV/AIDS is a highly politicized disease. It has most severely affected communities and populations that have historically been socially marginalized and discriminated against. It is transmitted through human behaviors that are highly sensitive, usually private, and sometimes illicit. Its steady incursion into new settings and its evolution over time within settings requires a constantly expanding political, economic, medical, and social response. It often can trump attention to other health and social issues because it is so poignant in its life-and-death reality, and because a vast infrastructure of governmental, quasi-governmental, donor, and civil society organizations has been developed to pay special attention to it. As such, the HIV/AIDS pandemic poses a host of political challenges to nations and the world as a whole, only a few of which have been addressed here, and, even then, only superficially. In coming years, it is likely that political discussions increasingly will focus on the methods and costs of sustaining the global response to HIV/AIDS over the long-haul. This in turn will involve an expanded discussion of the "special" status of HIV/AIDS relative to other health and social issues, and the translation of this into program, policy, and funding priorities for developing countries and international donors. While these discussions ensue, it remains vital that the current situations of people living with and at heightened risk for HIV infection not be forgotten, and that appropriate resources remain dedicated to scaling up evidence-based approaches to prevention and treatment and the human and infrastructural capacity necessary for doing so. Over the past 25 years, we have seen what can be accomplished with political will and commitment informed by public health sensibilities, even in unlikely places.

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# Part II

## Sub-Saharan Africa

# Chapter 10

# The HIV/AIDS Epidemics of Africa

Chris Beyrer, Wendy W. Davis, and David D. Celentano

The global pandemic of HIV-1 began in Africa, perhaps as many as 75 years ago, in a complex series of species cross-overs involving the original old world monkey hosts of this class of viruses, and subsequently our closest relatives, the Chimpanzees, and then ourselves. In an unfortunate connection with our Chimp cousins, it appears that Chimps were likely exposed to these viruses through the hunting and eating of monkeys, and humans in turn, through the hunting, butchering, and ingestion of Chimps (Wolfe et al., 2007; Keele et al., 2006.) HIV-2, the second virus which causes HIV/AIDS, probably emerged from a distinct cluster of monkey species from HIV-1. Though it causes an essentially identical clinical AIDS syndrome as does HIV-1, the period from infection to clinical disease is generally years longer for HIV-2. A much less infectious virus for humans, HIV-2 has to date remained limited principally to outbreaks in West Africa and in India, and is discussed in the West Africa chapter by Blattner, et al. It is HIV-1 which has found global "legs" and reached communities from the Amazon to Siberia, to Haiti and China, Havana, Paris, Lagos and Prague.

The initial decades-long adaptation of this virus to human hosts, and its emergence from the rain forests of Central and West Africa to virtually every human population globally is an extraordinary and tragic saga. The emergence of HIV/AIDS to become the most severe infectious disease epidemic of modern times underscores the great impacts of globalization, inter-continental travel, and the unprecedented interconnectedness of modern human populations. But it also reminds us of our fundamental biology—all humans are, after all, Africans, and indeed, African primates. As such we are profoundly susceptible to these rain forest retroviruses and their insidious undermining of our immune systems. That HIV-1 can spread through sexual intercourse, the birth process and through breastfeeding tells us how intimately this virus is connected to our reproductive



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_10, 

biology as a species—and why such primary human activities as courtship, marriage, sex, starting families, giving birth, and feeding our young should be associated with HIV-1 acquisition, transmission, and pathogenesis. While HIV/AIDS has become a global pandemic, it has its origins in our origins in Africa. And so it is terrible, but not surprising, that the greatest loss of life to AIDS has been in Africa, the highest rates of HIV infection by far are clustered in Africa, and by far the most profound impacts on families, communities, and societies too, have been seen in the high prevalence regions of Africa.

The human, social, and economic tolls of AIDS in Africa have been staggering. Life expectancy, which development economists generally agree is the most sensitive measure of population well-being, has fallen by 20–30 years in the most affected states, reversing decades of gains in development and health efforts. And in the most affected regions of the continent, KwaZulu Natal in South Africa, Lesothu and Swaziland, more than a third of all pregnant women are HIV infected. The losses of life from untreated AIDS have been enormous, and particularly devastating because of who AIDS kills; most infectious diseases, like influenza or TB, kill the weakest among us—infants and young children, the elderly, those with underlying conditions. In contrast, the heterosexual pattern epidemics of Africa have overwhelmingly affected young adults of reproductive age, with the peak of the dying coming in the 20s, 30s, and 40s. These are the working and parenting years, and in Africa, where it is this demographic that provides for the young and the old; this loss has been devastating to families, economies, and social structures. It is estimated that by 2010, more than 18 million children in sub Saharan Africa will have lost one or both parents to AIDS related illness (UNAIDS, 2007). Africa is dotted with villages where whole demographic structures have been affected and aged grandparents and orphaned children, or children-headed households, are all too common.

The overall demographic impact of AIDS in this region has been somewhat less than many predictions had posited, and this is largely due to the fact that HIV has spread in what were already very young and fast growing populations. But the impacts on social fabrics and community development have nevertheless been profound. Children have been forced to leave school to work, reversing years of educational gains in many states, and the enormous numbers of children growing up orphaned are a cause for concern on many levels—not the least of which their vulnerability to the many militias and insurgent groups which target children for forced conscription. AIDS is a human concern grave enough to have become a security concern (Garrett, 2005).

As the authors of the Africa section demonstrate, the early years of responses to HIV in Africa were focused primarily on prevention. And it is still the case that prevention research in many areas, such as methods to prevent heterosexual transmission or mother-to-child transmission, is now concentrated in Africa, since this is where HIV incidence remains the highest, and studies can most efficiently be done. The landscape for AIDS globally changed most dramatically in 1996, when the first studies demonstrated that triple (three drug therapy, usually with a protease inhibitor) could control HIV in the body and improve patients survival. Within a year the HIV/AIDS epidemic in the first world was powerfully transformed, as patients with end stage disease recovered, and began to live their lives again—this was called the Lazarus effect—a biblical allusion

that was painfully apt. This soon led to a difficult dilemma. Most of the effective treatment was occurring in the first world, most of the patients were in low and middle-income countries, and of that huge number, the majority was African. Treatment costs were prohibitively high—in the tens of thousands of dollars per patient per year in 1997, but much of this cost was due to patented pharmaceutical costs. No African state could take on the burden of AIDS care given the global cost structure. Advocates, activists, and patients began to demand treatment access, reductions in drug costs, and changes in the global pharmaceutical system that would allow for generic purchases and low-cost solutions. Many argued that treatment for Africans with expensive complex regimens was simply not feasible. Others argued that to have drugs, not use them, and let Africans die for want of funding, was morally untenable. By the time of 2000 World AIDS Conference in Durban, South Africa, the moral crisis of AIDS treatment access could no longer be ignored.

Justice Edwin Cameron, then serving on South Africa's constitutional court, gave what many believe to be one of the transformative speeches of the global AIDS movement. Addressing the Durban Conference in his invited Jonathan Mann Memorial Lecture, Justice Cameron disclosed his own HIV/AIDS status, and spoke as an openly gay man living with AIDS in South Africa. He argued that it was morally unacceptable that he should be alive and well and addressing us all, while others of his countrymen suffered and died for want of treatment. As the authors of the chapters in this section will demonstrate, the years after Durban have witnessed one of the great treatment rollouts of modern medicine—the attempt to rectify Justice Cameron's dilemma, and provide effective anti-viral therapy across the continent.

## The Virus

The molecular epidemiology of HIV in Africa demonstrates both the African origin of the virus, and the tremendous diversity of its spread across this vast and varied continent. A general rule in genetics is that the greatest diversity in a genetic tree is at the base—the farther you go out on each branch of such a tree, the less diversity is found. Following this principle, we would expect if HIV-1 came out of the Central and West African rain forest zones that the greatest array of genetic subtypes would be found among people living with HIV-1 in these regions. And indeed, the 3 main groups of HIV-1, M, N, and the outlier group O, and virtually all the known subtypes of HIV-1 (all are within the M group) including subtypes A, B, C, D, and so forth, co-circulate in the Democratic Republic of Congo and in Cameroon. These are the source zones of the pandemic. Curiously, neither is among the highest prevalence countries in Africa, a finding explored by Marie Laga and colleagues in their chapter on Central Africa. While HIV has been present in communities in DR Congo for perhaps generations—it has never led to the kind of community wide devastation seen in South Africa or Botswana. While HIV-1 spread among humans began in Central Africa, this large and densely forested region has been marked by modest HIV prevalence rates, despite weak programs, and in the case of DR Congo, decades of misrule, civil conflict, and the bloodiest war since

WW II.[1] This finding points to a crucial theme in the current understanding of HIV/AIDS in Africa—the marked diversity of epidemics across the human ancestral continent.

Laga and colleagues also explore the epidemics of Rwanda and Burundi, where like DR Congo, war and ethnic conflicts have ravaged populations through much of the AIDS era. In a short section on Rwanda and HIV in this post-genocide state, Kathy Anastos gives reason for hope that responses are possible even in the most difficult of circumstances. These authors point out an important assessment of the role of conflict in Africa's epidemics: some have led to HIV/AIDS exacerbations, such as the post-conflict prevalence rises seen in Ethiopia and Mozambique, but many, including the conflicts in Sudan, Somalia, Rwanda, Burundi and DR Congo itself, appear not to have done so.

## One Continent, Many Epidemics

It has long been a truism that HIV "stops at the Sahara." And indeed, the Saharan and North Africa states remain very low prevalence areas decades into the AIDS pandemic. Much of the literature on AIDS to date has been careful to delineate reference to "Sub-Saharan Africa." This may be changing, and HIV-1 has rarely been static in its course through populations. An emerging threat is the appearance of HIV among injecting drug users in this region, most notably in Libya, which may be the first state on the continent to have reached a 20% HIV infection rate among drug users (Aceijas et al., 2006).

In their chapter on the vast and troubled Horn of Africa, Simmons and colleagues explore the emerging outbreak of HIV in Libya, and discuss the complex and agonizing case of expatriate health personnel caught up in the large nosocomial outbreak in the pediatric ward Al-Fateh Hospital in Benghazi. Simmons and colleagues also detail the long history of HIV/AIDS in Ethiopia, and the relationship of HIV/AIDS responses to the conflicts, wars, and chaotic political environments which have characterized Ethiopia, and its neighbors Eritrea, Somalia, and the Sudan. Indeed, it is in these desperately poor countries where we can most starkly see the ways in which limited infrastructure, the loss of skilled personnel, and the collapse of health systems brought on by civil conflict have challenged HIV/AIDS responses *and* limited our ability to understand and measure the epidemic and its impacts. Simmons points to the terribly weak performance of the PMTCT programs in Ethiopia as an example of how even a relatively simple HIV intervention can be stymied by the more basic lack of prenatal services for pregnant women.

For HIV in the Horn, and for much of Africa, the needs of complex care programs have forced HIV/AIDS to deal with some of the weakest health systems we have. That health personnel in these difficult settings have nonetheless persevered, and that anti-viral therapy has become a reality for hundreds of thousands of people living with AIDS in Ethiopia and elsewhere in the Horn, is surely one of the hardest-earned triumphs of the HIV/AIDS era. But for public

[1] The 1998–2002 Regional War in DR Congo involved 9 countries and led to the death of an estimated 3.6–4.2 million Congolese, the greatest loss of life in a single conflict since WW 11.

health efforts more generally, these HIV/AIDS programs are seen by many as a return to the "verticality" or "silo" approaches of earlier eras in international health work. Surely when contrasted with developing country interventions like sanitation, immunization, micro-nutrient supplementation and the like, the every concept of attempting to provide life-time anti-viral therapy to millions of Africa's poorest citizens can seem like the ultimate in donor-driven vertical approaches. Yet the data Simmons and others present here suggests that Africans themselves desperately want these therapies to be available, and treatment measures such as patient adherence, at least several years into the ARV rollout, are generally comparable with those in the developed world, or better.

West Africa, as explored by Blattner and colleagues, has serious and generalized epidemics across its many states, reaching 2–10% of pregnant women across Nigeria and up to 7% overall in the most affected West Africa State, Côte d'Ivoire. Nigeria is the most populous country on the continent and the giant of the West. Nigeria's substantial HIV prevalence and huge population have generated some 2.6 million HIV infections—a staggering burden for any State. But this diverse and politically volatile region has also seen some important early success stories. Senegal had an early epidemic associated with female sex workers and their clients. Despite its predominately Muslim population, the Senegalese Government, among the most democratic in Africa, was able to decriminalize sex work, empower the women in the industry to manage it themselves, and mandate regular reproductive and sexual health care visits. The result was an impressive decline of HIV infections among the women and their clients, and this translated in the early to mid 1990s to one of the first population level declines in HIV infection in Africa. A model that sadly, proved difficult to implement elsewhere in Africa.

As effective treatment became a reality in the wake of the 1996–1997 trials demonstrating the efficacy of triple therapy, West Africa languished with the rest of continent. As Blattner and colleagues demonstrate with the example of Nigeria, however, once funding became available to increase access, Ministries of Health and community organizations mobilized with impressive speed to scale up care. The examples of the Global Fund and PEPFAR programs in Nigeria are heartening ones, with truly impressive numbers of Nigerians gaining access to ARVs in a relatively short time. Though the long-term sustainability of any donor supported program on this scale remains a question, there is little doubt that the feasibility of scaling up a treatment even as complex as HIV care has been answered, at least in a state with the resources of Nigeria.

The East African epidemics have been among the most closely studied worldwide. And it is certainly a tribute to the tremendous efforts of East African researchers and their colleagues in the North, that so many of the landmark HIV prevention and AIDS treatment trials have been conducted in this hard hit region. Helen Weiss and colleagues have taken on the daunting task of synthesizing the extraordinarily rich array of studies from Kenya, Tanzania, and Uganda to describe these mature epidemics, and the many studies which have been conducted in attempts to develop new tools to control them. The critical Rakai studies in Uganda, and Weiss own group's work in Mwanza, Tanzania attempted to control HIV spread through control of other sexually transmitted diseases—with mixed success. The Rakai group, including Weiss' co-author David Serwadda, recently conducted another landmark study—that

of male circumcision to prevent HIV acquisition from infected female partners, a study which, like the very first trial (conducted by Auvert and colleagues in Orange Farm, South Africa) showed considerable efficacy.

The impressive research and program efforts in this region have not spared its people, and the Ugandans in particular, have had their successes in HIV control claimed by a wide array of voices. Uganda's success has been ascribed to abstinence, to the "ABC" approach which eventually became official U.S. policy, and to early and vigorous national mobilization led by the committed and engaged leader Yoweri Museveni. Whatever may have actually brought Uganda's HIV infection rates under control, including, as the Rakai data sadly suggests, the death of so many of the early HIV infected population—there is ominous evidence of *climbing* HIV incidence in some groups, including adolescents and young adults, suggesting that Uganda's success may be eroding, as access to condom wanes, and new cohorts of adolescents begin sexual life.

No region has been more affected by HIV than the African South. This relatively small area is home to close to 1/3 of all people living with HIV in 2007, and nearly half the world's infected women and girls. In the contiguous states of South Africa, Botswana, Lesotho, Swaziland, Zambia, Zimbabwe, Mozambique, Malawi, and Namibia, we find all the countries on earth where HIV prevalence has reached 20% or more of reproductive age adults (UNAIDS, 2007). The epidemiology of HIV in this "hyper-endemic" region is radically different from the rest of Africa and the rest of the world. With a third of the young adult population of Botswana living with HIV infection, for example, the lifetime risk of acquiring HIV infection among all boys in Botswana is over 80%. Rural districts in South Africa's Province of KwaZulu Natal have found HIV prevalence rates among pregnant women of over 50% – making it more likely that a pregnant woman has HIV than that she does not. This is unprecedented. And it is clear that we have limited tools indeed to address HIV when it has reached this level of incidence density in communities, families, ethnic groups, states. How are we to explain this kind of extremity? James McIntyre and colleagues have attempted to address this and related questions in their chapter on the African South.

There are some key features of this epidemic which we do understand. The tremendous rate and prevalence of labor migration for Southern African blacks was a survival tactic during the decades of Apartheid. Labor migration remains a reality of life of men and women in this region, and has impacted family, social, and sexual network structures in complex interactions that likely favor HIV transmission. The pattern of relationships described as concurrency, where an individual may have a sexual partner (married or not) where one works, and another concurrently where one lives, may facilitate HIV spread in ways that multiple partnerships, such as the serial monogamy practiced by most young people in the modern north, probably does not. In addition to concurrency the circular nature of labor migration, where men and women move regularly between urban jobs and rural homelands, may also favor opportunities for HIV spread. And of course, when primary partners are away, non-migrant partners, particularly women, may also take on concurrent sex partnerships for survival, companionship, or to help support their children. The first report that labor migration was affecting black South Africans and driving sexually transmitted diseases outbreaks among them was reported by the mining labor sociologist

Kark in 1949—hence these are now likely to be generational patterns. (Beyrer, 2007).

Two states in this Southern region are on a somewhat different epidemic trajectory: Mozambique and Angola. These former Portuguese colonies came to independence late, and both became embroiled in decades long civil conflicts that were paradigmatic of the Cold War—which was never "cold" for the civilian populations on which U.S. and Soviet supported armies fought bloody proxy wars. While HIV has been associated with conflict in some settings, in these the conflicts appear to have spared the populations—probably due to decreased mobility. Sadly for both, the post-war "baby boom" so common after long conflicts appears to be associated with rapidly rising HIV rates, particularly in Mozambique, which may be among the most rapidly expanding epidemics in this region.

A paradox which remains unresolved is the unique molecular epidemiology of this Southern region. HIV-1 appears to have come to Southern African relatively late, and only one variant, HIV-1 subtype C, accounts for nearly all the studied infections. The great variety of HIV subtypes seen in the rest of Africa is not found here—and this one clade C appears to have spread across the entire southern region. While several groups are investigating the human genetic response to HIV, it is difficult to square this with the very special human populations of Southern Africa—which are extraordinarily diverse, and which include the ancient and probably ancestral genetic lineages of the San and !Xhosa peoples, who have the greatest diversity of human immune response genes of any known population. With such immunologic diversity we might reasonably expect these populations to do well, not poorly, in the face of an immuno-tropic virus, but the opposite appears to have occurred. The extent to which these findings reflect biologic versus social, cultural, and economic determinants is probably impossible to ascertain, and whatever host biologic components there are to help explain the severity of this epidemic are likely dwarfed by those realities most amenable to change: access to health care, education, the empowerment of women and girls, and the need for political leadership.

While public health has produced few quantifiable metrics for what has been called "political will" or "leadership on HIV/AIDS," it is nonetheless clear from well done case studies that political leadership and national mobilization have characterized most, if not all, of the national level AIDS successes now known. The examples of Uganda and Senegal explored here, the successes of Thailand, and Brazil, the Dominican Republic, and first world states like Australia all suggest that political leadership at the top has a crucial, if hard to measure, impact on HIV/AIDS. Tragically for all concerned, the example of the deeply flawed response to HIV/AIDS in South Africa is one of the most unequivocal arguments for the ways in which political failures can exacerbate HIV spread, undermine treatment efficacy, and increase suffering. The ANC (African National Congress) government of Thabo Mbeki will likely be remembered for many things—but his longstanding personal rejection of HIV as the cause of AIDS, and his unwavering support for his incompetent Minister of Health, Manto Shabalela Msimang, will probably be among them. This administration delayed for years the use of AZT with HIV infected pregnant women on the grounds that it was too toxic for use. Post-exposure prophylaxis after

sexual assault was banned for the same reasons, and physicians who prescribed it were threatened with legal action. As recently as the 2006 International AIDS Conference the official South African exhibition included promotion of beetroot, olive oil and garlic as effective alternatives to anti-viral drugs. While "Beetroot Manto" was something of a laughing stock, the devastation of HIV among the ANC's constituents, most especially the black South Africans who form the core of the ANC political base, threatens to undermine the incredible social and economic gains of black South Africans in their new democracy. This is surely one of the most painful paradoxes of the AIDS era—and one which is far from resolved at this writing.

Can Africa's many epidemics be summarized? The chapters here detail the great diversity in HIV rates, effective and flawed policies, and the remarkable stories of attempting to deliver AIDS care in some of the most challenging environments there are. HIV/AIDS will likely be with us for generations to come—and will likely continue to exact the heaviest toll among Africans, particularly in the South. That said, it is also clear that the answers to global AIDS are increasingly coming from Africa—and indeed, the critical questions are arising from the experiences of African researchers, providers, and communities as they grapple with the multiple challenges of AIDS.

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# Chapter 11

## The Situation in the Cradle of AIDS: Congo and Central Africa

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_11, 

## Introduction

For the Central Africa region, long considered the home of the HIV-1 virus, the decades which have seen the emergence and spread of HIV-1 have been dominated by the demands and upheaval of relentless conflict. Countries within this region which include for the purposes of this chapter, Burundi, Cameroon, the Central African Republic (CAR), the Republic of Congo or Congo Brazzaville, the Democratic Republic of Congo (DRC), Gabon and Rwanda, have had limited resources to focus on this deadly infectious disease and its intriguing epidemiology. Poverty is rampant throughout the region, with many individuals, in some countries close to 90%, living on less than USD 2 a day (UNAIDS, 2007). Life expectancy is uniformly low throughout the region, with no country having an average life expectancy of 60 or higher and some lower than 45 years (CIA, 2007). The median age of each population is also low ranging from as low as 16 to no higher than 19 (CIA, 2007), reflecting the toll of poverty, civil and other wars, and the impact of untreated HIV infections. Persistent conflict has also led to widespread displacement and engendered huge legions of refugees shifting homes from one country to the next, eliminating what employment may have existed, and placing even greater demand on infrastructures that are minimal at best. Within this context, efforts at characterizing and responding to the HIV/AIDS epidemic have been severely challenged. This chapter will discuss the history of the epidemic within this region, and the progress that has been made in understanding the epidemiology of the epidemic and addressing the additional threat it poses to these societies.

## Epidemiology

### Central Africa: The Cradle of HIV-1

AIDS in patients from Central Africa was first reported in a letter to the editor in the Lancet in 1983, two years after AIDS was first described in homosexual men in North America (Clumeck et al., 1983; Gottlieb et al., 1981). The African patients, who were diagnosed in Brussels, were from the Democratic Republic of Congo (DRC, formerly known as Zaire) and Tchad (also known as Chad), and three of them had been living in Belgium for less than 3 years, suggesting that these patients had not been infected in Belgium but rather in their home country. Subsequent review of patient records revealed that between 1979 and 1984, 18 patients from Central Africa had been admitted to hospital in Brussels with AIDS related problems (Clumeck et al., 1984). These patients did not belong to any of the known risk groups at that time, but appeared to have acquired their infection through heterosexual intercourse.

Around the same time, clinicians in Uganda had noticed the emergence of a new syndrome which they coined “slim disease” and which appears to have been AIDS (Serwadda et al., 1985). Considering the long incubation period from infection with HIV-1 to the development of full blown AIDS, HIV infections must have started to occur in Central Africa at the latest in the early 1970s. Indeed, tests of stored, frozen blood samples revealed HIV infection in a 1959 blood sample from a male resident of Kinshasa, the oldest documented case of HIV infection (Nahmias et al., 1986). Phylogenetic analysis of the RNA

isolated from this sample suggested that introduction of HIV-1 in the human population would have first occurred in the 1940s to early 1950s (Zhu et al., 1998). This evidence suggests that the HIV-1 epidemic in Central Africa is the oldest HIV epidemic in the world and most probably was the source of this infectious disease.

Since the late 1980s evidence has been accumulating that HIV in humans is the result of zoönotic transmission of primate lentiviruses, i.e. simian immunodeficiency viruses. The primate reservoir of HIV-2 was clearly identified as the soothy mangabey, whose natural habitat of West Africa overlaps with the epicentre of the HIV-2 epidemic (Chen et al., 1996). In the late 1990s, a subspecies of the common chimpanzee (*Pan troglodytes troglodytes*) was found to be the reservoir for HIV-1 groups M and N (Gao et al., 1994). The natural habitat of *P. t. troglodytes* extends from the south of Cameroon and the CAR, over Gabon to the northern parts of the Republic of Congo (Brazzaville). More recently the western gorilla (*Gorilla gorilla*) has been found to be infected with an SIV that is closely related to HIV-1 group O (Van Heuverswyn et al., 2006).

Zoönotic transmission of SIV to humans is believed to be due to the handling of monkey meat, that is typically consumed in Central Africa, in both the butchering process and in food preparation (Gao et al., 1994). The first cases of HIV infection probably occurred in isolated, rural communities where epidemic level spread of disease would be inhibited. The construction of roads, exploitation of the rain forest and urbanisation and migration to towns, however, likely provided the necessary conditions for a rapid spread of HIV (Anderson et al., 1991).

### A Great Diversity of Strains

So far three major lineages of HIV-1 have been identified through phylogenetic analyses. By far the most common HIV-1 lineage is the HIV-1 group M strain. Within group M, strains are classified into subtypes and so far 11 primary subtypes have been identified (A1, A2, B, C, D, F1, F2, G, H, J and K). In addition there are a growing number of circulating recombinant forms. All known groups and subtypes have been found in Central Africa. Table 11.1 gives a summary of the distribution of HIV-1 group M subtypes, classified according to the *env* fragment, in the DRC, Cameroon, the CAR and Gabon, in the 1990s (Vidal et al., 2000; Morison et al., 2001; Muller-Trutwin et al., 1999; Makuwa et al., 2000). A similar diversity of strains has been found in the Republic of Congo (Bikandou et al., 2000).

In populations with high HIV prevalence where many different HIV strains are co-circulating, one can expect the emergence of recombinants. Indeed, in Cameroon it was found that more than half of the strains classified as subtype A were in fact the circulating recombinant form CRF02_AG (Morison et al., 2001; Ndongmo et al., 2006). Studies conducted in the late 1990s found that more than 25% of strains circulating in DRC and in Cameroon were isolated recombinant forms (Vidal et al., 2000; Ndongmo et al., 2006).

The diversity of strains found in Cameroon, Gabon, the Republic of Congo, DRC and CAR, is consistent with this region having the oldest HIV epidemic in the world and is unique in the world. In Rwanda and Burundi, the situation is quite different. The epidemics in these two countries are dominated by two

**Table 11.1** Distribution of HIV-1 subtypes in four countries in Central Africa.

| | DRC 1997 N = 247 | Cameroon 1997 N = 104 | CAR 1991–1997 N = 105 | Gabon 1997–1998 N = 92 |
|---|---|---|---|---|
| **A*** | 52% (127) | 86% (89) | 80% (84) | 49% (45) |
| **B** | 0.5% (1) | – | 1% (1) | 2% (2) |
| **C** | 7% (18) | – | 1% (1) | 3% (3) |
| **D** | 9% (23) | 4% (4) | 1% (1) | 10% (9) |
| **E (now CRF01_AE)** | 2% (4) | 2% (2) | 12% (13) | – |
| **F** | 4% (10) | 2% (2) | – | 7% (6) |
| **G** | 7% (17) | 5% (5) | 1% (1) | 1% (1) |
| **H** | 7% (18) | 1% (1) | 2% (2) | 7% (6) |
| **J** | 3% (7) | – | – | – |
| **K** | 3% (8) | – | – | – |
| **Group O** | – | 1% (1) | – | – |
| **?** | 6% (15) | – | 4% (4) | 22% (20) |

*Classification based on the *env* fragment only, so this includes both subtype A and CRF02_AG.

HIV-1 subtypes, subtype A and C, and a minority of A/C recombinants (Gao et al., 1994; Vidal et al., 2007).

### Trends in HIV Prevalence

When it became clear that HIV/AIDS could be a major public health problem in Central Africa, several initiatives were taken to study the epidemiology of HIV/AIDS in this region. From 1985 on, in several countries, regular surveys were conducted on HIV prevalence among pregnant women in order to monitor trends in HIV infection in the general population. However during the 1990s these surveillance activities became more irregular in most countries for a variety of reasons. One factor was the lack of resources to maintain the surveillance system, but in a number of countries activities were interrupted because of political upheaval and civil war, including the DRC, Rwanda, Burundi, the Republic of Congo and the CAR. As a result, data for the past 10–15 years are sparse although trends in the epidemics in Central Africa can be discerned.

Table 11.2 presents the UNAIDS estimates for 2005 of the HIV prevalence in adults in the different countries of Central Africa (UNAIDS, 2006). With the exception of Rwanda and Burundi, the general trend in Central Africa has been one of relatively stable or slowly increasing HIV prevalence in the general adult population. In urban areas of Cameroon and Gabon HIV prevalence of HIV infection in pregnant women increased between the mid 1980s and the late 1990s, but remained below 10%. Among pregnant women in Yaoundé, the capital of Cameroon, the HIV prevalence was 0.7% in 1989, 4.7% in 1996 and 5.5% in 1998 (Sam-Abbenyi et al., 1993; Mbopi Keou et al., 1998; Glynn et al., 2000). In Libreville, the capital of Gabon HIV prevalence increased from 2.1% in 1986 to 4.2% in 1998 (Delaporte et al., 1996; Makuwa et al., 2000).

**Table 11.2** Recent HIV prevalence estimates in Central Africa.

| | Most recent estimated adult prevalence | HIV prevalence obtained by population based survey [year]> |
|---|---|---|
| **Burundi** | 3.3% [2.7–3.8%] | 3.6% [2002] |
| **Cameroon** | 5.4% [4.9–5.9%] | 5.5% [2004] |
| **Central African Republic** | 10.7% [4.5–17.2%] | |
| **Chaad** | 3.5% [1.7–6.0%] | |
| **Congo (Brazz)** | 5.3% [3.3–7.5%] | |
| **DRC** | 3.2% [1.8–4.9%] | |
| **Gabon** | 7.9% [5.1–11.5%] | |
| **Rwanda** | 3.1% [2.9–3.2%] | 3.0% [2005] |

*Source:* UNAIDS: "2006 Report on the Global AIDS Epidemic".

In Kinshasa, the capital of DRC, the first survey among pregnant women was conducted in 1985 and found a prevalence of 5.9%. In 1997 the prevalence was 3.1% and in 2000 it was 4.1% (N'Galy et al., 1988; Mulanga et al., 2004; Denolf et al., 2001). This suggests that the HIV prevalence in the general population of Kinshasa has remained relatively stable for at least 15 years. Also among female sex workers in Kinshasa there does not appear to have been an increase in HIV prevalence between 1988 and 2002 (Vandepitte et al., 2007). A similar pattern of stable HIV prevalence is seen in Brazzaville, the capital of the Republic of Congo which is across the Congo River from Kinshasa (Bazabana et al., 1995). In Pointe-Noire the port city of the Republic of Congo the HIV prevalence seems to be higher than in Brazzaville, around 10% but no trend data are available. In the CAR, HIV seems to have spread faster than in neighbouring DRC, Cameroon and Congo. At the end of the 1980s the prevalence of HIV among pregnant women in Bangui was similar to what had been found in Kinshasa, around 5%, but by 2001–2002 the prevalence had increased to 15% (Matsika-Claquin et al., 2004).

### Rwanda and Burundi

The epidemics in Rwanda and Burundi have run a somewhat different course. While both Rwanda and DRC were Central African countries where AIDS cases were already documented in 1983 (Van de Perre et al., 1984), in the 1980s and early 1990s HIV prevalence rates among pregnant women in Kigali, the capital of Rwanda, were much higher than in cities in the DRC and were in the same range as what was found in Kampala, Uganda. Indeed, sero-surveillance from the 1980s confirmed a severe generalised epidemic, with HIV prevalence among pregnant women increasing from 23–25% in 1989 to 26–31% in 1990 (Bucyendore et al., 1993). HIV rates of 75–88% were found among female sex workers in Kigali in 1983–1984 (Van de Perre et al., 1985). Civil unrest during the early 1990s and the genocide in 1994 resulted in massive displacement (estimated at 4 million persons), an estimated 800,000 deaths and had a devastating impact on the health infrastructure. Data obtained from Sentinal Surveillance during the 1990s are influenced by those factors which makes it difficult to interpret the extant data. Data from sentinel surveillance rounds

between 1998 and 2003, however, do suggest a declining trend in HIV prevalence. In 1998 the median prevalence of HIV infection in pregnant women in Kigali was 16.5% and in 2003 it was 13.2% (Kayirangwa et al., 2006). A national, population based survey conducted in 2005 found a 3.0% prevalence among adults (Garcia-Calleja et al., 2006).

Wide differences were also observed between urban and rural prevalence in Rwanda. In a national household survey conducted in 1986 the urban estimate was 17.8% while the rural prevalence estimate was 1.3% (Bugingo et al., 1988). HIV rates most likely peaked in the early 1990s in urban areas, with significant declines afterwards between 1990 and 2004. The rural/urban divide continues to exist until now, with rural areas experiencing a slow but consistent increase, or stable prevalence, with no signs of significant decline yet.

The HIV epidemic in Burundi is in many ways comparable to its neighbour Rwanda. Burundi also experienced an early, generalised epidemic in the 1980s. In 1991, the HIV prevalence was estimated at 18–20% in Bujumbura and 1% in rural sites (where surveillance was conducted) and in 1991/1992 the prevalence of HIV infection among pregnant women ranged from 8 to 26% (Sokal et al., 1993). Severe political unrest between 1993 and 1997 resulted in massive displacements of people and high mortality making surveillance very difficult. By 2001, HIV rates had stabilised and declined in urban areas, while a steady increase was noted in rural areas (Plan Stratégique National de Lutte contre le SIDA, République du Burundi). In 2002 a population based survey found a prevalence of around 10% in urban areas and 2.5% in rural areas (Niyongabo et al., 2005).

### Armed Conflicts and HIV/AIDS Epidemics in DRC, Rwanda and Burundi

Civil unrest and war are considered circumstances that are favourable for a rapid spread of HIV infection. Civilians are exposed to groups of soldiers who are in search of sex. Levels of sexual violence increase and rape may be used as a strategy to terrorize the civilian population. War brings normal economic activities to a halt and poverty may lead women to exchange sex for money as a survival strategy. Large numbers of people are displaced and the social fabric of communities is destroyed leading to higher risk sexual behaviour.

In 1992/1993 DRC plunged into a deepening political crisis. The overthrow of the Mobutu regime in 1998 raised hopes for a new and brighter future for the Congolese population, but these hopes were soon smashed as civil war broke out in the east of the country. The central government lost control over large parts of the country and since the beginning of the 21st century DRC has been a failed state with a complete breakdown of public services, insecurity, civil conflict and deepening poverty for the majority of the population. Despite this seemingly fertile ground for a rapid expansion of the HIV epidemic in DRC, HIV prevalence appears to have remained stable, not only in Kinshasa but also in the war ravaged eastern parts of the country (Mulanga-Kabeya et al., 1998; Mulanga et al., 2004; Programme National de Lutte contre le SIDA, 1997). The reduction in purchasing power and the resulting reduction in access of men to sex workers and extramarital partners have been proposed as explanations for the stable prevalence, in addition to the reduced mobility of people (Mulanga et al., 2004).

In 1994, Rwanda was the scene of a genocide in which an estimated 800,000 Tutsi and moderate Hutus were killed within a time span of three months. Thousands of women and girls were raped and hundreds of thousands of Tutsis and Hutus fled their homes (Donovan, 2002). A survey conducted a few years after the genocide, found that the large gap in HIV prevalence between urban and rural areas that existed in Rwanda before the genocide had substantially narrowed to 12.5% in urban areas versus 10.8% in rural areas (Programme National de Lutte contre le SIDA). Massive displacement of people would have been responsible for this. The findings of this survey however, were not confirmed by results from sentinel surveillance rounds among pregnant women, conducted between 1998 and 2003. In 1998, the median HIV prevalence among pregnant women was 16.5% in Kigali, 10.2% in other urban areas and 3.3% in rural areas (Kayirangwa et al., 2006).

Civil war started in Burundi in 1993 and by 2005, 250,000 people had been killed and more than a million displaced. As in DRC there is no evidence for an enhanced spread of HIV infection since the civil war broke out. A population based study conducted in 2002, found an overall prevalence in the age group above 12 years of 3.6% (Garcia-Calleja et al., 2006).

HIV surveillance activities were hampered by the civil wars in the DRC, Rwanda and Burundi. However the few data from sentinel surveillance rounds that are available and the data from population based surveys that have been conducted in recent years, provide evidence that political upheaval and civil war have not led to explosive epidemics in these three countries. This is contrary to common expectations. Likewise the wars in southern Sudan, Sierra Leone and Somalia seem not to have led to major HIV epidemics, suggesting that we need to revise our thinking about the effects of conflicts and social upheaval on the course of HIV epidemics (Spiegel et al., 2007).

### What Explains the Differences in HIV Spread Between Different Countries in Central Africa and Their Neighbouring Countries?

HIV prevalence in urban populations in Cameroon, Gabon, the Republic of Congo and the DRC has increased since the mid-1980s but this increase was relatively slow and did not bear any resemblance to the explosive spread of HIV in some neighbouring countries such as Uganda, Rwanda and Zambia. The most striking contrast was between towns in the Shaba Province (formerly Katanga) in the south-east of DRC and towns in neighbouring Zambia. Lubumbashi, the capital of DRC's Shaba Province, is a mere 200 km from Ndola, the largest town in the Copperbelt Province of Zambia. Both towns are in mining areas and the border between DRC and Zambia has not presented a major barrier to the movement of people. Yet, in 1989/1990, HIV prevalence in cities in the Shaba Province was well below 5%, whereas in urban areas in Zambia it was over 20% (Magazani et al., 1993). Likewise, at the end of the 1980s the HIV prevalence among pregnant women in Kigali was around 30%, whereas in Kinshasa it was below 10%.

A multicentre study conducted in the 1990s explored this issue in four cities in sub-Saharan Africa with contrasting HIV prevalence, including Yaoundé in Cameroon, Cotonou in Benin, Ndola in Zambia and Kisumu in Kenya and offered some insights into regional differences in HIV rates (Buvé, Caraël et al.,

2001a, b). Differences in sexual behaviour could not explain the differences in HIV prevalence. For example, high risk sexual behaviour appeared to be most common in Yaoundé, one of the cities with relatively low HIV prevalence (Ferry et al., 2001). The study concluded that any differences in sexual behaviour were outweighed by differences in prevalence of male circumcision and HSV-2 infection (Buvé et al., 2001b). The important roles that male circumcision and HSV-2 infection play in determining the course of HIV epidemics in sub-Saharan Africa, has recently been explored in mathematical models (Orroth et al., 2007; Freeman et al., 2007). The fact that in West and Central Africa most men are circumcised, may explain to a large degree the relatively slow spread of HIV, notwithstanding high rates of partner change and other risky sexual behaviours.

## Responding to the Epidemic in the DRC

The DRC was one of the first countries in Africa where the HIV/AIDS epidemic was recognized publicly. The epidemic in the DRC has been particularly well studied and provides a useful, in depth example of how HIV/AIDS has emerged and progressed in the Central African region. The first AIDS cases were confirmed in 1983 in Kinshasa at the General Hospital, then known as Mama Yemo (Piot et al., 1984) and led to the creation of Project SIDA, a Congolese-American-Belgian research program (Cohen, 1997). This program shed light on the epidemiology of the emerging epidemic and triggered the initiation of the first HIV prevention and care activities. As part of the research program, the first drop in centre for sex workers was set up in 1988 offering peer education, condom promotion and sexually transmitted infection (STI) care. It showed that working with this population of vulnerable and marginalised women was not only feasible, but also effective in slowing the spread of HIV and STIs among this group (Laga et al., 1994). During the same period, Population Services International (PSI) initiated one of its first condom social marketing campaigns on the African continent. Information campaigns were launched in the national media in 1987, and Franco, the most famous Congolese singer at the time, wrote a popular song about AIDS that received widespread playtime on radio, raising public awareness. Authorities responded to these initiatives by creating the national AIDS program (PNLS) within the Ministry of Health. These activities placed Congo, and in particular the city of Kinshasa, at the forefront of fighting the HIV/AIDS epidemic in the 1980s in Africa.

It is plausible that actions by both nongovernmental organizations (NGOs) and the government contributed to the low rates of HIV infection in Kinshasa in the 1980s although this is difficult to confirm, given the multiple factors involved in the spread of HIV. In 1991, Project SIDA suddenly ended, as a result of civil unrest. From 1991 to 1999, the country remained unstable, and HIV prevention and control activities were reduced to a minimum. Bilateral and multilateral cooperation were put on hold although local and international NGOs assured some basic services. Remarkably, the HIV rates in Kinshasa remained low and stable throughout this period, and even in 2006 the prevalence is estimated at 2–3% in pregnant women. Data from the rest of the country are scarce, but indicate the absence of an explosive spread of disease (Figure 11.1).

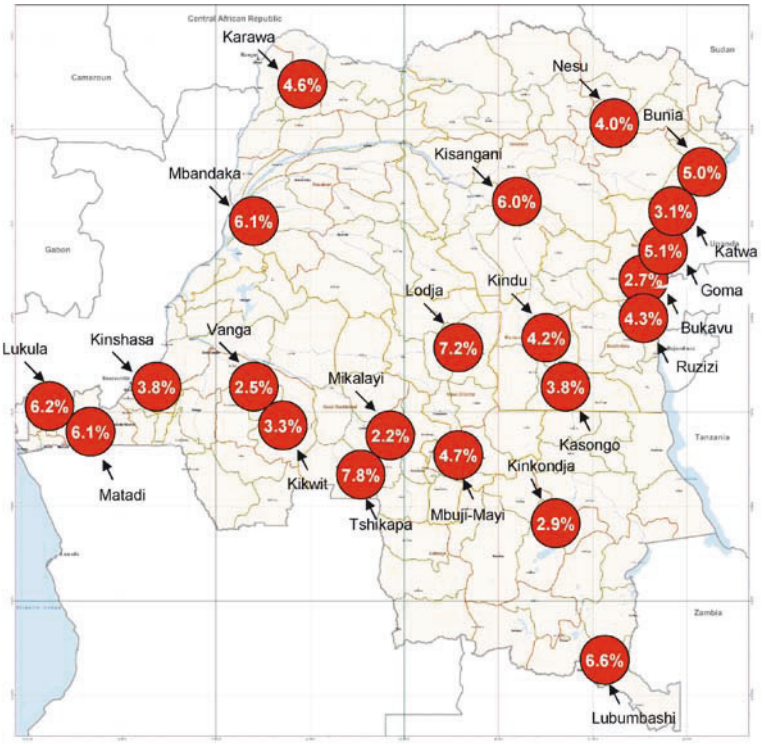


**Figure 11.1** HIV prevalence by geographic area in DRC, obtained by sentinel surveillance in pregnant women 2005.
Source: Programme National de Lutte contre le SIDA, DRC.

Since 2000 international donors have been returning to DRC, and more recently significant funding was made available through the World Bank's MAP program and the Global Fund to fight AIDS, Tuberculosis and Malaria. As with many other African countries the focus shifted from prevention to treatment, and the number of AIDS patients receiving antiretroviral treatment (ART) increased from 9,096 in 2005 to 17,561 in 2006, representing a coverage increase from 5.6 to 20.7% of the estimated eligible AIDS patients (Programme national de Lutte contre le SIDA, 2006). Prevention of mother to child transmission (PMTCT) was introduced in 2002, but is mostly limited to urban areas, representing a national coverage of less than 5%.

Due to the state failure, civil society organisations had to compensate or replace the state in domains like health and education. Congolese grass roots organisations like Amo-Congo and Fondation Femmes Plus have been playing an essential role in HIV testing, ARV provision, as well as advocacy and income generating activities. International NGOs like PSI, Family Health International and Medecins Sans Frontiers have been instrumental in scaling up ARV treatment programs, Voluntary Counselling and Testing programs and condom promotion.

In recent years, leadership from the president has become more visible. A multisectoral response has been encouraged, and with money from the World Bank, the National Multisectoral AIDS control program, which reports

directly to the office of the president, was created. The PNLS and increasingly the National Multi-Sector Program against HIV/AIDS (PNMLS) have been decentralised with coordination units now in all 11 provinces. Private sector involvement in AIDS control has become an important component of DRC's multisectoral response. For example, the brewery Bralima (Heineken) initiated HIV/AIDS related activities in 1998 and is now providing PMTCT and ARV to all their employees who need it.

## Prevention Efforts in Neighbor States

Prevention efforts in other states in the region (Burundi, Cameroon, CAR, Republic of Congo, Gabon and Rwanda), have been characterized by broad population based programs which are best suited to epidemics where the general heterosexual population is the most affected group. These kinds of efforts, however, can be challenging in societies disrupted by civil conflict, where large percentages of the population live in rural areas and where at least one fifth and sometimes nearly one half of the population is illiterate (CIA, 2007). Examples of broad prevention efforts which have had some measure of success within these societal contexts are reviewed in this section.

### Governmental Response

Despite the many challenges faced by governments in this region, some have been able to support the implementation of prevention programs. In Burundi, an early national response (1997/1998) focused on prevention and ongoing political commitment let to the formation in 2002 of an AIDS ministry and a national AIDS Control Council (UNAIDS, 2007). Civil societies are also well established and organized in Burundi with the Burundian Alliance for AIDS Control overseeing 150 NGOs. Organizations such as the Association for Young People and the Network of Women's Association's for AIDS control are located throughout the country and are well known (UNAIDS, 2007). In 2006, governmental and civil society supported many prevention activities including 972 Stop AIDS clubs which provided HIV/AIDS information and education to 23,354 school children, and supported efforts aimed at target groups such as young people and military personnel and improving the distribution of condoms (UNAIDS, 2007).

The Rwandan government was also instrumental in that country's early response to the HIV/AIDS epidemic. The government's response was coordinated by the Ministry of Health and included: establishment of a blood donor screening programme, Information, Education and Communication (IEC) activities using radio and public educators and sero-surveillance activities. Responding to the epidemic has been incorporated into all sectors of the government and increasing access to a comprehensive prevention package was a priority for 2007 (UNAIDS, 2007).

The government of Cameroon has also developed structured responses to the epidemic. Cameroon's National Strategic Plan 2006–2010 which was approved by all partners has a series of ambitious goals including cutting the cost of HIV

testing by almost half and increasing the number of mobile testing units. HIV control has also been included as a priority programme in Cameroon's Poverty Reduction Strategy Paper (UNAIDS, 2007).

### Voluntary Counselling and Testing

Many barriers to HIV testing remain in sub-Saharan Africa. Limited access to free testing, worries about stigma and discrimination, a lack of qualified counsellors and difficulties obtaining rapid results have all contributed to exceedingly low percentages of individuals being tested (12%) and being aware of their status (10%) (Matovu & Makumbi, 2007). Despite these barriers, some countries in the Central Africa region are making progress in expanding access to Voluntary Counseling and Testing (VCT). In Burundi, the number and quality of VCT centers continues to improve. In 2003, there were 80 VCT centers and by 2006 there were 135 VCT centers with more than 70,000 people tested that year (UNAIDS, 2007). Adoption of norms and standards and the provision of training for over 300 service providers has increased the quality of care provided at these centers as well (UNAIDS, 2007). Access to VCT is also increasing in Rwanda. In 2006, a total of 251 health centers were able to provide VCT (UNAIDS, 2007). In Cameroon, there are now VCT centers in every province. These centers are linked to treatment centers and have involved people living with HIV/AIDS (PLWHA) as counsellors and advisors which has encouraged their acceptability (Bassirou et al., 2004; Zekeng et al., 2004).

In the CAR and the Republic of Congo, where there is less centralized organization of prevention activities, innovative approaches to providing VCT have had some success. In Bangui, in the CAR, the French NGO Médicins du Monde provided technical assistance to an established STD center to expand its services to provide anonymous HIV counselling and testing. The European Union provided support for these activities which allowed the center to charge a relatively minimal fee for testing. Free testing provided in conjunction with annual AIDS day in the CAR was particularly successful. Incorporating anonymous VCT into an existing health venue increased its acceptability and demonstrated that this approach to providing VCT can be a practical one in challenging environments (Grésenguet et al., 2002).

In the Republic of Congo and also Rwanda, Burundi, and as mentioned earlier in the DRC, Heineken International has implemented a VCT program for its employees and their families and has linked testing to the provision of ART for anyone who tests positive (IFC Against AIDS, 2003). By providing prevention services including not only VCT but also STI detection and treatment, prevention of mother to child transmission (PTMCT) and condom distribution in the context of provision of care, Heineken has seen a significant increase in uptake of VCT by employees and their spouses (Rijckborst et al., 2004). Through this effort, Heineken has demonstrated that successful prevention and care can occur in the absence of a stable medical infrastructure (Rijckborst et al., 2004).

### Prevention of Mother to Child Transmission

For most countries in this region, barely 1% of HIV exposed newborns had received ART prophylaxis in 2004 (UNICEF, 2005). While the rates in the

Republic of Congo (3.7%) and Rwanda (12.3%) were higher, the region as a whole remained severely challenged in its ability to provide preventive care for its infants. Fundamental difficulties in providing this care still remain. Limited antenatal care, poor health infrastructure, a dearth of personnel and supplies and stigma associated with seeking care still thwart successful interventions (Druce & Nolan, 2007). At the same time, in the last several years, there have been examples of programs which have had appreciable success in PTMCT.

One program, in Cameroon, offered PTMCT as a routine and free part of antenatal care, provided same day results and pre and post test counselling given by the same counsellor (Welty et al., 2005). The program which was initiated in 2000 at two hospitals in the Northwest Province of Cameroon was operating in 115 health facilities in 6 of Cameroon's 10 provinces four years later. In an extension of this program, birth attendants from 20 rural villages were also trained in PMTCT. The birth attendants were able to test 99.1% of the women they encountered and to provide 85.7% of the HIV exposed newborns they delivered with single dose nevirapine prophylaxis (Wanyu et al., 2007). Even with these successes, many challenges remain to this program including having adequate supplies and achieving adequate prevention in terms of breastfeeding (Wanyu et al., 2007). Throughout Cameroon, the number of sites implementing PTMCT programs has grown from 3 in 2000, to 420 in 2005 (Tsague, 2005). Support and commitment from the Ministry of Public Health and the religious private sector and adopting a "bottom-up", "district approach" have been essential elements in this growth. Despite this progress, however, it is estimated that only 4.2% of pregnant women in Cameroon receive treatment to reduce mother-to-child transmission (UNAIDS, 2007).

Support from the central government and NGOs has also fostered progress in PTMCT in Burundi and Rwanda. In Burundi, a national policy calling for the extension and decentralization of PTMCT has meant that 18 sites are now providing PMTCT care and an increasing number of HIV positive women and infants are receiving care (UNAIDS, 2007). Rwanda's strong political commitment to PTMCT has been strengthened by several specific efforts. For example, Family Health International's (FHI) support of PTMCT at eight health centers was associated with high levels of accepted testing (80%) and receiving test results (93%) and high levels of HIV positive women receiving nevirapine at the start of labor (91%), giving birth in a medical setting (74%) and choosing exclusive breastfeeding (89%) which limits the possibility of transmission (Bangendanye, Ngabonziza & Murray, 2004). Researchers observed that low maternity costs encourage more women to choose medical centers which allowed for much greater monitoring of all PTMCT efforts and greater overall nutritional care for women and their babies (Bangendanye et al., 2004). A PEPFAR funded initiative has encouraged men to accompany their pregnant partners on PTMCT visits so that they can also receive testing and counselling. In 2002, the first year of the program, only 3% of men participated, but by the end of the third quarter of 2006, male involvement had increased to 74% (USAID, 2006). Rwanda's ongoing efforts have led to an improvement in PTMCT coverage, with PTMCT services available at over half of all facilities and two thirds of women who have tested HIV positive receiving preventive prophylaxis (Druce & Nolan, 2007).

While countries can monitor the provision of preventive prophylaxis at the time of delivery, breastfeeding practices are more difficult to measure and control. Using infant formula is often impractical and even dangerous in situations where access to clean water is unreliable. Cultural norms may also make it difficult for women to choose formula to feed their newborns. Following recommended practices for breastfeeding and early weaning which limit the transmission of HIV can also be culturally or practically difficult. Addressing these issues in countries in Central Africa remains a major task.

## Access to Care

Between 2003 and 2006, the prices of ART for most "first line" medications decreased by between 37 and 53% in low- and middle- income countries (WHO, 2007). For most low-income countries this meant that in 2006, the average cost for first-line treatment ranged from USD 123 per person per year to USD 493 per person per year (WHO, 2007). In countries where many are living on less than USD 2 a day and where the ability of the government to subsidize care is extremely limited, even these very low costs can be simply too high. Access to treatment is also impacted by the availability of established health services. Provision of treatment has been easier to accomplish in urban areas where existing health infrastructure may be better equipped to provide ART than in rural areas (WHO, 2007). Issues of cost and infrastructure underlie efforts to provide ART in Central Africa, where estimated coverage rates in Burundi, Cameroon, CAR, the Republic of Congo and Gabon range from a high of 35% (Gabon) to a low of 6% (CAR) (WHO, 2007). Rwanda whose estimated coverage rate of 72% is an exception in the region is discussed in detail in the box below.

### Rwanda's HIV Treatment Program: Signs of Hope (Kathryn Anastos)

Although Rwanda is most often discussed internationally in the context of its 1994 genocide, which left a deeply traumatized population, its current commitment to economic development, education and health care make it an important example of the successes that can be achieved in resource-limited settings by developing an infrastructure for delivery of services in a planned, systematic and logical manner. Healthcare services are a critical component of Rwanda's integrated approach to overall development, in which healthcare is a part of a larger whole that includes improving the quality and availability of education at all levels, investing in information and communication technology, and fostering economic development. The government of Rwanda has developed its programs for HIV/AIDS services with careful attention to policies that will promote success, with an explicit commitment to using resources efficiently to improve the health of HIV-infected Rwandans, and where possible, create an infrastructure for HIV services that also improves the public health infrastructure generally. Rwanda was the recipient of the 2005 PEPFAR commendation for excellence in implementing programs to deliver antiretroviral therapy effectively—meaning, a sustainable set of services resulting in improvements in AIDS-related morbidity and mortality. The World Bank has reported that the median life expectancy in Rwanda increased from just less than 40 years in 2001 to 52 years in 2007—an improvement in public health that is rarely achieved.

There are several keys to this success—not least the government's focus on improving the lives of Rwandans, including a commitment to provide to all HIV-infected Rwandans the full spectrum of care, including provision of medically indicated antiretroviral treatment (ART). As in many African countries, the

rate-limiting steps in achieving this goal quickly are the development of the infrastructure for the effective delivery of healthcare services, and increasing the size and scope of the healthcare workforce, especially physicians. Thus, simultaneous with building the health care infrastructure, the government is expanding and improving medical education, and developing new educational initiatives targeting the leading causes of mortality, for example public university-level training of nurse-midwives to impact favorably on the high maternal mortality rate.

Prevalence of HIV infection in Rwanda is 3 to 5%, with higher rates in urban areas and some specific provinces, and in women. As in most of sub-Saharan Africa, women are more likely than men to seek HIV-testing and to access treatment services. Nearly all HIV services in Rwanda, both prevention and treatment, are developed with the guidance of the public health system (the exception are small private clinics), which has implemented several mechanisms for optimizing the use of resources. The government maintains strict control over the allocation of HIV-related aid dollars to prevent duplication, ensure broad reach across the country rather than a concentration of resources in a few areas, and optimize the public health benefit. The approach is evidence-based, including evaluation of current practice for both medical effectiveness and cost-effectiveness. No provider is able to prescribe a suboptimal regimen, and all patients initiating ART are required to attend a 2 to 3-day education program, and must identify a "buddy" who attends the training with them. Thus for both patient and provider some monitoring mechanisms are in place, designed to foster both individual and population-based effectiveness.

### Special Challenges in Post-conflict Settings

The Rwandan genocide is one of the most commonly cited, and indeed one of the worst, examples of rape and other extreme forms of genital violation specifically wielded against women as a weapon of war. In the 100-day 1994 genocide, an estimated 250,000 Rwandan women experienced multiple episodes of brutal rape, with HIV infection planned by the perpetrators and deliberately used as a genocidal tool ("slow poison"). It was the International Criminal Tribunal for Rwanda that revolutionized the legal treatment of sexual violence by recognizing rape as an instrument of war and a crime against humanity. However, in 2007, the groups who perpetrated these rapes continue their crimes in the eastern Democratic Republic of the Congo, along the Rwandan border.

The prevalence of HIV infection is higher in women survivors than in the country as a whole, and their needs are far broader. They experience a high prevalence, as high as 50%, of depression and post-traumatic stress (PTS) symptoms, or both, and HIV-infection itself is experienced as a traumatic event. Many avoid public settings for several reasons, including fear of encountering the perpetrator(s) of their rape(s). Among those with PTSD, the most common PTS symptom is reliving of the traumatic events, and can be precipitated by entering some public settings. The effects of these conditions on the survivors' lives are profound, and some, even many, women avoid receiving necessary healthcare services for HIV-infection.

Thus in addition to the already large challenge of delivering needed care to the general population with very limited resources, there is an additional challenge in post-conflict settings: to ensure care to those too traumatized to engage in the general healthcare system. One mechanism that is working in Rwanda is the placement of services in community-based settings that feel safe to the survivors, for example grassroots associations of genocide "widows". Of interest, there is some evidence that treating their HIV-infection decreases the women's PTS and depressive symptoms. There is no evidence that their adherence to therapy is less. In fact, in nearly all available studies, self-reported adherence to ART among treated Rwandans, both women and men, and including genocide survivors, is close to 100%.

However, in all resource-limited settings, the most effective pharmacologic treatments for the mental health conditions resulting from trauma, for example selective serotonin reuptake inhibitors, are not available or are available only in rare

circumstances. For post-conflict settings, attention should be paid to funding mechanisms that will foster treatment of PTSD and depression.

On a broader scale, Rwanda has directly addressed the issue of gender inequality through its constitution and explicit policies in its legal system. As part of their commitment to economic development and "never again"—preventing future genocide—Rwanda has integrated women into positions of power and authority, with the belief that having women integrated more fully into political life can prevent the extremism that allowed the genocide. One example is that Rwanda has the highest proportion in the world of women in parliament (48%) and all decision-making organs must have a minimum representation of 30% women. However, one can assume that it will take some time for this to trickle down effectively to the day to day lives of all women, especially deep in the country-side.

In the midst of its struggle to overcome the legacy of a brutal genocide, Rwanda's mission-driven, non-corrupt government is developing one of the best HIV care delivery systems in the world, and is addressing the additional challenge of a traumatized population in general, and a large group of severely traumatized women victims of genocidal rape. We have much to learn from this example.

Other countries have also been able to make strides in providing care. In Burundi, access to ART is increasing rapidly. In 2006, more than 7,000 people received ART (UNAIDS, 2007) for an estimated coverage rate of 26% (WHO, 2007). Burundi also has more women on ART than would be expected by the percentage of individuals who are infected (WHO, 2007). Burundi's success may be attributed to a home based treatment and care programme which has improved access to care by bringing treatment, care and support activities into affected communities (IRIN, 2007).

Cameroon, which also has more women on ART than might be expected by the percentage of infected individuals overall (WHO, 2007) also has strong government commitment to providing widespread access to ART. Its 2004/2005 multisectoral plan for decentralizing the provision of ART has been hampered by weaknesses in health system infrastructure and personnel, particularly at the district level (IRIN, 2007). Problems with procuring and managing supplies of drugs and diagnostics have also been identified (IRIN, 2007). Technical assistance with these problems along with additional and sustained financial resources are needed to improve Cameroon's current estimated coverage rate of 25% (WHO, 2007). Similar problems plague CAR where years of political instability have had a critical impact on the basic health infrastructure (WHO, 2005) and the Republic of Congo where treatment and care are constrained by severely limited services, a shortage of trained staff, and an insufficient legal framework and funding mechanism (UNAIDS, 2007).

Higher estimated coverage in Gabon (35%) may be the result of the commitment of Gabon's head of state and the fact that the government's principal HIV/AIDS focus has been on providing care for PLWHA (UNAIDS, 2007). An annually renewable Treatment Solidarity Fund and the establishment of outpatient treatment centres in each of the country's provinces has also made the extension of treatment and care possible (UNAIDS, 2007).

Access to care in the Central African states underscores again the importance of political will and the basic resources of infrastructure, trained personnel

and secure, ongoing funding. While many of these countries have made impressive gains in coverage despite these challenges, scaling up to universal coverage will only be possible when these issues have been addressed.

## Conclusion

Countries in the central African region host some of the oldest HIV epidemics on the African continent, indeed in the world. These epidemics which feature multiple HIV subtypes are an ideal focus for research on the epidemiology of the epidemic as well as potential approaches for vaccinating against it. While there are intriguing vagaries in the spread of this epidemic, the result for this region, so burdened by other miseries, has been devastating. In every instance the generalized epidemics of the central African region have targeted the heterosexual population in the prime of their reproductive years. Women are disproportionately infected and their children remain at tremendous risk. The complexities of the epidemic present nearly insurmountable challenges for barely established political systems. The requirements of surveillance systems, prevention programs and treatment delivery are inconsistent with existing health and information networks. At the same time, the costs required for adequately assessing and addressing generalized epidemics are difficult to fathom in countries where subsistence is still a struggle. Despite all of this, however, countries in this region are, albeit to different degrees, struggling to mount an effective response to the epidemic. The success of these efforts will require substantial political, technical and economic support.

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# Chapter 12

# Public Health Aspects of HIV/AIDS – Nigeria and West Africa

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## Introduction

The HIV/AIDS epidemic in West Africa is complex, representing a diversity of genetic epidemiology and a divergence in cultures. The West African country of Nigeria has the second largest HIV/AIDS epidemic worldwide, after



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_12, 

South Africa (UNAIDS, 2006). In West Africa, there are two epidemics of HIV/AIDS: that linked to human immunodeficiency virus type 1 (HIV-1) and that associated with human immunodeficiency virus type 2 (HIV-2) (van der Loeff et al., 2007). HIV-2 has two major subtypes while HIV-1 is characterized in this region by subtypes A and G, the predominant circulating recombinant form CRF_02 AG, the newly emerging circulating recombinant forms (CRF) as well as a dizzying panoply of recombinant forms whose prevalence varies across the region and within countries and whose dynamic nature has challenged prevention efforts (Abimiku et al., 1994; Meloni et al., 2004). Research conducted in West Africa has spawned seminal publications that have shaped HIV/AIDS public health policy and scientific progress worldwide (Adjorlolo-Johnson et al., 1994; Jamieson et al., 2003; Sarr et al., 2005). Today with the advent of expanded access through the President's Emergency Program for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), as well as an increase in the world's attention on the impact of HIV/AIDS in Africa, the public health response to the epidemic in West Africa is slowly awakening. However, regional strife, pervasive poverty, and uneven public and private sector commitment to HIV/AIDS challenge West Africa's response.

## Epidemiology

The West African region, geographically, culturally, and linguistically a vestige of the artificiality of colonial claims, includes fifteen countries. From east to west, these are Nigeria, Niger, Benin, Burkina Faso, Togo, Ghana, Côte d'Ivoire, Mali, Liberia, Sierra Leone, Guinea, Guinea Bissau, The Gambia, Senegal, and Cape Verde. To the east, Cameroon and Chad transition to Central Africa and share many cultural features (the epidemic in Cameroon is covered in Chapter 11). Mauritania, to the north of Senegal, transitions to North Africa. The modern boundaries between contemporary West African nations cut across ethnic and cultural lines, often dividing a single ethnic group or tribe between two or more countries.

### History of HIV in the Region

The spread of HIV in Africa can be traced to the late 1970s (UNAIDS, 2006). The earliest documentation of HIV in West Africa dates back to a retrospective serologic survey of 1,248 samples collected in 1980 from Guinea-Bissau. In this sample, 11 individuals were positive, all for HIV-2 and none for HIV-1 (Piedade et al., 2000). This established Guinea-Bissau as the epicenter of an HIV-2 epidemic and documented an important and distinguishing feature of the West African epidemic, the early predominance of a significant HIV-2 epidemic clustered in the far western reaches of the region.

Molecular epidemiologic analyses have shown striking homology between the simian immunodeficiency virus of sooty mangabeys ($SIV_{smm}$) and HIV-2. A survey of samples in rural Sierra Leone from 9,309 human subjects found two with divergent HIV-2 subtypes, which parallels the pattern of highly divergent $SIV_{smm}$ noted in free-living and household pet sooty mangabeys in the region,

and is thus consistent with the hypothesis that new HIV-2 subtypes are the result of independent cross-species transmission of $SIV_{smm}$ (Chen et al., 1997). This molecular data, along with documented transmission to humans on multiple occasions as well as wide detection among free-ranging sooty mangabeys in Côte d'Ivoire, support the recognition of this simian virus as the progenitor of HIV-2 (Santiago et al., 2005).

Similar analyses point to $SIV_{cpz}$ from the gorilla species *Pan troglodytes* as the ancestor of HIV-1; *Pan troglodytes* is a nonhuman primate species whose natural range coincides uniquely with areas of West Central Africa, in which the three genetic groups of HIV-1 as classified by genomic characteristics – M (major), O (outlier), and N (non-M, non-O) – are endemic. These data, supported by reports of at least three independent introductions of $SIV_{cpz}$ into the human population and the repeated detection of closely related human and simian viruses among rural hunters in Cameroon, point to a Central African origin of HIV-1 (Gao et al., 1999).

Although HIV-2 was the first to invade West Africa, HIV-1 has proven to be a more adaptable and aggressive virus, with rapid introduction widely in the region by the mid-1980s and epidemic expansion from the early 1990s, such that more recent longitudinal surveillance has demonstrated a decline in HIV-2 and rising levels of HIV-1 (van der Loeff et al., 2007). By 1985, cases of HIV-1 were reported in Côte d'Ivoire, Benin, and Mali. Nigeria, Burkina Faso, Ghana, Senegal, and Liberia followed in 1986; Sierra Leone, Togo and Niger in 1987; Mauritania in 1988; The Gambia, Guinea-Bissau, and Guinea in 1989; and finally Cape Verde in 1990.

The pattern of spread in West Africa as detailed below in country-specific summaries resembles that of Eastern and Southern Africa, where the epidemic was driven initially by the core transmission groups of sex workers and their clients, with subsequent and broad penetration into the village and the household in a pattern characterized by higher rates in urban areas followed by centripetal spread into rural communities. This pattern has been driven by the ubiquitous regional migration of populations without borders in the region (Decosas & Adrien, 1997). For example, one study in Ghana linked high HIV rates (18.5% prevalence) among the Krobo ethnic group who lived near the Akosombo dam site to a failure of resettlement associated with construction of the dam, which prompted economically driven migration of sex work in a high-risk country, Côte d'Ivoire, and reintroduction into the country of origin, Ghana, upon return (Decosas, 1995). Because of displacement and lack of an appropriate economic plan, young people migrated temporarily to Cote d'Ivoire, where they acquired the virus; on return to Ghana, they became the foci for infection in their home community.

### Prevalence of HIV in West Africa

The HIV/AIDS epidemic in West Africa is a generalized one, with 2.6% of the 260 million people in the region infected with HIV (Table 12.1) (WHO, 2007). The highest prevalence rate in the region is in Côte d'Ivoire with a rate of 7.1%, accounting for 680,000 adult and 74,000 pediatric cases (UNAIDS, 2007a). Nigeria is second, with a prevalence of 3.9% based on Joint United Nations Programme on HIV/AIDS (UNAIDS, 2007e) reports, and a case number of

2,600,000 for adults and 240,000 for the 15-and-under age group, which dwarfs that of any country in the region and places it second in the world among countries. Senegal's prevalence of 0.9% is the lowest in the region and has remained stable for almost a decade (UNAIDS, 2007a). HIV prevalence rates in the remaining countries in the region vary between Côte d'Ivoire's high and Senegal's low.

Prevalence varies within countries as well, with urban rates generally higher than in rural areas. Based on Government of Nigeria statistics (Federal Ministry of Health, 2005), which are higher than those reported to UNAIDS (Table 12.1), the overall national prevalence is 4.4%, but regional prevalence ranges from 1.6% in Ekiti state to 10% in Benue state (Federal Ministry of Health, 2005). Higher prevalence rates are also seen among female sex workers and women. In Senegal, for example, where the national seroprevalence is less than 1%, prevalence among sex workers is nearly 20% (Wang et al., 2007). Women account for 57% of HIV/AIDS cases in West Africa, with 2.4 million of the 4.2 million adult cases (Table 12.1). Children under the age of 15 years account for 397,020 cases, representing 8.5% of the total 4.6 million cases in the region. Of the 4.2 million adult cases in the region, 724,700 (17%) are estimated to have clinical AIDS or a CD4 count $<200$ cells/$\mu$L, meeting the criteria for requiring antiretroviral therapy (ART). For children, 156,300 of the 397,020 (39%) are estimated to require ART (UNAIDS, 2007a).

### HIV Incidence in West Africa

In contrast to Southern Africa, where incidence rates of HIV often exceed 5 per 100 person years and higher (Humphrey et al., 2006), incidence rates in West Africa are generally in the 1–3% range, albeit with few publications reporting incidence rates. One study among pregnant women in Nigeria in 2006 reported that 2.1% experienced interval seroconversion during prospective follow up (Sagay et al., 2006). A similar rate of 2.48 per 100 person years was observed among controls in a Tenofovir prevention trial targeting high-risk women conducted in Ghana, Cameroon, and Nigeria in 2007 (Peterson et al., 2007). An open cohort study of professional and nonprofessional sex workers from Burkina Faso reported an HIV incidence of 3.2 per 100 person-years (95% confidence interval: 1.9–4.9) (Nagot et al., 2005). The incidence among high-risk women enrolled into a microbicide trial in Nigeria was approximately 1%, which likely represents the impact of intensive preventive education activities (Cates, unpublished data). A prospective cohort study of 752 HIV-negative high-risk Senegalese women reported in 2005 identified 26 incident infections, of which 23 were HIV-1 and 3 were HIV-2 (Sarr et al., 2005). The high HIV-1 incidence rate of 3.23 cases/person-years contrasts with the infrequent incidence of HIV-2, consistent with the more efficient transmission of HIV-1 compared to HIV-2.

### HIV-Associated Mortality

In 2005, it is estimated that 370,706 adults and children died in West Africa from HIV/AIDS (Table 12.1), many from AIDS-associated tuberculosis (TB). In West Africa, more women than men die from HIV/AIDS and they die at

**Table 12.1** HIV West African regional summary.

| Country | Adults infected 2005 | Women infected 2005 | Children infected 2005 | Prevalence rate adults | Number adult need ARV | Number children need ARV | Number adult and child death 2005 | Current living orphans | Total population in 2005 |
|---|---|---|---|---|---|---|---|---|---|
| Nigeria | 2,600,000 | 1,600,000 | 240,000 | 3.9% | 420,000 | 95,000 | 220,000 | 930,000 | 131,529,000 |
| Niger | 71,000 | 42,000 | 8900 | 1.1% | 12,000 | 3,500 | 7600 | 46,000 | 13,956,000 |
| Benin | 77,000 | 45,000 | 9,800 | 1.8% | 18,000 | 3,000 | 9600 | 62,000 | 8,439,000 |
| Burkina Faso | 140,000 | 80,000 | 17,000 | 2.0% | 25,000 | 5,700 | 12,000 | 120,000 | 13,227,000 |
| Togo | 100,000 | 61,000 | 9,700 | 3.2% | 18,000 | 3,500 | 9.100 | 88,000 | 6,145,000 |
| Ghana | 247,220 | 143,202* | 19.631 | 2.3% | 53,000 | 8,200 | 24,597 | 132,582 | 22,112,000 |
| Cote'D'Ivoire | 680,000 | 400,000 | 74,000 | 7.1% | 120,000 | 24,000 | 65,000 | 450,000 | 18,153,000 |
| Mali | 110,000 | 66,000 | 16,000 | 1.7% | 20,000 | 5,400 | 11,000 | 94,000 | 13,518,000 |
| Liberia | NA | NA | NA | 2–5% | NA | NA | NA | NA | 3,283,000 |
| Sierra Leone, | 43,000 | 26,000 | 5,200 | 1.6% | 7,400 | 1,900 | 4,600 | 31,000 | 5,525,000 |
| Guinea | 78,000 | 53,000 | 7,000 | 1.5% | 14,000 | 2,500 | 7,100 | 28,000 | 9,402,000 |
| Guinea Bissau, | 29,000 | 17,000 | 3,200 | 3.8% | 4,700 | 1,300 | 2,700 | 11,000 | 1,586,000 |
| The Gambia | 19,000 | 11,000 | 1,200 | 2.4% | 2,600 | 500 | 1,300 | 3,800 | 1,157,000 |
| Senegal | 56,000 | 33,000 | 5,000 | 0.9% | 10,000 | 1,800 | 5,200 | 25,000 | 11,658,000 |
| **Total** | **4,250,220** | **2,434,000** | **397,020** | **Average 2.6%** | **724,700** | **156,300** | **370,706** | **2,021,382** | **259,690,000** |

Source: UNAIDS, 2007a.

younger ages. In one hospital-based survey in Nigeria over a 3-year period published in 2006, 38.7% of deaths were due to HIV (Sani et al., 2006). A Senegal treatment study reported a first year on therapy death rate of 11.7% (95% CI, 8.9–15.3%), with most deaths attributable to mycobacterial infections, neurotropic infections, and septicemia (Etard et al., 2006).

## Modes of HIV Transmission

Heterosexual transmission accounts for approximately 80% of all HIV infections in West Africa and is as high as 90–95% in some locales (UNAIDS, 2006). A significant driver of this trend is transactional sex (Gomes do Espirito Santo et al., 2005). For example, in a study of the male population of Accra, Ghana aged 15–59 years, 84% of prevalent cases of HIV are attributable to sex with a sex worker (Cote et al., 2004). Coincident STDs, including HSV-2 (Nagot et al., 2005), are prevalent in this region and heighten the risk of transmission. Approximately 10% of all infections occur between mother and child either at birth or during the postpartum period with breastfeeding. Blood transfusion accounts for an additional 4–7% (Kehinde et al., 2004). Men who have sex with men (MSM) and injection drug users are recognized as risk groups but are not well studied because of stigma and fear of disclosure, so the true extent of HIV in these populations is poorly understood (Federal Ministry of Health, 2005).

An understudied but important source of infections are nonsterile instruments used in the hospital setting, by traditional healers, and in the context of traditional cultural practices such as circumcision of males, ritual scarification for spiritual atonement and health reasons (facial and body markings, which are common in West Africa, and differ from tribe to tribe and country to country), skin piercing, and female circumcision/genital mutilation (FGM). FGM is a cultural practice in which all or part of the female genitalia is removed by cutting. Sixty percent of all Nigerian women experience FGM and it is most common in the south, where up to 85% of women undergo it at some point in their lives (Federal Ministry of Health, 2005). FGM puts women and girls at risk of contracting HIV from unsterilized instruments, such as knives and broken glass that are used during the procedure.

## Contributing Factors in the Spread of Disease

### *Virologic Factors*

The epidemic in West Africa is complex because of the diversity of viral subtypes in the region with subtypes G and A and circulating recombinant forms, especially CRF02_AG, predominating. One recent analysis of interval seroconverters from Senegal found that HIV-1 CRF02_AG-infected women had a significantly higher mean viral load during the early stage of infection than did non-HIV-1 CRF02_AG-infected women, suggesting important implications for transmission and natural history (Sarr et al., 2005). Among interval seroconverters in Côte d'Ivoire, findings that median plasma HIV RNA level was high [4.6 log 10 copies/ml (IR, 3.8–4.9)] and median CD4 + cell count declined by 20 to 25/mm$^3$ per year, support the hypothesis that natural history among West African strains is more rapid (Salamon et al., 2002). Viral set point in a separate

cohort from Nigeria that is evaluating acute infection patients followed from before antibody development suggests a higher set point compared to a comparable cohort of acute infection patients infected with subtype B (Charurat, unpublished data). Interestingly, a prospective follow up of the Senegal sex worker study cohort reports that women infected with a non-A subtype were 8 times more likely to develop AIDS than were those infected with subtype A (hazard ratio=8.23; p=0.009), the predominant subtype in the study (Kanki et al., 1999).

Although these findings are preliminary, they do have important public health implications related to treatment and prevention. For example, decisions related to when to initiate HIV therapy based on CD4 level are based on subtype B studies, which assumes a relatively long median time from infection to disease occurrence. In a population with more rapid progression, an earlier intervention may have greater impact not only on preventing morbidity and mortality, but also on prevention. Selection of treatment regimen may also be influenced by subtype. One study of phenotypic analysis of CRF_02AG protease-recombinant viruses from Ghana demonstrated that Ghanaian proteases are differentially less susceptible to some protease inhibitors. This may be due to structural restrictions in the Ghanaian protease pocket (Kinomoto et al., 2005).

***Gender***

Women account for 57% of all adults living with HIV/AIDS in West Africa (Table 12.1). In addition to susceptibility associated with anatomic receptive status in sexual relations, women are vulnerable because of social and cultural factors. In many traditional societies in West Africa, women are placed in arranged marriages to older men, are engaged in polygamous marriage (common in Muslim and traditional cultures), must participate in wife inheritance (in which the widow, often infected by a husband who died from HIV, becomes the wife of the brother), are offered as a casual sexual partner by their spouse to friends for the evening, are subject to female circumcision (often with nonsterile instruments), are forced into dry sexual intercourse that facilitates genital injury, or are forced to undertake sex work because of reduced access to economic power (Orubuloye et al., 1992; Gausset, 2001).

Young women and girls are especially susceptible. HIV prevalence is two to six times higher in young women aged 15 to 24 than in men, who do not peak in infection rates until their mid 20s (UNAIDS, 2007a). Sex gender roles force young girls to marry older men at a young age when genital tract development favors heightened transmission. This cultural factor heightens male dominance over women and increases the risk of HIV infection given the demographics of high rates in young women and older males (Utulu et al., 2007). Societal beliefs that favor education of males can limit young women's access to education and vocational skills and lead them, as a survival strategy, to take on boyfriends to assist them with the purchase of food, clothing, and shelter.

Women of all ages have limited ability to influence condom use, which is unpopular because of, among other things, the high value placed on fertility and the association of condom use with sex work and lack of trust in a couple's relationship (Mill & Anarfi, 2002). The lowest rates of condom usage in West Africa are 12% among women in Mali, where a lack of female empowerment

is rooted in cultural tradition (UNAIDS, 2007d). Low rates of condom use in Nigeria, in the 45% range for women and 55% range for men, have been highlighted as an example of the need to promote female empowerment as a cornerstone of prevention (UNAIDS, 2007e).

***Sex Work***

Sex work is highly organized in Western Africa and caters to a broad range of society from those who frequent international hotels, brothels, and street walkers. Clientele include migrant herders, students, and laborers in urban areas displaced from their rural village. The driving force for sex work is economic, with some young women earning school fees, others supporting family members or as part of a local tradition earning a dowry. In some countries in the region, such as Nigeria, sex work is unlawful but openly and widely practiced, with over 1 million estimated in the trade in that country alone (Vandepitte et al., 2006). In other countries such as Senegal, it is legal but regulated, albeit with a substantial cadre of sex workers who are unregulated.

HIV infection rates among sex workers have been estimated to be as high as 60% or more in some areas, and numerous studies document the role of sex workers as a core transmission group (Dada et al., 1993). There are low levels of condom use among sex workers because of a lack of knowledge about HIV transmission and poor acceptance by male clients. For example, in a study carried out among sex workers in two urban areas in Cross River State in Nigeria, only 12.3% of respondents claimed regular use of condom with clients (Orubuloye et al., 1992).

***Migration in West Africa***

Regional trade and migration without regard to border is historically a way of life in West Africa. In 1975, a regional treaty, the Economic Community of West African States, established community citizenship and removed obstacles to the free movement of goods, capital, and people in the region. Since that time, people have migrated in response to demographic, economic, population, political, and environmental factors including population pressure, environmental disasters, poor economic conditions, conflicts, and the effects of macroeconomic adjustment programs. Migrants include temporary cross-border workers, seasonal migrants, clandestine workers, professionals, and refugees as well as sex workers, farm laborers, unskilled workers, and nomads. Since the mid-1980s, these migrations have fueled wide dissemination of HIV-1 and HIV-2 (van der Loeff et al., 2007; Russell & Teitelbaum, 1992; Lagarde et al., 2003; Pison et al., 1993).

Trade along historic nomadic routes, as well as via transregional highways such as between Nigeria and the Gold Coast, have proven to be an effective means of disseminating HIV across the region. Countries in the region with high HIV prevalence (with the exception of Senegal) also have the highest migration rates (UNAIDS/WHO, 2003). Twenty-five percent of the population of Côte d'Ivoire, which has the highest prevalence in the region, are migrants from other countries (Decosas & Adrien, 1997). Foreign migrants in the oil fields of Nigeria, for example, are often single men with high rates of sexual partner exchange and/or sex with sex workers (Nwauche & Akani, 2006). Long-distance drivers are another highly mobile high-risk group who traverse across multiple

borders in the region and contribute to the regional spread (van der Loeff et al., 2007). Truck stops along the major transportation routes provide wide access to sex work. Drivers move from rural to urban settings where they acquire HIV infection and, upon their return to their rural villages, introduce HIV infection into their households.

Female sex traders are another conduit for high-risk transactional sex, as sex workers often at a young age for economic reasons, migrate to urban areas where they acquire HIV infection and bring it back to the home setting. This urban–rural mobility pattern has been tracked in the centripetal spread of HIV from urban to rural areas in longitudinal studies (Decosas & Adrien, 1997).

***Conflicts and Wars***

Over the last 20 years, West Africa has had significant regional conflicts in Liberia, Sierra Leone, and Côte D'Ivoire, which have contributed to social destabilization and cross-border migrations that have further fueled the HIV/AIDS epidemic in the region (Decosas & Adrien, 1997). Women fleeing the conflict are forced to trade sex for food and protection for themselves and their children and, even when integrated into receiving communities, remain vulnerable to sexual exploitation. Soldiers engaged in peacekeeping activities in the region can serve as a bridging group, carrying HIV from war-torn countries back to their native countries. Further, HIV prevention services are not available in settings of civil conflict or refugees displaced by conflict.

***Orphans and Vulnerable Children***

It is estimated that over 2 million orphans whose parent(s) have died from HIV/AIDS reside currently in West Africa, with Nigeria and Côte d'Ivoire accounting for 68% of the regional total (UNAIDS, 2006). This increase in the number of orphans has strained traditional African cultural safety nets. While grandparents or more distant relatives have taken over the care of some children, child-headed households, sibling dispersal, migration, street children, and child labor are increasingly common. Such children have increased likelihood of physical, social, economic, and psychological morbidity and vulnerability to HIV infection, including sex work (International Labour Organization, 2003).

## Country-Specific HIV Epidemiology and Institutional Response

Of the countries in West Africa, only Ghana and Cape Verde have Human Development Index (HDI) scores (a comparative measure of life expectancy, literacy, education, and standard of living) that are not in the "low" category (bottom 30 of 177 currently ranked countries) (United Nations Development Programme, 2007). As such, West Africa is one of the poorest regions of the world. This poverty combined with a lack of health care infrastructure contributes to suboptimal health and societal responses to the HIV epidemic, although an infusion of resources through the Global Fund and PEPFAR are beginning to enhance the capacity to respond to the HIV epidemic, particularly in Nigeria and Côte d'Ivoire.

### Nigeria (0.448 HDI, Rank 159)

Nigeria, with 2.84 million people living with HIV/AIDS (PLWHA), has the largest epidemic in the region, the second-highest prevalence (3.9%), and an estimated 930,000 children orphaned by AIDS (UNAIDS, 2007a) (Table 12.1). The prediction of UNAIDS is that by 2010, Nigeria will have 5.5 million people living with HIV/AIDS and about 8.4 million by 2015 (UNAIDS, 2006). During the period from 1991 through 2005, there has been an almost fourfold increase in median HIV seroprevalence based on cross-sectional surveys of pregnant women, although prevalence rates have plateaued over the last several years. As shown in Figure 12.1, HIV-1 prevalence varies geographically, with highest rates reported in the southern states of Benue and Cross Rivers as well as the Federal Capital Territory, where the federal capital of Abuja is located. The lowest rates are reported mainly in the southwestern states, with rates of 2.0% or less. The large population center of Lagos has a rate of 3.3%, whereas the midbelt states harbor rates of 6–8% (Federal Ministry of Health, 2005). There are a number of possible explanations for this regional diversity. For example, the lower rates in the north may be linked to higher rates of male circumcision in the largely Muslim populations, while focal areas of high prevalence in the midbelt may be associated with higher prevalence of sex workers from this region coupled with low levels of education, which may result in low condom usage.

Within populations, certain groups have particularly high prevalence, such as sex workers (60.6%), sexually transmitted disease (STD) patients (21.2%),

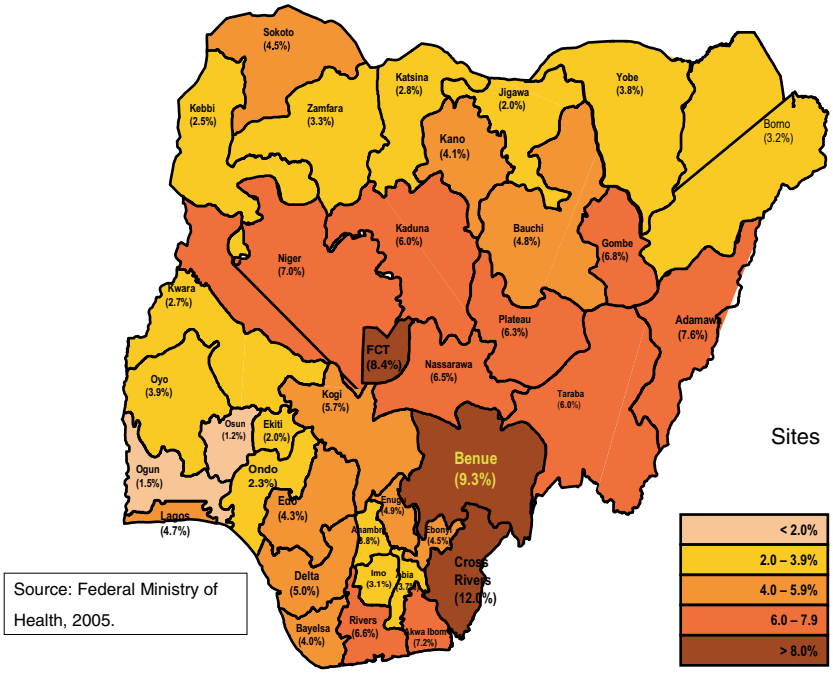


**Figure 12.1** Geographic Distribution of HIV in Nigeria
Source: Federal Ministry of Health, 2005.

and TB patients (16.2%) (Esu-Williams et al., 1997). As early as 1991, a rate of 12.3% was observed among sex workers in Lagos, underscoring the central role sex workers have played as a core transmission group in Nigeria (Dada et al., 1993). Population surveys have documented high rates of extramarital sex in the population and widespread polygamy in some regions, which further contributes to high-risk patterns of behavior. For example, in one 2003 national survey of 1,153 men and their wives, 11% of men reported extramarital sex in the previous year. Men with three or more wives had the greatest risk for extramarital sex with region of residence, religion, wealth, age at sexual debut, and self-perceived risk of HIV infection modulating rates of partner exchange (Mitsunaga et al., 2005). Mother-to-child transmission rates are also reported to be high, with one study reporting an overall rate of 22% (Audu et al., 2006).

The Nigerian government has responded to the HIV/AIDS epidemic by establishing important measures including the formation of the Presidential AIDS Council in 2000, which is chaired by the president and includes all major ministries, and the National Action Committee on AIDS in 2001, which coordinates the federal response and has support from development partners. The unequivocal stance of Former President Olusegun Obasanjo and his government that HIV causes AIDS had an undeniably positive impact in the fight against the epidemic, particularly in encouraging broad access to care (Zeitz & Frase-Blunt, 2007). Thirty-six state action committees are functioning and civil society organizations are actively participating in fighting the epidemic. As a PEPFAR "focus" country, Nigeria is also supported with substantial resources through the Emergency Plan, through both USAID and the U.S. Centers for Disease Control and Prevention (CDC). In Nigeria alone, over 75,000 individuals have been placed on ART through this program as of August 31, 2007 (PEPFAR, 2007).

### Niger (0.311 HDI, Rank 177)

With a 2005 HIV prevalence of 1.1% and 79,900 adults and children estimated to be living with HIV, Niger has the opportunity to take measures to keep prevalence low (UNAIDS, 2007a). A prior national population-based survey in 2002 to assess HIV prevalence in the population aged 15 to 49 years reported an adjusted prevalence of 0.87% (95% CI, 0.5–1.3%), with a significant difference between urban (2.1%) and rural (0.6%) rates and higher rates in women (1.0%) versus men (0.7%) (Boisier et al., 2004). HIV-1 accounts for 95.6% of infections; the remainder are HIV-2 (2.9%) or dual infections (1.5%) (Hemelaar et al., 2006).

Sex workers are an important core transmission group in Niger. A 2002 survey in Dirkou among sex workers, found that 50% (CI at 95%: 40.6–59.36%) were HIV positive and although knowledge was high (78.7% know at least one HIV transmission route and 76.9% knew at least one HIV prevention means), only 33.3% reported condom use (Boisier et al., 2004). Managing the spread of disease among this population will be a critical component in Niger's efforts to contain the epidemic.

Although it is one of the poorest countries in the world, Niger has demonstrated political commitment to HIV prevention by contributing financial resources and developing a plan that focuses on reducing stigma and protecting

the human rights of PLWHA; managing sexually transmitted infections (STIs); providing information, education, and communication activities; and caring for orphans.

### Benin (0.428 HDI, Rank 163)

The adult prevalence of HIV/AIDS in Benin is estimated at 1.8%, representing a total of 86,800 adults and children living with HIV (UNAIDS, 2007a). Although there are some areas with antenatal women having a prevalence between 3 and 5%, overall the prevalence is low, having fallen gradually from 4% (2001) to 2% (2005) (UNAIDS, 2006). As in other countries in the region, sex workers, who have an estimated seroprevalence rate of 55% based on a 300-person cohort from Cotonou, Benin reported in 2001, represent an important core transmission group (Lowndes et al., 2002).

Benin has integrated HIV/AIDS activities into its poverty reduction program and has set up a National AIDS Control Committee chaired by the Head of State. Benin developed a national strategy for the 2002 to 2006 period and has drawn up sectoral and departmental action plans for HIV prevention, although access to treatment is highly limited.

### Burkina Faso (0.342 HDI, Rank 174)

Current prevalence based on 2005 data is 2.0%, with 157,000 adults and children estimated to be living with HIV (UNAIDS, 2007a). Declining prevalence in HIV infection has been observed among antenatal women in Burkina Faso, where approximately 4% were infected in 2001 and 2% were infected in 2003 (UNAIDS, 2006). The reason for declining prevalence is not well explained because surveys continue to document risky behavior among core transmission groups (Sarker et al., 2005). As is the case for other parts of the region, rates are higher in women, in younger age groups, and among urban dwellers (Mishra et al., 2006). As in other countries, sex workers with coincident STDs are an important conduit for transmission (Latora et al., 2006).

### Togo (0.495 HDI, Rank 147)

With 109,700 adults and children with HIV infection, Togo has an overall HIV prevalence of 3.2% (UNAIDS, 2006). A national strategic plan has been developed with the involvement and commitment of all major interest groups. In the public sector, this includes education, health, military, police, youth, and sport ministries. Civil society, along with development agencies and the private sector, are also involved. Sectoral operational plans drawn up and budgeted in 2002 served as the basis for Togo's successful application to the Global Fund.

### Ghana (HDI 0.532, Rank 136)

The total number of adults and children in Ghana with HIV/AIDS is about 266,681 (UNAIDS, 2007a). Ghana has an overall (adult) HIV prevalence rate of 2.3%, with a downward trend from its peak of 3.6% in 2003 (UNAIDS, 2006).

The prevalence among pregnant women also declined from 3.1% in 2004 to 2.7% in 2005 (Duda et al., 2005). Among pregnant women, lower rates of infection have been found in the north and east and higher rates in the south and west where Ghana shares a common border with Côte d'Ivoire (Hemelaar et al., 2006). The Women's Health Study of Accra, a cross-sectional study of 1,328 women aged 18 years and older, reported an overall HIV prevalence of 3.1%, a prevalence of 8.3% among women aged 25–29 years and coincident STIs and high mean number of lifetime sexual partners as risk factors for infection (Duda et al., 2005). HIV was three times more prevalent among older age groups and married women than among single women.

Sex work is a driving factor for HIV transmission in Ghana. Among 1,013 sex workers in Accra, overall prevalence was 49.9%, varying from 26% among street walkers/bar girls to 74% among brothel-based sex workers (Samoah-Adu et al., 2001). This is likely due to the fact that brothel-based sex workers tend to have a higher level of sexual activity since street walkers/bar workers tend to be temporary/part-time sex workers. Prisoners have also emerged as a risk group. A 2006 study carried out among prisoners shows a prevalence of 19% among inmates and 8.5% among prison officers, with clinical presentation and stage showing recent infection for the inmates suggesting the possibility of incarceration acquired infection (Adjei et al., 2006).

The government's national strategic framework emphasizes preventing new infections; providing care and support to PLWHA; creating a social, legal, and political environment conducive to stemming HIV/AIDS; decentralizing implementation and monitoring; and evaluation of program implementation with research studies.

### Côte d'Ivoire (HDI 0.421, Rank 164)

Côte d'Ivoire has the highest HIV prevalence among adults in the West African region (7.1%) and, after Nigeria, the second highest number of adult and pediatric HIV/AIDS cases in the region (754,000) (UNAIDS, 2007a). Following a decline in prevalence rates in the late 1990s, the epidemic appears to have stabilized (UNAIDS, 2006). Among 36,442 antenatal women from Abidjan during the period between 1995 and 2002, prevalence decreased from between 14 and 15% in 1995/96 to 11% in 2002. The prevalence among 18- to 22-year-old women dropped from 15% in 1995 to 8% in 2002, whereas for older women it increased slightly or remained stable from 1995 to 1999 and decreased thereafter (Msellati et al., 2006).

Serial evaluation among sex workers in Abidjan also found declines in the prevalence of HIV infection from 89% in 1992 to 32% in 1998 as well as decreases in STIs among sex workers (Ghys et al., 2002). Declines in infection rates in both the general population as well as among sex workers appear to reflect increased condom use, especially among younger sex workers (Vuylsteke et al., 2003).

Côte d'Ivoire has responded to the HIV/AIDS epidemic by forming a team chaired by the Ministry for AIDS Control, which was established in January 2001. This team includes the government's Health and Defense ministries, bilateral and multilateral development partners, national and

international nongovernmental organizations (NGOs), and associations of PLWHA. Côte d'Ivoire was one of a handful of countries in this region to provide anitretrovial (ARV) access before the influx of funds from the Global Fund and PEPFAR.

As a PEPFAR "focus" country, Côte d'Ivoire is supported with substantial resources through PEPFAR's Emergency Plan, with the CDC spearheading U.S. government efforts there. The country had a 5-year (2001–2006) national strategic plan, which highlighted priorities including reducing the incidence of HIV/AIDS and STIs among youth, childbearing women (a drop in prevalence of HIV was demonstrated in a survey among pregnant women in antenatal clinics in Abidjan in 2006 (Msellati et al., 2006)), sex workers, migrants and truck drivers, new orphans, and vulnerable children. This plan emphasized strategies for condom promotion, management of psychosocial and medical care for PLWHA, improvement of the socioeconomic empowerment of PLWHA through community mobilization, and the promotion of income-generating microprojects for PLWHA (Ministry of Health, 2000). In 2005, Côte d'Ivoire, divided into two zones with United Nations forces to keep the peace, launched a national treatment access program supported by PEPFAR, which targeted 11,100 people to receive treatment.

### Mali (HDI 0.338, Rank 175)

There are an estimated 130,000 adults and children living with HIV/AIDS in Mali and approximately 1.7% of the population is HIV infected (UNAIDS, 2007a). Sentinel surveillance shows higher prevalence in urban areas and in areas bordering Burkina Faso and Côte d'Ivoire, as well as among sex workers (29.7%), truckers (4%), and older adults (1.7%) (WHO, 2007). In some parts of Mali, such as Segou, the prevalence in pregnant women was as high as 5.5% in 2002 (UNAIDS, 2006). Mali has responded to the epidemic with a multisectoral national strategic plan and important institutional reforms within the public, private, and civil sectors.

### Liberia (No HDI or rank Since 1993)

Liberia has an estimated HIV prevalence rate of 2.5% (UNAIDS, 2007a). With a life expectancy of less than 50 years, a literacy rate of less than 40%, a health infrastructure in ruins from prolonged civil war, and no sentinel surveillance system (United Nations Development Programme, 2006), Liberia has little information about its HIV/AIDS epidemic and faces the prospect of further spread of the epidemic because of population mobility and the lack of infrastructure. Nevertheless, with the recent establishment of an elected government, demonstrated commitment to addressing the issue through creation of a National AIDS Commission, and increased presence of international donors in country, a better understanding of the epidemic should be forthcoming in the near future.

### Sierra Leone (HDI 0.335, Rank 176)

Sierra Leone has a life expectancy of less than 35 years, a literacy rate of 36%, and has ranked last or second to last in the HDI for many years

(UNDP, 2007), all reflections of a prolonged civil war between 1991 and 2002. An estimated 48,200 adults and children are infected with HIV, giving a population prevalence rate of approximately 1.6% (UNAIDS, 2007a). Civil war also led to the displacement of more than 1 million people and the destruction of infrastructure. An ongoing context of poverty and gender-based violence has exacerbated the potential for an escalating epidemic. High HIV prevalence among combatants (more than 40%, according to one survey (UNAIDS, 2004)) poses an additional threat for the general population as soldiers are reintegrated into their communities. Sierra Leone's government in 2003 established a National HIV/AIDS Council with the President as Chairman and has inaugurated a Sierra Leone HIV/AIDS Response Project (National HIV/AIDS Secretariat, 2004), which is multisectoral and for which government has provided funding to line ministries to incorporate HIV/AIDS messages in their respective activities.

**Guinea (HDI 0.445, Rank 160)**

Guinea has a literacy rate of 41%, life expectancy of less than 50 years (UNDP, 2007), and a national HIV prevalence of 1.5% with 127,500 adults and children estimated to be living with HIV/AIDS (UNAIDS, 2007a). The prevalence of HIV infection in this population declined slightly from 1.87% in 1997 to 1.79% in 2000, with blood donors recruited from among the patients' family members (2%) and soldiers (3.72%) having higher rates of infection. Prevalence is considerably higher in urban areas and among vulnerable populations such as sex workers (42.3%), truck drivers (7.7%), soldiers (6.6%), and miners (4.7%) (UNAIDS, 2006). Various factors including political instability, population migration, and a culture of gender-based violence could individually or in combination accelerate the epidemic. The government of Guinea has adopted a multisectoral strategic plan for the 2003 to 2007 period.

**Guinea Bissau (HDI 0.349, Rank 173)**

With 32,200 adult and pediatric cases of HIV infection, Guinea Bissau had an estimated population HIV prevalence of 3.8% in 2005 (UNAIDS, 2007a). A study among 1,686 individuals over the age of 35 found HIV-1 prevalence to be 2.1% and HIV-2 prevalence to be 13.5% (Holmgren et al., 2003). Because of poverty and the hundreds of thousands of displaced persons and refugees in country, an up-to-date picture of the epidemic in Guinea Bissau is lacking and, within this context, HIV/AIDS has received less attention than other pressing health and security issues.

**Gambia (HDI 0.479, Rank 155)**

In this country, where nearly 60% of the population lives on less than USD 1 per day and life expectancy is less than 54 years (UNDP, 2007), HIV prevalence is estimated to be 2.4% and approximately 20,200 adults and children are living with HIV (UNAIDS, 2007a). There is heterogeneity in the country, with one rural area experiencing an unexplained fivefold increase in the numbers of individuals infected in six years (Schim van der Loeff et al., 2003).

Longitudinal analysis of HIV prevalence over a 16-year period (1988–2003) among patients attending the MRC research clinic shows a rising trend in HIV-1 infection rates from 4.2% in the 1988 to 1991 period to 17.5% in the 2001 to 2003 period. In contrast, prevalence of HIV-2 declined from 7.0% in the 1988 to 1991 period to 4.0% in the 2001 to 2003 period, demonstrating again how HIV-1 has eclipsed HIV-2 (van der Loeff et al., 2007).

Despite President Yahya Jammeh's belief in the efficacy of a homegrown remedy for HIV/AIDS consisting of a green topical herbal paste, a bitter yellow drink, and two bananas (CBS News, 2007), the Gambian government recognizes the need for a multisectoral approach to prevent further growth of the epidemic to ensure ongoing Global Fund donations (UNAIDS, 2006). The National AIDS Secretariat under the Office of the President coordinates the national response, while five Divisional AIDS Committees monitor local needs. Even though the Government has provided some limited funds through the Gambia Local Fund (UNAIDS, 2007c) for the National Response, most funding comes from other international Development Partners like the Global Fund; therefore, key health sector responses including ARVs are funded.

### Senegal (HDI 0.460, Rank 156)

Despite a relatively low overall national prevalence rate of HIV infection in Senegal of 0.9% with 61,000 individuals estimated to be living with HIV/AIDS, certain groups within Senegal are at higher risk (UNAIDS, 2007a). For example, in one study of unregistered sex workers who were interviewed in randomly selected establishments (official and clandestine bars, brothels and nightclubs), prevalence was: HIV-1, 6.0%; HIV-2, 3.6%; HIV-1+2, 0.4% (Laurent et al., 2003). Indeed, the driving factor for the epidemic in Senegal is sex work. MSM represent another important transmission group. In a study of MSM in Dakar, 21.5% were infected with HIV-1 and coincident STDs were frequent, as was bisexual activity, making this group an important core transmission group (Wade, 2005). While data on MSM from other West African counties is lacking, Senegal's more tolerant attitude that does not criminalize homosexual behavior, allows for the collection of information on MSM and some prevention activities. There are some geographic differences in the epidemic in Senegal, as the prevalence rate in the south of Senegal is twice as high as the national average. At the same time, differences in urban and rural HIV prevalence rates have not been observed.

Senegal's relatively lower population prevalence of HIV may be the result of a series of interventions by the government early on in the epidemic. Senegal's government implemented inclusive prevention programs that promoted condom use, encouraged counseling and testing, instituted education on HIV to sex workers, integrated HIV prevention into sex education, conducted comprehensive national surveillance to provide knowledge on the scope and spread of HIV, and instituted broad access to ART ahead of many regions throughout the world (Laurent et al., 2005), before receiving Global Fund and PEPFAR funds.

The Senegal response has been multisectoral, with religious leaders, private sector, and civil society organizations all involved.

### Cape Verde (HDI 0.722, Rank 106)

Cape Verde is a small country consisting of 10 primary islands and five islets. With an adult literacy rate of more than 75% and an average life expectancy of 70 years (UNAIDS, 2007a), it is significantly better off than other countries in the region. There has been no recent HIV/AIDS surveillance and thus the magnitude of the epidemic is poorly quantified. Given the large migration of its citizens because of a lack of employment opportunities within Cape Verde, there is a yet to be quantified pool of HIV at-risk persons.

The first case of HIV was detected in 1986; the government established the first response unit called the Action Group Against AIDS in 1987. With the support of UNAIDS, in 2001, a five-year National Strategic Plan Against AIDS was adopted by the government and stakeholders (Comité de Coordenação de Luta contra a SIDA, 2002). This strategic plan includes the following measures: control of STIs, prevention of mother-to-child transmission (PMTCT), surveillance, access to drugs, and care for PLWHA.

### Chad (HDI 0.368, Rank 171)

To the east of Niger, Chad transitions between West and Central Africa. It is briefly summarized here, although it is not officially part of the West African cluster. Chad is a poor country with a long tradition of domestic and cross-border migration, conflict, and political instability. Its overall prevalence of 4.8% masks wide variations within the country, where prevalence ranges from low levels in the north, to moderate levels in the center of the country, to high levels in the south (UNAIDS, 2007a). Along with migration and conflict, conditions contributing to a continued increase in HIV prevalence include the widespread practice of multiple sex partners, low condom use, female social and economic vulnerability, and limited access to health care and prevention services. The government has shown high-level political support for addressing the accelerating epidemic by earmarking new resources and committing to necessary reforms, particularly decentralization of the provision of services.

### Mauritania (HDI 0.486, Rank 153)

Mauritania, to the north of Senegal, is a transitional country to the North African cluster. Similar to countries in that region, it has a lower HIV prevalence rate (0.7%) (UNAIDS, 2007a). Although sentinel surveillance has not been established, a study of women attending antenatal clinics found no HIV at five sites and prevalence of 1% at three sites (UNAIDS, 2007b). A highly mobile male population combined with widespread denial could contribute to accelerating the epidemic, but the government has demonstrated awareness of these potential challenges and is providing leadership through the Ministry of Health.

## Prevention

### Promotion of Condom Use

A broad range of prevention strategies have been implemented in West Africa, including several interventions built upon pioneering data developed in the region (Leroy et al., 2003). With the support of international agencies and implementing partners, behavior change communication (BCC) based on the successful "ABC" (**a**bstinence, **b**eing faithful, and **c**ondom use) model implemented in Uganda is widely used in the region. Innovative strategies for BCC include media such as radio, television, and print media as well as culturally adapted approaches such as traditional folk media, which have been effective in translating complex prevention messages to an understandable format (Panford et al., 2001). The impact of BCC on condom usage in West Africa varies by country (UNAIDS, 2006) with representative rates shown in Figure 12.2 for several West African countries compared to other countries in Africa. For example rates of uptake as high as 50–65% in Burkina Faso, where it has been suggested that expanded condom distribution has helped to stabilize HIV rates in an urban setting (Meda et al., 2001). However as shown in Figure 12.2 condom utilization rates in countries of the region are below 50% and increased outreach to high risk groups and in the context of discordant couples for prevention for positives is needed.

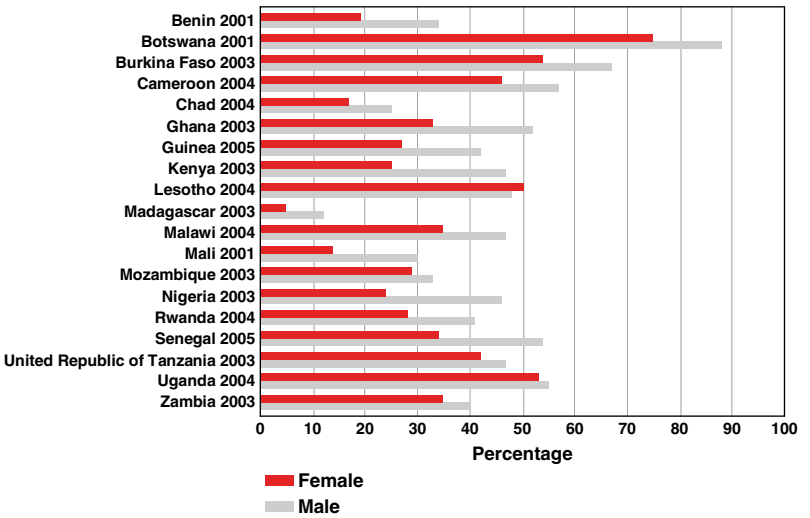


**Figure 12.2** Condom Usage with a non-regular partner, Sub-Saharan Africa, 2001–2005.

Sources: UNAIDS Demographic Health Surveys; HIV/AIDS Indicator Surveys (2001–2005) http://www.unaids.org/en/HIV_data/2006GlobalReport/press-kit.asp.

### Counseling and Testing

The advent of PEPFAR and Global Fund investments in the region (Table 12.2) has substantially increased the wide availability of HIV testing. Nigeria, for

**Table 12.2** Funding for HIV services – West Africa.

| Country | Global fund 2003-March 2007 $ Millions | World bank 2001-March 2007 $ Millions | PEPFAR 2004-2006 $ Millions | Country total $ Millions | Total infected Millions | HIV/AIDS dollars per infected person | Total population in 2005 | HIV/AIDS dollars per capita |
|---|---|---|---|---|---|---|---|---|
| Nigeria | 74.4 | 190.3** | 344.8 | 609.5 | 2.84 | $214.61 | 131,529,000 | $4.63 |
| Niger | 8.5 | 25.0 | 0 | 33.5 | 0.08 | $418.75 | 13,956,000 | $2.39 |
| Benin | 39.0 | 58.0 | 0 | 97.0 | 0.09 | $1077.78 | 8,439,000 | $11.55 |
| Burkina Faso | 10.6 | 74.7 | 0 | 85.3 | 0.16 | $533.13 | 13,227,000 | $6.46 |
| Togo | 25.7 | 0 | 0 | 25.7 | 0.11 | $233.64 | 6,145,000 | $4.21 |
| Ghana | 45.8 | 45.0 | 0 | 90.8 | 0.25 | $363.20 | 22,112,000 | $4.11 |
| Cote'D'Ivoire | 51.0 | 0 | 115.3 | 166.3 | 0.75 | $221.73 | 18,153,000 | $9.19 |
| Mali | 23.5 | 25.5 | 0 | 49.0 | 0.13 | $376.92 | 13,518,000 | $3.36 |
| Liberia | 19.7 | 0 | 0 | 19.7 | NA | NA | 3,283,000 | $5.97 |
| Sierra Leone, | 8.6 | 15.0 | 0 | 23.6 | 0.05 | $472.00 | 5,525,000 | $4.29 |
| Guinea | 9.7 | 20.3 | 0 | 30.0 | 0.09 | $333.33 | 9,402,000 | $3.19 |
| Guinea Bissau, | 1.2 | 7.0 | 0 | 8.2 | 0.03 | $273.33 | 1,586,000 | $5.13 |
| The Gambia | 14.6 | 15.0 | 0 | 29.6 | 0.02 | $1480.00 | 1,157,000 | $25.50 |
| Senegal | 8.8 | 30.0 | 0 | 38.8 | 0.06 | $646.67 | 11,658,000 | $3.33 |
| **Regional Total** | **290.3** | **505.8** | **460.1** | **1,307.0** | **4.66** | **$280.47** | **259,690,000** | **$5.03** |

Source: Adapted from The World Bank's Africa Region HIV/AIDS Agenda for Action 2007–2011
{http://siteresources.worldbank.org/EXTAFRREGTOPHIVAIDS/Resources/WB_HIV-AIDS-AFA_2007-2011_Advance_Copy.}
** Includes an additional $50 million awarded July 2007.

example, has seen, over an 18-month period, the administration of more than half a million HIV tests with results given to clients. Expansion of HIV testing has been driven by community-based programs for PMTCT, where rates of acceptance have been high even in the absence of expanded treatment access programs (Sarker et al., 2005). There are important barriers to testing, however, particularly related to fear of stigma, matrimonial disharmony, the incurable nature of the disease and the cost of treatment (Iliyasu et al., 2006; Pignatelli et al., 2006). The advent of expanded treatment may mitigate some of these concerns.

Other issues have affected the successful implementation of testing programs. Programs that require clients to return for a second visit to obtain results, for example, are associated with a 30–40% rate of failure to receive results. This problem has been improved by employing on-the-spot rapid testing and results reporting, such as that implemented in Nigeria (WHO, 2004). Additionally, there are many barriers to translating a positive test into effective response, particularly given negative attitudes from medical staff toward HIV result and disbelief among clients that the test result is truly positive (Painter et al., 2004). The issue of mandatory versus voluntary testing has also arisen in West Africa. Mandatory testing in southeastern Nigeria promoted by certain religious communities, for example, identified significant rates of infection but also raised issues of social stigmatization and infringement of human rights (Uneke et al., 2007).

### Prevention of Maternal to Child Transmission (PMTCT)

One of the major contributions of West African science has been pioneering research demonstrating the efficacy of short-course ART in the pre- and perinatal period (Jamieson et al., 2003). These findings and those from groups in the United States, East Africa, and Thailand have underscored the importance of routine HIV testing of pregnant women and access to preventive ART. Difficulties with translating these findings to the provision of care, however, remain. In one example from Nigeria, while 127,000 women were tested between October 2005 and March 2007, only 4,221 out of the 6350 HIV positive mothers (67%) received a complete course of ARV prophylaxis (Osotimehin, 2007). These data illustrate one of the major challenges of PMTCT implementation, the ability to link HIV positive women to preventive intervention and HIV care. This problem is amplified by the fact that most women in West Africa do not give birth at medical facilities, preferring community midwives and traditional birth attendants, where even if tested they do not access antiviral preventative prophylaxis. A goal of PMTCT in West Africa is to improve the cascade of PMTCT services down to the community level where the impact will be greatest.

There is also a need for interventions that address postnatal exposure through breast milk transmission. For example, in one analysis of breastfeeding HIV-1 seropositive women enrolled in trials at Abidjan, Côte d'Ivoire and Bobo-Dioulasso, Burkina-Faso, the risk of postnatal transmission was similar (9.8%) among 15-month-olds who had been PCR negative at 1 month of age as among babies who were PCR positive at birth (Leroy et al., 2003).

Concerns about not breastfeeding can be linked to worries about self disclosure of status, a cultural bias that favors breast feeding, and infrastructure challenges that make safe water for formula a major challenge. A prospective cohort study sponsored by the Bill and Melinda Gates Foundation through the Harvard AIDS Prevention project in Nigeria found high rates of infant mortality among children receiving breast milk substitute, a trend that challenges the cost and benefits of this intervention compared to exclusive breast milk feeding (Abimiku & Charurat, unpublished data). This finding paralleled recent experiences in Botswana, where the decision to implement universal breast milk substitution among HIV-infected mothers was reversed because of high infant mortality due to infant diarrhea and infection from unhygienic water used for preparing formula (Timberg, 2007). The high costs of replacement foods and fuel for cooking, unreliable electrical power, poor access to safe water, and storage facilities represent additional barriers (Abiona et al., 2006).

### Transport Routes and HIV Transmission

Given strong evidence that links transport routes to the spread of HIV, the Africa Region Transport Group was the first World Bank region to include HIV measures in its road operations as a means of addressing the impact of increased mobility of passengers and operators across borders. In West Africa, the coastal transport corridor that runs from Lagos through Benin, Togo, and Ghana to Côte d'Ivoire is estimated to transport approximately 3 million individuals annually. The World Bank–funded Cross-Border project along the Abidjan-Lagos corridor was inaugurated in December 2003. The project is working to reduce the spread of HIV/AIDS among transport workers, migrants, sex workers, and local people living along the corridor by complementing national AIDS programs in Côte d'Ivoire, Ghana, Benin, Togo, and Nigeria. The project focuses on HIV/AIDS prevention, treatment, and care services in border towns and communities in this subregion of western Africa. The project demonstrates innovative ways to limit HIV transmission along transport corridors by balancing multisector/multicountry challenges and by making transnational cooperation more effective to compensate for the lack of regional and institutional capacity.

## Care

Of the 4.2 million adult cases in the region, 724,700 individuals (17%) are estimated to have clinical AIDS or a CD4 count $<200$ cells/$^{\mu}$L, meeting the criteria for requiring ART. In children, 156,300 of the 397,020 infected (39%) are estimated to require ART (Table 12.1).

### AIDS and Opportunistic Infections

The spectrum of AIDS-defining illnesses in West Africa is broad and typical of those reported in other sub-Saharan African studies. For example, in Nigeria 68% of HIV-infected patients admitted to one university teaching hospital over a 2-year period had a variety of HIV-associated diseases including TB, HIV-encephalopathy, fungal meningitis, cutaneous Kaposi sarcoma, and pulmonary candidiasis (Salami et al., 2006).

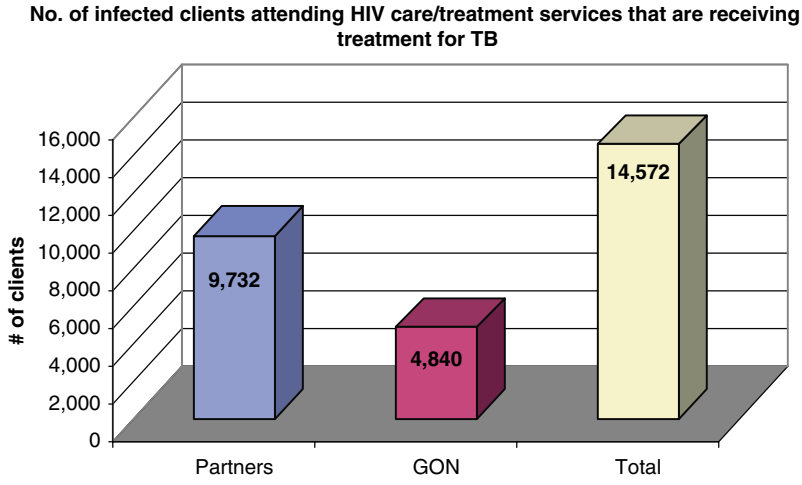


**Figure 12.3** HIV Clients Receiving Treatment for TB.
Source: B. Osotimehin, NACA, October 2005–March 2007.

TB is the leading opportunistic infection (OI) in West Africa, with between 40 and 60% of immunocompromised HIV-positive patients also infected with TB. Nigeria has the fourth highest number of TB cases in the world and the largest number of cases in Africa (WHO, 2006a). HIV has greatly accelerated the TB epidemic and contributed to increased mortality and a TB control program that is losing ground in achieving treatment success. HIV has greatly increased the prevalence of active TB but case detection has not increased, especially because only 50% of HIV/AIDS cases are smear positive and there is a near absence of x-ray facilities, even in secondary health facilities (Figure 12.3).

Positive HIV status is a significant risk factor for default from TB directly observed therapy, which underscores the importance of integrating TB and HIV care programs (Daniel et al., 2006). The magnitude of this problem is highlighted by the observation in Nigeria that only 12% of >120,000 patients on ART in Nigeria are receiving treatment for TB. This scenario is likely the same for other West African countries, a gap that is a major focus of the Nigerian Strategic Framework (World Bank, 2007a). Diagnosis of multidrug resistant TB and extremely drug resistant TB which have been widely observed in South Africa are not yet well documented in West Africa. An infusion of PEPFAR and Global Funds are upgrading TB diagnostic facilities in Nigeria to bring this capacity on line and, given the status of current TB indicators (Figure 12.3), it is likely that drug resistance will be found.

### Integrated Management of Adult Illnesses (IMAI)

The infusion of PEPFAR and Global Fund investments in West Africa has led to the rapid scale up of treatment and care services. Most governments in the region have now adopted Integrated Management of Adult Illness (IMAI) as the public health platform for improving access to care and treatment. Health and community workers are trained on the general principle that good chronic

care applies to all chronic diseases. This ensures a capacity to manage a range of conditions in addition to HIV/AIDS (Diallo et al., 1993). The synergy of ARV scale up and OI prophylaxis, for example, leads to significant cost savings (Nombela et al., 2006) and can have significant positive impacts on life expectancy.

IMAI also strengthens health systems by establishing "district networks" that enable efficient referrals between levels of the health system, as well as case discussion during on-site visits by physician mentors (WHO, 2006b). The IMAI approach empowers clinical officers and nurses to take up simplified case management and promotes the expansion of clinical teams to include trained PLWHA in the role of counselors and treatment supporters. These steps increase the number and range of providers, improve links with the community, and contribute to more robust primary care.

***IMAI in Senegal***

Senegal, where HIV prevalence is as high as 2.8% in rural regions, has employed the IMAI model. The country has been able to expand access to HIV care and treatment from six sites in 2001 to 32 sites in 2005, which has greatly reduced the distance that people must travel for health care. HIV treatment regimens have been standardized and simplified, laboratory equipment has been purchased to monitor CD4 cell counts, and nurses have been trained to take over from physicians the routine tasks of treatment and monitoring. To support this task-shifting, every day in each of the country's 11 regions, a physician-mentor is on call (by phone or e-mail) to address urgent questions from nurses in district clinics and health posts. This public health approach has helped Senegal to extend ART to hard-to-reach parts of the country and to provide treatment to 4,200 people by the end of 2005. However, given that twice this number are estimated to require therapy, further expansion of this approach as well as expanded outreach to hard-to-reach and marginalized populations is required to achieve complete coverage. Additional challenges revolve around the 50,000 infected who do not require treatment but must be accommodated into care structures that optimize OI prophylaxis, as well as access to laboratory infrastructures needed to support patient diagnosis and monitoring.

***IMAI in Nigeria***

The Government of Nigeria has adopted the IMAI strategy as its national policy, having recognized that its ART scale-up program was limited to a few urban-based University Teaching Hospitals in a country where 60–70% of the population are rural dwellers. While this policy has been in place since 2005, translation of scale up of HIV/AIDS services through decentralization, standardization, and integration of service delivery has been slow because there is a disconnect between these Federal University Teaching Hospitals and the largely state-run network of specialists and general hospitals, which are linked in turn to community health centers. Effective implementation is further negatively impacted by the degradation of capacity at the general hospital and community health center, which were not financially supported during the period of military dictatorship in the 1990s. Thus, while Nigeria is piloting the rollout for training of health personnel, who will form the bulk of trainers for a national scale up, structural issues remain a barrier. To help develop this capacity, the Institute of

Human Virology Nigeria (IHV-Nigeria), a University of Maryland implementing partner, is working with the health education establishment in Nigeria to develop a certification for nurses in HIV care and treatment, which will promote the core personnel for the ultimate scale up. Additionally, IHV-Nigeria is developing a PEPFAR clinical training center at University of Abuja Teaching Hospital to model elements of the IMAI in order to demonstrate feasibility and develop best practices for the Nigerian health care system. UNAIDS is also promoting the Universal Access package for specific states in Nigeria (WHO, 2006b).

### ART Scale up in Nigeria

In 2003, Nigeria was the first country in West Africa to implement a large ART scale up. Nigeria's ambitious program engaged 25 centers and targeted 10,000 adults and 5,000 children. While the program ultimately did enroll over 8,000 adults, program management suffered from drug stock-out and fees associated with the program largely excluded the poor (Okoli et al., 2006). While the country recorded success in the development and reasonable dissemination of guidelines, the demand for services overwhelmed capacity. There was inadequate human, technical, and institutional capacity in terms of infrastructure, staff, equipment, and supplies for ART services.

Interventions from bilateral and multilateral agencies such as PEPFAR, the Global Fund, and the World Bank resulted in a dramatic increase in points of service and more importantly a significant improvement in quality of services. This improvement was brought about by the substantial technical assistance offered by IHV-Nigeria's AIDS Care and Treatment in Nigeria (ACTION) and other PEPFAR programs. For example, the ACTION program built a national PEPFAR laboratory training laboratory at Asokoro Hospital in Abuja that has provided training for hundreds of laboratory personnel and implemented a model quality control, quality assurance program. Between October 2005 and March 2007, 120,220 patients were placed on ART in Nigeria, with 73,900 on therapy through the PEPFAR program and 46,320 through Government of Nigeria programs largely funded by the Global Fund, with a portion coming through direct funding from the government. This program abolished fees and is rapidly expanding to secondary and primary care venues within the IMAI paradigm.

## Funding the Fight Against HIV/AIDS in West Africa

### The World Bank

The World Bank has been supporting HIV/AIDS efforts through grants and interest-free loans since 1986. The Multi-Country AIDS Program (MAP) in Africa (launched in 2000) aims to increase access to HIV/AIDS prevention, care, and treatment programs, while emphasizing vulnerable groups (such as youth, women of childbearing age, and other groups at high risk) (World Bank, 2007b). The specific development objectives of each individual country project, as stated in the national strategic plans, provide the basis for this program and are agreed upon at the time of appraisal of the national projects. A key feature of

the MAP is direct support to community organizations, NGOs, and the private sector for local HIV/AIDS initiatives. MAP activities are currently being implemented in the West African region in Benin, Nigeria, Ghana, Burkina Faso, Côte d'Ivoire, Senegal, Sierra Leone, Niger, Mauritania, Mali, Guinea Bissau, and Cape Verde.

### The Global Fund to Fight AIDS, Tuberculosis and Malaria

The Global Fund was started in 2001 to coordinate international funding from members of the G-8 world economic powers and private contributions; it has committed $5.4 billion, with 57% of this going to HIV/AIDS projects (The Global Fund, 2007). Approximately 60% of the Global Fund's grants have been directed towards Africa (Table 12.2). The Global Fund makes grants to a prime recipient, usually a government agency who in turn makes awards to subrecipients in country, which include the Ministry of Health and other agencies such as the National Action Committee on HIV/AIDS (NACA) in Nigeria. An independent oversight body, the Country Coordinating Mechanism, reviews the proposed implementation and monitors achievement of milestones.

### PEPFAR

In January 2003, United States President George W. Bush announced the "President's Emergency Plan for AIDS Relief" (PEPFAR), asking the U.S. Congress to commit USD 15 billion over 5 years (U.S. fiscal years 2004 to 2008) to international HIV/AIDS, TB, and malaria efforts, with the goal of treating 2 million people with HIV/AIDS, preventing 7 million new infections, and providing care for 10 million infected and affected. This program has recently been reauthorized and expanded to USD 30 billion over the next 5 years. The program is unique in its targeting of funds to specific purposes by legislative mandate [Treatment (55%), Prevention (20%), Palliative care (15%), and Care for orphaned and vulnerable children (10%)] and by an implementation approach that engages organizations such as universities and other international groups to directly engage in program implementation by providing strong technical assistance and direct engagement in capacity building (Office of the United States Global AIDS Coordinator, 2007). The PEPFAR program is directed by U.S. in-country representatives of the Department of State and the Department of Health and Human Services and is closely aligned and coordinated with the goals of the national strategic plan. In the West African region, PEPFAR is supporting HIV/AIDS control activities in both Côte d'Ivoire and Nigeria.

### The United Nations

Numerous entities within the United Nations system carry out HIV/AIDS activities in West Africa. These activities are coordinated by UNAIDS through a central Secretariat. Each entity provides varying levels of project assistance to countries and a significant amount of technical assistance. The World Bank is one of these entities and it provides significant direct project support. In particular, the World Bank's Regional Support Team (RST) in Dakar, Senegal and the Country and Regional Support Department of UNAIDS Geneva provide

technical and financial support to countries in this region towards scaling up, including the finalization of target setting and planning processes. In addition, the RST will also continue to work with the regional civil society networks in West Africa to empower their respective member organization networks to play their roles in the national AIDS response and to help them identify more effective means of communication and representation at key regional and global fora and institutions.

### Three Ones

The increased flow of resources into developing countries to address the HIV/AIDS pandemic highlights the need for effective coordination of activities in order to prevent waste and the duplication of activities of various implementing partners. This concern led UNAIDS to begin promoting, in 2004, the principle of Three Ones (UNAIDS, 2007f). Within this principle, which has since been adopted across the countries of West Africa, each country has: (1) one agreed HIV/AIDS Action Framework which provides the basis for coordinating the work of all partners, (2) one National AIDS Coordinating Authority (e.g., NACA in Nigeria) with a broad-based multisectoral mandate, and (3) one agreed upon country-level Monitoring and Evaluation System.

### The Limits of Funding

Despite the generous donations of these organizations and efforts to manage and distribute funds wisely, significant challenges remain. Given limited internal resources, the bulk of funding for implementing strategic plans for countries in the West African region comes from funding from the international community, particularly the World Bank, the Global Fund, and PEPFAR. As summarized in Table 12.2, over USD 1.3 billion have been invested in West Africa since 2001 through these three programs. This translates to an average of USD 70 per year per person infected with HIV in the region. Given that the costs of HIV drugs are, at best, approximately USD 140 per year for infected persons (Huff, 2007) and that patient management costs for physicians and laboratory services are an additional USD 200 per patient per year (Kombe et al., 2004), this total falls far short of the need. Beyond these costs are the costs for expanded HIV testing as well as the cost for prevention and behavioral change campaigns. As a consequence, a much-expanded investment will be needed in this region to implement a comprehensive HIV/AIDS program.

## Next Steps; The Nigerian Example

As noted above in the country-specific summaries, each government in the region has mounted some sort of organized and coordinated national response, even countries that are engaged in or recovering from protracted and violent civil disturbances. These responses, which seek to partner governments, NGOs, and international agencies and donors to address the HIV/AIDS epidemic, are beginning to identify strengths and weaknesses in their existing responses and important next steps.

Nigeria provides a good regional example of a country undergoing this process. In 1999, after a decade and a half of military dictators and the devolution of its healthcare structure from one of the best in Africa to one with a crumbling infrastructure, Nigeria had the second highest number of prevalent cases of HIV/AIDS in the world (Table 12.1). The return of democracy in 1999 was associated with the formation of a Presidential AIDS Council and in 2000, the establishment of NACA. By 2002, President Olusegun Obasanjo was one of the first African leaders to unequivocally identify HIV as the cause of AIDS, an important response in light of the forceful statements by President Thabo Mbeki of South Africa denying this linkage (Schneider & Fassin, 2002).

Nigeria's progress is best captured by its National Strategic Framework (NSF), which was developed with substantial public discussion by all HIV/AIDS stakeholders including the government, the people from the six geopolitical zones of Nigeria, and Nigeria's international development partners (World Bank, 2007a). Highlighting the essentials of this document, Nigerian President Olusegin Obasanjo stated:

> I believe this NSF 2005–2009 is a good Plan due to the detailed attention paid to the interplay between gender and HIV. [Especially] The specific attention and focus on women, youth and specific groups as well as its many innovative strategies... (World Bank, 2007a)

The NSF targeted prevention of new infections through behavior change, universal access to care, treatment and support, and a national strategy for self sufficiency through research, new technologies, and local manufacture of commodities.

The 2005 NSF report also highlighted current concerns in the fight against HIV/AIDS. The report noted that women younger than the age of 24 years had a prevalence rate of 6%, making them a particularly vulnerable group. The report also observed that prevention education programs in Nigeria had not translated into effective behavior change, as evidenced by low condom usage, widespread stigma, and discrimination against PLWHA including among health workers, as well as the persistence of cultural practices and traditions that place women at risk (World Bank, 2007a). Suboptimal access to and uptake of HIV counseling and testing and the failure of PMTCT services to adequately bring HIV-positive women to care were also identified. National rollout of policies and guidelines including those for PMTCT, blood safety, and home-based care have been poorly integrated on a national scale, and there is inadequate human and technical expertise, inadequate institutional capacity, and an infrastructure that limits capacity to manage the complexities of HIV/AIDS disease.

These findings led the Nigerian government to adopt a series of objectives that they hope to achieve by the year 2009 (World Bank, 2007a). These include: improving the coordination and efficiency of resources so that the rate of program implementation can increase by 50% from its 2005 level; having 95% of general and at-risk populations adopt appropriate behavioral changes (safe sex, abstinence, etc.); increasing access to comprehensive gender sensitive prevention and care; 100% implementation of the national monitoring and evaluation plan; and improving the policy environment (policies, guidelines, legislations)

such that safer sex practices are encouraged, stigma is reduced, and rights of women and PLWHA are promoted.

## Threats and Opportunities

Expanded access represents the largest and most unique public health program ever attempted. It applies public health approaches to a complex medical problem caused by an incurable chronic virus infection, employing often toxic therapies in the face of a rapidly mutating virus prone to irreversible drug resistance. Unlike other public health programs in which program guidelines are well established, public health and clinical guidelines for combating HIV/AIDS continue to rapidly change in the face of new evidence. The cost effectiveness of this scale up has been clearly established (Goldie et al., 2006). The challenge remains, however, to develop a sustainable program that not only empowers countries of the region with long-term indigenous capacity, but also employs evidence-based strategies to define best practices. These best practices must ensure that therapy is available universally at all levels of the health care system, and that patients with highly complex medical diseases and complications are optimally managed.

The major threat to sustainability, beyond the daunting task of overcoming the limitations of faltering health care delivery systems, is to ensure that quality is at the core of program implementation. Quality is measured not only in the metrics of numbers achieved, but more importantly in the metrics of successful treatment that ensures seamless linkage from testing to care, from care to treatment, and then on to lifelong efficacy. At the heart of lifelong efficacy is the avoidance of treatment resistance and the medical consequences of treatment side effects, which are emerging after 10 years in the U.S. and Europe as major causes of morbidity and mortality in an aging HIV-treated population. The first step is effective treatment adherence because without adherence, drug resistance irreversibly develops and converts a manageable public health challenge into a public health disaster that could have been avoided. Salvage therapy is not a sustainable option. The seeds of failure are already present in the rates of treatment failure noted in early evaluation studies from West Africa (Idigbe et al., 2005; Laurent et al., 2005).

The second step is to ensure that there is sufficient investment in all phases of the program, but particularly in the development of high-quality medical services at all levels of the health care continuum. At the core of future sustainability is research funding, which is urgently needed to develop best practices based on scientific information and not opinion, to provide unvarnished assessments of where and why programs are succeeding or failing, and to translate these findings into quality improvements in public health practice. Expanded investment in prevention research to better integrate the benefits of testing and treatment into prevention theory are vital. Research to better understand the complexity of the TB–HIV interface is needed given the tight linkage of these dual epidemics. Sites engaged in expanded access provide robust infrastructures for testing new therapeutic approaches and provide ideal venues for efficacy trials of vaccines and other

preventative modalities. West Africa must continue to be at the forefront of this research effort as the fruits of expanded access are rapidly scaled in the region.

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# Chapter 13

## East Africa – Kenya, Tanzania & Uganda

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_13, 

## Introduction

The East African countries of Kenya, Tanzania and Uganda have been at the forefront of the HIV epidemic since the first cases of AIDS were reported in Rakai district in southwestern Uganda in 1982 (Serwadda et al., 1985), and in Kagera region in northwestern Tanzania in 1983 (Fothal et al., 1986).

In 2006, an estimated 3.7 million people in the region were living with HIV, corresponding to a national prevalence of 6–7% (UNAIDS, 2006). At times, each country has seen dramatically high prevalence of HIV, reaching up to 30% among women in some regions (Buve et al., 2001a; Jordan-Harder et al., 2004; Kilian et al., 1999) but there is striking variation in the dynamics of the epidemics and access to HIV-related services and treatment, reflecting differing national HIV control strategies.

Uganda declared AIDS to be a national problem in 1986 and reductions in HIV prevalence started in the late 1980s, and have largely been sustained since, demonstrating the importance of strong political leadership, widespread community mobilization, and active non-governmental organizations (NGOs). In contrast, both Kenya and Tanzania did not declare HIV to be a national disaster until 1999 (Cheluget et al., 2006; Garbus, 2004). Prevalence in Kenya has now started to decrease (Cheluget et al., 2006), but there is little evidence of this in Tanzania (Swai et al., 2006).

All three countries have made remarkable contributions to HIV research, changing global health policy with a series of landmark studies, including randomized controlled trials (RCTs) of nevirapine to prevent mother-to-child transmission (PMTCT), and to evaluate the impact of treatment for sexually transmitted diseases (STDs) and male circumcision on HIV incidence. Uganda has led provision of antiretroviral therapy (ART) in sub-Saharan Africa with early advocacy for reduced prices and development of the infrastructure necessary for administering them.

In this chapter we summarise the epidemiology, prevention policies and access to treatment and care in this relatively small region that has contributed so much to the fight against HIV/AIDS.

## Epidemiology

### Social Context of the HIV/AIDS Epidemic

These three East African countries gained independence in the early 1960s. Tanzania and Kenya had stable periods of economic growth until the 1970s when economic crises led to decreased health care expenditure in the early 1980s and a subsequent increase in morbidity and mortality (Kapiga & Lugalla, 2002). Structural adjustment policies adopted in both countries in the mid-1980s led to the introduction of user fees for health facilities and increased involvement of private health care providers. For the majority of people, the result was a reduced ability to afford adequate health care, just as the HIV epidemic was spreading.

Uganda underwent a very different post-independence history, with a series of civil conflicts. These resulted in poorly functioning health care systems, illustrated by a fall in immunization rates to below 20% by the early 1980s.

In 1986, President Yoweri Museveni came to power and the ensuing political stability encouraged international donors to restore the health system. However, as with Tanzania and Kenya, the Ugandan government also implemented structural adjustment policies, with a subsequent reduction in government spending on public services.

Socio-demographically, the countries border Lake Victoria and are characterized by a mix of ethnic and language groups, and major transportation routes such as the trans-Africa highway from Mombasa to Kampala. All are categorized as low-income countries, and are among the 35 poorest countries in the world, with per capita gross national income (GNI) below USD 500, an average life expectancy of around 50 years, and infant mortality around 80 per 1000 live births (Table 13.1).

### Early Spread of HIV in the Region

The first cases of AIDS in the region are believed to have occurred in Uganda, on the shores of Lake Victoria during the late 1970s (Uganda AIDS Commission & UNAIDS, 2000). The first reported cases of the disease (then called Slim disease) were reported in Rakai district in southwestern Uganda in 1982 (Serwadda et al., 1985), and in neighboring Kagera region in Tanzania in 1983 (Fothal et al., 1986; Killewo et al., 1990). The early deaths from AIDS in this region were associated with local fishermen, traders dealing in household goods, business and professional people (Obbo, 1993), followed by migrant workers and sex workers. HIV prevalence among sex workers increased rapidly leading

**Table 13.1** Development indicators in East Africa, 2004–2005

| | Kenya | Tanzania | Uganda |
|---|---|---|---|
| Population (millions) 2005 | 34.3 | 38.3 | 28.8 |
| Population growth | 2.1% | 2.0% | 2.9% |
| Adult literacy rate | 74% | 69% | 69% |
| GNI per capita (US$) 2004 | 460 | 330 | 270 |
| GDP per capita (US$) 2004[1] | 1586 | 732 | 1088 |
| Per capita total expenditure on health (US$) | 20 | 12 | 18 |
| Per capita government expenditure on health (US$) | 8 | 7 | 5 |
| Fertility rate (births per woman) | 5.0 | 4.8 | 7.1 |
| Life expectancy at birth (males) | 51.0 | 47.0 | 48.0 |
| Life expectancy at birth (females) | 50.0 | 49.0 | 51.0 |
| Infant mortality rate (per 1000 live births) | 78.0 | 78.0 | 81.0 |
| One year olds immunised with one dose of measles vaccination | 73% | 94% | 91% |
| Deaths among children aged <5 due to HIV/AIDS (%) (2000) | 14.6 | 9.3 | 7.7 |
| People with advanced HIV receiving antiretroviral therapy (%) | 24 | 7 | 51 |
| Physicians (per 1000 population) | 0.14 | 0.02 | 0.08 |

[1] GDP: Gross Domestic Product.

Source: World Health Organization Core Indicators- WHO Statistical Information System.

to identification of this group as a "core group" of transmitters in Kenya, where prevalence among Nairobi sex workers increased dramatically from 4% in 1981 to 61% in 1985 (Piot et al., 1987). Infection in the region spread rapidly to others at high risk such as STD clinic attenders and truck drivers, and soon to the general population. For example, in 1986, a third of lorry drivers and their assistants who passed through a transport depot in Kampala, Uganda, were found to be seropositive (Carswell et al., 1989), as were 15% of men with chancroid in Nairobi in 1985. At the same time, prevalence among pregnant women was estimated at 2% in Nairobi (Piot et al., 1987), rising to 6.5% in 1989 and to 13% in 1991 (Temmerman et al., 1992).

In Tanzania, HIV/AIDS also spread rapidly and by 1987 all regions of the country had reported AIDS cases, with substantial regional variation in the population-levels of HIV seroprevalence. A sero-surveillance study in four cities in 1986 reported the highest prevalence in Kagera (16% among pregnant women), and about 4% prevalence among antenatal clinic (ANC) attenders in Dar es Salaam, 5.2% in blood donors and 10% in STD clinic attenders (Mhalu et al., 1987). As in Nairobi, the prevalence was highest (29%) among female bar workers (Mhalu et al., 1987). Similar prevalence rates were also seen in Mbeya, a regional capital of southern Tanzania, near Malawi and Zambia, where the prevalence of HIV in 1986 was 3% among ANC attenders and 12% among 34 men with STD (Mhalu et al., 1987).

## Institutional and Civil Responses

### *Government Response*

Whilst AIDS cases were discovered almost simultaneously in all three countries, President Museveni of Uganda was the first to recognise HIV/AIDS as a severe problem, and placed an early emphasis on pro-active prevention. President Museveni declared the prevention of the spread of HIV to be a "patriotic duty" in interactions with Ugandans at all level from 1986 onwards, and his charismatic directness encouraged constant media coverage of all aspects of the epidemic, including behaviour change (Green et al., 2006). The realisation that HIV/AIDS had causes and consequences far beyond the health sector led Uganda, in 1992, to be the first country in the world to launch a multi-sectoral response to HIV/AIDS (AMREF, 2001) – the Uganda AIDS Commission (UAC) which was housed under the office of the President. The mandate of the UAC was to coordinate the activities of the various groups involved in fighting the epidemic, including government, local and international NGOs, and community-based and religious organisations, as well as donors and development partners.

In contrast, in Tanzania and Kenya, early responses to HIV/AIDS were largely coordinated by the health sector, with the Ministries of Health (MoH) taking a leading role in the development and implementation of prevention programs. Top-level active political commitment began only in late 1999 (AMREF, 2001), when President Mkapa of Tanzania and President Moi of Kenya declared HIV/AIDS a national disaster (NASCOP, 2005). Following this, the Kenyan National AIDS Control Council (NACC) was established in 1999, and the Tanzania Commission for AIDS (TACAIDS) in 2001.

### *Community Response*

Uganda's National AIDS Control Program enlisted community leaders, civil society, and religious groups in its activities from an early stage. The involvement of prominent personalities such as the archbishop of the Church of Uganda and the late musician Philly Lutaaya, who in 1988 became the first well-known Ugandan to speak openly about his infection, also made a significant contribution (Coutinho, 2003; MacLaren, 1996). One of the key players in the response to the HIV/AIDS epidemic in Uganda has been The AIDS Support Organisation (TASO), established in 1986, the first indigenous AIDS organization in Africa that now serves as a global role model. In Tanzania and Kenya, numerous NGOs and community-based organisations, including associations of persons living with HIV/AIDS, have also been involved in the response to the HIV/AIDS epidemic. In both countries, the major ones are grouped under national umbrella organisations such as the Tanzania Association of Nongovernmental Organizations and the Kenyan Association of Nongovernmental Organizations founded respectively in 1988 and 1990.

### *Current National Strategies*

Current national HIV response strategies are broadly similar in all three countries, with a focus on high level commitment, a multi-sectoral approach, decentralisation, community involvement and media campaigns. The key difference between them can be summarised by one word "earlier". Uganda's response came far earlier than those of Tanzania and Kenya, pioneering innovative control strategies involving a massive engagement of the community at all levels of the society. This was a major factor in Uganda's success in addressing the epidemic. Similar reductions are now being seen in Kenya and parts of Tanzania as a result of their multi-sectoral efforts. Figure 13.1 indicates the key institutional responses together with trends of the epidemic per country.

All three countries are priorities of the United States Agency for International Development's (USAID) HIV/AIDS program and have been included in the U.S. Centers for Disease Control Global AIDS Program. HIV/AIDS programs are supported by bilateral and multilateral partners including the World Bank, the Global Fund to fight AIDS, Tuberculosis and Malaria (Global Fund), United Nation Agencies, the United States President's Emergency Plan for AIDS Research (PEPFAR), and the William J. Clinton Foundation. Donor funds account for the largest proportion of HIV expenditure in the region and fund about 70% of the prevention and treatment care budget (Uganda AIDS Commission, 2005). Sustainability of prevention and treatment programmes, however, will rely on the national governments considering ways to increase their own contribution. The Kenyan government, for example, is exploring options for national health insurance as one means of addressing this issue.

## Trends in HIV Prevalence and Incidence Over Time

### *Measuring HIV Dynamics Over Time*

Tracking the HIV pandemic over time requires comprehensive and consistently collected data in well-defined population groups. Again, Uganda took the lead, establishing the first HIV sentinel surveillance sites at ANCs in Kampala in 1985, and expanding to other sites in 1989. HIV incidence data (number of

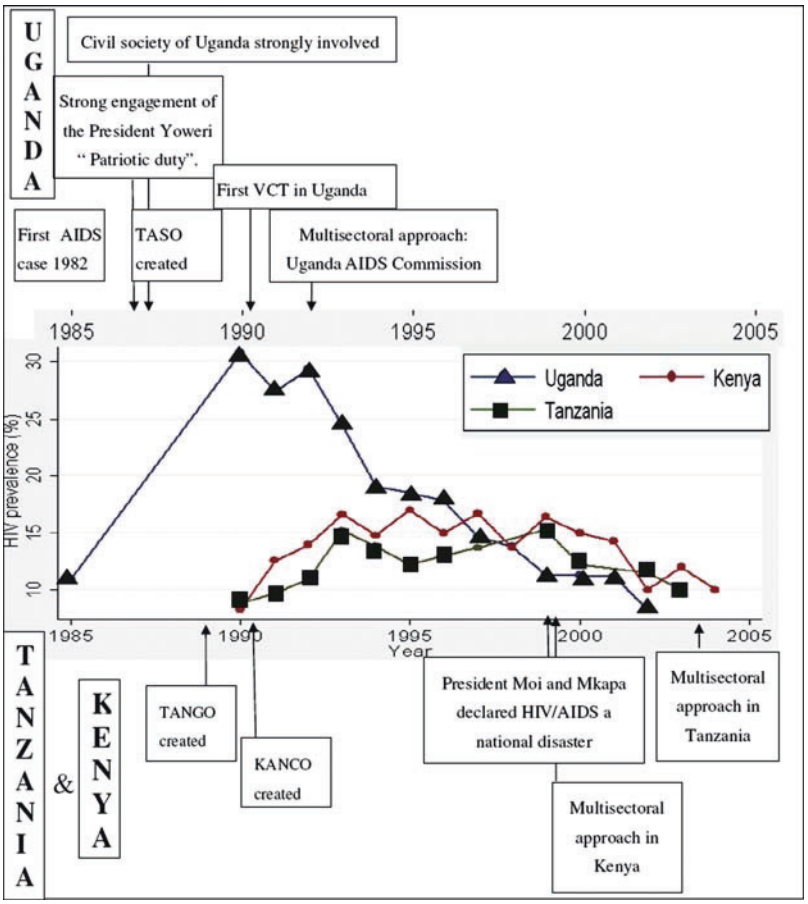


**Figure 13.1** Key institutional responses in regard of the trends of the epidemic per country.

new infections per year) reflects changes in infection rates better than HIV prevalence (proportion infected at one point in time), which depends on factors including mortality, migration, sub-fertility and improved survival of infected individuals taking ART, but is difficult to obtain from routine systems. Surveillance data can be used to estimate HIV incidence based on proxy-measures, for example using prevalence among young age groups who have only recently initiated sex and whose duration of HIV infection is likely to be short. Further, in this age-group, HIV-induced mortality and sub-fertility is low. However, young ANC attenders are increasingly unrepresentative of the general population due to the relatively small numbers of pregnant women who attend antenatal clinics, and increases in age of sexual debut and marriage.

HIV incidence measures can also be obtained in longitudinal studies, and East Africa is unusual in having a number of long-term population-based studies, described below. These data also permit ascertainment of the demographic impact of HIV, with estimates of population-level HIV prevalence, migration, mortality and fertility.

***Dynamics of HIV in the Region***

The different dynamics of HIV in the three countries are illustrated in Figure 13.2. In urban Uganda, there was a dramatically high prevalence of 30% in 1990, followed by a continuous decrease in prevalence. In contrast, data from urban clinics in Kenya and Tanzania show that prevalence peaked in the late 1990s at around 15% before declining to 10% in the mid 2000s. Similarly, in rural clinics, prevalence in Uganda decreased from the early 1990s, contrasting with other countries, where prevalence peaked in the late 1990s (at 22% in Kenya and 15% in Tanzania) before decreasing to 6%. Notably, the most recent data from Uganda shows no further decline in prevalence (Figure 13.2).

The HIV dynamics in ANC clinics in Uganda were reflected elsewhere, for example, among STD clinic attenders at Mulago hospital in Kampala, where prevalence decreased from 45% in 1990 to 19% in 2002 (Programme, S.A.C., 2003). Data from Uganda and Kenya suggest that HIV incidence has decreased substantially (National AIDS Control Council, 2005; Mbulaiteye et al., 2002; Whitworth et al., 2002) indicating some success in the prevention efforts in these countries. In contrast, there are no data from Tanzania showing a consistent decline in HIV incidence, with the exception of Kagera region close to the Ugandan border, where significant declining trends in HIV incidence and prevalence have been observed, particularly among people aged between 15 and 24 years since the late 1980s (Kwesigabo et al., 2005).

*Uganda* The declining prevalence in Uganda has been attributed to strong, early sustained political leadership and widespread AIDS awareness campaigns, including a comprehensive approach which involved other sectors outside the Ministry of Health, community mobilization and targeted behavior change programs, early and extensive voluntary counseling and testing (VCT)

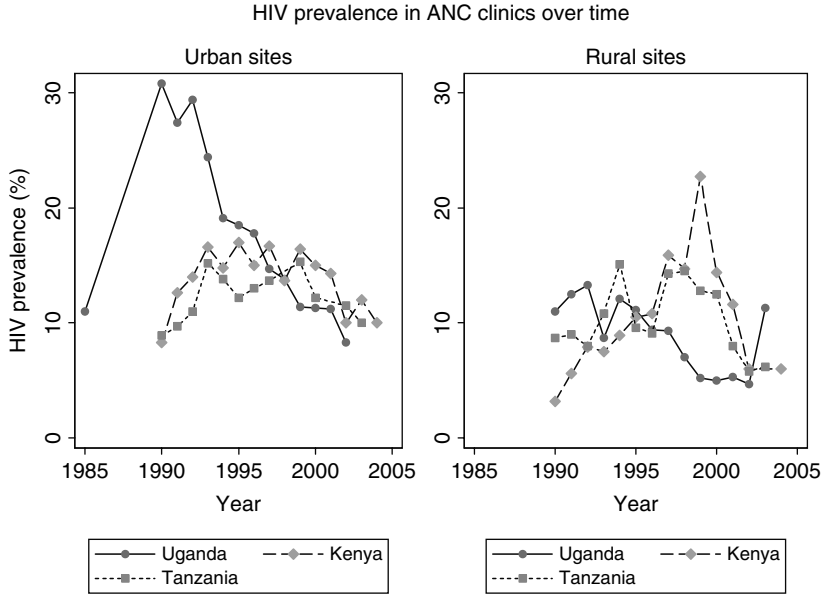


**Figure 13.2** HIV prevalence in ANC clinics.

services, and enhanced management and treatment of STDs (Green et al., 2006; Global HIV Prevention Working Group, 2003). Widespread community mobilization is likely to have had a major impact on changing behavior patterns as the decline in incidence, seen in the late 1980s, began before the advent of social marketing which encouraged reduction in number of partners, widespread condom distribution, VCT and improved treatment for STDs. Support for this is seen in Demographic and Health Survey (DHS) data from the 1990s which shows Uganda with a high proportion of respondents who cite friends, relatives or community meetings as sources of AIDS information.

Further evidence that the declining prevalence in Uganda is due to HIV policy and subsequent changes in behavior rather than the natural course of the epidemic comes from a comparison of trends observed in surveillance sites from neighbouring regions of Western Kenya and Eastern Uganda (Moore et al., 2001). In the 1990s, there was little difference in HIV prevalence at ANCs in these bordering regions of Kenya and Uganda. By 2000, however, all of the Kenyan sites were reporting HIV prevalence above 10% and all of the Ugandan sites had HIV prevalence rates below 10%. There were no obvious differences in behavioural factors between these two regions, and the authors concluded that the decline in Uganda was largely due to the early, comprehensive, and sustained government commitment to HIV control in Uganda (Moore et al., 2001).

Since 1992, the largest and most consistent declines in HIV prevalence in Uganda have occurred among the young, particularly those aged 15–19. In Kampala, for example, HIV prevalence among pregnant women aged 15–19 fell from 28.5% in 1991 to 8% in 1998 (Stoneburner & Low-Beer, 2004).

In southwest Uganda, two large population-based cohort studies, the Rakai Health Sciences Program and the MRC/Uganda Virus Research Institute Research Unit on AIDS in Masaka, were established in the late 1980s and have played a key role in furthering the understanding of the global HIV epidemic and in shaping policy. Each has an extensive program of epidemiological studies to monitor the HIV/STD epidemics in the general population, to implement and evaluate strategies for HIV/STD preventive, treatment and care services, and to undertake large randomized trials to evaluate potential new intervention strategies. Estimates from these population-based studies indicate substantial reductions in HIV incidence in the area. For example, in Masaka, adult HIV incidence dropped from 0.9 per 100 person-years (pyr) in 1990 to 0.52 per 100 pyr in 1999, with significant decreases seen in both sexes and in different age groups (Mbulaiteye et al., 2002). In neighboring Rakai district, HIV incidence was estimated to be 2.1% in 1990–1991 (Wawer et al., 1997) and almost half this (1.3%) in trading centres, which tend to be high incidence locations, between 1999 and 2002 (Arroyo et al., 2006). Similarly, the incidence rate in the control arm of the recent male circumcision trial was 1.33% (Gray et al., 2007). However, trends in these regions are likely to be atypical of the rest of the country, due to the very presence of the research institutes with their active prevention and treatment programs.

Recent data suggest that incidence may be increasing again in Uganda, especially in rural areas (Baryarama et al., 2007; UNAIDS, 2006). For example, data from Masaka District show that both prevalence and incidence have increased since 2000, although the trends are not statistically significant (Shafer et al.,

2006). Further research is needed to validate these worrisome trends, which may reflect recent reports of low levels of consistent condom use and increasing numbers of men who report having had more than one sex partner in the last year (UNAIDS, 2006).

*Tanzania* National ANC surveillance surveys show little evidence of decreasing HIV prevalence in Tanzania (9.6% in 2001–2002 and 8.7% in 2003–2004) (Swai et al., 2006). However, there are decreases in some regions, such as among ANC attenders in Dar es Salaam, where prevalence has decreased from 14.2% in 1995 to 10.6% in 2003 (Urassa et al., 2006) and in Kagera region where HIV prevalence decreased in all districts throughout the 1990s. For example, in the urban Bukoba district in Kagera, prevalence fell from 18% in 1993 to 13% in 1996, and 2004 prevalence estimates in the Kagera region are 3.7%, one of the lowest in the country (TACAIDS, 2005). Similarly to Uganda, the most significant decline was among 15–24 year old women (Kwesigabo et al., 2005) and is likely to reflect changes in sexual behavior, norms, values and customs, including increased uptake of VCT and safer sex behavior (Lugalla et al., 2004).

As in Uganda, much of the data on trends in HIV prevalence and incidence come from research programs. A long-standing collaboration between the Tanzanian National Institute for Medical Research, African Medical and Research Foundation (AMREF) and the London School of Hygiene and Tropical Medicine was established in Mwanza in 1991 and has since evaluated and implemented HIV prevention strategies. Data from this program indicate that the HIV epidemic stabilized in Mwanza town by the 1990s, with an almost constant prevalence of around 11% in pregnant women and HIV incidence of about 1% a year in the early 1990s (del Mar Pujades Rodriguez et al., 2002). In rural Mwanza region, female facility workers form a core group of transmitters, and truck drivers are a likely bridge of transmission to the general population (del Mar Pujades Rodriguez et al., 2002). For example high HIV prevalence of 25–30% has been noted recently among bar and food workers in Mwanza Town and around the gold mining regions in northwestern Tanzania (Vallely et al., 2007; Watson-Jones et al., 2006).

Further evidence of population-level trends comes from a demographic surveillance system (DSS) established in Kisesa ward in Mwanza Region in 1994. HIV incidence in this population increased from 0.8% in 1994–1997 to 1.3% in 1997–2000, with a concomitant increase in prevalence from 5.9% in 1994–1995, 6.6% in 1996–1997 and 8.1% in 1999–2000 (Mwaluko et al., 2003). Despite limitations with the data, such as a low follow-up rate, it seems clear that the interventions undertaken by the district multi-sectoral AIDS action committee had little success reducing HIV prevalence. Risk perception levels were still very low, and stigma associated with AIDS common.

Longitudinal studies estimating HIV incidence in community-based studies in Tanzania are summarized in Table 13.2. In general, incidence is highest in urban areas, among women, and in some occupational cohorts such as police officers, females employed in bars/hotels and factory workers. The table highlights the very high incidence in the general population in Kagera region in the late 1980s, especially in urban areas where incidence was estimated at 5.15/100 person-years (pyr) among women (Killewo et al., 1993). Incidence

**Table 13.2** HIV-1 seroincidence from prospective community-based studies in Tanzania.

| Reference | Year of data collection | Sample size | Setting | Sex | Residence | Incidence rate per 100 py (95% confidence interval) |
|---|---|---|---|---|---|---|
| Killewo et al. (1990) | 1987–1989 | 1,316 | Kagera | Women | Rural | 0.80 (0.30–1.30) |
| | | | | | Urban | 5.15 (1.96–8.34) |
| | | | | Men | Rural | 0.85 (0.22–1.48) |
| | | | | | Urban | 4.20 (0.84–7.56) |
| Hugonnet et al. (2002) | 1991–1995 | 3,403 | Mwanza | Women | Rural | 0.17 (0.06–0.37) |
| | | | | Men | Rural | 0.45 (0.25–0.74) |
| Senkoro et al. (2000) | 1991–1996 | 2,172 | Mwanza | Women | Urban | 1.92 (1.22–2.89) |
| | | | | Men | Urban | 1.05 (0.72–1.47) |
| Kapiga et al. (1998) | 1992–1995 | 2,471 | Dar es Salaam | Women | Urban | 3.40 (2.60–4.10) |
| Boerma et al. (1999) | 1994–1997 | 7,609 | Kisesa | Women | Rural | 0.84 (0.58–1.17) |
| | | | | Men | Rural | 0.73 (0.48–1.07) |
| Bakari et al. (2000) | 1994–1998 | 2,080 | Dar es Salaam | Women | Urban | 2.24 (1.34–3.36) |
| | | | | Men | Urban | 1.96 (1.12–2.96) |

among women using family planning services in Dar es Salaam between 1992 and 1995 was also high (3.40/100 pyr) (Kapiga et al., 1998). A high prevalence and incidence was also reported in a cohort of police officers in Dar es Salaam, where prevalence was 13.8% at enrollment in 1996 and incidence was 2 per 100 pyr (Bakari et al., 2000).

As expected, HIV incidence is relatively high among the core groups for heterosexual transmission. In an open cohort of female bar workers in Mbeya Region, HIV incidence declined from 13.1 per 100 pyr to 5 per 100 pyr over three consecutive 9-month periods from the end of 2000 (Riedner et al., 2006). Similar incidence was seen from 2002 to 2005 among female bar/hotel workers in Moshi, in northern Tanzania (4.6 per 100 pyr) (Kapiga et al., 2007).

*Kenya* Compared with Uganda and Tanzania there is relatively little population-based longitudinal data from Kenya, where there has been a strong focus on the dynamics of HIV transmission among core groups, especially sex workers. However, nationally representative data from the DHS and sentinel surveillance of ANC attenders allows for a description of trends in HIV prevalence over time. Using these sources, it is estimated that HIV prevalence had fallen from about 10% in the mid-late 1990s to 6.7% in 2003 (Cheluget et al., 2006; Central Bureau of Statistics, 2004), and there is evidence of a further decrease to 6.1% at the end of 2004 (National AIDS Control Council, 2005).

Analysis of trends in HIV prevalence at 13 urban sentinel surveillance centres of Kenya from 1990 to 2004 show regional variations, with a striking decline beginning in 1998 in five sites (Busia, Meru, Nyeri Thika and Nakuru) (mean prevalence 25.1% in 1998–1999 to 7.9% in 2004), and a decline starting in 2001 at three other sites (Garissa, Kisii and Kitui) (from 14.7% in 2001 to 4.3% in 2003). There is no evidence of a decrease in prevalence in the other five sites, which include the major cities of Nairobi, Mombasa and Kisumu (Figure 13.3) and the reasons for this lack of decrease in the major urban settings is unclear.

Combining national adult prevalence data with assumptions about the time from HIV infection to death and demographic information, it has been

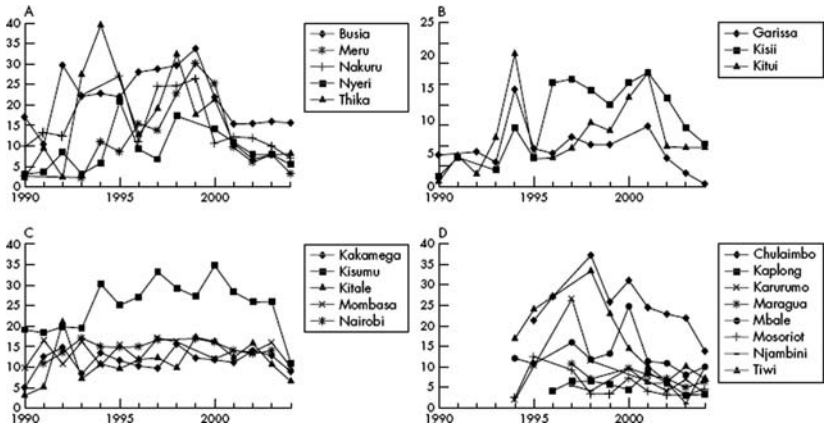


**Figure 13.3** Evolution of the HIV prevalence per Kenyan surveillance site from 1990 till 2004.

estimated that the annual number of AIDS deaths in Kenya increased by over 60% from 1998 to 2003, and that the number of new infections had decreased by two-thirds from its peak in 1993, to 2003 (Cheluget et al., 2006). The declining prevalence is corroborated by changes in reported sexual behavior in Kenyan DHS data, with a smaller percentage reporting more than one concurrent partner, but may also reflect the high mortality rate due to AIDS, about 10% of infected adults are dying each year prior to widespread access to antiretroviral therapy (ART) (Cheluget et al., 2006).

***Current Patterns of HIV***

*HIV Prevalence by Age and Sex* The nationally-representative DHS and AIDS Indicator Surveys (AIS) provide estimates of HIV prevalence and behavior patterns. The most recent data, from 2003 to 2005 (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006) surveyed between 11,773 and 19,656 individuals in each country, with HIV status available for 70 to 89% of those eligible. Overall prevalence among those aged 15 to 49 was 6.7% in Kenya, 7.0% in Tanzania and 6.4% in Uganda. Figure 13.4 shows prevalence by age and sex. In general, among those aged under 40, females have consistently higher HIV prevalence than males, and the differential is greatest for Kenya within each age group. Higher HIV prevalence in young women compared with young men is seen in many populations, explained partly by the tendency for younger women to have older partners, the greater transmission probability from male to female than female to male, the greater biological vulnerability of the genital tract in very young women, and the greater social vulnerability, in particular difficulty in negotiating condom use (Joesoef et al., 2003).

Among women, prevalence rises most rapidly in Kenya, with 13% of those aged 25 to 29 infected compared with 9% in Tanzania and Uganda, where

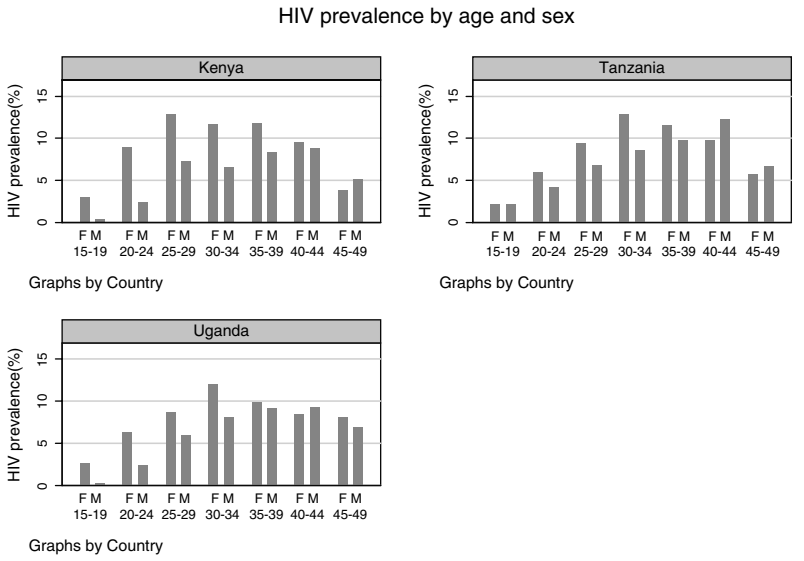


**Figure 13.4** HIV prevalence by age and sex.

prevalence peaks at about 13% at ages 30–35 (Figure 13.4). Prevalence among those aged over 45 is highest in Uganda, likely reflecting the high levels of prevalence previously seen in this population, and possibly the survival effect of widespread ART.

*HIV Prevalence by Socio-Economic Factors* HIV prevalence is consistently higher in urban areas as compared to rural areas (10.0% vs. 5.6% in Kenya; 10.9% vs. 5.3% in Tanzania; 10.1% vs. 5.7% in Uganda) among those in the highest wealth quintile in all countries, and among those employed (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006). For example, among women in Kenya, HIV prevalence is 3.9% in the lowest wealth quintile and 12.% in the highest; and HIV prevalence is 1.5% among unemployed men versus 5.9% among employed men (Central Bureau of Statistics, 2004). Similar patterns are seen in Tanzania (TACAIDS, 2005) and Uganda (MoH, Uganda, 2006). This may be because economic well-being may make it possible, especially for men, to afford having multiple sexual partners and engage in more high-risk sexual behaviors associated with HIV infection.

In all three countries, there is strong regional variation. In Tanzania, the highest HIV prevalence is in the two regions of Mbeya (15.5%) and Iringa (14.3%). These regions are on a major highway on the southern part of the country, bordering two high-prevalence countries, Malawi and Zambia. In both Tanzania and Uganda, the prevalence of HIV is also higher in the capital cities (10.9% in Dar es Salaam, 8.5% in Kampala). However, in Kenya, prevalence is highest in the less urbanized Nyanza region in western Kenya (15.1%) as compared with 9.9% in Nairobi. This higher prevalence in Nyanza is likely due to multiple social factors, including the lack of male circumcision among the Luo tribe in this part of Kenya. The Kagera region in Tanzania which in the 1980s had the highest prevalence of HIV in Tanzania now has one of the lowest rates (3.7%). The declining prevalence in this region may be due to changes in sexual behaviors, including increased condom use, reduced number of sexual partners, and increased uptake of VCT (Lugalla et al., 2004).

*HIV Knowledge and Awareness* The DHS and AIS indicate that awareness of HIV/AIDS is almost universal in this region, knowledge of methods to prevent HIV transmission is also high, and is similar in males and females (Figure 13.5).

Around 90% of the population knew that abstinence and having one uninfected, monogamous partner could protect from HIV infection, although this was slightly lower among females in Kenya (80%). The proportion who knew that consistent condom use could reduce risk of HIV was around 70%, and again lowest among women in Kenya. Knowledge of PMTCT was poorest in Tanzania, but conversely, Tanzania respondents scored best in rejecting common misconceptions about transmission of HIV.

To summarise, HIV prevalence has been decreasing in Uganda for many years, likely due to the widespread behavioral change campaigns from the 1980s. More recently, a decrease has been seen in Kenya, although there is no evidence of this nationally in Tanzania, where levels of HIV-related stigma tended to be higher and infrastructure can be weak. In all three countries, women are disproportionately affected by HIV, both in the general population and those vulnerable through their occupation.

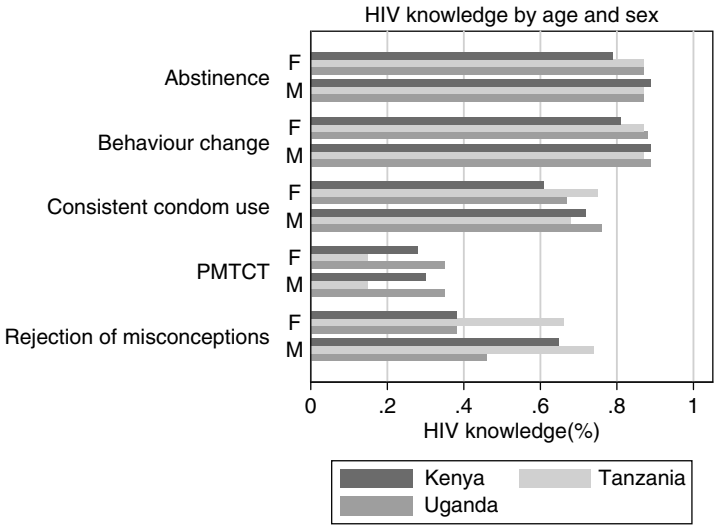


**Figure 13.5** Correct responses to HIV knowledge questions.

## HIV Prevention

Strategies to reduce risks of exposure of heterosexual and vertical transmission are central to preventing the spread of HIV in this region. In this section we discuss the wealth of prevention research and policies from the region which have frequently led HIV prevention initiatives worldwide.

### Behavioural Interventions

The primary approach to reducing risky sexual behaviour in this region is "ABC", which was pioneered in Uganda in 1986. The aim of this strategy is to encourage delayed initiation of sex ("A" – abstinence), being faithful to one uninfected partner ("B", "zero grazing"), and correct and consistent condom use ("C"). In Uganda, there was also an early and extensive focus on VCT services. The Ugandan government, led by President Museveni, launched a wide-ranging public health campaign to communicate these messages, using public media and large scale training of community-based AIDS counselors, health educators and peer educators. It is notable that in the most recent DHS survey, Ugandan respondents cited the radio as their main source of information about HIV/AIDS followed by health workers and peers. In addition, many employers instituted workplace education campaigns to increase HIV/AIDS knowledge and awareness, and encourage safer sexual behaviour. The involvement of communities and non-governmental organizations, including faith-based organizations led to culturally appropriate and effective interventions which helped facilitate changes in normative behavior. Much more recently, Kenya and Tanzania have adopted these policies.

Since 2003, PEPFAR which provides substantial financial support to the region, has focused on the "A" in ABC, with abstinence-driven public health campaigns, leading to a concern that this may detract from the combined

efficacy of a more comprehensive strategy including condom promotion (Cohen, 2004; Das, 2005). However, promotion and supply of condoms is now a central part of the national HIV strategy, and Uganda aims to use financing from the Global Fund to distribute 120 million condoms annually. Similarly, AMREF in Tanzania is focusing on condom promotion and social marketing for truck drivers who travel along major highways. This program is also using peer educators to provide HIV prevention messages and distribute condoms to high-risk women at truck stops. In Kenya, condoms are available through free distribution from the government; subsidized sales through socially marketed, donor-funded projects; and sales in the private sector (NASCOP, 2005) and reported condom use has increased markedly even in the rural sector. The most recent DHS data indicates that 41% of men in rural areas and 59% of men in urban areas used condoms at their last act with a non-marital partner (Central Bureau of Statistics, 2004).

The key determinant in Uganda's success is likely to have been reductions in numbers of partners, rather than widespread use of condoms (Green et al., 2006). Condoms were not widely available in much of Uganda until the mid 1990s (Epstein, 2007) and were not aggressively promoted (Epstein, 2007; Parkhurst, 2002). Instead, Uganda's AIDS campaigns focused on "Zero Grazing" (faithfulness and partner reduction) and there is evidence of a sharp reduction in the number of casual/multiple partnerships. In this section we examine the role of sexual behaviour on the spread of HIV in the region.

***Sexual Behaviour***

In 1997, a population-based multi-country study of factors was undertaken to try and understand why HIV had spread so much faster in eastern/southern Africa than West Africa. There were surprisingly few differences in behavioural factors between the countries which could explain the differences in HIV prevalence, but these included early age at sexual debut, early age at marriage and a large age difference between spouses (Buve et al., 2001b).

*Age at Sexual Debut* In 1997, age at sexual debut was lower in Kisumu (16.7 years) than in cities in western Africa (19.0 in Cotonou, Benin and 17.7 in Yaounde, Cameroon), and may have been partly responsible for the rapid spread of HIV (Ferry et al., 2001). The median age at first sex in urban Uganda was low in the 1980s (median age 15 years) (Asiimwe-Okiror et al., 1997) which is likely to have fuelled the HIV/AIDS epidemic, but then rose to around 17 years in both sexes by 1995 (Asiimwe-Okiror et al., 1997). Similarly, DHS data from six countries, including Uganda, Kenya and Tanzania, found evidence of increases in median age at first sex in Kenya and Uganda from 1989 to 2000 (Zaba et al., 2004).

*Marriage as a Risk Factor for HIV* Being married is a major risk factor for HIV transmission in East Africa (Glynn et al., 2003), and it is estimated that over 50% of HIV infections occur in couples who are married or living as married (Gray et al., 2000). A greater age difference between spousal partners was highlighted as an important determinant of the spread of HIV in Kisumu in the multicentre study (Buve et al., 2001a), and in separate studies in Tanzania (Kapiga et al., 2006) and Uganda (Kelly et al., 2003).

Overall levels of reported condom use remain low within marriage (for example, just 4% of those currently married reported using a condom at most recent sex in the Ugandan DHS (MoH, Uganda, 2006). Data from a recent World Health Organization (WHO) sponsored study, found that in Uganda, 55% of men and women thought it was acceptable for married couples to use condoms compared with only 22% of women and 45% of men in Kenya (Cleland, Ali & Shah, 2006). A qualitative study in Kampala, Uganda provides insight into factors that facilitate condom adoption in marriage (Williamson et al., 2006). Women usually initiated discussion about condoms with their partners after being encouraged to do so by health staff, or prompted by the results of an HIV test. About half the women classified as consistent condom users reported little or no resistance from their male partner. However, a community-based study of 457 women in Mbale, east Uganda, highlighted high levels of intimate partner violence, and noted that a fear of violence prevents women from requesting that their spouses use a condom use or undergo HIV testing (Karamagi et al., 2006).

The move towards higher levels of condom use within marriage should be a high priority, including increased uptake of VCT of couples, and reinforcement of the need for greater condom use in stable partnerships.

*Age Difference Between Partners* Age difference with non-spousal partners may be of particular importance in relationships involving young women, who may have less power to negotiate sex and condom use with older men (Msuya et al., 2006). For example, in Rakai, the risk of HIV among women aged 15–19 years was double (RR = 2.04, CI 1.3–3.2) among those reporting male partners 10 or more years older compared with those with male partners 0–4 years older (Kelly et al., 2003).

The proportion of women aged 15–19 who had non-marital sex in the previous 12 months with someone at least 10 years older than them is around 9% in Uganda and Tanzania, but lower in Kenya (4%) (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006). This is somewhat surprising given that HIV prevalence among females aged 15–19 years is highest in Kenya (3.0% compared with 2.6% in Uganda and 2.1% in Tanzania) (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006), although this may reflect lower levels of condom use among young women in Kenya, where only 23% of young women in Kenya reported using a condom at last high risk sexual intercourse compared with 37% in Tanzania and 56% in Uganda (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006).

There is some evidence that condom use among unmarried couples has increased over time in Kampala and Jinja (Asiimwe-Okiror et al., 1997) and that it is higher in Uganda than in Kenya and Tanzania. For example, among women who had been sexually active in the last 12 months, 15% reported having had sex with a nonmarital, noncohabiting partner, and of these 47% used a condom at last higher-risk sex. In contrast, a higher proportion of women in Tanzania and Kenya reported higher risk sex in the last 12 months (23 and 18% respectively), and fewer of these used a condom at last high risk sex (38 and 24% respectively) (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006). The reason for this difference is not clear, although it may result from long-term and widespread HIV prevention programming in Uganda.

### *Alcohol Use and Risky Sexual Behaviour*

In Uganda, longitudinal analysis of the population-based Rakai cohort found significant associations between alcohol use and HIV incidence (adjusted RR = 1.67, 95% CI 1.17–2.40 in men; adjusted RR = 1.40, 95% CI 1.02–1.92 in women) (Zablotska et al., 2006). Alcohol use was significantly associated with inconsistent condom use and multiple sex partners. Similar findings have been seen in cross-sectional data from neighboring Masaka district (Mbulaiteye et al., 2000), in a cohort of family planning attenders in Dar es Salaam, Tanzania (Kapiga et al., 1998), female bar and hotel workers in Moshi, Tanzania (Ao et al., 2006) and a population-based study in Kisumu, western Kenya (Hargreaves, 2002).

Several potential mechanisms may explain these associations. For example, alcohol increases sexual risk-taking by reducing inhibitions and diminishing perception of exposure risks (Mbulaiteye et al., 2000), and is associated with risk factors such as higher rates of unprotected intercourse, failure to use condoms appropriately, and often increased frequency of sexual activity and/or number of sexual partners. This is especially true in East Africa where alcohol is consumed in small bars and other informal alcohol-serving establishments patronized by men who may visit these places to meet new sex partners (Leigh et al., 1994; Simbayi et al., 2004; Weir et al., 2003). Further, alcohol may be associated with increased gender violence, sexual assault and rape (Kalichman & Simbayi, 2004; Mbulaiteye et al., 2000; Simbayi et al., 2004), factors known to increase women's vulnerability to HIV. Biologically, alcohol consumption may increase HIV risk indirectly through increasing susceptibility to other STDs (Cook & Clark, 2005) or directly if chronic alcohol ingestion increases susceptibility to HIV infection (Bagasra et al., 1993; Chen et al., 2004).

Qualitative research on community perceptions towards alcohol consumption and sexual risk-taking in Masaka district, southwestern Uganda found that public drinking was common among men and was perceived as associated with independence, masculinity, and freedom from domestic responsibilities. For women, drinking represented deviance of gender norms. Notably, accepting drinks from men was viewed as signifying assent to sex (Wolff et al., 2006).

There is a clear need for effective HIV prevention to incorporate education about alcohol use and risky sexual behavior. The Masaka study indicated that this is likely to be most effective if seminars were held at community-level for drinkers and non-drinkers, rather than being focused in bars among drinkers (Wolff et al., 2006).

### *Voluntary Counselling and Testing (VCT)*

Uganda established Africa's first confidential VCT service, the AIDS Information Centre (AIC) in Kampala in 1990. This centre pioneered provision of same-day results using rapid HIV tests, as well as creation of post-test clubs to provide long-term support for behaviour change, regardless of serostatus. One of the first RCTs to evaluate effectiveness of VCT on changing sexual behaviour patterns was conducted in Kenya, Tanzania and Trinidad (The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000), and showed that individuals who received VCT were less likely to report unprotected intercourse with non-primary partners than those who received basic health information. A similar reduction in reported unprotected sex was seen when both

couples attended VCT, but not in couples where one partner did not receive the intervention, suggesting a benefit of couples counselling. More recent data from a cohort of adults in Tororo, rural Uganda, also showed that partner VCT, along with providing ART and prevention counselling, reduced self-reported risk behaviour (Bunnell et al., 2006).

In order to be effective, the implementation of VCT services requires many key elements, including community awareness, education and mobilisation. These elements should ensure that those wishing to be tested understand what the test process is, where testing may be undertaken, and that those who test positive do not face discrimination. In Uganda, VCT has recently been integrated into health services at district levels (provider-initiated services), which also serve as an entry point for ART provision. In Tanzania, where the first VCT centres in the public sector were introduced in 1989 and at least one site per district provides counselling services, stigma and discrimination are still major barriers to prevention. In Kenya, the ABC message now includes a fourth component: "D" for Diagnosis: know your status", and joint efforts by the Kenyan government, international donors, and church and community-based NGOs have resulted in a rapid increase in VCT sites from 3 in the year 2000 to 680 sites by the end of 2005. Over the same period, annual VCT service uptake increased from about 1,000 to 545,000 (Marum et al., 2006).

The proportion of individuals in the region who have ever been tested for HIV and received their results is higher than in many other countries in sub-Saharan Africa, but still remains low (12–13%) (WHO/UNAIDS/UNICEF, 2007). It is likely that this is due to the relatively few VCT sites, especially in rural areas, transport costs required to reach VCT sites, and stigma and discrimination associated with the disease. Some of these barriers might be addressed by a VCT model that has been tested by CDC-Uganda and the Uganda Virus Research Institute (UVRI). In this model which incorporates home-based provision of counseling at the time people receive HIV test results, the number of individuals who received HIV results was greatly increased as compared to other studies. The researchers believed that their findings are related to transport costs, which are often a barrier to access of VCT, even free VCT. Participants also noted that they preferred to receive results within the privacy of their own home (Were et al., 2003).

## Biomedical Interventions

As with behavioural interventions, Uganda, Kenya and Tanzania have pioneered research into biomedical interventions to prevent HIV, notably bacterial and viral sexually transmitted infection (STI) treatment and male circumcision. In this section, we briefly review the contribution of the region to these public health interventions.

### *STD Symptoms and Treatment*

The main mode of transmission of HIV in sub-Saharan Africa is sexual intercourse, and risk of transmission is increased in the presence of genital ulcer diseases (GUD) and other STDs (Fleming & Wasserheit, 1999). GUD is common in East Africa, and is typically caused by herpes, syphilis and, less frequently, chancroid. One of the first longitudinal studies to show the importance

of GUD in HIV incidence was among STD clinic attenders in Nairobi in 1989 which found that GUD was associated with a 5-fold increased risk of HIV-1 seroconversion (Cameron et al., 1989). This finding has been confirmed in many subsequent studies in the region (Ahmed et al., 2003; Martin et al., 1998; Msuya et al., 2006; Serwadda et al., 2003).

To assess whether STD control reduces HIV transmission, several RCTs were undertaken in East Africa during the 1990s, enabling evaluation of the potential impact of different STD control strategies on HIV transmission. Four randomized trials have been conducted in the region, three community randomized trials in Uganda (Kamali et al., 2003; Wawer et al., 1999) and Tanzania (Grosskurth et al., 1995), and an individually randomized trial among sex workers in Nairobi (Kaul et al., 2004).

The first trial, in Mwanza region, found that improved syndromic case management for STDs integrated within the existing primary health-care system, reduced HIV incidence by 38% in the general population (Grosskurth et al., 1995) and was relatively cost-effective (Gilson et al., 1997). Two other community-based STD treatment trials were undertaken in rural Uganda but in contrast showed little impact on HIV incidence (Kamali et al., 2003; Wawer et al., 1999). The trial in Rakai District, Uganda, conducted between 1994 and 1998, administered mass presumptive antibacterial treatment, and the trial in neighboring Masaka District was a three-arm trial evaluating syndromic case management of STIs at government and private health units and intensive information, education and counseling. A fourth trial, in Nairobi, Kenya conducted between 1998 and 2002 evaluated the effect of monthly antibiotic prophylaxis on the incidence of bacterial STIs and HIV-1 infection. This trial which was conducted among female sex workers also had little impact on HIV incidence (Kaul et al., 2004)

The most likely explanation for the different findings from these community-based trials are that the HIV epidemic was in a later stage in Uganda, and individuals had already adopted safer sexual behaviors (Green et al., 2006; White et al., 2004).

Following the results of the Mwanza trial, syndromic management has been included in HIV strategic policies in the region since the mid 1990s. However, limitations within the health system, such as number of trained health workers and poor delivery systems for drugs have led to difficulties in implementing this preventive intervention (Kamali et al., 2003). For example, the current Tanzanian guidelines have a goal of increasing the proportion of patients with STI at health care facilities who are appropriately diagnosed, treated and counselled, to 70% in 2007 by expanding coverage of quality STI services to all districts, assuring continuous availability of essential STI drugs at all health facilities offering STI services, and making quality STI services available to vulnerable populations (TACAIDS, 2002).

Given that presumptive anti-bacterial STD treatment has little effect on HIV and that genital herpes is the major cause of GUD in East Africa, HSV control is a potential means of preventing HIV transmission. HSV-2 is highly prevalent in the region (del Mar Pujades Rodriguez et al., 2002; Kamali et al., 1999; Kapiga et al., 2006; Obasi et al., 1999; Wagner et al., 1994; Wawer et al., 2001) especially among females, and has been identified as an important co-factor in HIV acquisition and infectiousness (Freeman et al., 2006; Nagot et al., 2007).

The longer-term impact of suppressive therapy on HIV acquisition has been assessed in an RCT in Mwanza, Tanzania, but results showed little impact of up to 30 months of suppressive herpes therapy on HIV incidence. Further data will come from the Partners in Prevention study, an RCT of the impact of HSV suppressive therapy on HIV transmission in more than 3,300 monogamous HIV-discordant couples, including sites in Moshi, Tanzania; Kampala, Uganda; Kisumu, Eldoret and Thika in Kenya.

***Male Circumcision***

Male circumcision is less common in Uganda (25%) than in Tanzania (70%) and Kenya (84%) (Central Bureau of Statistics, 2004; TACAIDS, 2005; MoH, Uganda, 2006). In Uganda, circumcision status is determined mainly by religious affiliation with almost all Muslim men being circumcised, compared with 14% of non-Muslim men. In contrast, ethnicity largely determines circumcision status in Kenya where the main non-circumcising group are the Luo, in western Kenya, of whom 17% are circumcised (Statistics et al., 2004). In Tanzania, male circumcision is associated with ethnicity, better education, urban residence and higher socio-economic status (TACAIDS, 2005). For example, the Sukuma ethnic group in north-western Tanzania is traditionally non-circumcising but now that boys mix with other ethnic groups at school, the practice is more acceptable, with an estimated prevalence of 21% (Nnko et al., 2001).

National DHS/AIS data show that in Uganda, the overall HIV prevalence is 3.8% among circumcised men and 5.6% among uncircumcised men (MoH, Uganda, 2006). In Kenya, HIV prevalence was four times higher in uncircumcised men (12.6% vs. 3.0% in circumcised men). In Tanzania, however, the prevalence of HIV is similar among circumcised and uncircumcised men (6.5% vs. 5.6%), and is likely to be confounded by socio-economic factors as both HIV prevalence and circumcision are more common among wealthier and better educated men (TACAIDS, 2005).

Two recent RCTs in the region (in Rakai, Uganda and Kisumu, Kenya), have confirmed findings from an earlier trial in South Africa (Auvert et al., 2005), that male circumcision significantly reduces the risk of HIV acquisition (Bailey et al., 2007; Gray et al., 2007). The results of the three trials consistently showed around a 60% reduction in HIV incidence in circumcised men leading the WHO and the Joint United Nations Programme on HIV/AIDS (UNAIDS) to endorse expansion of safe adult male circumcision for HIV prevention in settings with HIV prevalence rates over about 15% (WHO/UNAIDS, 2007). The Kenyan Ministry of Health is to start offering no-cost male circumcisions with funding from donor governments and international organizations (Schoofs, 2007).

***Prevention of Mother-to-Child Transmission (PMTCT)***

The landmark RCT to estimate the efficacy of nevirapine to reduce mother-child transmission (HIVNET 012) was undertaken in Kampala, Uganda, from 1997 to 1999 (Guay et al., 1999). HIV-1 infected pregnant women enrolled at Mugalo Hospital in Kampala, Uganda, were randomized to nevirapine (200 mg orally at onset of labor and 2 mg/kg to babies within 72 h of birth), or zidovudine (600 mg orally to the mother at onset of labor and 300 mg every 3 h until delivery, and 4 mg/kg orally twice daily to babies for 7 days after birth). Infants randomized to nevirapine were significantly less likely to become HIV

infected by age 14–16 weeks (RR = 0.47, 95% CI 0.2–0.64) (Guay et al., 1999). A further follow-up found that the reduction was sustained up to age 18 months (Jackson et al., 2003).

Despite these exciting findings, treatment coverage in the region, as in many other countries, is woefully inadequate. The proportion of HIV infected women who receive ART for PMTCT is estimated at 20% in Kenya, 12% in Uganda, and just 6% in Tanzania in December 2006 with only 13% of all health facilities offering any counselling or prophylaxis to pregnant women. Cost remains a barrier in Tanzania, where, although antiretroviral drugs (ARVs) are provided at a subsidised rate to HIV positive pregnant women, the cost to patients remains high (WHO, 2005b).

***HIV Vaccine Research***

The role of these three countries to HIV vaccine research is reviewed in Chapter 5 and will be covered only briefly here. Uganda was the first country in Africa to conduct HIV vaccine trials. In 1999, a phase 1 study, HIVNET 007 evaluated the safety and immunogenicity of live recombinant canarypox vaccine containing HIV 1 clade B (env and gag-pro) antigens in 40 HIV-1 uninfected volunteers in Uganda. The immunogenicity of this vaccine, and a subsequent clade A HIV DNA/MVA (Modified Vaccinia Ankara) vaccine in 2003, were low, but helped establish trial infrastructure, expertise and a legal framework that led to the development of Ugandan national guidelines on HIV Vaccine Research. Since then, Kenya and Tanzania have initiated a number of HIV vaccine trials. The genetic diversity in HIV-1 presents a major challenge to vaccine development. Responding to this challenge, The Vaccine Research Center (VRC) at the National Institute of Allergy and Infectious Disease developed a Multiclade HIV 1 DNA plasmid vaccine. This 4 plasmid vaccine coding for HIV 1 gag, pol and nef polyproteins from B and env glycoproteins from clade A, B and C was tested in Uganda through a Makerere University-Walter Reed project in a phase 1 study (RV 156) in 2004. Another landmark trial in Uganda is the testing of a pediatric AIDS vaccine aimed at preventing HIV infection from mothers to babies during breast feeding. Phase 1 of this Makerere University-Johns Hopkins University collaboration to test the safety of this vaccine, which is known as ALVAC-HIV (vCP1521), is underway and will enroll 50 infants born to HIV infected mothers.

Several HIV vaccine trials have been conducted under the Kenya AIDS vaccine initiative (KAVI) since 2001 when the International AIDS Vaccine Initiative (IAVI) 002 study tested the safety and immunogenicity of a HIV clade A DNA vaccine, pTHr-HIV A, in 18 healthy, HIV uninfected volunteers. A subsequent study in 2002 (IAVI 004) evaluated the safety and immunogenicity of HIV-I MVA. In 2003, IAVI 010 was conducted in Kenya to test the safety and immunogenicity of a clade A HIV DNA/MVA prime boost combination in HIV–uninfected healthy volunteers at low risk for HIV infection. In 2005, another Phase I trial with two sites in Kenya and Rwanda are enrolling in IAVI V001 to test two multiclade vaccines, a 6 plasmid DNA vaccine and a recombinant adenovirus 5 vectored vaccine, the same vaccines used in RV 172 and developed by the VRC.

There has been less HIV vaccine research in Tanzania than in Kenya and Uganda, but in 2005, researchers at the Karolinska Institute and Muhimbili University College of Health sciences and U.S. Military HIV Research Program

(USMHRP) began a safety and immunogenicity study of a DNA candidate and a MVA vaccine in a prime boost regimen. A phase I/II trial will enroll 60 volunteers in Dar es Salaam, Tanzania. Finally, in 2006, the Mbeya Medical Research Programme, the USMHRP and the University of Munich started testing a multiclade HIV-1 6 plasmid DNA vaccine and Recombinant Adenovirus 5 vectored vaccine in a multi-site trial with other sites in Kenya and Uganda.

## Impact of HIV

The high rates of HIV in the region have had devastating social and economic impacts in all three countries. In this section, we describe the impact of HIV on life expectancy, family structure, and the social and economic impact on education, health care and agriculture.

### Demographic Impact

HIV/AIDS has dramatically reduced life expectancy in the region as elsewhere in sub-Saharan Africa. For example in Kenya, life expectancy at birth has been reduced from 62 years in 1990 to 51 years in 2004 (NASCOP, 2005; WHO, 2006). Life expectancy in Uganda and Tanzania are similar (Table 13.1; (WHO, 2006)), and are estimated to decrease even further, by 8% and 14% respectively, during 2010–2015 (Garbus, 2004; Garbus & Marseille, 2003). HIV/AIDS has had a substantial impact on national population sizes, which are estimated to as much as 15, 11 and 37% smaller in Tanzania, Uganda and Kenya respectively than would have been the case in the absence of HIV/AIDS (United Nations Secretariat, 2003).

Data sources for the population-level impact of HIV/AIDS include national population censuses, sample surveys, DHS surveys and vital registration systems (Blacker, 2004). In addition, invaluable data is provided from longitudinal surveillance systems such as the INDEPTH network (Adjuik et al., 2006; Ngom et al., 2001) which includes several surveillance sites in East Africa.

In 2005 there were an estimated 140,000 deaths due to AIDS in Kenya and Tanzania respectively, and 91,000 in Uganda, that is 1,000 deaths every day due to AIDS in this region (Adjuik et al., 2006). The surveys estimate that about 12% of all adult deaths in the two Tanzania sites (Ifakara and Rufiji) were attributable to HIV/AIDS. However, in the earlier days of the epidemic in Rakai, when HIV prevalence was 16% between 1994 and 1998, approximately 74% of adult deaths were estimated attributable to HIV infection (Sewankambo et al., 2000).

### Impact on Family Structure

Overall, an estimated 9% of children aged under 15 years have lost at least one parent to HIV/AIDS in sub-Sarahan Africa, with figures for Kenya, Tanzania and Uganda of 9.2, 8.6 and 12.4% respectively (Monasch & Boerma, 2004). In Kenya and Tanzania there is some evidence from DHS surveys that the proportion of orphans increased slightly from about 7% in 1992/93 to about 8.5% in the late 1990s. It is notable that countries with high HIV prevalence have seen an increase in orphanhood prevalence during 1990s, whilst those

with low HIV prevalence have seen decreases in orphanhood. The proportion of double orphans out of all orphans (those with no living parent) is a marker of HIV-related orphanhood, and this increased in the region during the 1990s, for example, from 4% in 1993 to 14% in 2000 in Kenya (Monasch & Boerma, 2004).

UNAIDS estimates that there were 2.9 million orphans due to AIDS in Kenya, Uganda and Tanzania in 2005 (UNAIDS, 2006). The problems faced by these children are myriad, including cycles of poverty, malnutrition, stigma, child labour, little access to education and health care, poverty and likelihood of engaging in risky sexual behaviour and crime (Matshalaga & Powell, 2002). Many of the children will themselves be HIV infected and although programs exist, such as a home-based programme for HIV positive orphans in Kampala, Uganda which provides psychological, medical and social support for children and their carers (O'Hare et al., 2005), the scale of the problem is immense.

## Macroeconomic Impact

The economic impact of HIV/AIDS comes largely from reduced labour productivity as a result of absenteeism and loss of experienced workers. In Uganda and Tanzania, it is estimated that HIV/AIDS has already resulted in welfare losses equivalent to almost 50% of the GDP (Crafts & Haacker, 2004). Three key sectors affected are the health system, education and agriculture:

### *Health System*

HIV/AIDS is causing extreme strain to the health care systems in the region with simultaneous increased demand and reduced supply, with an increased number of people seeking services and in the absence of widespread ART, increased attrition and absenteeism of healthcare workers (Over, 2004). In 1996, an estimated 39% of hospital beds in Nairobi and 56% in Kampala were occupied by HIV positive patients (Over, 2004). Other major costs to the health sector include safety measures such as needle sterilization and screening of blood and demands for increased pay for healthcare workers to compensate for the increased risk of becoming HIV infected (Over, 2004).

Governments face the multiple challenges of securing the resources needed to treat those already infected, preventing further transmission, and treating other diseases such as TB and malaria. In addition, the health care referral system becomes distorted as demand for quality care, and possibly desire for anonymity, can lead AIDS patients to bypass primary care facilities in favour of more expensive tertiary institutions (Loewenson & Whiteside, 2001).

### *Education*

A national study by the Government of Kenya and UNICEF in 2000 found that HIV/AIDS had had a widespread impact on education in many ways, including directly through infection of teachers and students, through fears of becoming infected at school, and through the competing commitments of teachers to their families and communities (Government of Kenya & UNICEF, 2000). In Uganda, mortality for both primary and secondary school teachers peaked during 1995–1997 and more recent studies from the World Bank found no major

direct impact of HIV/AIDS on teacher absenteeism although the education of HIV-affected children, including orphans, was a major problem (Hyde et al., 2001).

***Agriculture***

Agriculture is the major source of livelihood in the region, including crop, livestock and fisheries production. The household-level impact of HIV translates into decreased agricultural and fish production as well as loss of skills and knowledge about indigenous farming methods. According to the Food and Agriculture Organisation (FAO) of the United Nations, Kenya, Tanzania and Uganda will have lost 13–17% of their agricultural labour force because of HIV by 2020 (FAO, 2001). All three countries border Lake Victoria and HIV prevalence is especially high in fishing communities such as Rakai, Kagera and Kisumu, as has been found in other countries (Kissling et al., 2005). There is a need to develop appropriate HIV/AIDS messages for agricultural workers, to recognize HIV as a development issue as well as a health issue, and to formulate sound workplace HIV prevention programs (FAO, 2002; Rugalema, 1999).

## HIV Treatment and Care

The countries in this region have played a major role in setting standards for HIV treatment and care. Uganda pioneered the concept of home-based care for people with AIDS. All three countries now have active HIV treatment and care policies but access to care remains inadequate due to health system constraints. Community and church-based organisations continue to play a central role in expanding access to services but sustainability of the treatment programmes will depend on strengthening the national systems and continuing to promote awareness of HIV in order to reduce stigma.

### AntiRetroviral Therapy

As in other areas of the HIV/AIDS epidemic response, Uganda took the lead on provision of ART in sub-Saharan Africa establishing the National Committee on Access to ART in 1996. The 1998 Drug Access Initiative advocated for reduced prices for ART and provided support for developing infrastructure necessary for administering them. At that time, there was no public provision of ART in Kenya or Tanzania (WHO, 2002).

In all three countries, standard treatment guidelines were developed (in 2002 in Kenya, 2004 in Uganda and Tanzania) in accordance with the WHO treatment guidelines which simplify ART delivery and commodity management and minimise procurement costs. The current first line regimen in the region is stavudine (or zidovudine) plus lamivudine/nevirapine. First line therapy substitutes efavirenz for nevirapine for two months for people in the initiation stage of TB treatment and switches drugs in case of complication (to stavudine/lamivudine/efavirenz or zidovudine/lamivudine/efavirenz) (WHO, 2005a,b,c).

Uganda pioneered a home-based care program to deliver and monitor ART in the Tororo and Busia districts in May 2003 (Weidle et al., 2006). Home-based care has become a major resource in the region as a response to inadequate health care facilities, difficulty in accessing the available care facilities, and a

preference for care and death in the home setting (Garbus, 2004; NASCOP, 2005; Walker, 2003). Home-based care is essentially community based, with no direct government participation, organised largely by NGOs, with financing from external donors (Walker, 2003). In general, demand for home-based care far exceeds available resources, especially in rural areas which are particularly underserved. For example, the Miwani Home-Based care program is a community-based organisation in Nyando District, Kenya, where in 2002, the estimated HIV prevalence was 28% (Johnson & Khanna, 2004). The organisation focuses on people living with HIV/AIDS and AIDS orphans and is partially funded by community-generated microfinance projects which are operated by unpaid community health workers. The main obstacles to provision of home-based care in this program were lack of transportation for clients living far away, and lack of tangible incentives for the health workers (Johnson & Khanna, 2004). Thus, the burden of AIDS care remains heavily with households, particularly women and girls.

As in many other African countries, coverage of ART has improved significantly in recent years, but remains unacceptably low. In December 2006, fewer than half of those with advanced HIV/AIDS received ART in Uganda and Kenya (41% in Uganda, 44% in Kenya), and in Tanzania coverage was just 18% (WHO, 2005b). The low coverage results from many factors including cost, shortage of trained healthcare personnel, inadequate infrastructure, and stigma associated with HIV treatment (WHO, 2005a,b,c).

The cost of treatment has declined rapidly as illustrated in Figure 13.6, which shows how the number of people on ARVs in Kenya increased rapidly as the cost decreased. A Kenyan company has recently received a voluntary licence from GlaxoSmithKline for the local manufacture of ARVs, which may help to lower drug prices in the future (WHO, 2005a).

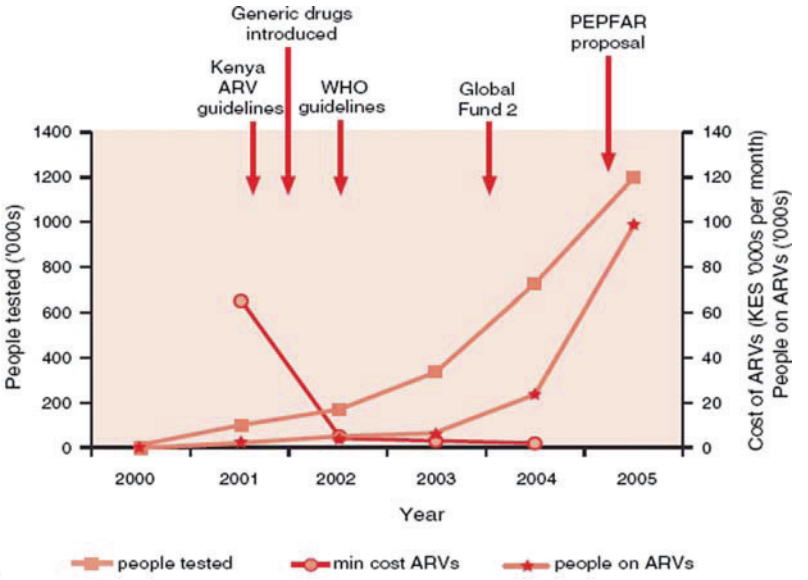


**Figure 13.6** Critical events in HIV/AIDS epidemic in Kenya
Source AIDS in Kenya, 7th ed. Nairobi: NASCOP; 2005).

However, even with lowered costs, a qualitative study in Kagera region, Tanzania, showed that difficulties with access to ART included transportation and supplementary food costs, an unfriendly and confusing hospital, and difficulties in sustaining long-term treatment. The over-riding concern, however, was stigma (Mshana et al., 2006).

In Uganda, a breakthrough in ARV prices occurred in October 2000 when the Joint Clinical Research Centre (JCRC) began importing low-cost generic ARVs manufactured by the Indian pharmaceutical company Cipla. ARVs have been made freely available throughout the public sector since 2004 in Uganda and Tanzania, and 2006 in Kenya (WHO, 2005b).

An additional problem in the region is that few institutes have facilities to perform the necessary tests to monitor ART. The need for CD4 cell counts and viral load testing was probably not fully appreciated until it became a major constraint to good patient management and care. However, following drug price reductions and international donors' assistance, access to these tests is increasing. In Uganda, three institutions currently provide HIV/AIDS reference laboratory services: UVRI, the JCRC, and Makerere University-JHU Research Collaboration Core Lab. The user pays the costs of laboratory tests, which average for a CD4 count test USD 30–50, and for viral load testing USD 100. Tests are usually performed only when clinically necessary. The MoH plans to place a CD4 counter in each of the 11 regional hospitals (Okero et al., 2003). In Tanzania, the number of laboratory facilities with CD4 count facilities increased from 10 in 2003 to 41 in September, 2005 (WHO, 2005b). In Kenya, a PEPFAR-funded program has been developed to strengthen laboratory capacity at the national level.

### Treatment of Opportunistic Infections

Treatment of opportunistic infections (OIs) has been largely unavailable in resource-poor areas, due to scarce resources of trained personnel, diagnostic facilities, and drugs. The current capacity to treat OIs is thus limited in the region especially in periurban and rural areas (USAID, 2003). In Uganda and Tanzania, the antifungal medicine Diflucan (fluconazole) is now available free of charge for the treatment of Cryptococcal Meningitis and esophageal candidiasis, and is distributed to government referral hospitals, mission hospitals, the police, the armed forces, prisons, and, in Uganda, all TASO centers. In Kenya, management of HIV/TB co-infection has improved and in 2005, 14% of TB notifications were tested for HIV, of which 57% were HIV positive. 80% of these individuals were reported to have started on cotrimoxazole preventive therapy against bacterial infections (WHO/UNAIDS/UNICEF, 2007). In Uganda, cotrimoxazole and isoniazid prophylaxis for TB were provided to an estimated 2% of HIV-positive adults in need of it in 2001, and access to treatment for OIs outside Kampala and in rural areas was deemed minimal (WHO, 2002).

## Assessment of the Response and Current Challenges

Since 2005, following the UNAIDS "Three Ones" initiative which calls for every country to have one system for country-level monitoring and evaluation, all three countries have national HIV/AIDS monitoring and evaluation systems.

These systems allow each country to evaluate their progress towards the goals and objectives stated in their respective Strategic Frameworks. Implementation of these systems is essential to document successes and weaknesses, and to guide strategic decision-making. Community-level responses have been of central importance in many initiatives, including home-based care, support for orphans and vulnerable children, and HIV/AIDS prevention and mitigation. However, despite macroeconomic progress in the region, Kenya, Tanzania and Uganda remain among the world's poorest countries. Their HIV/AIDS activities continue to be heavily reliant on external donors, a scenario that raises concerns regarding sustainability, and a major challenge is to increase government funding to respond to the HIV/AIDS epidemic.

Uganda has seen a substantial and sustained decline in HIV prevalence. This is largely attributable to behavior change, high-level commitment to awareness and prevention, community mobilization, involvement of key national stakeholders and pioneering NGO projects, a multi-sectoral response, condom distribution, VCT and involvement of marginalized populations. However, despite the early, sustained, and wide-scale political commitment to fight HIV shown by President Museveni and his government, challenges remain especially regarding technical and biotechnical activities. For example, improving the private and public health care systems (staff, infrastructures, material), scaling up best practice of PMTCT, providing VCT and ART to those who need it are among the challenges which were emphasised by Alex Coutinho of TASO in February 2003 (Coutinho, 2003) and which remain challenges today.

The government of Tanzania has made significant progress in establishing an institutional, multi-sectoral framework required to scale-up the response to HIV but although ministerial and district AIDS committees have been established, most of them are not yet effective and need to be implemented. Currently, in term of prevention, PMCT, VCT and STI treatment services need to be reinforced, stigma and discrimination are still major barriers in the country, and improved communication efforts focused on increasing public knowledge are needed. Regarding treatment, much of Tanzania's institutional infrastructure has limited capacity to respond to HIV/AIDS. Accessibility to ART is poor and needs to be increased. Personnel and other human resource limitations are likely to become increasingly acute as the response to the epidemic is scaled up and flows of HIV/AIDS funds into the country increase.

Overall prevalence of HIV in Kenya is now declining, but there are major differences in the risk of infection faced by different population groups. The HIV/AIDS response has been concentrated in urban areas and further prevention interventions in rural areas, and among populations at high risk of acquiring HIV are needed. The scale up of ART is on-course but availability of affordable treatment still falls far short of the need. These two major issues have been taken into consideration in the Kenya National HIV/AIDS Strategic Plan (2005–2010) (Kenya Ministry of Health, 2005).

To conclude, the region of East Africa provides a fascinating insight into the history of the HIV epidemic. Since 1982 when the first cases were identified in Uganda, the region has provided a wealth of research and policy initiatives, which have changed global HIV policies, and shown that behaviour change programmes can be successful. Contrasting the dynamics of the epidemics in the three countries shows clearly the need for sustained political will, strong

governmental leadership and widespread community involvement to address the multitude of issues encompassed by the spread of HIV.

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# Chapter 14

## Southern Africa (South Africa, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia, Zimbabwe)

James Alasdair McIntyre, Guy de Bruyn, and Glenda Elisabeth Gray




D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_14, 

## HIV/AIDS in Southern Africa

Southern Africa, incorporating South Africa, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe, is the region most affected by HIV-1 infection in the world. AIDS cases were documented in the region from 1982 (Ras et al., 1983; Raine et al., 1984; Brunet & Ancelle, 1985) and these nine countries, home to an estimated 32% of global HIV infections, have the highest population prevalence figures of any nations (Table 14.1) (UNAIDS, 2006b). The region leads in all the wrong ways: South Africa has the highest number of people living with HIV/AIDS; Swaziland, Botswana and Lesotho are the three countries with the highest prevalence rates in the world (UNAIDS, 2006b); and Mozambique has had one of the steepest increases in prevalence over time (World Health Organization, 2007). Nevertheless, there are some signs of hope: treatment programmes are expanding rapidly in all the countries of the region, and some signs of a decline of new infections are emerging, especially in young people.

## Emergence and Form of the Epidemic in Southern Africa

The early epidemiology of HIV/AIDS in South Africa was similar to the risk groups that emerged in the United States, with the epidemic particularly affecting homosexual men and patients with hemophilia. In other Southern African countries the epidemic appears to have been spread heterosexually from the beginning. The dominant viral subtype in all of the countries of Southern Africa is subtype C (Table 14.2) (Becker et al., 1995; Bredell et al., 1998; Engelbrecht et al., 1999; Novitsky et al., 1999; Ping et al., 1999; van Harmelen et al., 1999; Batra et al., 2000; Ndung'u et al., 2000; Engelbrecht et al., 2001; van Harmelen et al., 2001; Bredell et al., 2002; McCormack et al., 2002; Trask et al., 2002; Bessong et al., 2005).

Few early population samples are available; the earliest detected subtype C sequences were isolated from Malawian samples in 1983 (McCormack et al.,

**Table 14.1** Current estimates of population HIV prevalence in Southern Africa.

| | Population (million) | HIV Prevalence Rate Adult 15–49 [95% CI] | People living with HIV/AIDS [95% CI] |
|---|---|---|---|
| **Botswana** | 1.8 | 24.1 [23.0–32.0%] | 270,000 [260,000–350,000] |
| **Lesotho** | 1.8 | 23.2 [21.9–24.7%] | 270,000 [250,000–290,000] |
| **Malawi** | 13.5 | 14.1 [6.9–21.4] | 940,000 [480,000–1,400,000] |
| **Mozambique** | 20.5 | 16.1 [12.5–20.0] | 1.8 million [1,400,000–2,200,000] |
| **Namibia** | 2.1 | 19.6 [8.6–31.7] | 230,000 [110,000–360,000] |
| **South Africa** | 47.7 | 18.8 [16.8–20.7%] | 5,500 000 [4, 900 000–6, 100, 000] |
| **Swaziland** | 1.0 | 33.4 [21.2–45.3%] | 220,000 [150, 000–290, 000] |
| **Zambia** | 12.1 | 17.0 [15.9–18.1%] | 1,100,000 [1, 100, 000–1, 200, 000] |
| **Zimbabwe** | 13.2 | 20.1 [13.3–27.6%] | 1,700,000 [1, 100, 000–2, 200, 000] |

Source: UNFPA (2007). *State of the World's Population, 2007*. New York: UNFPA. UNAIDS (2006). *2006 Report on the Global AIDS Epidemic*. Geneva: UNAIDS.

**Table 14.2** Subtype specimens recorded from Southern Africa.

| | Subtype specimens deposited | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **A2C** | **A** | **B** | **C** | **D** | **G** | **Other** | **Total** |
| **Botswana** | – | – | – | 209 | – | – | 3 | 212 |
| **Malawi** | – | 10 | – | 781 | 13 | – | 10 | 814 |
| **Mozambique** | – | – | – | 107 | 2 | – | – | 109 |
| **South Africa** | – | – | 54 | 2004 | – | – | 57* | 2115 |
| **Zambia** | 16 | – | – | 1181 | – | 28 | 21† | 1246 |
| **Zimbabwe** | – | – | – | 241 | – | – | – | 241 |

* Other includes isolates classified as: A/ A1/ A2/ D/ G/ AG/ A2C/ AC/ A1CDGKU/ CK/ CD/ A1C/ U.

† Other includes isolates classified as: A/ A1/ A2/ A1C/ D/ J/ C1/ C2.

Source: Los Alamos National Laboratory, HIV sequence database; accessed April 7, 2007.

2002). While subtypes A and D were also present among the earliest infections (between 1982 and 1984), subtype C went on to cause the majority of infections by 1986–1989. The early AIDS cases in the Southern African region were associated with infection with subtype B and D isolates (Williamson e t al., 1995; Loxton et al., 2005). As most of these early cases were mainly among men who have sex with men (MSM), the predominantly subtype B viruses likely reflects acquisition in emerging subtype B epidemics in developed nations (Engelbrecht et al., 1995; Maartens et al., 1997; van Harmelen et al., 1997). Other isolates, including those related to subtype A, circulating recombinant forms, as well as a diverse variety of forms which were likely imported have also been identified in the region (Becker et al., 1995; van Harmelen et al., 1999; Bredell et al., 2000, 2002).

## Quantifying the Epidemic

The form of the HIV/AIDS epidemics in Southern Africa is largely understood through data generated by national HIV surveillance programs (Pisani et al., 2003; Garnett et al., 2006). In all Southern African states this surveillance is largely achieved through sentinel site monitoring, particularly among women attending antenatal clinics (ANCs). Programs have been in place since the 1980s in Malawi, Mozambique, Zimbabwe, and Zambia, in some cases being focused initially on one or a few sites. Other countries in the region initiated programs in the 1990s or later. The limitations of surveillance by this approach are well known, particularly the problem with generalizing to men, generalizing to women at both older and younger ends of the age spectrum, generalizing to women in settings where hormonal contraceptive prevalence is high, as well as the overall impact of HIV on fertility and by extension the population of women visiting ANCs (Garnett et al., 2006).

In some settings, antenatal clinic surveillance has been supplemented by nationally-representative or local population-based surveys (including workplace evaluations) of HIV prevalence and assessments of sexual behavior (Shisana & Simbayi, 2002; Pettifor et al., 2005b; Shisana et al., 2005). HIV incidence data are limited in all locations, being primarily available from clinical trials or observational cohorts. The adoption of laboratory measures

to evaluate HIV incidence using cross-sectional samples in the region has been limited owing to the need for further validation and refinement of certain available tests. In late 2005, the Joint United Nations Program on HIV/AIDS (UNAIDS) advised that the BED assay not be used for surveillance or population monitoring owing to discrepancies between the results of BED and other direct or indirect assessments of incidence in a variety of settings including Southern Africa (UNAIDS Reference Group on Estimates, 2005).

Population-level impacts of HIV/AIDS are also evident in national mortality statistics, where reasonably accurate causes of death can be determined, or the relative fraction attributable to HIV can be ascertained for some or all deaths (Hosegood et al., 2004). For some settings, these various sources of data can then contribute to detailed epidemic models and projections, constructed by organizations such as the Actuarial Society of South Africa (ASSA) (Dorrington et al., 2006).

## Qualities of the Epidemic

The Southern African region is affected by high prevalence, generalized epidemics, with acquisition occurring predominantly through heterosexual transmission. A sizeable minority of infections also occur through mother to child transmission (MTCT). Compared to Central or East Africa, the HIV/AIDS epidemic emerged slightly later in the heterosexual population, after initially being described in MSM. Injection drug use is uncommon in the region. Little recent data is available about this risk factor for HIV acquisition, but early reports did not indicate that HIV was prevalent among injection drug users (IDUs) (Sher, 1986; Williams et al., 1997). The rising use of methamphetamine and other non-injecting "club drugs", particularly in the Western Cape region in South Africa, (Morris & Parry 2006, Parry et al., 2007) however, may contribute to sexual risk in the region. Alcohol use appears to be an important behavioral mediator of HIV acquisition, as it is associated with several risk behaviors among both men and women in national surveys in Botswana (Weiser et al., 2006b), South Africa, (Simbayi et al., 2006) and elsewhere. Transactional sex, which is a broader concept than typically applied to commercial sex work and entails exchange of sex for material gain, is common in some settings, including urban environments and in the mining communities where male migrant labor is concentrated (Dunkle et al., 2004; Williams et al., 2003).

Age and gender sexual dynamics are a key element in understanding regional HIV/AIDS epidemics. This is well illustrated by recent South African data (Pettifor et al., 2005b). Young men and women have a similar HIV prevalence in early teen age strata (2.3% vs. 4% among 15–16 year olds), but young girls and women become rapidly infected thereafter so that by age 21, 31.2% of women are HIV infected compared to 5.8% of their male peers (Figure 14.1). Remarkably, these data suggest that the per-partnership transmission probability for young South African girls approaches one, far higher than previous transmission probability estimates (Pettifor et al., 2007). Many factors may be contributing to womens' heightened risk. The practice of young women having much older partners has been associated with an increased risk of HIV infection (Gregson et al., 2002) as has intimate partner violence (Dunkle et al., 2004;

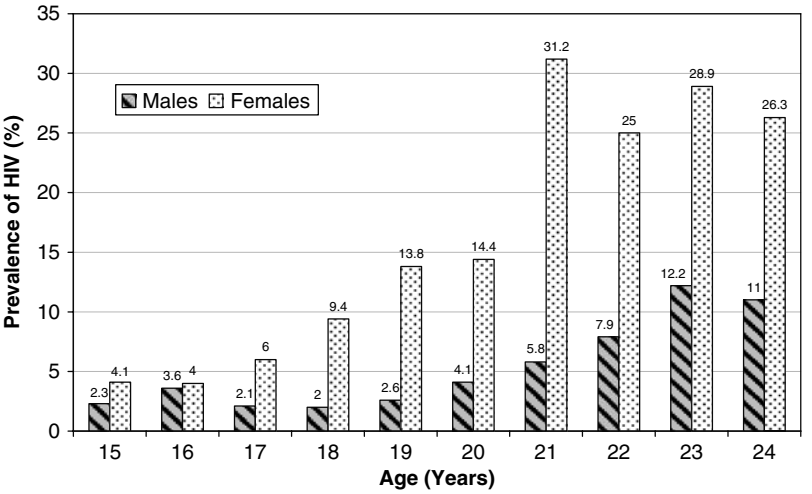


**Figure 14.1** Age and gender-specific HIV prevalence rates among 15–24 year old youth in a South African national survey. Adapted from Pettifor et al. (2005b).

Kalichman & Simbayi, 2004). High levels of intimate partner violence have been reported in the region (Dunkle et al., 2004; Brown et al., 2006).

In comparative studies, it is biological factors however that seem to account for differences in HIV prevalence among different African locations, after adjusting for levels of sexual risk behavior (Auvert et al., 2001). In particular, the seroprevalence of Herpes Simplex Virus-type 2 (HSV-2) and prevalence of male circumcision are two factors that appear important in explaining differences between communities. Multiple studies have reported an elevated risk of HIV acquisition among persons with prevalent HSV-2 (Wald & Link, 2002) and this risk may be magnified following HSV-2 acquisition (Reynolds et al., 2003). The reduction in HIV susceptibility following male circumcision is also well demonstrated, most recently in the setting of randomized controlled clinical trials in three African populations (Auvert et al., 2005; Bailey et al., 2007; Gray et al., 2007).

## Epidemiology of HIV/AIDS in Southern Africa

### *South Africa*

In South Africa, the first two reported cases of AIDS were in MSM, both white men who worked for an airline and traveled frequently to the United States (Ras et al. 1983). The number of reported cases rose over the next few years, and occurred predominantly among MSM (Spracklen et al., 1985; Sher, 1986). HIV antibody tests were not available until the mid 1980s, at which point South Africa's pioneering AIDS researcher Reuben Sher reported a prevalence of 13% among stored samples from 1983 (Sher, 1989).

Transfusion related infections also rose in the late 1980s. Patients with inherited clotting disorders had been mainly treated with locally produced clotting factor replacement, although a local shortage in the early 1980s required

importation of pooled factor-VIII concentrate from the United States, with consequently high rates of HIV infection found among patients who received the imported product (Cohn et al., 1990). The virus appears to have spread rapidly to the heterosexual population in the late 1980s. Initial studies had demonstrated infection in migrant mine workers from other parts of Southern Africa, but not in South African born residents (Dusheiko et al., 1989) until it was reported in two black South African women in 1988 (Botha et al., 1988). By this time several surveillance projects were in place, including screening of blood donations. A total of 166 AIDS cases had been reported, with 22 in the black community, three of which were in children (Sher, 1989).

The first report of HIV prevalence in a large series of pregnant women came from Baragwanath Hospital in Soweto in 1989. HIV testing in almost 7,500 women showed a prevalence of 1 in 313, or 0.3 % (Snipelisky et al., 1989). National anonymous antenatal clinic surveillance surveys were started by the South African Department of Health in 1990. A generalized epidemic was already present by this time, when the first survey demonstrated an HIV prevalence of $>1\%$ among women attending care in public-sector antenatal clinics. The national anonymous antenatal HIV seroprevalence surveys provide a graphic illustration of the failure of prevention efforts over time in women of childbearing age (Department of Health, South Africa, 2006). The rate in the first survey in 1990 was 0.7%. Five years later, in 1995 it was 10.4%, more than doubling in the next five years to 22.4% in 2000, and continuing to rise to 30.2% in 2005. Summary figures released for 2006 show a slight decline to 29.1% (Department of Health South Africa, 2007). Extrapolating these results to the annual number of pregnancies of around 1.1 million in 2007 suggests that upwards of 320,000 pregnant women newly test HIV positive each year, or nearly 1,000 each day across the country. The provincial data from 2006, shows a national average of 29.1%, but this average hides wide provincial differences, ranging from 15.2% (95% CI: 11.6–18.7) in the Western Cape to 39.1% (95% CI: 37.5–40.7) in kwaZulu Natal. Large differences can also exist within provinces. An analysis at the district level in the Western Cape in 2004 showed a range of HIV prevalence in pregnant women from 1 to 33% (Shaikh et al., 2006).

Prevalence statistics provided by antenatal surveys can not account for the possibility that a reduction in rates may not be due to a decrease in the number of new infections but rather to the fact that women of child bearing age are dying and that HIV infected women are experiencing the reduced fecundity which is associated with HIV infection. Indeed the Statistics South Africa mortality figures suggest that this may be the case, showing a more than three-fold increase in the number of deaths per year in women aged 20–30 years between 1997 and 2004 (12,754–41,737) (Statistics South Africa, 2006). More encouraging has been a drop in prevalence in the youngest age group in the antenatal survey, those younger than 20 years, from 15.9% in 2005 to 13.7% in 2006.

Epidemic expansion was particularly explosive in the 1990s, during a period of social disruption resulting from political conflict in the province just prior to and following the end of the apartheid era. Other factors which contributed to this explosive increase included labor migration (Lurie et al., 2003), lack of access to condoms and other prevention technologies, a low rate of male circumcision, poverty resulting in sex work and female economic reliance on men, and gender violence (Langen, 2005).

In 2006, it was estimated that 5.54 million South Africans have HIV, the most affected country in the region (Dorrington et al., 2006), with 18.8% of the adult population (15–49 years) affected. HIV prevalence varies by residence, with population level prevalence in informal urban areas being nearly twice as high as in formal urban areas (17.6% vs. 9.1%) (Shisana et al., 2005), and region. In the eastern KwaZulu-Natal province of South Africa, HIV prevalence has increased fastest and reached the highest prevalence levels among South African provinces. National-level HIV prevalence also varies markedly by population group, sex and age. Black Africans are six to seven times more likely to be HIV infected as compared to other race groups and females aged 15–29 are three to four times more likely to be HIV infected as compared to males in the same age group. HIV prevalence has been found to be approximately 3% in children aged 2–14 years (Dorrington et al., 2006).

In South Africa, the ASSA model indicates that prevalence rates may be attaining a plateau across all the provinces, albeit at different levels, with KwaZulu-Natal estimated to have the highest prevalence, and Western Cape the lowest (Dorrington et al., 2006). A possible explanation for the leveling of HIV prevalence is that HIV-related deaths now approximate the rates of new infections. Deaths from AIDS in South Africa are expected to peak in 2015. Life expectancy in South Africa in 2006 was estimated to be 49 years in men and 53 years in women, 13 years lower than they would have been without AIDS (Dorrington et al., 2006). HIV further impacts on population demographics by removing many women of child bearing potential from the population pool, as well as causing a steady decrease in fertility in women who have HIV (McIntyre, 2003) The ASSA model suggests that after 2011, population growth will settle at 0.5% annually (Dorrington et al., 2006), although a UN report had previously suggested that the country would enter negative population growth in 2005 (United Nations Secretariat, 2003).

High incidence rates are still reported from South Africa. The 2005 South African national HIV household survey used the BED capture enzyme immunoassay optimized for dried blood spot (DBS) specimens to estimate incidence. Overall national HIV incidence for those older than 2 years was 1.4% per year, equivalent to 571,000 new HIV infections in 2005, although among women in the 20–29 year age group, the incidence rate was 5.6% (Rehle et al., 2007). Another study revealed incidence rates among women of 6.8% in Durban and 3.4% in Soweto in the 2004–2006 period (Padian et al., 2007).

The proportion of deaths directly attributable to HIV varies from province to province, according to prevalence. While an estimated 47% of overall deaths in the country in 2006 were HIV-related, the figure was as low as 30% in the Western Cape, while approaching 60% in higher prevalence (and more highly populated) provinces such as KwaZulu-Natal, Mpumalanga, or Gauteng. Overall, mortality among females aged 20–39 years has more than tripled between 1997 and 2004. Over the same period, deaths due to AIDS-related conditions, such as tuberculosis (TB), in the age group 25–29 years have increased six fold among females and tripled among males (UNAIDS, 2006a).

***Botswana***

Botswana's first cases of HIV/AIDS were diagnosed in 1985 in the heterosexual population, and the epidemic progressed at an almost unparalleled rate in the

two decades that followed, with the highest reported rates in the world until 2004. In 2005, it was estimated that 270,000 people out of a total population of less than 2 million were living with HIV. The adult prevalence of 24.1% is second highest in the world, after Swaziland. Women make up 58% of infected adults, and life expectancy has dropped from a high of 65 years in the early 1990s to 40 years, with an even more dramatic drop for women from 66.9 to 39 years. (UNAIDS, 2006a; Fredriksson-Bass et al., 2007) Census data showed a 62% increase in mortality between 1991 and 2001 (UNAIDS et al., 2007). This increase has been seen across all levels of society: for example, by 2005, Botswana had lost 17% of its healthcare workforce due to AIDS (World Health Organization, 2007).

Much of the information on the Botswana epidemic has come from antenatal surveillance surveys in place since 1992. These have shown that prevalence in pregnant women increased from 18% in 1992 to a peak of 38.5% in 2000, and has since declined to 33% in 2005 (World Health Organization, 2007). Although rates have declined across the country, they remain very high in some areas, including the highest in Selebi-Phikwe, where an antenatal care HIV prevalence of 46.5% was recorded in 2005 (down from 52% in 2003). The greatest declines have been in younger women, although in 2005, over 40% of pregnant women 25–39 years were HIV-infected and 49% of those aged 30–34 years (UNAIDS, 2006b; Seipone, 2006).

Many factors have been implicated in the explosive growth of the HIV epidemic in Botswana. One of these is the mobile nature of the population, many of whom have homes both in the cities and in the rural areas. Others are the inequality in income which still exists across the country, despite Botswana's relative affluence compared to other countries in the region, and the high rates of migrant labor in the mining industry (Stegling, 2005). Another major factor is thought to be related to the subordinate status of women, and the lack of control that women have over their sexual lives and risks.

Several studies have also documented relatively high rates of concurrent sexual partnerships. In one study 23% of 546 sexually active adults interviewed reported having a concurrent relationship in the previous year, and this was more common in men, in those under 25 years of age and in those who regarded themselves as "non-religious"(Carter et al., 2007). A similar pattern has been reported among people living with HIV/AIDS (PLWHA), where 20% reported concurrent partnerships in the preceding three months. Although condom use was reported by 80%, the primary partners of those with multiple partners were less likely to be protected by condom use, and those with concurrent relationships were less likely to have disclosed their status (Kalichman, 2007). These data reinforce the need for effective prevention interventions with HIV-positive adults.

The increase in infection in Botswana has occurred despite widespread knowledge about HIV: 99% of Batswana in one 2005 survey were aware of sexual transmission of HIV and 97% knew of the protective effect of condoms (Physicians for Human Rights, 2007). In the 2004 Botswana AIDS Impact Survey II, a household survey in a representative population, 60% of men reported always using a condom. Condom use was 25.6% in married men, but around 70% of men reported always using a condom with non-regular partners or sex workers (National AIDS Coordinating Agency Botswana, 2005). In the same

survey, however, only one third of young people aged 15–24 had comprehensive knowledge of HIV preventive practices, suggesting that prevention programs have not yet impacted fully on this population.

***Lesotho***

Lesotho has one of the highest prevalence rates in the world, with estimates of an adult prevalence of 29.8% in 2006, and 270,000 people living with HIV/AIDS in a population of 1.8 million. Of these, 16,000 are children, while projections suggest that an additional 97,000 children are orphans (UNAIDS, 2006a). In the 2004 Lesotho Demographic and Health Survey (DHS), HIV prevalence was higher in total in women than in men (26% vs. 19%), higher in women than men under 30, and higher in men than in women, aged 40–49. HIV prevalence is higher in urban areas than in rural areas, and higher among those with lower levels of education (Ministry of Health and Social Welfare Lesotho et al., 2005). The prevalence of HIV in adults in Lesotho has stayed relatively stable for several years, but these figures mask the effect of increased numbers of HIV/AIDS related deaths, and suggest continued high levels of new infections (UNAIDS, 2006b).

***Malawi***

Malawi is one of the poorest countries in Africa, and one of the hardest hit by the HIV/AIDS epidemic. The first cases were described in 1985, and HIV prevalence increased rapidly through the early 1990s. Prevalence rates have stabilized since the mid 1990s, in part due to increased AIDS-related mortality. In 2005, close to a million people were estimated to be living with HIV out of a population of 12.3 million. With 78,000 AIDS-related deaths each year, AIDS is the leading cause of death and life expectancy is now 38.5 years. The adult prevalence rate was 12.7% in the 2004 Malawi DHS survey and estimated at 14.1% by UNAIDS in 2006. Prevalence is higher in women than in men (13% vs. 10%), (UNAIDS, 2006b; National Statistical Office (Malawi) & ORC Macro, 2004). Prevalence rates vary across the districts of the country, and are higher in urban areas as compared to rural areas (17% vs. 11% for all adults), although 85% of Malawians live in rural areas. This prevalence difference between urban and rural is more marked in men (16% vs. 9%) than in women (18% vs. 13%).

***Mozambique***

Unlike some Southern and Eastern African countries, Mozambique has seen a continued increase in prevalence rates between 2000 and 2005. At the end of 2005, the estimated adult prevalence was 16.1%, with 1.4 million to 2.2 million people living with HIV/AIDS. A sharp increase in infections in young women was documented between 2000 and 2004, rising from 11 to 16%.(World Health Organization, 2007). There are higher rates in the south and central part of the country, and in the provinces around the capital Maputo (reaching up to 27%). Even in the Northern provinces, previously severely impacted by the outbreak and aftermath of a prolonged civil war, prevalence rates have doubled since 2000, to above 10%. The virus is spreading most rapidly in those provinces linked by major transport routes to Malawi, South Africa and Zimbabwe (UNAIDS, 2006a).

### *Namibia*

Namibia's adult HIV prevalence was 19.6% in 2006, with around 230,000 people living with HIV. Prevalence rates vary considerably across the country, from highs of over 40% in pregnant women in the North East, to below 10% in the Himba area of Opuwo in the North West. Biennial antenatal prevalence surveys have been in place since 1991, and have shown an increase from 3% in 1991/1992 to 26% in 2006, with higher rates in the major urban centers. AIDS is a leading cause of mortality, accounting for more than half of all deaths (UNAIDS, 2006a).

### *Swaziland*

Swaziland, with a population of 1.1 million, has the highest HIV prevalence rate in the world. The first cases were reported in 1986. Antenatal surveillance surveys have shown an increase from 3.9% in 1992 to 42.6% in 2004, although initial reports from 2006 describe a decline to 38.6% (Swaziland National Emergency Response Council on HIV/AIDS (NERCHA), 2005; IRIN plus news, 2006). Results from the first Swaziland DHS found that 26% of sexually active adults were HIV infected, with 49% of women between the ages of 25 and 29 infected, and 45% in men aged 35–39.

Almost one third of children in surveyed households were orphaned, and another 12% are considered to be vulnerable, in that their survival, well-being or development is threatened by HIV/AIDS (Measure DHS, 2007). The country has also experienced an increase in its Crude Death Rate from 9.9 deaths per 1,000 population in 1998, to 22.7 deaths per 1,000 population in 2002 as a result of AIDS mortality. It is projected that this rate will reach 30.2 deaths per 1,000 population by 2010, with annual AIDS deaths rising from 1,470 in 1991 to an estimated 21,730 by 2015, in the absence of widespread access to Anti-retroviral therapy (ART). The prevailing picture is of a country in crisis, as HIV/AIDS affects the supply of labor, the availability of skilled professionals, including teachers and nurses, creates vulnerable households, worsens food insecurity, and overloads the country's health infrastructure (Swaziland National Emergency Response Council on HIV and AIDS, 2005).

Many factors have been implicated in the explosive spread of HIV/AIDS in Swaziland, several of which are common to other countries in the area, including a high rate of male migrant labor, high levels of poverty and the subservient status of women, and HIV-related stigma and discrimination. Several traditional practices common in the country may further fuel the epidemic, including polygamy, wife inheritance and restricted inheritance laws for women.

### *Zambia*

The first cases of AIDS in Zambia were diagnosed in 1984, and prevalence rates rose rapidly to reach peaks of around 27%. In 2005, the national HIV prevalence rate was 17%, or 1,100,000, 57% of whom were women. The highest rates are in the mining areas of the Copperbelt and along the main transport routes. The impact of the epidemic is severe: one in six adults are infected, life expectancy at birth has dropped below 40 years, almost 100,000 people die from AIDS annually and over 70,000 children have been orphaned by AIDS.

Young people in Zambia have a 50% chance of dying of AIDS in the absence of treatment (UNAIDS, 2006a). Prevalence rates in antenatal surveys, in place since 1999, have stabilized slightly, although there is wide variation across the country. The rate of HIV infection in women 15–19 years in Lusaka dropped from 28.4% in 1993 to 14.8% in 1998, and in national surveys HIV prevalence in this age group decreased from 20% in 1994 to 14% in 2004 (Fylkesnes et al., 2001) (UNAIDS, 2006b).

***Zimbabwe***

In Zimbabwe, the first cases of AIDS were reported in 1985 and by 1989 prevalence levels of over 3% were being reported. In the first antenatal survey, in 1990, HIV prevalence among pregnant women was 10% (UNAIDS, 2005). Rapid increases in the population prevalence of HIV were seen in the 1990s, reaching estimates of 29% by 1996, but dropping since then to national government estimates in 2005 of a prevalence of 20.1% or 1.7 million people living with HIV/AIDS. In antenatal care surveys, the rate in 2000 among pregnant women was 32.1% and in 2004, 23.9% (Pembrey, 2007; UNAIDS, 2006a; Gregson et al., 2006). These trends suggest that the epidemic has matured to a point where new infections are matched by deaths due to AIDS. Although, it is also possible that these declines are associated with prevention interventions. The decrease in HIV prevalence observed in Zimbabwe makes it the only country in Southern Africa to report a drop in prevalence, although some East African countries have done so. While this rate remains one of the highest in the world with one in five infected, this reported fall in seroprevalence has been the source of some controversy given Zimbabwe's chaotic political and economic situation.

Against the background of political oppression, economic instability and hyperinflation (estimated at over 4,000% in mid 2007) and the emigration of 3–4 million Zimbabweans, reported prevalence figures are difficult to interpret. In addition, the government's 2005 Operation Murambatsvina or "Clean Out Garbage", forced up to 700,000 Zimbabweans out of the main city, and away from access to HIV/AIDS surveillance or treatment. Food supplies have been severely disrupted since 2006, with increasing reports of malnutrition and hunger. Reductions in prevalence may reflect reduced incidence, increased deaths or both. Linked to the political issues in Zimbabwe is a lack of donor funding that has constrained the rollout of treatment efforts, and at least part of the decrease in prevalence is thought to be due to increased numbers of deaths in the absence of widespread treatment access (International Treatment Preparedness Coalition (ITPC), 2007). Despite these concerns, a real decrease in new infections does appear to be happening in younger Zimbabweans, and changes in sexual behavior, with increased condom use but little change in age at sexual debut have been documented (UNAIDS, 2005; Hallett et al., 2007; Mahomva et al., 2006). The 2005–2006 Zimbabwe DHS included anonymous HIV testing in a representative sample of women aged 15–49 years and men aged 15–54 years and demonstrated an HIV prevalence in adults of 18% (21% in women and 15% in men) (Central Statistical Office Zimbabwe & Macro International Inc. 2007).

## Prevention and the Community and Political Response

### Confronting the Epidemic in South Africa

There have been numerous initiatives in South Africa to halt the spread of HIV, including national campaigns by the government and a wide array of local initiatives by community and non-governmental organizations (NGOs). These are supported by the National Strategic Plan (NSP) 2007–2011, which includes ambitious targets to achieve a 50% reduction of new infections by 2011 and provide an appropriate package of treatment, care and support services (South Africa Department of Health, 2007). The South African government has committed significant resources to educational HIV prevention and support programmes over the last decade, and surveys indicate that knowledge about transmission of the virus is relatively sophisticated, although perceptions of risk are disappointingly low. This failure to effect significant behavior change has been a major challenge.

South Africa's National Strategic Response 2000–2005 articulated four priority areas: prevention; treatment, care and support; legal and human rights; and research, monitoring and surveillance (Department of Health South Africa, 2000) The government has developed a large source of information, education and communication materials which focus on the "Abstain, Be faithful and Condomize" messages. Prevention strategies have focused largely on information-based media campaigns including the Khomanani (Caring Together) Brand Campaign, Soul City, a project using television and radio dramas to raise public awareness about HIV/AIDS and loveLife, aimed at making safe sex behavior an accepted component of youth culture. The 2005 South African Health review reported that by 2004, loveLife had been seen or heard by 85% of its target market, although only 34% had participated in other aspects of the programme (Collinge, 2005). A designated sexuality programme (Life Skills: HIV and AIDS) has also been implemented in all schools in South Africa, although reports indicate that consistent condom use among youth is still not optimal. Other risk factors for HIV are often not addressed in prevention messages: one study of South African youth aged 15–24 years found that sexually active men reporting heterosexual anal intercourse were nearly twice as likely to be HIV infected as men reporting only vaginal sex (OR 1.7, 95% CI 1.0–3.0) (Lane et al. 2006).

Sexual violence and coercion are additional factors fuelling the HIV/AIDS epidemic in South Africa. Although guidelines for the management of Post-Exposure Prophylaxis following sexual assault have been developed and published in South Africa, it appears that only 35% of those sexually assaulted have received ART in the public sector (Kim et al., 2003).

A further frustration has been the seemingly little impact the improvement in free male condom distribution throughout the country, has had on the epidemic. Male and female condoms remain the most important technologies for the prevention of sexual transmission of HIV-1 in South Africa. The South African government procured 425 million male condoms and 2.6 million female condoms in the financial year 2005/6. These condoms were distributed free of charge through both traditional(public sector health facilities) and non traditional outlets (NGOs that work in HIV/AIDS) (South Africa Department

of Health, 2007). In a recent South African Human Sciences Research Council (HSRC) survey almost 70% of respondents did not pay for the last condom used (Shisana et al., 2005). While most people report easy access to free condoms when needed, condom use is variable and exclusive condom use only occurs in approximately a third of youth surveyed in South Africa (Pettifor et al., 2005b). It has been calculated from a study conducted in 1998–1999 (Myer et al., 2001), that 44% of condoms distributed are used for sex, 22% are given away, and less than 10% are discarded. Based on this data, the male condoms distributed in 2005 protected almost 20 sex acts per man for South African men aged 15–49.

Additional targeted strategies in South Africa have included increasing the number of trade unions who have implemented HIV/AIDS and sexually transmitted disease (STD) policies and the trucking industry's AIDS High Transmission project. High Transmission Areas have been identified in South Africa, with the majority of these sites situated around truck stops and prisons. At these sites, information and education materials, peer education, sexually transmitted infection (STI) syndromic management and condom distribution occurs. A similar cross-border prevention programme has been implemented in Southern Africa. Initiated in 2000, it has established 41 sites in 8 countries and 12 sub-partners in the region, with activities including STI management, condom social marketing and behavior change promotion (South Africa Department of Health, 2007).

Few prevention activities in South Africa have been targeted at MSM. As the South African epidemic came to be understood as a predominantly heterosexual epidemic, the focus on MSM infections dropped away. As Oppenheimer and Bayer (2007) have noted "amnesia would set in regarding the gay AIDS epidemic in South Africa". Despite being the only country in the region in which homosexuality is legally protected, no government led campaigns have targeted HIV in this group, no prevalence data have been generated for many years, and the current magnitude of the MSM epidemic is unknown. Some recent work has started to address this, but little is known about the epidemiology, risk factors or HIV subtype of HIV infection in MSM in South Africa (Jewkes et al., 2006; Lane et al., 2006a,b).

Prevention efforts have included access to voluntary counseling and testing (VCT). In 2005, 31% of women and 26% of men surveyed through the HSRC had previously been tested for HIV (Shisana et al., 2005), and in the public health sector, almost 2 million South Africans had received counseling for HIV testing, and of these, almost 1.4 million South Africans were tested (South Africa Department of Health, 2007).The national strategy has targeted access to counseling and testing with the aim of, by 2011, having 70% of the population tested, and 95% of health facilities routinely offering testing.

The question remains as to why, at this level of effort, there is no concomitant decline in HIV infection rates? The political history of AIDS, based on the issue of national identity, race and the conspiracy theory, threaten prevention programs. The African National Congress (ANC)-lead government's response to HIV has always been an ambivalent one. Its attempts to address the escalating epidemic have been and continue to be shrouded in controversy including the irregular funding of "Sarafina II", an "AIDS education" play; the government's promotion of "Virodene", an unsubstantiated AIDS cure; the refusal to provide interventions to prevent mother-to-child transmission of HIV; AIDS denialism;

equating nutritional supplementation to ART; and the slow pace at which government roll out of ART occurred.

### Prevention Efforts in Botswana

Stigma and the fear of disclosure have hampered Botswana's prevention campaigns from the start. Early prevention campaigns in Botswana treated HIV as a health problem and followed standard western style prevention messages. The absence of a strong HIV advocacy community in the country made it difficult for community views to be heard and incorporated into programming. Although VCT was made available in public sector services, the uptake of testing was relatively low, both for free standing VCT and in prevention of mother to child transmission (PMTCT) programmes. The government's "Tebelopele" VCT service provided free, anonymous, same-day HIV tests to 117,234 clients in the four year period from 2000 through 2004, and demonstrated an increased uptake of testing for reasons of "illness" after free ART was made available (Creek et al., 2006). Before ART was available, 8.3% of clients sought a test because of illness, and 26.3% were HIV-positive. After ART became available, 20.1% of clients sought a test because of illness, and 38.8% were HIV-positive. The factors discouraging testing are illustrated in a 2000 study, which showed that 40% of the 112 HIV-positive respondents delayed testing, mainly due to fear of the stigma resulting from a positive result. Once tested, 94% hid their results from their communities and 69% from their families (Wolfe et al., 2006). Similar factors influenced testing in PMTCT programmes: fear of knowing an HIV result, fear of stigmatization based on infant feeding and fear of the attitudes of health workers discouraged testing, while access to free ART and free infant formula was a positive reason to test (Kebaabetswe, 2007).

Against this background, the move by the Botswana government in January 2004 to make HIV testing routine in all health facilities initially met with a mixed response, with concerns about human rights, that testing may be too coercive, that it could result in gender violence or in stopping people from using public heath facilities (Cockcroft et al., 2007; Stegling, 2005). Attitudinal surveys in the first year showed that the majority of respondents supported the idea of routine testing, and believed that it would increase access to treatment and decrease stigma and violence against women (Weiser et al., 2006a). The policy proved to be remarkably successful. Testing uptake increased 134% in 2005, and 90% of those offered testing accepted it (Fredriksson-Bass et al., 2007). The success of the strategy can also be measured in the fact that 41% of those tested were HIV-positive, and able to access appropriate care following diagnosis. In PMTCT services, the proportion of HIV-infected pregnant women in public sector facilities who knew their status increased from 48 to 78% in the eight month period following the introduction of routine testing in 2004 (Creek et al., 2007). The success of the routine testing strategy is due in large part to the political commitment and the mobilization of communities and associated marketing campaigns, but it also should be seen as part of a large and widespread treatment access programme, which has led the way in providing ART in Africa.

### Prevention Efforts in Lesotho

Lesotho was the first country in the region to develop an initiative for universal HIV counseling and testing. The "Know Your Status" campaign started on 1 December 2005, with a high level of political commitment (Mills & Chong, 2006). The programme is regarded as the entry point to access to prevention and treatment services, and is backed up by a policy of "routine offer" of HIV testing at health facilities. Prior to the launch of this programme, the DHS in 2004 reported that 12% of women and 9% of men had ever had an HIV test.

High risk sexual behavior has been reported as widespread, with 40% of women and 60% of men reporting sex with a non-cohabiting partner in the preceding year in the 2004 DHS. Condom use at last sex was around 44% with a non-cohabiting partner (Ministry of Health and Social Welfare Lesotho et al., 2005). Migrant labor presents another prevention challenge, as an estimated 15% of Lesotho's male work force work as migrant laborers on South African mines.

In Lesotho, as in other countries in the region, gender inequality has hampered HIV/AIDS prevention efforts and access to both prevention and care services for women. Recent enactment of legislation to provide equal legal status to married women, who were previously considered minors, underscores the government's political commitment to fighting HIV/AIDS.

### HIV Prevention in Malawi

In contrast to the conventional wisdom that HIV is closely associated with poverty, data from the 2004 Malawi DHS, and some pooled data from other African DHS surveys, demonstrate higher rates of infection with higher socioeconomic status, in this region. In the Malawi survey, HIV prevalence among men in the wealthiest households was more than three times higher than for those living in the lowest income households (National Statistical Office (Malawi) & ORC Macro, 2004; Mishra, 2006). This may be due to more opportunities for paid sex and higher rates of transactional sex. In the DHS data, men who had paid for sex in the twelve months before the survey had an HIV prevalence of 18% compared to 10% in those who had never paid for sex. The same survey showed that 8% of women and 27% of men reported sex with a non-cohabiting partner in the preceding year, with condom use reported by only 30% of women and 47% of men.

Rates of HIV testing in Malawi have remained relatively low, with an "ever tested" rate of 17% in both men and women, with only 4% of women and 8% of men having been tested and received the test results in the year prior to the survey (National Statistical Office (Malawi) & ORC Macro, 2004). Education level was correlated with testing, with 25% of those with secondary education having been tested, but less than 10% of those with no education having been tested. The increased access to ART since 2004, however, is reported to have been associated with a very marked increased uptake of testing, and these figures may be expected to continue to rise, aided by a household testing campaign announced by the government (HIV-AIDS, 2007).

### Prevention in Mozambique

In Mozambique, access to VCT has been limited, but is expanding, with increased uptake as treatment services have expanded, and with sites now available by the end of 2006 in more than half of the country's health districts. Rates of testing are considerably lower than in neighboring counties, possibly due to the impact of civil conflict, with only 4% of adult men and women reporting ever having had a test and 2% in the past twelve months in a 2003 report (National Statistics Institute et al., 2003)

### Prevention in Swaziland

The lack of success of Swaziland's prevention strategies through the 1990s is reflected in its extremely high prevalence figures. However, there have been some encouraging signs that prevention efforts may be starting to have an impact. Condom use had been reported as lower than in some other southern African countries, but in the 2006 DHS, condom use at last sex with a non-cohabiting partner was reported by half the women and two-thirds of men (IRIN plus news, 2006). Prevention messages may be having a greater impact in young adults: a decrease of HIV prevalence in the Swaziland 2006 antenatal figures reported by the government was more marked in young women (IRIN plus news, 2006), and one study has reported a delay in sexual debut in secondary school students (Buseh, 2004).

The government has created more than 20 testing centers across the country, predominantly in health facilities and testing is also provided by NGOs and social marketing organizations, such as the New Start centers. In the 2006 DHS, 22% of women aged 15–49 reported an HIV test in the previous twelve months, although only 9% of men reported having been tested (IRIN plus news, 2006). Several anecdotal reports have described increasing demand for elective circumcision by men in Swaziland, following publicity around HIV prevention effects associated with that procedure.

Prevention efforts have failed to address what the group Physicians for Human Rights has called an "Epidemic of Inequality" in which entrenched gender inequities lead women to have little control over sexual behavior or risk. The Physicians for Human Rights 2006 survey showed that 40% of Swazi female respondents had no control over deciding when to have sex and 18% had no control over when to use a condom. In this group, more than a third of women reported not using a condom at some stage in the preceding year because of a refusal from their male partner (Physicians for Human Rights, 2007).

Even at the level of official prevention campaigns, accepted gender attitudes have had ill effects. A national campaign launched in 2006, aiming to reduce multiple partnerships, was called "Makhwapheni Uyabulala" ("a secret lover kills"). Local and international women's rights groups and organizations of people living with HIV and AIDS condemned the campaign, on the grounds of gender discrimination. The term "makhwapheni" is considered to be insulting when applied to women in Swaziland, and it was regarded as stigmatizing and judgmental, and appeared to blame women for looking for multiple partners and promoting the spread of HIV.

### Prevention in Zambia

Although HIV testing rates in Zambia are only between 6 and 9% (Central Statistical Office et al., 2003; Siame et al., 2002), some levels of behavior change have been described, which may be contributing to the reduction in prevalence in young people which seems to be emerging. These include increased condom use, fewer partners, less use of dry sex practices and delays in pregnancies. These behavioral changes have been, however, more marked in urban and better educated men and women than in rural areas (Sandoy et al., 2007). The change in behavior could be attributed to the HIV campaigns in Zambia that encourage delaying sexual debut and abstinence before marriage. Although a link between alcohol and HIV is acknowledged in the Zambian HIV strategic plan, there is still no systematic incorporation of alcohol or substance abuse as a strategy in the HIV response (Morris & Parry, 2006).

### Prevention in Zimbabwe

Prevention campaigns in Zimbabwe have been led by the National AIDS Co-ordination Programme and by local and international NGOs, although international assistance for HIV prevention has been hampered by government regulations introduced in 2004 regulating funding and activities by NGOs, and preventing funding for some HIV organizations. A strong focus on condom use and on VCT has characterized prevention messages. Despite education campaigns and a very high awareness of HIV/AIDS, knowledge of how to prevent infection is not as widespread. In the 2005/2006 Zimbabwe DHS, 99% of men and 98% of women had heard of AIDS, but only 47% of men and 44% of women had what was considered to be comprehensive knowledge about HIV transmission and prevention (Central Statistical Office (CSO) [Zimbabwe] & Macro International Inc., 2007).

Some changes in sexual behavior appear to have occurred, especially in young people. As one example, in eastern Zimbabwe, changes in sexual behavior were documented between 1998 and 2003, including a reduction in the number of casual sex partners and delayed sexual debut in younger people, and these are thought to be at least in part responsible for an experienced drop in prevalence, most marked in younger men and women (Gregson et al., 2006).

Condom distribution and use has increased in several reports (Mahomva et al., 2006; Adetunji, 2000), and Zimbabwe has had one of the highest rates of female condom use, linked to social marketing activities. In the 2005/2006 DHS, condom use at last intercourse with non-cohabiting partners was reported by 46% of women and 71% of men, but with cohabiting partners by 4% of women and 8% of men. Condom use with any partner was reported by 8% of women and 24% of men. In contrast to many other African countries, condoms purchased through social marketing or the private sector accounts for more than half of the condom use reported by women and over 80% of the condom use reported by men, with a much smaller proportion from the public sector (Central Statistical Office (CSO) [Zimbabwe] & Macro International Inc. 2007). This has been interpreted to date as a positive finding, demonstrating the commitment to condom use in the population. Given the profound social and financial effects of the Zimbabwe economic crisis in 2007, however, there are

major concerns that the purchase and use of condoms will be reduced as food security becomes the first concern in a time of rampant inflation.

Provision of VCT has increased dramatically in Zimbabwe since 1990, with at least one VCT access point in each health district (Pembrey, 2007). Several innovative approaches to delivering VCT have been described in Zimbabwe, including mobile counseling services (Haacker, 2001) and workplace programmes (Corbett et al., 2006). It remains to be seen how the country's economic problems will impact its HIV prevention activities.

## Prevention of Mother to Child Transmission

Transmission rates from mother to child vary in the region from 2 to 30% depending on the availability and uptake of interventions to prevent MTCT, and the duration and method of breastfeeding (Chersich & Gray, 2005; Chopra et al., 2005; Coetzee et al., 2005; Doherty et al., 2005; Stringer et al., 2005; Van der Merwe et al., 2006). Globally in 2005, only around 11% of the 2 million pregnant women living with HIV received antiretroviral (ARV) prophylaxis. In Southern Africa, coverage is slightly better, averaging around 18% across countries, but ranging from 6 to 54% (World Health Organization, 2007). Despite the countries of Southern Africa having the highest rates of HIV-infected pregnant women in the world, only Botswana and South Africa are achieving reasonable coverage of ARV provision for PMTCT (World Health Organization, 2007).

### PMTCT in South Africa

The PMTCT programme in South Africa has always been controversial. Despite some pivotal research studies demonstrating the efficacy of short course antiretroviral PMTCT regimens, including nevirapine based regimens (The Petra Study Team, 2002; Moodley et al., 2003; Gray et al., 2006), moving from research to service provision took some time. The Health Minister and National Department of Health's (DoH) reluctance to give antiretroviral prophylaxis, linked to the AIDS denialist debate in the country at that time, led eventually to a constitutional court case, and PMTCT services started in 2001 in pilot sites, after the Department of Health lost the case (Cullinan, 2002).

The programme has developed well in general, although there has been wide variation in both the quality and uptake of services. By the end of 2005, 3,064 facilities were providing PMTCT services (South Africa Department of Health, 2007). Improving coverage of PMTCT programmes remains a challenge as is evidenced by the fact that less than a third of HIV infected pregnant women received single dose Nevirapine as a PMTCT strategy in 2005. While accurate data are not available, government estimates are that about 80% of pregnant women have access to HIV testing, although only half accept this, due to stigma or health service issues. This drop-out means that only about a third of HIV-positive women receive appropriate prophylactic regimens (Meyers et al., 2006). In most of the country, state programmes still provide a nevirapine-only regimen, although the 2006 World Health Organization (WHO) guidelines recommend a regimen of zidovudine from 28 weeks with peripartum nevirapine (World Health Organization, 2006a). While nevirapine alone is

effective in reducing transmission, an enhanced regimen with zidovudine, could halve the number of infections currently seen with nevirapine alone. But the problems in expanding PMTCT services do not lie in providing drugs alone, as expanded coverage requires community mobilization and improving staff attitudes.

### PMTCT in Botswana

The PMTCT programme in Botswana started as a United Nations agency supported PMTCT pilot, one of the first in the region. Initially based on a short-course zidovudine regimen, the programme has regularly reviewed treatment regimens and has introduced a combination regimen of zidovudine and nevirapine. All health districts have provided PMTCT services since 2003, and antenatal care coverage is almost universal, estimated at 97% of pregnancies in the period 1997–2005. Around half of the HIV infected pregnant women in the country received ARVs for PMTCT by the end of 2005 (World Health Organization, 2007). Although not optimal, this level of coverage makes Botswana the only country in Africa to achieve more than 40% coverage for pregnant women. The program estimates that 13% of potential HIV infections in infants were averted in 2002, 74% in 2006, and that over 11,000 new infections in children were averted in the five years between 2002 and 2006 (Keapoletswe et al., 2007). The programme is moving to the use of filter paper dried blood spot collection to facilitate early diagnosis of infected children, with diagnosis in centralized laboratories (UNAIDS et al., 2007).

### PMTCT in Zimbabwe

Zimbabwe's PMTCT programme started providing free services in 2002, and was available at 800 public sector facilities by the end of 2005. Despite this, the estimated proportion of HIV-infected pregnant women who received ARVs for PMTCT was only 9% in 2005 (World Health Organization, 2007). This low figure is due in large part to lack of uptake of testing by pregnant women: only 23.5% in one study in an urban area (Martin-Herz et al., 2006). A study of a community mobilization campaign in Buhera district, however, showed an increase in awareness of MTCT risk and prevention strategies from 48.0% in 2002 to 82.8% in 2004 (OR = 4.9, 95% CI 3.3–7.3, P = 0.001) (Orne-Gliemann, 2006). The implementation of "opt-out" testing in antenatal services has also been suggested and preliminary acceptability work at six rural sites has shown that this would be acceptable to 97% of previously tested women and 79% of those who had not previously accepted a test (Perez et al., 2006).

### PMTCT in Swaziland, Lesotho, Namibia and Zambia

PMTCT services have been put in place in other southern African countries, but the coverage remains low. These countries share a pattern of good antenatal services, but a drop-off at each stage of the PMTCT process, linked to inadequate uptake of testing, failure to deliver test results or lower rates of delivery of the antiretroviral intervention.

Despite very high coverage of antenatal care services (estimated at 90% of pregnancies) and 70% of deliveries occurring in health facilities, PMTCT

coverage in Swaziland remains incomplete, although considerably improved since 2004. Approximately 60% of the 29,000 pregnant women annually are offered PMTCT services but only a third of HIV positive women receive ART for PMTCT, demonstrating the need for further improvement of services and interventions (UNAIDS et al., 2007).

PMTCT services in Lesotho started in 2003 and by 2007 had been extended to all 17 hospitals and 20 health centers. Despite this, UNAIDS estimates that the coverage of PMTCT services in 2006 was only 5% of the 50,000 annual pregnancies (UNAIDS, 2006a)

In Namibia, a rapid expansion of PMTCT services has resulted in an increase in PMTCT coverage from 0.1% in 2003 to 16% in 2005 (UNAIDS, 2006b).

PMTCT services in Zambia started in the main urban areas, with rapid expansion to citywide coverage in Lusaka by 2003 (Stringer et al., 2003, 2005). By 2007, some level of PMTCT service coverage at a facility level had been achieved nationally, reflecting a government commitment to scaling up and coordinating PMTCT. Meaningful access to services in rural areas has not been established. Several challenges remain for the services, particularly in increasing coverage in rural areas where there is a high rate of home deliveries.

### PMTCT in Malawi

Malawi has a history of groundbreaking research efforts in PMTCT (Taha et al., 1997, 2004, 2006; Miotti et al., 1999;) A national PMTCT programme, based on single dose nevirapine was started in 2003, and VCT is offered at antenatal clinics and most hospitals, as the entry point to this programme. Services are hampered by the fact that only 40% of deliveries take place within a health facility. Uptake of testing has also been low, predominantly due to fear of stigmatization and the reaction of male partners. Only 50,000 out of 125,000 women in need of services accessed testing and counseling in 2005, although 71.7% of the 7,052 HIV-positive pregnant women identified received nevirapine due to inadequate services (International Treatment Preparedness Coalition, 2007).

### PMTCT in Mozambique

In Mozambique, some isolated PMTCT services have reported excellent results with the use of more complex ARV regimens (Palombi et al., 2005), but these project successes have not yet reached most of the PMTCT services. The national PMTCT programme has been in place since 2000, but service coverage remained poor, with only 6% of HIV-positive women receiving any ARV intervention by the end of 2005, despite 74 sites providing PMTCT services in 67 of the country's 146 districts. The scale-up of services has been highest in the central region and slowest in the northern region, where services have been slower to recover from the civil conflict (World Health Organization, 2007). A move to "opt-out" testing in maternity services is expected to provide much higher proportions of tested women. In late 2006, the programme begun to move to more complex ARV regimens, including a zidovudine and nevirapine regimen for those women not yet in need of treatment (Yersin et al., 2007).

## The Advent of Treatment

When the first reports of the efficacy of triple combination ART surfaced in 1995/6, they seemed to be news from a different planet for people living with HIV and their caregivers in Southern Africa. The epidemic was already established as generalized, but the costs of the drugs were way beyond the imagination of those in need. In South Africa, the small group of doctors with AIDS treatment experience were able to offer ART within private practices, with some increase in numbers in 1998 when medical insurance schemes that provided coverage to many employed South Africans, began to include a restricted benefit for ART (Oppenheimer & Bayer, 2007). As the well-resourced countries of the world came to see AIDS as a chronic manageable condition, in Southern Africa, there seemed to be no prospect of widespread treatment access. In the state sector, pioneering AIDS clinics such as those at Johannesburg Hospital and Somerset Hospital in Cape Town started with some ART, and others followed suit on a very small scale. Doctors in South Africa, as in their neighboring countries did what they could, rationing care and rationalizing the treatments they could offer as appropriate for the setting (Ncayiyana, 2001).

By the time of the International AIDS treatment conference in Durban in 2000, the tide of world opinion had started to turn, pressuring both the pharmaceutical industry to make the drugs less expensive and the rich countries of the West to invest more in supporting treatment access. But the scale of the epidemic meant that very different approaches had to be used. The western model of a well trained infectious disease physician, working in specialized centers with experience in ART would not be sustainable for Southern African countries, where doctors were scarce and health system infrastructures were shaky. As an example, in 2006, an estimated 36,000 people were receiving ART in the United Kingdom, and close to 300,000 in the United States. In this same year, the estimated number in need of ARVs in nine southern African countries was 2.27 million, of whom 731,000 were receiving it (World Health Organization, 2007). The enormous challenge to scale up in these countries has demanded a "public health approach", including the use of simplified, standardized regimens and laboratory monitoring, provision of care at the primary health care level and the increasing use of nurses and lower level health workers, rather than doctors, for ARV provision.

In the early 2000s, there were many who believed that treatment access would not be possible in healthcare settings in Southern Africa. A 2001 International Monetary Fund discussion paper on AIDS impact in Southern Africa held that none of the countries in the region, with the possible exceptions of South Africa and Botswana, would be able to offer ARV programmes, and that the potential for alleviating this situation through the provision of foreign aid was limited (Haacker, 2001). Some have argued that, for most countries, ARV programmes would be almost impossible to fund, given the available resources (Stewart et al., 2004). Others have espoused a more positive view, believing that the development and provision of antiretroviral therapy (ART) services could help rebuild the collapsing health infrastructure of the area (Nattrass, 2004).

Donors were wary of investing in treatment programs. This was partly from a concern about adherence and adherence support (Boulle & Coetzee, 2006), based in part on experiences from well-resourced settings in which adherence is

a central issue for successful treatment. There also seemed to be a paternalistic presumption on the part of donors that poor Africans would not be responsible enough to take their drugs. This attitude was best exemplified by the (then) USAID chief administrator Andrew Natsios in 2001, before the United States President's Emergency Plan for AIDS Relief (PEPFAR), who explained to the Boston Globe that the resources of the newly formed Global Fund for AIDS, TB and Malaria (Global Fund) should be spent on prevention and not treatment because:

> (many Africans) don't know what Western time is. You have to take these (AIDS) drugs a certain number of hours each day, or they don't work. Many people in Africa have never seen a clock or a watch their entire lives. And if you say, one o'clock in the afternoon, they do not know what you are talking about. (Donnelly, 2001)

The launch of the Global Fund in 2002 and PEPFAR in 2003 changed the landscape, providing southern African countries with funding for treatment initiatives at a scale that they could not have achieved alone. At the end of 2003, WHO and UNAIDS launched the "3 by 5" initiative, with the goal of having 3 million people in developing countries on ART by the end of 2005. Although the 1.3 million on treatment at the end of 2005, over 800,000 of who were in Africa, fell way short of the 3 million target, the campaign did focus and facilitate action on treatment provision in southern African countries.

Two countries in southern Africa exemplify opposite ends of the spectrum in the provision of ART. In Botswana, political commitment at the highest level, along with a proactive process of mobilization of donor resources from the international community and from private enterprise resulted in the rapid expansion of a treatment programme. At the time that Botswana was starting to move in this direction, and recognizing the devastation that HIV/AIDS was bringing to the country, South Africa was grappling with a rejection of the utility of ARVs by its President and Health Ministry.

### Treatment in South Africa

South Africa's AIDS policies and programmes have seemed doomed since the late 1990s (Heywood & Cornell, 1998; McIntyre, 1996). While the National AIDS Convention of South Africa brought together civil society and the new government in 1994 to produce an AIDS plan that was both comprehensive and progressive, it was sidelined by a series of events. Successive scandals around Sarafina II and Virodene damaged the working relationship between government, civil organizations and researchers (Oppenheimer & Bayer, 2007). These relationships deteriorated further as President Mbeki began to question the viral cause of AIDS. Addressing South Africa's parliament in 2000, Mbeki said:

> Does HIV cause AIDS? Can a virus cause a syndrome? How? It can't, because a syndrome is a group of diseases resulting from acquired immune deficiency."(Harvey, 2000).

Many believe that the rapid spread and sexually transmitted nature of HIV was problematic for Mbeki and his allies, as it threatened to entrench the racism that they had fought against and reinforced the reality of racial discrimination and poverty that they were determined to eliminate. Controversy about the

cause of AIDS reached its lowest point in 2002 when an epic of AIDS conspiracy theory, entitled "*Castro Hlongwane, Caravans, Cats, Geese, Foot and Mouth and Statistics. HIV/AIDS and the Struggle for the Humanisation of the African"*, and which featured vicious attacks on researchers and treatment advocates was circulated throughout the African National Congress (Anonymous, 2002).

President Mbeki's questioning of the cause of AIDS and his Presidential Advisory Panel of 2000 which included a large proportion of AIDS denialist members encouraged ambivalence on the part of the government towards ARVs. This position was further entrenched by the government's rejection of the "Durban Declaration", and an increasingly polarized political climate around AIDS (Smart, 2005; Sidley, 2000; Oppenheimer & Bayer, 2007). Within this environment, the emergence of the Treatment Action Campaign and its growth into one of the most successful civil society advocacy groups, put treatment supporters on a direct collision course with the policies of the South African government (Heywood, 2005).

The approval of a national ART plan in 2003, despite President Mbeki's assertion in that same year to the Washington Post that he did not know "anyone who has died of AIDS", was widely hailed as a return to the right track for the South African government (Murphy, 2003; Department of Health, Government of South Africa, 2003). At the same time, it often seemed that South Africa's Health minister and her department were doing as much to slow down the provision of treatment as provincial health departments and dedicated medical staff were doing to accelerate it (Schneider H. 2006; Heywood, 2005). The rollout of ART started across the country in 2004, with uneven progress across the nine provinces. In the Western Cape, where there had been experience with the Médecins Sans Frontières (MSF) Khayalitsha treatment project and a more progressive attitude to treatment and to PMTCT services, the treatment rollout moved fairly rapidly (Abdullah, 2005). In Gauteng and kwaZulu Natal and the North West province progress was also good, but the less resourced provinces of Mpumalanga and Limpopo have made less progress in achieving meaningful coverage.

The country's AIDS programme was given a new sense of urgency and purpose with the finalization of a new National Strategic Plan (NSP) for 2007–2011 (South Africa Department of Health, 2007), a process which reengaged government and civil society and which provided some hope for the acceleration of treatment access. The rollout of treatment in South Africa achieved remarkable increases in the number on treatment in its first three years, rising from less than 2,000 in 2003 to 200,000 by the end of 2005, to 360,000 by early 2007, around 24% of those in need (Nattrass, 2006; International Treatment Preparedness Coalition (ITPC), 2007). Of these, approximately a third are being treated in the private sector, with treatment for another third being supported by PEPFAR, MSF and other major donors and the remainder fully funded by the national program. Around 21% of the 86,000 children in need of treatment were receiving ARVs by the end of 2006, the number having increased by 50% between December 2005 and September 2006 (World Health Organization, 2007).

Treatment programmes in South Africa, as in other neighboring countries have demonstrated high levels of success at a clinical and virological level.

One of the longest running programmes, in Khayalitsha, has shown clinical improvements in those on treatment equivalent to the best results in well-resourced countries (Coetzee et al., 2004).

The number of individuals on treatment in South Africa's treatment program's make it the largest ART programme in the world, but conversely, the numbers are poor in comparison with Botswana, or several other Southern African countries in terms of the proportion of those in need of treatment or even targets established by the country's plan. NSP targets include having 80% of adults needing ART initiating treatment by 2011, which would amount to an additional 1.375 million adults needing to start ART before 2011. Achieving this would bring the total in treatment to beyond 1.7 million, and would mean an estimated cost of close to $6.2 billion for the first five years.

### The Botswana Success Story

Botswana was the first African country to provide widespread access to ART in the public health sector. The establishment of the treatment programme followed recognition by the top political leadership that the AIDS crisis was threatening the very heart of the country. Addressing the United Nations in 2001, Botswana President Festus Mogae articulated the level of seriousness with which his government viewed the epidemic:

> We really are in a national crisis. We are threatened with extinction...People are dying in chillingly high numbers (Farley, 2001).

The programme was started in 2002, and was named "Masa", a Setswana word meaning New Dawn. It represented a significant partnership between the Botswana Ministry of Health (MoH) and a public/private partnership group named the African Comprehensive HIV/AIDS Partnership, which included the Bill and Melinda Gates Foundation, the Merck Company Foundation, and McKinsey & Company. The partnership aimed to support the national coordination of a comprehensive HIV prevention, treatment and support programme and to build sustainable capacity for health care to alleviate the impact of the epidemic (de Korte et al., 2004).

The ART programme started in 2002 at the Princess Marina hospital in Gaberone and had extended to 4 sites by late 2002, 12 facilities in 2003, 32 in 2005 and at least one site in each of the country's health districts by 2006. By mid 2003, over 10,000 patients had commenced treatment (Stewart et al., 2004). According to WHO estimates, this had increased to 180,000 people at the end of 2006, representing 85% of those in need (World Health Organization, 2007). The programme has been successful in both initiating treatment and maintaining quality of follow up care. This is illustrated in the three year follow up data from the Mahalapye district hospital, in which the survival rate was nearly 90%. In common with the experience of other Southern African programmes, survival was better in those initiating treatment with CD4 counts over $100/mm^3$, demonstrating the importance of early diagnosis and access to care (Puvimanasinghe et al., 2007). On a broader scale, a programme evaluation in 2006 indicated that there had been an 8% reduction in national adult mortality, and that at a district level, this reduction was associated with treatment uptake in the district (Stoneburner et al., 2006).

### Treatment Expansion in Lesotho

The Lesotho government has actively sought to mobilize international donor support to increase access to treatment, and to upgrade the necessary care infrastructure. Less than 100 doctors work in the country, most of them foreigners in short term posts, and nurse-run health services are also affected by emigration of staff to higher paying posts in South Africa. The coverage of HIV treatment services remains limited. At the end of 2006, an estimated 18,000 people were receiving ARTs out of 57,000 in need (World Health Organization, 2007). In addition to USD 39 million in Global Fund grants, joint projects have been established with groups such as the Stephen Lewis Foundation, and, for a pediatric treatment Center of Excellence, Bristol Myers Squibb and Baylor College of Medicine, USA. Interaction with tuberculosis (TB) is a major issue for Lesotho. The country has the fourth highest rate of TB in the world, with more than half of TB patients co-infected with HIV. Extensively drug resistant (XDR) TB was reported in the country in mid 2007, and there are concerns about the rapid spread of resistant TB in the face of HIV infection, migrant labor and inadequate health resources.

### Treatment Expansion in Malawi

Malawi started national ART scale-up in 2004, with a fixed-dose combination treatment with stavudine, lamivudine and nevirapine. The country has very limited medical resources with approximately 150 doctors available for its population of 12 million. The country has drawn upon experience with TB programmes and maintained a focus on securing the background infrastructure for ART delivery, which has helped extend treatment fairly rapidly from around 5,000 people in 2004 to over 80,000 of the 190,000 people in need of treatment by the end of 2006 (World Health Organization, 2007; Harries et al, 2004; Harries et al., 2007). Pediatric treatment has also expanded, with close to 3,000 children aged less than 15 years (around 6–7% of the total on ART) on treatment by mid 2006, with excellent treatment outcomes reported (Malawi Paediatric Antiretroviral Treatment Group, 2007). Of the 81,821 people ever started on ART by December 2006, 39% were male, 61% were female, and 7% were children aged 14 and below. Of those alive and still on ART, 97% were on their first line regimens at the end of 2005, demonstrating, as in other Southern African sites, the durability of the first line regimens in the field (International Treatment Preparedness Coalition (ITPC), 2007). The Malawi government programme has also made use of private sector providers, in for-profit facilities and in workplace programmes of large employers, to increase capacity for ART delivery. These providers are expected to eventually account for 10% of those on treatment (Schouten et al., 2007).

### Treatment Expansion in Mozambique

Treatment services in Mozambique are provided within an integrated health care model. By December 2006, ART was estimated to be reaching 40,000 people, 14% of those in need. The number of public sector sites providing ART increased from eight at the end of 2003 to 55 by August 2006. The geographical distribution of the sites is uneven, with a concentration in the southern

region, where the capital city is located (World Health Organization, 2007). Staff capacity is a key limiting factor as almost half of the 608 medical doctors working in Mozambique are in Maputo, making it very difficult to find and utilize doctors in rural areas (Médecins Sans Frontières, 2007).

One approach to increasing treatment access has been to integrate ART closely with TB care. One such project in the Beira region found that 70% of TB patients tested for HIV were positive, and their access to ART was accelerated in the linked project (Montoya et al., 2006). The major increase in Mozambique's treatment programme has come from the devolution of ART care to lower level health workers. This was particularly evident after May 2006, when 315 mid-level health workers (medical officers) covering 85% of the ART sites were trained and authorized to prescribe ART, resulting in rapid expansion of the number of people on ART in sites without doctors. From May to December 2006 the number of ART sites rose from 44 to 142, and the percent of ART eligible patients on ART increased from 9.4 to 16.3% (Gimbel et al., 2007) (Ramirez, 2007).

Prior to 2005, pediatric ART care was only available in Maputo. Expansion of pediatric expertise and training to under-5 clinics, within an Integrated Management of Childhood Illness package, and into adult HIV clinics in a family model, has increased and decentralized the number of children on treatment, including a five-fold increase in children on treatment at the participating sites. (Vaz et al., 2007)

### Treatment Expansion in Swaziland

AIDS was declared a national disaster in 1999 by Swaziland's King Mswati III and an accelerated response followed with the establishment of the National Emergency Response Council on HIV and AIDS. While the initial response to HIV/AIDS in Swaziland had little emphasis on treatment, the Second Multisectoral HIV and AIDS Strategic Plan 2006–2008 includes a greater emphasis on treatment, extending the ART program launched by the government in January 2004. An estimated 44,000 people were in need of ART at the end of 2006, with 18,000 estimated to be on ART at 19 public sector facilities and several private sector and NGO initiatives, including workplace programs (World Health Organization, 2007). Funding from the Global Fund, totaling USD 52.5 million has supported treatment since 2003, and will support the expansion of treatment access envisaged in the National Plan.

### Treatment Expansion in Namibia

In Namibia, an estimated 32,000 people were receiving ART at the end of 2006, out of 45,000 in need (World Health Organization, 2007). The high proportion of people receiving treatment has been accomplished by a rapid increase in access to state services and NGO services and has been facilitated by grants from both the Global Fund (USD 104 million for HIV by 2006) and PEPFAR (USD 57 million in 2006), relatively high funding for a country with a population of under 3 million. While there have been concerns about high levels of individual and institutionalized stigma in the past, the country has benefited from an energetic and committed National HIV/AIDS Control Programme and few of the political issues in AIDS that have stalked neighboring South Africa.

### Treatment Expansion in Zambia

The Zambian MoH has used donor funding to facilitate and support a rapid expansion of ART, with about 80,000 on treatment by early 2007, of which 30,000 were children. Coverage is best in the big urban centers with, more than half of those on treatment being in Lusaka (International Treatment Preparedness Coalition (ITPC), 2007). One PEPFAR supported primary health care program in Lusaka enrolled 21,755 adults into HIV/AIDS care, and started 16,198 on ART between May 2004 and November 2005. This group has reported very good clinical outcomes, with 13/100 patient years in the program, demonstrating the feasibility of large scale ART in relatively poor African settings. As with other programs in the region, most mortality occurred early on in treatment, suggesting that earlier diagnosis and earlier access to care treatment may improve survival (Stringer et al., 2006).

Despite the success of the Lusaka program, a 2006 assessment of 68 ART delivery sites, two thirds of all Zambian sites, identified the existence of problems in providing sustainable services that all Southern African countries face. Adherence support and counseling were insufficient, provision for the prophylaxis and treatment of opportunistic infections was inadequate, and failures of drug supply logistics had led to some drug stock-outs at more than half the sites in the previous year. A lack of clinical space and shortages of staff were also recurrent issues (Hughes et al., 2006)

### Treatment Expansion in Zimbabwe

By WHO estimates, in 2006, Zimbabwe had the lowest life expectancy at birth in the world, 34 years for women and 37 years for men, due in large part to the effects of the HIV/AIDS epidemic (World Health Organization, 2006d). The government committed to an ART strategy in 2002, with the aim of providing universal access to ART by 2010. An estimated 350,000 people are in need of ARVs, and approximately 52,000 (around 15%) were receiving them by the end of 2006. An additional 45,000 children were in need of ART, but only around 6% of these were on treatment by the end of 2006 (World Health Organization, 2007). Zimbabwe's chaotic economic and political situation has discouraged international donors such as PEPFAR, and the Global Fund from investing heavily in ART programs. As a result, unlike many of its neighboring countries, Zimbabwe has received limited funds, with Global Fund contributions, totaling only USD 10 million by 2005, although a further grant of USD 65 million was announced in December 2006.

## Lessons from the First Years of Treatment Access in Southern Africa

The establishment and growth of ART programs in southern Africa have provided a number of lessons, which are common across the countries. While significant gains have been made, more than one million people in southern Africa in need of ARVs are not yet receiving them.

Political will is paramount; the most successful programs have emerged in countries where the leadership has taken a clear and unequivocal stand on the

provision of treatment. Large scale donor funding has facilitated the expansion of treatment programs in Southern Africa. Figure 14.2 shows the proportion of those people in need of treatment who are receiving ART and the funding in dollars per capita received from PEPFAR, AIDS designated funds from the Global Fund, and the World Bank's Multisectoral AIDS Programme in the triennium 2004–2006. While this is a gross measure of funding access, which does not take into account the amount of funds provided by the country itself or other bilateral donors, the correlation between AIDS program funding and the success of treatment programs is striking. The funding of ART programs will always be a major factor in their success. With increased numbers on treatment, more people will require second line regimens, which remain considerably more expensive.

While it can be demonstrated that the provision of ART will reduce mortality, hospitalizations and utilization of higher level facilities at a later stage of the disease, and be cost-effective, this balance is not achieved in the early stages of ART programme delivery (Stoneburner et al., 2006; Martinson et al., 2006; Harling & Wood, 2007; Cleary et al., 2006). Striking the balance between an ART program that is fully integrated into the health system, and one which is vertically delivered in a more flexible manner is an abiding challenge for Southern African countries. Innovative approaches to extending this care are

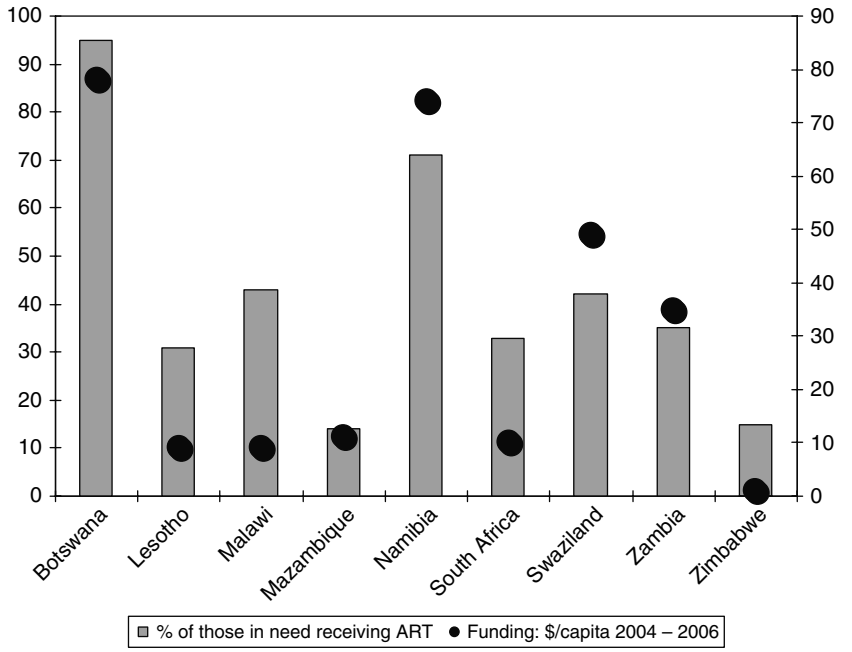


**Figure 14.2** Proportion of those in need receiving ART, and AIDS funding in USD per capita received from PEPFAR, The Global Fund and World Bank MAP in the triennium 2004–2006. The Global Fund to Fight AIDS, Tuberculosis and Malaria, country profiles at www.theglobalfund.org accessed April 7, 2007. World Bank MAP at www.worldbank.org. accessed April 7, 2007. World Health Organization. (2007).
Sources: PEPFAR country profiles at www.pepfar.gov accessed April 7, 2007.

paying dividends as the use of health workers other than doctors, partnerships with private providers, task-shifting and alternative drug delivery routes are all being used with success in the region.

The provision of treatment is also shown, in all of these countries, to be more difficult as it moves from centers of excellence led by champions to a more routine function within the health service. This makes the ART program vulnerable to all of the weaknesses that exist within the health service. A lack of visible political leadership may also slow down the expansion of AIDS care to other levels of the health service (Schneider, 2006; Egger et al., 2005; Martinson et al., 2007). Further, Botswana has demonstrated that the offer or routine testing will be associated with an increase in the number of people identified and on care. Similar programs in other countries could facilitate treatment, but services must be ready and able to scale up as demand increases. In most southern African programs, in contrast to the experience in the West, women make up the majority of those being treated, at least as high as the proportion of women infected in the countries. This may reflect easier access to testing for women through clinic services and PMTCT programs. The challenge ahead is to maintain women's access to care, and to also reach men at an early stage and ensure appropriate care for all.

The capacity to provide ART in this region will also greatly depend upon the levels of health worker staffing which are available. The very success of ART programs in turn puts more stress on ART providers, as numbers of people in follow up care increases (McCoy, 2006). The primary limiting factor for the further expansion of treatment programs is likely to be the availability of trained and appropriate staff. Most of these countries are falling far behind in this respect. In Malawi there are 2 doctors and 56 nurses per 100,000 inhabitants, in Lesotho 5 doctors and 62 nurses, in Mozambique, 2.6 doctors and 20 nurses: the WHO minimum standard is 20 doctors and 100 nurses per 100,000 inhabitants (Médecins Sans Frontières, 2007). The WHO estimates that there is a need for 820,000 more health workers in Africa, and that the current training output will provide only 10% of the required number. This is aggravated by the impact of HIV/AIDS on health sector staff themselves, an estimated 16.3% of workers in South Africa (World Health Organization, 2006c).The need to ensure adequate laboratory back up for treatment programs, the need for lay counselors, community level support and for community mobilization adds to the staffing crisis (World Health Organization, 2006b; Zachariah et al., 2007). ART programs also need a robust and sustainable drug supply infrastructure which must be developed and maintained in both urban and rural areas.

## Conclusions

Southern Africa is the global region most affected by HIV, still accounting for a third of the global pandemic. Generalized, high-prevalence epidemics are present in all countries in the region, predominantly due to HIV subtype C. Transmission is mainly through heterosexual and mother-to-child routes. Most countries show continued increases in HIV prevalence, with only Zimbabwe to date having data showing that HIV prevalence may be reaching a plateau or decreasing. In Zambia, behavioral changes appear to have contributed to

a decline in HIV prevalence in some settings, but this is more pronounced in urban settings amongst people in higher education groups. Improved access to community based HIV testing and improved access to optimized interventions to prevent mother to child transmission of HIV-1 have the ability to further impact on the HIV epidemic in southern Africa. Proven biomedical interventions, like male circumcision, need to be implemented in large scale, and the barriers to executing these, need to be overcome. Interventions that are female-controlled like microbicides and HIV vaccines need to be studied in these settings. The prevention of breast-milk transmission requires prioritization in country programs.

On treatment, overall, there is good news out of southern Africa. ART programs, thought to be impossible a decade ago, have demonstrated both feasibility and good clinical results. Much of this has been made possible by the influx of large amounts of foreign aid funding, targeted at ART programs. This has facilitated the establishment of treatment programs, including the drug supply mechanisms, trained health workers and supplemented the staffing of the programs and purchase of drugs. Most importantly, this funding has driven southern African governments to see HIV treatment as an achievable goal and shown how it can work. The challenge that remains is to expand and sustain the treatment programs, and the donor concern, in order to reach millions more people in need of treatment.

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# Chapter 15

## HIV/AIDS in the Horn of Africa

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_15, 

## Introduction

The Horn of Africa is a vast, diverse, impoverished and troubled region of 125 million people beset by famine, floods, conflict and disease. For the purposes of this chapter, we will consider the Horn to include Somalia, Djibouti, Ethiopia, Eritrea and Sudan; while it is not strictly located in the Horn, Libya will also be mentioned. Ethiopia and Sudan are the largest and most populous of the nations in the region, and have felt the brunt of its HIV epidemic. Unfortunately, instability in most of the region has made conduct of research and surveillance on HIV/AIDS particularly difficult. Ethiopia, however, has been a center of HIV research, most notably by the Ethiopia-Netherlands AIDS Research Project (ENARP). It is this research by Ethiopian and international investigators that provides the source of much of our knowledge about the regional epidemic. This chapter offers an overview of the regional epidemiology and social and environmental factors that affect it, as well as a country-by-country assessment of epidemiologic trends and efforts to combat the epidemic, with a particular emphasis on Ethiopia.

## Regional Overview

In the 25 years since HIV is thought to have first entered the Horn, the region has seen civil war and partition of its three major nations. In Sudan, a 21-year civil war between the Arab, desert north and the tribal, tropical south reached a fragile settlement in 2005, though violence and abuses continue to occur among the 2.1 million refugees (Affected Populations, 2005) in the western Darfur region. On the collapse of the Soviet Union, in 1991, Soviet client governments in both Ethiopia and Somalia were overthrown. The rebellious Eritrea region immediately seceded from Ethiopia and in 1998, war between the two countries was renewed, leading to border disputes which still threaten to break out into major conflict. Somalia descended into clan warfare, leading to the de facto secession of the northern Somaliland and northeastern Puntland regions. The December 2006 intervention by Ethiopia troops in southwestern Somalia and its capital Mogadishu, has not brought hoped-for stability to the region, which faced one of the world's worst humanitarian crises, according to the United Nations (De capua, 2007; Gettleman, 2007a).

The region began this quarter-century ill-equipped to deal with a major epidemic, with governments in disarray and among the lowest health and education indicators in the world. Troop mobilizations and demobilizations and flights of refugees across borders likely transmitted HIV, along with other pathogens, between countries and regions. As of 2005, some 7.5 million refugees and internally displaced persons remain in camps where they are vulnerable to disease (Affected Populations, 2005); this number was augmented in late 2007 by 800,000 Somalis fleeing their homes (De capua, 2007).

### Tracing the Epidemic

Evidence suggests that the virus first entered the Horn of Africa between 1980 and 1983 at two likely entry points: the town of Juba on the Ugandan border in

southern Sudan, and the Red Sea port of Assab in the present Eritrea, formerly Ethiopia. Sera collected in southern Sudan's Upper Nile region, between 1981 and 1983 already showed a 1.1% HIV prevalence rate (Arbesser et al., 1987; Arbesser & Sixi, 1988). Sudan's first reported AIDS case, from 1986, was a 43-year-old Ugandan soldier stationed in Juba (Woodruff et al., 1988). The waves of soldiers and refugees sweeping back and forth across the region likely spread the virus throughout southern Sudan, and perhaps to the adjacent Ethiopian region of Gambella, which despite its lack of major road connections with the rest of Ethiopia has an estimated adult prevalence rate of 6.0%, the highest among regions of that country (EDHS, 2005). Molecular epidemiology shows a mixture of viral subtypes in Sudan that reflect these population flows: West African-like subtype D, East African-like subtype D, Ethiopian-like Subtype C, and a number of recombinants (Hierholzer et al., 2002).

Molecular epidemiology studies also point to two separate introductions of HIV subtype C (labeled C' and C) from Assab into the main road system of Ethiopia, in about 1982 and 1983 (Abebe et al., 2000, 2001a,b). The virus then likely spread south along the major trucking routes through the capital, Addis Ababa, to the Kenyan border town of Moyale (Khamadi et al., 2005), and to most other major Ethiopian towns along the road. By 1988–9, HIV was present among prostitutes in all major towns of Ethiopia, including the Eritrean region (Mehret et al., 1990d,f). Prevalence peaked at 30–40% in Assab and the three major towns nearest it among the Red Sea road, and declined with distance along the road (Mehret et al., 1990d). In 1988, 13% of truckers working along the Red Sea road were also found to be infected (Mehret et al., 1990e). The Horn region's first reported AIDS case was a driver's helper on the Addis-Ababa to Assab route who became ill in mid-1985 and died in January 1986 (Lester et al., 1988). The first reported case of mother-to-child transmission of HIV in the Horn region also occurred in Assab (Tekle et al., 1989). Subtype C subsequently spread to Djibouti, where the first evidence of HIV infection was found in 1986 (Rodier et al., 1993), and, by 1987, to Somalia (Fox et al., 1989).

Transmission in the region has primarily been through commercial sex in towns, along the roads, and near camps of soldiers based away from home (Mehret et al., 1990e; Zewde et al., 2002; Abebe et al., 2003). Use of non-sterile injections from drug vendors, reuse of syringes at medical facilities and shared sharp instruments in traditional ceremonies was common and may also have contributed to the spread of HIV. Condom use among prostitutes was quite low early in the epidemic and HIV prevalence among sex workers rapidly reached high levels, such as 14% among prostitutes in Juba, Sudan in the early 1990s (McCarthy et al., 1995), 29% in Massawa, Eritrea (Ghebrekidan et al., 1998) in 1995 and peaking at 74% in 1998 in Addis Ababa (Mehret et al., 1990b,c,d; Aklilu et al., 2001). In studies from Ethiopia and Eritrea in the early to mid 1990s, 25–50% of urban, educated and mobile men, and nearly all soldiers (Abebe et al., 2003), and truck drivers (Mehret et al., 1990e; Mekonnen et al., 2003) reported a history of sex with sex workers. The epidemic spread rapidly among these groups, with prevalence rates peaking in the mid-1990s between 9% and 19%, particularly among the 25–29 year old age group (Ghebrekidan et al., 1998; Fontanet et al., 1998; Abebe et al., 2003; Zewde et al., 2002).

Farmers, herders, plantation workers and other rural residents, on the other hand, had less opportunity to come to town and tended to have more

conservative mores, with only 13–14% admitting visiting sex workers (Shabbir & Larson, 1995; Larson et al., 1991; Sahlu et al., 1998; Mekonnen et al., 2003). These factors have limited adult HIV prevalence throughout the Horn of Africa, which is comprised of predominantly rural regions, to under 3% (EDHS, 2005; WHO, 2006b; Maslin et al., 2005; Eritrea, 2006a; USAID, 2005; Hashim et al., 1997; Kaiser et al., 2006; Sahlu et al., 1998). The widespread practice of male circumcision (EDHS, 2005) among the region's predominantly Muslim and Ethiopian Orthodox Christian population may also have inhibited the epidemic's spread in some areas and may partially explain the higher rates of HIV seen in southern Sudan, the region's only non-Muslim, non-Orthodox area (CIA World Factbook, 2007).

### Actions and Solutions

Social mobilization and HIV prevention efforts are now established in all regions and free antiretroviral therapy (ART) is being provided, to some extent, in Ethiopia, Eritrea, Djibouti, southern and northern Sudan and Somaliland (Global Fund, 2007). Darfur, Puntland and south central Somalia still lack ART service points. Regional initiatives are also moving forward. In one example, recognizing the risk of the virus spreading via major transportation routes into previously untouched areas, donor-funded road projects have incorporated HIV prevention (World Bank, 2003a,b; FHI, 2006).

In 2006, national AIDS commissions from Djibouti, Eritrea, Ethiopia, Puntland, Somaliland, South Central Somalia, North and South Sudan, Kenya and, across the Red Sea, Yemen, as well as a number of U.N. agencies formed a Horn of Africa Partnership (HOAP) "to address HIV vulnerability and cross-border mobility" in the region. HOAP plans to develop a regional plan of action to scale up HIV prevention and ART services for mobile populations, including refugees, truckers, traders, nomads and herders, victims of human trafficking, soldiers and former soldiers (Horn of Africa Partnership, 2006).

## Ethiopia

### Responding to an Epidemic

#### *1985–1991: Under the Derg*

In 1985, the year after the identification of the HIV virus, the Communist Derg government formed the National Task Force on the Prevention and Control of HIV Infection and AIDS in Ethiopia. The Task Force worked actively from December 1985 to August 1987, to establish the country's first general policy on HIV/AIDS. It conducted a national seminar on HIV/AIDS for health care workers, distributed informational materials on HIV/AIDS to every hospital, health center, and health station in the country, and began a nationwide advertising campaign through the government-controlled radio, TV, and newspapers (Zewdie et al., 1990).

This Task Force also coordinated the first serosurveillance of stored sera that had been collected between 1982 and 1987 (Tsega et al., 1988; Hailu et al., 1989; Mehret & Khodakevich, 1990a). This surveillance disclosed signs of a growing epidemic. Of 959 specimens collected between 1982 and 1983 none were positive while 2 (0.7%) of the 267 specimens collected in 1984

were positive. Other studies among military recruits and sex workers and their male clients also revealed an incipient epidemic (Tsega et al., 1988; Hailu et al., 1989).

In response to these findings, the National AIDS Control Program was institutionalized, in a Department of AIDS Control within the Ministry of Health (MoH) in September 1987. The program received support from UNAIDS and USAID, and the WHO assigned it a full-time epidemiologist, Lev Khodakevich, to assist with surveillance. Between 1987 and 1991, most prominently under the leadership of Debrework Zewdie, the National AIDS Control Program established a national AIDS referral laboratory, implemented HIV screening in the major blood banks run by the Ethiopian Red Cross Society, and conducted large surveys on knowledge, attitude, behaviors, as well as the prevalence of HIV/AIDS among sex workers and long-distance truckers (Zewdie et al., 1990).

Surveys conducted in 1988 and 1989 (Mehret et al., 1990b–d) found that Ethiopia's major towns had large, active populations of sex workers in red-light houses, as well as bar girls and waitresses in *tella* (beer) and *tej* (honey wine) establishments who were also involved in commercial sex. Using data from sexually transmitted disease (STD) clinic registries, Mehret and colleagues estimated that 7.1%, or 35,000 women in Addis Ababa, and 1.7%, or 17,000, in other urban areas, were sex workers. The average number of partners per week (most of them apparently commercial) ranged from 1.1 for the *tella* sellers to 4.2 for those in red-light houses; 88.4% of these sex workers said they never used condoms. High rates of sexually transmitted infections (STIs) were also found in a subsample of this study (Desta et al., 1990). The 1988 survey found an average HIV prevalence rate among sex workers of 17% for towns outside of the capital (Mehret et al., 1990d). The 1989 prevalence in Addis Ababa was 24.7% overall, reaching as high as 43.8% in red-light houses and in one inner city neighborhood, *kebele*, 60% of sex workers were HIV positive (Mehret et al., 1990f). Many of these women were transient, having come to the cities to find work. Six months after the survey, more than half had migrated outside of the capital.

With survey results highlighting the severity of the epidemic, the Ministry of Health approved its first Five Year AIDS Control Plan (Zewdie et al., 1990). A critical element in developing the plan was involvement of all sectors of society through a 52-member Technical Advisory committee, which included all government ministries, youth, women's and farmers' groups (known in this communist period as "mass organizations"), university researchers, religious groups, and coalitions of non-governmental organizations (NGOs). Information and education on AIDS was disseminated through the schools, media, local Red Cross Clubs, annual national conferences, the Sports and Culture Ministry, trade unions, and religious groups including Ethiopian Orthodox, Catholic, evangelical Christian and Muslim groups (Hagdu et al., 1990).

This first 5-year plan included initiating AIDS case reporting (1987) and piloting sentinel surveillance among pregnant women (1989) (Zewdie et al., 1990; AIDS in Ethiopia, 2006). An aggressive condom social marketing campaign, begun in 1990, was a key plan element. In 1987, only 20,000 condoms were available in Ethiopia. This number had grown to 6.24 million condoms sold (many from kiosks) in 1991 and 26 million sold in 1993 (Mehret et al., 1996). A sex worker peer education program encouraged selling condoms to

other sex workers at a low cost of $0.025 (U.S.) apiece. It proved highly successful in increasing condom use in the trucking and trading town of Nazareth, where an estimated 7% of the female population were sex workers (Belete et al., 1990) and was ultimately rolled out in 23 cities around Ethiopia.

***1991–1998: Transition and Turmoil***

Then, in 1991, the Soviet Union collapsed. After 17 years of civil war, the Tigray-based Ethiopian People's Revolutionary Democratic Front (EPRDF) swept out the Soviet client Derg regime. The Eritrean People's Liberation Front declared victory in its long rebellion in the coastal region, ratifying its secession with a referendum in 1993 (Biles, 2005). Several years of chaos and consolidation followed and for five years, the focus on HIV/AIDS was lost. Decentralization and establishment of a federal system of government with nine regional states led to a loss of a central focus on the epidemic while budget crises meant that HIV/AIDS funding and staff were slashed, and access to health care declined (EWMS, 1999a,b, 2001), all during a time of donor fatigue. However, research by ENARP enabled continued tracking of the magnitude of the epidemic (Sanders et al., 2003a).

The demobilization and return to their villages of 509,200 soldiers from the Derg, the EPRDF, and the Oromo Liberation Front may also have helped spread the epidemic as soldiers who had been stationed in northern towns with high HIV prevalence among sex workers returned home (Kloos & Haile Mariam, 2003; Berhane et al., 2006; Dercon & Ayalew, 1998; Shabbir & Larson, 1995).

Data from continuing sentinel surveillance, conducted at antenatal care centers in Addis Ababa and a handful of other towns, suggested a growing epidemic. In 1989, 4.6% of pregnant women at sentinel sites in the capital had tested positive for HIV. By the 1992/1993 period, that number had reached 11.2%, peaking at 21.2% in 1995 and falling somewhat to 17.8% in 1996 (AIDS in Ethiopia, 2006). These figures formed the basis for UNAIDS projections, publicized at the time of the UN General Assembly Special Session on HIV/AIDS in 2001 (United Nations, 2001) suggesting that over 10% of adults in Ethiopia were HIV infected, that 900,000 children had been orphaned by HIV/AIDS and that Ethiopia had the third largest number of HIV-infected people in the world, after India and South Africa. Later research indicates these figures were substantial overestimates (see discussion below). However, donors were reawakened.

***1998–2004: Resources and Response***

In 1996–97 a multi-donor team, led by the World Bank, urged the government to refocus its attention on HIV/AIDS. In August 1998, the government adopted the National HIV/AIDS Policy that had been drafted in 1990. This policy promised effective AIDS prevention and mitigation strategies, a "broad, multi-sectoral response to HIV/AIDS, including more effective coordination and resource mobilization, by government, NGOs, the private sector and communities," to support care for people living with HIV/AIDS (PLWHA), orphans and dependents, to protect human rights, empower women, youth and vulnerable groups, and promote and encourage research (World Bank, 2000, 2006a; AIDS in Ethiopia, 2002).

In May 1998 the simmering border conflict with Eritrea broke out into full-scale war, making new donor funding nearly impossible. Despite this, the World Bank continued building a consensus for action within the Ethiopian government. President Negasso Gidada began speaking out on HIV issues. Representatives from the Ministry of Economy and Finance agreed to borrow money for HIV. Crucial support was obtained from Prime Minister Meles Zenawi and the MoH.

Stability returned with the June 2000 Ethiopia-Eritrea peace accord, which enabled both the government and the World Bank to refocus their attention on health. The public, whose concern had been effectively raised over the past decade, and civil society, whose capacity to combat HIV/AIDS had been gradually built up, were mobilized. A new National AIDS Council brought together religious, government and non-governmental organizations. A Council secretariat was established within the Prime Minister's Office and a comprehensive, highly detailed 5-year Multi-sectoral HIV/AIDS Strategic Plan was put in place. President Negasso, the National AIDS Council chair, stated "It is high time for all of us to realize that if the [HIV/AIDS] situation is allowed to continue unabated, we will reach the point where the loss of a generation will be a real possibility."

This demonstration of institutional commitment then enabled the World Bank to initiate an Ethiopian project as a showcase for its new Multicountry AIDS Program (MAP) for Africa. This program was now managed by Dr. Zewdie, who had long since joined the Bank. A $63.4 million loan was negotiated in only 6 weeks, "because Bank management considered that the AIDS crisis warranted an emergency response." National AIDS Councils at regional and local levels were responsible for monitoring implementation of the loan (World Bank, 2000, 2006a; MoH, 1999; Berhane et al., 2006).

The strategic plan, with its effective organizational structure reporting to the high levels of government, galvanized other international donors (who have dominated the more recent response) and local communities, in a rarely achieved synergy. Successes during this period included the provision of training and medications and institutionalization of programs to treat opportunistic infections (OIs) a more than doubling of sentinel surveillance sites, distribution of two nationwide behavioral surveillance surveys of high-risk groups, in 2002 and 2005, as well as a household HIV seroprevalence survey in 2005, and an increase in the number of blood banks who were screening all blood for HIV. AIDS Councils were established at the federal, regional, *woreda* (districts) and *kebele* level. Financial support was provided for community groups, including PLWHA associations, professional associations, anti-AIDS clubs, neighborhood funerary associations (*idirs*) and high school anti-AIDS clubs. Between 2002 and 2005, some sort of welfare support was also provided to 50,000 PLWHA. Voluntary Counseling and Testing (VCT) sites were expanded from 17 in 2002 to 658 in 2005; 448,241 people had been tested for HIV/AIDS at these sites by December 2005. In addition, 129 government hospitals and health centers began providing nevirapine-based PMTCT. Condom distribution increased from 4 million in 2000 to 61 million in 2004 (World Bank, 2006b).

Along with the continuing role of the nationwide NGO association, Organization of Social Services for AIDS (OSSA), women's associations and groups of PLWHA began to play a leading role at national and local levels.

The strategic plan also engaged religious leaders in fighting the epidemic. Workshops in Jimma, southwest Ethiopia, in 2000, worked with Muslim and Orthodox community leaders who viewed HIV/AIDS as God's punishment for promiscuity and who had been unwilling to discuss AIDS prevention, condom use, or provide PLWHA with treatment and care. While religious leaders did become more engaged in educating their congregations about HIV/AIDS, their negative attitudes to condom use were resistant to change.(Surur & Kaba, 2003).

In 2006, the World Bank concluded that EMSAP, the World Bank loan, had encouraged

> "a major change in the way Ethiopia is responding to the HIV epidemic . . . Not only has the persistent silence on HIV/AIDS been broken, but EMSAP has facilitated a generalized response to the epidemic with participation from all levels and sectors of Ethiopian society . . . For the first time Government engaged civil society organizations (particularly NGOs) and the private sector in scaling up its response to HIV/AIDS . . . A wide-ranging coordinating structure for the national response to HIV/AIDS, from central level to community level . . . has functioned remarkably well" (World Bank, 2006a)

***2003-Today: ART Rollout***

The government first made ART available on a broad scale in mid-2003, for a standard fee of USD 28 per month from Ethiopian Red Cross and municipal pharmacies (HAPCO, 2005). Health providers were given a standard 1-week training program, and recipients were screened to ensure that they could afford to pay the monthly fee for treatment, although many found the cost oppressive. By the end of 2004, 42 public and private hospitals were providing low-cost ART to more than 13,000 patients (HAPCO, 2005); free treatment was available through the MSF hospital in Humera and to about 200 infected military patients and family members (MSF, 2004, 2005, 2006).

In 2004, the available resources for HIV treatment and care in Ethiopia were multiplied several-fold with the award of a USD 55 million grant from the Global Fund to Fight AIDS Tuberculosis and Malaria (Global Fund), and the inclusion of Ethiopia as one of 15 focus countries in the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). Global Fund HIV fund awards quickly grew to USD 181 million in approved funding, while PEPFAR, whose support continues through at least 2008, provided USD 255 million in commodities and extensive technical assistance in numerous areas in FY 2004–2006 (Global Fund, 2007; PEPFAR, 2006a,b).

These resources were intended to support the next HIV/AIDS five-year Strategic Plan, covering the years 2004–2008, an ambitious, wide-ranging effort, which included an effort to dramatically expand the capacity of the health sector to cover 80% of the general population by constructing 2,000 health posts, upgrading 675 health stations to health centers, and equipping 119 hospitals for HIV and general medical care, increasing the number of health officers (equivalent to nurse practitioners) and tripling the number of village-level health extension workers. The plan also called for broad-based access to HIV/AIDS care with all hospitals and health centers providing VCT, treatment for STIs, PMTCT, treatment for OIs, referral to home-based care and ART. Under the strategic plan, goals for ART

coverage included having 100,000 PLWHA start ART by the end of 2006 and 210,000 by the end of 2008, with ART coverage available to all who needed it (per the WHO goal of Access for All) by 2010. In addition, home-based care, social services, financial aid and other needed supports were to be provided to 1.05 million infected persons, family members and HIV orphans and prevention services were to be implemented with the goal of preventing 550,000 new infections (Ethiopian Strategic Plan, 2004; Ghebreyesus, 2006; MOU, 2006)

Though training, treatment guidelines, and strategic planning were put in place, management weaknesses in the government's procurement system for drugs and essential reagents delayed startup of the planned free ART program for over a year. The program was initiated in early 2005, in 20 hospitals with PEPFAR-provided, brand-name commodities. Guidelines for program eligibility and first-line regimens closely followed the WHO Guidelines for ART in Resource-Limited Settings (WHO, 2003; MoH, 2005). CD4 testing was provided for eligibility determination and treatment monitoring while viral load monitoring was not routinely available. Although delayed, startup of the ART program was rushed. The morning after the government's January 2005 launch ceremony was broadcast on national television, over 1,000 patients, many of them in tears, were turned away from the model ART clinic at Addis Ababa's Zewditu hospital. Regional road maps intended to guide the program were not in place for six months or more, laboratory reagents and test tubes for drawing blood were not available, and contracts to provide them were not in place. Weak procurement and control mechanisms and inadequate storage and distribution facilities caused roadblocks to drug availability. A requirement to ration scarce free ART by requiring patients to receive economic eligibility certificates from their local *kebele* committee drew fire from human rights activists because it could require patients to reveal their HIV status in their communities. The delineation between facilities receiving PEPFAR support and that of the Global Fund was unclear. In September, 2005, the Global Fund threatened to withhold funding unless ART uptake improved.

By the end of 2005, Ethiopia had largely resolved these issues. A new, dynamic health minister, Dr. Tedros Adhanom Ghebreyesus was appointed in October 2005 and focused immediately on ART roll-out. The Country Coordinating Mechanism subcontracted drug procurement to UNICEF (Global Fund, 2007; Abt, 2005). The economic eligibility requirement was withdrawn, and free ART was made available to all (HAPCO, 2005). Global Fund resources were used to purchase less expensive, first-line adult ART regimens, largely generically produced fixed-dose combinations, while PEPFAR funds were used for brand-name pediatric drugs and second-line regimens (MOU, 2006).

In addition to drug procurement and management, PEPFAR efforts also addressed HIV education, counseling and testing, HIV and ART care, and related preventive care for PLWHAs, their family members and HIV orphans that extends to clean water, insecticide-treated bednets for malaria prevention and partnerships to tackle malnutrition and its interaction with HIV. PEPFAR also supported laboratory upgrades, blood bank safety, safe medical injections, and surveillance and monitoring of services. Most PEPFAR assistance is delivered through partnerships with Ethiopian and U.S.-based institutions; the technical

expertise, skilled manpower, trouble-shooting ability come largely from highly trained Ethiopians and the many skilled health professionals of the Ethiopian diaspora in the U.S. and elsewhere (PEPFAR, 2006b).

## Impact of the Response

### *Public Knowledge, Attitudes and Behavior*

*Knowledge* Within a few years of the HIV virus' first entry into Ethiopia, AIDS had become a household word for those Ethiopians with access to the media, such as urban residents and high school students (Gebre, 1990; Larson et al., 1991) as state-controlled radio and television channels were saturated with prevention messages. Publications, mass organizations, health workers and word of mouth were also effective in spreading information about the new disease. In rural areas where most households in 2002 still did not have radios, and most adults are illiterate, school children and educational drama presentations were effective educational tools. By 2002, 95% of rural residents surveyed had heard of AIDS (BSS, 2002). Detailed knowledge about HIV and HIV prevention has continued to increase (see Figure 15.1). Knowledge is consistently lower among women than men, partly because they are more likely to be illiterate (EDHS, 2005). Despite relatively high awareness of AIDS, however, misinformation, particularly about condoms, is widespread. Beliefs include that condoms spread HIV infection, rather than preventing it, and that one can get HIV by eating a raw egg laid by a chicken which had eaten a condom (Surur & Kaba, 2003; BSS, 2002). While it is difficult to prove that such mistaken beliefs decrease condom use, they continue to be of concern.

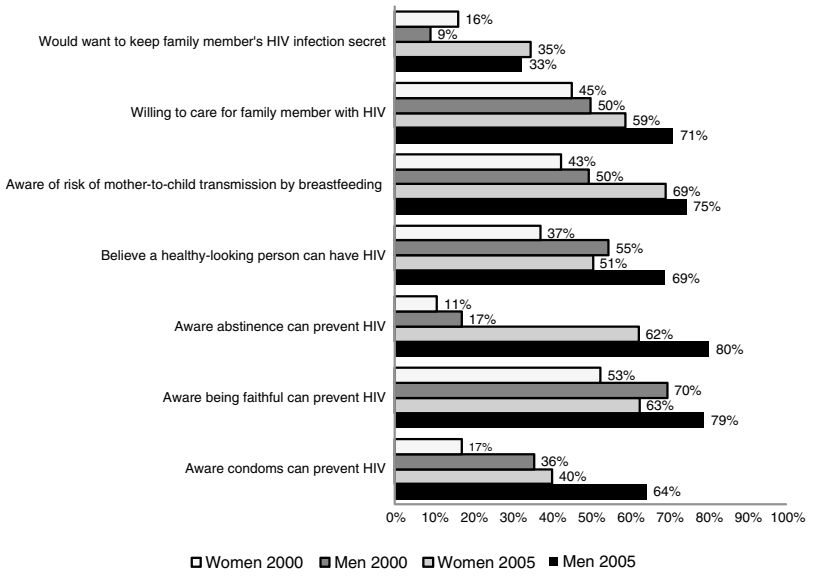


**Figure 15.1** Knowledge and attitudes about HIV in Ethiopian Demographic and Health Surveys.

*Stigma and discrimination.* In Ethiopian villages and city slums, stigma and discrimination surrounding HIV/AIDS and its handmaiden, tuberculosis (TB) are omnipresent. Families evict infected mothers and their babies from their homes, leaving them to the streets and – if they are lucky – the support of NGOs and local funerary societies (*idirs*) who have been trained in home-based care. Dying mothers leave their babies at orphanages, trusting in foreign support, and, if the babies are lucky enough not to be infected, the hope of foreign adoption (Wax, 2005; BSS, 2002). ART patients choose treatment at hospitals rather than neighborhood health centers so as to avoid neighbors knowing of their infection (TSEHAI, 2006). In 2005, only 20% of women and 25% of men would buy vegetables from a shopkeeper with HIV, and only 41% of women and 51% of men say that a female teacher with HIV should be allowed to keep teaching. As Figure 15.1 shows, while the population may have become more accepting of PLWHA themselves over the past few years, they are increasingly fearful of outsiders' reaction to a family member's HIV infection. Fifty-nine percent of women and 71.2% of men surveyed in 2005 would be willing to care for an HIV-infected family member, up from 45.3% and 50.1%, respectively, in 2000. However, 34.8% of women and 32.6% of men now would want to keep a family member's HIV infection secret, up from 16.3% and 9.1% in 2000 (EDHS, 2000, 2005).

*Sexual risk: men* The major HIV risk behaviors that likely drove the HIV/AIDS epidemic in Ethiopia: early sexual debut, unprotected commercial sex, and unsafe medical injections, appear to have dramatically declined. Among men, compared to the 47% percent who reported extramarital and/or commercial sex in 1988, when condom use was virtually unknown (Mehret et al., 1990e; Larson et al., 1991), about 5% of men surveyed in 1993 said they had commercial sex, and 55% of them said they had used a condom on the last occasion (Mehret et al., 1996). ENARP researchers studying factory workers in the central Ethiopian towns of Akaki and Wonji, reported a dramatic decline in men's sexual risk behavior over a three year period, from 1997 to 1999 (Mekonnen et al., 2003). In the 2002 nationwide behavioral surveillance, while high rates of sex with female sex workers remained among male high risk groups, condom use was also high. Thirteen percent of truckers and bus and taxi drivers, 76% of army troops and 21% of air force members surveyed reported commercial sex in the past 12 months. Of these, 91.4% of bus and taxi drivers, 84.1% of truckers, about 80% of military, and 66.7% of factory workers reported using condoms consistently (BSS, 2002).

*Sex workers* Among urban women, compared to the 1988–9 estimate that 7% were sex workers (Mehret et al., 1990b,d,f), in 1993, just 3% of women surveyed in four cities acknowledged having sex in exchange for money (Mehret et al., 1996); 67% of them said they had used a condom the last time they had done so. By 1998, a group of sex workers surveyed at Addis Ababa health clinics found that 99.2% had ever used condoms and 98% said condoms were easy to find, but only 40% used condoms more than 95% of the time (Aklilu et al., 2001). In 2002, 90.8% of sex workers reached in nationwide behavioral surveillance reported consistent use of condoms. Of the 8 cities surveyed, this figure was lowest in Gambella, where only 81.1% of sex workers reported consistent condom use (BSS, 2002).

*Sexual Risk: Youth* At the beginning of the epidemic, sex with multiple partners was common among unmarried, urban youth. In 1990, for example, 47.2% of college students in Gondar and 36.2% of high school students in Addis Ababa reported sex with a non-regular partner (Kebede et al., 2000). Those levels have fallen substantially. Among youth surveyed in the nationwide behavioral surveillance in 2002, the reported age of sexual debut was 20.5 years for women and 19.5 years for men (BSS, 2002). Sexual risk – in terms of both age of debut and multiple partners – was highest in the western regions of Gambella and Benishangul Gumuz.

*Marriage* Women in Ethiopia have been considered more vulnerable to HIV than men because they have traditionally married very young, often to men 10 years their senior who have had multiple commercial partners. In addition, Muslim women, particularly in herding communities, were considered vulnerable because men were permitted up to four wives, and extramarital partnerships were accepted. Whether in response to HIV education and other health promotion efforts or simply encroaching modernity, the population-based Ethiopia Demographic and Health Survey found these traditions are changing. Of women aged 45–49 in 2005, 38% had been married by age 15 while only 13% of those surveyed who were aged 15–19 were married by that age. Twelve percent of married women surveyed in 2005 were in polygynous marriages, down from 14% in 2000. These general population household surveys also found very low levels of self-reported risk behavior, and even these levels declined between 2000 and 2005. About 90% of those who are sexually active are married or living with a partner. Of these, the percentage of men reporting two or more sexual partners in the past year declined from 7.4% in 2000 to 4.1% in 2005. The share of sexually active women reporting two or more partners in the past year declined from 1.5% in 2000 to 0.2% in 2005. While high-risk, mobile populations may have been more likely to be away from home during both surveys than their low-risk counterparts, it is likely that the change in behavior reported is real and reflects the rural bulk of the Ethiopian population (EDHS, 2000, 2005).

### *ART Uptake*

Ethiopia did not meet its end of 2006 Global Fund target of having 100,000 patients started on ART until August, 2007. As of that date, 115 public and private hospitals and about 100 government health centers were reported to be providing free ART and HIV care under the national ART program; 172,036 persons were reported as ever having been enrolled in HIV/AIDS care, and 101,010 as having started ART (Monthly HIV Care and ART Update, 2007). About 30% of these were in Addis Ababa and the rest were in other regions; even very remote areas such as Gambella and Afar had succeeded in placing several hundred patients each on ART (see Figure 15.2). Of the patients ever having started ART, 4,554, or 4.6%, were children aged 14 and under. Of patients aged 15 and over, 47% were men and 53% women. To more than double the numbers of patients having started ART by the end of 2008, the government is attempting to strengthen referral links between VCT centers, TB clinics and ART clinics.

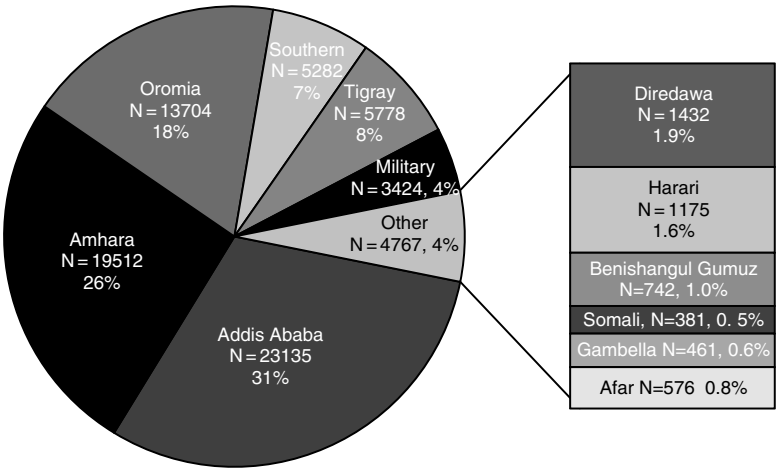


**Figure 15.2** Number of Patients on ART as of August 10, 2007, by Region of Ethiopia.
**Note:**"Military" refers to patients receiving ART at military hospitals.
Source: Monthly HIV Care and ART Update, Ministry of Health/HAPCO, August 10, 2007.

### *HIV Prevalence: The Debate*

A large number of seroprevalence surveys have been conducted in Ethiopia, but their results are highly variable, reflecting the highly localized nature of the epidemic and its association with urban and mobile populations (see Figure 15.3).

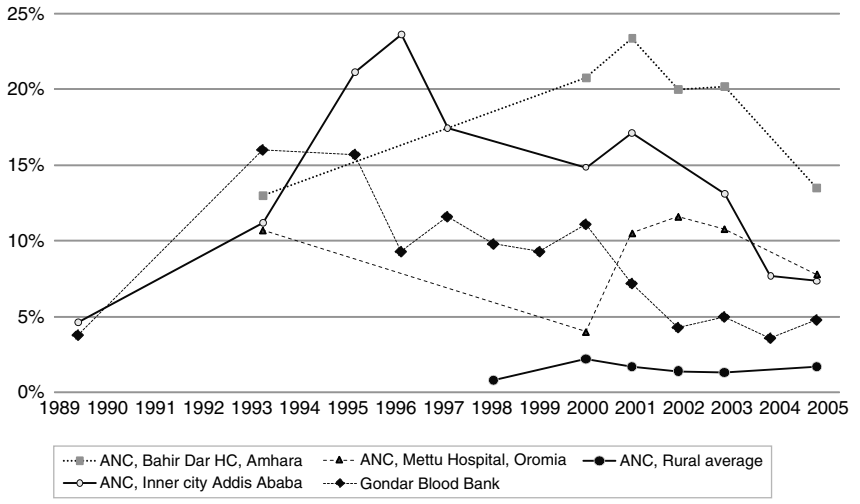


**Figure 15.3** HIV Prevalence at Selected Ethiopian Sites, 1989–2005.
**Note:**Includes antenatal clinic (ANC) sentinel surveillance sites with time trend data. In Addis Ababa, includes the inner-city Kazanchis and Teklehymanot health centers (HC). The rural average is a crude average of prevalence rates at Ayra Hospital, Dadim Clinic, Gosa Clinic and Gambo Hospital, all in Oromia, and Attat Hospital, SNNPR.
Sources: ANC sentinel surveillance sites—AIDS in Ethiopia 2006; Gondar blood bank data—Kassu et al. (2006); Assefa et al. (1994).

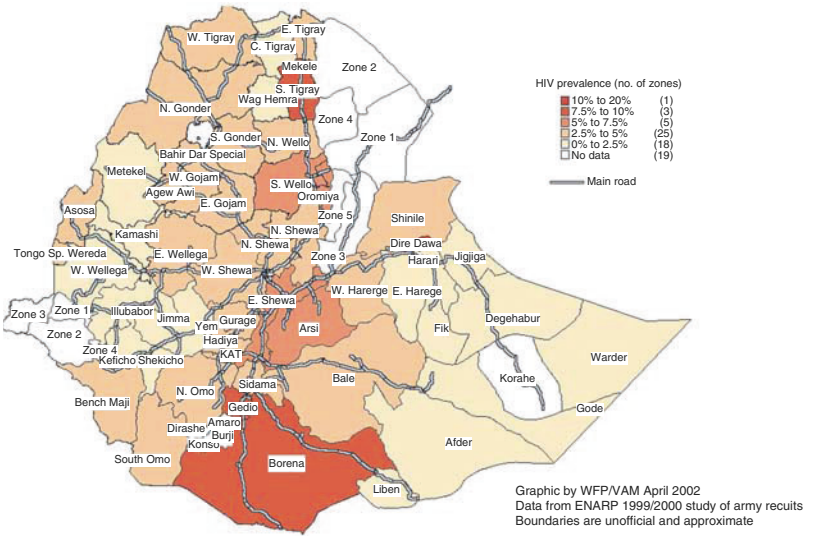


**Figure 15.4** Estimated HIV prevalence in 62 000 rural army recruits, Ethiopia 2000.

Prior to 2000, the best nationwide surveillance data came from HIV screening of the 72,000 military recruits called up during 1999–2000 for the conflict with Eritrea, which resulted in an estimate of 7.2% HIV prevalence among urban and 3.8% among rural male recruits (Abebe et al., 2003, see Figure 15.4). Estimates of overall population prevalence have also been coming down, every year, as sentinel surveillance sites have expanded into rural areas. In 2005, based on sentinel surveillance of 28,247 blood samples from 44 rural and 38 urban sites, the Ethiopian MoH estimated the national HIV prevalence rate among 15–49 year olds at 3.5% (10.5% in urban areas and 1.9% in rural areas). In an estimated population of 77 million, then, the estimated HIV infected population would be 1.32 million. Annual HIV incidence was estimated at 0.26% (AIDS in Ethiopia, 2006).

By contrast, the household-based anonymous serosurveillance conducted as part of the 2005 Demographic and Health Survey (DHS) estimated that HIV prevalence among 15–49 year olds was 1.4% nationwide, with 1.9% women and 0.9% men infected, and 6% of those in urban areas and 0.7% in rural areas infected. The age distribution of HIV infection from the DHS is shown in Figure 15.5. This estimated prevalence rate would yield a population prevalence estimate of 528,000 (EDHS, 2005).

Both methods have their limitations. The standard UNAIDS estimation methodology, in which prevalence in both men and women is modeled based on a sample of pregnant women in antenatal care (ANC), was validated in highly urban southern Africa settings where there is high use of ANC. It is less likely to be valid in a highly rural setting like Ethiopia, where ANC centers tend to be concentrated in the same urban and mobile areas that are at highest risk for HIV infection, and only 28% of women receive any prenatal care (Diaz et al. 2005a,b; Garcia et al., 2005; Boerma et al., 2003). On the other hand, individuals missed in population surveys and those refusing HIV testing are likely to be at much higher risk of infection. Kassa et al. (2006) estimate that

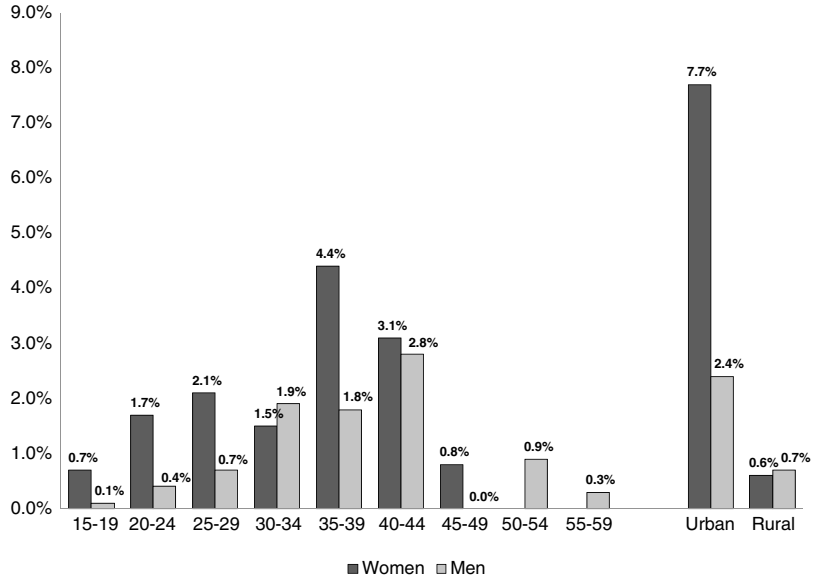


**Figure 15.5** HIV prevalence in Ethiopian population-based survey, 2005.
Source: Ethiopia Demographic and Health Survey, 2005. Prevalence based on 5,736 women age 15–49 and 4,804 men age 15–59 in sampled households who agreed to HIV testing.

the methodology used for the DHS, HIV testing of dried blood spots, may have missed up to 14.3% of infections.

Which of these methods is closer to the truth may never be known. For planning purposes, the Ethiopian government and UNAIDS have agreed on intermediate estimates, which result in a nationwide estimate of 2.1% adult prevalence, or nearly 1 million infected, in 2007. The consensus estimate places adult prevalence at 7.7% in urban areas, 0.9% in rural areas, 2.6% among women and 1.7% among men (HAPCO, 2007).

### *Mortality and Morbidity*

Since Ethiopia does not have a vital statistics system, estimates of AIDS mortality are based on models and are subject to the same limitations as calculations of prevalence. The AIDS in Ethiopia 2006 report, which was based on ANC surveillance, calculated the cumulative AIDS death toll at 1.1 million; a mortality estimate based on the latest, lower estimate of prevalence s would also likely be lower. In 2001, ENARP conducted comprehensive surveillance of burials in Addis Ababa and compared them with age-specific mortality rates from the pre-AIDS era census of 1984. They estimated that AIDS was responsible for 54.7–62.4% of the deaths in adults aged 20–64 in the city of 2.6 million (Sanders et al., 2003b). While the proportion of deaths in which AIDS played a part is consistent with official estimates, the ENARP team's estimated count of 7,000–9,000 AIDS deaths in 2001 is much lower than the Ministry's original estimate, due to the debate over prevalence. High rates of endemic TB are also responsible for much morbidity and mortality from HIV/AIDS. From 1997–8 to 2002–3, TB diagnoses increased by two-thirds, particularly in the extra-pulmonary, smear-negative form likely to be associated with HIV/AIDS

(Demissie et al., 2006). Between 40% and 70% of TB patients are HIV positive (Berhane et al., 2006).

ART has had a dramatic impact on the mortality of those treated. In a cohort of patients in Arba Minch, southern Ethiopia, death rates of ART patients were 15.4 per 100 person-years compared to 58.1 per 100 person-years for patients not on ART (Jerene et al., 2006). Other authors report one-year mortality rates of ART patients of about 10% (Wolday et al., 2006; Woldu et al., 2006). While this is similar to rates in other African programs (ART-LINC, 2006), it remains substantially above the level in developed countries and occurs in the context of high loss to follow-up rates, on the order of 10–15%, which may represent undocumented mortality (TSEHAI, 2006). Based on consensus prevalence estimates, the MoH estimates that, in 2004, 100,000 people, including 89,000 adults and 11,000 children, died of AIDS. By 2007, the number of adult deaths was estimated to have dropped by 31%, to 61,000, in part due to the impact of ART. Pediatric deaths, however, were estimated to have fallen just 3% (HAPCO, 2007).

### Remaining Challenges

Ethiopia should justly celebrate its successes, the results of great effort and collaboration. However, three major challenges in addressing the Ethiopian epidemic remain. First is the country's inability to account for patients who started ART and are no longer listed as taking it. Of 101,010 patients who started ART through August 10, 2007, the MoH reports that just 75,602, or 76%, are still on ART (Monthly HIV Care and ART Update, 2007). It is unclear whether this represents flawed counting methods, high mortality, large numbers of incompletely treated patients leaving care, or some combination of these. Intensive efforts to better track patients and document mortality or survival should be a priority.

A second concern is the severe shortage and high turnover of trained physicians and nurses to both implement the ART program and address the other serious health needs facing the country as it strives to expand access to care. According to WHO, Ethiopia has only 1,936 physicians and 14,893 nurses for its population of over 70 million. Its physician: population ratio, 1:34,000, is the second-lowest in the world (WHO, 2006a). Just 638 physicians work in public sector health facilities, for an effective physician: population ratio of 1:118,000 (Berhan, 2007). Average government-sector physician salaries of USD 200 per month are not enough to keep doctors in remote rural areas, when they are pulled by the lure of the private sector in Addis Ababa, the still-growing Ethiopian diaspora, or, increasingly, more competitive payment rates to provide ART care in other African countries. Training more health officers may only draw equally-scarce nursing staff away from primary care. The government's priority is to develop a corps of rural health extension workers, but as more and more responsibilities are laid on these secondary school graduates' shoulders, it is unclear if the current one-year training program is sufficient.

Finally, PMTCT is the Ethiopian HIV program's greatest challenge. One dose of nevirapine given to a mother during labor and one to her child after birth, is recommended by WHO as the "absolute minimum" ARV prophylactic regimen for HIV-positive pregnant women. It has the potential to halve vertical

transmission rates, from about 25% at birth to about 12.5% (WHO, 2006b). Despite having established 408 PMTCT sites (Monthly HIV Care and ART Update 2007), Ethiopia is managing to accomplish this "absolute minimum" in only a handful of cases. Of the 28% of mothers in Ethiopia who receive any antenatal care at all, most come for only a single visit while only 6% of women deliver in health care facilities (EDHS, 2005).

Even at health facilities, PMTCT is not routinely delivered. For example, of the 468,532 women coming for antenatal care at PMTCT sites during July 2006-June 2007, just 43.6% were reported as receiving pre-HIV test counseling, although this may be an underestimate because some women had multiple ANC visits. Just over 26% of the total were tested. Of the 6,655, or 5.4%, who tested HIV-positive, just 3,967 (60%) of the mothers and 2,736 (41%) of the babies received nevirapine (Monthly HIV Care and ART Update, 2007). These figures cry out for a fresh approach. The MoH hopes that opt-out HIV counseling and family-based approaches will make mothers feel more comfortable with testing and be the answer for those women who reach antenatal care. For the vast majority of mothers, ways first need to be found to extend prenatal care into their homes and communities, where they can be provided an integrated package of ANC, HIV testing and –where needed – single-dose nevirapine (Druce & Nolan, 2007). Only then can the needless infection of 10,000 babies a year be prevented.

### Libya: The Benghazi Outbreak

The world's largest reported nosocomial outbreak of HIV occurred in the mid-1990s in the pediatric ward of the Al-Fateh Hospital in Benghazi, Libya. It became an international *cause célèbre*, leading to the eight-year imprisonment of six foreign nurses and doctors. Libyan leader Col. Moammar Khadafi charged that the HIV virus had been created by a CIA-led conspiracy and used to infect the Libyan children at Al-Fateh (Holley, 2001).

News of the Benghazi outbreak first surfaced in 1998, when Libya alerted WHO to over 420 recent cases of HIV infection among children who had been patients at the Al-Fateh Hospital pediatric ward. On February 9, 1999, 19 foreign nurses and physicians who had been working at Al-Fateh Hospital were arrested in connection with the outbreak. While 13 were freed within weeks, five Bulgarian nurses and one Palestinian doctor were imprisoned for eight years, reportedly tortured, and twice put on trial, charged with deliberately infecting the children with contaminated blood products. The six defendants were convicted and sentenced to death first in 2004 and again in 2006, despite international protests from U.S. President George W. Bush, eminent HIV researchers (Ahuja et al., 2006) and others (Morrison, 2007; Chronology 2006). On July 24, 2007, the medical workers were released as part of a deal normalizing relations between Libya and the European Union. The "Benghazi six" flew home to Bulgaria accompanied by French first lady Cecilia Sarkozy. Each affected family received USD 1 million in compensation, paid by a charity run by Khadafi's son. The original source of the funds was unclear (BBC News, 2007).

International investigations of the Benghazi outbreak have found that it pre-dated the foreign workers' arrival at the hospital in March 1998 (De Oliveira et al., 2006), and likely resulted from multiple infection control violations, including reuse of syringes without sterilization and use of in-dwelling intravenous catheters in hospitalized children (Montagnier & Collizi, 2003). Many of the infected children visited or were admitted to the relevant ward multiple times, but investigators found that seven were definitely and 25 were probably infected during 1994-February 1998. The outbreak did peak in mid-1998, but it continued after the workers were arrested in February 1999. Only two of the children's infections appear to have resulted from mother-to-child-transmission – these may have been the original source

of the outbreak virus. Forty-seven percent of 148 of these HIV-infected children tested were found to be co-infected with Hepatitis C (HCV) and 33% co-infected with Hepatitis B (Yerly et al., 2001) Molecular subtyping found that all 51 patients with sequenced HIV were infected with a circulating recombinant form common to West Africa, CRF02_A/G, consistent with evolution from a single clone related to a sequence from Ghana (Visco-Comandini et al., 2002; De Oliveira et al., 2006; Yerly et al., 2001). The molecular evolution analysis revealed that both the HIV and HCV strains were highly likely to have originated and begun spreading before March of 1998 (Yerly et al., 2001). This scientific evidence of a nosocomial infection was presented at trial and rejected in favor of the opinion of five Libyan physicians (National Experts Committee, 2003). Infected children transmitted HIV to 17 of their mothers, likely through breastfeeding and two nurses at Al Fateh were also infected (Visco-Comandini et al., 2002). A Center for Immunodepressed Children has been established to treat the surviving victims of the Al-Fateh outbreak (Montagnier & Colizzi, 2003), but as of April 2007, 57 children had already died (Morrison, 2007).

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## Eritrea

Eritrea is among the poorest countries in the world, with a per capita income of USD 170 (as of 2005, World Bank, 2005a), and 70% of its people still in need of food aid as a result of a drought in 2002–3 (Global Fund, 2007). Thirty years of civil war and border conflicts with Ethiopia, in addition to severe drought, has left more than 54,000 of Eritrea's estimated population of 4.4 million people living in refugee camps (Affected Populations, 2005). Economic development is limited given the unavailability of the country's traditional markets in Ethiopia, and essential foodstuffs and supplies are rationed (Gettleman, 2007b). This instability, combined with destruction of much of the country's health infrastructure during the war, has limited HIV/AIDS surveillance, prevention and treatment activities.

Despite these challenges, however, it appears that HIV/AIDS has not spread directly from the southern port city of Assab, where the first case in the region was reported, to other urban areas in the north. This is likely because of the lack of major transport routes through the Danakil desert that separates Eritrea's north and south. Further, Assab's Red Sea oil refinery has been shut since 1997 and the entire port has been closed down since the outbreak of war in 1998; Muller (2005) reports that most sex workers in Assab had been of Ethiopian origin and left when the war started. The impact on HIV transmission of the newly constructed coastal highway connecting Assab and Massawa has yet to be seen (Eritrea, 2006b). Roads that connect the northern regions of Eritrea with Ethiopia have been closed due to the border conflict, further limiting the virus' ability to penetrate Eritrean territory.

The tenuous stability achieved since independence has, with international support (Global Fund, 2007), allowed construction and reconstruction of health facilities and the expansion of health services to a greater fraction of the population (World Bank, 2005a). In response, some health indicators have shown great improvement: from 1995 to 2002, child mortality dropped from 136 to 93 per 1,000 live births and full vaccination rates of 1 year-old children increased from 41% to 76% (Eritrea DHS, 1995, 2002). Life expectancy rose from an estimated 52 years for both sexes in 1995 (WHO, 1996) to 59 for men and 63 for women in 2005 (WHO, 2007).

UNAIDS estimates the adult HIV prevalence rate in Eritrea at 2.4% (plausible range: 1.3–3.9%), and the number of people living with HIV at 59,000 (plausible range: 33,000–95,000) (UNAIDS, 2006a). Through 2004, 19,514 AIDS cases had been reported and AIDS has become the leading cause of in-patient hospital deaths among both adults and children (Global Fund, 2007). Estimated population prevalence based on a 2003 round of sentinel surveillance is highest in Assab, at 7.2%. Urban areas such as Asmara, with 4.1–4.3% prevalence and Massawa, with 2.9% prevalence, are also considered hot spots (World Bank, 2005a). At 3.3%, estimated 2003 urban prevalence was substantially higher than the estimated rural prevalence of 0.9% (World Bank, 2005a).

Measured prevalence among sex workers appears to have peaked at 35% in 1999 (Global Fund, 2007). Prevalence of 6% in the military was viewed as serious because of the large number of recruits – 250,000—and the risk that planned demobilization could further spread the epidemic. Military recruits also accounted for more than one-quarter of reported AIDS cases (Global Fund,

2007). The prevalence of HIV among TB patients has ranged from 8.5% to 22.6% (Global Fund, 2007; World Bank, 2005a).

### Responding to the Epidemic

A newly independent Eritrea established its National AIDS Control Program in 1992, but given the overall reconstruction challenge, little was done until 1997, when the country established its first national policy on HIV/AIDS and STIs, which emphasized prevention and public information. This program was led by the semi official "mass organization," the National Union of Eritrean Youth and Students, which formed an NGO to carry out social marketing of its Absulama brand of condoms and HIV/AIDS education and communication programs; the union's reach to all areas of the country made it an effective mechanism to raise general awareness (Muller, 2005). A small network of people living with HIV/AIDS, called BIDHO or "Challenge," was formed in 2000 by two PLWHA (Muller, 2005). By 2002 this network had 600 members; many of the 35 most active members, including the chairperson, came from the military (Global Fund, 2007). BIDHO members and about 80 representatives of religious groups, whose leaders were drawn into the response early, provided home-based care and counseling. However these activities were largely limited to the capital city of Asmara, and the handful of volunteers felt overwhelmed.

The government established VCT sites, although these were mainly limited to government hospitals and a few clinics in Asmara (Global Fund, 2007). Blood screening was also introduced with the establishment of the National Blood Bank and Transfusion Center, although this was fairly late, in 2002 (Muller, 2005). The Eritrean DHS of 1995 and 2002 included behavioral surveys and results from these as well as a 2001 nationwide serological and behavior survey had the government extremely worried by 2003. "The HIV/AIDS epidemic is perhaps the gravest threat faced by Eritrea today," the government-led Eritrean Partnership Against HIV/AIDS, Tuberculosis and Malaria, wrote in its application to the Global Fund that year,

> The post-conflict situation, the mass mobilization of youth into national and military service (men and women) and their impending demobilization create an ideal environment for the massive and rapid expansion of the HIV epidemic. The uncontrolled spread of HIV infection would have devastating effects on the fragile but recovering economic and social sectors (Global Fund, 2007).

The partnership decided to jump-start establishment of HIV-related programs through the World Bank-supported Rapid Results Initiative, which focuses on results within 100 days. New VCT centers, a condom-use drive among sex workers and home-based care roll-out were rapidly established through this program (Muller, 2005).

As in nearby Ethiopia, the country's ability to respond depended critically on donor support and encouragement. However, international bilateral support has been jeopardized by the government's decision in May 2005 to limit international NGO activity and expel a number of NGOs and USAID from the country, calling relief aid "neocolonialism" (Eritrea, 2005a,b; Sanders, 2007). In addition to assistance on health issues, these organizations had been providing food aid and emergency humanitarian assistance to refugees. Specifically on HIV/AIDS, USAID, working per its usual practice with international

NGO partners, had supported condom social marketing and expansion of VCT (USAID, 2005). The reasons for the expulsion were never clearly explained but were thought to be related to the close U.S. alliance with perennial rival Ethiopia. President Isaias Afwerki rejected that idea, however, telling the Los Angeles Times recently that "We need this country to stand on its two feet" (Sanders, 2007).

Health sector aid from multilateral institutions appears somewhat more welcome, although the government turned down USD 200 million in offered assistance during 2006–7, including World Food Program feeding for 1 million people (Sanders, 2007). In 2001, after the renewed fighting with Ethiopia had concluded, the World Bank launched a USD 40 million 5 year multisectoral HIV/AIDS, Malaria, STIs and Tuberculosis (HAMSET) Control Project, which supported a broad range of initiatives including: communication about behavior change, sentinel surveillance, blood bank screening, procurement of essential drugs, equipment and supplies, and health personnel training to address major shortages (World Bank, 2005a). In 2004, Eritrea had only 215 physicians, for a physician:population ratio of 1:20,000 (WHO, 2006a). HAMSET II, a USD 26.5 million grant approved in 2005, includes support for ART implementation, prevention efforts targeted to high-risk groups, community-based care and support for PLWHA and AIDS orphans, and major improvements to the national TB program (World Bank, 2005a). A USD 17.4 million Global Fund grant approved in 2004 targeted prevention, VCT and PMTCT expansion, the spread of PLWHA peer support groups and income-generating activities, such as chicken farming, run by BIDHO, STI diagnosis and treatment and establishment of a national reference laboratory. A subsequent USD 33.9 million grant signed in October 2006 is supporting a national ART program, scaling up PMTCT, providing VCT in rural and border areas and increasing community-based care and support (Global Fund, 2007).

### Impact of the Response

A national serosurvey in 2001 found a prevalence of HIV of 2.8% among ANC attendees which dropped two years later to 2.4% in 2003 (Global Fund, 2007). Reported STIs also dropped by more than half from 3,369 in 2000 to 1,546 in 2004 (Global Fund, 2007). ANC attendees are more representative of the general population in Eritrea than they are in neighboring Ethiopia, as 72% of pregnant women have at least one antenatal visit (Eritrea DHS, 2002). Similarly, prevalence levels of 22.8% among bar workers in 2001 had apparently fallen to 11.9% by 2003, although it is unclear whether the two samples were strictly comparable (Global Fund, 2007). In contrast, the prevalence of HIV among military recruits edged up from 4.6% to 6% during the same period, despite a number of prevention programs targeting the army. Urban unmarried women age 15–24 overall are also considered a high risk group, with a prevalence of 8% (Global Fund, 2007).

Knowledge of HIV/AIDS was nearly universal by 2001, and women's knowledge of prevention methods increased greatly between the 1995 DHS and the 2002 DHS. Among women, those citing abstinence increased from 22% to 47% while reported condom use rose from 35% to 54%. In 2002, 54% of women knew where to buy condoms (Eritrea DHS, 1995, 2002). Indeed,

over 10 million male condoms and 27,000 female condoms are now sold each year (Global Fund, 2007). In a 2004 behavioral surveillance survey, 98% of sex workers reported using condoms during their last sex with a client, although a much lower rate actually had condoms in their possession during the interview (Global Fund, 2007).

By 2007, according to the Global Fund grant performance report, there were 96 VCT sites in Eritrea, in which 192,000 people received counseling and testing. In 2001, only 2,227 individuals received VCT. In 2007, there were 59 sites around the country providing PMTCT, up ten-fold from 3 pilot sites in Asmara in 2004; however the 180 of HIV-positive pregnant women receiving single-dose nevirapine in 2007 was only double the 88 who received nevirapine in 2004 (Global Fund, 2007). Currently, nine clinics are providing ART (UNAIDS, 2007) and as of August 21, 2007, 1890 patients had started receiving ART, while 7,800 PLWHA were receiving home-based care (Global Fund, 2007).

## Djibouti

### Introduction

The former French colony of Djibouti (pop. 793,000) would seem to present an ideal setting for an HIV/AIDS epidemic. The city of Djibouti, which is the Horn of Africa's main port, hosts military bases for French and American troops, and is at the crossroads between the Middle East and Africa. Since the closure of the port of Assab in 1998, Djibouti has been Ethiopia's main outlet to the sea, and its port receives 500 trucks a day bringing Ethiopian shipments. In 2002, 80.7% of men in the city of Djibouti, the country's only city, reported having had extra-marital sex with an average of 3.7 sexual partners and almost two thirds never used a condom (Global Fund, 2007). Indeed, these many risk factors have been reflected in the prevalence of HIV among street-based sex workers which rose from 41% in 1990 to 70% in 2002 (Global Fund, 2007). These vulnerabilities, however, have been countered by the conservative Muslim nature of the non-immigrant population, where widespread circumcision and little promiscuity among married women may explain a relatively low overall adult HIV prevalence rate. In 2006, UNAIDS estimated that 3.1%, (plausible range: 0.8–6.9%) of the population was HIV infected, or about 15,000 adults (plausible range: 3,900–34,000) (UNAIDS, 2006a).

In a 2002 serosurvey, prevalence was higher in Djibouti city (3.4%) where three-fourths of the population lives, than in rural areas (1.1%) (Global Fund, 2007). Although it is the country with the highest TB prevalence rate in the world (1,137/100,000 population), only 13.5% of TB patients are co-infected with HIV, although this figure is somewhat higher among hospitalized patients (World Bank, 2003c; Global Fund, 2007); compared to between 40% and 70% in neighboring Ethiopia (Berhane et al., 2006). Both epidemics disproportionately affect refugees, which are estimated to make up between 7% and 10% of the population of Djibouti and other migrants, who compose an additional 10% (Global Fund, 2007).

Those infected with HIV/AIDS in Djibouti face high stigma. In 2002, discussion of the disease was still taboo and infection was thought to bring shame

upon a PLWHA's entire clan. As Kadidja Mohamed, whose husband divorced her upon learning her HIV positive status, recently explained "being HIV positive is like having death glued to your skin" (Djibouti, 2006).

### Response to the Epidemic and its Impact

Djibouti, like its neighbors, was in a state of open or silent civil war for much of the 1990s, and it also hosted over 100,000 persons displaced by its neighbors' conflicts (van Beurden, 2000). A May 2001 peace accord (U.S. Department of State, 2007) freed the government to focus on its many social problems, including HIV/AIDS. In October 2001, President Ismaïl Omar Guelleh inaugurated a new National AIDS Control Program. Since then, HIV/AIDS has received high government priority; assistance has been provided through the World Bank, which approved a USD 12 million HIV/AIDS, malaria and TB control project in 2003 (World Bank, 2003c), and the Global Fund, which approved USD 12 million in HIV funding in 2005 and an additional USD 11 million in April 2007 (Global Fund, 2007). The French government also provides 6 million euros in HIV/AIDS assistance (Agence Francaise de Developpement, 2006). All funding is in support of a 2003 national strategic plan with its goals of reducing prevalence among youth and providing ART to PLWHA (Global Fund, 2007).

The national free ART program began on March 11, 2004 at Peltier Hospital, the country's main medical center (Djibouti, 2004). By mid 2006, comprehensive HIV/AIDS care, including ART, had been rolled out to 11 sites in the city, including the French military base and VCT was available at 25 sites, including 6 in rural areas (Djibouti, 2006). Handicap International, with French support, has started rolling out treatment to border regions (Agence Francaise de Developpement, 2006). Five hundred fifty five PLWHA were reported to be currently on ART as of August 21, 2007; As of March 2006 the number on ART included 71 dually-infected TB-HIV patients treated at the Center Paul Faure, the national TB referral facility (Global Fund, 2007). As of May 2006, among the first 421 patients treated, treatment failure rate and loss to follow up were reported to be very low, at 0.8%, and 5.3% respectively (Global Fund, 2007). Over 5,000 people, including 2,753 pregnant women, received HIV testing in 2005 (Global Fund, 2007). As of Aug 21, 2007, PMTCT was offered at 17 health facilities, but only 52 HIV-positive women had received nevirapine (Global Fund, 2007).

## Somalia

### Introduction

International partners have struggled to establish an HIV/AIDS prevention and treatment program in this collapsed state despite ongoing clan warfare, the involvement of Ethiopian troops, little health infrastructure, a heavily nomadic population and other, more pressing, health and humanitarian emergencies such as child mortality (under 5 mortality 224/1000) (WHO, 2006a). In 2004, a WHO sponsored serosurveillance of ANC sites nationwide found HIV

prevalence to be 0.9% (plausible range, 0.5–1.6%) leading to an estimate of 44,000 PLWHA (plausible range: 23,000–81,000) in a population of 8.2 million people (UNAIDS, 2006a). Among surveillance sites, prevalence was highest, 2.3%, in the port city of Berbera, and similar to levels in near neighbor, Djibouti. The overall northwestern Somaliland region, which includes Berbera, had a prevalence of 1.4%. Prevalence was intermediate (1.0%) in the northeastern region of Puntland and lowest, 0.6%, in the main, south central region that includes the capital of Mogadishu (UNAIDS, 2005). The HIV/AIDS epidemic has not yet significantly impacted on Somalia's severe TB epidemic as the prevalence of HIV among TB patients at 3 sites ranged from 2.4% to 5.6% (UNAIDS, 2006b). There is little awareness of HIV/AIDS, and it is highly stigmatized in this conservative and largely illiterate Muslim society. In a 2004 survey, just 27% of Somaliland women had ever heard of condoms and only 13% of men and 3% of women had ever used a condom (Somalia, 2006).

**Response to the Epidemic and its Impact**

Separate HIV/AIDS commissions have been established in the independent regions of Somaliland and Puntland as well as south central Somalia. A five-year Strategic Framework for HIV/AIDS Prevention and Control was endorsed by all three regions in 2003, and accompanying action plans developed, with the goal of preventing escalation of the epidemic to levels seen in neighboring countries (UNAIDS, 2005). The World Bank allocated USD 5 million from its Low Income Countries Under Stress initiative for the period 2004–2007 to support seroprevalence studies, begin advocacy and community mobilization on HIV/AIDS and train medical and paramedical personnel (UNDP/World Bank, 2003). The Health Sector Committee of the Somali Aid Coordination Body, which is composed of donors, UN agencies, international and local NGOs and some local authorities, acted as a Country Coordination Mechanism to submit an application for assistance to the Global Fund, which has approved USD 10 million for Somali HIV/AIDS programs. In the absence of an established central government, UNICEF acts as the principal funds recipient and implements programs (Global Fund, 2007; Capobianco et al., 2004).

Outreach and communication efforts include overall development of radio programs and spots, theater performances, 20,000 posters and 45 billboards, and regionally, in Puntland, training of 2000 youth peer educators and, in Somaliland, development of a quarterly youth magazine called KOOR, or cowbell (UNAIDS, 2006b). Attempts to promote condoms as a means of HIV prevention has been met with deep seated resistance from religious Muslims. The Somali Ulema Council, the ruling Islamic group, formally banned condoms, saying they promote adultery, in December 2003 (Somali, 2003). As of August 2007, only 209,000 condoms had been distributed under the Global Fund program, 10% of the original goal (Global Fund, 2007). Thirteen blood banks are open and screening donations for HIV (Global Fund, 2007). Twelve VCT sites had been opened as of August 2007, up from four in 2004, and at least 2,990 people had been tested (Global Fund, 2007). The first ART site opened in June 2005, in Hargeisa, Somaliland, after a cluster of HIV cases were identified there among internally displaced persons (Somalia, 2006). Three more have since been opened and the four sites were serving 201 patients as of August, 2007

(Global Fund, 2007). Given low prevalence and testing rates, few patients are expected to be referred for ART. The program's main purpose, therefore, is to reduce the stigma of the disease.

## Sudan

### Introduction

Aid groups have likewise been struggling to provide assistance to Sudan following the January, 2005 comprehensive peace agreement between that government and the southern rebel group, the Sudan People's Liberation Movement (SPLM). Muslim-dominated northern Sudan has had a stable government and is most able to tackle an HIV epidemic. However, HIV prevalence is believed to be lowest there, compared with the Christian and animist South, and the conflict-riven Darfur region. A 2002 serosurvey found prevalence of 1.0% among ANC attendees in the north, down from 2.9% in 1997. Prevalence among high risk groups such as sex workers (4.4%), prisoners (2.0%), soldiers (0.5%), STD clinic patients (1.1%) and TB patients (1.6%) were also found to be relatively low (Global Fund, 2007). In 2006, UNAIDS (2006a) estimates an adult prevalence of 1.6% (plausible range: 0.8–2.7%) among the 27 million people living in northern Sudan.

In the south, only limited serosurveillance has been done. HIV prevalence in 2002–3 was 4.4% in Yei town, on the Ugandan border, where half of respondents were internally displaced and one-third had been refugees outside Sudan, and 0.4% in Rumbek, 500 km from the Ugandan border. Women in Yei were twice as likely to be infected as men, and single women were 7.7 times more likely to be infected than married women. Fewer than 10% of women and 40% of men with non-regular partners during the past year reported using a condom (Kaiser et al., 2006).

More worrisome was the HIV prevalence in the Kakuma refugee camp in Kenya, which was estimated at 5% in 2002 and from which 60,000 Sudanese refugees have begun to return home (Sudan, 2004). Also of concern is the incidence of TB in South Sudan, 325 per 100,000 population, which is among the highest in the world (World Bank, 2005b). HIV prevalence among TB patients was assessed recently at 10% in Rumbek and 16% in Nzara (Global Fund, 2007).

Knowledge about HIV and prevention techniques is low in all parts of Sudan. In behavioral surveillance carried out in northern Sudan in 2002, only 53% of the population reported knowing that HIV was sexually transmitted, two-thirds of the population had never heard of condoms, and just 2% of men with commercial partners reported using condoms on the last occasion (Global Fund, 2007). Stigma is high in both southern and northern Sudan.

### Response to the Epidemic and its Impact

The Global Fund began assistance to Sudan in 2005 with a USD 20.8 million grant. Although the health minister chaired the Country Coordination Mechanism, the UN Development Program (UNDP) serves as the primary recipient and implementing partner. A second, USD 112.6 million grant to scale up

the program in the north was approved in December 2006. In August 2007 the Global Fund found implementation of the initial grant to be largely on track, with 186,000 condoms having been distributed to high risk groups and 9,658 high-risk individuals having received VCT (Global Fund, 2007). ART was reported as being available at 18 sites in northern Sudan, with treatment for 1,011 people being supported. Despite the success of these pilot efforts, the government's open discussion of HIV/AIDS in a society governed by Islamic religious law (sharia), with its rigid prohibitions on publication of obscene material and on extramarital sex, has caused controversy. For example, members of parliament from the predominantly Muslim National Congress party called for the dismissal of the new Christian health minister, SPLM member Tabitha Sokaya, after she publicly advocated condom use (Moszynski, 2006).

Political leaders in Southern Sudan recognized the seriousness of the HIV/AIDS epidemic as early as 2001; with SPLM Commander John Garang calling it the second front in the Sudanese civil war, and formulating a regional policy and New Sudan National AIDS Council later that year (Sudan, 2007a). Reconstruction in the region is being supported by the South Sudan Multi Donor Trust Fund through a USD 225 million, three-year Umbrella Program for Health System Development and a USD 27.25 million Rapid Impact Emergency Project. These projects, in coordination with a USAID reconstruction effort, are working with a shaky south Sudanese government formed in October, 2005 (World Bank, 2005b,). Reconstruction projects include a focus on HIV/AIDS and TB among other high-impact areas in this region where the estimated child mortality rate is 250 per 1000 (World Bank, 2005b) and where in 2004, there was only one hospital for every 400,000 people (World Bank, 2005b).

A USD 28.4 million Global Fund grant for behavior change communication, VCT and other preventive services, and ART in southern Sudan was approved in June 2005. UNDP was again the principal recipient, although as of August 2007, implementation of this grant had not begun because of security concerns. As Global Fund reviewers noted in August 23, 2007,

> There is no infrastructure and no existing health system . . . . There are no real statistics or data, population was estimated at 7.5 million in 2003 and could rise to 12 million in a short period due to returning refugees. Working conditions are very poor as well as mobility from one city to another. There are no roads and when available are impassable or too dangerous as many of the warriors are still living on the roads. The Peace treaty signed in January 2005 is still shaky with outbursts of conflict every now and then and it is still unclear what kind of stability the [Government of Southern Sudan] will secure to the Region (Global Fund, 2007).

Despite these obstacles, there is some HIV/AIDS prevention and treatment available in the south. A Medicins sans Frontieres hospital in Kajo Keji, a refugee center on the Ugandan border, was providing ART to 50 patients as of July 2006 (MSF, 2006). There is a VCT center in Malakal that can theoretically provide ART, but as of March 2007 had only one ART patient (Sudan, 2007a). VCT is also operating in Juba (Sudan, 2006b). In Yei, patients who need ART travel 100 km to Arua, Uganda to obtain it; UNICEF established four PMTCT sites in Yei in 2006, but as of August 2007 they no longer had any nevirapine for women testing positive (Sudan, 2007c). The Sudan People's

Liberation Army, formerly the main rebel group but now the official army of southern Sudan, has set up five of its own VCT centers in collaboration with IntraHealth International. (Sudan, 2007b).

It has also been difficult to provide HIV/AIDS prevention and care in Darfur in western Sudan, where little is even known about the prevalence of HIV in this region. Despite a peace agreement signed in May, 2006, rape and murder by the Janjaweed militias remain more of a threat than HIV/AIDS. To protect against peacekeepers spreading the virus, as has occurred in other post-conflict regions, the government announced it would screen African Union peacekeepers coming to Darfur for HIV. Since the signing, the Sudanese MoH has opened a VCT center in Nyala, capital of South Darfur state, where 11% of the 180 people tested in the first 4 months have been HIV-positive. The Sudan Council of Churches, in partnership with Action by Churches Together and Caritas International, are also training peer educators in Nyala in HIV prevention, VCT and care for PLWHA (Sudan, 2004, 2006a).

## Conclusion

Experiences in the Horn of Africa demonstrate how successful programs to prevent HIV/AIDS are dependent first and foremost on social and political stability. When war, conflict and social transition reigned in the mid 1990s, the epidemics in much of the region spun out of control. The three countries in the region that have largely stabilized their internal and external conflicts, Ethiopia, Eritrea and Djibouti, have been able, with donor assistance, to mobilize many sectors of society to largely control their epidemics. In Somalia and Sudan, ongoing conflicts have prevented substantial donor resources from being effectively used. To date these nations may have been protected from HIV by their conservative Muslim traditions, but they remain unstable, and at risk. The continuing flow of refugees across national and regional borders puts many others at risk, as well.

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# Part III

## South and Southeast Asia

# Chapter 16

# HIV/AIDS in South and Southeast Asia: An Overview

David D. Celentano, Chris Beyrer, and Wendy W. Davis

Asia is home to nearly half of the planet's population, and is dominated by two countries with over one billion citizens each—China and India. The region is comprised of a large number of ethnically diverse peoples, ranging from the Hmong tribemen of Vietnam, Laos, and Southern China to the more than 60 distinct ethnic groups in Burma alone, including the vast Indian and Chinese diasporas which have distributed peoples from these countries across Asia, from Thailand to Oceana. Culturally, the countries and peoples of Asia are similarly diverse, ranging from widely varying religions (Buddhist, Taoist, Hindu, Christian, Muslim, among dozens of others), political structures (from military dictatorships, to constitutional monarchies, four of the world's five remaining communist states, and vibrant democracies), and vast differences in a large variety of beliefs, attitudes and values regarding the structures of society, the family, and the individual. Despite the complexity of considering a terrain so vast, there are geopolitical commonalities in Asian societies that make some generalizations possible. The structure of most Asian communities is focused on the extended family with reverence for one's parents and elders. Education has long been highly valued and sought out, and improving one's lot in life is a central value, both economically and socially. Norms regarding personal comportment are also widespread, including the importance of marriage and having descendents, avoiding intoxication in all forms and hiding any deviations from "acceptable behavior". The latter would include the great stigma and discrimination associated with same-sex behavior and drug use. How these complex social realities have played out in the era of HIV/AIDS is detailed in the six quite varied country scenarios that form the next section of this book.



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_16, 

HIV/AIDS in Asia is an exceptionally broad topic. Indeed, while there are similarities between the Punjab of India and the jungles of Malaysia, the differences in culture, history and economics in this region would deter most comparisons. Generally, medical geographers separate South Asia from Southeast Asia, and would include the North or North Eastern states of China, Japan, and the Koreas as another distinct cluster. Central Asia, by virtue of that region's long experience as part of the Soviet Union, is addressed here in the section on the Former Soviet Union and Eastern Europe. Southeast Asia has been by far the most affected Asian region, with the three highest prevalence states in Asia; Thailand, Cambodia, and Burma, sharing the Indochinese peninsula and a number of related social risks for HIV/AIDS. North Asia has been the most spared, with the high income states of Japan and Korea having seen relatively few cases of HIV—hence their exclusion from this book.

South Asia has the largest number of people living in absolute poverty (over half a billion persons living on less than USD 1 a day across India, Pakistan, Nepal, Bangladesh and Sri Lanka) and has some of the world's most pronounced gender inequalities in income and in health—making this a special region of concern for HIV/AIDS—though population rates of HIV in several of these large countries, notably Pakistan, Bangladesh, and the enormous "Hindi" belt of north and central India have been relatively spared from HIV infection to date.(UNAIDS, 2007) Given the massive and young populations and widespread poverty of this region, concerns about the future spread of HIV/AIDS are quite real. Were an HIV epidemic to take firm root among the general population of reproductive age adults in either China or India, the disease burdens could be enormous and the entire region could be politically and economically compromised. The good news for Asia is that to date, the epidemic seems to be generally constrained to pockets of high risk men and women, and generalized epidemics have either not yet occurred or, as in the case of many Southeast Asian outbreaks, have been well controlled.

As is outlined in each of the following six chapters, the epidemiology of HIV across Asia must be considered regionally. While HIV may have been introduced by a "foreigner" (as was the reputed case in Thailand and Malaysia), the key epidemiologic features of the Asia epidemics are the economic, political and cultural interconnections between these countries and the critical role of drug trafficking and drug use. While the Taliban's control of the Afghan poppy fields may have recently eclipsed the importance of the Golden Triangle in terms of heroin production, this region has a long and storied history of local growth and consumption of opiates. Opium production originally was associated with ethnic minority peoples in China, Thailand, Burma, Laos and Vietnam, but in recent years heroin use has moved into larger segments of the majority populations in these states–among the lowland Thais of Thailand, the Viet Minh, and among young Han across Southwestern China. For example, while heroin use among soldiers in the U.S. and South Vietnamese armies was notable during the war, after 1975, heroin use in Vietnam was rare. Yet, with the economic opening of the country in the mid-1980s, drug trafficking reemerged and drug use followed.

Along with trafficking of drugs has been the transmission of HIV, and the molecular epidemiology of HIV in the region has shown remarkable penetration across borders with changes in recombinant forms occurring

dynamically and swiftly. The emergence of CRF01_AE and its rapid predominance in Thailand was soon followed by outbreaks of this variant in both its neighbors, China and Malaysia, shortly thereafter. CRF01_A/E became the predominant, indeed almost only virus to be found in both Cambodia and Vietnam, and was later identified among Vietnamese emigrants to Australia, and in the U.S., Bulgaria, Indonesia, and Uruguay among military forces who had served with the United Nations Transitional Authority in Cambodia (Beyrer, 1998). The recent identification of a new variant, CRF33_01B, in Malaysian drug users may be an early indicator of yet another shift in the genetic structure of the HIV virus in this region.

China has seen a distinctive molecular epidemiologic picture, with segregation of HIV subtypes by both region and risk group. The early cases among transfusion recipients in Central China and men who have sex with men along her eastern seaboard were all subtype B of HIV-1. Along the Burma borders, recombinants of the Thai B' and Indian C subtypes, which the evidence suggests recombined among drug using populations in upper Burma, generated two new recombinant forms CRF07_B/C and CRF08_B/C. These swiftly became the predominant viruses of Yunnan, Guangxi, Sichuan, and Xinjiang Provinces, the four most affected provinces in China, and all characterized by injection drug user (IDU) predominance. A focus of the Thai CRF01_A/E recombinant has been long seen among the ethnic Thais (the Dai minority) in Southwest China, a finding which some have suggested indicates an ethnic tropism for this variant (Beyrer & Stephens, 2004).

India has been the only state outside West Africa with substantial spread of the HIV-2 virus, but India's epidemic has been overwhelmingly caused by subtype C of HIV-1, the virus which has dominated the world's highest prevalence region, southern Africa. Some of the concern for India's potential for heterosexual spread has been due to the presence of this clade C virus. The northeastern states of Manipur and Nagaland, as might be expected, have a molecular picture much more akin to Burma and to Yunnan then the rest of India; here B, B/C recombinants, and the A/E recombinants of Southeast Asia co-circulate, along with the Indian C clade, and HIV-2 has not been seen.

In each of the Asian country's reviewed, drug use has been a central component of the HIV epidemics, being the central driver today in China, Thailand, Vietnam and Malaysia. While Thailand initially had an explosive heterosexual epidemic related to that country's extensive commercial sex industry, today much of the transmission of HIV to women reflects sex with a drug-using male partner. The lack of good data in India and Burma precludes making confident statements about the importance of drug use in seeding the epidemic or continuing it. Nevertheless, what data exist suggest a high burden of HIV infection among IDUs. While the six country experiences reviewed here are illustrative of the regional situation, it is also important to appreciate the HIV epidemics in other large populations in the region, including the Philippines, Pakistan, and Indonesia. In each of these locations, drug use and sex work are the principal drivers behind nascent epidemics. The next several years will likely determine whether these states can muster the resources and political will required to mount effective prevention responses for these emerging epidemics.

China, Vietnam and India's large populations can be best characterized as rural dwellers, where three-quarters of their residents are found. This makes

mounting effective HIV prevention, treatment and care programs especially difficult. While services can be efficiently provided in urban locations, how to establish and maintain programs in widely dispersed and decidedly not densely populated locales can be a very difficult operational research dilemma. A similar task awaits HIV/AIDS program managers in Indonesia, where people living with HIV/AIDS are dispersed across a vast archipelago of islands.

China's response to HIV/AIDS has changed extremely rapidly in the past several years. Wu and colleagues aptly describe the situation as moving from a government focusing on policy advocacy to implementation, from a public health orientation to a multi-sectoral response which encourages the participation of non-governmental and governmental organizations, and shifting from an emphasis on demonstration projects to nationwide scale-up of known effective programs of prevention, treatment and care. Of course, all of this must needs be done on a massive scale, requiring a large cadre of workers and major budgetary expenditures. Yet, the Chinese are responding, and HIV appears not to be expanding beyond core risk groups. An exception may be some of the most heavily affected ethnic groups along China's long border with Burma, and among the Uighurs of the far northwest. Many lessons have been learned in China, and undoubtedly many experiences in the coming years will provide other tips for increasing success or avoiding the pitfalls they may encounter. China has taken surveillance seriously, and has put significant effort into obtaining data to inform decision-makers on the course of the epidemic and where best to mobilize resources. And China has shown remarkable pragmatism. The massive scale-up of methadone maintenance for the treatment of opioid dependence and the rapid expansion of needle and syringe exchange programs represents a major change from a policy of enforced detoxification in security bureau detention camps to one embracing harm reduction.

One can contrast the situation in China with the case of India. Until mid-2007, surveillance data from India suggested a massive and unfolding HIV epidemic, with a greater number of persons infected in India than in South Africa. However, these projections, which were officially espoused in the UNAIDS/WHO 2006 AIDS Update (UNAIDS/WHO, 2006), are now considered marked over-estimates of the actual situation. An expansion of the sentinel surveillance sites in India to capture a larger segment of the Indian population, an adjustment in key projection values (for example, increasing the gap from HIV acquisition to frank AIDS from 9 to 11 years), and reliable data from a massive household HIV survey conducted in 2006 including over 100,000 adults from every State and district, allowed the Ministry of Health and Family Welfare to project a current epidemic of 2.5 million Indians living with HIV/AIDS. How India takes this new reduced figure into account in planning services will likely be their next challenge.

As Solomon, Sivaram and Solomon describe, a huge international multisectoral response to the Indian HIV/AIDS epidemic is underway. How equitably these services will be distributed among the Indian people, especially the rural and isolated poor, remains to be seen. As with China, the scale of the challenge is almost beyond belief. India's population is considerably larger than the entire population of the African continent (some 800 million,) or roughly $3\frac{1}{2}$ times the size of the U.S. population—and it is still young and growing. One key issue that remains to be confronted in India is the low penetration of

HIV testing. Only about 30% of Indians with HIV are aware of their serostatus, which means that availing themselves of effective and life-saving treatments will not be possible until this gap is addressed. Finally, in India as in many of the former British and French colonies in Asia, homosexuality remains illegal, and hence data collection on HIV among this population remains a best guess at most. This is a common theme in Asia, as was the case in Thailand, where surveillance data among MSM were first collected almost 15 years after the implementation of the national HIV sentinel surveillance effort. In Malaysia and Singapore too, homosexuality is illegal, as attested to by draconian sodomy laws, and the MSM community, while not officially outlawed in China, is just emerging.

Malaysia offers another window into the political and cultural wars that HIV/AIDS engenders. For years, Malaysia maintained a zero tolerance policy regarding drugs, making fear of arrest a very real deterrent for an opioid dependent person seeking drug treatment or HIV testing. Sex work is also illegal in Malaysia, which limits access to another important high-risk group. And again, homosexuality is illegal in Malaysia. Thus, the main transmission routes (parenteral drug use, male same-sex relations and commercial sex) for HIV were illegal and the practices were highly stigmatized. However, by 2005, in spite of opposition from lawmakers and religious leadership, the government launched an aggressive harm reduction program, based on expanding methadone maintenance treatment, launching numerous needle and syringe exchange programs, and aggressive outreach. How this came to be is reviewed by Adeeba Kamarulzaman and Karina Razali. Overcoming the barriers to harm reduction in this Muslim society offers many lessons, perhaps the most important of which is the power of advocacy. The Malaysian AIDS Council put consistent pressure on many of the important sectors of society to shift policies regarding harm reduction, just as has happened in The Islamic Republic of Iran.

The HIV/AIDS situation in Burma is least well documented. As Beyrer and colleagues point out, the ruling military junta maintains control in part through repression as well as a steadfast refusal to collection information. While the epidemic no doubt is moving unchecked, there has been little systematic collection of evidence, or open disclosure of what data has been collected. Since Burma has been such a mainstay of opium production and heroin trafficking in Southeast Asia, being the primary link between the northeastern states of India and the semi-subtropical south of China, it would be highly unusual for Burmese drug users and sex workers not to be effected by the HIV epidemic. The lack of data certainly influences statistical projections of the state of the epidemic, but also has a strong influence on prevention and care. As is pointed out, virtually no state funds are spent on health care or HIV prevention activities. As an international outcast, the HIV/AIDS situation in Burma remains as unknown as its junta.

Nothing could be in greater contrast to Burma than the case of Thailand, its neighbor, which has perhaps the region's most well-documented HIV epidemic. Based on a very advanced and centralized public health system, the Thais moved rapidly to mount their HIV sentinel surveillance system once a problem was detected. The rapidity of their response and its wide coverage allowed Thai leaders to act decisively. Of greatest importance to the Thai response was the conviction by the Prime Minister in 1990 to make HIV a national priority

and to empower all ministries to become involved. The well-known "100% Condom Campaign" that resulted was responsible for turning around the heterosexual HIV epidemic in Thailand and for reducing HIV risks among young adults nationwide. However, missed in the response to HIV in Thailand were marginalized and discriminated persons, including migrant female sex workers, MSM and IDUs. Ignoring the prevention and care of these disadvantaged populations has allowed the HIV epidemic in Thailand to continue to expand, as shown by recent data reported by Chariyalertsak, Aramrattana and Celentano.

As Quan and colleagues explain, roll-out of prevention, treatment and care services in Vietnam has been slow despite an outpouring of international aid to assist Vietnam with the only expanding HIV epidemic in Asia. Other than IDUs, the largest high risk population in Vietnam, little is known about risk populations, especially MSM, who are highly stigmatized. Harm reduction was legalized in 2006, and yet there has not been broad scale-up in opiate substitution therapy to date. Expanded VCT services were established in 2002 (with a very high rate of referral to medical care sites and a very high degree of patient satisfaction with services) in Vietnam, but it is estimated that fewer than one in twenty persons with HIV in Vietnam has been tested. Thus, getting infected people onto ART is going to be an uphill battle.

The Asia region has had an important impact on ART. Malaysia was the first Asian country to issue a compulsory license for an AIDS medication after the Doha Declaration. While Brazil often threatened this, they never actually issued a compulsory license, rather shaming pharmaceutical companies into reducing their rates to acceptable levels. The second important factor for HIV care in the region is the widespread manufacture of AIDS medications by the generic pharmaceutical sector. India is now a major player in the international HIV medications distribution network, providing drugs at low cost for many developing countries, especially to their neighbors in Southeast Asia and to more distant places in Sub-Saharan Africa.

Asian countries have experienced a mix of HIV epidemics reflecting local conditions and culture. India's epidemic started much like that in Africa—a mix of migrant men seeking sexual services from female sex workers. While the epidemic rapidly diffused through IDUs, the relatively small number of IDUs in India precluded a major epidemic. In Thailand, the number of IDUs has decreased dramatically in recent years, in part due to reduced heroin supplied and high prices, but also to a very draconian crack-down on drug dealing and drug use. This has not been seen in other countries in the region. While harm reduction is being rolled out in a comprehensive fashion in China and Malaysia, there has been less activity in Vietnam and virtually none in Thailand. For essentially all Asian cultures, however, the response to HIV prevention for MSM has been muted at best, reflecting traditional Asian attitudes towards sex roles and behaviors. Unless more proactive policies are adopted, there are concerns that the HIV epidemic in Asia may claim MSM as its next victory.

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# Chapter 17

# China

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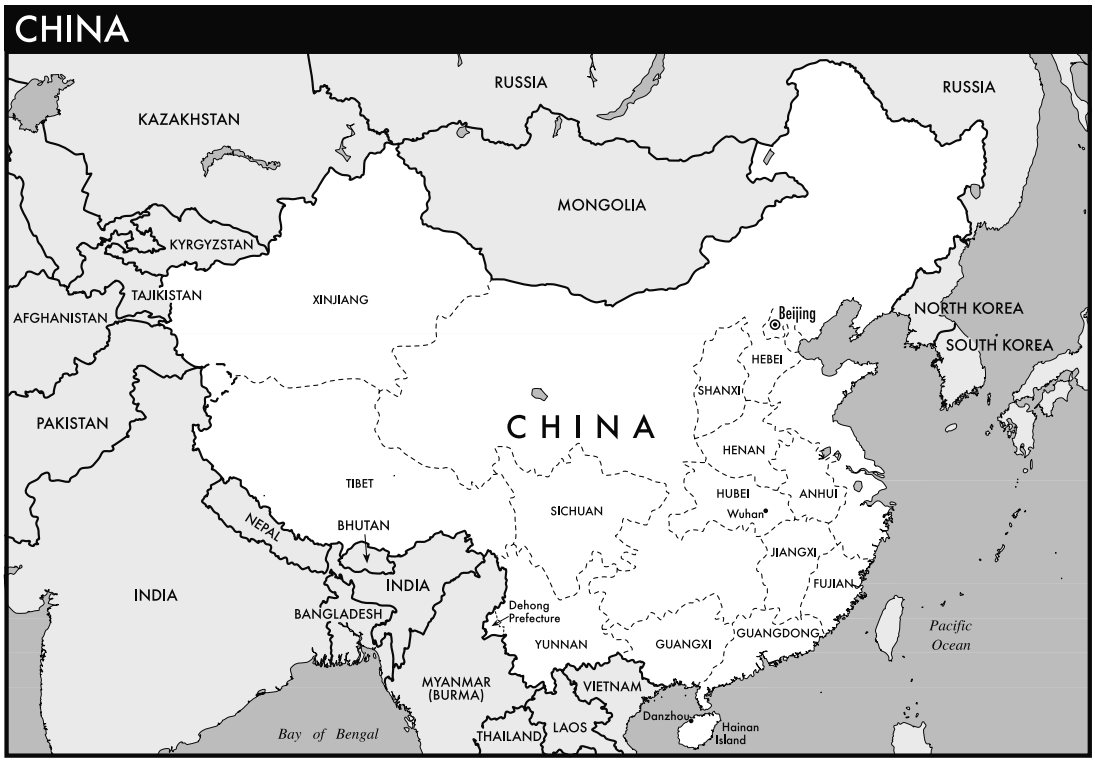


## Introduction

Over the last 22 years, China has experienced dramatic changes in the course of the HIV/AIDS epidemic and in the government's response to the epidemic (Wu et al., 2007). Since the first AIDS case was reported in China in 1985, HIV/AIDS has spread to all corners of the country. The course of the HIV/AIDS epidemic has changed, in terms of concentration, from being initially isolated to imported HIV infections (1985–1988), to primarily involving injection



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_17, 

drug users (IDUs) (1989–1994), and subsequently to both former commercial plasma donors (FPDs) and IDUs (early 1990s). Since 1998, the epidemic has been driven by injecting drug use and unprotected sexual contact.

The government response to the epidemic has also progressed from initial denial, to measured response, to now a very vigorous response. The epidemic of severe acute respiratory syndrome (SARS) in 2003 served as a catalyst, radically altering the Chinese government's fundamental approach to public health issues. In the last several years, control of HIV/AIDS has moved from policy advocacy to policy implementation; from a purely public health response to a multi-sectoral government response with greater involvement of non-governmental organizations (NGOs); and from small demonstration projects and programs to a nationwide response, including scale-up of universal access to prevention and care. This chapter presents an overview of the HIV/AIDS epidemic in China, governmental and non-governmental responses (particularly since 2003), and the challenges that remain.

## Epidemiology

### Overview

A unique pattern of HIV has been observed in China in that the epidemic began in rural areas and only later spread to urban settings. The first HIV infection was identified in China in 1985 in an Argentinean-American tourist who had AIDS (Zeng, 1988; Zheng et al., 1989). He was a homosexual man who had been diagnosed with AIDS in the U.S. and became sick during his visit to China, where he died in Beijing in June 1985. The first indigenous outbreak of the disease was observed in 1989 among IDUs in a rural border area between China and Myanmar (Burma) in Yunnan Province (Ma et al., 1990). It then spread slowly to IDUs in nearby cities (Cheng et al., 1997; Zhang et al., 1999) and to IDUs residing along the major drug trafficking roads to Guangxi, Xinjiang, Sichuan, Guangdong and other provinces (Lin et al., 1999; Wang, 1998; Wu, 1999; Yin, 1998; Zheng, 1999; 2000). HIV has spread from IDUs to their sexual partners and infants (Li et al., 2005; State Council AIDS Working Committee Office & UN Theme Group on HIV/AIDS in China, 2004).

Between late 1994 and early 1996, a second outbreak of HIV/AIDS occurred among FPDs in rural communities in several provinces (Liu et al., 2001; Wang et al., 2001; Wu et al., 1995, 2001; Yan et al., 2000; Zheng et al., 2000). This was due to the practice of harvesting plasma from impoverished rural people and then reinfusing pooled packed red blood cells into the donors. It is possible that infections were introduced by migrant workers who had become infected through drug injection while working in provinces such as Yunnan, where there had already been HIV outbreaks, and who returned to their provinces infected, sold blood with everyone else, and contaminated the blood pool (Grusky et al., 2002).

The HIV/AIDS epidemic in China can be characterized then by a first curve which peaked around 1995, and was caused by contaminated plasma donation, and a second curve which continues to slowly but steadily increase, driven primarily by both IDU and sexual contact (see Figure 17.1). HIV infection has been reported in all of China's 31 mainland provinces with considerable

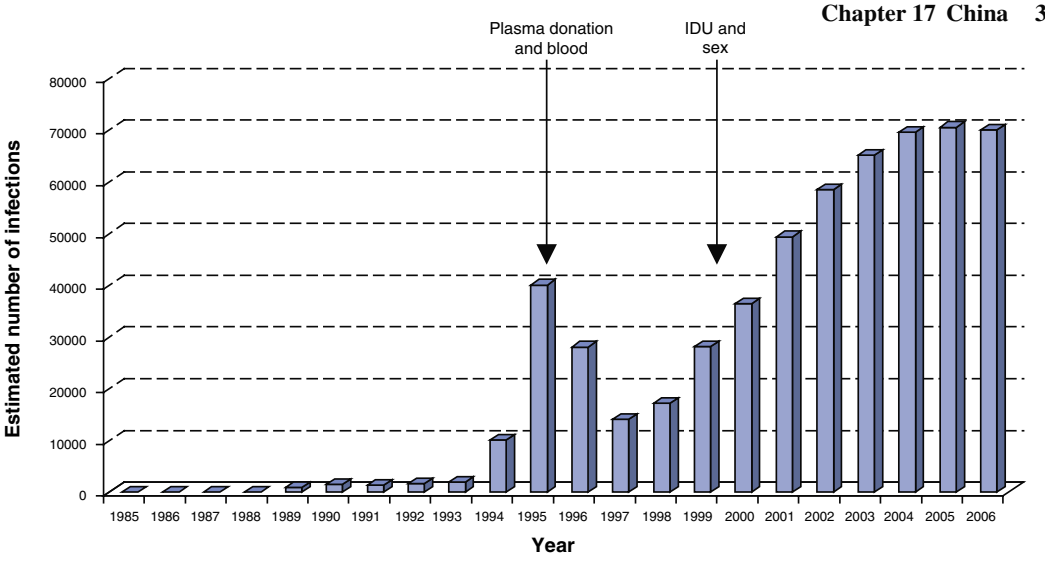


**Figure 17.1.** The overall shape of the HIV Epidemic in China.
Source: Chinese Center for Disease Control and Prevention, (NCAIDS).

variation in transmission routes and infection rates. For example, in Henan and Anhui provinces, infection has occurred primarily among former plasma donors (FPDs). Infection rates among this group are over 50% in some communities. Because the government clamped down on illegal plasma collection centers in 1996, most of these infections are now quite old but still account for many of the country's AIDS cases. In Yunnan and Xinjiang infection is primarily found among IDUs and these provinces report some of the highest infection rates (up to 89%). In Fujian and Beijing, infections have occurred mostly through sexual transmission and are increasing (State Council AIDS Working Committee Office & UN Theme Group on HIV/AIDS in China, 2004; Wu et al., 2007; Zhuang et al., 2003).

Unlike most other countries where HIV infection tends to be concentrated in urban areas, about 80% of China's estimated 650,000 HIV-infected people are rural residents (Ministry of Health of China et al., 2006). Although a high proportion of HIV infection is still observed among IDUs, transmission via sexual contact has become the main driving force for the epidemic since 2005 (Ministry of Health of China et al., 2006). While we anticipate that unprotected sexual contact and injecting drug use will continue to be the two principal modes of HIV transmission in China for the near future, there is also evidence to suggest that the epidemic is spreading to the general public. In areas where the early epidemic was IDU-driven, for example, over 1% of pregnant women receiving antenatal care are HIV-positive (Ministry of Health of China et al., 2006).

### Epidemic Among Former Commercial Plasma Donors

Former plasma donors (FPDs) in China have some of the highest rates of HIV infection in the world and the highest rates of HIV/AIDS in China. Transmission through unhygienic plasma donation was recognized in early 1995

(Wu et al., 1995) when multiple infections were observed among families in Anhui Province, with the only possible route of infection being plasma donation. Intermittent reports of HIV infection in other areas where plasma donation was popular alerted authorities to the possibility of additional outbreaks of HIV infection (Wu et al., 2001).

From the late 1980s until the early 1990s, thousands of commercial blood collection stations were established around the country, mostly in rural areas. To a certain extent, this was in response to bans on importing blood products implemented in the mid 1980s (Ministry of Health of China & General Office of Customs of China, 1986; Ministry of Health of PR China, 1986, 1987) and subsequent national blood shortages that arose in the 1990s. Cash incentives were offered to encourage donation but it was only those in greatest financial need who responded to the offer (Qian et al., 2006). Farmers were paid CN¥50 (USD 6.67[1]) for their plasma, which was an easy way for them to supplement their income, and consequently the practice was extremely popular (Wu et al., 2001). Local government officials, who were profiting from the practice, encouraged people to donate as often as possible to demonstrate what good citizens they were (Lu et al., 2005). Although plasma donors were supposed to wait 15 days between donations, some people patronized several different collection centers, used false names, and donated many times per week. Usually, 400 or 800 milliliters of blood was taken, the plasma was removed by centrifugation, and red blood cells were re-infused back into the donor. The tubing was re-used and was not sterilized between donors allowing for the contamination which led to so many donors being infected. In addition, donations of the same blood type were sometimes pooled before centrifugation. The red blood cells were then diluted with saline solution and returned to donors. Given their low political status and lack of education, the plasma donors blindly followed the orders of their local leaders, despite concerns about safety (Lu et al., 2005). A follow-up survey of 1,517 FPDs found that the number of donations was directly related to the probability of infection (Wu et al., 2001).

The epidemic among FPDs included not only those who donated but ultimately their spouses and children. In Henan province, for example, the HIV infection rate among spouses of HIV infected FPDs was 4% while in Hubei province, HIV prevalence among donor spouses was higher than 20% (Henan CDC, 2004; Hubei CDC, 2005). In one district with an overall HIV prevalence of 6% among FPDs, as many as 2% of children aged 0–7 had contracted HIV (Wang et al., 2001). Among 208 female FPDs in Henan, 50.9% were infected with HIV, and of the 67 who were mothers, 38.4% of their children were infected (Zhuang et al., 2003). In these studies, none of the children tested had received blood transfusions, suggesting that mother-to-child transmission was the most likely route of infection.

Infected FPDs now account for 8.5% of known HIV infections in China (Ministry of Health of China et al., 2006). The most severely affected areas were Henan and its neighboring provinces, including Anhui, Hubei, Shanxi and Hebei (State Council AIDS Working Committee Office & UN Theme Group on HIV/AIDS in China, 2004). These central provinces are among the

[1] At the time of writing, USD1 ≈ CN¥7.5.

poorest and most overpopulated in China. Most FPDs have been infected for up to 10 years and account for most of China's known AIDS patients. Despite these high numbers, the magnitude of the HIV/AIDS epidemic among FPDs is much lower than initially thought. Previous estimates purported that perhaps hundreds of thousands of people had been infected (The UN Theme Group on HIV/AIDS in China, 2002), but these predictions were based on surveillance in some of the worst-affected areas which overestimated the scale of the problem, nationwide. Screening has since been conducted which has provided a more accurate assessment of the epidemic among FPDs (Ministry of Health of China et al., 2006). For example, in 2004, the provincial government launched a province-wide HIV testing campaign among all FPDs in Henan which revealed an overall HIV infection rate of 8.9% (Wu et al., 2006). Nationwide testing carried out between October 2004 and June 2005, determined that affected FPDs were more localized than previously thought (Lu et al., 2006).

A smaller group of people (2.2%) contracted the disease through routine blood transfusion, including many hemophiliacs who were infected by blood products in the mid 1990s (Ministry of Health of China UNAIDS, WHO, 2006). Many of these cases have been reported from areas where plasma donation was popular in the 1990s.

### The Epidemic Among Injection Drug Users

The first outbreak of HIV infection in China was reported among IDUs in Ruili, Yunnan Province in 1989 (Ma et al., 1990). Yunnan province borders Myanmar, an area adjacent to the famous "Golden Triangle", one of Asia's primary areas for illicit opium production which is located along the borders of Myanmar, Laos and Thailand. It is likely that IDUs in Yunnan first contracted HIV/AIDS through sharing contaminated needles with infected users in these border regions. In the early 1990s, HIV/AIDS spread rapidly among IDUs along main drug-trafficking routes to Guangxi, Xinjiang, Sichuan and Guangdong provinces (Zhao et al., 1991; Zheng et al., 1994, 1993). The proportion of total HIV infections reported in China due to IDU was 68.5% in 1996, 76.5% in 1997, 75.2% in 1998, 78% in 1999, 66.5% in 2000, 48.6% in 2005 and 39.6% in 2006 (China CDC, 2001, 2007; Ministry of Health of China, 2000, 2006). Declines in the overall proportion of HIV attributable to drug use in the last several years reflect the disease's spread from IDUs to the general population and the increasing role of sexual transmission in HIV infection in China. Moreover, it is probable that the scale-up of harm reduction programs is leading to reduced HIV transmission among IDUs (Sullivan & Wu, 2007). Despite these trends, however, infection through needle-sharing remains a major source of HIV transmission in China (Ministry of Health of China et al., 2006).

The provinces and autonomous regions hardest hit by the HIV/AIDS epidemic among the drug using population include Yunnan, Xinjiang, Guangxi, Guangdong, Sichuan and Jiangxi provinces. When trafficking through Thailand became more difficult, these provinces became important stop over points along the major drug trafficking routes (Sullivan & Wu, 2007). From Guangxi, heroin is smuggled through Guangdong to Hong Kong and from there to other parts of the world. From Yunnan, heroin is trafficked north to Sichuan and from there through several sparsely populated provinces to Xinjiang. Guangxi, Yunnan

and Xinjiang are home to many of China's ethnic minorities, marginalized groups which have been disproportionately affected by drug addiction and HIV (Kaufman & Meyers, 2006).

It is expected that high levels of transmission of HIV will continue to occur within the IDU population and that the spread of HIV/AIDS from the IDU population to other groups, as observed in Dehong Prefecture, Yunnan province, where the epidemic began in the late 1980s, will recur throughout the country. For example, the HIV infection rate of spouses in Dehong increased from 2% in 1990 to 12% in 1997 (Zheng et al., 1997) to 18% in 2004 (Dehong Prefecture CDC, 2005).

## The Epidemic and Sexual Transmission

The second largest subgroup of HIV infected individuals in China includes those who have contracted HIV/AIDS through either heterosexual sex or male homosexual sex. Infections through sex account for 43.6% of those currently infected with HIV and 49.8% of new infections in 2005 (Ministry of Health of China, et al., 2006). Increases in HIV infections have also been seen among patients at sexually transmitted disease (STD) clinics. For example, in Yunnan, the prevalence of HIV among clinic attendees rose from 0.05% in 1992, to 0.2% in 1994, to 1.6% in 1998, to 2.4% in 2000 (China-UK HIV/AIDS Prevention and Care Project, 2001) to 9.6% in 2006 (China CDC, 2007). Among 81 sentinel surveillance sites with STD patients, the proportion of sites reporting cases of HIV infection increased from 25.9% in 2003 to 33.3% in 2004 to 42.0% in 2005 to 45.7% in 2006 (China CDC, 2007).

The prevalence of HIV among heterosexuals is a clear indication that the disease has moved into the general population and is no longer confined to high-risk communities. Further evidence of this is the changing gender ratio of those infected. From 1990 to 1995, the male-to-female ratio was 9:1; currently (2007) it is estimated to be 2.5:1 (China CDC, 2007). This represents a significant increase in the prevalence of HIV among women. Increasing infections among female sex workers, expanded drug use among women in China, and increased rates of STDs in general have made women more vulnerable to the disease (Chen et al., 2000; Gill et al., 2004). HIV infection has been reported among antenatal women in six of ten sites from the sentinel surveillance program. Antenatal women accounted for 0.5% of HIV infections in Yunnan, many of whom may be sex workers or the sexual partners of drug users (Yunnan Center for AIDS Control, 2006). However, these sentinel surveillance data have also identified HIV infection among low-risk women attending antenatal clinics, indicating transmission from infected individuals to their spouses.

### *HIV Infection Among Sex Workers*

Transmission of HIV/AIDS via sex workers has increased alarmingly nationwide. The new economic environment, allowing the rich to purchase sex as a commodity and giving the poor a market in which to sell it, as well as increased population mobility, changing sexual mores, and ignorance about condom use to prevent sexually transmitted infections (STIs) and HIV have all influenced this trend (Gil et al., 1996; Shao et al., 1996). National HIV sentinel

surveillance results show an increase in the prevalence of HIV among sex workers from 0.02% in 1995 to 2% in 2000. Rates of HIV infection among sex workers are highest in the areas which had an earlier HIV epidemic among IDUs. For example, in Yunnan Province, surveillance data indicate that the HIV prevalence among sex workers increased from 0% in the 1992–1994 period, to 0.5% in 1995, to 1.5% in 1997 to 2.9% in 2000 (Yunnan Center for AIDS Control, 2001). Between 2003 and 2006, among 36 sentinel surveillance sites testing sex workers, the proportion of sites identified with HIV infection increased from 33.3 to 44.4%. The highest rates of HIV infection among sex workers were reported in Guangxi (14.5%) and Sichuan (8.6%) (National HIV Sentinel Surveillance in 2006, National Center for AIDS Prevention and Control (NCAIDS), unpublished data).

While inconsistent condom use with clients and lovers is a significant risk factor for HIV infection among sex workers, economic status and drug use, particularly injecting drug use, also represent important risks for infection. The China Comprehensive Integrated Program for Research on AIDS (CIPRA) has found that in Yunnan, sex workers of lower class have a higher infection rate (14%) than sex workers in general (10%) and that among the 111 sex workers who also used drugs, the HIV infection rate was 38.6% (China CIPRA, submitted for publication). Another study conducted in Gejiu in Yunnan Province in 2006 found a 76% infection rate among sex workers who were also IDUs (Ren, 2007).

### *HIV Infection Among Men Who Have Sex with Men*

Rates of HIV infection among men who have sex with men (MSM) are not well understood. Officially, the Ministry of Health (MoH) estimates that there are between 5 and 10 million MSM, of whom 1.3% may be infected with HIV (China Daily, 2006). However, the validity of survey results or whether they reflect the true prevalence is not known as a high proportion of the MSM population remains hidden due to stigma. This is also a problem for surveillance, and efforts to include MSM in national sentinel surveillance programs have also been largely unsuccessful (Wu, Rou et al., 2004). The government plans to improve surveillance among MSM by including them as a high risk group and ordering surveillance sites, even in low-epidemic areas, to survey them (State Council of P.R. China, 2006a). It is probable that a not insignificant proportion of individuals with HIV/AIDS who report that they contracted the disease through unknown activities may in fact have as their risk factor sexual intercourse with MSM. Homosexuality is still stigmatized in China deterring many MSM from revealing their true sexual orientation (Zhang & Chu, 2005). Anecdotally, MSM who have worked with the National Center for AIDS Prevention and Control (NCAIDS) to develop technical guidelines for MSM interventions, have reported that men would rather admit to drug use or sex with a prostitute than reveal they have had sex with another man. A limited number of unsystematic surveys have indicated that the HIV infection rate among MSM is between 1 and 3% in urban areas of China. It is also estimated that MSM account for 11% of total people living with HIV/AIDS and 12% of newly HIV infections in China in 2007 (State Council AIDS Working Committee Office UNTG &

U.N. Theme Group on HIV/AIDS in China, 2007). Recent data also suggests that MSM in China are engaging in unsafe sexual practices (Choi et al., 2004).

### Epidemics Among Children

Another small but potentially growing group of HIV infected individuals is children who were infected through mother-to-child transmission. In 2003, this group comprised 0.9% of all HIV cases whereas in 2005 they accounted for 1.4% (Ministry of Health of China, 2006; State Council AIDS Working Committee Office & UN Theme Group on HIV/AIDS in China, 2004). This trend is likely to rise in the future given an ongoing absence of adequate antenatal screening. Provinces likely to be most affected will be Yunnan and Xinjiang, where the prevalence of HIV among pregnant women seeking antenatal care already exceeds 1% in some areas (National HIV Sentinel Surveillance, NCAIDS, unpublished data).

### Rural-to-Urban Migrants

A group who are being increasingly looked upon as a new threat to HIV/AIDS prevention and control are the approximately 130 million migrant workers who typically come from poorer regions of the country and work in the cities as laborers, restaurant workers, and sex workers (Anderson et al., 2003). Many of them have low levels of literacy and have limited access to prevention and treatment programs. There is currently no estimate for how many migrant workers are infected with HIV as they are not incorporated in testing, prevention or care efforts of local health authorities.

## Governmental Policies and Strategies

In 1985, when the first case of AIDS was identified in China, the government immediately started developing policies that they hoped would stop HIV from both entering into and spreading through the country. Many of these laws were neither realistic nor feasible, especially in remote areas, and they actually impeded rather than facilitated HIV control (Wu, Rou et al., 2004). For example, banning the importation of foreign blood products led to increased demand for locally-sourced blood and inefficient monitoring of this industry led to thousands of infections among donors. It was not until 2003, when the SARS outbreak heightened awareness about public health issues that national attention was paid to the potential economic and social instability that HIV/AIDS could cause.

One sign of the government's more proactive approach came on September 22, 2003, when the executive vice minister of health, Mr. Gao Qiang, speaking on behalf of the Chinese government at the United Nations Special Session on AIDS, made five commitments for responding to HIV/AIDS. These were to: (1) strengthen government efforts in leadership and clarify governmental responsibility; (2) provide free treatment and medicine to economically disadvantaged HIV/AIDS patients; (3) improve laws and regulations and intensify the intervention for HIV risk behaviors; (4) protect the legitimate

rights of HIV-infected individuals and oppose social discrimination against them; and (5) be more active in international cooperation. Since that declaration, a host of policies and developments have been introduced to fulfill these commitments.

Another sign of the government's increased commitment to fighting the HIV/AIDS epidemic has been its increasing financial support of that effort. The contribution from the Chinese central government rose from less than CN¥15 million (USD 2 million) per year before 2000, to CN¥100 million (USD 13.3 million) in 2001 to CN¥390 million (USD 52 million) in 2003, to CN¥810 million (USD 108 million) in 2004 and 2005, and to CN¥850 million (USD 113.3 million) in 2006 (Wu et al., 2007). At the same time, HIV/AIDS funding from provincial governments has also increased greatly, from less than CN¥100 million (USD 13.3 million) in 2003 to CN¥280 million (USD 37.3 million) in 2005.

### HIV/AIDS Policy

On World AIDS Day 2003, Premier Wen Jiabao visited AIDS patients at Beijing Ditan Hospital and announced the "Four Frees and One Care" policy on AIDS. The "four frees" include (1) free antiretroviral treatment (ART) for AIDS sufferers among rural residents and urban poor, (2) free HIV testing, (3) free services to prevent mother-to-child transmission, and (4) free schooling for children affected by HIV/AIDS. "One care" refers to social and economic support for those infected and their families. Implementation of the "Four Frees and One Care" policy was initiated in areas where the HIV epidemic was caused by plasma donation, and has since been expanded to other parts of the country.

The Chinese MoH has selected 127 counties in 28 provinces with high rates of HIV infection for participation in a comprehensive HIV/AIDS prevention and care program known as the China Comprehensive AIDS Response, or China CARES. The program provides funding for the implementation of "Four Frees and One Care" in these counties and supports promotion of prevention behaviors (e.g. condom use and safer drug injection). Designated expert groups are assigned to each of the 127 sites to provide technical support for implementing comprehensive programs.

### HIV/AIDS Related Legislation

In the last several years, the rights of people living with HIV/AIDS (PLWHA) have been protected through legislation and specific regulations. Additional Articles to the Infectious Disease Prevention and Control Act protect the confidentiality of patients who have contracted, or are suspected to have contracted, an infectious disease and defines their rights as citizens and indicates punishment for violation of those rights. On March 1, 2006, the HIV/AIDS Treatment and Prevention Regulations were promulgated, upholding the rights of HIV/AIDS patients and their families to employment, education, and health services and providing for their protection from discrimination. These regulations are the first to emphasize the human rights of people affected by this disease. They also identified condom promotion, methadone maintenance treatment (MMT) and other

strategies as effective national strategies for controlling the HIV/AIDS epidemic within high risk groups. Since 2003, more than 30 new government policies have been issued at the national, provincial, and local levels to make prevention and care feasible and accessible to all those affected by the epidemic.

Enforcement of policy is difficult, particularly in rural areas, where relevant officials may not be fully aware of or fully comprehend these laws and their implications. Training was provided to relevant government officials when the regulations were released, but it remains unclear how useful this was. Moreover, HIV legislation, particularly where it concerns IDUs and sex workers, may be counter to other laws regarding criminal behavior which can take precedence.

### Detection, Screening, and Surveillance

The infrastructure for identifying HIV cases has also been vastly improved to better meet the scope of the epidemic. There are now 5,000 screening laboratories and 99 confirmatory laboratories in 2,800 counties and city districts. Sentinel surveillance data collected from both national (n = 393) and provincial sites (n = 370) has been integrated, such that the surveillance database now receives data from over 700 sites. Voluntary counseling and testing (VCT) services have been extended from 365 counties/districts in 15 provinces to 2,862 counties/districts in 31 provinces. Uptake of testing is hindered, however, by stigma and discrimination, which are still prevalent in China. The government has tried through legislation and public education to reduce HIV/AIDS-related discrimination, but this has been difficult to achieve, particularly in rural areas (China CDC, unpublished data).

In light of the reluctance of people to seek testing and in order to better understand the scale of the HIV epidemic among its residents, the government of Henan province launched a massive campaign appealing to all FPDs to undergo free HIV testing in 2004. Of 280,307 FPDs invited to participate, approximately 25,000 subjects tested HIV-positive (~8% refused testing) (Ministry of Health Expert Consultation Committee, 2005). Similar large-scale screening for HIV/AIDS among vulnerable groups was carried out in Yunnan province from September to December 2004. Some 424,000 subjects, including IDUs, sex workers, spouses of HIV-infected individuals, pregnant women, out-patient clinic attendants, and individuals visiting STD clinics, were invited to receive HIV tests. Among them, 98.7% agreed to be tested and of them roughly 13,000 were found to be HIV positive (3.2%) (Ministry of Health Expert Consultation Committee, 2005).

Based on the positive examples set by these two provinces, the government decided to conduct nationwide campaigns to encourage testing among high risk groups, including FPDs, sex workers, IDUs, MSM, and prisoners/detainees in closed-settings. Some of these programs have recently been completed (e.g. among FPDs) and some are ongoing (e.g. all detoxification center detainees and prisoners are routinely screened). During the initial screening in Henan and Yunnan, acceptance rates for testing were over 90%, and in Henan VCT rates substantially increased after the campaign. Those testing positive were referred for confirmatory and $CD4^+$ testing to determine eligibility for ART (Wu et al., 2006).

## Prevention

### HIV Education and Anti-stigma Campaigns

Until relatively recently little effort was made to raise knowledge about HIV/AIDS among the general public or to fight HIV/AIDS-related stigma and discrimination. Between 1988 and 1995, education campaigns were minimal and only held in conjunction with World AIDS Day. Efforts to educate the public and media coverage improved somewhat after the 1995 outbreak among plasma donors, albeit to a limited extent. Since 2003, however, senior public officials, including President Hu Jintao, Premier Wen Jiabao and Vice-premier Wu Yi, have publicly visited AIDS patients, eaten with them, and shaken their hands to demonstrate that social contact does not transmit HIV. Popular figures have starred in antidiscrimination advertisements, such as basketball player Yao Ming who was featured in several television and print advertisements with Magic Johnson. Numerous large-scale HIV education campaigns, involving distribution of information pamphlets, posters, condom distribution and public events have been held to raise awareness about HIV transmission routes, the need to reduce stigma and to promote condom use. Throughout the country there are banners and posters with AIDS awareness messages designed to increase knowledge and encourage tolerance toward those affected by HIV.

### Securing the Blood Supply

In 1995, all plasma collection centers in China were closed temporarily to review their operations and ensure their safety. Centers were reissued licenses only after meeting government requirements. Most blood banks were also reviewed for safety and reissued licenses. In the ensuing years, the central government supplied equipment and medical devices to western and central China to improve blood safety in those regions as the western provinces are among the poorest and least well-resourced in the country, and the central provinces were those hardest hit by the blood contamination scandal. Since then there have been ongoing efforts, including quality assurance and control of testing procedures by the central reference laboratories, to protect the blood supply. Despite these efforts, in 2004, when an examination of more than 900 blood collection and supply institutions and 36 blood product manufacturers was conducted nationwide, 144 were forced to shut down because they were not in compliance with safety standards. More than CN¥2 billion (USD 400 million) has been raised to overhaul the blood supply system since 2004. Campaigns to raise public awareness about HIV/AIDS and the risks of paid plasma donation and to increase voluntary blood donations have done well so far and voluntary donations are on the increase. Although the blood supply in urban areas is effectively screened for HIV, screening has been more difficult in rural areas where quality control procedures have been more difficult to implement and monitor and where blood drawn for emergency purposes may not be screened.

### Programs for IDUs

Treatment for drug use in China has traditionally involved compulsory abstinence therapy at a detoxification center. In these centers, IDUs may receive ed-

ucation about the law, drug use and the health-related consequences of drug use, although the delivery of this information varies between centers. Since 2003, alternative, community-based approaches to drug control, such as methadone maintenance treatment (MMT) and needle exchange programs, have been evaluated and introduced.

To target HIV-related harm reduction among IDUs, MMT has been promoted, jointly by the MoH, the Ministry of Police, and the State Food and Drug Administration, as a major strategy to address both drug use and the drug related HIV/AIDS epidemic. Eight MMT clinics were piloted in 2004. An evaluation of these sites six months after implementation indicated reduced rates of crime, unemployment and needle sharing among attendees and has led to a scale up of a national MMT program (Wu, 2005). At the end of 2006, there were 320 MMT clinics in 23 provinces providing services for 46,000 heroin users nationwide. Expansion of these services is continuing.

National needle-exchange programs have also been implemented as pilot programs since 2000 and, on a wider scale, since 2006, when programs were scaled up from 93 sites to 729 sites in seventeen provinces (Wu et al., 2007) (see Table 17.1). Programs enlist the help of over 2,700 peer educators who conduct out-reach services. Clean needles have been provided for 42,214 IDUs (about 12% of the total estimated population of IDUs), and 98.7% of used distributed needles and syringes have been collected (Wu et al., 2007). Evaluation of initial pilot trials of needle exchange indicated significant reductions in hepatitis C and HIV infection among participants in intervention communities (Wu, Lin et al., 2004). The needle exchange program is being continuously scaled up and will include 1,400 needle exchange sites aimed at reaching 60% of the total estimated IDU population by the end of 2008 (State Council of P.R. China, 2006a).

Outreach programs for IDUs, operated out of needle exchange programs or independently are sometimes hampered by crackdowns by local public security bureaus, especially when the agencies conducting the outreach have not developed a good relationship with the police. When the central or local government launches crackdowns on drug use, users of these harm-reduction systems can be rounded up and sent to re-education and detoxification centers to fill quotas (Davis, 2004). In some cases, police watch IDUs collect needles and syringes and then arrest them if they are carrying drugs, which leads to distrust in the programs and hinders harm reduction efforts (Hammett et al., 2006).

### Programs for Sex Workers

To encourage safe sex practices and control HIV transmission among sex workers, a number of outreach programs have been undertaken in the last several years, a major component of which is the promotion of condom use. One hundred percent condom use among sex workers was initially promoted in two provinces (Hubei and Jiangsu) in 2001 and was later expanded to another two provinces (Hunan and Hainan) in 2002 (WHO, 2004). Wuhan city in Hubei was chosen by the MoH and the municipal authorities because it had a large number of entertainment establishments where sex workers operated. Jingjiang County in Jiangsu was chosen because the public health system already in place was well developed and there was strong commitment from local officials to

**Table 17.1** Intervention with high risk group in China in 4th Season of 2006.

| Place | Drug users | | | Sex workers | | MSM | |
|---|---|---|---|---|---|---|---|
| | Estimated number | MMT coverage | NEP coverage | Estimated number | Coverage | Estimated number | Coverage |
| Beijing | 32000 | 773 | 215 | 16614 | 5808 | 52107 | 415 |
| Tianjing | 598 | 0 | 0 | 7730 | 2279 | 303 | 131 |
| Hebei | 10826 | 0 | 0 | 28592 | 5776 | 45032 | 1458 |
| Shangxi | 9440 | 0 | 0 | 14510 | 4596 | 380 | 0 |
| Inner Mongolia | 4202 | 0 | 0 | 12744 | 8293 | 1876 | 290 |
| Liaoling | 10067 | 0 | 0 | 30720 | 10569 | 27710 | 7834 |
| Jieling | 2143 | 63 | 0 | 23602 | 5525 | 1184 | 350 |
| Heilongjiang | 921 | 0 | 0 | 44213 | 21817 | 16645 | 3082 |
| Shanghai | 24626 | 453 | 21 | 56008 | 22024 | 1694 | 314 |
| Jiangsu | 14147 | 2176 | 0 | 25865 | 11975 | 6373 | 348 |
| Zhejiang | 27837 | 1947 | 68 | 83046 | 42539 | 7550 | 1319 |
| Anhui | 9258 | 215 | 0 | 31853 | 9926 | 39070 | 817 |
| Fujian | 9696 | 369 | 0 | 19094 | 7099 | 2986 | 521 |
| Jiangxi | 8346 | 459 | 2541 | 26324 | 20831 | 2106 | 226 |
| Shandong | 889 | 0 | 0 | 23142 | 6965 | 5450 | 585 |
| Henan | 13503 | 0 | 0 | 27952 | 4046 | 5656 | 1695 |
| Hubei | 33937 | 1523 | 962 | 30141 | 18573 | 2792 | 520 |
| Hunan | 84575 | 3870 | 7284 | 52481 | 19775 | 1659 | 115 |
| Guangdong | 186811 | 1815 | 1350 | 85723 | 20457 | 105978 | 960 |
| Guangxi | 60916 | 2627 | 5566 | 39294 | 18445 | 20066 | 853 |
| Hainan | 31336 | 478 | 1025 | 10104 | 3911 | 220 | 20 |

(continued)

**Table 17.1** (continued)

| Place | Drug users | | | Sex workers | | MSM | |
|---|---|---|---|---|---|---|---|
| | Estimated number | MMT coverage | NEP coverage | Estimated number | Coverage | Estimated number | Coverage |
| Source: China CDC, unpublished data. | | | | | | | |
| Chongqing | 4944 | 873 | 81 | 23319 | 10586 | 812 | 230 |
| Sichuan | 180974 | 4734 | 9146 | 179292 | 26048 | 20000 | 6000 |
| Guizhou | 35401 | 3640 | 1811 | 18856 | 10387 | 786 | 712 |
| Yunnan | 98013 | 5454 | 12044 | 51568 | 49638 | 3273 | 677 |
| Tibet | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shaanxi | 741 | 3091 | 0 | 4247 | 3156 | 10 | 1 |
| Gansu | 31212 | 124 | 0 | 18074 | 8679 | 2584 | 297 |
| Qinghai | 1016 | 80 | 0 | 2065 | 909 | 0 | 0 |
| Ningxia | 21158 | 67 | 55 | 5338 | 3899 | 4003 | 466 |
| Xinjiang | 1000 | 2514 | 45 | 1400 | 870 | 300 | 35 |
| Bintuan | 1 | 0 | 0 | 955 | 816 | 0 | 0 |
| **Total** | **950534** | **37345** | **42214** | **994866** | **386217** | **378605** | **30271** |

Source: China CDC, unpublished data.

support the pilot program. Li county in Hunan was later chosen because recent economic development there has meant that many migrant workers are flocking to the area, and thus there is a burgeoning sex trade. Finally, Danzhou city in Hainan island was chosen because it too has high economic growth and is also an attractive tourist destination (WHO & China CDC, 2007).

In 2003, central government funds provided for condom promotion for sex workers in 351 counties. By 2006, 1,874 counties were receiving funds for condom promotion. Condoms were distributed through multiple channels including out-reach, condom vending machines, women's drop-in centers, STD clinics, hotel bathrooms, and entertainment establishments. Each month, roughly 386,000 sex workers (39%) were covered by the condom promotion program (see Table 17.1). Early demonstration projects suggest that condom promotion may effectively increase condom use rates and reduce STDs (Wu, 1998; Wu et al., 2002), but nationwide evaluation of condom distribution programs has not yet been done.

Recently released guidelines encourage sex workers to require customers to use condoms, seek reproductive health services, and be treated for venereal disease. Those working in entertainment places, restaurants, hotels, and on the streets will also be offered education on HIV/AIDS and safe sex, as well as tests and treatment for STIs. In 2004, the MoH implemented a program of intervention outreach mobile teams for the education of sex workers. The nearly 17,000 individuals who have been recruited as staff for these teams nationwide, organize out-reach activities aimed at reducing risky sexual behaviors among sex workers and MSM.

As with programs for IDUs, outreach for sex workers is hindered by crackdowns against prostitution that are carried out by public security. Another challenge in working with sex workers is their high mobility. Many sex workers stay in a place for only a few months before moving on making long-term outreach efforts difficult (van den Hoek et al., 2001). Therefore, most intervention efforts target the establishment owners to support the implementation.

### Programs for MSM

HIV/AIDS intervention programs with MSM are still limited, and are mainly conducted by MSM support groups. Across China, there are about 120 MSM volunteer groups with 4,150 volunteers to conduct HIV/AIDS peer education and intervention programs for this community and almost 50 MSM websites. Current interventions with MSM include peer education, outreach, condom and VCT promotion, support to infected individuals and STD services. Nationwide coverage is given in Table 17.1. Government efforts to prevent HIV infection among MSM have only recently begun and have so far been limited to the development of technical guidelines for conducting interventions among MSM, although to date no intervention activities have been conducted. A key facet of current government efforts with MSM has been raising awareness among health workers at the local level about the need to consider MSM a high risk group.

### Prevention of Mother-to-Child Transmission

In 2003, free testing and counseling services for pregnant women were initiated in the five provinces with the highest reported numbers of HIV infections.

All pregnant women in these five provinces were given counseling and were encouraged to have HIV testing. To date, 310,000 women have been tested at these sites, and 387 (0.13%) were identified as HIV-positive. HIV-positive pregnant women are offered intensive counseling and abortion is offered for women who present early enough. Of those who delivered, 207 (53.5%) received ART to prevent perinatal transmission. Those who did not receive ART, were generally in remote mountain areas where delivery of ART was not feasible or delivered their child before HIV was confirmed. Several women refused to take ART. Where possible, babies are delivered by Caesarian section to reduce the risk of transmission. The government also provides formula to infants for 12 months. Free programs to prevent mother-to-child transmission of HIV/AIDS are being expanded to other affected regions. At the time of writing, 271 counties were included and in the past three years, more than 2 million women were screened, with 2706 testing positive for HIV (China CDC, unpublished data).

## Treatment and Care

### National Free ART Program

In December 2002, an ART feasibility trial was conducted in Henan province. Prior to this, few people had access to treatment and clinical expertise in treating HIV was extremely limited. The national Free Antiretroviral Treatment Program was officially launched in June 2004 and as of December 2006, more than 30,000 of the estimated 70,000 AIDS patients in need had been enrolled for treatment. The program provides ART to AIDS patients living in rural areas and to those living in the cities with low incomes and no health insurance. The criteria for AIDS include a $CD4^+$ cell count of less than 200 or the presence of persistent opportunistic infections (OIs (China CDC, unpublished data)).

Initially, the program focused on providing treatment to AIDS patients in the central provinces affected by the contaminated plasma donation epidemic. However, by December 2006, patients in all provinces, who had been infected by all forms of transmission, had been enrolled in the program. The government plans to deliver ART to no less than 50% of those in need by the end of 2007 and to 80% by the end of 2010 (State Council of P.R. China, 2006a).

Guiding the roll-out of the program is the Free ART Manual, which provides technical guidance for available ART, OI prophylaxis, and laboratory monitoring. A database has been established to monitor patients in the program for adherence, treatment termination and drug resistance. Scale up is hindered by the debilitated Chinese healthcare system, which has insufficient human and medical resources and which is driven by a user-pays model that does not encourage physicians to provide free care, although they are mandated by the government to do so. Most medical professionals working in the areas of greatest need have little more than basic preventive medicine and first aid training and know little about treating a disease as complex as HIV nor understand the importance of adherence to ART and early treatment. Many patients receive ART with little or no counseling and non-adherence is a major problem.

Training programs have been established to increase the professional capacity of health care workers responsible for dispensing ART and managing patients taking the medications. Nine training centers have been established and 1,100 health professionals from all provinces have taken "train the trainers" courses to improve their treatment practices. More than 3,000 health workers have participated in 5-day didactic courses, and around 1,400 physicians have participated in 2-month mini-residencies (Division of Treatment and Care, NCAIDS, unpublished data).

Stigma and discrimination deter people from seeking testing to enter the program and healthcare workers may be reluctant to treat those infected (Lieber et al., 2006), although there is some evidence that the program has led to reductions in stigma in some communities (Cao et al., 2006). There is also substantial stigma towards providing ART for drug users who are generally expected to have poor adherence, despite evidence to the contrary (MSF, 2006), but who are the largest affected group. Moreover, because treatment is not yet available in prisons or drug detoxification centers, treatment can be interrupted which can lead to resistance.

Drug-resistant strains of HIV are already evident in some areas (Ma et al., 2007) and given the limited regimen options available this is likely to become an increasing problem until second-line treatment regimens become available. A wider range of treatment options are needed, but at present China domestically produces only generic zidovudine (AZT), stavudine (D4T), didanosine (DDI), nevirapine (NVP) and indinavir (IDV). Efavirenz (EFV) is imported, as is lamivudine (3TC). Most patients (80%) receive AZT+DDI+NVP, while the remainder receives D4T+DDI+NVP. The procurement of additional nucleoside reverse transcriptase inhibitors and protease inhibitors in 2007 has been prioritized by the Central Government.

### The National Pediatric Free ART Program

In 2005, the Clinton Foundation donated pediatric formulations of AZT, D4T, 3TC, NVP, EFV, and cotrimoxazole to support implementation of the National Pediatric Free ART Program. The program initially started in 6 provinces and has expanded to 18 with more than 600 children enrolled. The care model is similar to that of adults, with the exception that a treatment team of county, provincial, and national infectious disease physicians and pediatricians closely follows each child. The government has since pledged to continue to provide pediatric formulations for children with AIDS. The first 83 children enrolled in the program are being followed for growth and development, clinical outcomes, immunologic and virologic tests, and drug resistance to build a better understanding of pediatric AIDS care in China and other developing countries (China CDC, unpublished data).

### Management of Opportunistic Infections

Management of OIs is one of the major tasks in clinical treatment of AIDS patients. Although OI treatment is not fully free countrywide, AIDS patients can generally obtain routine medicines from the local government. Certain medicines, particularly imported medicines, are not free for AIDS patients.

## Major Internationally Supported Programs

In recent years, international cooperation and communication with international agencies such as the World Health Organization and the United Nations, as well as with other nations, have been strengthened. The governments of the United States, Great Britain and Australia among others have made significant contributions to China's efforts to combat HIV/AIDS. Significant contributions have been received from the Global Fund to Fight AIDS, TB and Malaria (Global Fund). NGOs, such as the Clinton Foundation, have also made significant contributions. In total, China has received more than CN¥2 billion (USD 267 million) in support or pledges from international organizations and agencies and from other nations.

### World Bank Health IX HIV/STI Prevention and Care Project

A five year program (2000–2005) supported by the World Bank Health IX Project, STI/HIV/AIDS subproject has provided USD 25 million to China's central government and four provinces, Fujian, Shanxi, Guangxi, and Xinjiang for HIV prevention and blood safety management. Local governments provided matching funds. An extension of the project to 2007, has supported policy advocacy, capacity building, surveillance, and prevention. Attached to the program was an NGO capacity-building grant funded by the Australian Agency for International Development (AusAID). Family Health International (FHI) also provided support to the program.

The project has focused on exploring innovative strategies to effect behavioral change among high-risk groups including piloting needle social marketing among IDUs and condom promotion among sex workers, and providing services to sex workers, migrant workers, IDUs, people living with HIV and young people.

### Global Fund to Fight AIDS, Tuberculosis and Malaria

The Global Fund awards from funding rounds 3, 4, 5 and 6 have given China a total of USD 204,928,236 (http://www.theglobalfund.org/en/).

Round 3 moneys were used to scale up the China CARES program in seven provinces (Anhui, Hebei, Shandong, Henan, Hubei, Shanxi, Shaanxi), with a particular focus on increasing access to treatment and care, and reducing mother-to-child transmission and sexual transmission to uninfected partners.

Round 4 projects targeted IDUs and sex workers in seven provinces (Yunnan, Xinjiang, Guangxi, Sichuan, Guizhou, Hunan and Jiangxi) and evaluated various prevention strategies, including behavioral change communication, VCT, MMT, needle and syringes exchange, condom use promotion, STD syndromic management, and ART.

Round 5 funding has targeted prevention in key "bridge" populations (MSM, sex workers, rural-to-urban migrants and people living with HIV/AIDS (PLWHA). It also emphasizes the involvement of NGOs in addressing problems faced by these groups including stigma, knowledge of transmission risks, access to services, poverty and legal barriers. Strategies include condom promotion, peer education, outreach, developing better guidelines for the treatment of

STDs and linking STD services to prevention, improving surveillance systems, and building partnerships between government and civil society.

Funding from Round 6 targets sex workers and their clients, MSM, IDUs, out of school youth and PLWHA, including orphans and children affected by HIV/AIDS in 15 provinces. The role of civil society as a key player in developing and implementing strategies to improve their own capacities, as well as to deliver effective prevention and treatment is a focus of this round of funding.

### U.S. Global AIDS Program

Beginning in 2002, the Global AIDS Program (GAP) of the U.S. Centers for Disease Control and Prevention (CDC) has been collaborating primarily with China's CDC on a 5-year cooperative agreement which provides USD 2 million per year. The program maintains a close link with counties participating in China CARES to support surveillance, prevention, VCT, harm reduction among IDUs, and care and support for HIV-infected and affected people. GAP also enhances strategic planning, advocacy, and communication activities and works to complement other ongoing projects and to encourage integrated programming.

### U.S. National Institutes of Health Support for Research Projects

NCAIDS has won several large, competitive research funding awards from the U.S. National Institutes of Health (NIH) that have funded research programs to increase the capacity for HIV/AIDS research in China. The largest of these was a USD 15 million grant from the Comprehensive International Program for Research on AIDS (CIPRA). This five-year project, which started in 2002, has five sub-areas: (1) epidemiology; (2) behavioral intervention; (3) immunology; (4) clinical outcomes; and (5) vaccine development (http://www.ciprancaids.org.cn). The HIV Prevention Trials Network (http://www.hptn.org), in collaboration with FHI, has implemented ongoing trials in Xinjiang and Guanxi provinces. China is also one of five sites selected for an international prevention project evaluating the use of popular opinion leaders to change community attitudes and promote safe sex practices among market venders. Through the Fogarty International Center, NCAIDS has also been awarded a USD 3 million International Clinical, Operational, and Health Services Research and Training Award that provides funding for HIV training for students and health workers to improve the human capital of China's health system. Prior to these grants, little funding was available to conduct research into HIV/AIDS in China. Programs supported by these grants have helped to establish internal review boards to ensure ethnical conduct of research at national and provincial levels, guided research evaluating novel behavioral intervention programs, provided additional epidemiological data on risk populations, and improved quality control procedures.

### United Kingdom's Department for International Development

In 2000, the United Kingdom's Department for International Development (DFID) launched a £15 million China-UK HIV/AIDS Prevention and Care Project, which is being implemented by China's CDC with support from FHI

and the Futures Group Europe. Its aims were to develop replicable models of HIV/AIDS prevention, treatment, and care among high-risk and vulnerable groups in Yunnan and Sichuan. The program conducted projects with PLWHA, IDUs, sex workers, MSM, minorities, police and students. Unique aspects of the program included conducting education for drug users within detoxification centers and using Buddhist religious leaders to develop health education and safe sex education materials for Tibetans (China-UK HIV/AIDS Prevention and Care Project, 2004).

### AusAID HIV/AIDS Prevention and Control Project

AusAID, along with Aus Health International, has been working with CDCs in Tibet, Guangxi and Xinjiang to improve local capacity to control HIV transmission. Funding is being used to develop and strengthen community-based intervention and educational programs, to build the capacity of the local governments, and to increase the effectiveness of the health systems. The program in Xinjiang has utilized Muslim Imams to promote harm reduction among drug users in affected areas (XJHAPAC, 2006). Australia has also pledged A$ 25 million for the China Australia Integrated Health and HIV/AIDS Program which will support activities that strengthen the Chinese government's ability to respond to HIV and other emerging infectious diseases.

### China HIV/AIDS Roadmap Tactical Support Project (CHARTS)

The CHARTS project is jointly funded by the UK, Norwegian and Australian governments and has the aim of strengthening China's strategic capacity to deliver an effective, coordinated response to HIV/AIDS by addressing constraints identified in the 2003 United Nations/Chinese Government Joint Assessment of HIV/AIDS in China (State Council AIDS Working Committee Office & UN Theme Group on HIV/AIDS in China, 2004). Steps include (i) strengthening leadership and co-ordination of HIV/AIDS responses at the national level; (ii) improving mechanisms for information exchange and utilization; (iii) enhancing capacity for sub-national level implementation and monitoring; and (iv) ensuring effective mobilization and utilization of resources.

### Clinton Foundation

In 2004, the Clinton Foundation signed a memorandum of understanding with the MoH to provide technical assistance in AIDS treatment and care. They also have individual memorandums with the Yunnan and Xinjiang governments. To date, USD 18 million has been donated which has been used for training and drug procurement. The Foundation is also involved in a pilot program to monitor tuberculosis (TB) co-infections aimed at improving the diagnosis of TB in HIV patients and management of concurrent treatment.

## Nongovernmental Organizations

In most countries, NGOs play a significant role in working with communities that governments cannot or do not want to reach, such as IDUs, sex workers

and MSM. In China, however, NGOs need to be registered with a local, relevant government bureau as well as the Civil Affairs bureau. The individual who grants registration is personally liable for anything the NGO does that breaches the law (The United States Embassy in China, 2003). Not surprisingly then, few NGOs who work with groups engaging in illegal activities (i.e. IDUs and sex workers) are able to be registered. NGOs do work anyway, registering themselves as businesses (which means they have to pay taxes) or operate unregistered and, essentially, illegally. There has been talk of relaxing this system for years, but so far no changes have been made.

Several groups, known as GONGOs (Government NGOs), which are registered and commonly receive funds directly from the government work in HIV as well, including the All-China Women's Federation, the Youth League, the Chinese Foundation for the Prevention of STD and AIDS, the China Preventive Medicine Association, the Chinese Family Planning Association, and the China Family Education Society. These groups have been specifically designated by the government to engage in HIV prevention and education programs (State Council of P.R. of China, 2006b).

Despite these restrictions, many NGOs, both domestic and international, have already played an important role in fighting the epidemic through education and behavioral intervention activities and through the provision of social support in affected areas. Their role is being increasingly recognized and the involvement of NGOs is an important facet of the last two Rounds of Global Fund moneys.

## Limitations of the Healthcare System

In spite of all these efforts, China faces a number of challenges that hinder its ability to control the HIV/AIDS epidemic. One of the biggest problems is that the majority of those infected with HIV are unaware of their status. At the end of 2006, roughly 700,000 people were living with HIV (Ministry of Health of China, UNAIDS, WHO, 2006), although only 191,565 people had been identified. Some of these had not received their testing results and remained unaware of their serostatus. The national testing and surveillance system though considerably improved provides an incomplete picture of many elements of the epidemic. Data mapping of the course of the epidemic remains scant, and testing approaches are neither consistent nor routine. Complete, reliable information is needed to determine the scale and progression of the epidemic.

A significant contributing factor to the problems faced in surveillance is the current state of the public health system. Deregulation of the system in the 1980s meant that the central government was no longer the sole financier of the healthcare system and health agencies had to seek profits to support their salaries and delivery of services (Bloom & Xingyuan, 1997). Staff and hospitals were allowed to profit from the sale of medicines and from ordering tests and procedures, both of which encourage over and often unnecessary prescribing of drugs and has, in some cases, left families in significant debt. Compounding this situation is a lack of well trained medical professionals and inadequate equipment and technologies, as well as persistent economic constraints. Furthermore, much of the need for care is concentrated in poor and remote regions.

The public health system currently suffers from a major deficit of qualified people who can work in HIV/AIDS prevention and control. For example, in Yunnan there are only 200 HIV/AIDS trained clinicians to serve the estimated 80,000–100,000 people who are infected. There are few physicians, nurses, laboratory staff, counselors, and other trained personnel who are able to provide advice to HIV patients and their families. They have limited knowledge about the disease and may refuse to treat HIV patients, even in high prevalence areas (Hesketh et al., 2005; Xu et al., 2007). Fear of discrimination and punishment leads people to avoid seeking VCT, treatment, and support, thereby increasing the chances of them contracting or spreading HIV (Office of the UN High Commissioner for Human Rights (OHCHR) & The Joint United Nations Programme on HIV/AIDS (UNAIDS), 1996). Clearly, education and training to raise the capacity understanding of these staff are needed. Even with a larger pool of qualified staff, China still faces the challenge of trying to convince these staff to work in rural areas, where the majority of HIV-infected people live.

The public health system also suffers from having inadequate facilities, despite efforts to improve them. For example, there are a limited number of sites that can measure $CD4^+$ cell counts and viral loads among patients. Some places may also suffer from having irregular supplies of essential medicines and may not be able to provide drugs for treatment of OIs on request (Xu et al., 2007).

## Conclusion

Recent developments in the response to HIV/AIDS in China demonstrate the Chinese government's commitment and willingness to take action to control the HIV/AIDS epidemic. The government has explicitly identified target groups (sex workers, MSM, IDUs, people infected with STIs, and migrant workers) as well as the general public and outlined pragmatic guidelines for behavioral interventions. Recognizing the conflict that exists between the various departments involved, the new guidelines instruct local staff to seek cooperation from the departments of public security and industry and commerce administration, among others. With this mandate, it will be easier for the MoH to work with other government agencies to improve the effectiveness and efficiency of their battle against HIV/AIDS. For example, although there has been a strong commitment by the central government to control HIV/AIDS, the magnitude of the task in a country of more than 1.3 billion people requires the cooperation of all sectors and governments, including those at the local level. China has made an impressive start. The commitment needs to be sustained to assure compliance and cooperation of all sectors and communities.

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# Chapter 18

# The HIV/AIDS Epidemic in Thailand – The First Two Decades

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_18, 

## Introduction

Thailand is frequently cited in the HIV/AIDS prevention literature as a key example of a successful response to the heterosexual epidemic in the mid-1990s, which had substantially defused its epidemic by the end of the decade. This is one of the signal successes in HIV prevention, along with the Ugandan ABC program, the success of condom social marketing in Senegal, and universal access to antiretroviral treatment in Brazil. In each of these instances, public policy was effective in preventing the further spread of HIV infection at the national level. Nevertheless, Thailand in 2008 continues to experience a sustained series of independent epidemics among minority populations, including injection drug users (IDUs), men who have sex with men (MSM), and other disadvantaged groups (for example, immigrant ethnic female and male sex workers) that may derail the many spectacular achievements that have been made in controlling the HIV epidemic. Further, a huge number of already infected Thais will place significant pressure on the health care system as they present for treatment.

In this chapter, we review the development of the HIV epidemic in Thailand from 1985 to 2007. We will present the epidemiologic data and country responses to successive stages of the epidemic and highlight the Thai responses to HIV prevention and AIDS care as they unfolded. Thus, we will chronologically present the emergence and spread of HIV through the Thai population, prevention strategies adopted, and then focus on the later development of early treatment options, ending with the more recent adoption of a goal of universal access to antiretroviral medications (ARVs) in the Kingdom. We will also address policy responses (e.g., the Thai 100% Condom Campaign and Taksin Shinawatara's 2003 War on Drugs) and community responses, including the establishment and growing voice of People Living with HIV/AIDS (PLWHA) groups, advocacy campaigns and social responses. Finally, we review the significant contribution of Thai academic research on HIV/AIDS and the documentation of successes and failures of responses.

In the Kingdom through 2006, 1,109,000 cumulative cases have been estimated by the Thai Working Group on HIV/AIDS Projection, with 600,600 deaths to date. While the number of new cases has slowed dramatically from what was seen a decade before, approximately 14,000 new cases were expected in 2006, many occurring in those with no apparent risk factors, especially young, monogamous, married women. Thailand is currently estimated (2006 data from UNAIDS, 2007) to have 580,000 persons living with HIV, with a prevalence rate of 1.4 (95% confidence interval from 0.7 to 2.1%) among adults aged 15–49, of whom 220,000 (38% of all infections) are in adult women. A total of USD 93 million was spent by the Thai government on HIV in 2006, 85% for treatment, care and support and only 15% for prevention. It is estimated that about 80% of HIV infected men and women needing HIV treatment are receiving antiretroviral therapy (ART) and about 89% of HIV infected pregnant women current receive ART to prevent maternal-to-child transmission. HIV/AIDS accounts for the greatest morbidity in the country; while the disability adjusted life years declined from 1,333,000 in 1999 to 936,000 by 2004

(World Health Organization, 2005). HIV/AIDS ranked first for males (11.1%) and fourth for females (6.2%) as cause of death in the Kingdom in 2004 (World Health Organization, 2005).

## Epidemiology

The first case of HIV infection in Thailand was detected among a male sex worker in Bangkok who had worked for a year in a gay bar (Wangroongsarb et al., 1985). In a review of serosurveys among male sex workers from 1985 to 1990 in various locations in Thailand, HIV seroprevalence never surpassed 4% (Weniger et al., 1991). In the sentinel surveillance conducted in five provinces (Bangkok, Chiang Mai, Chon Buri, Phuket and Songkhla) in June 1991, the HIV prevalence was 8% (with a range of 5–13%). Thus, the explosive rise in HIV transmission seen in the U.S. at the same time period was not replicated in Thailand. However, among other risk populations, the epidemic was not so benign. Early in the Thai epidemic, Weniger et al. (1991) characterized the unfolding epidemic as comprising a series of waves, with IDUs hit first, as is shown in Figure 18.1.

By 1990, sentinel surveillance was conducted in all provinces in Thailand for the following risk groups: IDUs, "direct" female sex workers (women working in brothels and other establishments), "indirect" female sex workers (women working in bars, karaoke), males attending government STD clinics, blood donors, and pregnant women (Frerichs et al., 1995). The establishment of systematic surveys allowed for a quite precise determination of the course of the epidemic regionally, for risk populations, and over time. The results of these sentinel surveys helped shape Thailand's response, and, in turn, have allowed for national trend measures of the impact of her population-level interventions, a situation with few parallels in developing country public health.

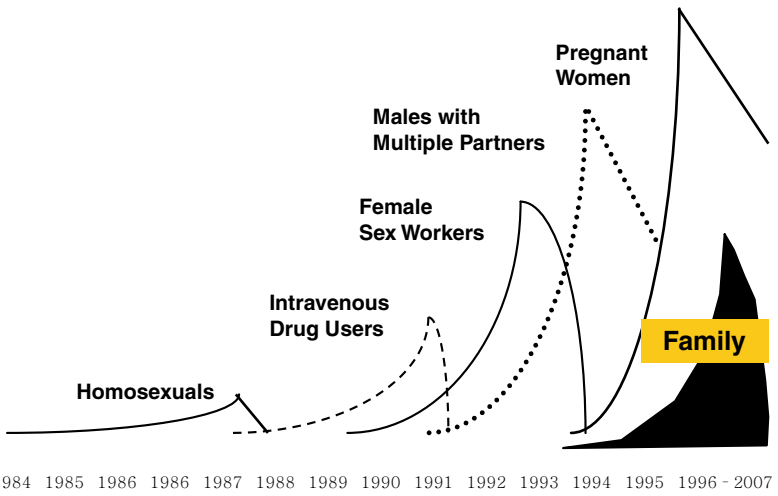


**Fig 18.1** Phases of the Thai HIV epidemic, 1983–2007.

### HIV Among Drug Users

During the mid-1980s, HIV rates among IDUs were shown to be minimal, usually 0 or 1% (Suwanakool & Rojanapithayakorn, 1989). Surveillance of HIV infection among admissions for drug detoxification by the Thanyarak Hospital for drug treatment near Bangkok showed an explosive rise in HIV infections from 1% in January of 1988 to 31% by July, reaching near 40% in the next 12 months (Uneklabh & Phutiprawan, 1998). This report was complemented by serotesting of opioid dependent outpatients in the Bangkok Metropolitan Administration Health Department methadone treatment centers, where HIV prevalence rates went from a handful of cases detected in January 1988, to over 40% by late summer (Phanuphak et al., 1989).

During this same period, prospective studies of previously HIV negative drug users showed monthly incidence rates of 3% between February and September 1988, and a 5% monthly incidence between September 1988 and April 1989 (Vanichseni et al., 1990). Choopanya and colleagues recruited two samples of IDUs in November 1989, a group already in drug treatment and a group new to the treatment system. HIV prevalence was 39 and 27%, respectively (Choopanya et al., 1991). While the seroprevalence in Bangkok stabilized thereafter in the 30% prevalence range, Weniger et al. (1991) pointed out that this may have masked continuing high transmission due to high turnover in the IDU population (Des Jarlais et al., 1991). In the ensuing year sentinel surveillance expanded to include all provinces in Thailand. The HIV prevalence among IDUs rose from 30% to nearly 50% by 2005, never showing the declines noted in most other sentinel populations (see Figure 18.2). In the 22 waves of the sentinel surveillance between 1989 and 2004, HIV prevalence dipped below 30% on only one occasion, suggesting that this is an enduring epidemic that reflects a lack of prevention focus.

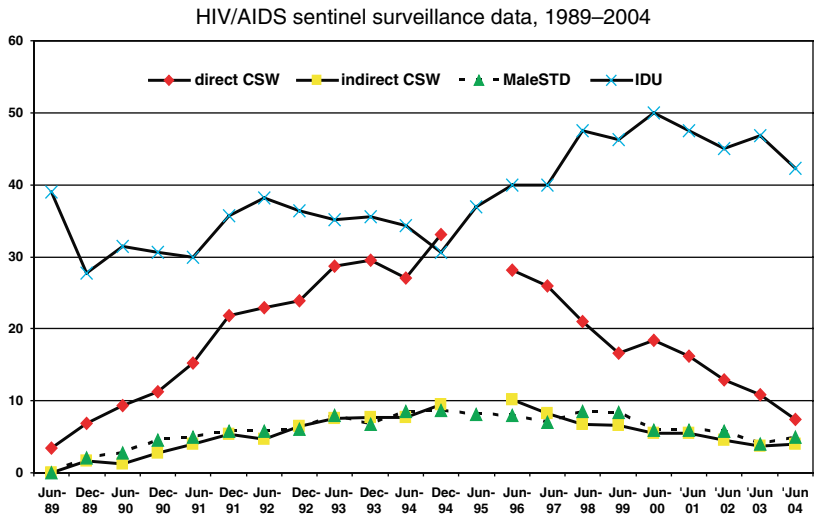


**Fig. 18.2** HIV/AIDS sentinel surveillance data, 1989–2004.

The behaviors that place IDUs at increased risk are the same in Thailand as have been documented worldwide, namely: demographic factors (of Thai ethnicity vs. ethnic minorities; age 20–39; being separated, divorced or widowed; of low education) (Razak et al., 2003; Celentano et al., 1998; Celentano et al., 1999); injection factors (sharing injection equipment and frequency of injection) (Razak et al., 2003; Perngmark et al., 2003), and a lifetime history of incarceration (Beyrer et al., 2003; Choopanya et al., 2002) and recent imprisonment (Vanichseni et al., 2001). Risk reduction following repeated counseling has been shown in cohort studies of IDUs in Thailand (Choopanya et al., 2003) and among prophylactic vaccine trial participants (van Griensven et al., 2004).

Heroin availability, needle-sharing practices among IDUs, and HIV spread through populations have been well-documented (Yu et al., 1996; Weniger et al., 1994). Beyrer and colleagues demonstrated that overland heroin routes link HIV transmission and injection drug use between Burma, Thailand, China, Laos and India, which can be documented using contemporary molecular epidemiologic methods (Beyrer et al., 2000). Regional approaches to both narcotics policy and HIV prevention and control are unlikely to be successful unless the underlying narcotics economy is addressed. HIV prevention for IDUs was scant until recently.

### HIV in Sex Workers

The Thai sex worker epidemic has been particularly well-documented in the medical literature. Early ad hoc surveys of female sex workers showed no infections from 1985 to 1989. However, in the June 1989 sentinel survey, 44% of women from low-class brothels in Chiang Mai were found to be HIV seropositive (Ungchusak et al., 1989). The incidence of HIV infection there was about 10% per month (Siraprapasiri et al., 1991). In a companion study in the neighboring province of Chiang Rai to the north, Kilmarx and colleagues measured an HIV incidence rate of 20.3 per 100 person-years among brothel-based female sex workers ("direct CSW") during the first year of follow-up, as compared to a rate of 0.7 per 100 person-years among women who worked in massage parlors or bars ("indirect sex worker") (Kilmarx et al., 1998). The risk factors identified to predict HIV seroconversion included direct sex work and chlamydial cervical infection. Lower HIV seroprevalence and seroincidence were found among female sex workers from 24 brothels in the northeastern province of Khon Kaen, a prevalence of 12.5% and incidence measured as 9.2 per 100 person-years (Ungchusak et al., 1996). In the south of Thailand, in 1994, the HIV prevalence was approximately 20% and the incidence was 4.2 per 100 person-years (van Griensven et al., 1998), showing the marked regional differences in Thailand during the early period of the rapidly escalating epidemic.

Shortly following the emergence of the HIV epidemic among IDUs the sentinel surveillance surveys showed regional differences in HIV prevalence, with the highest rate seen in the north, especially in the upper-north provinces along the Golden Triangle (see Figure 18.2). National HIV prevalence rose from about 4% nationally among brothel-based female sex workers (referred to in the Thai literature as "direct" commercial sex workers) to a high of 33% in December 1994. From June 1996 onwards, the HIV prevalence rate declined,

from 28 to 7% by June 2001 (Nelson et al., 2002). The regional differences detected during the early years of the Thai HIV epidemic slowly reached parity by 2001, where significant declines in prevalence in the north eventually came down to the levels seen in the northeast, central and south of Thailand.

Early in the epidemic, the risk factors for prevalent HIV among female sex workers directly reflected the probability of exposure: frequency of intercourse, infrequent condom use, lower charge per sex act, less frequent post-coital genital cleansing, and history of genital ulcer disease (Siraprapasiri et al., 1991; Celentano et al., 1994; Limanonda et al., 1994). Sex workers in the north of Thailand were economically deprived, poorly educated, and often bonded by the brothel; turnover among sex workers within brothels was high, often over fifty percent per year (Rugpao et al., 1993; Sawapanyalert et al., 1994). Over time, the procurement of young women to work in the sex industry shifted from northern Thai women to immigrants, often refugees from the civil war in Burma (Muecke, 1992; Rugpao et al., 1997) in response to the high rate of HIV associated with female sex work.

To combat the rising epidemic among sex workers and their clients, the government strongly promoted the "100% Condom Campaign" to reduce the risk associated with commercial sex (discussed below in "The 100% Condom Campaign"). Other interventions focused on decreasing women's risk of acquiring and transmitting HIV to their clients, focusing on STD control (Rugpao et al., 1997). Visrutaratna and colleagues conducted a multifaceted AIDS prevention program among brothel-based sex workers in Chiang Mai to increase condom use (Visrutaratna et al., 1995). Two strategies were used in this demonstration project: "Superstar", small group training sessions led by experienced peers who acted as educators; and "Model brothel", which encouraged brothel owners to insist on mandatory use of condoms by sex workers and encouraged clients to agree to use condoms. Sex worker refusal to have sex without a condom increased dramatically in this study, lasting up to one year following the conclusion of the intervention. Other innovative condom promotion programs have also been reported in Thailand, including promoting the female condom in situations where male clients would refuse to use a male condom (Fontanet et al., 1998). Over the years, demand for brothel-based sex work has declined (Nelson et al., 2002), recruitment of women into sex work has declined, the price of commercial sex has risen and many brothels closed (Hanenberg & Rojanapithayakorn, 1998).

### Heterosexual Men

The third wave of the Thai epidemic affected heterosexual men, where HIV was initially detected among men attending government sexually transmitted disease (STD) clinics (Weniger et al., 1991). As can be seen in the national sentinel surveillance data (Figure 18.1), the HIV prevalence rose from 0 to nearly 10% by December 1994, and then gradually declined to about 5% a decade later. What caused this increase in infection? Simply, commercial sex exposure.

The first reports of heterosexual exposure to HIV came from epidemiologic surveys of rural villagers in Chiang Mai Province (Nelson et al., 1994). This study was conducting an epidemiologic assessment of viral hepatitis in the

general population, and repository specimens were subsequently tested for antibody to HIV. In 1990, 21 (of 1161, or 1.8% overall) cases of HIV were detected, with a male:female sex ratio of 7:1. In 1992, 44 (or 956, or 4.6% prevalence) cases were detected. Even more disturbing, annual incidence rates of 3.15 and 0.9% were detected among men and women, respectively. These data clearly demonstrated that HIV had arrived at the village level and that it was not confined to urban areas; these data were a harbinger of a rapidly escalating epidemic.

Epidemiologic studies of military conscripts provide the most direct evidence for documenting the HIV epidemic among heterosexual (and homosexual) men in Thailand. Each year in April, all men who are 21 years old return to their village of national registration to participate in the military lottery (Nopkesorn et al., 1998). Approximately 10% of men are conscripted for military service, which is a two-year commitment. While there are some exemptions from military service (educational deferments and other occupations that are considered strategic), it is estimated that at least 80% of men participate in the lottery each year. These cohorts of men who are conscripted are epidemiologically important because the Thai military does not exempt men based on HIV status, drug use or sexual orientation. Thus, conscripts represent a unique epidemiologic group that is very representative of the national experience.

In 1991, a cohort of men conscripted into the Royal Thai Army and Air Force in the six upper northern provinces of Thailand was enrolled into a longitudinal study of epidemiologic risk factors for prevalent and incident HIV infection (Nelson et al., 1993). Among 2,417 young men aged 19–23 years, 289 (12.0%) were HIV infected at the time of conscription. The strongest predictors of prevalent HIV infection were heterosexual activities. History of commercial sex was almost universal among these men (96.5% among the HIV infected and 79.0% among those HIV-negative) but the frequency of visits was increasingly associated with HIV in multivariate analysis, and in only 61.5% of recent reports of sex with a female sex workers was a condom used (and not associated with HIV infection). Reports of sex with men and injection drug use in 1991 were uncommon and not associated with HIV prevalence. A companion study conducted in the lower-north (in Phitsanuloke Province) had a lower prevalence rate (6.9%), but among men from the upper-north, the prevalence was significantly higher, showing the regional concentration of the burgeoning epidemic (Nopkesorn et al., 1993). Studies of all Royal Thai Army conscripts from 1989 to 1994 corroborated these regional differences (Mason et al., 1995).

This cohort of conscripts from the upper-north was then followed at six-month intervals for two years, with serial blood draws, HIV counseling and testing, and an interview to determine their behaviors in the intervening period (Celentano et al., 1996). Over the 24 month period, 85 men (of 1932 seronegative men followed) seroconverted to HIV-1, giving an incidence rate of 2.43 per 100 person-years. Risk factors associated with HIV incidence included frequency of visits to female sex workers (Celentano et al., 1993), sex with men, and incident STDs, while high frequency of condom use was protective among men who visited brothels in univariate analysis but was not significant in multivariate analysis. Substance use did not differentiate men who seroconverted from those who did not. The incidence rate in the upper-north was higher than

that estimated in the lower-north (Nopkesorn et al., 1998), demonstrating the strong geographic affinity for HIV seen early in the epidemic.

A cohort of young men conscripted in the Thai military in 1993 had a baseline prevalence of 12.5%, a rise from that seen in 1991 (Nelson et al., 1996). However, by 1995, the prevalence declined to 6.7%, and was only 0.7% among men who denied any sex worker visit before 1992. Comparing risk behaviors at the time of induction in these three cohorts, sex worker visits dropped from 81.4 to 63.8%, and condom use increased from 61 to 92.5% in 1995. History of an STD declined three-fold, from 42.2% in 1991 to 15.2% by 1995. Further cohorts studied demonstrated that the decline in HIV infection and behavioral risks were real and sustained, with HIV prevalence declining to 2.4% by 1998 (Nelson et al., 2002), with reports of condoms being used 95% of the time in commercial sex and a decline in STD history to 4.4%. Clearly, a significant behavior change was taking place that was documented throughout the Kingdom (Kitsiripornchai et al., 1998). As we will detail in "The 100% Condom Campaign", the 100% Condom Campaign was at work. However, as Nelson et al. (2002) pointed out, the proportion of HIV cases attributed to history of drug use increased from 1% in 1991 to almost 26% in 1998, suggesting a new risk in the general heterosexual population might be emerging.

### Heterosexual Women

Women were added to the sentinel surveillance in Thailand in June, 1991 as it was recognized that as heterosexual men were increasingly acquiring HIV, their wives and girlfriends would be the next population segment to become infected. This intuition proved correct, as can be seen in the growing HIV prevalence data on women presenting for care in antenatal clinics (Figure 18.3).

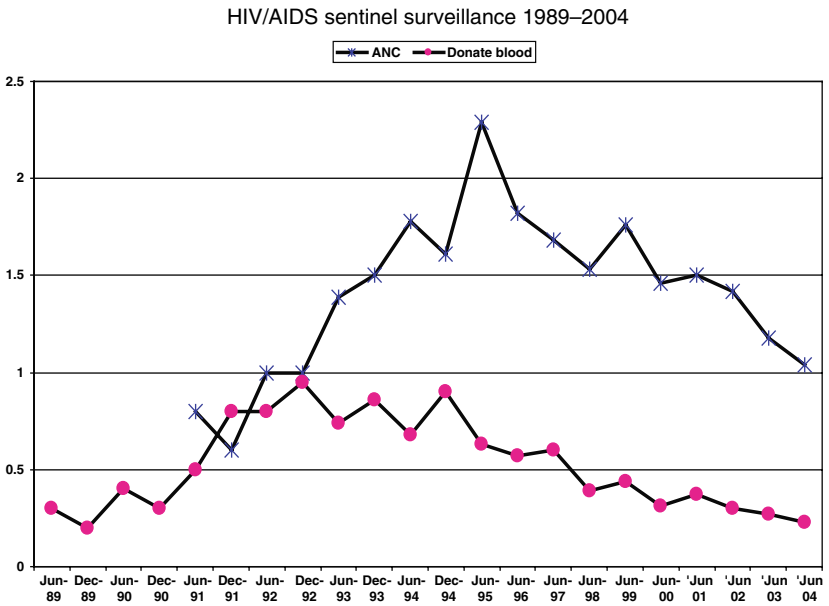


**Fig. 18.3** HIV/AIDS sentinel surveillance 1989–2004.

The HIV rate nationally reached its highest point in June 1995, approximately 6–12 months after the turning point for indirect sex workers and men presenting to government STD clinics. While the rates never approached that seen in other populations, the peak rate achieved was 2.25% among women whose only risk factor was having sex with her sole partner.

Early in the epidemic, a study in northern Thailand evaluated HIV transmission in a population of HIV-infected male blood donors, almost all of whom appear to have been infected during commercial sex, to their regular female partners, most of whom were their wives (Nelson et al., 1999). Among 467 discordant couples where the woman had no risk factors for HIV other than sex with her infected partner, 216 (46.3%) of the women were HIV infected, of whom about half had a partner with a CD4 count $\leq$200 cells/uL. Women were twice as likely to be infected if their male partner gave a history of an STD, contributing to this risk. This early evidence suggested that married women were likely to become infected as the epidemic progressed. Subsequent studies of HIV infected blood donors showed a declining HIV prevalence through 2001, indicating success in recruiting a safer donor population (Nantachit et al., 2003).

Other than the sentinel surveillance system, a few site-specific data suggested locally more dramatic increases in HIV infection among pregnant women. From 1991 to 1996, a retrospective review of HIV test results from two Bangkok hospital antenatal clinics were reviewed, and HIV prevalence increased from 1.0 to 2.3% (Siriwasin et al., 1998). Sex with a sole partner was the identified risk in about half (52%) of HIV-positive women. While risks were modest, sex with more than one lifetime partner and a partner with high-risk behavior was associated with seropositivity. However, one-fourth of the HIV-infected women had a partner who was HIV-seronegative, emphasizing that women remain at risk from current and former partners. A report from Chiang Rai Hospital, in the northernmost province in Thailand, shows that among over 40,000 deliveries, HIV seroprevalence increased from 1.3% in 1990 to a peak of 6.4% in 1994, declining thereafter to 4.6% in mid-1997, with the greatest decline seen in young primigravidas (Bunnell et al., 1999). In a report on 804 mostly married women largely recruited from a postpartum clinic in Chiang Rai, the HIV seroprevalence in 1998–1999 was 3.1% (Xu et al., 2000). Most women had a low risk profile, and most appeared to have been infected by their husbands. Condom use was extremely low (only 2% of couples used condoms in the six months prior to the interview), even among women who suspected their husband was risky. Thus, these women remain at elevated risk.

The impact of maternal HIV infection took an enormous toll on families in Thailand, with few women disclosing their HIV status due to fears of stigma and discrimination. In a prospective study of selected HIV infected women in Bangkok, within two years of HIV detection, partner illness or death, economic diversity, family breakup, and isolation were evident (Manopaiboon et al., 1998), all very real manifestations of HIV's social and economic influences. Against this backdrop of a rise in HIV among pregnant women came the rush to find an effective treatment to prevent HIV-infected women from transmitting the virus to their babies, as discussed below in "Preventing HIV". Thailand currently estimates there are 16,000 children 0–14 years infected with HIV (UNAIDS, 2007).

### Men Who Have Sex with Men: Part 2

In 2005, The Thailand-US Collaboration (TUC) reported a remarkable study that caught the field off guard – they reported HIV prevalence of 17.3% among Thai MSM in Bangkok (van Griensven et al., 2005), where the mean age was 27 years and many (43%) had completed university education. Sex with both men and women in the prior six months was acknowledged by 22.3%, and 36% gave a lifetime history of sex with women. Since MSM had never been included in the national HIV sentinel surveillance, this report caused much consternation in the community (Celentano, 2005). The TUC expanded the study to include MSM from Chiang Mai and Phuket in addition to Bangkok, and extended the sample to include male sex workers and transgendered persons (Centers for Disease Control and Prevention, 2006). In Bangkok, the HIV prevalence rose to 28.3%, a statistically significant change. In 2005, in the capital, 22.3% of the youngest (15–22 years), 30.5% of MSM 23–28 years, and 29.7% of men 29 years and older were infected. In Chiang Mai in 2005, HIV prevalence among MSM was 15.3%, but only 5.5% in Phuket. The high prevalence in the youngest age group, where sexual activity onset may have been quite recent, is a cause for much concern. Based on these data, a national response is being developed to prevent the further spread of HIV in this population. An important correlate of this research activity investigating HIV risk among MSM has been the development of an advocacy organization for HIV prevention, care and support for the affected community, the Rainbow Sky Coalition as has occurred in other epidemics (Baral et al., 2007).

### Molecular Epidemiology of HIV in Thailand

The Asia regional HIV epidemic has been characterized as consisting of rapidly shifting inter-subtype recombinations across risk groups who are frequently exposed to HIV (Kizak et al., 2007). Since Thailand is somewhat unique in Asia for having molecular epidemiologic data from early on in the epidemic, and continuing through some two decades of spread, we have learned a great deal about the viral dynamics of HIV spread at population levels from studies done in Thailand. Early on in the Thai epidemic, subtype B', a Thai variant of the predominant subtype B circulating in the U.S., Western Europe, and the Caribbean, was overwhelmingly found (McCutchan, 2006). This variant was soon overtaken by subtype E, which is now recognized to be a recombinant form of subtypes E and A, and is referred to as CRF01_AE. This CRF was first detected in IDUs but swiftly became the predominant virus across virtually all risk groups (Tovanabutra et al., 2004). Between 1988 and 1993, HIV subtypes in IDUs in Bangkok shifted from 80.4% being type B' to 43.8%, with the remainder being the A/E recombinant, a remarkable shift (Wasi et al., 1995), to the subtype predominating in the heterosexual epidemic (Subbarao et al., 1998). The A/E recombinant, still widely referred to in the literature as Thai subtype E, also became the predominant virus in Cambodia and Vietnam, as well as in Laos and northeastern Burma, as their epidemics expanded in the 1990s. The variant was predominant throughout mainland southeast Asia by 2000. However, shortly thereafter, Tovanabutra and colleagues reported a new triple recombinant variant, CRF15_01B, which combines the external envelope of subtype B' with the remainder of the genome coming from CRF01_AE. This new variant

is widely circulating in the Kingdom, and appears to represent a bridging of the heterosexual and IDU epidemics at a molecular level (Tovanabutra et al., 2003). Using mathematical modeling based on a cohort study of IDUs in a prophylactic vaccine trail in Bangkok, the incidence of new HIV infections showed 18% and 72% respectively were subtype B and CRF01_AE between 1999 and 2004, with 9% of these being superinfections (Xiridou et al., 2007). It is superinfections which led to the generation of novel recombinants, including the triple recombinant now circulating. As has been shown by Beyrer and colleagues (Beyrer et al., 2000), the molecular epidemiology of HIV in Southeast Asia has evolved in remarkable association with the poppy crop, narcotics shipping routes, and intermixing of users, traffickers and sex workers. Since HIV appears to evolve so easily, with rapid changes in the molecular epidemiology of the virus, developing an effective HIV prophylactic vaccine may prove to be an especially difficult task for this region. "Real-time" molecular epidemiology will likely be needed to understand the relationship of vaccine candidates to subtypes in circulation in populations, like Thailand, where multiple subtypes and recombinants now co-circulate, and where new variants can emerge at any time.

## Summary

The HIV epidemic in Thailand exploded in the upper-north of Thailand in the late 1980s, and was only detected with the application of systematic epidemiologic studies. While the early epidemic showed sporadic infections among MSM, the epidemic among these men did not take off as it had in many Western countries such as in the U.S. and Western Europe, until some 20 years later. Early in the HIV epidemic, Thais considered HIV to be a "farang" (foreigner) disease, attributing early cases among MSM to have been acquired from visiting sex tourists who brought the virus with them to Thailand. Whatever the origin of the epidemic (as discussed above in "Molecular Epidemiology of HIV in Thailand"), it became abundantly clear in early 1998 that a significant HIV epidemic was rapidly unfolding in the IDU community, clearly attributed to tight networks and needle-sharing. However, it was not until the fielding of the national sentinel surveillance surveys that the extent of the epidemic was appreciated, and the localization of the epicenter in the upper-north of Thailand was then clear. Over time, the geography of HIV/AIDS in Thailand shifted from the North to the current situation where the epidemic has become geographically equalized. Among all of the populations studied in the sentinel surveillance, all groups showed an increase from 1989, then peaking 5–7 years later, and then a gradual decline over time – with the exception of IDUs, where no decline has been seen. The application of HIV prevention, care and support services have been attributed with the turn-around of this epidemic, especially the 100% Condom Campaign.

## Preventing HIV

The government of Thailand responded quickly, actively and decisively in response to early reports from the national HIV sentinel surveillance surveys. In 1991–1992, it launched a nationwide information campaign using media,

government and non-governmental organizations (NGOs) along with a program to ensure universal condom use in brothel-based commercial sex, the identified vector of infection (World Bank, 2000). Prime Minister Anand Panyarachun chaired the National AIDS Prevention and Control Committee, which enjoined all ministries in the government to make HIV reduction a national priority, and included an integrated political and financial commitment to HIV prevention at all levels of Thai society. This progressive policy consisted of four major components: (1) AIDS policy came under the direct control of the Office of the Prime Minister; (2) the information campaign was put under the direction of a nationally recognized cabinet member, Mechai Viravaidya, who had strong ties to NGO and community groups, built on his long work in contraceptive campaigns; (3) the "100% Condom Campaign" was adopted nationally with monitoring performed by the Ministry of Public Health, and (4) repressive policies regarding names reporting and immigration laws were repealed. At the same time, public spending on HIV prevention rose from slightly under USD 700,000 in 1988 to USD 7 million in government funds by 1991.

### The 100% Condom Campaign

The Ministry of Public Health (MoPH) took the leadership of the 100% Condom Campaign, basing it on its strong, decentralized provincial and district health authorities, and its experience in STD treatment and control. While prostitution was outlawed in the early 1960s, the MoPH has controlled commercial sex rather than attempt to eradicate it, presumably because, in the 1980s, most sex workers worked in commercial sex establishments, including brothels (whereby far the largest number of women were located), but also in massage parlors, bars and certain restaurants. At the time, MoPH officials in each province (usually in the Provincial Chief Medical Officer's unit) kept lists of these establishments and maintained frequently updated lists of workers. At the same time, based on a successful STD control program, government STD centers, which began with twelve regional centers in large provinces, were ramped up when the HIV epidemic unfolded (Rojanapithayakorn & Hanenberg, 1996).

The program was originally tested in Ratchaburi Province in late 1989, and adopted by 13 additional provinces the following year. In August 1991 the National AIDS Committee adopted a resolution to implement the program nationally, which was adopted by all provinces by April 1992 (Rojanaphithayakorn & Hanenberg, 1996).

The program sought to ensure full compliance with condom use in commercial sex countrywide. However, the campaign was virtually exclusively focused on "direct" (brothel-based) sex establishments. The MoPH supplied condoms free of charge to these brothels, and included a vigorous campaign to educate sex workers on HIV prevention, condom use, and how to prevent HIV infection. Workers also underwent monthly STD examinations and quarterly HIV testing. This focus on testing accomplished two goals: (1) it identified instances of inconsistent condom use, thereby leading to possible sanctions against the establishment for non-compliance with the new program; and (2) it treated sex workers rapidly, allowing less time for further transmission. At the same time, men presenting to government STD clinics were asked where they had acquired the STD, and sanctions could then be applied to the establishments

named. Provincial chief policy offices and their district offices would enforce sanctioned establishments with the threat of fines, closure or other actions.

What was the uptake of the condom program? Nearly all establishments participated, and there was relatively evenhanded enforcement by government officials. The impact of the program was assessed by self-reports of condom use by clients and sex workers, and STD cases presenting at government centers. Hanenberg and colleagues published their evaluation of the program in 1994, which quickly diffused through the HIV research and prevention communities (Hanenberg et al., 1994). Between 1989 (when the government pilot tested the program in Ratchaburi province) to 1993, condom use in brothels increased from 14% to 94% based on surveys of female sex workers, while the STD cases (syphilis, gonorrhea, non-gonococcal urethritis, lymphogranuloma venereum, and chancroid) declined by 79% (Hanenberg et al., 1994). This clearly appears to be a triumph of public health over an infectious disease agent.

In an important editorial in the medical journal *AIDS*, Rojanaphithyakorn and Hanenberg (1996) reviewed the factors contributing to the success of the 100% Condom Campaign. First, they cited the limited goal of the mass media campaign, which focused only upon condom use in commercial sex. Rather than addressing morality or eradication of prostitution, the HIV control program addressed a pragmatic goal that would lead to an improvement of the public's health. A second factor was the existence of a strong health care infrastructure that was established before the onset of the HIV epidemic. The strong liaison between provincial health authorities and the brothels allowed condom distribution, education and enforcement activities to be easily implemented. Thai culture is also cited as important for the success of this campaign. Thais are pragmatic and in large part, non-confrontational. Decisions were made by physicians from the MoPH, not politicians. Further, the explicit and blunt mass media television commercials aired nationwide were approved by the government, who also became the leading purchaser of condoms in the region. Finally, the collaboration between ministries, levels of government and CBOs allowed this program to evolve rapidly and successfully.

An independent evaluation of the impact of the 100% condom campaign was conducted with the northern Thai conscript cohorts conducted between 1991 and 1995. During the period of observation, when the campaign was at its height, HIV incidence declined from 2.48 per 100 person-years in 1991–1993 (corresponding to the rollout of the campaign) to 0.55 per 100 person-years from 1993 to 1995, when the campaign was at its most active (Celentano et al., 1998).

### Prevention of Mother to Child Transmission (PMTCT)

As we showed in Figure 18.3, the rate of mother to child HIV transmission rose from nil in 1990 to 2.3% in 1995, a major public health emergency in a country with approximately 900,000 pregnancies each year. In 1990–1991, several hospitals began routine screening of pregnant women in antenatal clinics (Siriwasin et al., 1998; Bunnell et al., 1999), at a time when prevention regimens were not available and medical providers were not experienced in conducting HIV voluntary counseling and testing. As Stringer and colleagues point out, testing may have been conducted to advise medical providers to take extreme

precautions when coming into contact with a patient with HIV, further fueling the stigma and discrimination that was rampant early in the epidemic (Stringer et al., 1999). In fact, women who learned their HIV status before 24 weeks gestational stage routinely terminated their pregnancies (Taneepanichskul et al., 1995).

The release of the results of the AIDS Clinical Trials Group protocol 076 in 1994 was a watershed event in the PMTCT of HIV. In this regimen, women with HIV were given zidovudine during the last trimester of pregnancy, an intravenous dosing of zidovudine during labor, and zidovudine was given to her newborn for six weeks, reducing HIV transmission by two-thirds in non-breast feeding mothers (Connor et al., 2004). This regimen was recommended as standard practice in developed countries. However, in developing countries like Thailand, the high cost of treating a large number of women was considered unsustainable. Hence, Thai researchers conducted two trials on shorter course zidovudine therapy. The first study compared short-course zidovudine therapy to a placebo, and found a 50% reduction in transmission (Shaffer et al., 1999). The second study compared zidovudine short-course to a longer-course, and found it inferior (doubling of transmission) (Lallemant et al., 2000).

Since 1999, after the successful field trial of the combination zidovudine and nevirapine in the north-eastern and Bangkok regions, the Department of Health (DOH), MoPH, launched a country-wide program to cover PMTCT over the entire national system of ante-natal care (ANC) clinics. Thailand's policy of offering HIV testing as a routine part of antenatal care has allowed nearly all women receiving antenatal care to learn their HIV status before giving birth. However, PMTCT coverage is still at 89%, meaning that at least 11% of women in Thailand did not enter the programme or chose to opt out. Around 12% of HIV-seropositive women giving birth did not receive any antenatal care. Offering rapid HIV testing around the time of delivery provided HIV testing to 71% of women who did not receive antenatal care. Women with positive test results could learn their serostatus in time for interventions to reduce mother-to-child transmission risk (Lyttleton et al., 2007).

The Perinatal HIV Implementation Monitoring Systems (PHIMS) was launched in October 2000 to enable the provincial and national level to monitor and evaluate the ongoing programme. The PHIMS was applied in every hospital and has yielded effective indicators for monitoring the programme (World Health Organization, 2005). Overall, the current program is thought to prevent some 2500 infants from acquiring HIV infection per year. The majority of Thai women have long had access to formula feeding, which is routinely encouraged for HIV infected mothers, so breast milk related transmission has been less important than in many less-developed settings. Breast feeding however, remains the dominant mode of infant feeding among the tribal minority peoples of northern and northeastern Thailand and may play somewhat more significant roles in post-partum HIV transmissions among these women and infants.

### Voluntary Counseling and Testing (VCT)

The first VCT service was established in 1991 in Chiang Mai province with the support of the Thai-Australian Northern AIDS Prevention and Care Programme and Communicable Disease Control Region 10. It was followed by the opening

of an anonymous clinic by the Thai Red Cross in Bangkok. These VCT settings were designed to provide preventive measures to the general population. Subsequently, the MoPH promoted the development of anonymous clinics in public hospitals throughout the country. HIV/AIDS counselling and voluntary counselling and testing (VCT) are now available at approximately 1,000 hospitals and clinics across the country. These services can be delivered in specific HIV counselling units or are integrated in outpatient departments (OPD) or in general health counselling units. Thailand has a comprehensive and extensive network of voluntary counselling services staffed by trained counselors and supported by extensive referral networks. VCT accounted for 2% of the total HIV/AIDS expenditure in the MoPH budget in 2003 (World Health Organization, 2005).

## HIV Care in Thailand

Access to HIV/AIDS medical care in Thailand and treatment practices have lagged Western developed countries, but only by a few years. In the late 1980s, monotherapy using zidovudine was common in the U.S. but Thailand only treated common OIs such a tuberculosis (TB) PCP and cryotococcal meningitis. Northern Thai AIDS patients were also affected by a local OI. the dimorphic yeast *Penicillium marneffei*, which was the fourth most important OI in this population (Chariyalertsak et al., 2001). However monotherapy became more widely available, at first in tertiary care settings, but then widened to the HIV/AIDS care community, between 1992 and 1995. Dual therapy was instituted in 1995–1996, consisting of AZT+DDI or AZT+ddC, followed by dual therapy and HAART following the introduction of protease inhibitors. Since the turn of the millennium, access to care now consists of HAART treatment and OI prevention and treatment, with the goal of providing treatment to all PLWHAs as soon as possible.

### HIV Treatment

With the introduction of the 30 baht health scheme by the Thaksin administration in 2004, the current universal HIV/AIDS care package consists of: (1) PMTCT using nevirapine and/or the short-course dosing of zidovudine and provision of infant formula; (2) treatment and prophylaxis for OIs, and ART using a three-drug regimen. The current inclusion criteria for initiating ART in adults includes: symptomatic patients with CD4 $\leq$ 250 mL, AIDS or asymptomatic with CD4 $\leq$ 200 mL. The ARV regimens used for adults are: D4T+3TC+nevirapine; the second line regimen consists of D4T+3TC+Efavirenz, while the third line regimine is D4T+3TC+Indinavir/ritonavir. Limitations of current ART in Thailand mirror those reported worldwide. Adherence is a significant concern among the medical and public health communities, with worries that if adherence levels are less than optimal, resistance will develop; of special concern is resistance to protease inhibitors, due to loss of effective regimens once that drug class is lost. Clearly, cost is a major issue: the first line regimen, called GPO-vir, being manufactured as a generic triple combination drug by the Government

Pharmaceutical Organization, costs approximately B 1,200 per month (or about USD 40). The second line regimen is currently about B3,000 and the third line regimen costs B 5,400 per month. Other ART concerns are drug-drug interactions and patient reports of side-effects.

The total health expenditure on HIV/AIDS increased from 2996 million Baht in 2000 (USD 74.4 million) to 4188 million Baht in 2003 (USD 101.3 million). The largest increase in spending during this period came from the ART programme and from outpatient care. In response, the share of total AIDS expenditure going to ART increased from 20.3% in 2000 to 50.1% in 2003. Jointly, ART and OI treatment account for 85.1% of total AIDS spending (World Health Organization, 2005). Clearly expenditures are rising, but the number of PLWHA who have access to ART also increased from fewer than 3,000 patients in 2000 to about 100,000 in mid of 2007, with the numbers rapidly escalating towards the ultimate goal of universal access to ART.

## HIV Natural History in Thailand

Chariyalertsak and colleagues reported on the clinical, demographic and risk behaviors of over 100,000 patients with AIDS to the MoPH between 1994 and 1998 (Chariyalertsak et al., 2001). The rate of reported cases doubled in this time period, with almost 40% of cases coming from the North, and 80% of all reports were among men. TB was the most common diagnosis, being reported in 29% of cases. *Pneumocystis carinii* pneumonia and cryptococcal meningitis were found for about one-fifth each of patients, and *Penicillium marneffei* infection was found for 7% of patients, mostly from the North. One of the most common clinical manifestations found (for 30% of patients) was the wasting syndrome, which was often accompanied by TB or chronic diarrhea. Kaposi's sarcoma, common early in the pre-treatment era among patients in the U.S. and Europe, was exceptionally rare in Thailand, where only 0.2% of patients in this series had Kaposi's sarcoma. However, as a larger proportion of Thai PLWHA are now on ART, the landscape will undoubtedly dramatically shift over the coming decade.

Rangsin and colleagues conducted one of the rare epidemiologic studies on the natural history of HIV infection in Thailand where the date of seroconversion was known (Rangsin et al., 2004). Following up on a series of 284 HIV seroconverters identified from seven cohorts of military conscripts enrolled in incidence studies between 1991 and 1995, the peak of the Thai heterosexual epidemic, these men and a sample of cohort-matched HIV negative controls were followed in 1998–1999. After determining the vital status of 99% of the cohort, one-third of the HIV infected and 3% of the HIV negative controls were determined to have died. Death certificates showed that HIV/AIDS was listed as the cause of death in only 44% of the time; however, verbal autopsies with relatives suggested 79% of the men were judged to meet clinical criteria for AIDS. Information from clinical records and physical examinations for the seroconverters showed 85 of 235 seroconverters had clinical AIDS, of whom 61 had died. The median time to AIDS from seroconversion was 7.4 years, a substantially more rapid progression to AIDS and death after HIV infection than has been reported for Europe (CASCADE, 2000). It is not clear why the decline in immune status was more rapid for this sample, but it may be attributed,

among other factors, to include host immune responses, viral characteristics or lack of prophylaxis for OIs in this ART pre-treatment cohort.

### The Evolving Dual Epidemics of HIV and Tuberculosis

In 1993, the World Health Organization declared tuberculosis to be a global emergency (World Health Organization, 1998). The highest prevalence and incidence of tuberculosis was soon thereafter seen in Sub-Saharan Africa and Southeast Asia (Raviglione et al., 1995), coincidentally in the same regions of the world devastated by HIV infection. Infection with HIV has now been identified as the leading biologically plausible risk factor for developing TB, where among HIV patients with prior TB infection, reactivation occurs in 3–14% (Hopewell & Chaisson, 2000). Newly acquired TB infection rapidly progresses to active disease in a large proportion of HIV infected persons (Daley et al., 1992). In northern Thailand, two years after HIV infection was detected, the incidence of TB was shown to double (Yanai et al., 1996). In a case-control study of all new TB patients seen at Chiang Rai Hospital in northern Thailand between 1990 to 1998, the number of new patients tripled and the proportion of cases attributable to HIV infection role to 70%, during a time when HIV incidence was on the decline. TB control efforts may be undermined by co-existing HIV epidemics, where new and aggressive strategies are required to reduce the elevated TB incidence seen in societies burdened by HIV (Coberly & Chaisson, 2007).

## HIV/AIDS Policy Opportunities and Challenges in Thailand

Thailand has been widely noted for its early commitment to provide access to free ART for all patients with AIDS. That commitment stemmed from experience early in the epidemic, when community activists partnered with government health officials to develop a highly organized, hierarchical system of HIV/AIDS networks, including PLWHA support groups, local NGOs, Buddhist temples and public health offices. The networks were most highly developed in the high-prevalence provinces in the north of the country, with branches existing in each subdistrict. They reached up to the national level to the multi-sectoral National AIDS Prevention and Control Committee, established in 1991 and chaired by the prime minister (World Bank, 2000). PLWHA groups, particularly in the north, partnered with local herbalists and indigenous traditional practitioners to develop folk remedies and provide holistic care and mutual support. The groups found bases and meeting places in local temples and hospitals. Group members and Christian missionaries provided home visits while Buddhist temples established AIDS hospices (Experience, 2003). Northern hospitals developed innovative models of care delivery, such as the Day Care Center at Mae Chan Hospital, in Chiang Rai province (Lyttleton et al., 2007).

Initially, the emphasis focused on health promotion, treatment of OIs, and palliative care, as effective medications were not available. As the epidemic expanded, hospitals became filled with patients seeking these limited services, as families had nowhere else to turn. However in 1992, the National AIDS

committee approved a policy subsidizing provision of zidovudine (AZT, introduced in the West in 1986) for low-income, HIV-infected patients (Chasombat et al., 2006). This provision was carried out in the context of a health care system that provided a patchwork of insurance plans and left 30% of the population uncovered (Hughes & Leethongdee, 2007) with initial AZT prices of 80,000 baht (then $3,200) per patient per year, (Chasombat et al., 2006) and a PLWHA population that was desperately poor. Monotherapy (later shown to be ineffective in controlling HIV infection) was provided to just 150 patients in 1992, rising to 1,500 in 1995 as programs expanded (Chasombat et al., 2006). To deal with skyrocketing costs, the Government Pharmaceutical Organization (GPO) began producing generic AZT, as well as other ARVs, by the end of this period (Gill, 2003). A review by the World Bank, WHO and MoPH found that fewer than 5% of diagnosed AIDS cases were being reached, loss to follow-up was high and that the low benefit did not justify the high cost of the program (Revenga et al., 2006, Chasombat et al., 2006).

After this review, control of the ART program was shifted to a Clinical Research Network of 45–58 hospitals in 20 provinces serving 1,095 patients (Revenga et al., 2006; Chasombat et al., 2006). Dual therapy was introduced through this network in 1998. While the operational research was less useful than hoped, it effectively created a network of expert physicians and HIV laboratories, which became a key infrastructure for the program that followed. A more critical element in the national program's development was the Comprehensive Continuum of Care (CCC) model for HIV care delivery, originally proposed by Eric von Praag in 1995, and enthusiastically and systematically adopted by the Thai MoPH. Hundreds of communities across Thailand received small grants to conduct community mobilization and to develop linked systems to ensure facility-, home- and community-based care that addressed the biomedical, psychological and human rights needs of PLWHA. The north served as a laboratory for development of this CCC system, a role it was to play throughout the development of the national care program.

In 1999, the network of Thai AIDS activists and their national NGO, the AIDS Access Foundation, were mobilized in support of the GPO's request to the MoPH for compulsory licensing of the ARV ddI, for which Bristol Myers Squibb held the Thai patent, which cost up to USD 4 per dose (Gill, 2003). Massive demonstrations resulted in more general calls for expanded access to ART. Thailand's first serious ART initiative, the Access to Care (ATC) program, followed soon thereafter. This initiative, offered at 167 government hospitals, initially included an option of eight different ART medi-cations for triple-drug regimens. Again, the upper north of Thailand served as the national laboratory. For the first time, there were formal eligibility criteria: symptomatic HIV, CD4 count $\leq$200, or clinical AIDS (Revenga et al., 2006). However, only 1,300 treatment slots were initially available. In the north, to ration the limited slots among long patient waiting lists, each participating hospital formed a committee of PLWHA, community leaders and others to determine which of the many needy patients could access ART. While ART was found to effective for those who stayed in the program (Global Fund, 2007), 30% of the 819 patients enrolled at northern hospitals dropped out in the first 6 months, half of those due to adverse effects. Patient education was uneven and providers felt inadequately trained.

In parallel to efforts toward ART expansion, Thai policymakers and advocates had been planning for wholesale health system reform. Policymakers in Phayao province, where prevalence among pregnant women exceeded 10%, argued that the need to assure proper AIDS care – ART access, high levels of medication adherence and a comprehensive continuum of care in a rural, uninsured population – would by itself require substantive reform. When Thaksin Shinawatra and his populist *Thai Rak Thai* swept to victory in the Thai legislative elections in 2001, universal access to health care was a key item on their political agenda. The Universal Health Care or "30 baht" health insurance scheme was put in place in October of that year and soon covered 75% of the population. Another 20% remained covered by the more generous Social Security and Civil Servant insurance schemes, and just 4.5% were left uninsured (Hughes & Leethongdee, 2007). Universal Health Care was nicknamed the "30 baht" plan because it provided almost any service or medication for a copayment of 30 baht (USD 0.75) – anything, that is, except for ART. Activists' cries, predictably, became "Include ART in the 30 baht plan." (Lyttleton et al., 2007)

Broad access to ART would soon also be provided, but as part of a separate, vertical program. Enabling this were several factors. First and most importantly, the GPO's 2002 production of a generic, fixed dose combination pill, combining stavudine (d4T), lamivudine (3TC) and nevirapine (NVP), or GPO-VIR (Chasombat et al., 2006) From a newly constructed, dedicated factory, sufficient quantities of ART could be produced to serve the population in need, at a cost of just 1,200 baht (USD 30) per month. Adherence would be optimized by prescribing the then-innovative three-in-one combine pill, to be taken twice a day, as the standard first-line regimen. Second, the Global Fund had just been launched, and the Thais were awarded one of the first and largest HIV grants, for USD 109 million, providing critical resources for procurement of flow cytometers and development of care systems. It was particularly noteworthy that the Thai government proposed to shoulder the bulk, 70%, of the USD 35 million in planned annual ART spending, requesting only USD 9.5 million a year for ART from the Global Fund. Third, the Thais had learned from their years of piloting programs. The GPO produced as many of its own drugs and laboratory reagents as possible, or if not, negotiated large discounts for bulk purchases. Drugs were stored in large regional warehouses, with adequate supplies on hand. The package of services and forms were standardized and implemented in standard fashion in all district and provincial hospitals. Treatment was based on national guidelines first written in 1997 and updated each year. Brief, 2-day trainings were provided to 8,000 participating healthcare professionals, and mass updates were provided each time a policy changed. The established networks of PLWHA were enlisted to aid the program, conducting patient education, monitoring adherence and conducting home visits (Lyttleton et al., 2007). Private and university hospitals were allowed to provide ART under the national program, on a voluntary basis (Chasombat et al., 2006). The final key factor was the national pride the Thai government felt at the opportunity to host the July 2004 International AIDS Conference in Bangkok, and to demonstrate its international leadership in HIV/AIDS. In October 2003, the government announced it would provide ART to all who needed it, with the goal of 50,000 ART patients in 2004 – a target that was met.

By March 2007, a cumulative total of 115,994 patients had enrolled in the national ART program, which the previous October had finally been integrated into the Universal Health Care scheme as an ordinary service. 91,520, or 79% of them, were still on ART at over 900 participating hospitals and health centers. That number is over 150% of the total number of Thais projected to be living with AIDS in 2007, had ART not been introduced (Thai Working Group, 2001). Access is reportedly good, except for IDUs and migrants without access to the national insurance scheme (Lyttleton et al., 2007). Of 42,139 patients starting ART between 2000 and 2005 and followed for a median of 7.7 months, 6.9% died, 2.6% stopped ART, and 5.4% were lost to follow-up – rates that are lower than those in many developing country settings (Ningsanond et al., 2006). Among 107 children in the national program followed for 192 weeks (nearly 4 years), only 5 (3%) died, 5 (3%) switched regimens due to adverse drug reactions and 10 (5%) switched due to virologic failure. Seventy percent of survivors had undetectable HIV RNA and mean CD4 cell percentage increased from 5.3 to 26.6% (Puthanakit et al., 2007). The case reports of new AIDS diagnoses and deaths from HIV/AIDS most dramatically demonstrate the impact of ART. New case reports of clinical AIDS fell from a peak of 27,813 in 2004 to 15,232 in 2006 and 4,694 in the first 10 months of 2007. AIDS deaths fell from a peak of 8,993 in 1999 to 2,584 in 2006 and 900 in the first 10 months of 2007 (Lyttleton et al., 2007). Clearly, this was an accomplishment at the equal of the most generous AIDS medications rollouts seen in the world.

### The War on Drugs

In December 2002, His Majesty, King Bhumibol Adulyadej, gave his annual birthday speech to the nation, an event that reaches the vast majority of the Thai people. In his presentation on what the nation needed to do to resist challenges to Thai culture and adapt Thai ways to rapid technological development, he raised the issue of the scourge of the methamphetamine epidemic gripping the nation, and called for the people to resist drug use, especially among youth, the future of Thai society. The Prime Minister, H.E. Pol. Lt. Col. Thaksin Shinawatra, a former police official from Chiang Mai who wielded enormous political power through his *Thai Rak Thai* party, and who had just been re-elected with the largest plurality in Thai history, responded to the King's remarks by announcing on February 1, 2003 a social values campaign that would soon play out across the Thai landscape (Vongchak et al., 2003). The policy had the major objective of reducing both the supply of and the demand for illicit drugs, with the stated purpose of responding to the methamphetamine epidemic. The policy consisted of several components. To reduce demand, a "drug user rehabilitation" law was enacted that mandated that all drug users attend drug treatment (Office of the Narcotics Control Board, 2003). For those who did not volunteer for drug treatment by April 21, 2003, compulsory treatment was administered by the Ministry of Justice, in four modalities: military boot camps; in-patient drug treatment facilities, locally administered treatment by the community, and regularly reporting to a local probation office. In the first four months of the campaign, 285,000 drug users turned themselves in for treatment, and 56,000 were arrested, primarily for sale of small quantities of drugs

or drug use. The drug treatment phase of the policy came on the heels of a wave of "drug-related" shootings, in which some 2,600 murders were committed. The majority of these murders went uninvestigated by police authorities, who denied any complicity. While the policy enjoyed considerable support from the nation's citizen, there were clearly human rights issues at play (Sherman et al., 2007).

***Impact of the War on Drugs on Injection Drug Users***

While conducting research on HIV prevention among injection drug users in Chiang Mai, a collaborative team of researchers from Chiang Mai University, the Ministry of Public Health, and Johns Hopkins University, documented the impact of the "war on drugs" on IDUs. Overall, the campaign appeared to have been successful in decreasing demand, as 85% of survey respondents who had admitted using drugs by injection denied this after the "war". Indeed 70% of the respondents explicitly stated that they had stopped using drugs because of the policy. However, a large proportion of users shifted their drug use from heroin to methamphetamines or opium, more often in rural areas than in urban areas. Alcohol abuse also increased in this population (Sherman et al., 2007). Reports from the national household surveys on substance use conducted in 2001 and 2003 also showed decreasing trends in opiate use in all areas with the exception of southern Thailand (Office of the Narcotics Control Board, 2004). However, while numbers of persons arrested for heroin use or possession during 1998–2005 showed clear decreasing trends, the amount of heroin seized shows an increasing trend (Office of the Narcotics Control Board, 2005; Poshyachinda et al., 2005). The longer term effects of the "war" on drug use in the population will be monitored to determine whether the supply returns (at least for heroin, it does not seem to have returned) or if greater numbers of users relapse over time, resparking the next epidemic.

***Limits to Prevention for Drug Users***

The continuing epidemic of HIV among IDUs suggests that there has been insufficient attention paid to their prevention needs. Drug use in Thailand, especially in the wake of the "war on drugs", is especially stigmatized, and community attitudes plays a major role in keeping IDUs from seeking treatment for their drug dependence, from obtaining HIV voluntary counseling and testing, and if HIV infected, from being provided access to ART. Very few drug users are currently on ART, reflecting both reticence of providers to treat them (due to concerns about low compliance, that might lead to virilogic failure and resistance) and discrimination. While there is current discussion that drug users should be considered for access to current treatment, few have been put on treatment (World Health Organization, 2005).

Harm reduction strategies have had a limited history in Thailand. While a limited demonstration project in the upper-north among ethnic minority populations showed value (Gray, 1995), this activity was conducted clandestinely and did not enjoy the support of the MoPH. There have been rare needle-exchange programs, although they are not legally sanctioned. Why has this occurred in Thailand, especially in the face of evidence that this public health approach has been shown to be effective? The experience of Malaysia and Iran,

documented in this book, suggest that even in Muslim societies where intoxication is considered a major moral failing, harm reduction can be applied to prevent the further spread of HIV. The answer appears to lie in the marked stigma and discrimination toward drug users.

Thailand's vertically integrated health care system includes a treatment system for drug use. The Bangkok Metropolitan Administration has both a large in-patient treatment center for treatment of drug dependence, and a large system of out-patient treatment facilities. However, while treatment outside the capital is available, it is rarely accessed. Methadone substitution therapy is available but very rarely accessed by opioid dependent persons. Why is this? Again, the key appears to be fears of identification by drug users of their dependence, mistrust of the medical system (due to poor treatment and discriminatory attitudes of health personnel), and a lack of belief in the effectiveness of methadone as a treatment option. In 2007, a trial of burenorphine maintenance started in the upper-north under the auspices of the HIV Prevention Trials Network of the U.S. National Institutes of Health, in collaboration with Chiang Mai University and the MoPH. Only time will tell if opiate dependent persons will avail themselves of this treatment option.

## Lessons Learned from Thailand

Phoolcharoen and colleagues chronicled the first phases of the Thai response to HIV/AIDS in an early evaluation of programs in 1998 (Phoolcharoen et al., 1998). They reviewed the phases of response, characterized as following distinct phases of action: the health focused phase that lasted from 1984 to 1990, with a focus on "risk groups", with most funding coming from external sources; the socially focused phase (1991–1996) with a focus on societal vulnerability, a growing epidemiological and behavioral evidence base with an expanded policy infrastructure, in which governmental budget allocation increased dramatically, followed by a holistic phase, from 1997 to 1998, a time when HIV/AIDS awareness reached the entire Thai population, followed by a focus on human development and programs based on empowerment of PLWHAs as an essential resource for community prevention and care. A second review by Punpanich and colleagues updated this evaluation in 2004 (Punpanich et al., 2004). They outlined the challenges remaining, including maintaining and reinforcing the new safer sex culture across a range of partners, renewing strategic approaches and a broader commitment by government to the ills posed to Thai society by youthful drug abuse, and recognizing the status of women in Thai culture and the special need to include them in governmental programs. They note the essential role of data in guiding the Thai governmental response, especially the (1) systematic collection of sentinel surveillance information, (2) learning from pilot projects that could be expanded nationally, (3) the early response to the highest risk context (heterosexual transmission), (4) the strong public health infrastructure that allowed rapid program scale-up, (5) partnership of international foundations and multilateral bodies to scale up prevention programs, and (6) the formation of multilevel strategies embracing all sectors of civil society.

## The Future: Challenges and New Paths

### Unmet Needs

***Prevention Needs: IDU, MSM, Sex Workers, Migrants, and Adolescents***

Following the success of the 100% Condom Campaign which showed a remarkable impact on the heterosexual epidemic, the 1997 Asian economic crisis put a brake on prevention spending. With the advent of inexpensive ART and its spectacular success in reducing HIV-related morbidity and mortality, the focus on the national AIDS control effort shifted to treatment access and expansion, at the expense of prevention. Who was affected by this shift in priorities? – the disadvantaged, including IDUs, MSM, female (largely immigrant, undocumented) sex workers and other migrants. While school-based primary prevention for youth and adolescents has been a part of the national health education for HIV prevention, it has been primarily based on life-skills approaches which have until recently not directly addressed youth health information needs. A renewed prevention strategy is essential if the rapid gains in HIV control are to be sustained in the future.

In response to the recent TUC studies of HIV prevalence among MSM in Thailand, the MoPH has responded. In collaboration with the Purple Sky Network, an association of groups advocating for HIV prevention and care for MSM in the Greater Mekong Sub-region, HIV prevention programs are finally being discussed. While Thailand had no national strategic plan to include MSM in national HIV prevention efforts, today MSM are included in the national plan, following consultations in 2005.

***Treatment Needs: Second Line and Salvage Regimens, Sustainability of the Health Care System Approach***

While the advent of expanded access to ART has been quite successful, new challenges have emerged. Some patients do not respond effectively to the government sponsored first line therapy, and more expensive second line and salvage regimens are needed. These drugs are increasingly expensive, and access remains limited. As larger and larger numbers of patients become treatment experienced, there will be failures, due to a lack of virologic response or due to inadequate adherence to their regimens. There will undoubtedly be increased need for additional treatment options, all of which come at considerable cost. There remain concerns for the future budgetary needs for the universal access program, as Thailand still has a considerable backlog of treatment indicated patients. This will undoubtedly place a major economic stress on the healthcare system.

### New Ways Forward – Current Research Suggests Some Options

For the past 15 years, the chapter authors have been collaborating on a series of HIV prevention and care research projects to bring innovative strategies to bear to the needs of the Thai situation. We summarize several of our current projects to show what we consider approaches that might bear fruit to solve some of the contemporary challenges faced.

***Opioid Substitution Therapy for HIV Prevention Among IDU***

Treatment of opioid dependence has been shown to be effective in reducing HIV transmission in uncontrolled observational studies (Metzger et al., 1993). Evidence-based data from randomized controlled trials of drug treatment for HIV prevention have been lacking. We are currently accruing participants in an RCT of Suboxone treatment for opioid dependence in an NIH-supported investigation under the auspices of the HIV Prevention Trials Network (protocol HPTN 058). This therapy, utilizing sublingual dosing of a combination of buprenorphine and naloxone (to minimize diversion), has been shown to effectively reduce opioid craving, narcotic use and diversion (Feillin, 2007). Our trial is comparing the effectiveness of Suboxone maintenance with detoxification among IDUS who will receive one-year active behavioral drug and risk reduction counseling for the prevention of relapse and HIV acquisition. The trial compares Suboxone and counseling compared to Suboxone detoxification and behavioral counseling in subsequent HIV incidence. The study is on-going in Thailand. If successful, the results of this study will have two outcomes: it will demonstrate that drug treatment using this new approach can effectively treat opioid dependence, and it will determine the effectiveness of drug treatment for HIV prevention among IDUs.

***Increasing Access to VCT Among Isolated Populations***

NIMH Project Accept is a community randomized trial of expanding HIV VCT for populations that have remained outside the mainstream of HIV prevention. This collaborative project is taking VCT to the next step – bringing VCT from the fixed VCT center (often only available in urban areas) to the community level. It uses a three-pronged approach to expanding access to VCT: community mobilization, provision of rapid testing with same day results at the village level, and access to post-test support services at the village level. The comparison communities receive strengthened VCT services at fixed locations, generally government supported VCT centers at the district level. Four of the five sites are rural in nature, where transportation is limited, the populations are impoverished or disadvantaged, and cost is a major barrier to seeking VCT (whether direct, due to economic limitation, or indirect, due to employment and fear of discrimination). The intervention began in 2006 and results are anticipated in 2010. One of the key innovative aspects of this study is that the principal trial outcome is not behavioral (which is an important secondary objective), but will compare community-wide HIV incidence across the two approaches to VCT.

***Antiretroviral Therapy as HIV Prevention***

While it has been firmly established that timely HIV treatment using ART dramatically reduces HIV-related morbidity and mortality, the effectiveness of ART on HIV transmission, while hypothetically reasonable, has not been demonstrated in an RCT. Under the auspices of the HIV Prevention Trials Network of the U.S. NIH, we are participating in a multinational trial of

early versus delayed ART treatment for the prevention of HIV transmission in HIV-discordant couples. Full study operations began in 2007, with final study results due in 2013.

## Conclusions

Thailand's response to the current HIV epidemic must be flexible to reflect a changing epidemic. The strong governmental response to the heterosexual epidemic showed the effectiveness of an early, concerted public health approach to a viral challenge. However, with the successes enjoyed come additional challenges, particularly among those living at the fringes of society. Addressing the needs of IDUs, MSM, and immigrants must be vigorously pursued; to do anything less may undo all of the progress made to date. The lack of response to the MSM community until very recently demonstrates the impact of not responding quickly to mounting HIV prevalence. However, a response is now forthcoming.

Prevention needs to follow shifting risks, and treatment must reach those excluded from the system. The public health strategies focusing on identification and prevention before the era of HAART have been largely undone as budget and focus turned to scaling up proven therapies. Spending less than 20% of the HIV/AIDS budget on prevention is insufficient to delay further erosion of the gains made to date. Addressing the ongoing fiscal challenges of HIV treatment will also be a significant challenge to the Thai government in the coming years. However, we believe that the public health community and the wider Thai society are up to the task.

The Thai national plan for HIV/AIDS stresses the following components: (1) prevention works but scaling it up nationally requires concerted political and sustained financial commitment; (2) all sectors of the nation are needed to address the socioeconomic and behavioral antecedents of HIV acquisition and transmission; (3) data are key to determining programs and policies that are effective; and (4) pragmatic action is essential in light of substantial barriers to prevention. Strategies to meet these goals will require a greater investment of public funds, maintenance of the national STD program, strengthening prevention for the disadvantaged, increasing accessibility of services and necessary medication for those already infected with HIV, expand partnerships more widely, and integrating the HIV treatment program into the Universal Health Care system. Doing this will be invaluable; not pursuing this path could undermine Thailand's impressive responses to the HIV/AIDS epidemic.

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# Chapter 19

# HIV AIDS in Burma: Public Health Constrained

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_19, 

## Introduction

Burma's [Myanmar] HIV/AIDS epidemic (Beyrer et al. 2006a) has been relatively similar to its Southeast Asian neighbors, Thailand, Cambodia and Vietnam. Much less is known about HIV/AIDS in Burma, however, compared to the other relatively well-studied outbreaks in Southeast Asia. This is the case largely because Burma remains a closed and tightly controlled society under what the social scientist Christina Fink (2001) has called "the living silence" of protracted military rule. The marked under-funding of the health system, and of public health in particular, by the various ruling military juntas which have controlled political life in the country since 1962 has further undermined efforts to understand and respond to the epidemic.

The ruling junta has restricted the activities of international organizations, including the several United Nations (U.N.) agencies active in the country, making it difficult for the international community to bridge the many information and service delivery gaps across the country. The current junta, which carries on an Orwellian tradition in choice of names: The State Peace and Development Council (SPDC)[1], continues to wage an aggressive and protracted campaign of counter-insurgency and forced relocation against Burma's many ethnic minority groups, and has shown little interest in sustainable development. Its consolidation of power in 2004 under the faction led by Senior General Than Shwe, has led to an even more restrictive regime, forcing a number of international humanitarian and public health entities to either leave the country (as did the Global Fund to Fight AIDS, Malaria and TB (The Global Fund), in 2005, and Medecins Sans Frontieres (MSF) France later the same year) or greatly restrict their activities, as did the International Committee for the Red Cross (ICRC) in 2007. The closures and decreases in these programs have particularly marked impacts in Burma because the ruling junta devotes so little of its own resources to public health and the fight against diseases.

## Political and Economic Constraints on Public Health in Burma

Understanding the political situation in Burma is essential to appreciating the unique challenges faced by those engaged in the fight against HIV/AIDS in this country. The sudden transfer of Burma's capital provides a telling example. On November 11, 2005, a date and time apparently chosen for astrologic reasons, the junta abruptly relocated the capitol from Rangoon to Pyinmana, 250 miles north. The immense new capital boasts multi-lane highways devoid of vehicular traffic and 24-hour electricity, an unimaginable luxury for most Burmese (Htay, 2007). The new capital has been grandiosely dubbed Naypyidaw or the "Seat of Kings" (Huggler, 2007; Paung, 2007).

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[1] George Orwell, British author of 1984 , Burmese Days, and Animal Farm served 5 years as a colonial police officer in Burma in the 1930 s. A joke in Burma is that he didn't write one novel about Burma, but three.

Naypyidaw stands in stark contrast to Burma's underlying realities. For the last two decades, the country has been ranked a U.N. Least Developed Nation, amongst the poorest in the world, with poverty especially pronounced in rural areas of the country. Gross National Income per capita is estimated to be USD 220; neighboring Thailand's is USD 2750 (UNICEF, 2006a,bb). Almost a quarter of Burmese households have incomes below minimal subsistence level and 70% of average household expenditures are spent on food (UNDP & UNPF, 2001). Yet Burma is a land rich in natural resources, particularly natural gas, oil, and hydropower, all of which are sold to her rapidly industrializing neighbors Thailand, India, and China. In the fiscal year, ending March 2007, foreign trade reached almost USD 8 billion, netting Burma a trade surplus of over USD 2 billion, the bulk of it derived from energy sales (Myanmar Predicts, 2007). Burma's hard currency reserves have also skyrocketed, increasing from USD 89 million in 1988 to USD 685 million by 2004 (Parker, 2006; Schuman, 2006). Despite being awash with energy resources, most Burmese live without regular electricity, and, like other limited measures towards economic liberalization, the main beneficiaries continue to be primarily Burmese military officers and their affiliates.

### Limited Funding of Public Health Activities

The International Monetary Fund estimates that moving the capital to the "Seat of Kings" has an ongoing cost of between USD 122 and USD 124 million per year, or between 1 and 2% of Burma's annual Gross Domestic Product (McDonald-Gibson, 2007). Burma's once-vaunted social services such as health and education receive perhaps $<3\%$ and 10% of national expenditures respectively, while the military consumes almost 40%, despite a lack of external enemies (IMF, 2001; OSI, 2001).

In 2000, the WHO ranked Burma's healthcare system the second worst of its member states, ahead of only Sierra Leone, with health indicators such as infant, child, and maternal mortality rates amongst the highest in the region (WHO, 2000). In statistics submitted to the WHO in 2005, official expenditure on health was USD 0.40 per capita, equivalent to 0.5% of Burma's GDP. Almost 90% of health expenses are borne privately (WHO, 2006a). In contrast, neighboring Thailand spends USD 61 per capita on health (WHO, 2006b). The Burmese junta has also become increasingly reliant upon foreign aid to fund health in the country to avoid a "budget deficit". In figures submitted to the WHO, in 2004 and 2005, "external resources" accounted for about 13% of Burma's health budget, versus 0.2% in neighboring Thailand (WHO, 2006a,b). Even for one of the most cost-effective health interventions, basic childhood vaccinations, the Burmese government finances 0% (the Thai government, in contrast, finances 100%). Indeed, 90% of vaccines in Burma are provided for by UNICEF (UNICEF, 2006a,b; Pinheiro, 2006). And, where such programs exist, their existence is also subject to the vicissitudes of commanders' whims. For example, in 2006, a USD 2 million UNICEF measles vaccination campaign was threatened then significantly delayed while Burmese generals ascertained whether such a program was "politically safe" (Parker & Latt, 2006).

One result of this misgovernance and disinvestment is that hospitals, where they exist in Burma, operate at very rudimentary levels. Low government staff

salaries and widespread corruption mean that in addition to paying for actual medical expenses, families often must bribe hospital employees to obtain even substandard treatment (Belak, 2002; Sen, 2001). Under-funding has also left hospitals without sufficient supplies, and families are often forced to obtain needed drugs on a burgeoning black market (Belak, 2002). A WHO report on Burma's HIV/AIDS program noted that,

> . . .when it [shortages] occurs they [health facilities] are likely to buy products from the local market. Because the registration mechanism is not strongly enforced, many products on the local market may not meet international quality standards (WHO, 2006c).

These realities, in combination with widespread, pervasive poverty in Burma, mean that many, particularly in rural areas, go without health care (The Mess, 2005; BPHWT, 2006; UNDP & UNPF, 2001). Preventable disability and death from infectious diseases continue to be common, from entities such as malaria, tuberculosis, and lymphatic filariasis (elephantiasis), and Burma continues to suffer outbreaks of cholera, including in more urban areas of the country (Beyrer et al., 2006b; Children Die, 2006; WHO, 2004; Cholera Outbreak, 2006). Vaccine preventable illnesses, including measles and polio, continue to disable and kill many Burmese children, especially in rural areas (Parker & Latt, 2006). Increasing numbers of Burmese are making the often long, arduous, and dangerous journey to neighboring countries, especially Thailand, to access basic health services, including eye surgery or tuberculosis (TB) treatment, which are unavailable to them at home (Maung, 2007; Roy, 2007).

Similar pressures and priorities manifest in figures of Burma's National AIDS Programme (NAP), tasked with controlling what UNAIDS calls "one of the most serious HIV epidemics in south-east Asia (UNAIDS, 2007). In 2004, Burmese government expenditures on HIV/AIDS totaled USD 720,607, of which about USD 100,000 was for the National AIDS Programme; foreign sources, including the United Nations, WHO, the United States Agency for International Development (USAID), and other NGOs accounted for the remainder of the USD 17,168,977 which was spent on HIV/AIDS in Burma that year (WHO, 2006c). The most recent estimates available, from UNAIDS, estimated that the Burmese Ministry of Health expenditure on HIV was USD 137,000 in 2005, a per capita expenditure of less than half of USD 0.01 (UNAIDS, 2007). In contrast, the equivalent figure for two other high prevalence countries in the region, Thailand and Cambodia, stand at USD 1.43 and USD 0.07 respectively (UNAIDS, 2007).

### Public Health and HIV/AIDS in Minority Areas and Conflict Zones

The public health situation in Burma is particularly grave along its ethnically diverse frontiers, especially those bordering Thailand, where the major armed ethnic groups resisting the Burmese military are still active: in the Shan, Karenni, and Karen ethnic areas in eastern Burma. In these areas the Burmese military utilizes a counter-insurgency strategy known as the Four Cuts Policy, which is intended to deprive suspected insurgents of their four crucial links to local villagers: food, funds, recruits, and information. The policy is achieved by forcibly removing villagers to areas more firmly controlled by the Burmese government, and destroying food, rice fields, and food storage facilities (TBBC,

2004; ICG, 2003). Widespread human rights abuses against civilians occur in this process (TBBC, 2004; Risser et al., 2004; Shan Human Rights Foundation, 2002). Since 1996, over 3,000 villages in eastern Burma have been destroyed or abandoned and an estimated 350,000 individuals are estimated to reside in government-controlled relocation centers, while another 540,000 live as internally displaced persons (IDPs) (TBBC, 2006; Risser et al., 2004; Shukla, 2006). In the past year alone, the SPDC may have displaced an additional 30,000 individuals (Jane's Intelligence Review, 2006; KHRG, 2006; Wolff, 2006; Naing, 2007).

These abusive policies have direct public health consequences, although their precise impact on HIV/AIDS is complex and probably impossible to ascertain, given the state of chronic instability in these conflict zones. Among IDP communities living in Eastern Burma, over half of the households suffered from abuses, mainly by the Burmese military, within the past year; almost a third had suffered forced labor and a quarter from food seizure or destruction (BPHWT, 2006). Confiscation or destruction of food supplies increased the odds of childhood malnutrition, malaria, landmine injuries, and overall death several-fold (BPHWT, 2006). The Burmese military also regularly confiscates and destroys medical supplies in conflict zones, burning down clinics established by local health organizations (KHRG, 2007). Not surprisingly, the Backpack Health Worker Team, an NGO which is often the sole source of primary care for these communities, found that within these areas, measures of infant, child, and maternal mortality bore closer resemblance to the humanitarian disasters of Sierra Leone, Democratic Republic of the Congo, Niger, and Angola than Burma's official figures, which were already amongst the worst in the region (KHRG, 2007; BPHWT, 2006).

While HIV/AIDS data are scarce from these conflict zones, what data we have is largely from the Karen conflict zones and suggests somewhat *lower* rates of infection than in the central Burmese regions. Among pregnant women attending pre-natal clinics at the largest service provider (on the Thai side of the Karen State border) HIV rates are roughly 2% among antenatal clinic (ANC) women (Mae Tao Clinic, 2007). The relative isolation of these populations and their very low reported rates of injection drug use may have contributed to lower prevalence rates. This lower prevalence in conflict areas, which has been reported from several African conflict zones (Spiegel et al., 2007), has not been seen in the large and populous Shan State. This region has long had one of the more severe and generalized epidemics in Burma, with ANC rates reaching some 3% of pregnant women by 2000 (Beyrer et al., 2003). Several factors may be at play in this divergence. Shan women and girls have been targeted by transnational traffickers for the Thai sex industry, at least in part because the Shans are ethnically and linguistically related to the Thais, and can pass much more easily than other Burmese in Thailand (Beyrer, 2001). A second factor is that large numbers of young Shans, by one estimate over 600,000, work as migrants in northern Thailand, and patterns of circular migration for work, similar to those seen in South Africa and her neighbor states, may increase the risks of sexual exposure and transmission at home and at labor destinations.(Charm Tong, 2007, Annual Report) Given the clandestine and illegal nature of most of this labor migration, however, this hypothesis is probably impossible to investigate at this writing.

### Political Limitations on HIV/AIDS Activities

Since 2004, the Burmese military junta has increased its limitations on community organizations, banning an increasing number of groups because they are perceived to be "too political, too independent or because they do a better job than the government at providing social services" (Myanmar Cracks, 2007). Those still able to operate are frequently harassed by or forced to partner with junta-affiliated organizations such as the Union Solidarity and Development Association (USDA), which has a history of violence against perceived enemies of the regime, including an assassination attempt against resistance leader Aung San Suu Kyi in 2003, and the Myanmar Maternal and Child Welfare Association (MMCWA) which, despite being portrayed as a voluntary, non-government organization, is headed by the wives of ruling Burmese generals (Burmese HIV/AIDS, 2006; Burmese Buddhist, 2006; Yeni, 2006a,b). The recent trend has been increased closures of independent community organizations, with social services increasingly run by state or para-statal organizations, including the USDA (Free USDA, 2007). Noted a recent editorial, "The self-help groups that confront prejudice, common in many other countries where HIV/AIDS is prevalent, are rarely seen in the country- mainly due to the government's dislike of any organized activity outside their control" (Myanmar: Uphill, 2007).

The shifting attitude of the military junta has also severely affected the work of international humanitarian agencies. In late 2005, paramount leader, Senior General Than Shwe, noted in a speech to Burma's top military leaders that "all the white faces" should be expelled from Burma (Jagan, 2006). Concurrently or soon thereafter, increasing restrictions were placed on the work of international aid agencies, which the SPDC increasingly suspects of harboring spies linked with its opponents (Htet Aung, 2007a; GAO, 2007; Marshall, 2006).

### New Restrictions on Humanitarian Assistance and Public Health

In February 2006, government guidelines for provision of humanitarian assistance were formally issued by the Ministry of National Planning and Economic Development in a document entitled "Guidelines for UN Agencies, International Organizations and NGOs/INGOs on Cooperation Programme in Myanmar" (Myanmar Ministry of National Planning and Economic Development, 2006). Addressing health catastrophes of international concern, including priority diseases, are not explicitly mentioned in the objectives and listed guidelines tighten central government control over all humanitarian activities (Beyrer et al., 2006a). These guidelines restrict the mobility, staffing and design of aid programs and require that "Coordination Committees" oversee the work of individual aid programs. Members of these committees would not only be drawn from ranks of government authorities but would also include members of the USDA and auxiliary fire brigades, organizations known to have been involved in violence, including murder, against dissidents (GAO, 2007; Htet Aung, 2007a; Jagan, 2006). A Burmese language version of the Guidelines, containing even more restrictions than the English language version, was also issued but not distributed to U.N. Agencies or NGOs (Htet Aung, 2007a; Jagan, 2006).

The government's move to the "Seat of Kings" has also taken a toll on international humanitarian aid work. The move has meant that aid organizations with headquarters in Rangoon now have to expend time and resources to travel

to Naypyidaw for the meetings with relevant government agencies that are necessary for obtaining required permissions for projects and travel (GAO, 2007).

This increasingly restrictive environment has driven several international humanitarian aid organizations with HIV/AIDS portfolios to cease or significantly curtail their operations in Burma, including the Global Fund against AIDS, TB, and Malaria, the International Committee of the Red Cross (ICRC), and MSF-France, despite the magnitude of the humanitarian crisis in Burma and the badly needed assistance. Herve Isambert, the country director for MSF-France, summarized the pressures behind their withdrawal from Burma,

> We had to face up to the facts: the Myanmar authorities do not want independent, foreign organizations to be close to the populations they want to control... For humanitarian organizations, the issue is to recognize when our role has been reduced to being a technical service provider of the Myanmar authorities, subject to their political agenda and no longer to the goals that we have set for ourselves as a humanitarian organization (MSF, 2006).

SPDC restrictions on the work of the ICRC, including pressure from the government to partner with the USDA, violated the impartiality of their programs, also prompting the organization to curtail their activities (Paung, 2006; Jagan, 2006). In 2006, without explanation, the SPDC ordered the ICRC to "suspend their activities" in five field offices in Mandalay, Mon State, Karen State, and two sites in Shan State, all but shutting down the organization's health programs in these areas (Red Cross, 2006; Silp, 2006; ICRC, 2006). Although later allowed to re-open, ongoing restrictions and lack of headway in negotiations with the regime resulted in the ICRC closing two field offices (in Kengtung and Moulmein), and its issuing of an unusually severe rebuke to the regime (Engeler, 2007; Mungpi, 2007). Noted the organization,

> ...increasingly severe restrictions imposed on the ICRC by the government have made it impossible for the organization's staff to move about independently in the affected areas and have hampered the delivery of aid intended for strictly humanitarian, apolitical purposes...
>
> The organization [ICRC] uses confidential and bilateral dialogue as its preferred means of achieving results. However, this presupposes that parties to a conflict are willing to enter into a serious discussion and take into account the ICRC's recommendations. This has not been the case with the authorities of Myanmar [Burma] (ICRC, 2007)

The regime angrily responded with conspiracy allegations, noting, "The authorities found out evidences [sic] that personnel of the five regional offices of the ICRC had clandestine relations with insurgent groups (Aung, 2007)."

This unreceptive environment has seriously eroded the already limited ability of independent NGOs to objectively collect and disseminate data essential for assessing needs and implementing health programs (Yeni, 2007; GAO, 2007; Marshall, 2006; Ngunte, 2006; Ong & Davidson, 2006; Burma's Uphill, 2007; Burmese Buddhist, 2006; Burmese Authorities, 2006a,b; Htet Aung, 2007b; KHRG, 2007). As Herve Isambert of MSF-France explains, "it even became impossible to exchange medical data on epidemics with local health authorities given the pressure they faced from the military, which forbid the distribution of any information (MSF, 2006)."

Where information gathering and dissemination is not explicitly forbidden, the environment of fear created by Burma's military rulers provides incentive for being less transparent and practicing self-censorship, particularly given the existence of vaguely-worded regulations allowing for the threat of abuse. Noted a foreign health professional anonymously on a blog posting,

> Datas [sic]... have to be "approved" and checked at different levels before being published... UNAIDS and WHO can only rely on datas given and "approved" and have no means to check anything... What I can say from my experience is that, we were horrified by the number of cases (average 5 new HIV cases per day which [sic] was much much more than any expectation). But I won't say more about it to not endanger my friends and this program.... (HIV Information for Myanmar, 2006)

These concerns were more diplomatically noted in a 2006 external review of Burma's National AIDS Programme, which noted, "...the private sector has been excluded as a stakeholder for information dissemination. Also, the review team did not find evidence of dissemination of information to the general public" (WHO, 2006c). As a result, even for those diseases recognized as priorities by the regime such as HIV/AIDS, health information from inside the country has declined.

Public reports from the Burmese government on the state of the HIV epidemic are problematic as well. In 2006, in their first follow-up report after the United Nations General Assembly's special 2001 HIV/AIDS assembly at which countries agreed to use internationally-agreed upon, time-bound target indicators, Burma's figures revealed that they were failing to meet agreed upon targets. Even more concerning, however, were the inconsistencies and altogether missing information in the report. One notable inconsistency, were the figures for HIV prevalence among young adults aged 15–24 years, which were reported as "0.0% among Yangon [Rangoon] city urban population, and 2.3% among other urban areas." Although possible, such a discrepancy is highly unlikely (Min Thwe, 2006). Similar inconsistencies and absences feature in Burma's country progress indicators, leading UNAIDS to concede that "the overall environment is not conducive to their [community organizations] development and growth..." Despite these many challenges to achieving an accurate assessment of HIV/AIDS in Burma, some patterns and trends to the epidemic have emerged.

## Epidemiology of HIV/AIDS in Burma

HIV first appeared in Burma in the late 1980 s, at roughly the same time it began its spread in Thailand, 1988–1989 (Ministry of Health Myanmar, 2007). As in the Thai case, HIV may have reached epidemic proportions first among incarcerated injecting drug users (IDUs). Throughout the 1990 s, Burma was the world's largest producer of illicit opiates and the largest exporter of heroin. (Between 2002 and 2003, Afghanistan overtook Burma in illicit opiate production.) However, Burma has and continues to be the principal source of heroin for the illicit markets of Thailand, China, Northeast India, Malaysia, Indonesia, and Vietnam, all states with epidemics of heroin use and most with subsequent epidemics of HIV/AIDS among IDUs (Beyrer et al., 2003).

In addition to this central role in the spread of HIV/AIDS in the region, Burma has also experienced very high rates of injection use of heroin among its own population. The purest Burmese heroin is known regionally as "Number 4." It is four times refined to a highly injectable grade of white powder and has several street names outside Asia, the most well known being "China White." The widespread availability of heroin in the country, the lack of HIV prevention and evidence-based drug treatment for IDUs, and the very limited availability of needles and syringes for any use has fueled both high rates of injecting drug use among Burma's population, and high rates of HIV infection among her IDUs. A World Health Organization (WHO) survey conducted in Kachin State in 1998–1999, which borders China's Yunnan Province, tested 200 IDUs in the Kachin capital city of Myitkyina and found only 8 to be uninfected, a prevalence rate of 96% which at the time was the highest percentage ever reported among IDUs (Morineau & Prazuck, 2000). This finding, albeit from a selected sample of IDUs in one city, nevertheless sounded alarms throughout the public health community in the region and made it clear for perhaps the first time how severe Burma's HIV/AIDS epidemic had become.

The Kachin outbreak provides an example of how the epidemic has unfolded in Burma. This is the region with the highest HIV prevalence among reproductive age adults of any region in Burma (Beyrer, 2003). This mountainous northern region's principal industry is mining, particularly of jade, done using huge open pits, mines which can only be worked in the dry season. When the ground is firm, camps surrounding the mines may have up to 200,000 inhabitants from all over the country. When the monsoons make mining impossible, these same communities may shrink to fewer than 5,000 persons. As in South Africa, the mines provide seasonal employment and drive a great deal of labor mobility (Lurie et al., 2003). Sex workers also work the mining areas, where the mostly young and male miners may be away from wives and family for months at a time.

In a variant of the Southern African context, however, migrant miners in Burma are not only at increased risk for sexual exposure to HIV while working away from family and community, but also at increased risk of exposure through injection drug use. Heroin has been repeatedly reported to be widely available in the mining areas, and there are credible reports of some mines actually offering workers wages in opium or heroin, a much more usable currency then the inflated and unpredictable Burmese Kyat (KDNG, 2007). An assessment of Burma's epidemic revealed that the epidemiology of HIV/AIDS in the country was most likely explained by the pattern of migration and risk associated with mining, sex worker patronage, and injection drug use (Beyrer et al., 2003). Several years later, a leaked internal document from the Burmese Ministry of Health (MoH) revealed that the civilians in the MoH had come to the same conclusion in the 1995/1996 period; this analysis had been suppressed by the Burmese government.

### The Spread of HIV Among Injection Drug Users

The risky and rugged mining environment has also encouraged the development of a unique and highly dangerous "tea stall culture" of heroin injection practices in Burma. Tea stalls are ubiquitous in Burma and serve the social functions

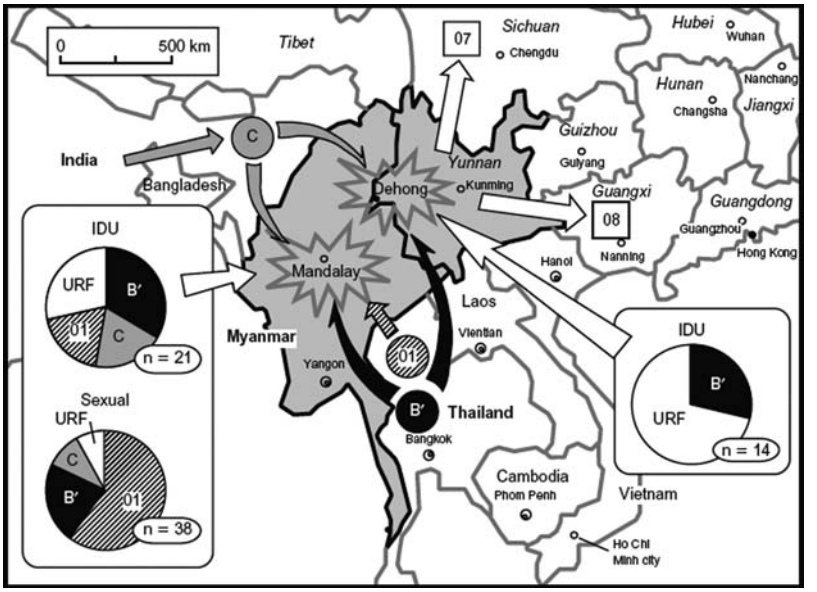


**Figure 19.1** Geographic hot spots of extensive recombinations between circulating HIV-1 subtypes in Southeast Asia (Takebe et al., 2003).

of the café, the pub, and the corner hangout. Tea stalls in Burma's heavy heroin use communities often have small injection rooms where "professional" injectors will sell heroin and inject it for a small fee. Equipment may be used multiple times and cleaned, if at all, with water or soap. Heroin is also put into intravenous (IV) infusion bags, and users can buy these heroin/glucose drips by the drop (Levy & Scott-Clark, 2001). Again, the IV infusion sets may be used multiple times. These kinds of tea stalls have been most commonly and regularly reported in Burma's northern mining areas (Levy & Scott-Clark, 2001). These practices, and the heroin trafficking associated with them, appear to have led to a distinctive viral dynamic in this northern Burma region, which the Japanese researcher Professor Yutaka Takebe has described as a zone of "hyper-recombination." Because HIV variants from Thailand, India, and China all co-circulate in upper Burma, and multiple reuse of injection equipment allows for repeated exposure, Burma appears to be a key center for the generation of HIV-1 viral diversity in Asia (Takebe et al., 2003; Takebe, 2006; Beyrer et al., 2000; Tovanabutra et al., 2001; Tovanabutra et al. 2004; Garrett, 2005) (Figure 19.1).

## HIV Among Commercial Sex Workers

Burma's sex industry in the 1990 s was covert, little studied, and little understood. In contrast to the Thai multiplicity of sex venues and their relative openness, Burma's sex workers were hidden and highly stigmatized. Nevertheless, the few surveys conducted among this group, all from the two largest cities of Rangoon and Mandalay, reported HIV infection rates in the 40 to 50% range by 1999, which suggested that while hidden from health authorities, these women

and girls were not hidden from disease risks (Beyrer et al., 2003). The most recently available sentinel surveillance, from 2003, suggested that HIV infection rates in sex workers in Rangoon and Mandalay had stabilized at high levels (Beyrer et al., 2006a).

Condom promotion efforts for sex workers have appeared to improve in recent years, largely led by the condom social marketing campaigns of NGOs including Population Services International, PSI. Nevertheless, sex work remains illegal, highly stigmatized in Burmese society, and still relatively hidden compared to the sex industries of Thailand and Cambodia. An additional concern for Burma is that Burmese women and girls, particularly from the Shan states, but also increasingly from other areas of the country, have been extensively trafficked into the Thai and Malaysian sex industries (Leiter et al., 2006). Little data is available on the HIV rates among these trafficked women, but it is known that they overwhelmingly are found in the lowest strata of the brothel-based component of the Thai sex industry, where HIV rates have generally been the highest. Special vulnerabilities for these women include illegal status, language and cultural barriers, little prior knowledge of HIV or STD risks, debt bondage, and very limited autonomy or control in commercial settings (Leiter et al., 2006).

### HIV Among Men Who Have Sex with Men (MSM)

Little is known about HIV infection in MSM in Burma. MSM have not been included as a risk group in the national sentinel surveillance, and few studies have been done with measures of HIV infection rates. In 2006, however, MSM participation in the National AIDS Programme was officially sanctioned, and there is growing awareness of the needs of this community (UNAIDS, 2007). The National AIDS Program review conducted by WHO in 2006 identified MSM as among the most underserved of Burma's populations and called for much greater efforts to reach them with HIV prevention and treatment services (WHO, 2006c).

There is a longstanding and vibrant, if somewhat hidden, MSM tradition in Burmese culture. This has been centered around the pre-Buddhist Burmese folk tradition known as the *Nat Pwe.* The *Nats* are folk deities, usually tragic figures who died harsh deaths, and then became intermediary spirits between the worlds of the living and the dead. *Nat Pwes* are their ritual festivals, in which spirit mediums contact the *Nats,* ask for their assistance, and invoke their presences in elaborate theatrical rituals which can last several days, and include dancing, drinking, and trance induction. The priests, or shamans, of the *Nat Pwe* are commonly transvestite or transgender men who "marry" the *Nats* and become their wives during these rituals (Beyrer, 1998). These rituals have traditionally been important meeting places for men seeking sex with other men. The largest of these *Nat Pwes*, at the sacred mountain where the *Nats* are said to live, Mount Popa, attracted up to 20,000 such men, before being closed down by the military some years ago (Beyrer, 1998).

### HIV in the General Population

By the mid-1990 s there was evidence that the spread of HIV/AIDS beyond IDUs and sex workers was underway. Burma had established a national HIV

sentinel surveillance modeled on the Thai Ministry of Public Health's HIV surveillance program. The samples in these surveys were somewhat small and they generally did not test all risk groups in all sentinel areas; only pregnant women were tested in all surveillance points across the country. Although these problems were compounded by the fact that the Burmese military junta did not often release the findings to the international community or to the people of Burma, these surveys were arguably the best available data to assess Burma's growing epidemic. The 1999 national sentinel surveillance and a large household survey were used as a proxy for a population census (the last formal census was conducted by the British in 1931) to assess the magnitude of the epidemic (Beyrer et al., 2003). This work suggested that 1 in 29 adults was living with HIV infection in 2000, some 3.46% of the population, meeting the criteria for a generalized epidemic. While there were marked regional differences, pooled data on rates of infection in pregnant woman provided a national estimate of 1.7% (95% CI 1.2, 2.6). Yet even this population estimate, which excluded high-risk populations such as IDUs, sex workers, and STD patients as no reliable denominators existed for these groups, is likely a conservative one.

Some feared that Burma in 2000 was headed for an Africa-like scenario, with ever increasing rates in the general population. But as with Thailand, Cambodia, Vietnam, and Malaysia, this did not happen. AIDS morbidity and mortality were high in the 1990 s, and most of those infected early across the region died without antiretroviral (ARV) treatment. The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated in 2000 that some 45,000 Burmese were dying of AIDS annually, most of them without ever having an AIDS diagnosis (UNAIDS, 2001). Thus, as the regional AIDS epidemic matured, and death tolls mounted, prevalence appeared to level off. This regional scenario may explain why no Southeast Asian country in 2007 has a population prevalence above 3% of reproductive age adults, including Burma. However, as the region is densely population, even this relatively small percentage translates into close to 9 million people affected with HIV. Yet worst-case scenarios, for reasons we only partially understand, have not been seen. In the cases of Thailand and Cambodia, we have good evidence that the epidemics peaked and began to decline once public health interventions targeting the sex industry nexus at the core of these outbreaks were taken to scale. This occurred in Thailand in the 1993–1995 period, and about 3–4 years later in Cambodia.

In the case of Burma, while there is little evidence that the epidemic came under control due to any given intervention, the most recent sentinel surveillance does suggest stabilization, at least in some groups (Table 19.1). The latest official adult HIV prevalence rate in Burma is 1.3% or about 350,000 adults, a figure arrived at as a result of an official workshop convened in September 2005 (UNAIDS, 2007). This estimate was based on standard extrapolation procedures from national sentinel surveillance efforts but was hampered by two fundamental restraints: data were only collected in a limited number of cities (no rural areas were sampled) limiting generalizability, and sample sizes for each population (N = 100) were very small for national estimates. The very limited nature of the initial data collection meant that confidence intervals were very wide: the 95% confidence interval of this figure was, 0.7–2.0%, insufficient to make the basic distinction between a concentrated and generalized epidemic (UNAIDS, 2007; Stover et al., 2007). Similarly, in the last sentinel

**Table 19.1** HIV Sentinel surveillance data from March–April, 2003, from the National AIDS Control Program of the Ministry of Health, Burma (Myanmar).

| Groups | Number of sites | Total N | Number $HIV^+$ | Percent $HIV^+$ | Median | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| Male attendees with STDs | 29 | 2713 | 163 | 6.01 | 6.00 | 0.00 | 21.00 |
| Female attendees with STD | 8 | 693 | 63 | 9.09 | 12,55 | 1.00 | 18.18 |
| Sex workers | 2* | 185 | 58 | 31.35 | | 11.00 | 55.17 |
| IDUs | 6 | 243 | 92 | 37.86 | 48.10 | 23.00 | 77.78 |
| ANC attendees | 29 | 5654 | 93 | 1.64 | 1.00 | 0.00 | 7.50 |
| Blood donors | 2 | 5596 | 69 | 1.23 | | 1.05 | 1.38 |
| New military | 2 | 1199 | 25 | 2.09 | | 1.00 | 3.17 |

ANC, antenatal clinic.

* Those samples with only 2 sites (sex workers, blood donors, new military) were only sampled in the 2 largest cities, Rangoon and Mandalay.

surveillance reported, 2003, the nationwide prevalence of HIV in ANC attendees was 1.64%, with a 95% CI of ranging from 0.0% of all pregnant women to 7.5%, a range too imprecise to be useful for either planning or program purposes (Beyrer, 2006a). Data from the Mae Tao Clinic, which serves some 60,000 Burmese patients per year from Eastern Burma, suggests that some 2.3–2.5% of pregnant women were HIV infected in 2006, a rate, again, which probably cannot be generalized, but which suggests a widespread heterosexual epidemic in the country (Mae Tao Clinic, 2007).

## Responding to HIV/AIDS in a Restrictive Environment

### Prevention

This dearth of accurate, reliable data, heavily politicized and restricted by the regime, are issues that also plague HIV prevention efforts in Burma, which also suffer from a chronic lack of resources and limited access to some of the more affected regions of the country, including the conflict zones of the Shan State, the remote border areas of Burmese Nagaland and Kachin State, and the large populations of the poor whom the junta has forced out of the cities and into satellite resettlement zones under tight security (GAO, 2007).

### Condom Distribution and Sex Workers

Despite this operating environment, some organizations working within the country have been able to achieve meaningful progress. The most successful HIV prevention programs in Burma have been condom campaigns, and condoms are much more visible now in the country. This is in contrast to the period up until 2001, when condoms were illegal and condom possession was evidence of prostitution with the possessor of condoms liable for arrest (Kazmin, 2006; WHO, 2006; FHAM, 2005). The National AIDS Programme, NAP, administers the 100% Targeted Condom Programme (TCP) for sex workers and their clients, which started as a pilot in 2001 and expanded to cover over 150 sites

by 2005 (FHAM, 2005; WHO, 2006; National AIDS Committee, 2006). This effort was supported by the Fund for HIV/AIDS in Myanmar, the Global Fund, the United Nations Population Fund, WHO and UNAIDS, working with local authorities and organizations for implementation. Condoms are distributed by local teams to guesthouses, military units, taxi drivers, truck drivers, factory workers, and during festivals (WHO, 2006c). Through this program, the NAP reported that they distributed between 6 and 7 million condoms in 2005 (WHO, 2006c).

Another NGO, PSI, supported by USAID, has also been able to increase the availability of condoms to the Burmese public by heavily subsidizing and marketing its own trusted brand of condom, Aphaw ("trusted companion" in Burmese), using a distribution network which relies on non-traditional sources such as betel nut stalls, massage parlors, barber shops, and guesthouses (Kazmin, 2006; Honeyman, 1998). The program has been successful, with the number of retail outlets obtaining condoms from PSI increasing from 1,400 in 2000 to 10,000 in 2004, to over 15,000 by 2006, covering almost all townships in Burma (Kazmin, 2006; FHAM 2005; Stover & Beyrer, 2007). In a further sign of increased acceptability of condoms, PSI was permitted to run a series of humorous television ads on Burmese television during the popular World Cup (Conner, 2007). Noted Guy Stallworthy, PSI's country director for Burma,

> We are demonstrating that a lot can be done without legitimising or materially supporting the government. . . We are especially proud of this huge growth in condom consumption – it is the main thing that has been done over 10 years to fight HIV/AIDS in this country (Kazmin, 2006).

Although these two programs have provided the most condoms, other organizations including MSF- Holland, CARE, United Nations Development Program (UNDP), and World Vision have also had condom distribution programs (FHAM, 2005).

Despite increased distribution of condoms (as many as 40 million were distributed in 2005) other data suggest that risk taking behavior remains a very real threat (WHO, 2006c). Condom use rates with sex workers are estimated to be around 62% in Rangoon, 90% in Moulmein, and 50% in Hpa-An; however, these figures are likely unreliable and in some areas of Burma, overall consistent condom use with sex workers may be nearer to 50% (WHO, 2006c; National AIDS Program, 2005). Reported condom use rates are far lower for sex with casual acquaintances, girlfriends or spouses (FHAM, 2005; Min Thwe, 2005). A consistent barrier to prevention among sex workers continues to be arrests of sex workers by police trying to meet quotas and demonstrate control of sex work. As a result, many vulnerable individuals avoid drop-in centers, reducing their access to condoms and education programs for HIV and further inhibiting accurate data collection (WHO, 2006c; Stover & Beyrer, 2007).

### Prevention among IDUs

Prevention programs targeted towards another high-risk population in Burma, IDUs, have been more limited, and the implementation of initiatives for harm reduction more recent. These have consisted of more outreach to and education for IDUs and the creation of drop-in centers as well as needle exchange and condom distribution programs. VCT services have also increased for IDUs. The focus of these programs have been in areas hardest affected, mainly Shan and Kachin States as well as parts of Pegu and Mandalay, with program implementation by a variety of partners including the United Nations Office on Drugs and Crime (UNODC), CARE, and Médecins du Monde (FHAM, 2005; WHO, 2006c) , and the Australian Government supported Asian Harm Reduction Network. By August 2006, 15 drop-in centers had been established in 12 townships where IDU has been identified as a serious problem (Stover & Beyrer, 2007). These programs were able to reach over 11,500 IDUs in 2005 and reportedly reduced rates of needle sharing from 44% in 2003 to 23% in 2005, with over 1 million needles exchanged at drop-in centers (National AIDS Committee, 2006; Stover et al., 2007; WHO, 2006c). The most recent component of prevention among IDUs has been substitution therapy, with methadone maintenance introduced in 2006 as a pilot project, involving only about 70 IDUs (WHO, 2006c).

### Prevention of Mother to Child Transmission

Despite limitations on ANC monitoring and surveillance, pregnant women have been an important HIV program focus in Burma for some years. The first inclusion of any anti-viral agents by the Ministry of Health was that of AZT for a five site PMTCT pilot program in the late 1990 s. ANC coverage has been expanded to some 19 sites, according to the national AIDS program (NAP, 2006). Given the uncertainty over the numbers of HIV infected pregnant women, and the limited program reach in rural and border areas, however, it is currently not possible to assess coverage on PMTCT services at a national level.

## Treatment and Care

With a serious and maturing epidemic, increasing numbers of Burmese living with HIV/AIDS require treatment. However, with the monthly cost of antiretroviral medicinces (ARVs) running almost USD 50, more than the average monthly salary in Burma, treatment remains out of reach for most, and perhaps only 4.4% of those with advanced HIV/AIDS are receiving therapy (Marshall, 2006; Htay, 2006; Thwe, 2006). To fill this gap, limited HIV treatment programs have been initiated, the most significant of which is a collaboration between MSF-Holland (also known as Artsen Zonder Grenzen or AZG), NAP, and the Waibargyi Specialist Hospital for infectious diseases (FHAM, 2006; National AIDS Committee, 2006). By the end of 2005, over 2500 patients were receiving combination therapy for HIV/AIDS through these collaborative programs (National AIDS Committee, 2006). However, with ARVs readily available without supervision and control in Burma's poorly regulated pharmaceutical markets, many patients do not obtain their medications from

practitioners knowledgeable about HIV treatment. Instead, they make purchases from unknown vendors on the black market often resorting to intermittent therapy or not using standard combination therapies, with implications for HIV resistance (National AIDS Committee, 2006; FHAM, 2005).

Another major impediment to the expansion of official treatment programs, in addition to unsupervised medical treatment, is the centralized nature of HIV/AIDS programs in the country and the limited local partnerships with organizations working for populations disproportionately affected by the epidemic, such as IDUs and sex workers (WHO, 2006c; FHAM, 2005; UNAIDS, 2007). There are no recent indications that this is improving; in fact, as more state and para-statal organizations, such as the USDA, assume duties providing social services, the trend has been diametrically opposite, and community needs continue to be placed secondary to entrenchment of military control over Burma's peoples ("Free USDA," 2007).

As a result of such pressures, treatment for HIV/AIDS in Burma has been late in coming and difficult to implement, compounding death and disability as the epidemic matures. According to the Fund for HIV/AIDS in Myanmar's annual report, 2,953 people with advanced HIV infection in March 2006 are receiving ARVs, well under the 5% of infected individuals it is estimated need it. This treatment is being provided largely through international medical charities, including the largest treatment program, that of MSF-Holland (FHAM, 2006).

## Conclusions

Although some headway has been made in the last decade towards addressing the epidemic of HIV/AIDS, Burma's worsening political stalemate and restrictions from the junta bode poorly for sustained, effective efforts overall to ameliorate the situation. As noted earlier, there have been increasing numbers of crackdowns on HIV/AIDS community groups and deliberate efforts towards bringing them more under the control of state or para-statal organizations, further limiting the space for engaging with affected communities (Labour Movement's International Forum, 2006). The increasingly worrisome environment created by the junta has also been noted by former UN Special Rapporteur on the Situation of Human Rights in Myanmar, Paulo Sergio Pinheiro (2006) in his report to the UN General Assembly, "Since October 2004, however, the positive trend toward addressing the humanitarian exigencies have been largely reversed." However, increasingly, there is evidence that these problems are not solely confined to Burma: as political stagnation and widespread abuses continue, coupled with junta policies that continue to fuel poverty and disinvestment in health, the peoples of Burma continue their exodus into neighboring countries. This has implications for regional spread of epidemics, including HIV, and is particularly true for China and India (Stover et al., 2007).

In recognition of the intimate and inextricable link between health, particularly HIV, and Burma's political realities, a coalition of democratic and ethnic organizations noted, "Humanitarian assistance [especially for TB, malaria, and HIV/AIDS] must aim to complement progress towards national reconciliation not replace it or undermine it. Both humanitarian assistance and political pressure are essential and must be pursued simultaneously. . .it is vital that all

agencies realise the political roots of the humanitarian crisis." The position paper concludes, "A democratic society in Burma is vital to ensuring truly effective humanitarian assistance that directly benefits all Burma's people (Labour Movement's International Forum, 2006)."

There is a general principle at work in these responses as well: while NGOs and donor groups can point the way forward with pilot programs and feasibility studies, sustained public health interventions need to be taken up by the Burmese government and "owned" by leaders, communities, and the public health system. Burma's generals have consistently limited scale-up of successful interventions and refused calls to put national resources into health or education, preferring the international community to support these programs within junta constraints. Humanitarian assistance and HIV/AIDS programs are likely to be limited in lasting impact unless these policies change.

There are two ways that the international community can increase its aid and support of the fight against the HIV/AIDS epidemic in Burma. First, more assistance, material and political, to the nascent NGOs and active international organizations still operating inside Burma could expand both prevention and treatment. Second, cross-border interventions have been shown to be feasible and able to reach populations most in need, as has been demonstrated in IDPs living in conflict zones of eastern Burma (BPHWT, 2006; Shwe Oo, 2007). Finally, the collapse of Burma's public health system, which has so limited her response to HIV/AIDS, is the outcome of military misrule. Political reform may be essential to implementation of the kinds of comprehensive public health and humanitarian programs that Burma's people require and deserve.

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# Chapter 20

# The HIV Epidemic in Vietnam: Past, Present, and Opportunities

Vu Minh Quan, Nguyen Tran Hien, and Vivian F. Go




D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_20, 

## Introduction

Vietnam is a Southeast Asian country, bordering China in the north, Laos in the northwest, and Cambodia in the southwest. Approximately 73% of its 83 million people reside in rural areas (General Statistics Office, 2003). The country's two largest cities are Ho Chi Minh City (HCMC) with a population of 5.6 million, and Hanoi, the capital, with a population of 3 million. Since 1987, when the government's *doi moi* (renovation) policies were launched, the country has dramatically advanced its economy and improved various aspects of life for the Vietnamese people. In 2006, Vietnam's economy was ranked one of the fastest growing economies in Southeast Asia. The gross national income has doubled in the past decade. Healthcare services have also benefited from its economic development. Life expectancy at birth increased from 67 years among males and 70 years among females in 1999, to 70 among males and 73 among females in 2002 (Vietnam Commission for Population Family and Children, 2005).

However, Vietnam's HIV epidemic is also one of the fastest growing in Asia. Since the first HIV infection was detected in 1990, 117,000 persons have been diagnosed with HIV and AIDS in the country, and AIDS has been the country's second leading cause of death since 2003 (Ministry of Health, 2004b). In this chapter, we analyze national HIV surveillance data from 1994 to 2006 and summarize selected studies to evaluate the status of the national HIV epidemic and progress in prevention and care for HIV and AIDS in Vietnam. Epidemiologic data on HIV sero-prevalence and HIV and AIDS case reports presented in the *Epidemiology* section were collected, compiled by the National Institute for Hygiene and Epidemiology (NIHE) and analyzed by the authors, unless otherwise referenced.

## Epidemiology

### Sentinel HIV Sero-Surveillance

Vietnam's national AIDS program conducts annual HIV sero-surveys in selected sentinel groups in sentinel provinces (Nguyen Tran et al., 1999). Sentinel groups represent high-risk populations [injection drug users (IDUs), female sex workers, male patients attending sexually transmitted disease (STD) clinics, and tuberculosis (TB) patients] and low-risk populations (women attending antenatal clinics and men screened as military recruits). In each sentinel province, the annual sample size was 400 for each high-risk group, and 800 for each low-risk group. Men who have sex with men (MSM) have not been included in the sentinel groups because evidence suggesting that this sub-group may be a sizable part of the national epidemic was not available until recent years. The surveillance system was initiated in 12 sentinel provinces in 1994, was expanded to 20 provinces in 2000, and to 40 of the country's 63 provinces in 2003.

### Case Reports of HIV and AIDS

Through 2006, 116,546 HIV infections, including 18,990 AIDS cases and 11,802 AIDS-related deaths, have been reported in the country. The number

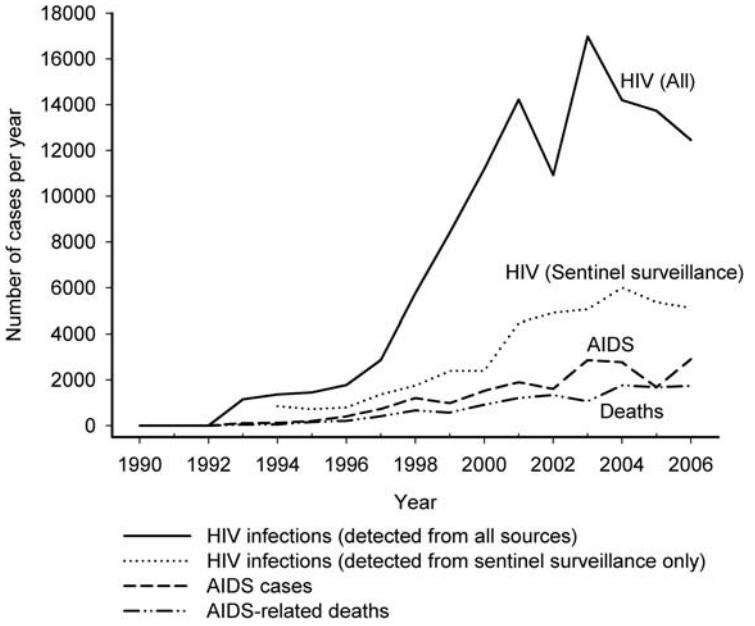


**Figure 20.1** Annual reports of HIV infections, AIDS cases, and AIDS deaths, Vietnam, 1990–2006.

of reported HIV infections per year has increased rapidly, from less than 3,000 per year before 1998 to approximately 13,000 HIV cases annually after 2000 (Figure 20.1). Of all reported HIV cases, 84% are among men. The 2006 national incidence rate was estimated at 140.2 per 100,000 population, representing a 6-fold increase compared to 22.5 per 100,000 in 1999, and a 20-fold increase compared to 7.0 per 100,000 in 1996 (Quan et al., 2000).

Risk information is available for HIV cases identified through sentinel HIV sero-surveillance. From 1994 to 2006, among 41,187 HIV cases, the principal transmission risk for HIV has been injection drug use, which accounts for 72.5% of cases. The predominance of injection drug use has lessened slightly over time, from 81.8% of infections identified in 1996, to 71.2% in 2000, to 68.8% in 2006.

The second most common route of transmission is through heterosexual contact. Of 41,187 HIV cases, 3,818 (9.3%) cases were among female sex workers; an additional 2,011 (4.9%) cases were in patients being seen clinically for an STD and 898 (2.2%) cases were in pregnant women (for whom sexual risk is assumed to be the source of transmission). Thus, at least 16.4% of HIV cases presumably have been sexually acquired. Since MSM are not included in sentinel surveillance, HIV risk associated with male-male sex cannot be inferred from the identified HIV-infected cases.

## Injection Drug Users

### *The Changing Epidemiology of Substance Abuse*

Before 1975, drug use was reported among American and Vietnamese soldiers in the central and southern regions, and was estimated at tens of thousands

of individuals. In the north, opium poppies were cultivated by ethnic-minority highlanders, particularly H'mong and Dao ethnic groups, many of whom used opium as part of their daily life (United Nations Office on Drugs and Crime, 2003).

Drug use emerged as a major social problem during the 1990 s, following the expansion of market-oriented economic policies. Vietnam has been an attractive drug transit route for heroin produced in the Golden Triangle, which has increased heroin availability and encouraged new populations of drug users (Beyrer et al., 2000; U.S. Department of State, 2001). Heroin has been smuggled from Myanmar (Burma) through Laos to northern Vietnam, and to a lesser extent, through Cambodia to southern Vietnam, then onward to destinations in Australia, Hong Kong, Japan, the Philippines, Singapore, and Taiwan (U.S. Drug Enforcement Agency, 2003; UNODC, 2006). The five northern provinces of Lai Chau, Son La, Nghe An, Ha Tinh, and Thanh Hoa are currently the main routes for illicit drugs entering Vietnam from Laos and account for over 60% of the country's confiscated heroin and other addictive drugs (U.S. Department of State, 2002). By 2005, heroin injection had replaced opium smoking as the primary route of drug administration (72%) (United Nations Office on Drugs and Crime, 2005), due to decreased availability of opium and easy access to injectable heroin at a relatively low price (approximately USD 2 per injection).

More recently, amphetamine-type stimulants (ATS) such as methamphetamine, ecstasy, and ketamine have entered into the country from Laos and China and are increasingly used among youth in major urban areas (U.S. Department of State, 2006). Amphetamine use among youth (USD 15–20 per tablet) has been an expression of being of higher social class relative to their peers (Portraits of Hanoian flyers, 2005). In April 2007, law enforcement tested 1,100 individuals who were present in a large nightclub in Hanoi on a single night, and found that one-fifth were positive for drugs, including amphetamines and heroin (Hanoi's New Century busted, 2007).

While the Vietnamese government has taken major steps to eradicating opium cultivation in the country and is no longer on the United Nations Office on Drugs and Crime's (UNODC) list of major drug-producing countries, drug trafficking in Vietnam has not decreased. Drug enforcement intercepted 11,000 drug trafficking cases with 200,000 arrestees between 1997 and 2007, a 5-fold increase compared to the preceding ten year period (More than 11,000 drug cases, 2007). The amount of heroin seized by drug enforcement increased 3.6 fold between 2000 and 2004 and in this same period, the number of drug users known to governmental authorities increased 70%, from 101,000 to 170,000 (UNODC, 2005), representing a growing population exposed to HIV infection (Figure 20.2).

Treating opioid dependence represents a major challenge in Vietnam. The government primarily relies on the Ministry of Labor, War Invalids, and Social Affairs' 83 drug treatment centers, which are capable of providing treatment to 58,000 drug users annually (Over 235,000 drug addicts nationwide, 2007). Treatment for opioid dependence in these centers is comprised of 1–2 week management of withdrawal symptoms (using benzodiazepines or levomepromazine) and in-patient rehabilitation for 6–24 months. Relapse following such

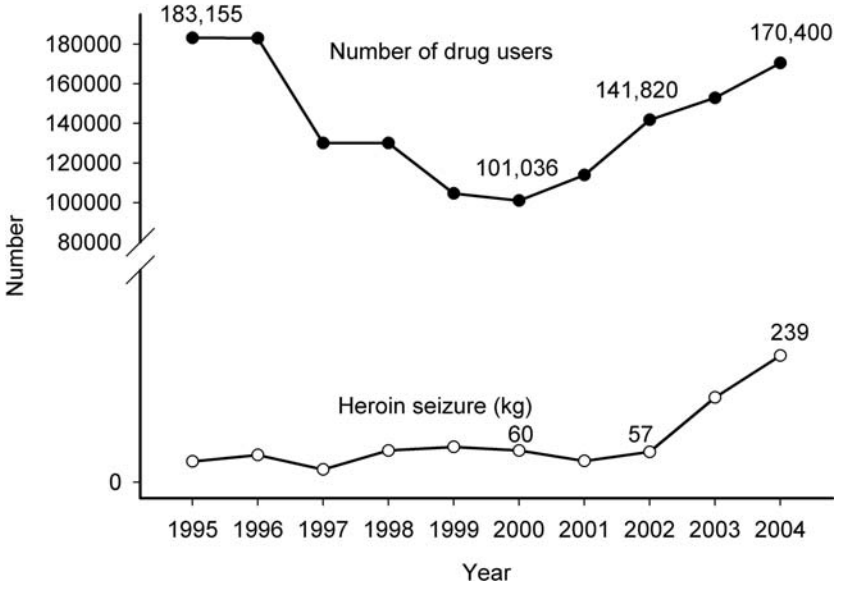


**Figure 20.2** Quantity of heroin seized (kilograms) by law enforcement and number of drug users known to authorities, Vietnam, 1995–2004.

treatment is common (70–90%) (Over 235,000 drug addicts nationwide, 2007; Tuan, 2004). Methadone and buprenorphine have not been utilized for treating opioid dependence in large scale. Since 2003, HCMC's government began to implement an USD 87 million post-detoxification rehabilitation plan and to build 20 in-patient rehabilitation centers to accommodate drug users for four years and provide them with rehabilitation, education, vocational training, and job creation. By 2007, 38,500 drug users of HCMC have been undergoing the program with nearly half of them on stable jobs (Education, job creation for former drug addicts, 2006; HCM City, 2007). The rehabilitation program was considered effective and will likely be replicated to other provinces (Drug detoxification model in HCMC, 2007; Education, job creation for former drug addicts, 2006). While evaluations of the program's long-term impacts on relapse into drug use, HIV transmission, individuals' welfare, and the intervention's cost-effectiveness has not been available there have been some concerns of potential HIV transmission risks within these centers (Open Society Institute, 2007).

***HIV Sero-Surveillance Among Injection Drug Users***

HIV sero-surveillance data indicate continuing high levels of HIV infection among IDUs (Table 20.1). In the majority of surveyed provinces, the HIV epidemic has spread in two general patterns: (1) an explosive increase in HIV prevalence of 20% or greater over one year, occurring in areas with large networks of IDUs who share injection equipment; and (2) a gradual but steady increase in HIV prevalence, a pattern that occurred in recent years when sharing of injection equipment was reduced but some risk taking persisted.

**Table 20.1** HIV prevalence among injection drug users, Vietnam, by province, 2000–2006.

| Province | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Trend* | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| **Red River Delta** | | | | | | | | | | |
| Ha Noi | % pos | 17.5 | 22.3 | 25.3 | 30.5 | 31.3 | 27.5 | 24.3 | 3.2 | 0.001 |
| | n | 400 | 400 | 400 | 400 | 400 | 400 | 400 | . | . |
| Ha Tay | % pos | . | 11.5 | 13.8 | 25.0 | 27.8 | 28.1 | 26.8 | 9.0 | <0.001 |
| | n | . | 625 | 792 | 496 | 529 | 505 | 400 | . | . |
| Hai Duong | % pos | . | 56.3 | 61.3 | 1.3 | 42.5 | 37.0 | 28.5 | –8.6 | <0.001 |
| | n | . | 400 | 400 | 400 | 400 | 400 | 485 | . | . |
| Hai Phong | % pos | 70.4 | 72.0 | 48.3 | 60.5 | 64.0 | 57.8 | 46.3 | –5.9 | <0.001 |
| | n | 240 | 400 | 400 | 400 | 400 | 510 | 400 | . | . |
| Nam Dinh | % pos | 13.1 | 25.0 | 20.1 | 27.8 | 24.8 | 26.9 | 24.1 | 4.1 | <0.001 |
| | n | 475 | 540 | 563 | 400 | 561 | 432 | 311 | . | . |
| Thai Binh | % pos | . | . | . | 12.5 | 36.9 | 17.6 | 12.9 | –3.0 | 0.003 |
| | n | . | . | . | 456 | 621 | 347 | 527 | . | . |
| **North East** | | | | | | | | | | |
| Bac Giang | % pos | . | . | . | . | 16.1 | 10.7 | 9.0 | –3.0 | 0.003 |
| | n | . | . | . | . | 341 | 373 | 400 | . | . |
| Cao Bang | % pos | . | . | . | . | 22.2 | 25.1 | 17.0 | –1.8 | 0.070 |
| | n | . | . | . | . | 396 | 259 | 400 | . | . |
| Lang Son | % pos | 9.3 | 6.8 | 7.0 | . | 31.3 | 28.8 | 28.0 | 12.1 | <0.001 |
| | n | 400 | 400 | 400 | . | 390 | 400 | 421 | . | . |
| Lao Cai | % pos | 2.6 | 2.6 | 6.5 | 6.0 | 22.6 | 19.8 | 18.6 | 12.6 | <0.001 |
| | n | 457 | 385 | 540 | 579 | 495 | 465 | 474 | . | . |
| Phu Tho | % pos | . | 15.5 | 15.5 | 19.4 | 19.9 | 20.7 | 20.7 | 2.6 | 0.009 |
| | n | . | 400 | 400 | 242 | 301 | 377 | 405 | . | . |
| Quang Ninh | % pos | . | 60.5 | 75.2 | 54.3 | 63.9 | 57.0 | 54.5 | –4.0 | <0.001 |
| | n | . | 301 | 420 | 400 | 410 | 405 | 400 | . | . |
| Thai Nguyen | % pos | 10.8 | 27.5 | 28.4 | 29.2 | 32.0 | 33.3 | 40.8 | 8.9 | <0.001 |
| | N | 418 | 422 | 412 | 411 | 400 | 400 | 400 | . | . |
| **North West** | | | | | | | | | | |
| Dien Bien | % pos | . | . | . | 15.9 | 29.4 | 40.8 | 36.8 | 8.7 | <0.001 |
| | n | . | . | . | 591 | 608 | 600 | 600 | . | . |
| Hoa Binh | % pos | . | . | . | 25.8 | 17.9 | 20.1 | 19.2 | –2.2 | 0.028 |
| | n | . | . | . | 480 | 391 | 418 | 458 | . | . |
| **North Central Coast** | | | | | | | | | | |
| Ha Tinh | % pos | 18.3 | 12.5 | 15.4 | 23.8 | 10.5 | 15.4 | 12.0 | –1.2 | 0.222 |
| | n | 219 | 546 | 532 | 400 | 428 | 487 | 367 | . | . |
| Hue | % pos | 1.9 | 4.5 | 15.0 | 7.8 | 1.5 | 3.5 | 4.8 | –3.0 | 0.003 |
| | n | 106 | 400 | 400 | 437 | 410 | 400 | 400 | . | . |
| Nghe An | % pos | . | 23.0 | 14.8 | 28.5 | 27.5 | 34.3 | 27.5 | 4.3 | <0.001 |
| | n | . | 256 | 400 | 400 | 400 | 400 | 400 | . | . |
| Quang Tri | % pos | . | . | . | 23.2 | 2.9 | . | . | –2.8 | 0.005 |
| | n | . | . | . | 383 | 35 | . | . | . | . |
| Thanh Hoa | % pos | 19.8 | 25.6 | 34.6 | 25.8 | 16.9 | 25.9 | 26.0 | 1.9 | 0.058 |
| | n | 1020 | 531 | 471 | 333 | 201 | 305 | 439 | . | . |
| **South Central Coast** | | | | | | | | | | |
| Binh Dinh | % pos | 44.7 | 85.7 | . | 6.9 | 6.9 | 11.8 | 27.3 | –8.5 | <0.001 |
| | n | 85 | 28 | . | 173 | 218 | 170 | 33 | . | . |
| Da Nang | % pos | 37.5 | 10.6 | 11.0 | 7.5 | 8.3 | 5.8 | 7.0 | –7.6 | <0.001 |
| | n | 160 | 432 | 400 | 400 | 400 | 361 | 400 | . | . |
| Khanh Hoa | % pos | 25.4 | 29.2 | 42.4 | 47.0 | 37.2 | 35.7 | 26.6 | 0.3 | 0.789 |
| | n | 252 | 305 | 257 | 400 | 320 | 409 | 350 | . | . |

**Table 20.1 (continued)**

| Province | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Trend* | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| **Central Highlands** | | | | | | | | | | |
| Dak Lak | % pos | 21.4 | 26.4 | 24.0 | 27.9 | 31.2 | 25.1 | 24.8 | 1.0 | 0.294 |
| | n | 224 | 379 | 154 | 179 | 202 | 199 | 105 | . | . |
| Gia Lai | % pos | . | . | 20.9 | 17.2 | 26.0 | 3.3 | 29.7 | 0.4 | 0.692 |
| | n | . | . | 43 | 58 | 77 | 181 | 128 | . | . |
| Lam Dong | % pos | . | 53.3 | 50.1 | 14.7 | 17.9 | 19.2 | 23.6 | –10.7 | <0.001 |
| | n | . | 197 | 407 | 190 | 201 | 395 | 351 | . | . |
| **South East** | | | | | | | | | | |
| Binh Duong | % pos | 10.5 | 27.9 | 40.5 | 40.6 | 46.7 | 35.7 | 26.0 | 7.4 | <0.001 |
| | n | 600 | 602 | 400 | 406 | 403 | 431 | 438 | . | . |
| Binh Thuan | % pos | . | . | 19.5 | 16.9 | 17.1 | 11.9 | 6.9 | –6.8 | <0.001 |
| | n | . | . | 380 | 361 | 416 | 226 | 795 | . | . |
| Dong Nai | % pos | 17.5 | 41.1 | 42.5 | 45.0 | 27.6 | 20.9 | 21.0 | –4.6 | <0.001 |
| | n | 417 | 756 | 435 | 400 | 399 | 392 | 400 | . | . |
| Ho Chi Minh City | % pos | 58.1 | 83.7 | 80.7 | 54.8 | 53.3 | 47.3 | 45.2 | –8.3 | <0.001 |
| | n | 554 | 282 | 171 | 398 | 405 | 400 | 418 | . | . |
| Ninh Thuan | % pos | . | . | . | 23.5 | 19.4 | 16.0 | 8.0 | –6.0 | <0.001 |
| | n | . | . | . | 400 | 350 | 400 | 400 | . | . |
| Vung Tau | % pos | 54.8 | 52.8 | 42.8 | 37.0 | 27.5 | 38.0 | 17.8 | –12.1 | <0.001 |
| | n | 400 | 400 | 400 | 400 | 400 | 400 | 400 | . | . |
| **Mekong River Delta** | | | | | | | | | | |
| An Giang | % pos | 9.9 | 33.3 | 30.0 | 26.3 | 39.0 | 25.5 | 19.1 | 2.8 | 0.005 |
| | n | 556 | 429 | 400 | 403 | 403 | 404 | 460 | . | . |
| Ca Mau | % pos | . | 10.8 | 18.3 | 27.5 | 13.5 | 10.4 | 20.9 | 0.0 | 0.989 |
| | n | . | 362 | 400 | 400 | 400 | 385 | 196 | . | . |
| Can Tho | % pos | 21.3 | 41.5 | 52.9 | 47.0 | 46.4 | 37.8 | 45.0 | 3.6 | <0.001 |
| | n | 328 | 424 | 399 | 400 | 349 | 400 | 400 | . | . |
| Dong Thap | % pos | . | . | . | 2.0 | 5.6 | 4.8 | 22.3 | 7.2 | <0.001 |
| | n | . | . | . | 197 | 160 | 356 | 287 | . | . |
| Kien Giang | % pos | 13.3 | 23.5 | 19.5 | 14.3 | 24.5 | 3.0 | 10.5 | –4.6 | <0.001 |
| | n | 400 | 400 | 400 | 400 | 400 | 400 | 400 | . | . |
| Long An | % pos | . | . | . | 43.3 | 38.6 | 34.5 | 35.0 | –2.6 | 0.008 |
| | n | . | . | . | 400 | 396 | 403 | 326 | . | . |
| Soc Trang | % pos | . | 29.4 | 23.3 | 20.1 | 20.2 | 11.5 | 13.1 | –5.6 | <0.001 |
| | n | . | 136 | 227 | 269 | 450 | 400 | 412 | . | . |
| Vinh Long | % pos | . | . | . | 29.8 | 25.0 | 20.0 | 18.3 | –4.2 | <0.001 |
| | n | . | . | . | 400 | 400 | 400 | 400 | . | . |

Abbreviations: n, number of persons tested for HIV; % pos, percent HIV positive.
* Cochran-Armitage trend test.

Thirteen of 40 surveyed provinces (30%) experienced an explosive increase in the prevalence of HIV among IDUs. The earliest increases occurred in major urban areas in the southern and central regions: Ho Chi Minh City (2.0% in 1992 to 30.0% in 1993), Da Nang (13.5% in 1995, 38.5% in 1996). Studies of IDUs showed that most were in their mid-40 s and injected opium (Abdul-Quader et al., 1999; Tran et al. 1998). Since the late 1990 s, multiple, dramatic outbreaks of HIV infections have affected IDUs in all northern, central, and southern regions (Quang Ninh: 0% in 1997, 65.9% in 1998, 72.9% in 1999; Hai Phong: 0.9% in 1997, 32.5% in 1998, 60.4% in 1999; Vung Tau: 5.6% in 1997, 16.7% in 1998, 43.5% in 1999). In more than half of these

provinces (7 of 13), HIV prevalence reached 70–85% between 1998 and 2002 (Binh Dinh, 85.7% in 2001; Khanh Hoa, 85.0% in 1998; HCMC, 83.7% in 2001; Da Nang, 80.0% in 1998; Quang Ninh, 75.2% in 2002; Hai Phong, 72.0% in 2001). Most of the IDUs surveyed were 20–30 years old and injected heroin (UNODC, 2005). Since 2003, HIV prevalence in these provinces has somewhat declined although it remains high (median = 28.8%; interquartile range [IQR] = 17.6–46.3%).

Gradual, steady increases in HIV prevalence among IDUs have been observed in recent years, in less urban areas in the northwestern region (Dien Bien: 15.9% in 2003, 29.4% in 2004, 40.8% in 2005), northeastern region (Thai Nguyen: 29.2% in 2003, 32.0% in 2004, 33.3% in 2005, 40.8% in 2006), the Red River delta region (Ha Tay: 13.8% in 2002, 25.0% in 2003, 27.8% in 2004, 28.1% in 2005), the north central coast (Nghe An: 14.8% in 2002, 28.5% in 2003, 27.5% in 2004, 34.3% in 2005).

Through 2006, 37 of 40 surveyed provinces (93%) had had at least one year with a prevalence of HIV infection among IDUs that was greater than 20%. The median HIV prevalence rate among IDUs in 39 provinces in 2006 (data from Quang Tri province not available) was 23.6% (IQR = 17.0–28.0%). Provinces with the highest HIV prevalence in 2006 were Quang Ninh (54.5%), Hai Phong (46.3%), HCMC (45.2%), Can Tho (45.0%), and Thai Nguyen (40.8%) (Figure 20.3).

## Female Sex Workers

### *Sex Work*

While there was a sizable population of sex workers in southern Vietnam before 1975 (Hart, 1974), the number of sex workers did not increase substantially until the late 1990s. It was estimated that the population of sex workers increased 10 fold in the period between 1994 and 2001 (Morrison & Nieburg, 2006). Statistics on the number of sex workers in Vietnam are scarce, ranging from 70,000 sex workers who are known to governmental authorities, to potentially 300,000 sex workers (Hong et al., 2004; Nguyen Tran & Wolffers, 1994). Because of its illegal nature sex work typically takes place in public venues (streets, parks, beaches), adjacent to other civil services or facilities (massage parlors, karaoke bars, hotels, restaurants), or more recently, through contacts via the Internet and call-girl networks. More sex workers are reported in major urban areas (such as HCMC where an estimated 80,000 sex workers live, as well as Hanoi, Hai Phong, Khanh Hoa) and in southern provinces close to the Cambodian border, where cross-border sex work has been documented (Lindan et al., 1997; Thuy et al., 1998).

### *HIV Sero-Surveillance Among Female Sex Workers*

HIV prevalence rates among female sex workers by province from 2000 to 2006 are presented in Table 20.2. In 2006, eight provinces (20%) had an HIV prevalence among sex workers of 5% or greater: Hanoi (14.3%), Hai Phong (8.4%), Ha Tay (5.2%) in the northern region; Khanh Hoa (5.0%) in the central region; Can tho (33.9%), HCMC (11.7%), An Giang (9.5%), and Kien Giang (5.3%) in the southern region. In 5 of the 8 provinces, the increase in HIV

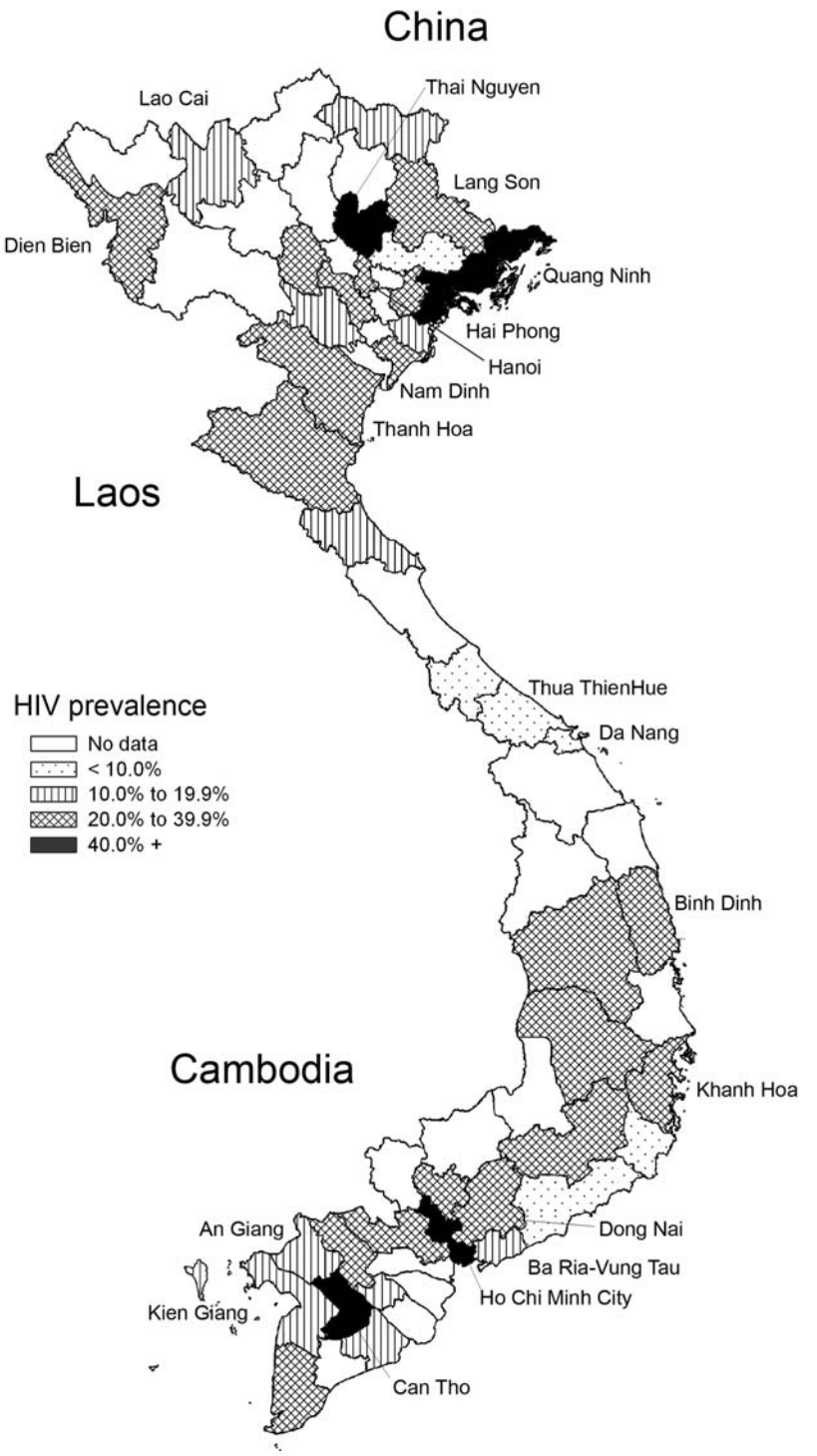


**Figure 20.3** HIV prevalence among injection drug users in 40 sentinel provinces, Vietnam, 2006.

**Table 20.2** HIV prevalence among female sex workers, Vietnam, by province, 2000–2006.

| Province | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Trend* | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| **Red River Delta** | | | | | | | | | | |
| Ha Noi | % pos | 10.0 | 11.5 | 14.5 | 15.0 | 15.5 | 13.0 | 14.3 | 1.9 | 0.063 |
| | n | 400 | 400 | 400 | 400 | 400 | 400 | 400 | . | . |
| Ha Tay | % pos | . | 1.9 | 2.4 | 8.4 | 7.0 | 6.5 | 5.2 | 3.1 | 0.002 |
| | n | . | 425 | 455 | 403 | 328 | 372 | 404 | . | . |
| Hai Duong | % pos | . | 0.0 | 2.0 | 0.0 | 1.5 | 2.0 | 0.8 | 0.0 | 0.970 |
| | n | . | 35 | 100 | 150 | 200 | 150 | 373 | . | . |
| Hai Phong | % pos | 4.5 | 7.3 | 7.8 | 5.9 | 6.3 | 5.6 | 8.4 | 1.1 | 0.290 |
| | n | 400 | 400 | 400 | 404 | 400 | 411 | 404 | . | . |
| Nam Dinh | % pos | 1.7 | 5.0 | 5.1 | 1.0 | 2.2 | 2.4 | 2.2 | –1.1 | 0.252 |
| | n | 287 | 220 | 255 | 400 | 321 | 253 | 279 | . | . |
| Thai Binh | % pos | . | . | . | 2.3 | 3.2 | 5.4 | 1.3 | –0.6 | 0.574 |
| | n | . | . | . | 261 | 280 | 149 | 302 | . | . |
| **North East** | | | | | | | | | | |
| Bac Giang | % pos | . | . | . | . | 0.0 | 1.1 | 0.3 | 0.3 | 0.779 |
| | n | . | . | . | . | 259 | 373 | 360 | . | . |
| Cao Bang | % pos | . | . | . | . | 2.9 | . | . | . | . |
| | n | . | . | . | . | 34 | . | . | . | . |
| Lang Son | % pos | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 4.1 | 4.4 | 3.6 | <0.001 |
| | n | 47 | 110 | 152 | 26 | 156 | 170 | 205 | . | . |
| Lao Cai | % pos | 0.0 | 0.3 | 0.0 | 0.7 | 0.0 | . | . | 0.2 | 0.841 |
| | n | 171 | 296 | 228 | 141 | 156 | . | . | . | . |
| Phu Tho | % pos | . | 0.5 | 0.5 | 8.0 | 1.4 | 0.0 | 2.1 | 0.6 | 0.528 |
| | n | . | 200 | 200 | 88 | 286 | 190 | 289 | . | . |
| Quang Ninh | % pos | . | 1.7 | 4.2 | 3.3 | 4.0 | 2.3 | 2.5 | –0.2 | 0.852 |
| | n | . | 403 | 403 | 400 | 402 | 400 | 400 | . | . |
| Thai Nguyen | % pos | 0.0 | 0.0 | 0.9 | 1.9 | 1.7 | 3.1 | 0.0 | 1.8 | 0.075 |
| | n | 352 | 316 | 341 | 308 | 300 | 223 | 400 | . | . |
| **North West** | | | | | | | | | | |
| Dien Bien | % pos | . | . | . | 2.0 | 0.6 | 1.4 | 0.0 | –1.3 | 0.203 |
| | n | . | . | . | 148 | 162 | 217 | 130 | . | . |
| Hoa Binh | % pos | . | . | . | 1.8 | 0.6 | 0.9 | 1.6 | 0.0 | 0.993 |
| | n | . | . | . | 221 | 337 | 235 | 257 | . | . |
| **North Central Coast** | | | | | | | | | | |
| Ha Tinh | % pos | 0.5 | 0.0 | 0.0 | 0.3 | 1.0 | 0.3 | 1.8 | 2.7 | 0.006 |
| | n | 205 | 254 | 314 | 400 | 400 | 303 | 397 | . | . |
| Hue | % pos | 0.0 | 0.3 | 0.0 | 0.2 | 0.3 | 0.8 | 0.0 | 0.8 | 0.439 |
| | n | 192 | 400 | 400 | 407 | 400 | 400 | 400 | . | . |
| Nghe An | % pos | . | 7.0 | 2.4 | 5.8 | 6.5 | 6.0 | 3.3 | –0.6 | 0.544 |
| | n | . | 172 | 255 | 400 | 400 | 400 | 400 | . | . |
| Quang Tri | % pos | . | . | . | 0.5 | 0.3 | 0.0 | 0.6 | –0.2 | 0.858 |
| | n | . | . | . | 400 | 379 | 169 | 168 | . | . |
| Thanh Hoa | % pos | 12.2 | 25.5 | 3.3 | 4.5 | 0.6 | 0.6 | 0.9 | –8.0 | <0.001 |
| | n | 139 | 51 | 392 | 134 | 310 | 328 | 327 | . | . |
| **South Central Coast** | | | | | | | | | | |
| Binh Dinh | % pos | 3.0 | 0.0 | 1.2 | 2.0 | 3.0 | 4.1 | 2.7 | 1.1 | 0.289 |
| | n | 202 | 104 | 161 | 149 | 168 | 170 | 225 | . | . |
| Da Nang | % pos | 0.0 | 0.0 | 0.3 | 0.9 | 0.3 | 0.3 | 1.0 | 2.0 | 0.043 |

**Table 20.2 (continued)**

| Province | | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Trend* | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | n | 400 | 403 | 306 | 347 | 400 | 378 | 288 | . | . |
| Khanh Hoa | % pos | 0.0 | 5.8 | 0.6 | 1.0 | 5.6 | 4.0 | 5.0 | 3.0 | 0.003 |
| | n | 186 | 190 | 165 | 400 | 320 | 225 | 416 | . | . |
| **Central Highlands** | | | | | | | | | | |
| Dak Lak | % pos | 2.0 | 2.5 | 2.0 | 1.8 | 4.8 | 5.8 | 0.0 | 1.1 | 0.250 |
| | n | 100 | 163 | 102 | 113 | 62 | 86 | 26 | . | . |
| Gia Lai | % pos | . | . | 0.0 | 0.0 | 0.0 | 2.2 | 1.3 | 1.1 | 0.268 |
| | n | . | . | 29 | 37 | 58 | 45 | 78 | . | . |
| Lam Dong | % pos | . | 0.7 | 1.2 | 0.2 | 0.7 | 2.8 | 0.7 | 0.1 | 0.904 |
| | n | . | 284 | 416 | 468 | 447 | 72 | 147 | . | . |
| **South East** | | | | | | | | | | |
| Binh Duong | % pos | 4.5 | 6.8 | 6.5 | 1.5 | 4.5 | 8.0 | 2.7 | –2.0 | 0.044 |
| | n | 600 | 600 | 400 | 411 | 111 | 113 | 403 | . | . |
| Binh Thuan | % pos | . | . | 0.0 | 2.3 | 1.9 | 0.5 | 2.8 | 1.6 | 0.104 |
| | n | . | . | 299 | 301 | 377 | 395 | 319 | . | . |
| Dong Nai | % pos | 1.0 | 2.5 | 0.8 | 11.6 | 2.5 | 1.6 | 0.6 | –0.7 | 0.483 |
| | n | 206 | 485 | 366 | 43 | 397 | 384 | 335 | . | . |
| Hochiminh City | % pos | 18.1 | 23.4 | 14.3 | 10.5 | 15.6 | 12.3 | 11.7 | –3.9 | <0.001 |
| | n | 497 | 542 | 2179 | 200 | 514 | 204 | 351 | . | . |
| Ninh Thuan | % pos | . | . | . | 6.7 | 3.3 | 2.3 | 1.3 | –3.3 | 0.001 |
| | n | . | . | . | 150 | 400 | 400 | 400 | . | . |
| Vung Tau | % pos | 4.0 | 0.3 | 6.5 | 1.0 | 1.3 | 2.0 | 1.0 | –2.7 | 0.007 |
| | n | 400 | 400 | 400 | 400 | 400 | 400 | 400 | . | . |
| **Mekong River Delta** | | | | | | | | | | |
| An Giang | % pos | 6.1 | 6.1 | 14.5 | 14.1 | 27.6 | 12.2 | 9.5 | 4.0 | <0.001 |
| | n | 557 | 444 | 448 | 403 | 402 | 402 | 611 | . | . |
| Ca Mau | % pos | . | 0.7 | 1.5 | 0.5 | 0.0 | 1.3 | 1.0 | 0.0 | 0.969 |
| | n | . | 405 | 400 | 400 | 400 | 400 | 391 | . | . |
| Can Tho | % pos | 1.8 | 7.9 | 11.0 | 16.5 | 14.2 | 8.5 | 33.9 | 8.6 | <0.001 |
| | n | 400 | 390 | 364 | 200 | 345 | 400 | 189 | . | . |
| Dong Thap | % pos | . | . | . | 0.0 | 1.4 | 1.3 | 0.5 | –0.2 | 0.867 |
| | n | . | . | . | 100 | 441 | 400 | 210 | . | . |
| Kien Giang | % pos | 1.3 | 3.5 | 1.3 | 5.0 | 3.8 | 4.5 | 5.3 | 3.4 | 0.001 |
| | n | 400 | 400 | 400 | 400 | 400 | 400 | 400 | . | . |
| Long An | % pos | . | . | . | 2.3 | 0.5 | 1.5 | 0.2 | –2.1 | 0.032 |
| | n | . | . | . | 400 | 400 | 411 | 403 | . | . |
| Soc Trang | % pos | . | 2.6 | 2.3 | 3.2 | 4.5 | 3.5 | 0.8 | –0.7 | 0.493 |
| | n | . | 273 | 400 | 402 | 400 | 400 | 400 | . | . |
| Vinh Long | % pos | . | . | . | 0.0 | 1.3 | 1.0 | 1.0 | 1.4 | 0.171 |
| | n | . | . | . | 400 | 400 | 400 | 400 | . | . |

Abbreviations: n, number of persons tested for HIV; % pos, percent HIV positive.
* Cochran-Armitage trend test.

prevalence among sex workers was highly correlated with the increase in HIV prevalence among IDUs, including Hanoi (Spearman correlation coefficient, $r = 0.97$, $p < 0.001$), Hai Phong ($r = 0.66$, $p = 0.015$) in the northern region; Can Tho ($r = 0.86$, $p < 0.001$), HCMC ($r = 0.62$, $p = 0.024$), and An Giang ($r = 0.75$, $p = 0.003$) in the southern region.

### *Sex Work and Injection Drug Use*

Increasing HIV infection rates among sex workers have been linked to injection drug use. In HCMC, HIV sero-prevalence among sex workers which was 3% or less in the 1994–1998 period, increased to 18% in 1999, and 23% in 2001 and was associated with injection drug use (Nguyen et al., 2004). A similar increase in HIV prevalence rates was observed among sex workers in Hanoi, in 2002, and was also associated with drug injection risk (Tran et al., 2005). In 2006, drug use among sex workers was reported in all seven provinces where national HIV/STD behavioral surveillance was conducted. Up to 17% of sex workers in Hanoi and Can Tho province reported having injected drugs, and in the remaining five provinces, between 3 and 9% of sex workers reported having injected drugs. HIV infection rates in these provinces ranged from 1 to 29% and were associated with a history of injection drug use (National Institute of Hygiene and Epidemiology & Family Health International, 2007).

## Patients Attending STD Clinics

The HIV prevalence among male patients attending STD clinics in 40 surveyed provinces increased significantly (random effects model, $p = 0.03$) from 2000 to 2006, but the prevalence was generally low (median = 1.2%, IQR = 0–3.2% in 2006). In 2006, the six provinces with an HIV prevalence of 5% or greater among male STD patients were Thai Nguyen (11.3%), Nghe An (6.5%), An Giang (6.1%), HCMC (6.1%), Dien Bien (5.0%), and Soc Trang (5.0%). From 2000 to 2006, four provinces (An Giang, Kien Giang, HCMC, Thai Nguyen) have had an HIV prevalence of 5% or greater for at least two consecutive years among male STD patients, suggestive of persistently high prevalence. Three of these four provinces (An Giang, Kien Giang, HCMC) also had high HIV prevalence rates among sex workers in 2006, suggesting an increase in heterosexual transmission of HIV.

## Men Who Have Sex with Men

Same sex behavior is highly stigmatized in Vietnam, and little is known about the number of MSM, their HIV risks, and the magnitude of HIV and STD infection rates among this group. Some available behavioral data suggest that MSM are engaging in high risk sex and that HIV infection in this population may be a significant part of the national HIV epidemic. In 2006, the National Institute of Hygiene and Epidemiology and Family Health International conducted surveys of MSM in Hanoi ($n = 397$) and in HCMC ($n = 393$), as part of the national HIV/STD behavioral surveillance. In the month prior to interviews, many of the men reported having had at least two male sex partners (43.7% in Hanoi, 70.2% in HCMC), or having sold sex to male partners (21.8% in Hanoi, 40.7% in HCMC). Of those who sold sex, 44.2% in Hanoi and 28.5% in HCMC did not use a condom in their last encounter. Approximately one-fifth of these MSM (22.8% in Hanoi, 21.0% in HCMC) had ever used drugs and 9.2% in Hanoi and 3.8% in HCMC had ever injected drugs. HIV prevalence was 9.4% in the Hanoi sample and 5.3% in the HCMC sample (National Institute of Hygiene and Epidemiology & Family Health International, 2007). Other surveys among MSM have reported an HIV prevalence of 8.0% in HCMC in 2005

(Nguyen et al., 2007) and 0% (n = 295) in Khanh Hoa province in 2005 (Truong Tan et al., 2006).

### Pregnant Women

Sero-surveillance indicators of HIV infection in the general population (pregnant women, military recruits) continue to be low. Combining data from 40 provinces, HIV prevalence among pregnant women was 0.20% in 2000, slightly increased to 0.30% in 2001, then stabilized through 2006 [0.20% in 2000 (15,853 tested); 0.30% in 2001 (22,304 tested); 0.34% in 2002 (24,406); 0.26% in 2003 (31,832 tested); 0.30% in 2004 (63,214 tested); 0.30% in 2005 (57,182 tested) and 0.36% in 2006 (57,056 tested)].

In 2006, only three of 40 provinces had an HIV prevalence rate among pregnant women that was greater than 1% (Dien Bien, 2.0%; Thai Nguyen, 1.6%; and Thanh Hoa, 1.6%). All three provinces have experienced increasing HIV prevalence among IDUs in recent years, and all had HIV prevalence rates among sex workers which were below 1% in 2006. These data suggest a low likelihood of a generalized epidemic in these provinces, as compared to major urban areas in which the HIV epidemic is established among sex workers such as HCMC and Hanoi. However, further investigations are needed to examine the possibility that IDUs are transmitting HIV to their female sexual partners, and the trends in HIV prevalence among pregnant women in these provinces merit close monitoring.

Among eight provinces with high HIV rates among sex workers in 2006, including HCMC, An Giang, Kien Giang, Can Tho, and Hanoi where the HIV epidemic is well established among sex workers, HIV infection rates for pregnant women were all below 0.5%. These figures suggest that sexual transmission of HIV in the general population remained limited, even in areas with the greatest HIV rates among high-risk heterosexuals.

### Military Recruits

Consistent with HIV rates among pregnant women, HIV prevalence among military recruits continues to be low. The HIV prevalence has declined significantly (random effects model, $p < 0.001$) in the period between 2000 and 2006 [0.96% in 2000 (17,584 tested); 0.93% in 2001 (25,683 tested); 0.65% in 2002 (26,352 tested); 0.41% in 2003 (26,866 tested); 0.43% in 2004 (21,667 tested); 0.31% in 2005 (30,404 tested); 0.17% in 2006 (19,583 tested)]. Examining data from provinces individually reveals similar findings, with 39 of 40 surveyed provinces showing no significant increase in HIV prevalence among military recruits.

### Tuberculosis Patients

Tuberculosis (TB) is the most common opportunistic infection (OI) among HIV/AIDS patients in Southeast Asia and the second most common OI in Vietnam (Louie et al., 2004; Zhou et al., 2005). While HIV sero-surveillance among TB patients provides an indirect and lagging indication of the evolution of the HIV epidemic, it is an indicator of the health system's burden in treating AIDS and TB. From 2000 through 2006, HIV prevalence among TB patients

increased significantly (Cochran-Armitage trend test, $p < 0.05$) in 19 of 40 (48%) surveyed provinces. In 2006, the median HIV prevalence among TB patients was 3.2% (IQR = 1.7–5.5%), as compared to 1.8% (IQR = 0.4–2.0%) in 2000. The 13 provinces with the highest HIV prevalence (≥5%) among TB patients in 2006 were Quang Ninh, 23.8%; Hanoi, 17.5%; Soc Trang, 16.5%; Thai Nguyen, 13.0%; Hai Phong, 11.9%; Can Tho, 9.3%; Vung Tau, 8.0%; Phu Tho, 7.8%; Nam Dinh, 6.1%; Khanh Hoa, 5.5%; Long An, 5.2%; Kien Giang, 5.0%; Dien Bien, 5.0%. The uniform increase in HIV prevalence among TB patients in nearly half of the surveyed provinces suggests that the HIV epidemic is established in these areas and will begin to have an impact on the burden of TB and AIDS treatment.

## National and International Multisectoral Response: Prevention

The government's response to the HIV/AIDS epidemic in Vietnam began in 1990 with the establishment of the National AIDS Program (NAP) within the Ministry of Health (MoH). The NAP was charged with coordinating all AIDS-related activities in the country, including public education campaigns through mass media, peer outreach education to high-risk populations, blood screening, training of medical and public health personnel, HIV sero-surveillance, and STD treatment. Blood safety was a high priority for the NAP in the early 1990s, when the annual government allocation for AIDS control was limited (equivalent to USD 900,000). By 1994, all blood transfusion centers and provincial healthcare facilities were equipped with basic serologic testing capabilities for blood screening. Thus far, no transfusion-associated HIV infection has been reported.

In 2000, the government replaced the NAP with the National Committee for AIDS, Drug, and Prostitution Prevention and Control (NCADP) with the aim of promoting broader governmental responses and societal participation and coordinating control of HIV/AIDS, drug use and prostitution. However, the combining of the three programs (AIDS control, illicit drug control, and prostitution control) has been criticized as unintentionally deepening the already rooted stigma against HIV and AIDS (Hong et al., 2004). The NCADP includes multiple sectors of the national government, including the MoH, the Ministry of Culture and Information, Ministry of Labor, War Invalids and Social Affairs, Ministry of Public Security, and mass organizations, such as Women's Union and Youth Union. At the provincial level, the committees are similarly structured and led by the second highest level of the civil administrative authority for the province (i.e., a vice chair-person of the provincial People's Committee) to ensure collaboration between sectors and consistency of approach.

HIV/AIDS prevention and control recently received much attention from the central level of the government, the Communist Party, and the National Assembly, following the emergence of HIV infections among IDUs and sex workers. In 2004, the Prime Minister approved the National Strategy for AIDS Prevention and Control, which included scaling up harm reduction programs; expanding HIV counseling, care and treatment; and reducing stigma and discrimination against people with HIV and AIDS (National Committee

for AIDS Drug and Prostitution Prevention and Control, 2004). A year later, the Communist Party's Central Committee issued a directive highlighting the expanded threat of the HIV/AIDS epidemic and called for strengthening leadership in HIV/AIDS work and improvement of HIV/AIDS prevention education among youth and high risk groups, including IDUs, sex workers, and MSM (Communist Party of Vietnam's Central Committee, 2005). In 2006, the National Assembly passed the Law on HIV/AIDS Prevention and Control, which legalizes harm reduction measures, including condom promotion, access to sterile injection equipment, and substitution treatment for opiate dependence (The XIth National Assembly of the Socialist Republic of Vietnam, 2006). The government has increased the annual government allocation for HIV/AIDS control activities by 34%, from USD 5.1 million in 2006 to USD 6.9 million in 2007 (Ministry of Health, 2007). Nevertheless, the allocation remains very limited, relative to the magnitude of the national HIV epidemic.

International partnerships have made a significant contribution to control the spread and impact of the HIV/AIDS epidemic in Vietnam. International and nongovernmental organizations have committed to a total of USD 135 million in aid for the 1999–2011 period. These organizations and programs include the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), United Nations agencies, the Global Fund against AIDS, TB and Malaria (Global Fund), the World Bank, the Asian Development Bank, the U.K. Department for International Development (DFID), the Norwegian government, and the Australian Government Aid Agency.

### HIV Prevention Among Injection Drug Users

In the 1990 s, HIV prevention for IDUs generally relied on information, education, and communication strategies to promote behavior changes. Mass media campaigns, TV clips, roadside billboards, and leaflet distribution focused on HIV risk associated with sharing needles. Several drug treatment and prevention interventions specific to IDUs were launched with pilot-scale, including peer education programs in Hanoi and HCMC in 1993, funded by the NAP and Save the Children Fund (UK); a needle exchange and peer education program in three districts in Hanoi and HCMC in 1995, funded by the World Health Organization (Abdul-Quader et al., 1999; Quan et al., 1998); and an opiate treatment program using methadone with tapered dose in Hanoi, sponsored by the Vietnam National Institute of Mental Health (Tuan, 2004).

Funds for larger-scale HIV prevention interventions for IDUs were not available until 1998, when the government supported a peer education program for IDUs and sex workers in the 20 provinces with the highest HIV prevalence. An assessment, which was conducted by the NAP in 2000, concluded that the program, with more than 500 peer educators (for both IDUs or sex workers) who made approximately 7,000 contacts with high risk individuals per month, facilitated behavior change to some extent, but that the limited program coverage was less likely to produce measurable impacts on the HIV epidemic among high risk populations (Khoat et al., 2003).

Since 2002, the national AIDS program, with support from the U.S. Centers for Disease Control and Prevention (CDC) and PEPFAR has conducted a peer-outreach program for IDUs and sex workers in 40 provinces which includes

referrals to anonymous HIV voluntary counseling and testing services (VCT) and out-patient HIV clinics. In 2006, DFID funded an HIV prevention program that distributed 1.5 million sterile needles through a network of 323 peer educators in 21 provinces. A similar prevention program, funded by the World Bank, has distributed 1.7 million sterile needles to IDUs through peer educators in 18 provinces (Ministry of Health, 2007). In 2007, the government, for the first time, allowed for the implementation of a methadone maintenance program in HCMC and Hai Phong province, with funds from the DFID and United States Agency for International Development. The program is expected to evaluate its effectiveness in the treatment of 1,500 patients by the end of 2008 ("Methadone to be used as drug replacement," 2007).

There have been no large-scale evaluations with before-and-after design or randomized field studies to measure the impact of prevention services on the HIV epidemic among IDUs. Sharing of needles decreased in the northern region from a range of 20–60% in the years before 2000, to 12–15% in 2006, yet was still frequent in the central and southern region (25 to 36%) (Abdul-Quader et al., 1999; National Institute of Hygiene and Epidemiology & Family Health International, 2007; Nguyen et al., 2001; Tran et al., 1998). The increasing or continuing high HIV prevalence among IDUs in most parts of the country suggests that HIV transmission among IDUs continues.

### HIV Prevention Among Female Sex Workers and Condom Programs

HIV prevention interventions for sex workers have also attained large-scale coverage only in recent years, focusing on peer education and condom distribution: a DFID-funded program distributed 800,000 condoms to sex workers through peer outreach and sold another 26.8 million condoms through social marketing channels in 21 provinces; a PEPFAR-funded outreach program distributed 3.4 million condoms to sex workers in 40 provinces; a World Bank-funded program distributed 2.3 million condoms to sex workers in 18 provinces (Ministry of Health, 2007). Data from the national HIV/STD behavioral surveillance showed that condom use among sex workers in seven surveyed provinces in 2006 was high, with between 94 and 100% of sex workers reporting having used a condom at their last sex with one-time clients (National Institute of Hygiene and Epidemiology & Family Health International, 2007). Consistent condom use with clients in the past month was lower, ranging from 36 to 89%, depending on province. These self-reported data suggest initial achievements, yet further evaluations and research are needed to monitor HIV risk behaviors and to inform interventions to address emerging HIV risks (such as injection drug use) in the growing population of sex workers.

### HIV Prevention Among Men Who Have Sex with Men

HIV prevention among MSM in Vietnam has been largely ignored due in part, to a lack of understanding of this highly stigmatized and difficult to reach population. In 2004, Family Health International and the HCMC AIDS Committee conducted a pilot HIV prevention program for MSM, which utilized

community peer outreach in 24 districts to provide MSM with information and skills for HIV prevention. The program made contact with approximately 3,400 MSM per year and referred them to HIV counseling and testing services and HIV and STD care and treatment (Broh et al., 2006). Several self-help groups and drop-in centers have been established in Hanoi, Hai Phong and HCMC. Existing data suggested that high-risk behaviors are being commonly practiced in some sub-groups of MSM. Further research is needed to better understand the MSM population, the scope of the HIV epidemic among MSM, and to guide the design of HIV prevention interventions.

### HIV Counseling and Testing

A large-scale HIV voluntary counseling and testing (VCT) program was established in Vietnam in 2002 by the MoH, with funds from the U.S. Centers for Disease Control and Prevention (CDC) and PEPFAR. The program employed the CDC's client-centered, risk reduction, prevention counseling model to provide VCT services. As of 2006, the program has trained 852 counselors and laboratory technicians, and provided equipment and testkits to 53 counseling sites operating in 40 provinces. Over 62,000 clients have been served; of these 17% tested positive for HIV, suggestive of the program's ability to reach high-risk groups. Of those clients who were HIV-positive, 63% were referred for care and treatment services (Tran et al., 2006), with the vast majority (95%) of clients reporting satisfaction with the services delivered (Nguyen Trong et al., 2006). Despite this success, the overall HIV testing rate remains low in Vietnam (5% of Vietnamese aged 15–49 had ever been tested for HIV in 2005) (General Statistical Office et al., 2006), as compared to Kenya (14%), a fellow PEPFAR country (Marum et al., 2006), highlighting a need for the expansion of VCT services.

### Preventing Mother-to-Child Transmission of HIV

The CDC and PEPFAR played a critical role in collaborating with the MoH to initiate a prevention of mother-to-child HIV transmission (PMTCT) program in Vietnam in 2005. Approximately 6% of Vietnam's PEPFAR funds was allocated for PTMCT. Through 2005, an estimated 70,700 pregnant women were screened for HIV, and of these, 200 pregnant women received antiretroviral (ARV) prophylaxis with the number of infant infections averted estimated to be 38 (Office of the United States Global AIDS Coordinator, 2006). Preliminary data from a non-representative sample of 202 infants in HCMC indicated an HIV transmission rate of 6.4% among 6-month-old infants born to HIV-infected mothers who received variable levels of pre- and post-natal care (Sohn et al., 2007). This transmission rate is higher than the rate of 2% which has been achieved in other developing countries (Coovadia et al., 2007). Insufficient pre- and post-natal antiretroviral therapy (ART) and care (23.3% of mothers did not receive pre-natal ART or both pre- and post-natal ART), and breastfeeding practices (9.4% of infants were ever breastfed) likely contributed to the higher HIV transmission rate (Sohn et al., 2007), and thus, should be considered in expansion of the PMTCT program.

## National and International Multisectoral Response: Treatment and Care

Before 2004, ART was generally unavailable in Vietnam (only 160 patients treated with ART in 2003) due to the lack of ARVs, diagnostic testing capabilities required to monitor treatment, and trained personnel (Ministry of Health, 2004c). In 2004, with aids from the PEPFAR program, the Global Fund, and from other donors, the MoH began to strengthen its infrastructure and purchase ARVs, and in 2005, started its roll-out program. By 2006, a total of 6,591 had been treated with ART, of these patients, 53% were supported through the PEPFAR program (carried out in 6 provinces), 20% through the Global Fund (20 provinces), and 21% through a government-funded program (Ministry of Health, 2007). The MoH also began to establish a community-based healthcare network, sponsored by the Global Fund which provided 16,100 people living with HIV and AIDS (PLWHA) in the communities with counseling service and opportunistic infection prophylaxis and treatment in the first 2 years in operation (Long & Canh, 2006).

These programs undoubtedly benefit thousands of PLWHAs and carry with them an unprecedented hope for hundreds of thousands other PLWHAs in the country. Evaluations of potential impacts of these programs on patients' survival, quality of care, adherence to therapy, toxicity, or therapeutic impact have not been available. Preliminary data from 200 patients treated in HCMC showed that patients were admitted to the treatment program with severe immunodeficiency (median CD4+ T lymphocyte count = 19 cells/$mm^3$, range = 1–53 cells/$mm^3$) and multiple co-morbidities. While the patients highly adhered to therapies, 10% died shortly after the initiation of ART (Thanh Liem et al., 2006). As many of these patients received treatment when they were terminally ill, solutions need to be sought to diagnose HIV infections earlier and to make ART accessible to patients in earlier stages of disease when patients may benefit most from therapy.

From a broader perspective, even though providing nearly 7,000 patients with ART within two years represents an important achievement – contributed, in part, by the responsive health system that made Vietnam succeed in previous health crises – the current uptake of ART in Vietnam falls seriously short of the scale needed to meet the magnitude of the national HIV epidemic today: 116,000 HIV infections have been identified; although the MoH estimates the actual number of infections to be 300,000 by 2006 (Ministry of Health, 2004a). It is clear that without effective prevention interventions to reduce the current rate of HIV transmission, achievements of the roll-out programs will be undermined.

Another major challenge is cost. The price of ARVs will rise rapidly in the next several years, as both the cumulative number of patients who require the life-long treatment and the need for second-line or third-line treatment regimens increase. In 2005, costs for ARVs for treating 180,000 patients in Brazil reached USD 400 million (Greco & Simao, 2007). In Thailand, antiretroviral expenditure accounted for 6% of the national health budget in 2004, and the figure is expected to increase to 10% in 2010 (Ford et al., 2007). As Vietnam's government may not be able to self-support the ART program in the foreseeable future, long-term commitment and support from the PEPFAR, Global Fund, and other

donors are critical to ensure the sustainability of the free-of-charge access to ART in Vietnam.

## Conclusions

The HIV/AIDS epidemic in Vietnam continues to intensify among IDUs throughout most of the country and among female sex workers in major urban and southern areas. MSM may potentially be an important part of the epidemic, though the magnitude of the HIV epidemic among MSM remains largely unclear. Sentinel HIV sero-surveillance data among pregnant women and military recruits suggest that HIV infection is not yet expanding to the broader general population, but the potential for expansion exists.

HIV transmission among IDUs in Vietnam has been characterized by multiple explosive increases in HIV prevalence, closely linked to the changing epidemic of drug use. The first wave of HIV transmission occurred in the early 1990s among opium injectors in major urban areas in the central and southern regions. The second wave, since the mid 1990s, has been associated with a population of younger heroin injectors and has resulted in uniformly high levels of HIV infection among IDUs, reaching rates as high as 70–85%. After 2004, HIV prevalence declined slightly in provinces with already high prevalence, while steadily increasing in others. As of 2006, most surveyed provinces (93%) have had a high HIV prevalence rate (above 20%) among IDUs. These data indicate that the HIV epidemic among IDUs has not been successfully controlled.

Behavioral data from national HIV/STD behavioral surveillance and studies in Vietnam show that many IDUs still have insufficient knowledge of HIV and how to prevent the infection (National Institute of Hygiene and Epidemiology & Family Health International, 2007; Thao le et al., 2006). A lack of timely, sufficiently-scaled, and well coordinated key prevention components has contributed to the ongoing HIV epidemic among IDUs in Vietnam. Providing an effective treatment program for opiate dependence, sufficient access to sterile equipment, evidence-based behavior interventions that are flexible enough to address the changing epidemiology of drug use, and a strong school-based education for HIV and drug prevention are critical elements of any effort to slow the progress of the HIV/AIDS epidemic in Vietnam. A newly-passed law on HIV prevention and control and its accompanying decrees promulgated by central government should help with the implementation of these measures.

Although secondary to injection drug use, HIV infections associated with female sex work continue to increase in major urban and southern areas. The growing sex worker population and their increased injection drug use are grave public health concerns. Injection drug use accelerates HIV transmission among sex workers, heightens the threat of a broader heterosexual epidemic as experienced by Thailand and Cambodia, and poses additional challenges to HIV prevention in sex workers.

Despite increases in rates of HIV infection in IDUs and sex workers, the indicators of HIV in the population at large (antenatal women, military recruits) suggest that HIV infection is only slowly reaching the general population. Low prevalence in the general population (below 0.5%) which has been contained

for 16 years is a major achievement in HIV/AIDS control in Vietnam. This achievement can be attributed to: early and sustained efforts to provide the public with information on HIV and basic prevention measures through mass media, healthcare system, and mass organizations such as Women's Union, Youth Union; and HIV rates among sex workers which were contained at low level in most parts of the country for the past decade. However, with the increases in HIV prevalence among IDUs and among sex workers in urban and southern areas, the risk of a wider spread of the epidemic is heightened.

From the beginning of the epidemic, Vietnam was quick to establish HIV surveillance, blood screening, and undertake numerous prevention activities. The government and the public sector have been open and pragmatic and have kept the public informed regarding the epidemic, the risks, and have made discussion of condom use very public. Despite the political complexity of the principal risks for HIV, the public health sector directed the piloting and expanding of harm reduction interventions for HIV prevention for high-risk populations, providing accurate and reliable surveillance data and projection, and contributed to major policy changes in recent years. The government, with strong support from international partnerships, has made tremendous progress in expanding HIV prevention programs, strengthening health infrastructure, quickly initiating an ART program, and has demonstrated its ability to rapidly scale up quality services.

The HIV epidemic in Vietnam, at the current stage, is still highly concentrated among those with highest risks (IDUs, sex workers, and MSM), and requires that targeted prevention interventions be continued and strengthened. Simultaneously, the large number of people who have been infected with HIV (estimated 300,000), which will soon overwhelm the healthcare system with providing AIDS and TB treatment, requires a major scale-up of treatment programs, which appends to the challenges. However, the newly approved legal framework, the increasing support from international partnerships, the strong healthcare system, and the commitment from the people and government of Vietnam have created unprecedented opportunities and a firm foundation for Vietnamese people to take effective actions and to succeed in this endeavor.

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# Chapter 21

## Malaysia

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### Introduction

Malaysia is made up of a federation of 13 states and three federal territories including the Kuala Lumpur Federal Territory. The population size of Malaysia at the beginning of 2007, was about 27 million with approximately 60% of



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_21, 

the population living in urban areas (Department of Statistics, 2007). The population is multi-racial, with roughly 58% Malays, 24% Chinese, 8% Indians and 10% of other ethnicities. Islam is the official religion, but the multi-racial framework of the country means that various religions are practiced, including Christianity, Buddhism and Hinduism.

## Epidemiology

### Overview

The first cases of HIV in Malaysia were reported in 1986, with three cases of HIV, including one AIDS-related death (Ministry of Health, 2004a). The first case of full-blown AIDS was in a 45-year old Chinese Malaysian who had been living overseas for the past 30 years. The patient had no exposure to homosexual contacts, blood transfusions or intravenous drug use, but did report multiple sexual partners ten years prior to developing AIDS (Goh et al., 1987).

It has been suggested that the early epidemic was a cascading effect from Thailand, located at Malaysia's northern border. The timing of the introduction of the epidemic and the existence of high levels of risk behaviour in the form of injecting drug use allowed the epidemic to take off and persist in the population (Reid et al., 2004). As the epidemic, which was initially more or less restricted to the injecting drug user (IDU) population, progressed, infection with HIV also began to occur in conjunction with sex work. Sex work provided a bridge from transmission via injecting drug use to transmission via sexual contact. Nonetheless, for the past twenty years, the profile of HIV-positive persons remains predominantly young and heterosexual Malay men.

Malaysia is currently defined as a country with a 'concentrated' HIV epidemic, based on relatively low rates of infection in the general population as measured by a prevalence of less than 0.1% among women attending government antenatal clinics, and seemingly isolated high prevalence rates among high-risk groups such as IDUs, prison inmates and female sex workers. Compared with many other countries in South-East Asia, Malaysia has a relatively low prevalence of HIV/AIDS with an estimated 0.4% of the adult population infected (Ministry of Health, 2004a). There is, however, serious concern that the HIV/AIDS situation may escalate to a 'generalized' epidemic in the near future, particularly given indications that infection rates are rising among high-risk groups. In 2002 it was reported that Malaysia had the fifth fastest growing HIV infection rate in the Asia Pacific region, with the infection rate doubling every three years (United Nations, 2002). The Ministry of Health (MoH) announced in February 2007 that based on current trends, numbers of people living with HIV/AIDS were expected to reach 300,000 by 2015 (AP, 2007).

### HIV/AIDS Among the General Population

As of December 2006, official reports document 76,389 people with HIV/AIDS in Malaysia while 9,155 people have died of AIDS-related illnesses. In 2006, most of those infected with HIV or diagnosed with AIDS were male, at 85% and 88%, respectively (MoH, 2007). The number of adult women aged

15–49 years infected with HIV was estimated to be about 17,000 in 2005, or approximately 12% of new HIV cases. The proportion of women infected with HIV has increased over time, rising from 1.4% in 1990 to 3.4% in 1995, and reaching almost 7% of cumulative cases by 2003. The number of women living with AIDS increased from zero in 1990 to 700 in 2003, representing about 8% of total AIDS cases (UNICEF, 2007a).

While most men report contracting HIV through injecting drug use, among female cases, the majority (64%) were heterosexually transmitted, with only 20% reporting having contracted the infection through injecting drug use (UNDP, 2005; MOH, 2007). In 2006, 27% of reported HIV cases and 35% of reported AIDS cases were acquired through heterosexual contact (MoH, 2007). The proportion of cases attributed to heterosexual transmission annually has risen from 4.9% in 1990 to 22% in 2005 (NST, 2006).

The racial distribution of HIV cases in Malaysia, based on reported cases, indicates that the majority, at up to 73% are Malay, followed by 15% Chinese, 9% Indian and 3% among those of other races or foreigners (Ministry of Health, 2004a). The disproportionate proportion of Malays infected is linked to the fact that the majority of substance abusers in the nation are Malay men. There is a clear difference in the profile of mode of HIV transmission when distinguished by race. Whereas the majority of HIV infections among Malays and Indian-Malaysians are associated with injecting drug use, heterosexual transmissions play a larger part among Chinese-Malaysians. It has been postulated that the breakdown of cases by mode of transmission among Chinese-Malaysians may better reflect the distribution of risk among the general population as detections in this group are less biased towards drug users.

Relatively steep annual increments were observed in HIV infection rates through the mid 1990s. It is likely that these reflected increased capabilities and/or enforcement in HIV testing and surveillance among sub-groups of the population. The first upswing in the HIV infection rate in 1995 coincided with the MoH active screening program among special groups, particularly among individuals in drug rehabilitation and prison inmates. In the second half of the 1990s, the numbers of new infections appeared to plateau at around 4,500 new infections per year, followed by another rise in 2001 to a higher plateau of around 6,000–6,500 annually. This second upswing saw a 17% increase in the number of cases from the previous year, and coincided with the use of rapid HIV test kits for routine surveillance (UNAIDS, 2005).

### HIV Prevalence Among Injecting Drug Users

Malaysia has a long history of drug use, originating with opium consumption in the early 19th century. In the 1950s, responding to the introduction of heroin into the country, and an increase in the number of drug-related crimes, Malaysian authorities launched an anti-drug strategy. More recently, Malaysia with its close geographical proximity to the Golden Triangle (Myanmar, Laos and Thailand) and other Southeast Asian countries that produce heroin, amphetamine type substances (ATS) and other drugs, has been vulnerable to a rising domestic drug use problem. Drug trafficking throughout the country often originates within Golden Triangle countries. Trafficking has occurred overland via the long border Malaysia shares with Thailand and/or through various

and extensive sea routes between the two countries. Both nations have long established fishing industries and it has been reported that fishing boats not only trade in fish but traffic in drugs as well as a result of their easy access to various sea ports (National Narcotics Agency, 2001; UNODC, 2003; Reid et al., 2004; U.S. State Department, 2004).

Between 1988 and 2006, there were 300,241 registered drug users and offenders in Malaysia (NADI, 2007; Chawarski et al., 2006). Registered drug users are those who have been, at one time or another, detained at a drug rehabilitation centre or prison. By 2004, there were 28 of these centres operating throughout the country, able to serve 18,000 interned drug users. Although these centres are available to any drug user, very few enter the program voluntarily. Almost all had been detained by the authorities based on a drug-positive urine-test (Mazlan et al., 2006). Using drug-positive urine tests, the government estimated, in 2004, that there was somewhere between 400,000 and 500,000 drug users in Malaysia (Malay Mail, 2004). A substantial proportion of these are injectors, although the level of accuracy of this estimation is also not known, with different sources quoting a varied range of estimates, between 20% and 67%.

Estimates on HIV prevalence among IDUs are based on HIV screening conducted in drug rehabilitation centers and prisons. Drug users undergo mandatory HIV screening upon entry into the 28 drug rehabilitation centers and 33 prisons throughout the country. The estimated prevalence of HIV among IDUs was 20% in 2002 (MOH, 2004a). In 2001, 10% of drug rehabilitation centre inmates who were tested using rapid test screening kits were found to be HIV positive. The overall HIV prevalence among approximately 12,000 inmates of drug rehabilitation centers in 2003 was found to be 17%, ranging from 8% in the state of Selangor to 35% in the northern east coast state of Kelantan (UNAIDS, 2005).

In prisons, it was estimated that up to 60% of all prisoners have a drug-related offence (Mazlan et al., 2006). Prison statistics report 10% prevalence among inmates in 2002 and between 5% and 7% in 2004 (Jusoh, unpublished data; Reid et al., 2004; UNAIDS, 2005). The majority of these prisoners acquired their infection through injecting drug use. The apparent decrease in the HIV prevalence amongst prisoners cannot be explained. To date there are no specific HIV prevention measures that have been instituted in prison settings at the community level to a scale that would explain this decrease in HIV prevalence.

### HIV Prevalence Among Sex Workers

In selected urban areas, HIV prevalence rates among sex workers are beginning to exceed 5% (UNAIDS, 2006). A survey conducted in 1999–2000 among 208 sex workers (35% females and 65% transsexuals) found an HIV infection rate of 7% with 14% of transsexual sex workers infected (MoH, WHO/WPRO, 2000). However, this survey was conducted in only one location in Kuala Lumpur and may not be representative of the total population. In 2000, there were an estimated 10,000 transgendered persons in Malaysia, 70% of whom work as sex workers (Salmah, 2000). Aside from a few surveys conducted on limited samples, general population statistics about female and transsexual sex workers are extremely scarce. Little research has been done

on this population given logistical and sampling difficulties associated with this marginalized population. There has also been inadequate support from the government, until recently, for assessing the needs and welfare of sex worker populations.

### HIV Prevalence Among Men Having Sex with Men

In 2005, only 431 cases (0.9% of total cases) were reported to be transmitted via same-sex sexual contacts, although this is suspected to be an underrepresentation as a result of stigma and the generally 'underground' nature of the homosexual community in Malaysia (UNAIDS, 2007). It may be that there are cases of HIV transmitted by homosexual contact, namely among men who have sex with men (MSM), that have not been accounted for, or also that they have been noted in a different exposure category, such as IDU. Indeed, by the end of 2006, 4.5% of reported HIV cases and 6.4% of reported AIDS cases were acquired through homosexual contact (MoH, 2007). While there have been no obvious changes in policy with regards to testing during this period, it is possible that this increase in reporting of homosexual contact is a consequence of an increase in response to voluntary counseling and testing services.

### HIV Prevalence Among Other Population Sub-Groups

Another group of people at high-risk of HIV infection are truck drivers, fishermen and factory workers. These have been identified as groups in which the virus is spreading rapidly. The reason behind this is likely to do with the nature of these occupations which take these workers, mostly men, away from their homes for long periods of time. This increases the potential for them to indulge in high-risk sexual contacts. Between 1986 and 2004, 5.0%, 4.1% and 2.4% of reported HIV cases were among truck/long-distance drivers, fishermen and factory workers, respectively (UNAIDS, 2005; MAC, www.mac.org.my).

### Mother to Child Transmission

HIV prevalence among antenatal mothers is less than 0.1%. In 2002, out of over 380,000 antenatal mothers tested, 0.04% were found to be HIV-positive (UNAIDS, 2006). In 2006, mother-to-child transmission of HIV accounted for roughly 1.3% of new cases (102 cases in 2006), compared to an annual average of 0.8% during the period 1985–2005 (MoH, 2007).

To date, there is no reliable estimate of the number of Malaysian children orphaned by HIV/AIDS, although the Joint United Programme on HIV/AIDS (UNAIDS) has suggested that it is likely that the number is in the range of 5, 500–16,400 (UNAIDS, 2006).

### Epidemiological Challenges

Overall, data on HIV prevalence and risk behaviour are lacking, not only for IDUs, but also for sex workers, the transgender population, the homosexual population and other hidden sub-populations. Gaps in monitoring and evaluation of these populations limit prevention efforts and assessment of the course

of the epidemic and make it difficult to establish a research-based culture for policy-making and program development. The completeness and quality of mortality data are also cause for concern. In the 1990s, on average, only 40% of deaths in Malaysia were medically certified (UNAIDS, 2005). The majority of uncertified deaths were listed under unknown causes, which could potentially have included deaths related to AIDS. There are ongoing efforts to improve this situation.

## Molecular Epidemiology of HIV

HIV-1 is characterized by tremendous genetic diversity that is driven by high rates of mutation and recombination. HIV-1 group M, which is largely responsible for the global pandemic, has diversified into 11 subtypes and various types of recombinants. HIV-1 recombinants with epidemic spread are known as circulating recombinant forms (CRFs). Thirty-two CRFs are currently recognized (Tee et al., 2006). In the early phase of the Malaysian epidemic, similar to the early stage of the Thai epidemic, subtype B and CRF01_AE were circulating relatively independently among heterosexuals and IDUs respectively (Beyrer et al., 1998; Saraswathy et al., 2000). This similarity suggests a link between the Thai epidemic and the Malaysian epidemic, possibly in how the infection was initially spread across the border, as was seen in other parts of South-East Asia (Beyrer et al., 2000; Chantavanich, 2000).

Recent studies performed on stored samples taken between 2003 and 2004, however, also show a high prevalence of a unique CRF01_AE/B intersubtype recombinant among IDUs (Tee et al., 2005). Among IDUs diagnosed between 1993 and 2002, Subtype B was present in 50% followed by CRF01_AE/B recombinant in 42% with a larger proportion of CRF01_AE/B recombinants detected from samples taken between 2000 and 2002 (Brown et al., 1996; Beyrer et al., 1998; Saraswathy et al., 2000; Tee et al., 2005). More recently a novel CRF composed of CRF01_AE and subtype B and called CRF33_01B has been widely detected among various risk groups in Malaysia (Tee et al., 2006).

The prevalence of CRF33_01B is particularly high among IDUs (42 %), compared with other risk populations such as MSM (19%) and heterosexuals (10%) (Tee et al., 2006). This may suggest that CRF33_01B first emerged among IDUs and subsequently spread to other risk populations. Wide distribution of this new CRF involving all major ethnic and risk groups provides evidence for extensive bridging of HIV-1 transmission between different risk groups in Malaysia (Tee et al., 2006).

## Risk Behaviour

### Risk Behaviour Among Injecting Drug Users

Of IDUs registered with the authorities, 65% report that heroin is their primary drug (Chawarski et al., 2006). While heroin is the major drug injected, mixing of drugs, particularly benzodiazepines with heroin or with amphetamine type

substances, has been reported at the majority of street drug injecting sites (referred to as ports in Malaysia). Preliminary results on a baseline behaviour surveillance of attendees at the pilot sites of the Needle and Syringe Programmes indicate that injection of buprenorphine has also been reported (personal communication, S. Govindasamy). IDUs may inject three to four times per day, often in small transient groups of two to four people.

Sharing of equipment is common, with only 28% of 800 IDUs in a Behavioural Surveillance Survey (BSS) conducted in 2001 reporting always using new equipment in the preceding month (MoH, 2004b). Even where needles are not shared, sharing of other injecting equipment including syringes, cookers, drug solutions, and rinsing water is widespread. Some users are unaware that this also poses a risk for blood-borne virus transmission (unpublished data, Needle and Syringe Exchange Program Monitoring & Evaluation report). Although in the BSS, many (83%) IDUs reported cleaning their equipment, most used only water (79% cold water, 19% hot water).

There is evidence to suggest that IDUs are also spreading HIV through their sex partners. Most drug users, up to 88% according to one study, report having had unprotected sex with female sex workers (Singh & Crofts, 1992). Another study reported that 77% of IDUs were sexually active while only 19% of them used a condom (Fauziah et al., 2003). In the 2007 BSS, of those interviewed, 72% of male IDU respondents admitted to having bought or sold sex in the last month with a low percentage of condom usage (personal communication, S. Govindasamy). These findings suggest that the sexual partners of HIV-positive IDUs, may serve as a bridge for HIV/AIDS to the general population. Of equal concern is the fact that most female IDUs report being sex workers (Wai et al., 1996).

### Risk Behaviour Among Sex Workers

Among sex workers, preliminary results from the initial BSS undertaken in 2004 suggest that up to 49% of all sex workers interviewed did not always use condoms during sexual intercourse. Consistent condom use was lowest among sex workers with non-paying clients (18%) and lower among female sex workers as compared to male or trans-gender sex workers (MoH, 2004b).

### Risk Behaviour Among Men who have Sex with Men

Gathering any kind of epidemiological data on MSM has been complicated by the fact that homosexuality is illegal in Malaysia. Further, there is a general perception in Malaysia that the MSM population is small and that MSM constitute only a small minority of HIV cases. Data from the MoH's 1996 National Health and Morbidity Survey II, however, found that 14% of male adolescent respondents reported homosexual experiences (MoH, 1997). Although a proportion of this is likely to have been experimentations among those with a heterosexual orientation, these findings suggest that there is indeed a segment of the population with unmet needs for HIV resources and support services.

As with many other Asian countries, there is immense social pressure on Malaysian men to marry and have children and thus it is not uncommon to find that MSM tend to be married too. Despite this, MSM who do not participate in

the "gay" community or identify as "gay" can easily find male sexual companionship within the anonymity of paid sex, saunas, and cruising parks while also participating in "mainstream" society (Scoville, 2004). Saunas appear to be a venue where MSM commonly participate in sexual activities. These saunas do not regularly or openly distribute condoms and safer-sex information for fear of legal intimidation. Saunas are demonstrative of the socio-political context of Malaysia that allows for the existence of gay venues, but does not permit open acknowledgment of homosexual sex through on-site safer-sex information (Scoville, 2004). At the same time, however, large urban cities such as Kuala Lumpur have witnessed substantial growth in their MSM populations. Urban gay venues found in many cities worldwide now thrive in Kuala Lumpur, including bars, clubs/discos, restaurants, saunas/bathhouses, and massage centers (parlors). Cruising parks also dot the city where MSM "cruise" for sexual partners or solicit male sex workers ("money boys") (Scoville, 2004).

### Risk Behaviour Among Youth and Adolescents

As in many other parts of the world, young people in Malaysia account for an increasing number of HIV infections every year. Studies have indicated that while the proportion of adolescents aged 13–17 years who had had sexual intercourse was approximately 1.8% in 1996, the proportion increased to as high as 13% in 2000 and was 5.8% in 2006. Of the 13% of adolescents who reported having had sexual intercourse in the 2000 survey, 72% engaged in sex without considering contraception (MoH, 1997; Zulkifli & Low, 2000; Lee et al., 2006). December 2005 statistics from the MoH reveal that more than 37% of infections were among young people aged between 13 and 29 (UNICEF, 2007a).

## Prevention

Active mass media campaigns against HIV/AIDS were launched in the 1990s, but the visibility of these campaigns has since declined. Such campaigns included a nation-wide HIV/AIDS awareness campaign "Prevent AIDS Now" launched in 1991, and a "Women and AIDS" educational and awareness campaign implemented in 1997 (MOH, 2004c). Although these campaigns served as important tools in raising the overall level of awareness towards the general issue of HIV/AIDS, implementation was somewhat superficial with not much being done beyond the standard posters and public service announcement billboards. The lack of actual intervention during these early years, compared to, for example, Thailand's 100% condom use campaign, meant that opportunities to make an impact on a burgeoning epidemic were not maximised.

Despite these limitations, awareness programs appear to have had some degree of success. A relatively high level of awareness of HIV/AIDS has been reported among the Malaysian public (NPFDB, 1995; Scott et al., 1993; Haliza & Mohd Sukur, 2002), and among selected high-risk groups, including notably, sex workers, IDUs and transsexuals (Ismail, 1998; Teh, 2002; Fauziah et al., 2003). The National Study on Reproductive Health and Sexuality 1994/95 revealed that 98% of adolescent respondents had heard of HIV/AIDS (Narimah et al., 2003). This seemingly high level of awareness regarding HIV/AIDS,

however, does not appear to be associated with engaging in preventive behaviours. Indicators of appropriate preventive behaviours among the population such as consistent condom use in high-risk sexual contacts and avoiding the sharing of injecting equipment, have not shown a corresponding decrease (The Star, February 2007; UNICEF, 2006). Details about specific prevention efforts and their impact are reviewed below.

### Harm Reduction Among IDUs

Until recently, in line with its zero tolerance drug policies, Malaysian authorities were opposed to implementing harm reduction strategies such as needle and syringe exchange programs (NSEPs) and drug substitution therapies. The religious, social and political climate of the country also meant that such plans were met with strong opposition. Concerted and continuous advocacy by non-governmental organizations (NGOs) including most notably the Harm Reduction Working Group of the Malaysian AIDS Council, persistent reports of high rates of relapse from drug rehabilitation centers and alarming statistics and trends related to the HIV epidemic, however, led the Malaysian government, in early 2005 to approve the implementation of some initial harm reduction measures. These measures have included the introduction of methadone maintenance therapy (MMT) in selected clinics and hospitals, and the NSEP which was piloted through drop-in centers and outreach at three NGO sites around the country.

In the initial MMT pilot program, 16 clinics and hospitals were designated as pilot sites to treat 1,200 heroin users. Encouraging results have led to an expansion of these programs which is currently taking place. In addition to government run methadone clinics, private practitioners have also been involved in drug substitution treatment with methadone or buprenorphine in recent years. However these medications have to be bought by drug users from these general practitioners at a relatively high price, making it inaccessible to a majority of those in need. The user pay system has also led to diversion particularly of bupernorphrine and paradoxically has also resulted in injection of these substances for greater effects by many drug users (personal communication, S. Govindasamy).

More needle and syringe exchange sites are currently being planned across the peninsula with at least another four new sites being added to the program in the first half of 2007. Preliminary results from monitoring and evaluation of the NSEP show that of the more than 4,000 street drug users who have accessed the NSEP, 60% were regular attendees with return rates of used injecting equipment averaging 60% for the 12 month duration of the pilot project (NTFHR, 2007). Similarly with retention rates in the pilot methadone project averaging at above 85%, scaling up of substitution therapy is also underway with plans for having at least 5,000 people in treatment by the end of 2007 and between 15,000 and 20,000 in treatment at over 50 hospitals and clinics all over the country by 2010. With Malaysia's substantial population of IDUs, it is not surprising that large waiting lists now exist for these relatively few treatment spots. Both MMT and NSEP programs are funded by the MoH. The success of MMT and NSEP programs will depend on continuous support from all parties especially law

enforcement and the ability to involve skilled community and outreach workers and personnel versed in the issues of drug addiction.

### Prevention Among Sex Workers, Men who have Sex with Men and Transsexuals/Transgendered Communities

To date, very little organized effort has been made to implement HIV prevention strategies among marginalised populations, namely sex workers, men who have sex with men and the transsexual/transgendered communities. While prevention in marginalized populations is an aim of the National Strategic Plan on HIV/AIDS for 2006–2010 (NSP), and financial support for prevention efforts has been made available by the government, the bulk of the effort rests on local NGOs such as the Malaysian AIDS Council (MAC) and the Pink Triangle (PT) Foundation. Support from the NSP, however, has meant that plans for an increase in focus on these marginalised populations are underway. One example is planning for an integrated bio-behavioural surveillance of key marginalised communities which is to be conducted as a pilot project in Kuala Lumpur in 2008, and spearheaded by the Malaysian AIDS Council.

### Prevention Among Youth

In collaboration with the MoH and UNICEF, the government in 1996 implemented a large-scale education program on HIV/AIDS for youths, known as PROSTAR (*Program Sihat Tanpa AIDS untuk Remaja* – Health without AIDS for Malaysian Youths Program). The program targets youth between 13 and 25 years old, and uses peer educators to plan, organize and carry out motivational and educational activities related to the prevention and control of HIV/AIDS (MOH, 2004b). By the end of 2003, 1,099 PROSTAR clubs had been established throughout the country, reaching more than 600,000 youths and providing training for 64,000 peer counselors. There are now plans to incorporate an additional HIV/AIDS education program into the compulsory youth National Service program.

Between 1986 and 2001, 1.7% of reported HIV cases were among 13–19 year olds (MOH, 2001). Since then, HIV rates among individuals in this age group have steadily declined to 0.8% in 2004 (MOH, 2004c). Whether or not this is a direct effect of the education programs can not be said with certainty, as this decline may also represent a general increase in HIV awareness among the youths, or simply a result of a more substantial increase among the older age groups.

### Prevention of Mother-to-Child Transmission

Malaysia acted quickly to implement interventions that would prevent the transmission of infection from HIV infected pregnant women to their unborn children. This relatively swift response, in comparison to the implementation of other preventive programs may have been based on an underlying perception that mothers and children were the “innocent victims” in this epidemic and therefore were in need of protection. A national program which included antenatal HIV testing, provision of antiretroviral therapy (ART) to mothers and

their newborn and free replacement of formula milk to discourage breast feeding was implemented in 1998 in all government antenatal clinics and hospitals. It is estimated that more than 70% of antenatal mothers seek medical care from government healthcare centers, and up until December 2004 the antenatal HIV testing program, which has an 'opting-out' policy for mothers who choose to not be HIV tested, has screened more than 2 million antenatal mothers or 82% of those attending these government clinics. Since its implementation in 1998 through the end of 2004, 757 pregnant women tested positive (0.035%), with 25 of 602 newborns (3.8%) subsequently diagnosed with HIV infection (Ministry of Health, 2004a).

## Care

### Antiretroviral Therapy

When highly active antiretroviral therapy (HAART) first became available in Malaysia in 1996, the MoH's anti-retroviral (ARV) policy was to support access to this costly treatment via a "shared burden, shared responsibility" model. Patients were provided with one free ARV agent from the government with the cost of the additional two drugs borne by the patients. Certain categories of patients, including children, antenatal mothers, and individuals infected through blood products or occupational injuries, and governmental employees were provided with free HAART.

The high cost of ARV agents and the increasing financial burden they presented led Malaysia to become the first Asian country to issue a compulsory license following the World Trade Organization's (WTO) adoption of the Doha Declaration (Oh, 2004; 3D-Trade, 2004). This declaration clarified that members of the WTO had the right to take measures to protect public health, such as ensuring access to medicines for all, by granting compulsory licenses. Passage of the Doha Declaration allowed Malaysia to import generic stavudine, ritonavir and nevirapine in 2003 and later in 2004, zidovudine, didanosine and a combination of zidovudine and lamivudine. As a result, the average cost of HAART per patient dropped from USD 315 to USD 58 per month, an equivalent of about an 81% reduction. The 'government use' order also encouraged local patent holders to drop their own prices due to competition from the generic imports.

In 2005, stavudine and nevirapine, were registered for local production in order to increase access to those drugs. A local company negotiated a voluntary license to use lamivudine to manufacture a three-in-one fixed-dose ARV combination (stavudine + lamivudine + nevirapine) with royalty payments to the local patent holder of lamivudine. This fixed dose formulation has been available to all government clinics and hospitals nationwide since the end of 2006 (Chee, 2006). The decrease in the price of ARVs was associated with a dramatic increase in the number of patients receiving treatment in 2001, although numbers being treated remain relatively small. As of December 2005 approximately 3,800 of the 10,000 patients in need of treatment were receiving therapy. Of these, only about 12% are IDUs, which is notable given the high percentage of HIV/AIDS cases in Malaysia which are among IDUs (Open Society Institute, 2006). It is likely that stigma and the fear of prosecution keep many IDUs from

accessing treatment and care. One attempt to rectify this situation has been the establishment of a program to provide ARVs to IDUs in a closed setting in one of the drug rehabilitation centres (UNDP, 2005).

One major obstacle to the scale up of ARV access in Malaysia has been the shortage of skilled and trained doctors and nurses to administer these medications (TREAT Asia Report, 2003). The ratio of trained doctors to HIV-infected patients in Malaysia was estimated at 1:1323 in the 2003 TREAT Asia Report. Another major obstacle preventing HIV infected patients from accessing treatment and care has been the widespread stigma and discrimination that exist including in health care settings (Zulkifli et al., 2006).

### HIV Testing Programs

The Malaysian MoH operates 122 hospitals, 809 health clinics and 1,919 rural clinics throughout the country, in 131 health districts (MOH, 2005). In 1985, the country set up a National AIDS Task Force (later replaced by a National Coordinating Committee on HIV/AIDS), and the national HIV/AIDS case notification system was initiated. Because of the difficulties and high cost incurred in collecting incidence data, HIV monitoring systems collect prevalence data. These data, however, are rarely collected from representative samples of the populations, focusing instead on known high-risk groups in order to prioritize efforts and resources.

Surveillance via the national HIV/AIDS case notification system is based on case-reporting systems and routine screening programs at drug rehabilitation centers, prisons, tuberculosis and sexually-transmitted infections (STIs) clinics, blood banks and antenatal clinics. Throughout the country there are now 62 HIV screening centers, with at least one per state. Mandatory testing is applied to blood donors, inmates of drug rehabilitation centers and high-risk prison inmates i.e. drug users, drug dealers and sex workers. All persons taken in by police for suspected drug possession and/or use, and prostitution are also tested. The system has been successful in the operational sense in that it has been efficiently integrated into the existing healthcare services and has a fairly good organisational flow from the federally-managed MoH down to the state and institutional level. However, surveillance is largely limited to those attending government health institutions or who are incarcerated, whereas there is a lack of surveillance at the general population level and among marginalised populations.

The Malaysian MoH has also initiated a Voluntary Screening Program, piloted in the state of Johor in 2001 and available nation-wide since 2003. Individuals who feel that they are at risk of being infected are able to take a rapid test, provided at all government hospitals and health clinics, anonymously. Those who are found to be HIV-positive are referred for further care through a service package that includes counseling, follow-up checks and treatment at hospitals and health clinics (MOH, 2003). In 2003, the first year of its nation-wide implementation, the program attracted 5,234 people for testing, and increased to 9,388 in 2004 with varying numbers tested in each state (MOH, 2004c). The low uptake for these programs reflects concerns among the general public about the stigma and discrimination that can occur in health care settings.

Individuals also fear knowing their status, as those who are HIV infected are ostracized and face loss of employment, particularly in rural settings.

Additionally, since 2001, amidst a wave of controversy, a few states in the country have mandated, or are considering mandating, compulsory HIV testing for Muslim couples registering for marriage. As this policy was adopted by the Department of Islamic Development, which has the authority on Muslim marriages, non-Muslim couples are not subject to the same ruling. The state of Johor, the first to introduce this policy, tested over 77,000 people between 2001 and 2004 and detected an HIV prevalence rate of 0.16% among those tested (UNAIDS, 2005). The program, enforced by the state religious department with cooperation from the state department of health, is aimed at protecting and preventing transmission to an intended spouse, and includes counseling services to couples, should either one or both of them test positive for HIV. Mandatory testing raises issues of privacy and civil rights, particularly with regard to potential abuse of information.

## Response to HIV/AIDS

### Response to HIV/AIDS by Civil Society

From the beginning of the epidemic, civil societies, particularly NGOs focused on HIV/AIDS have played a pivotal role in mobilizing action and advocacy in Malaysia. The Malaysian AIDS Council (MAC) was formed in 1992 and acts as an umbrella of various NGOs (currently with 40 affiliates or associate organizations) and creates links between these NGOs and the MoH. The MAC works in all areas of HIV/AIDS, including advocacy for the rights of people living with HIV/AIDS (PLWHA) and increasing public awareness, and together with the MoH has been at the forefront of the response to the HIV/AIDS epidemic in Malaysia.

One of the key roles of the MAC is to coordinate NGO efforts and streamline the work of its 42 partner organizations by eliminating unnecessary duplication of work as well as overlapping of programs. MAC also provides these organizations with the necessary training, funds and other resources to implement effective HIV/AIDS programs within various communities in Malaysia.

An example of the work of one MAC's partner organizations is the PT Foundation which focuses on MSM Programs. It remains the only registered gay service organization with the resources and capacity to produce and distribute prevention information specific for the MSM community. The MSM Program operates a drop-in center, a support/social group, a telephonic counseling line, and an outreach program. More recently the PT Foundation commenced an anonymous VCT service for the MSM community in the local area. WAKE, an NGO affiliated to the MAC on the other hand focuses on programs for sex workers including transgenders, while TENAGITA concentrates on HIV prevention care and support for the migrant population. MAC also provides extensive support for awareness and education programs for not only its partner organizations across the country but also other agencies including notably schools and the business sector.

Through the years one of the key roles that MAC has played has been in the area of advocacy. MAC has played a major role advocating for the rights

of PLWHA to treatment and care, for the reduction in the price of ARVs and for the implementation of harm reduction to prevent the spread of HIV amongst drug users. In addition to these activities, MAC and its fund raising partner the Malaysian AIDS Foundation also provide direct financial assistance to PLWHA and children infected and affected by HIV/AIDS. The Malaysian AIDS Foundation also supplements government grants to support shelter and community homes for the affected community.

## Challenges

### *Stigma*

Pervasive stigma has hindered efforts to combat the HIV/AIDS epidemic. The notion that HIV/AIDS only afflicts certain sub-groups with certain socially undesirable or morally unacceptable behaviors continues to attach a stigma to those with HIV and keeps the definition of who is at risk exceedingly narrow. For example, a drug user is often portrayed as an unproductive member of the society who lives on the streets, committing crimes to sustain the drug use habit. This stereotype reinforces the notion that IDUs are responsible for their drug addiction and HIV infection. In the same way, sexually deviant behaviour is associated with HIV infection. These stereotypes lead to the denial of risk among those who are so-called outside of these high-risk groups. Negative perceptions build a formidable barrier to taking steps critical to prevention, such as sex education, voluntary HIV testing, and open communication between sex partners about sexual history and practicing safe sex.

The generally conservative climate of the country is reinforced by religious beliefs and Asian values which impose strong views on issues central to the HIV/AIDS epidemic, such as homosexual practices, premarital and promiscuous sex, commercial sex, drug use and condom use. Further, sex is generally considered a taboo subject. In 1992, one of the MoH's early efforts at introducing sex education in schools, video tapes on HIV awareness which were produced and distributed to schools, was unsuccessful because teachers themselves found the topic taboo. Similarly, open discussions about condom use in casual sex are also taboo as sexual relations outside marriage are forbidden by most religions, particularly in Islam. Even more difficult is the subject of homosexuality. The cultural and religious stigmatization of homosexuality produces, ironically, situations where some MSM must live double lives, consequently creating potential conduits for infection into heterosexual communities.

Stigma associated with HIV/AIDS also causes families and friends to deny help and avoid contact with PLWHA. More dramatically, there have been suggestions that PLWHA should be separated from the community as a control measure, such as isolating all PLWHA on an island, as was famously suggested by a local Islamic religious *mufti* (cleric) in 2005.

Efforts are being made to educate religious leaders about HIV/AIDS, to improve empathy for those infected and to dispel misconceptions. Including these religious leaders, who are influential members of society, in HIV prevention efforts may help to change public perceptions and de-stigmatize the disease. Improved knowledge and understanding of HIV/AIDS issues have been associated with changes in the attitudes of some religious leaders.

Ultimately, support is needed to enable PLWHA and other communities to participate in HIV/AIDS programs, as well as in policy and program development. In addition to fears of stigma and discrimination which prevent PLWHA from participating in treatment, care and prevention programmes, members of marginalised communities often lack the capacity to carry out effective programmes. The diversity in ethnicity, modes of transmission, social and educational status that exists among those affected, has made galvanizing the affected community for a ground level grass root response to date a significant challenge. Further, inclusion of PLWHA in policy and program formulation has not been formally institutionalized. Support from religious leaders, PLWHA and all aspects of society are needed to challenge perceptions of personal risk and to promote risk-reduction behaviour as normal and desirable.

***Legal and Penal Codes***

One of the main barriers to the response to HIV/AIDS has been existing laws and policies on drug use, sex work and homosexuality. For example, the advertising of condoms has been restricted for decades based on a perceived association with 'immoral' activities, namely casual and commercial sex. Malaysia's 1996 revision of the National Drug Policy has also impeded prevention efforts (National Narcotics Agency, 2003). Striving to eliminate the supply and demand of illicit drugs and create a drug free Malaysia by 2015, the National Drug Policy provided for an acceleration of draconian punishments towards drug users. In 2000, for example, under the Dangerous Drugs Law/Act of 1952, 11,550 people were arrested and by 2003 this number had almost doubled to 19,738 (Reid et al., 2004).

First time offenders face compulsory treatment involving a maximum of two years in a government run drug rehabilitation centre followed by two years of follow up care. Upon discharge from the drug rehabilitation center, former inmates are to report to the nearest police station on a daily basis for another two years. These check-ins to police stations were merely for reporting purposes and with approximately 70,000 highly mobile drug users within the police supervision program, it is not surprising that most individuals were lost to follow up by the police. Second and third time offenders were sent to prison for terms between five and seven years in duration and were also caned (Reid et al., 2004). There are no official indications that this program has had any real success in reducing the number of drug users. Indeed, the number of repeat offenders remains high and the program does not seem to act as a deterrent to new drug users.

Given the existence of this policy, it is not surprising that the recent implementation of the NSEP has been fraught with challenges. Although support for this government sanctioned program comes from the top ranks of the police force and Standard Operating Procedures for Police in relation to policing around NSEP and MTT have been formulated and disseminated, raids and arrests continue to occur resulting in difficulties with conducting outreach for NSEP in particular. The existence of the current laws makes it difficult for police particularly junior officers to reconcile the strict zero tolerance policies with the newly introduced harm reduction measures.

The Penal Code of Malaysia also outlaws sodomy and controls the dissemination of information about homosexual sex. While these laws are rarely used

for prosecution, they do allow government officials to question the distribution of MSM-targeted safer-sex information, the public distribution of condoms in businesses or elsewhere, and the operation of gay targeted businesses. This context is important in understanding the difficulties of HIV prevention in saunas (Scoville, 2004).

The continued existence of laws which forbid the advertisement of condoms, criminalize a homosexual lifestyle and which heavily penalize drug use can't help but impede progress in HIV/AIDS prevention. Within this context, reluctance on the part of marginalized groups to access mainstream services is not surprising.

***Financial Resources and Healthcare Services***

Effective intervention programs are costly. Malaysia is currently spending about RM 22 million (USD 5.8 million) annually on HIV prevention including the PMTCT program, PROSTAR and the mandatory testing of drug users and prison inmates, and is still in need of financial support. The country's economic progress, however, means that it no longer qualifies for development aid or as a recipient of funds from donor countries, making sources of funding even more limited. The government funds most of patient care, but research funds for social and behavioural aspects of HIV/AIDS are relatively small, and for monitoring and evaluation, practically non-existent. This absence of an established monitoring and evaluation system may further discourage donor agencies due to the lack of accountability on the usefulness and impact of particular programs.

## 2006–2010 National Strategic Plan

In response to the escalation in the rate of HIV transmission in Malaysia and the country's failure to achieve the eighth Millennium Development Goal of reversing the trend of HIV/AIDS, a new National Strategic Plan on HIV/AIDS 2006–2010 (NSP) was formulated by the government in partnership with NGOs supported by local United Nations organizations, particularly the World Health Organization (WHO) and UNICEF. This NSP provides a framework for the country's multisectoral response to HIV/AIDS over the next five years (UNICEF, 2007b). Key strategies include enhanced leadership and advocacy through the establishment of a Cabinet Committee on HIV/AIDS that is chaired by the Deputy Prime Minister, and a focus on reducing HIV vulnerability among IDUs by embracing harm reduction including the provision of sterile injecting equipment and drug substitution treatment. The NSP also acknowledges the need for expanding these comprehensive programs in incarcerated settings such as the government-run drug rehabilitation centres and prisons. It further acknowledges the need to initiate and enhance programs to reduce the vulnerability among marginalized and vulnerable groups including sex workers, MSM and transgenders and mobile populations such as migrants (particularly illegal immigrants) and the homeless. Since the implementation of the NSP, the most visible action has been in the harm reduction efforts that have taken place. The Malaysian AIDS Council has plans underway to institute programs addressing the prevention needs among MSM, transgenders and sex workers.

## Conclusions

Although there have been major advances in the Malaysian government's commitment to fighting the HIV/AIDS epidemic which has resulted in improved prevention and treatment efforts in the last three years, scaling up to achieve desired coverage and impact remains challenging. While substantial financial resources have been allocated for HIV/AIDS programs in recent times, the lack of skilled human resources for prevention, treatment and research efforts means that rapidly scaling up all programs will continue to be difficult. An area that is in urgent need of review is the existing laws and policies in relation to sexuality, sex work and drug use which were formulated before the HIV era which appear to provide significant barriers to the implementation of effective and proven programs to halt and reverse the HIV epidemic in Malaysia.

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# Chapter 22

# Towards Equitable and Quality HIV Prevention and Care Services: Assessing the Situation in India

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_22, 

## Introduction

India has the second largest population in the world (CIA, 2007) with over a billion people living in the 593 districts which comprise India's 29 states (Government of India, 2001). In the past decade, India has emerged as an important force in the global landscape, becoming synonymous with leadership in computer technology as its popular culture gains world wide attention and appreciation. Technological progress has been centered in urban metropolitan cities where access to wealth and health care has increased dramatically. Over 75% of India's population, however, lives in rural areas under poor health and economic conditions which are marked by poor infrastructure and access to essential services (Patil et al., 2002). Regional differences also exist. Health and literacy indicators in southern states such as Kerala are at par with developed countries, while northern states such as Bihar and Orissa lag behind (Ministry of Health and Family Welfare, 2006). Over all, the public health sector remains burdened with vector-borne illnesses, preventable conditions such as typhoid and water-borne illnesses and communicable diseases such as tuberculosis (TB).

This chapter will consider the HIV/AIDS epidemic and its impact on the large and diverse country of India. The epidemiology of HIV infection, populations at risk for contracting HIV and specific behaviors that increase vulnerability to HIV infection will be discussed. Various strategies aimed at preventing the spread of HIV and helping individuals and families living with HIV/AIDS as well as the role of international initiatives in combating the epidemic will be evaluated.

## Epidemiology of HIV in India

The first cases of HIV/AIDS in India were uncovered in 1986 in a study of female sex workers in the custodial care of the city of Chennai (Simoes et al., 1987). Of 102 women tested, ten were positive for HIV. The government responded rapidly, launching the National AIDS Control Program (NACP) in 1987 to monitor the epidemic and plan prevention programs. The launching of such a program was consistent with other public health programs such as the National Malaria Control Program and the National Immunization Program.

### Overview of Government Programs and Surveillance

Acknowledging that HIV prevention and control demanded coordination and implementation of activities that were unlike previous public health campaigns, the Indian government created the National AIDS Control Organization (NACO). NACO has served as a central agency to coordinate national prevention and care efforts. Milestones in India's efforts to combat HIV prior to and since formation of NACO in 1992 are shown in Figure 22.1.

NACO's mandate was implemented in phases, with each phase having specific goals largely framed as a result of findings from an earlier phase. These goals and operational strategies for realizing each goal were developed through a process of consensus that involved experts from the Indian government,

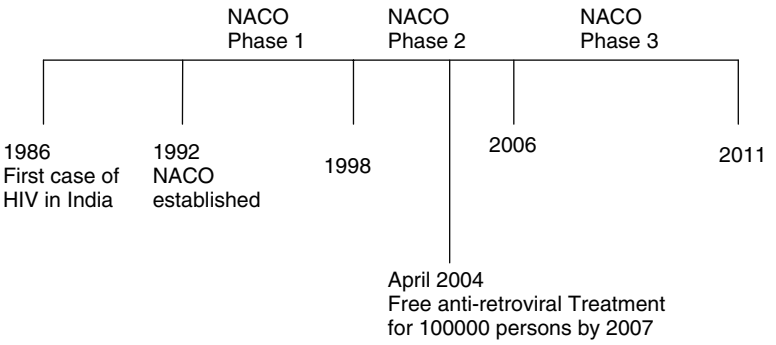


**Figure 22.1** Timeline of AIDS prevention and control activities in India.

the private non-governmental sector in India, as well as international experts from funding agencies with technical expertise such as the World Bank.

Phase I (1992–1998) was aimed at developing an HIV/AIDS surveillance system, increasing the managerial capacities of states to administer NACO's policies and launching widespread prevention awareness programs. In 1994, each Indian state formed their own State AIDS Control Society (referred to as the State AIDS cell), which facilitated development of a national network of HIV/AIDS surveillance sites. These sites included government hospitals and clinics within these hospitals such as antenatal care clinics (ANCs) and sexually transmitted disease (STD) referral clinics. At the beginning of Phase I in 1992, there were 54 such sites. By the end of Phase 1, there were 180 participating sites (NACO, 2007). Another significant milestone in Phase 1 was the recognition of the problem of an unsafe blood supply in India and the establishment of 154 zonal blood testing centers. These centers were linked to blood banks and offered testing and same day reporting of samples received.

Monitoring activities from Phase 1 coupled with non-governmental activities, including research, found prevalence rates of between 1 and 20% among female sex workers and among injecting drug users (IDUs), particularly in the north-eastern part of India, an HIV prevalence rate of 10% (NACO, 2007). High prevalence rates of HIV were also reported at several TB clinics. These findings signaled the need to focus HIV intervention efforts on vulnerable communities and the importance of developing partnerships in the non-governmental sector to implement these efforts. The need for behavioral surveillance was also underscored.

Phase II was implemented between 1999 and 2006 with targeted interventions (TI) for four groups: female sex workers, men who have sex with men (MSM), IDUs and clients at TB clinics. TIs were implemented by non-governmental organizations (NGOs) who responded to a governmental request for proposals for these specific interventions. Monitoring of interventions was conducted by the NGOs with input from the government. Phase 2 also included implementation, in 2001, of the first country wide HIV sentinel behavior surveillance survey. A sample of 84,000 individuals were asked about sexual behaviors, substance use behaviors as well as access to prevention tools such as condoms and STD care services. Interviewees included

members of the general population and female sex workers (National AIDS Control Organization, 2001). Phase II also addressed care and treatment needs. In 2004, the government, after negotiations with local pharmaceutical companies, began a pilot program that offered free anti-retroviral medications (ARVs) to individuals with HIV/AIDS. Phase III, begun in 2006, will continue through 2011.

In 2006, the Indian government estimated, based on anonymous testing data from public prenatal health care clinics and clinics for individuals in high risk groups or with sexually transmitted infections (Steinbrook, 2007), that over 5 million adults were infected with HIV (NACO, 2007). This estimate was revised downward in the summer of 2007, to a prevalence rate of 0.36% or somewhere between 2 million and 3.1 million individuals living with HIV/AIDS (UNAIDS, 2007). The addition of 400 new sentinel surveillance sites and implementation of a comprehensive population based survey contributed data which led to this revision (UNAIDS, 2007). Through 2005, a total of 24,995 cases of AIDS had been reported to the government (UNAIDS, 2006).

## Geographic Distribution

Of 29 Indian states, NACO has designated six: Andhra Pradesh, Karnataka, Tamil Nadu, Maharashtra, Manipur and Nagaland as "high prevalence" and considers these six to be experiencing a generalized epidemic. More than 1% of pregnant women are infected with HIV and in high risk groups more than 5% are infected. Three states: Gujarat, Goa and Pondicherry are classified as moderate prevalence states, where the prevalence among pregnant women is under 1% while among high risk groups it is over 5%. The remaining 22 states are low prevalence states, designated as such because the prevalence among risk groups is less than 5%.

Program monitoring conducted by NGOs suggests that prevalence levels even in moderate and low prevalence states can be high in certain segments of the population. For example, recently in the low prevalence state of Madhya Pradesh, an HIV prevalence rate of 11% was detected among clients attending an HIV voluntary counseling and testing (VCT) clinic (Anvikar et al., 2006). Other government surveillance reports from low prevalence states such as Delhi and Rajasthan have found HIV prevalence rates of greater than 10% among clients attending STD clinics (NACO, 2007). These findings suggest that populations vulnerable to HIV are not confined to any particular geographic region. The various vulnerable populations that are monitored by the Indian government include Antenatal Care attending women, patients of STD clinics, Injecting Drug Users, Female sex workers, MSM and clients of TB clinics.

## Vulnerable Populations

### *Female Sex Workers*

It has been estimated that there are between 1 and 16 million female sex workers in India (Venkataramana & Sarada, 2001) and that in high prevalence states, HIV infection rates in this population range from 5% (NACO, 2007) to 55% (Brahme et al., 2006). Among moderate prevalence states reports of HIV prevalence among sex workers have been as high as 48% (Desai et al., 2003).

Even in low prevalence states such as West Bengal where targeted interventions have been successful in reducing infections in this population (Basu et al., 2004), an HIV prevalence rate of 12% has been documented among younger sex workers (Sarkar et al., 2006). Traditional practices unique to India may also be contributing to the epidemic. In Karnataka, for example, young women are "married" to a temple or deity, a tradition called "devadasi" in which they provide sexual services for priests and temple patrons (Steinbrook, 2007).

It has been suggested that eliminating HIV risk associated with sexual intercourse with a sex worker would eliminate the epidemic in India (Nagelkerke et al., 2002). However, the circumstances of initiation into sex and the conditions of coercion and violence that predominate the practice of sex work in India (Panchanadeswaran et al., 2008) suggest that HIV prevention among this group will need to address the larger contextual factors which contribute to the vulnerability of sex workers (Jana et al., 2004).

***Injecting Drug Users (IDUs)***

Injection drug users constitute approximately 3% of all reported HIV infections in India. It is estimated that there may be as many as 2.02 million IDUs in India with HIV prevalence among IDUs ranging from 1.3 to 68.4% (Aceijas et al., 2004). Traditionally, high HIV infection rates among IDUs have been reported in the north eastern part of the country, particularly in the states of Manipur and Nagaland. These states lie in close proximity to the "golden triangle" of northern Thailand, eastern Burma and western Laos, an area long associated with drug production and trafficking. Northeastern India serves as an international drug trafficking route and has a large drug injecting population (Mandal et al., 2002). In Manipur, HIV prevalence rates as high as 57% have been reported among IDUs (Panda et al., 2001).

Recently, however, the prevalence of HIV among IDUs was higher in the southern state of Tamil Nadu (39.9%), and the city of Mumbai (28%) than in the northeastern state of Manipur (22%) (NACO, 2005). In fact, Mumbai and Delhi (which are located in the western and northern areas of India, respectively) are estimated to be among the cities with the largest IDU populations in the world (Aceijas et al., 2006). The primary injected drug of abuse in India is heroin followed by buprenorphine. Spasmoproxyvon, a combination of dextropropxyphene and diclofenac, is also a commonly injected drug especially in the northeastern parts of India.

Sharing injecting equipment and a history of incarceration have been associated with HIV prevalence among IDUs (Panda et al., 2005). Male IDUs have also reported low perceptions of HIV risk and high risk sexual behavior (Panda et al., 2001). IDUs represent an important bridge population as they can potentially transmit HIV to their spouses and sexual partners. Over 40% of heterosexual IDUs are married men (Devine et al., 2007). There are reports of transmission of HIV from IDUs to their spouses in Manipur (Panda et al., 2000) and Chennai (Panda et al., 2005). IDUs have also been found to frequent sex workers with low rates of condom utilization (Panda et al., 1998; Sarkar et al., 2006)

There are few empirical reports of the prevalence of illicit drug use among adolescents and young adults in India. Further, there are no peer-reviewed reports to date on the prevalence of drugs such as ecstasy, MA, cocaine or LSD

in India, although the 2007 World Drug Report by the United Nations Office on Drugs and Crime (UNODC) (UNODC, 2007) has indicated an increase in the use of most of these drugs in India over the past year. Most of the reports are anecdotal, with concerns noted in the press about the rise in drug seizures, arrests for possession of drugs, and drug trafficking. There is no household survey on drug use, and few reports on drug use in the medical literature.

Because the reported costs of drugs such as ecstasy, cocaine and MA are high, many in India appear unaffected by club drug use, being more often dependent upon alcohol, glue/inhalants, marijuana and (more rarely) heroin. Yet most epidemiologic studies of HIV prevalence, sexual risk behavior and drug use in India, have been restricted to the members of the lower socio-economic strata or populations that live below the poverty line, explaining why there is little data on cocaine or ecstasy. However, anecdotal reports have made it clear that drugs exist, that they are affordable for the middle- and upper- classes, and that drug use is commonly associated with drinking in establishments or at rave parties in houses or nightclubs.

***Men who have Sex with Men (MSM)***

Men who have sex with men (MSM) are another important risk group in India. The behavior of MSM in India is complex. There are men who have sex with other men and who identify themselves as homosexual (referred to as kothi in southern India), men who are bisexual, often with a primary female partner (panthi in the south), and hijras or eunuchs who are either castrated or have trans-sexual identity (Asthana & Oostvogels, 2001). These behaviors have different risks associated with them. Kothis have only recently being exposed to prevention messages for HIV. Panthis, whose sexual partners are both men and women, pose a high risk of infection to either type of partner. Hijras live in the margins of society and report harassment and forced sex by bisexual men.

A recent study in Chennai has shown that MSM experience a nine-fold higher risk of HIV infection compared to non-MSM (Go et al., 2003). Other reports have shown that prevalence varies from 14% (Hernandez et al., 2006) to 19% (Gupta et al., 2006) in STD clinic populations. In one of these studies which sampled 2,381 men attending an urban STD clinic in western India, 13% of men reported having sex with women, other men and with eunuchs (Hernandez et al., 2006). Another comparison of MSM and non-MSM showed that MSM were more likely to have large number of partners than non- MSM (Gupta et al., 2006). In this study it was also noted that over 30% of those reporting sex with men were also married to women. These studies suggest vulnerability of both male and female partners of MSM to HIV and that prevention messages need to be tailored to address the impact of risk behaviors on all partners involved.

***Long Distance Truck Drivers***

Long distance truck drivers, also called lorry drivers, are key components of the Indian economy. Driving on roads which stretch over 1.4 million miles across the country, there are an estimated two to three million truck drivers and helpers in India (Bethapudi, 2000). Both drivers and helpers are men, with helpers often younger than drivers. Typically, the role of the helpers is to assist

with mechanical support of the vehicle and serve as an assistant and travel companion to the driver. On average, truck drivers and helpers are away from their homes for three to four months at a stretch (Bethapudi, 2000).

While on the road, truckers typically stop at rest stops called *dhabas*. *Dhabas* serve hot food and offer a place for drivers and their helpers to rest. Dhabas are also visited by sex workers who offer services to the drivers. Sometimes these women are local women who return home after a day's work at or near a *dhaba*. Other times, truck drivers may pick up these women at one stop and after a brief sexual partnership drop them off at their next stop (Bryan et al., 2001). It has also been suggested that sexual activity occurs between male truck drivers and their male helpers (Chandrasekaran et al., 2006).

Surveys of long distance truck drivers suggest that they are engaging in behaviors that may place them at heightened risk for HIV acquisition and transmission. Between 57 and 87% of drivers report exposure to multiple sexual partners; of which less than 11% report using condoms (Chaturvedi et al., 2006; Rao et al., 1999; Bal et al., 2007). Between 24 and 34% of lorry drivers reported sex with sex workers, low use of condoms and high rates of alcohol abuse (Chandrasekaran et al., 2006). HIV infection among lorry drivers ranges from 1 to 7% (Chandrasekaran et al., 2006). Long distance truck drivers may be serving as a bridge population in transmitting HIV from urban to rural areas (Manjunath et al., 2002).

### *Male Alcohol Users*

Behavioral surveillance conducted by NACO shows that 75% of a nationwide sample of female sex workers drink occasionally before sex and 23% of their male clients who were interviewed reported drinking on a daily basis (National AIDS Control Organization, 2001). Other studies evaluating behavioral factors associated with sexual risk in India report that male alcohol use is associated with heterosexual risk markers such as prevalent STDs and sex with female sex workers (Madhivanan et al., 2005), extra-marital sex (Schensul et al., 2006) and non-use of condoms (Manjunath et al., 2002). Alcohol use has been a latent concern for public health and development in India and HIV prevention efforts are bringing the discourse on alcohol abuse prevention into the forefront. Studies investigating dependence consistently report that approximately half of those who drink alcohol show signs of dependence (Mohan & Sethi, 2001).

### *Heterosexual Men*

Over 80% of HIV infections in India are transmitted heterosexually (NACO, 2007). Social and gender norms permit and encourage multiple partners among men, favor male sexual exploration and sexual needs and discourage communication about sexuality initiated by women and a focus on needs of female partners in a sexual relationship. Studies in low prevalence states such as Haryana and Rajasthan report that 19% of married men (Bhatia et al., 2005) and 40% (Bhattacharjee et al., 2000) of unmarried men have multiple sexual partners. The high HIV infection rates now being observed among monogamous women attending STD clinics (Mehta et al., 2006) suggest that these behaviors are having an impact in the general population.

***Other Groups at Risk***

Other segments of the population who are at risk of HIV infection are married women, vulnerable children and residents of tribal areas in India. A married monogamous woman's primary exposure to HIV is through her spouse. Community based sample surveys in western India have shown that between 15 and 19% of Indian married men (Bhatia et al., 2005) have multiple partners. Male extra-marital relationships lead to married women becoming infected by their spouse and it is now evident that being married to a man who has multiple partners is the single most important risk factor for HIV acquisition for a monogamous woman (Newmann et al., 2000). This risk is facilitated by norms that disallow women to initiate discussion of condom use despite awareness of spousal promiscuity, and that permit tolerance of multiple partners among men as a mark of their potency.

An unfortunate consequence of heterosexual risk among married couples is children infected with HIV. It is estimated that 100,000 children, under 14 years of age, are infected with HIV/AIDS (National AIDS Control Organization, 2006). In addition to concerns about parent to child transmission, there are other forces such as human trafficking of children that place young girls and boys at very high risk not only for physical and emotional abuse but also for sexual coercion and HIV infection.

A recent government report notes the particular vulnerability of tribal residents in India to HIV. Indian tribes comprise 8.2% of the population and most reside in the northeastern states (NACO, 2005). While some states such as Andhra Pradesh and Tamil Nadu seek participation of tribal residents in their HIV programming, overall lack of access to media, poor health services and education impede access to these important services. A social assessment of behaviors and risks has suggested cultural norms that might facilitate HIV acquisition. These norms include high levels of pre and extra marital sex among men, early marriage and cohabitation among men and women, and the need for cultural permission to divorce and remarry (NACO, 2005). A tribal action plan under Phase III of the national AIDS control program seeks to increase outreach services to this population by provision of programs through the respective state AIDS cells and by integrating tribal populations into ongoing efforts in the area.

## HIV Prevention Services in India

For the purposes of this discussion, we define prevention broadly as services designed to avert new infections in the population. In India, education efforts are implemented as either mass education or targeted education efforts. Both are discussed here.

### Mass Education

Mass education efforts are designed to be simple in language, accurate in content, appropriate in their delivery strategy and informative for all persons regardless of specific risk behaviors or prevention needs. In one example, a campaign to initiate conversations about HIV risk was launched nationwide by Population Services International (PSI, 2003). Tailored to local languages

and using attractive dialogues, this campaign consisted of several television and print media spots. These spots began with a discussion of where a certain hypothetical male (name varied in different regions of India) would get HIV/AIDS and continued by reviewing various modes of transmission. Other television and radio spots produced in collaboration with the International Labor Organization and the British Broadcasting Corporation incorporated prevention messages as a natural part of the conversation between characters talking about topics of current interest such as cricket. These private sector collaborations have offered a novel presentation of prevention information which are engaging and catchy. Recent campaigns have also involved celebrities such as movie stars and cricket players who talk about prevention.

Despite these widespread education efforts, of 15–29 year olds surveyed in 2005–2006, only 61% of women and 84% of men had heard of HIV/AIDS. Approximately 4 in 10 women and 7 in 10 men were aware of ABC and its three arms of prevention, practice abstinence, be faithful and use condoms (NFHS, 2007). Awareness varies by locations with urban residents more aware of accurate measures of HIV transmission and prevention than rural residents (Organization, 2001–2002), who account for 74% of the Indian population (Census of India, 2001). A recent National Health Survey supported by UNICEF and the UK and US governments showed that 46% of women living in rural areas had not heard of AIDS. In Mizoram, two thirds of women and men have a comprehensive knowledge of HIV/AIDS while in Assam, West Bengal and Meghalaya, only 15 percent of men and even less women have a comprehensive knowledge of HIV/AIDS (NFHS, 2007).

A key challenge to prevention programming in rural areas has been outreach. Reasons for poor outreach include poor infrastructure to work in rural remote areas, and low capacity of rural NGOs to implement prevention interventions. The latter is being addressed via innovative methods such as telemedicine which attempts to connect rural practitioners to their counterparts in other rural areas and urban centers (Hospitals, 2007). Use of technology in this manner holds promise in improving outreach for prevention programs.

***Mass Prevention for Young Adults***

Despite findings from a recent behavioral surveillance survey, which showed that 73% of young men and women did not fully understand the modes of transmission for HIV (Organization, 2001–2002), prevention efforts for young adults have been in place for some time. In 1992, the government launched the University Talk AIDS Project. This program focuses on students and youth to raise awareness levels, help them resist peer pressure, clarify misconceptions and help them develop safe and responsible lifestyles. Some private agencies in Delhi and Chennai also offer telephone education, a service that offers access to education and counseling in a confidential manner. Reports from these centers suggest that among young people who have access to a telephone, this is a useful way to seek accurate information about HIV transmission and prevention (Reuters, 2007).

In December of 2007, the government launched an ambitious prevention effort for young adults. The Red Ribbon Express, a brightly colored train housing an AIDS exhibition and counseling center, will stop at 180 train stops in a 17,000 mile, year long journey across India. NACO hopes that the train

will greatly improve HIV prevention knowledge among 15–24 year olds. The government plans to deliver prevention information to approximately 60,000 villages with more remote villages being reached by buses and even cyclists (Lakshmi, 2007).

***Condom Promotion Efforts***

While condoms are widely available in India, their use has been limited by individual factors such as discomfort (Roth et al., 2001), situational factors such as inability to access condoms during unplanned sexual intercourse and social barriers such as embarrassment to be seen purchasing a condom in public or experiencing constraints in using and purchasing condoms when needed (Sivaram et al., 2004). Another barrier to condom use is the lack of communication between sexual partners. Women who are aware of HIV prevention methods report fear of physical and sexual violence from their partner if they initiate discussions about condom use (Go et al., 2003). Such fears are also reported when women seek support from partners to care for their own or their partner's evident STD (Sivaram et al., 2005). Education of men, based on an understanding of these barriers, is a priority of the national and international initiatives that emphasize the prevention of heterosexual transmission of HIV in India. Meanwhile, a pilot of the female condom among sex workers in Kolkata city in eastern India is underway. While prices are competitive (less than 20 US cents a piece), data from several pilot studies will evaluate acceptability of this method (Ramakant, 2001).

Education efforts have been accompanied by social marketing of condoms. While the government markets the Nirodh brand of condom, other private sector brands of condoms are widely available in India largely through pharmacies and health clinics. Since the advent of AIDS prevention campaigns in India, there is evidence that at least in the southern states, condom use has increased particularly among sex workers (Kumar et al., 2006).

## Targeted Interventions

While mass prevention programs create awareness and, through repetition, can maintain interest in a particular topic, targeted interventions (TIs) focus on the needs of specific groups. Under the second phase of the NACP, the emphasis on targeted interventions has gained momentum. TIs focus on high risk groups such as female sex workers, MSM and IDUs. These groups have specific behaviors that place them at heightened risk. Based on an understanding of the behavioral epidemiology of these groups, TIs focus on education, STD treatment, condom promotion and providing an environment that offers opportunity to discuss prevention and seek social support.

***Prevention Efforts Among Female Sex Workers***

Peer-led interventions among female sex workers have been successful in providing this environment by addressing issues such as lack of prevention information, access to condoms, and negotiating with brokers (Basu et al., 2004). One successful program in Kolkata in eastern India, the Sonagachi project (Sonagachi refers to the location of the red light area in Kolkata), has organized sex workers and addressed many of their needs. The project has worked with

participants on negotiating with clients and brokers, interacting with local institutions, communicating prevention with peers and advocating for reproductive health rights. Lower HIV and STD rates have been associated with this project (Jana et al., 2004).

Despite successes such as these, several concerns about the status of prevention efforts among female sex workers, which are still relatively new, remain. Limited availability of STD treatment in particular and prevention programming in general have been identified as particular issues (Chandrasekaran et al., 2006). Responding to concerns such as these, and recognizing the central importance of large scale prevention efforts with extensive coverage, the India AIDS Initiative (Avahan), funded by the Bill and Melinda Gates Foundation, in 2003 implemented a series of intervention programs for sex workers in six high prevalence states (Steen et al., 2006). By 2005, this initiative had resulted in the creation of an additional 274 community outreach settings in clinics in 77 districts with 70% of the total number of estimated sex workers having been contacted through peer outreach and 41% of the total number of estimated sex workers having attended a clinic at least once (Steen et al., 2006).

***Prevention Efforts Among Injection Drug Users***

Prevention for IDUs in India has been limited. Sterile needle exchange programs (SNEPs) are not part of the government's strategy for harm reduction and few NGOs currently operate SNEPs. The number of drug treatment slots available for IDUs are also far too few. However, the National AIDS Control Program Phase III (NACP III) has identified the need for increased prevention efforts among IDUs and a scale-up of opiate substitution programs nationwide has been proposed (Steinbrook, 2007).

***Prevention Efforts Among MSM***

Prevention efforts among MSM in India are complicated by the fact the homosexuality in India remains an illegal offense for which individuals can be jailed. Diversity among MSM, which includes kothi, panthi, and hijras, along with the fact that many men do not consider themselves homosexual, further challenge prevention efforts (Steinbrook, 2007).

While prevention programs for MSM throughout India remain limited, in 2005 only 31 of 965 targeted interventions were for MSM (Chandrasekaran et al., 2006), efforts are being made. In southern India, peer-led efforts have focused on training MSM in HIV prevention so that they can reach other men who are at risk. This program has made use of known networks and a largely stable population (Palanisamy, 2002). In western India, programs along the national highways target male sex workers at truck stops and have focused on prevention messages and empowering sex workers to adopt prevention methods (Pandya & Noronha, 2004).

***Prevention Efforts Among Truck Drivers***

The mobility of truck drivers and difficulties in targeting them for any length of time given their work schedules has made working with this community a challenge. There may also be some resistance to prevention messages among truckers. In a recent study, investigators reported deficits in skills needed to prevent HIV, motivate and adopt behavior change among truck

drivers (Bryan et al., 2001). In an effort to address these constraints, prevention programs including voluntary counseling and testing (VCT), information dissemination and behavior change education, are being offered at important border areas such as the Indo-Nepal border and through workplace intervention programs in the ports and other loading points for drivers. These NGO operated programs also incorporate social marketing of condoms and offer treatment services directly to lorry drivers. Other prevention programs are housed in the *dhabas* and use a combination of audio-visual presentation, print materials and condom distribution, to try to capture the attention of truck drivers and helpers when they have a moment to rest (Singh et al., 2002). Other locations such as toll booth checkpoints, and license renewal points along the highways have also been targeted for HIV prevention efforts.

***Prevention Efforts Among Male Alcohol Users***

Prevention programs have also been initiated among male alcohol users. In the southern state of Tamil Nadu, for example, an HIV prevention intervention for male alcohol users has used a participative process for the design of an intervention. Participating men were able to decide the method of delivering the intervention, weigh in on topics of concern and interest to them and provide strategies to communicate HIV prevention information among peers (Sivaram et al., 2004).

***Prevention Through Voluntary Counseling and Testing***

There are over 722 public and private voluntary testing and counseling (VCT) centers throughout India which are largely supported by government and state AIDS cells (NACO, 2007). Currently all districts in each of the six high prevalence states have a VCT center in their public hospital. There are also three model VCT centers in the cities of Chennai in south India, Mumbai in the west and Imphal in the north east. These centers, established in consultation with WHO, provide training and demonstration of best practices in counseling and testing.

There is relatively low utilization of VCT in India. VCT clinics had approximately 970,000 clients in 2005 (Chandrasekaran et al., 2006). There are several potential reasons for this. Health counseling is a relatively new concept in India (Solomon et al., 2004) and the discussion of sexual risk behaviors which is a central component of VCT is considered socially inappropriate. Other factors include low awareness of the existence of VCT and the benefit VCT might offer to HIV prevention, low perception of susceptibility to HIV and stigma associated with visiting a VCT clinic. Concerns about stigma and confidentiality can lead individuals to leave their community for VCT. In one leading clinic in Chennai, over 40% of its clients come from out of town (YRG CARE, 2007).

Individuals at risk may also be less inclined to visit government clinics. In the most recent national behavior surveillance for HIV, only 27% of respondents said that they would seek care for HIV or STDs from a government clinic (Kielmann et al., 2005). As a result, VCT clinics are emerging in the private sector. The quality of the services offered by these clinics, however, is of concern. Incomplete counseling, misinformation, and incomplete disclosure of status have all been observed in private clinics, heightening an individual's

risk of transmission (Kielmann et al., 2005). These clinics also have little or no capacity to counsel or treat persons with HIV.

***Preventing Parent to Child Transmission***

Of the over 27 million women who give birth in India each year, approximately 1% are HIV positive and many do not receive medical care until they are in labor (Marfatia et al., 2007). In an effort to reach this population, the Government of India (GOI) has established over 300 Prevention of Parent to Child Transmission (PPTCT) centers. These centers, located in antenatal clinics, were incorporated in medical colleges and selected district hospitals of high prevalence states in 2002. Since then, PPTCT centers have been included in antenatal clinics in low prevalence states as well.

Despite the availability of free and routine testing to all mothers visiting antenatal clinics, only 64% of the women who get tested actually collect their results (Vijaykumari et al., 2002). As a result, in most cases a single dose of nevirapine given to the mother during the first stage of labor with suspension of the drug to the child post-delivery is the only option (Gupta et al., 2006). This regimen has drawbacks including resistance to nevirapine in the mother as well as in the child. Almost half of women in India give birth at home, approximately 45%, which further limits the efficacy of PPTCT efforts (Chatterjee, 2003). Another challenge to the prevention of mother to child HIV/AIDS transmission in India is the practice of breastfeeding. Forty four percent of all HIV positive mothers in a study in between 2000 and 2002 breast fed their children as this is culturally appropriate in India (Suryavanshi et al., 2003).

## Prevention Challenges

The Bill and Melinda Gates foundation's Avahan initiative which targets high prevalence states, reports that coverage of high risk groups even in states such as Tamil Nadu that are relatively more experienced in prevention programming is still only at a 40% level. Further, relatively little is known about specific target populations. In an effort to address these concerns, the Avahan intiative has begun to map risk groups and enumerate population segments so as to determine the denominator of those at risk. This information will allow for the implementation and monitoring of appropriate prevention programs (Chandrasekaran et al., 2006).

Evaluating the effectiveness of ongoing mass AIDS awareness campaigns is also necessary. Often the efficacy of entertainment programs such as folk and street theater which feature prevention messages and are part of ongoing community events is not assessed. Gathering this kind of information is essential for successful strategizing about modes of education delivery and content of prevention messages. This type of research will also encourage support from local leaders and stakeholders who have an important role in sustaining efforts in the community.

Prevention efforts have also been challenged by existing funding mechanisms. Government funds are administered through the respective state AIDS cells who then solicit applications from private sector organizations. This process has been criticized for being inflexible, for delays in funds disbursement, for funding programs that lack focus in content and

for overall poor coordination and communication between state AIDS cells and implementing groups in the private sector. Advocates have called for more transparency in the funding process, faster processing times and more decentralization of efforts to monitor programs.

## HIV Treatment and Care

### Affordability

Prior to 2000, antiretroviral medications (ARVs) were sparsely available in India. ARVs were imported and at approximately USD 800 per month, unaffordable to the majority of the population who required them. In 2000, generic antiretroviral therapy (ART) was introduced in India by Cipla, an Indian pharmaceutical company. Since then at least five leading companies have offered ARVs in the market. The wide production of these drugs has resulted in a steep decline in the cost of ART. A first line-regimen in India now costs about USD 20 per month. As the cost of these drugs has decreased over time, there has been an increase in the number of patients accessing VCT services and registering to receive treatment.

Despite increased affordability, WHO estimates that less than 10% of the demand for ART is being met in India (WHO, South east Asia Regional Office, 2003). This is primarily due to the fact that even though the cost of ARVs has been significantly lowered, it is still too expensive for many, particularly in rural areas where need and prevalence of HIV are increasing (NACO, 2007). A World Bank study of HIV positive individuals found that while participants were able to pay for initial tests, follow-up tests and costs related to medications were prohibitive to most (Over et al., 2006). Further, many need assistance in sustaining their ability to purchase these drugs. As a result, many individuals with HIV who have been on ARVs at some point in time have not been able to stay adherent, due to costs. This study also surveyed physicians who reported that a majority of their clients are from the middle to upper middle class.

Access to ART is impacted by cost in other ways as well. In India, the majority of health care spending occurs in the private health sector (Over et al., 2004). This spending is largely out of pocket and as a consequence poorer households have less private care than wealthier households (Over et al., 2004). HIV infected individuals attending private clinics in India, who have more education and higher incomes than their public clinic counterparts, are much more likely to be on ART and to have had CD4 testing (Ramchandani et al., 2007). This same study also found that among 1667 HIV infected clinic attendees, only 36% had even heard of ART, suggesting that knowledge of the existence of ART at all may be another important barrier to care (Ramchandani et al., 2007).

### Current Regimens

The most commonly used regimen in India is a combination of stavudine, lamivudine and nevirapine. This regimen of two nucleoside reverse transcriptase inhibitors (NRTI)s and one non-nucleoside reverse transcriptase inhibitors (NNRTI), while currently what is recommended by the WHO, is not

listed as a first-line regimen nor as an alternate regimen in the United States' (U.S.) Department of Health and Human Services' guidelines. This is mainly because newer less toxic regimens have been identified. The side effects associated with some of these agents such as the lipoatrophy and peripheral neuropathy (Mallal et al., 2000) associated with stavudine have almost negated its use in the industrialized world. Yet, it is the staple first line regimen in India as the cost of newer and less toxic agents such as tenofovir are typically three or four times higher.

Once an individual is on therapy, routine blood panel and biochemistry tests, such as liver function tests, are ideally used to monitor patients' response to treatment. Very few centers in India have the infrastructure and trained personnel, however, to provide these tests. Unlike in the developed world where viral load (which detects presence of the actual HIV genetic material in the infected person) data is used to make decisions on therapy initiation and testing, in India, CD4 count (which detects presence of antibody response of the infected person) still remains the most important marker for both initiation of therapy and decisions about medication. This is because of the high cost of viral load testing and the low numbers of centers equipped to conduct these tests. Because viral load testing is not used in routine monitoring of patients on ART, patients can be maintained on failing regimens for prolonged periods of time which can lead to drug resistance.

### Quality of Care

For those who are able to access care, there are also concerns about quality of care. Over 80% of ARVs are prescribed by less than 10% of the physician pool and the standard of clinical practice is not uniform (World Health Organization, 2003). The nature of clinical practice in India, where more than 80% of care is provided through the private sector, with higher levels seen in rural areas, encourages this lack of uniformity (Patil et al., 2002). Private sector providers include qualified medical doctors, doctors in traditional medicine, pharmacists and unlicensed providers. Clients may find it easier and more affordable to seek medication from a pharmacy in order to avoid costs of testing and follow-up. Traditional medicine can also be appealing as claims of curing AIDS abound in the media (Indian Network of Positive Living with HIV/AIDS, 2003). Varying practices and options in the private sector result in differing standards of prescription that have implications in drug resistance, tolerance and consequent follow-up care (Over et al., 2006).

### ART Roll-out

In an effort to broaden access to ART, the Indian government launched a free ART roll-out program aimed at initiating 100,000 people on HAART in April 2004. Pregnant women with HIV, children under 15 and then adults with AIDS were prioritized to receive treatment (Over et al., 2006). One goal of the program was to evaluate the public sector provision of ART so as to better understand potentially limiting factors from the patient's and adminstration's points of view. By the end of 2005, there were approximately 70 centers providing

ART with plans to expand that number to 100 by the end of 2007. As of 2006, however, only 35,000 patients were receiving ART via the government sector, a fraction of the 770,000 patients the World Health estimates require ART in India (NACO, 2007).

## Ongoing Challenges to Prevention and Care; Stigma and Gender Inequality

Despite nationwide efforts to prevent and treat HIV, there remain significant challenges in India. Some of these challenges occur in the social cultural milieu. Stigma against HIV infected individuals can discourage these individuals from seeking appropriate services while entrenched social norms and economic constraints foster individual vulnerability.

### Stigma

Stigma refers to the alienation and discrimination a person experiences as a result of being HIV positive (Madru, 2003). Anticipation of stigma often influences disclosure of status and persons with HIV/AIDS may disclose differentially to minimize experience of stigma (Bradshers & Goldsmith, 2004.). Members of social networks such as family may exert a negative emotional impact and that there may be many missed opportunities for HIV prevention as a result. In one example of this, young men who know or suspect they may be HIV positive will marry young women, who are themselves responding to social and familial pressure to be wed early and in a "timely" way, without disclosing their HIV positive status (Godbole & Mehendale, 2005). Often these young women do not find out they are HIV infected until their first pregnancy (Godbole & Mehendale, 2005). Stigma may also lead families to exclude HIV infected women (Carr & Gramling, 2004) and men to initiate partner violence against infected partners (WHO, 2001).

Stigma can impact an individual's access to care. More than half of physicians in a national survey in India were unaware of the prevalence of HIV in their own state and nearly half believed that HIV positive patients must be isolated in care areas because of a risk of transmission (Kurien et al., 2007). Indeed, many private physicians are unwilling to treat HIV positive individuals and will refer them to the public sector or to VCT clinics (Kielmann et al., 2005). Once in care, worries about disclosure to family, friends or community can make adherence to ART more difficult (Kumarasamy et al., 2005).

There are very few interventions in India aimed at promoting acceptability of HIV in the community. Recent attempts to combat stigma have included national education campaigns, celebrity endorsement of HIV prevention efforts, and activism by members of the gay community. Legislation can also ameliorate stigma. Legal reforms to decriminalize homosexuality, to increase accountability of both solicitor and female sex worker in a sexual transaction and work place policies that protect confidentiality and penalize discrimination all need to be realized. The Lawyers Collective is a group of legal experts advocating for these reforms.

### Gender Inequity

Closely related to stigma is the role of sexual inequity. Over 85% of HIV infections are transmitted heterosexually in India (NACO, 2007). In Indian culture, unmarried men are free to explore their sexuality with a variety of sexual partners and rates of sexual promiscuity are high among young unmarried men (Bhattacharjee et al., 2000). Alternatively, young unmarried women are expected to be sexually naïve. These differences can make it difficult for young women to negotiate prevention of HIV/AIDS. Gender inequity extends to married life as well. In the 2005/2006 National Family Health Survey, both women (54%) and men (51%) reported that they believe that it is justifiable for a husband to beat his wife. Among ever-married women, 37% report having been the victim of spousal physical or sexual violence (NHFS-3, 2007). Only 45% of women report having money of their own and only one third of women report that they can travel unaccompanied to markets and other areas within their community (NHFS-3, 2007). These social norms create an environment in which it may be difficult for women to demand that their male partners use condoms.

To change these norms, one has to begin by addressing men which poses several challenges. Men are typically more transient as they are inclined to migrate in search of work and unlike women have not been traditionally organized for health promotion purposes. Policy and funding agencies are increasingly focusing on the role of heterosexual men in HIV transmission, however, and are finding that men may be reached in an effective way at venues such as alcohol outlets, college campuses and workplace environments.

## Conclusions

In many respects, the HIV/AIDS epidemic in India remains a daunting challenge. Awareness of HIV/AIDS and the prevention of infection are far from universal and access to prevention for both target at risk populations as well as the general population, particularly pregnant women, remains woefully inadequate. And while India has done much to improve access to care, far too few infected individuals, particularly those with limited means, are receiving care. At the same time, however, India is well positioned to launch an effective assault on the epidemic. The government's understanding of the parameters of its epidemic is increasingly sophisticated, and its willingness to devote significant resources to the effort is clear. International aid efforts have been welcomed by the government and are also substantial. Further, it appears that the epidemic remains largely concentrated in high risk target groups. These realities suggest that India can prevent a generalized epidemic. To do this, however, India must overcome the significant constraint of stigma to address the epidemic among all high risk groups. It must also ensure that protection is available to every component of the population. This protection has to include instilling a universal and sophisticated understanding of the disease and the provision of financially and culturally accessible testing and care. India's ability to meet these challenges have broad implications for us all.

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# Part IV

## Eastern Europe & Central Asia

# Chapter 23

# The HIV/AIDS Epidemics in the Former Soviet Union, Central Asia, and Iran

Chris Beyrer, Wendy W. Davis, and David D. Celentano

The HIV virus is an obligate intra-cellular parasite: it has no energetic system and no motility beyond that supplied by its human hosts as they engage in the kinds of sexual or drug use risks through which the virus can be transmitted. HIV can only spread, and can only reach epidemic proportions, when its exacting conditions for spread are met by human agents. To reach epidemic proportions its hosts must be in large enough networks of risk to sustain chains of transmission within and across communities. The most recent emergence of epidemic spread of HIV infection has been in the states of the Former Soviet Union including the massive Russian Federation itself, Ukraine, the five Central Asian Republics, and Iran. HIV has found its conditions for rapid epidemic spread met by a convergence of factors and one central reality: the enormous production and output of opiates, principally heroin, from the chaotic Central Asian state of Afghanistan (Beyrer, 2007). These epidemics, as the three Chapters in this section will show, have all been primarily driven by epidemics of heroin uptake and use, and the seemingly inevitable transitions to injection use of heroin which have followed these outbreaks of opiate use and dependence. With Afghanistan's crop in 2007 reaching unprecedented levels of well over 6,000 metric tons of opium base, there is little likelihood of declines in supply across this vast region. With heroin use among young people likely to increase—the principal hope for containment lies in rapid implementation of existing technologies for prevention of parenteral spread: needle and syringe exchange programs; the wider set of efforts known as harm reduction; and drug treatment, with opiate substitution therapy as a cornerstone. While the prevention policy picture across these states is highly varied, and is generally improving, they all shared an almost complete lack of HIV prevention services



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_23, 

for drug users when their epidemics entered early explosive phases of spread. Worse, they also shared highly punitive and legalistic policy environments which aided and abetted HIV spread, particularly in prisons, and did little to mitigate the epidemics at critical nascent phases.

UNAIDS estimated that by the end of 2006 there were some 1.7 million people living with HIV infection in the Former Soviet Union (FSU) and Central Asia (UNAIDS, 2006). Among these people living with HIV some 270,000 were infected that year (Beyrer, 2007). The epidemic remains highly concentrated in injecting drug users (IDU), accounting for more that 75% of all cumulative infections (UNAIDS, 2006). All of these estimates should be taken with some caution, however, as HIV surveillance, particularly for hard to reach populations, has been problematic across the region. This has been true despite the fact that Russia has aggressively tested its population for many years—having conducted over 220 million HIV tests for a population of only 160 million persons (Stachowiak & Peryskina, 2007). Widespread testing and effective surveillance are not, of course, synonymous. Where drug users, sex workers or gay men must register as such to seek care, widespread testing may hide more infections than it uncovers. Nevertheless we can assert with some confidence that population level spread of the virus has not reached above 2% of reproductive age adults in the FSU. The next several years will likely determine if this will remain the case. Doubtless there will be considerable heterogeneity in HIV incidence across this diverse region.

The HIV epidemics in the FSU were arguably among the most preventable—given the state of our knowledge when these outbreaks began in the mid-late 1990s—but almost to a nation state, the opportunities for early intervention were lost. The most pressing questions ahead for states from Belarus to Kazakhstan and in Russian regions from Siberia to the Caucasus will be the extent to which wider HIV spread from the IDU core groups can be contained, and the extent to which the next cohort of young drug users will have access to effective and evidence-based treatment and prevention services. The dramatically changing landscapes of the regional sex industry, the role of trafficking and other forms of population movement, and the hidden and stigmatized, but nonetheless emerging networks of men having sex with men will also likely play key roles in whether these epidemics remain as highly concentrated in drug users as they have been, or whether the conditions for wider spread of HIV will be met. There are reasons for optimism: many of these societies are highly literate and have extensive, if dysfunctional health systems; the Islamic Republic of Iran and several Central Asian states have shown an impressive dexterity in dealing with opiate use, which faces substantially less Koranic opprobrium than alcohol; and these outbreaks have occurred in the 1990s–2000s, when we already know so much more about how to contain HIV spread. But they also have special vulnerabilities: the old Soviet system was vehemently opposed to methadone or any other substitution therapy, and this aversion continues in Russia and the States, like Belarus, she still dominates; the FSU may be among the only regions where HIV is spreading in the context of *declining* populations, so the demographic impact of the epidemic could be much greater in Russia or Tajikstan, than it would be in a rapidly expanding population in South Asia or a similarly growing African context; and finally, as Daniel Wolfe and colleagues so lucidly describe, most of these states have shared a painful history of public

health collapse after their departure from the old Soviet system in the early 1990s. HIV found its conditions for spread amply met in these societies marked by rapid and complex transitions, and with little experience in modern public health.

In Chapter 24, Anjali Sharma and colleagues detail the HIV/AIDS epidemic in the Russian Federation itself. They underscore the ongoing need for taking HIV prevention to scale, and the impressive efforts underway to provide AIDS treatment for those Russian citizens who require it. They have detailed what may remain the single most important barrier for the Russian response to AIDS—the structural realities and rigidities of the Russian health system in responding to the complex array of challenges posed by AIDS. An example is the roles non-governmental (NGO) sectors have played in advocating for necessary reform, and for providing services, like needle and syringe exchanges, when government sector entities were unable or unwilling to do so. But while NGOs can lead innovative pilot projects, their ability to take interventions to scale across this enormous country has been limited: coverage rates for IDU across the Russian Federation have been estimated at less than 3% of the need, when UNAIDS has suggested that roughly 60% coverage is required to achieve control of HIV spread in IDU populations (OSI, 2006; UNAIDS, 2006). And civil society cannot be expected to implement programs like provision of methadone substitution therapy when the drug remains illegal and its use criminalized.

The extraordinary rigidity of the Russian narcological, psychiatric and public health communities towards substitution therapy is difficult to fathom, but palpably real. We (CB) presented the evidence for methadone maintenance therapy (MMT) as an HIV prevention tool at the Russian Federal AIDS Conference in the holy city of Suzdal in 2005. This was shortly after methadone and buprenorphine (after a several year struggle and ongoing opposition from the Russian delegation) were added to the World Health Organization's essential drug list. When the WHO decision was mentioned the Russian audience literally groaned with the pain of what they saw as a policy defeat for their position. The only analogously passionate adherence to a failed policy that comes to mind in the public health arena has been the shibboleth of needle exchange for Congressional conservatives in the U.S., a policy that even in 2007 looks unlikely to be reversed. In both cases effective HIV policy has been hamstrung by political considerations—and in both cases the HIV virus has benefited. Finally, it must be said that the current Russian administration has been increasingly hostile to the NGO and civil society sectors in every domain of Russian life—and this has included groups working on HIV, with sex workers, and on Lesbian, Gay, and Transgender issues. Indeed, the space for progressive community action has markedly diminished under the current administration, and this may well further limit responses to the next waves of HIV spread, should they move into sexual minority populations.

As Daniel Wolfe points out in a concise summary of the HIV experience in Ukraine, innovative public health policy reform is happening in the region. Ukraine has managed to implement both prevention services for IDU and substitution therapy. However, structural barriers remain in play here too, and principally involve the police, the countries' harsh drug laws, and the disastrous state of the penal system where all too many users are incarcerated in high risk environments for HIV acquisition and transmission. If HIV has taught

us anything it is that "national mobilization" means just that—if key sectors remain outside the debate on reforms necessary to respond to HIV/AIDS, the virus will find its conditions for spread met, yet again.

Wolfe and colleagues describe the varied and often encouraging efforts to deal with HIV emergence in Central Asia, arguably the most recently affected region worldwide. They focused on the three key states of Tajikistan, Uzbekistan, and Kyrgyzstan, which share a range of vulnerabilities for HIV spread and AIDS impacts. The virtual absence of any data from the closed state of Turkmenistan makes its inclusion essentially impossible here—but what little has become known since the 2006 death of the dictator Saparmurat Niyazov, "Turkmenbashi," suggests that the Turkmen people too, may share some of these risks for HIV infection. Not the least of these being frontline states in the Afghan narcotics economy. Wolfe and colleagues have added an important dimension to the analysis of what data we have from Central Asia—granularity. Their examples are drawn from experience on the ground and from working with grassroots individuals and groups grappling with emergent HIV. This is an example of what might be called "deep epidemiology," to borrow a term from "deep ecology," and by this we mean the understanding of epidemic data through rich and sustained engagement in context. Students of public health would do well indeed to consider that while we live and breathe in a world of prevalence and incidence, odds ratios, viral load and CD4 counts, HIV is acquired by people in tough situations, the most marginal of contexts, and under the pressure of forces as harsh as the security agencies of Uzbekistan. Heroin use in these regions often begins along Tajik heroin routes out of Afghanistan, and in some of the world's most grim prisons. And it is in such difficult settings that public health must engage if it is to have real-world impacts.

It is especially heartening then, to see in countries like Kyrgyzstan the emergence of both progressive HIV/AIDS policy, and rapidly expanding access to services, treatment, and care. While small in population, this landlocked state of the FSU has shown that there is nothing inherent to the FSU inhibiting HIV/AIDS work in the region.

This good news, albeit with caveats, is also to be found in Azarakhsh Mokri and Richard Schottenfeld's chapter on HIV/AIDS in Iran. Here we have another front-line state in the Afghan heroin nexus, and one with some of the highest reported population rates of opiate use and dependence in the world. HIV has spread explosively, beginning, as has been so often the case, among incarcerated drug users. And yet, despite being a conservative Islamic Republic, Iran has been increasingly recognized as an emerging leader in taking harm reduction programs to scale. Iran has gone as far as allowing substitution therapy in prisons, and has implemented conjugal visits for prisoners to reduce sexual activity in her jails. Mokri and Schottenfeld document this perhaps surprising turn of events, and the benefits the Iranian people are already deriving from these pragmatic approaches. HIV/AIDS treatment and care too, are increasing in availability and quality. In the domain of sexual spread of infection, however, the same pragmatic approaches have been much more difficult to undertake. (Readers may want to read the Thailand chapter for an almost complete inversion of this situation: The Thais found pragmatic approaches to sexual risks relatively straightforward to achieve, but have had enormous difficulty in implementing humane and pragmatic approaches to drug use related HIV spread.) In the words of Paul Simon "One man's ceiling is another man's floor."

The intense social stigma against men who have sex with men and the criminalization of sex between consenting adults of the same gender, still punishable with death in the Islamic Republic, have made HIV prevention for MSM intensely difficult. The same holds true for sex workers, and arguably, for women and girls in general. These structural barriers have the potential to limit Iran's success, should her epidemic spread beyond the drug use core. One hope is that Iran's positive experiences with harm reduction may allow for similar approaches to be undertaken in neighboring Afghanistan. While the Afghan epidemic appears to be in its very early stages of spread, with cases primarily identified among small clusters of Kabul drug users, the country is very poorly prepared to deal with any epidemic disease spread, much less an epidemic as complex, challenging, and expensive as HIV/AIDS has generally proven to be. Plans are underway to develop an HIV surveillance system for Afghanistan, initially to be supported by the World Bank, and this effort cannot be started too soon.

Finally there are some important features of the epidemics of the FSU from a molecular epidemiology perspective which may shed some light on the trajectory of the epidemics and on their relationships. Russia, Ukraine and Belarus have had remarkably homogenous outbreaks of subtype A of HIV-1 (Bobkov et al., 1998, 2004). This has also been the predominant virus in Lithuania, Latvia, Kazakhstan, and in the high prevalence region of Russia Siberia (Ezyaguirre et al., 2007). This variant has been sequenced and is virtually identical to African A isolates from much earlier phases of the epidemic. Interestingly, pure subtype A epidemics have been overtaken by recombinant forms across Africa: A/G recombinants predominate in the Western States including Nigeria and Cote d'Iviore; A/C, A/D, and multiple complex A/C/D recombinants predominate in the Eastern States of Kenya, Tanzania, and Uganda. And in Southeast Asia, where A has been little seen, A/E recombinants are the dominant viruses in Thailand, Cambodia, and Vietnam. In Russia and her geographic neighbors alone, a subtype A virus predominates in non-recombinant form, making this an attractive region for A clade HIV vaccine candidate research, but also making for an unresolved epidemiologic paradox: the A clade is not found uncombined in its place of origin, but circulates in its early form only in the most recent epidemic region globally.

The A clade predominance does not hold, however, across the entire FSU. The Tajik and Uzbek outbreaks have been characterized by mixed pictures of A and A/G recombinants virtually identical to the IbNG CRF02_A/G virus which predominates in Nigeria and Cote d'Iviore (Carr et al., 2005a,b). We know little about how these West African variants have come to spread in Central Asia, but this, as in all HIV epidemic contexts, had to come from at least one incident of population mixing—a "founder effect" of at least one infected individual with this variant entering a risk network which likely includes both Uzbekistan and Tajikistan. A founder effect likely also explains the unique epidemic context of Estonia. This small Baltic state, whose capitol city of Tallinn is remarkably close to St. Petersburg, has a completely distinctive molecular picture from that city and from its other neighbors. More than 95% of sample isolates from Estonia, virtually all of which were from IDUs, are a variant known as CRF06_cpx, for complex recombinant form (Adojaan et al., 2005). This mosaic virus, with several different parents, is the predominant virus in only one other place: the small West African state of Burkina Faso. This finding again suggests

a founder effect, with perhaps only a handful of transmissions linking these remote states—and suggesting as well, the density and insularity of Estonia's IDU networks, where HIV variants differ so markedly from all of Estonia's border states (Lithuania, Latvia, and Russia.)

Taken together these findings suggest that much of the FSU is experiencing a linked epidemic, but there is a clearly distinct Central Asian focus in Tajikistan and Uzbekistan, and Estonia is a clear outlier. This bodes well for HIV vaccine research in the region, and highlights the critical role that social networks have on HIV spread, particularly in IDU driven epidemics, such as still predominate in the FSU.

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# Chapter 24

## Russian Federation

Anjali Sharma, Dmitry Lioznov, and Jack A. DeHovitz


### Introduction

HIV has emerged relatively recently in the Russian Federation (RF), in part because the strict controls on internal migration, significant barriers to contact with foreigners, and a relatively well developed public health system established during Soviet times have deteriorated (Field, 2004). Currently, the HIV epidemic is occurring within the setting of a true public health crisis in Russia. Heart disease, alcoholism, smoking and infectious diseases are increasing dramatically. It is estimated that the impact of these public health problems will fuel a one-third drop in the population of Russia by 2050 (Specter, 2004).



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_24, 

The increase in infectious diseases in general and HIV specifically is due to several factors (Coker et al., 2004). First, political transition in the early 1990s led to dramatic declines in income, a significant increase in unemployment and widened income inequities. These economic dislocations also led to an expansion of informal and criminal economies (UNICEF, 2001). Secondly, the highly structured public health system rooted in the Soviet tradition has been unable to effectively transition to meet post-Soviet challenges. The Soviet model was based on a highly centralized and hierarchical sanitary-epidemiologic system, which was characterized by a large labor force and minimal emphasis on technology (Coker et al., 2004). Within this system, while surveillance was developed, health promotion efforts remained rudimentary (Vlassov, 2000). The epidemic of HIV now sweeping across Russia has its roots in both economic dislocation, as well as an under-resourced public health system.

## Epidemiological Overview

The first reported outbreak of HIV disease occurred among a group of 90 children infected after exposure to nonsterile needles in 1988–1989 in Southern Russia, highlighting ongoing problems with infection control in Soviet health care institutions (Bobkov et al., 1994). Prior to 1995, fewer than 200 new HIV infections per year were diagnosed in Russia, with most cases reported in men having sex with other men (MSM). However in 1996, multiple intravenous drug user (IDU) associated outbreaks were reported in Kaliningrad, Krasnodar, and Murmansk. By the end of 1998, nearly 4,400 people had tested positive for HIV and over 12,000 new cases of HIV were reported in Russia in the first nine months of 1999, with 80% of these new cases in IDUs (Euro HIV, 2003).

The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimated that 940,000 Russians were living with HIV at the end of 2005, with a prevalence of approximately 1.1% for those between the ages of 15 and 49 years (UNAIDS, 2006a). Of these HIV-infected individuals, 80% were between 15 and 29 years old and over one third were women. The annual number of officially reported cases appears to have peaked in 2001 at slightly over 87,000 cases, and then declined to 35,379 in 2005. The reasons for this decline are not yet clear, as it has occurred in the absence of any targeted prevention campaign. It has been postulated that it may reflect the reduction in HIV testing in IDUs, as the total number of IDUs tested fell from slightly less than 500,000 in 2001 to 280,000 in 2003 (Euro HIV, 2003).

While only 369,998 cases have been cumulatively reported in the RF (AIDS Foundation East West, 2006), the World Bank projects that by 2020, the number of HIV cases in Russia could range anywhere from 5.4 to 14.5 million (World Bank, 2004). There are quality issues with Russia's HIV/AIDS data, due in part to the size of the country as well as weaknesses in the health information systems used. There is little or no population based behavioral or surveillance data, and current reports reflect only those who come in contact with centralized HIV testing programs. While HIV testing is obligatory for blood, body fluid and tissue donors and medical or research personnel working in HIV/AIDS related centers and laboratories, it is voluntary for most Russians. Many individuals

either lack access to HIV testing or avoid it for fear of being identified as a member of marginalized and stigmatized subgroups.

### Injection Drug Use

Injecting drugs remains the major risk factor for the acquisition of HIV. Consistent with other European and Asian IDU epidemics, heroin and psychostimulants are the injected drugs of choice in Russia (Kozlov et al., 2006). Opium production has increased on the southern border, and there is an increase in heroin traffic along the Silk Road from Afghanistan (Hayton, 2002). In addition, there is evidence of increased production of psychostimulant drugs in Russia, including amphetamines and ephedrine derivatives (Kozlov et al., 2006). Between 1.5 and 3 million Russians are believed to inject drugs (1–2% of the entire population) with an estimated 30–40% of IDUs utilizing nonsterile needles or syringes (Luo & Cofrancesco, 2006). Overall numbers may even be higher as many IDUs reside illegally in oblasts (regions) where they cannot be registered as residents, and therefore, are not considered in estimates.

Reports are beginning to emerge on the prevalence and incidence of HIV infection among Russian IDUs. A cross sectional study of HIV infection in the National Institutes of Health (NIH) funded HIV Prevention Trials Unit study in St. Petersburg revealed that approximately 30% of IDUs initially recruited through this trial were infected (Shaboltas et al., 2006). This is consistent with other publications, which have noted that between 12 and 56% of Russian IDUs are HIV infected (UNAIDS, 2005). As a follow-up to this study, a cohort of 520 HIV negative IDUs were recruited and retested for HIV at 6 and 12 months, and the HIV incidence rate was found to be 4.5/100 person-years (Kozlov et al., 2006).

Little is known about risk factors associated with HIV infection among Russian IDUs. In one study, multivariate analysis revealed that the only risk factor for seroconversion in this population was frequent psychostimulant use (Kozlov et al., 2006). In this study, the majority of psychostimulant users were also heroin users, underscoring the complex association between the use of multiple drugs, and injecting.

Studies also suggest that the majority of IDUs do not use condoms consistently, highlighting their important role as a reservoir for sexually transmitted HIV infections (Moshkovich et al., 2000; Rhodes et al., 2004). In one community based cross-sectional survey of IDUs in Togliatti City, over half of the male participants reported that their regular partners were non-IDU and one third reported having sex without a condom with their regular partner (Platt et al., 2005). IDUs may also be transmitting HIV through sex work. In one study of 100 IDUs of unknown HIV status in St. Petersburg, 37% reported a history of sex trading (Benotsch et al., 2004) while in another study one third of female subjects gave a history of selling sex for money and/or drugs (Kozlov et al., 2006).

### Sex Workers

Following the collapse of the Soviet Union, increasing inequity and unemployment and greater drug availability were associated with widespread sex

work. Russia's HIV epidemic disproportionately affects sex workers, whose seropositivity rates are between 5 and 15%, and as high as 48% in those who are also injecting drugs (UNAIDS, 2006b). There is evidence of sex work throughout the social hierarchy, from women working transportation routes to those in agencies or hotels (Aral et al., 2005) and evidence which suggests that inconsistent condom use and other risk factors exist. In a study of 70 sex workers (SW) in Moscow of unknown HIV status, 44% reported injection drug use, 31% reported a history of syphilis and 20% reported never using condoms (Salamov, 1998).

A number of studies have shown a higher prevalence of both risky drug-use and risky sexual behavior in IDUs who are SW. In a community based cross-sectional survey of IDUs in Togliatti City, IDUs who were SW reported earlier first injection, were more likely to inject daily, to inject with syringes previously used by a person known to be HIV or HCV positive, and to have shared needles or paraphernalia in the last four weeks when compared with IDUs who were not SW (Platt et al., 2005). Among female participants in this study, sex work was associated with a high frequency of sexually transmitted infections (STIs) (Platt et al., 2005). Other studies of IDUs have also found an increased risk of STIs among those IDUs involved in sex work (Platt et al., 2006). A study of female IDUs in St. Petersburg, found that 44% reported sharing injection equipment, 37% reported a history of exchanging sex for money or drugs and that participants had a mean of 49.5 male sexual partners in the previous month, and reported 15.4 unprotected vaginal intercourse acts in the previous month (Benotsch et al., 2004). Despite high overall rates of risky behavior, most of these female IDUs did not perceive themselves to be vulnerable to HIV; in fact 43% of the sample indicated that they were at either slight or no risk of contracting HIV. Findings such as these highlight the need for HIV and STI screening, treatment for STIs, health education, and risk reduction counseling.

### Sexual Transmission of HIV in the General Population and Among Men Who Have Sex with Men

Studies in St. Petersburg suggest little knowledge exists about HIV transmission in the general population (Hamers & Downs, 2003) although limited research has been conducted in this area. Other studies have highlighted the interplay between HIV and STIs. The United States Centers for Disease Control and Prevention (CDC) conducted a cross sectional study of women and men in Moscow, examining street youth, adults at a homeless detention center, and women and men in a remand center. Bacterial STIs were present in between 58 and 85% of the women, and HIV was present in between 2% and 4% of both women and men, highlighting the potential contribution of both STIs as well as these at risk groups to the HIV epidemic (Shakarishvili et al., 2005).

Although predominant in the early years of the epidemic, relatively few cases of HIV infection in the RF are now being reported in MSM. Official reports to Euro HIV indicate that cumulative cases of HIV infection in MSM in Russia, through 2005, total less than 1,200 (Euro HIV, 2005). This population is both highly stigmatized and vulnerable and few studies have been conducted regarding HIV risk or prevalence among Russian MSM. One study of MSM in St. Petersburg did highlight ongoing high-risk behaviors. In this community

based sample of 434 MSM, 126 participants had both male and female partners in the previous three months, and 45% reported recently engaging in unprotected anal intercourse with their male partners. Of equal concern, the investigators noted significant gaps in the HIV/AIDS risk knowledge of many men (Kelly et al., 2002).

### HIV in Prisons

HIV prevalence among general prisoners has been reported at between 0.8% and 4.76% (Dolan et al., 2007). In one study of IDU prisoners in St. Petersburg, 46% tested HIV positive (Dolan et al., 2007). Further, HIV transmission within prisons has been documented in Russia. In a prison in Nizhnekamsk, an HIV outbreak resulted in 400 cases of HIV among a population of 1,824 prisoners (Nikolayev, 2001).

### Youth in Russia

Street youth in Russia are young people living part-time or full-time on the street. Factors leading to the relatively high prevalence of street youth in Russia include parental abuse or neglect, parental addiction to drugs or alcohol, abandonment or parental death (Hillis et al., 2007). It is estimated that the street youth population in Russia may approach 3 million (Zaretsky et al., 2002). Individuals under the age of 30 years comprise 80% of total HIV infections in Russia and appear to be particularly at risk for homelessness, drug use and their biological consequences (Osborn, 2005). There is now substantial evidence that HIV rates are quite high among street youth. For example, in 2000, the non-governmental organization (NGO) Medecins du Monde France conducted HIV testing among over 2500 street youth in St. Petersburg and found an HIV seroprevalence of 17.7% (Griffith, 2001). Based on these and other studies, the CDC conducted a cross-sectional study in 2006 to assess HIV seroprevalence as well as the social, sexual and behavioral characteristics associated with HIV infection among 15 to 19 year old street youth (Kissin et al., 2007). Using city-wide mapping of 41 street youth locations, random selection of 22 study sites, rapid HIV testing, and an interviewer-administered survey, 313 participants were assessed. Overall, 37.4% of participants were HIV-infected. Subgroups with seroprevalence above 60% included double orphans, homeless individuals, those with a previously diagnosed STI, those sharing needles, and current IDUs. This study highlights the extraordinarily high HIV risk that exists in homeless youth in Russia.

### Perinatal Transmission

Although the HIV epidemic in Russia began primarily in male IDUs, injection drug use in women, and increasing heterosexual transmission of HIV has resulted in an increase in HIV infections among women and their children. In 1998, only 125 pregnant women with HIV were reported in Russia, compared to 3,531 reported in 2003 (UNAIDS, 2004). These increases have been especially well documented in St. Petersburg, where an ongoing study noted that HIV seroprevalence in women giving birth has multiplied 100 fold between 1998 and 2002 (Khaldeeva et al., 2003). In the same study, women without

prenatal care had a higher prevalence of HIV (8%) than did those with prenatal care (1%). Of additional note, HIV infected women were nine times more likely to relinquish infants to the State after birth.

### Co-infections

The HIV/AIDS epidemic in the RF is further complicated by a series of concurrent infectious disease epidemics. High rates of Hepatitis C (HCV) and B (HBV) have been observed among Russian IDUs. A cross sectional study in St. Petersburg revealed HCV antibody in 93.0% of all HIV infected IDUs, and Hepatitis B surface antigen (HBsAg) in 33.7% of HIV infected IDUs. Of those subjects positive for HBsAg, 90% were also coinfected with HCV. HCV genotype 1 was observed in 50.6% of HIV infected patients including those infected by mixed genotypes (Lioznov et al., 2003). High rates of HCV infection were also seen in HIV infected and uninfected IDUs in Moscow (67%) and Volgograd (70%) (Rhodes et al., 2006).

Tuberculosis (TB) rates are also rising dramatically in the region, in part fueled by the prevalence of HIV. TB control has also been hampered by under funded surveillance systems, limited TB drug supplies and the government's reluctance to adopt Directly Observed Treatment, Short Course, a well-established approach to treating TB (Coker et al., 2004). In addition, inadequate links between civilian and prison institutions have allowed patients to fall between service gaps (Fry et al., 2005). As a result a threefold increase in the TB notification rate has occurred between 1990 and 2000 (Shilova, 2001), and this rise in TB cases has also been associated with increasing rates of multidrug resistant TB (MDR-TB) (Drobniewski et al., 2004). The World Health Organization (WHO) estimated in 2002 that 5.1% of TB cases in Russia were HIV co-infected, however data on the current size of the HIV-TB epidemic is lacking (WHO, 2003). Characteristics of co-infected patients are consistent with the overall HIV epidemic. In one study from St. Petersburg, most of 49 HIV infected patients with culture positive TB were young (69% $<$30 yrs), and with a history of injection drug use (92%) (Van Rie et al., 2005).

The prevalence of extensively drug resistant TB (XDR-TB) is not known in Russia. However, according to the global Network of Supranational Reference Laboratories, 13.6% of MDR-TB isolates in the Eastern European Region (including Russia) were XDR-TB (Shah et al., 2007). While HIV prevalence rates among TB patients are still relatively low, the potential exists for a dramatic increase in TB in the HIV-infected population. Enhanced collaborative TB and HIV control efforts with associated access to effective medications and HIV monitoring among TB patients are critical.

## HIV Prevention in Russia

HIV tends to spread more quickly among highly vulnerable groups that lack access to basic health services and are unlikely to participate in HIV screening or voluntary testing. In Russia, the HIV epidemic has been concentrated among IDUs, who are over-represented in the prison system, and may also trade sex for money or dugs, thereby serving as a conduit for HIV transmission into the

general population. This section will discuss the Russian government's HIV/AIDS and drug policy and its implications for HIV prevention efforts, the status of harm reduction programs and HIV prevention programs among sex workers, in prisons, among pregnant HIV infected women and finally the role of mass media in combating stigma and disseminating educational information related to HIV.

### HIV/AIDS Policy of the Russian Government

In 1995, the Russian Government adopted Federal Law No.38-FZ, "Prevention of Spread of the Disease caused by the Human Immunodeficiency Virus (HIV)", designed to establish the rights of people living with HIV/AIDS (PLWHA) and to prevent the spread of infection. Key components of this law included: development of an epidemiologic surveillance system, public dissemination of information on HIV prevention including use of the mass media, accessibility of anonymous HIV testing upon request with pre- and post-test counseling, free access to medical care including inpatient and out patient treatment, and social services for PLWHA (Transatlantic Partners Against AIDS, 2005). However, there have been numerous gaps between the provisions detailed in the law and its implementation. Initially, the Soviet Ministry of Health (MoH) created a separate, centralized system of AIDS centers and laboratories and instituted mandatory testing for certain high-risk groups. Effective integration of HIV prevention and treatment was blocked by the creation of this separate system, and to date, the health system's ability to reach general population groups for HIV prevention and treatment remains limited.

On August 22, 2004, passage of another Federal Law mandated that only public health institutions and federal organizations would receive federal funding for HIV prevention and that free HIV testing services would only be provided at state health care institutions. The implementation of these policies effectively limited the accessibility of these services (Transatlantic Partners Against AIDS, 2005). For many years this centralized system of AIDS centers has also been under funded. Scarce resources have been inappropriately allocated to mass screening of the population for HIV rather than targeted surveillance for high-risk groups, or for education, prevention, or treatment (Brookings Institute, 2005). The requirement that PLWHA receive medical care only from these state run AIDS centers means that many hesitate to seek care at all, in order to avoid being publicly identified as being HIV infected.

President Vladimir Putin has been widely criticized for his many years of silence and inaction on HIV/AIDS. His first mention of the epidemic occurred in passing in the spring of 2003, during his annual address to the parliament. Putin despite a lack of political and financial commitment to domestic AIDS programs was, however, willing to support international efforts against HIV/AIDS, and pledged USD 20 million in Russian funding for the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) (Global Fund, 2007). More recently, political commitment to a national response to reduce the spread of HIV has been increasing. President Putin announced an increase in HIV/AIDS funding in the federal budget from the 2005 level of USD 4.55 million to USD 105 million in 2006. In April 2006, Mr. Putin announced an allocation of USD 175 million for HIV/AIDS programs, with an expected increase to USD

284.9 million for the next year (Russian President Putin Calls for Increased HIV/AIDS Awareness, 2006).

Increases in funding have been accompanied by increasing dialogue about the HIV/AIDS epidemic. In May 2006, the first Eastern European and Central Asian AIDS conference was held in Moscow. HIV/AIDS advocates and delegates from 50 countries discussed the promotion of effective HIV prevention methods, increasing access to antiretroviral therapy (ART), and reducing stigma surrounding the disease. Also in 2006, President Putin convened a meeting of the Russian State Council and called for the creation of a comprehensive national HIV strategy, including improved coordination between federal ministries and agencies, the development of an accurate system of monitoring and surveillance, and the launching of a widespread informational campaign designed to reach at risk individuals and youth (President Putin calls for urgent measures, 2006). Despite this progress, ambiguity regarding overall responsibility for the problem of HIV/AIDS within the MoH and among other governmental structures exists, and overall coordination remains weak. A comprehensive national AIDS strategy has not been implemented, and the absence of a national AIDS coordinating authority represents a major challenge.

### Federal Drug Policy and HIV Prevention

Economic collapse and consequent rises in unemployment, and poverty along with increased availability of cheap heroin trafficked through central Asia and the former Soviet states have led to a dramatic rise in the use of injected heroin in Russia since 1990 (Dehne et al., 1999). In an attempt to bring the injection drug use problem under control, in 1998, tightening of Russia's federal drug laws prohibited the use, possession, and distribution of illegal drugs, substitution treatment (i.e. methadone, buprenorphrine), "drug propaganda", and inducement to drug use. The penalty for possession of even small amounts of drugs, including the residue in a used syringe, included imprisonment. Mass incarceration followed passage of these laws, as well as a large increase in the number of HIV-infected and at-risk individuals in the prison system. The number of known HIV-infected individuals in the Russian prison system increased from 7,500 in 1999 to 32,000 in 2005 (UNGASS, 2006).

With passage of the Federal Law of 1998, the State Drug Control Committee also suggested that harm reduction programs, including syringe exchange and counseling on safer injection practices were activities that "incline" individuals to use drugs and thus regarded as criminal offenses. The MoH countered these claims. Finally, in 2003, to clarify the intended purpose of the law, a commentary was issued to ensure that harm reduction activities including syringe exchange were not considered to promote drug use if they were approved by executive health authorities and drug control agencies (Transatlantic Partners Against AIDS, 2005).

The Russian government's 2004 revision of the penal code, considers harm reduction services, when approved by the local government, legal, although syringe exchange programs have to be located within state operated organizations and require IDUs to register as participants in the programs. Many drug users are reluctant to use harm reduction services that are tied to official structures, fearing discrimination and harassment from the police and other officials. For

example, registration for narcology services can affect an individual's ability to retain driving privileges, as well as gain employment or housing. A community survey conducted among 426 IDUs showed that 86% of those surveyed relied on pharmacies and shops as their primary source of needles, while only 8% reported using syringe exchange programs, and that IDUs noted a reluctance to carry needles and syringes for fear of detainment by police (Rhodes et al., 2002). A survey of IDUs in two Russian cities identified three main barriers to accessing drug treatment: financial difficulties, fear of registration as a drug user, and perceived low treatment efficacy. IDUs associated registration with loss of employment, stigmatization, and fear of being reported to the police (Bobrova et al., 2006). The current Russian drug treatment system is based mainly on short-term detoxification, rehabilitation, and follow-up outpatient observation, and is not covered by health insurance fees.

### Harm Reduction

As noted previously, the majority of HIV infections in the RF occur among IDUs. The HIV/AIDS epidemic in the RF remains concentrated in, and disproportionately affects IDUs, sex workers (who are often IDUs), and sexual partners of IDUs. Although IDUs comprise 87% of the cumulative number of registered HIV cases, programs to reach IDUs with HIV prevention are limited. Of the estimated 1.98 million IDUs in Russia, only 4.9% are reached by prevention programs (UNODC HIV/AIDS Unit, 2005; UNAIDS, 2006b). Coverage of IDUs by needle and syringe exchange programs (NSEPs) in the RF remains inadequate. Results from a survey of 26 of Russia's 48 NSEPs operating in early 2001 showed that the mean percentage of IDUs regularly reached by each NSEP was 0.74%, a number which falls far short of the target of 60% coverage recommended in 2000 by the UNAIDS Task Force for HIV Prevention among IDUs in Central and Eastern Europe (Burrows, 2001). NSEPs operate in only 33 of Russia's 89 oblasts and as of 2005 there was no needle exchange in Moscow, where the population of Russians infected with HIV is the highest in the country (International Harm Reduction Development Program, 2006a). At the same time, substitution treatment of any kind for drug addiction is illegal (UNODC HIV/AIDS Unit, 2005).

Harm reduction programs for IDUs in Russia have relied heavily on international funding. In 1995 the first NSEP began in St. Petersburg, operated by the Russian NGO Return and funded by Médecins du Monde. By the end of 1997, there were three additional HIV prevention programs for IDUs in place, including an outreach program (without needle exchange) in Moscow funded by Médecins Sans Frontiéres (MSF), the Yaroslavl syringe exchange program and peer driven intervention funded by the International Harm Reduction Development program (IHRD) of the Open Society Institute (OSI), and the Penza syringe exchange program operated and funded by local authorities (Open Health Institute, 2006).

In 1997, OSI helped establish a consortium known as the Russian AIDS Prevention Initiative-Drugs, which included international organizations, Russian NGOs, and the HIV/AIDS Department of the Russian Federal MoH, and began to coordinate the expansion of HIV prevention programs among IDUs in the RF. To bridge a funding gap for harm reduction activities supported by OSI and

an anticipated World Bank loan, the Department for International Development of the United Kingdom granted support for these programs for a three-year project. After a prolonged negotiation process, in 2003 Russia accepted a USD 150 million loan from the World Bank, yet by 2005, the federal government had not supported any harm reduction projects and still offered no backing for needle exchange. Regional authorities have supported programs through donations, small grants, or sponsorship of NSEPs at government clinics, though more often NGO programs receive no government funding (International Harm Reduction Development Program, 2006b).

Major projects continue to be funded largely by international donors. In 2004, Russia's first Global Fund grant was awarded to the Open Health Institute to support a number of projects including 23 NSEPs in 10 oblasts and condom distribution for IDUs and was implemented by a consortium of five NGOs (The Global Fund, 2007). The Russian Harm Reduction Network, a multi-service network of 20 organizations and 15 individuals, was awarded a Global Fund grant in 2006 to expand the coverage of harm reduction services. This included increasing availability of clean syringes and condoms in regions not covered in earlier grants, as well as providing counseling, information, and treatment and adherence support to IDUs living with HIV/AIDS or tuberculosis in the Russian Federation. The project will support 28 harm reduction programs in year one and expand to 33 programs by the end of year two, and aims to increase coverage of harm reduction services for IDU to 60% by year five (The Global Fund to Fight AIDS, Tuberculosis and Malaria, 2007). In 2000, 70% of the funding for existing NSEPs was from international donors, and 30% was from local funding sources (Burrows, 2001). Federal support for harm reduction activities remains disappointingly low, and to date the overwhelming majority of programs continue to be funded by international sources.

Several studies have evaluated the effectiveness of harm reduction activities in Russia in reducing risky behavior. In a cross-sectional study conducted in five Central Eastern European cities and five Russian cities, IDUs recruited from NSEPs were interviewed on risky behavior conducted for the 30 day period prior to the interview and for the 30 day period prior to the use of the NSEP, as well as their knowledge of HIV/AIDS. Participants in all ten programs reported substantial decreases in "receptive syringe sharing" (injecting with a syringe or needle that had been used by someone else), and in the majority of programs there were significant reductions in "front loading" (where the drug solution is squirted from a donor syringe into the front of another syringe with the needle removed) or "back loading" (where the drug solution is squirted from a donor syringe into the back of another syringe with the plunger removed), sharing of drug preparation equipment, and injecting at anonymous venues (Des Jarlais et al., 2002).

In Sverdlovsk Oblast, a study conducted among IDUs in three cities compared high-risk behavior between IDUs participating in NSEPs and IDUs not participating in these programs. IDUs participating in NSEPs were less likely to report sharing needles or syringes, filters, or drug solutions, and were less likely to report using another's syringe for measuring their drug dose, although condom usage did not vary between groups (Power & Nozhkina, 2002). A cohort study designed to assess the effectiveness of harm reduction programs (HRPs) in three Russian cities found that HIV prevalence among IDUs was

14.7% in the city without HRP, 2.1% in the city where HRP was two years old, and 0.3% in the city where HRP had been established in 1998, and that after one year of follow-up, incidence rates were 13.2%, 2.5%, and 0% respectively (Eroshina et al., 2005).

Despite the fact that the concentration of the Russian HIV/AIDS epidemic is among young IDUs, the HRP coverage remains inadequate. Existing HRPs have demonstrated reductions in risky behavior as well as HIV incidence and prevalence. To date, federal support for harm reduction activities remains disappointingly low, and international sources of funding continue to be the primary support for such activities.

### HIV Prevention Among Female Sex Workers

In Russia, while soliciting money in exchange for sex is an administrative offense rather than a criminal one, SW are often harassed or detained by the police for "petty hooliganism" or for lack of documentation, including residency permits, may experience extortion for sex or money and may even encounter physical violence and rape (CEEHRN, 2005; Burris & Villena, 2004). Forced testing of arrested sex workers for STIs and HIV as well as hospitalization for compulsory STI treatment has been reported (Lowndes et al., 2003). Such a situation discourages SW from contact with any state structures, including health services, and acts as a deterrent to sex workers seeking medical care and HIV/STI testing.

The IHRD has initiated one major prevention initiative, funding 33 sex work harm reduction projects in 12 countries in Central and Eastern Europe (including Russia). Approximately 6,500 SW were engaged at least once with harm reduction information about HIV, STIs, and drug use. Projects in Russia noted several successes, including the creation of linkages with local funders, medical services, and media although several projects also experienced continued difficulties with militia and police (Open Society Institute & International Harm Reduction Development, 2002).

Other projects in Russia have developed partnerships with existing public health services and clinics to provide specialized prevention services for sex workers. In Penza, the Anti-AIDS Foundation expanded its existing HIV prevention program to deal with HIV and STI prevention among SW. Interventions provided by the Anti-AIDS Foundation include: HIV and STI prevention education for female SW and their clients, psychosocial counseling, assistance with legal and administrative affairs, developing and distributing information, education and communication materials and condoms, outreach, referrals to free STI and other medical services, harm reduction interventions for injection drug using SW, involvement of pimps in HIV and STI prevention interventions, and primary prevention for young people (UNAIDS, 2006b).

As of 2005, 25 harm reduction projects had been implemented among SW in the Russian Federation although, according to a survey conducted among 32,000 SW, only 16% reported that they had been reached by at least one HIV prevention program in the previous year, highlighting the challenges of reaching marginalized groups with current prevention strategies (UNGASS, 2006). Much higher proportions of the target population must be

reached in order to have a significant effect on the rates of STI and HIV transmission, requiring a massive scale up of interventions with attendant financial and legal support.

### HIV Prevention in Prisons

Incarceration continues to be a major risk for the transmission of HIV and TB in Russia. IDUs are over-represented in prison populations, and continued drug use and paraphernalia sharing are common in prisons. In a survey conducted among 1,044 prisoners in 10 Russian prisons by MSF, 8.6% reported that they had injected a drug in the prison facility where they were surveyed, with two-thirds of those sharing injecting equipment. Twenty-six percent of this sample reported having a tattoo made in prison and of these only 31% used a new needle. Ten percent of the sample reported sex in prison, but none of the women and only 17% of men had ever used a condom in prison (Frost & Tchertkov, 2002). Both needle exchange and substitution treatment remain unavailable to the estimated 42,000 HIV infected prisoners in the RF and are prohibited by law (International Harm Reduction Development Program, 2006b).

Some HIV prevention strategies have been employed in the penal system. They include training of prisoners and prison staff regarding HIV transmission and prevention, peer education, and the provision of condoms and disinfectants for cleaning needles (Open Health Institute, 2006). An international NGO, AIDS Foundation East-West, began implementing a five-year HIV prevention program in the Russian penal system in 1999, designed to establish HIV prevention and health programs in the Russian prison system in the Penza, Omsk, and Krasnodar Regions and Moscow. Upon its completion, 600 inmates were trained as outreach workers, 500 medical professionals and psychologists were trained in pre- and post- test counseling for HIV, 560 members of the prison staff were trained in risk-reduction in the workplace, and informational materials and bleach were distributed, as well as 100,000 condoms, although the success of this program in preventing HIV transmission is unknown (AIDS Foundation East West, 2003). Under the Globus project, HIV prevention programs were supported in the penal systems of ten regions, including staff training on HIV prevention and the distribution of condoms and disinfectants to inmates. Despite the implementation of these promising programs, basic HIV prevention measures, including condoms and materials for sterilization of syringes, are largely lacking in Russian correctional facilities, which remain high-risk environments for HIV transmission (Human Rights Watch, 2004).

### HIV Prevention Among Street Youth

Street youth in Russia have poor access to health care due to their lack of official documentation and societal stigmatization. These vulnerable youth often have little knowledge of prevention methods, and have limited access to HIV testing and treatment. HIV infection is highly prevalent among street youth, and in a study of street youth conducted in St. Petersburg,

most HIV infected street youth were sexually active (96.6%), had multiple partners (65.0%), and used condoms inconsistently (80.3%) (Kissin et al., 2007). The Russian Federal government has undertaken some actions to control and decrease the number of street children. In 2002, it issued Resolution #154, aimed at developing a system of social support for at-risk children and also approved measures to prevent homelessness, neglect and juvenile delinquency.

HIV prevention programs for street youth have been instituted by a number of NGOs. Beginning in 1995, the French NGO Doctors of the World, launched its HIV prevention programs for street youth, and the organization Humanitarian Action, based in St. Petersburg, grew out of these programs. The current program, now supported by Humanitarian Action, is based on the cooperation of doctors, psychologists, social workers, out-reach workers and teachers, with activities including: (1) distribution of preventive educational materials promoting healthy attitudes and behaviors; (2) provision of access to medical, psychological and social assistance; (3) HIV, viral hepatitis B and C, syphilis testing; (4) resocialization of street children through collaboration with families and shelters; and (5) provision of access to education (Humanitarian Action, 2007). The Humanitarian Action Fund was awarded the 2005 Award for Action on HIV/AIDS and Human Rights, an award given annually by Human Rights Watch and the Canadian HIV/AIDS Legal Network to an individual or organization that has made outstanding contributions to addressing HIV/AIDS and human rights.

The NGO Doctors of the World-USA (DOW) has been working to address the needs of street and at-risk children and youth in St. Petersburg since 1994, creating community-based, sustainable projects to reduce children's homelessness and institutionalization. DOW has created Drop-in Centers to provide street and at risk children and youth with a safe place to access medical, psychosocial, and legal support services that acknowledge their rights and dignity. In 2006, DOW initiated a program to facilitate care and support for HIV-positive street and at-risk children and youth in St. Petersburg. Built on a unique collaboration between the public sector and local organizations, the project enables access to comprehensive medical, social, and psychological services for HIV-positive street and at-risk youth. A mobile outreach unit visits areas where street and at-risk children and youth live and gather, offering free HIV counseling and testing. HIV-positive individuals are referred to a variety of services, including medical and psychological support. DOW helps HIV-positive street youth access ART and other essential medical care at the City AIDS Center. DOW also partners with the U.S. Agency for International Development (USAID) to reintegrate street and neglected children into the community (Doctors of the World-USA, 2007).

### Prevention of Mother to Child Transmission

One of the challenges posed by rising rates of HIV infection in pregnant women is the delivery of interventions to prevent maternal to child transmission (PMTCT). While Russian governmental sources report that 84.6% of HIV

infected pregnant women in Russia, and 91.7% of babies delivered by HIV-infected women were covered by PMTCT in 2005 (WHO, 2006a), in 2006 UNAIDS reported that only 14.6% of HIV infected pregnant women living in Russia received PMTCT (UNAIDS, 2006c.) Reasons for the discrepancy between these reports remain unclear. Regardless, innovations in providing PMTCT are achieving some success. In 2004, in St. Petersburg, rapid HIV testing, which can enhance access to PMTCT (Minkoff & O'Sullivan, 1998) was implemented in a program for women who were giving birth and had not received prenatal care. Among 670 women without prenatal care who received rapid HIV testing, 6.4% (43) had positive results. Among these HIV-positive mothers, receipt of intrapartum antiretroviral (ARV) prophylaxis increased significantly compared to pre-program levels (76% versus 41%) (Hillis et al., 2007).

### Mass Media HIV Prevention Campaigns

United Nations (U.N.) Secretary General Kofi Annan first called upon media companies to join the global effort against HIV/AIDS in January 2004 at a special meeting of media leaders at UN headquarters in New York, where the Global Media AIDS Initiative (GMAI) was established. The GMAI was conceived of and organized by UNAIDS and the Kaiser Family Foundation, and aims to activate media organizations to provide information on HIV prevention and treatment to a global audience and to help combat AIDS-related stigma and discrimination. In 2004, a group of leading Russian media companies announced the formation of the Russian Media Partnership to Combat HIV/AIDS (RMP) (Russian Media Partnership to Combat HIV/AIDS, 2004). The partnership was coordinated by the NGO Transatlantic Partners Against AIDS (TPAA) in close collaboration with the Kaiser Family Foundation, Viacom- through its KNOW HIV/AIDS campaign, and UNAIDS in the context of the Global Media AIDS Initiative, and united a coalition of over 40 Russian and international media companies (Transatlantic Partners Against AIDS, 2005).

In the first year of its campaign, RMP committed over USD 26 million in free commercial advertising space for an unprecedented national HIV/AIDS public awareness campaign. On World AIDS Day 2005 (December 1), RMP launched its StopSPID (Stop AIDS) campaign, a public education campaign designed to challenge HIV/AIDS associated stigma and discrimination and raise public awareness about HIV prevention, testing, and treatment. The campaign delivers messages via public service advertisements in television, radio, print, film, and online, integrates HIV related topics into entertainment and informational programming, briefs journalists and media organizations to improve the quantity and quality of HIV/AIDS coverage, and provides public access to informational resources. RMP has committed more than USD 250 million worth of commercial advertising space to the campaign for the first three years. A poll commissioned by TPAA in July 2005 found that 46% of those surveyed were familiar with at least one of StopSPID's public service announcements on television, and of those who had seen the public service announcements, 47% felt motivated to learn more about HIV (Survey Shows Russians, 2005).

## HIV Treatment

### Structure of HIV/AIDS Treatment Centers in Russia

The Russian MoH is responsible for formulation of health policy and administration of the state-owned medical research, education, and health care system. Although recently a network of private health care providers has been growing, the majority of Russians receive their health care through the MoH system, which guarantees universally accessible care free of charge under Article 41 of the Constitution. Although Russians have the right to choose their own medical providers, the vast majority obtain care through the physician and municipal-level polyclinic to which they are assigned within their neighborhoods, and adhere to a vertically organized system of local and regional general and specialized hospitals; secondary or tertiary care is by referral by polyclinics. Patients routinely pay out of pocket for medical expenses, and side payments, both freely expressed on price lists as well quietly hidden, are the norm in polyclinics. Scarce and wasted resources have resulted in a large gap between the quantity and quality of health care assured under Article 41 and the capacity of the health care system to provide that care free of charge (World Bank Operations Evaluation Department, 2005).

Initially in the Soviet era, institutional authority for HIV/AIDS was assigned to the STI network of the health care system although there was no overarching national program to coordinate HIV-related activity. In 1987 the MoH began to develop a network of laboratories to screen blood donors and conduct HIV testing. In ensuing years, a computerized system was established to register and analyze testing activity, and a centralized system of AIDS Centers and diagnostic laboratories was created. Initially these AIDS Centers functioned to provide epidemiologic surveillance for HIV infection. Mandatory HIV testing was launched in 1987 for 15 population groups. The HIV surveillance system was expensive and inefficient, and primarily tested those at low risk for HIV infection, producing little public health benefit and diverting resources from prevention efforts.

In 1993, the Russian government developed the "Federal Program for the Prevention of the Spread of AIDS from 1993 to 1995", which introduced a system of HIV prevention, improved diagnostic and treatment capacity, and epidemiologic surveillance, and disseminated educational materials. The program provided the basis for the extensive vertically organized system of AIDS centers run by the MoH, and prioritized biomedical science over prevention education, and social services; the program was renewed in 1996 and 2002. In 2005, the MoH issued a new regulation reorganizing the structure and function of the AIDS Centers (Order #757 on December 05, 2005).

AIDS Centers now consist of out-patient and in-patient units, and staff may include a broad range of subspecialists including infectious diseases physicians, venerealogists, obstetrician-gynecologists, and pulmonologists, among others. At present, the AIDS centers are the sole institutions responsible for HIV testing and prevention and health care for PLWHA in the region. As a result, HIV prevention and treatment are not integrated into primary health care, and health care providers outside of the AIDS Centers are untrained and uninformed about HIV. Low rates of follow-up at AIDS Centers due to patient

distrust of official services, and discrimination in health care settings have been problematic, and many PLWHA avoid seeking medical care at all, due to fear of being branded as HIV-infected. Despite significant salary supplements, many physicians are unwilling to work with PLWHA, as a result of outdated knowledge, stigma, poor working conditions, and limited opportunities for professional growth.

As noted, most primary health care providers are untrained in the management of HIV/AIDS. In May 2006, the Russian Health Care Foundation interviewed more than 2,000 physicians, medical assistants, and nurses as part of a study assessing the level of HIV-related knowledge among health care professionals outside of the AIDS centers in nine regions (Monitoring & Evaluation Unit Federal Public Health Institute, 2006). Researchers concluded that the level of HIV knowledge among health care professionals was inadequate for current demand, and that further training in testing and counseling, treatment and palliative care, and HIV prevention are much needed. Programs supported by the Russian government and the Global Fund are expanding HIV/AIDS related training for medical providers in an effort to increase the number of qualified clinicians and other health care professionals.

### Access to Antiretroviral Therapy

As stated earlier, guaranteed access to HIV testing, treatment and prevention, and social support were established by Federal Law No. 38-FZ on March 30, 1995 (On Preventing of the Spreading of the Disease Caused by the Human Immunodeficiency Virus in the Russian Federation). The Federal Law ensures free medical care for PLWHA including medications in out-patient and in-patient health settings, in accordance with international recommendations. To further improve the national response in combating HIV/AIDS the Russian government adopted "Emergency Measures to Prevent the Spread of HIV AIDS" (Anti-HIV/AIDS Programs) in 1993–1995, 1996–2000, and 2002–2006. The five-year budget of the Anti-HIV/AIDS Program from 2002 to 2006 was about USD 100 million, including USD 27 million from the federal budget and about USD 70 million from regional budgets. This program included 4 major components:

1. Prevention, testing and treatment of HIV/AIDS (93% of program budget)
2. Conducting research (1.6% of program budget)
3. Strengthening material and technical basis (5.2% of program budget)
4. Staff training (0.12% of program budget).
   (Federal Task Program – Government Regulation #790 on November 3, 2001).

Despite the 1995 federal regulation and this subsequent "Emergency Measures Anti-HIV/AIDS" funding, by some estimates ART was provided to only 500 of the 5,000 estimated HIV-infected persons in need of ARVs in 2004, and an additional 500 of the 15,000 patients in need of ARVs in 2005 (Anti-HIV/AIDS Programs, 2004 & 2005). These data on the number of individuals on treatment are disputed. According to the WHO, there were 5,000 individuals

on treatment in 2005, while governmental surveillance estimates are between 2,500 and 3,000 (WHO, 2006b; Goliusov, 2006). There are several explanations for why only a small proportion of those in need actually receive HIV treatment: the supply of medications is insufficient, treatment is denied by local AIDS centers, especially to IDUs, and many PLWHA are unaware of how to access treatment or even that they need treatment.

The main obstacle in scaling up access to treatment for HIV infection is the cost of ARVs in Russia. Before 2006, the cost of first line ARVs was between USD 3,500 and 8,000 per patient per year. However some progress is being made, and in 2005 the Ministry of Health and Social Welfare reached an agreement with international pharmaceutical companies to decrease the cost of ARVs. Project GLOBUS has successfully advocated for the reduction in ARV costs, which has reduced the annual cost of ARVs to USD 1,500 per patient per year.

Theoretically, increased funding opportunities, along with lower drug prices would allow treatment for every HIV-infected individual who needs to initiate ARVs in Russia. According to official estimates, between 13% and 20% of HIV-infected individuals are in need of ART throughout the country. An increase in the number of HIV-infected persons receiving ART has been observed since the latter part of 2006. According to the MoH 14,400 HIV-infected individuals (including about 5,000 pregnant women and about 600 prisoners) were provided with ART in 2006, covered by funds from the Priority National Project in Health Care (Ministry of Health 2006; Onischenko, 2006). Additionally the Globus project has provided treatment for about 4,000 HIV-infected persons (Proceedings #1of Government Commission on HIV prevention, testing and treatment on January 17, 2007). In 2007, about 30,000 patients, representing 8.1% of all registered HIV infected individuals in Russia, are expected to receive treatment (Onischenko, 2006). To improve access to treatment for HIV infection, the Government Commission on HIV prevention, has announced that it is considering allowing the production of generic ARVs in Russia. A special meeting of the Government Commission is planned, in which government ministries along with pharmaceutical companies, will discuss ways of decreasing prices for medications to treat HIV infection (Proceedings #1of Government Commission on HIV prevention, testing and treatment on January 17, 2007).

### Treatment for Injection Drug Users

IDUs are often excluded from HIV treatment programs, although they represent the majority of those infected with HIV in Russia (IHRD OSI, 2006b; Samoilov, 2004). In 2002 and 2004 there was not one IDU on ART in either Moscow or St. Petersburg (Human Rights Watch, 2004; CEEHRN, 2002). There is a belief commonly held by clinicians and policy makers, including those who work in the AIDS Centers, that IDUs cannot adhere to ARV treatment regimens and "therefore to give them medications instead of giving them to someone who deserves is a total loss" (CEEHRN, 2004). The idea that those who used drugs somehow deserved what they got, including death from AIDS, is a common theme in government and health care facilities in Russia.

### Treatment for Sex Workers

Access to ART for high-risk marginalized populations such as SW in Russia is limited, yet several programs have successfully partnered with public health services and clinics to provide specialized STI and HIV services. In St. Petersburg, a network of clinics exists, including: the City Hospital for Infectious Diseases, which provides out-patient consultation with an infectious diseases doctor and testing for HIV, hepatitis B and C, and syphilis, in-patient care, and drug treatment assistance; the Clinic for Skin and Venereal Diseases, which provides outpatient examinations and treatment with hospitalization as needed; the Center for Reproductive Health of Young People ("Juventa") which provides out-patient screening for and treatment of STIs as well as gynecologic services; the Medical Drug Treatment Hospital which provides consultation and in-patient treatment for drug using SW. Additionally, in Volgograd, the NGO "Marija" refers SW to doctors who provide free and anonymous medical services as part of an agreement with the Dispensary for Skin and Venereal Diseases in which they can provide STI testing and treatment free of charge for five to six SW a month (Central and Eastern European Harm Reduction Network, 2005). Significant challenges remain in addressing stigma and discrimination in order to increase effective and comprehensive delivery of care for SW.

### Funding for HIV Treatment in Russia

Recently, governmental and non-governmental contributions have significantly increased funding for prevention and treatment of HIV/AIDS in the RF. In September of 2005, President Putin announced the Priority National Project in Health Care. The project has allocated more than 3 billion rubles (USD 116 million) to combating the HIV/AIDS epidemic and will provide support for primary care, basic medical aid, and disease prevention including vaccination. Increasing access to health services and the scale-up of ARV coverage is another key component of the project. Additionally, the Anti-HIV/AIDS Program 2007–2011 budget proposes an allocation of USD 348 million (9,035 million rubles) for HIV prevention and treatment, as well as other services. Funding for treatment will also come from the Global Fund which has awarded two projects to the RF. The first, project GLOBUS, has an USD 89 billion budget for 2004–2009, and the second "Development of a Strategic Response to HIV/AIDS Treatment and Care for Vulnerable Populations in the Russian Federation" will provide USD 120.5 million for 2005–2010.

Project GLOBUS aims to increase HIV awareness and reduce transmission, by focusing on mass media campaigns, health education in schools, voluntary testing and counseling, and improving availability of condoms. Prevention efforts specifically target vulnerable groups such as IDUs, SW, prisoners, MSM, and street children. GLOBUS also aims to expand access to ART, ensuring that marginalized groups such as IDUs have equitable access to treatment, as well as initiating a PMTCT-plus program and working towards comprehensive ART for PLWHA. The World Bank has loaned USD 150 million to implement TB and HIV/AIDS prevention and treatment programs, of which USD 50 million has been allocated for HIV/AIDS components, including USD 4 million for PMTCT programs.

### Challenges in Delivering Treatment

Presently, the major challenges faced in providing care for HIV-infected individuals are the rigid, vertical system of current AIDS centers, limited knowledge and participation of general practitioners in the care of HIV-infected individuals, and a high prevalence of co-morbidities such as drug addiction, hepatitis B and C, and TB, and the cost of ART. The national budget of the "Anti-HIV/AIDS" program has not provided the financial resources necessary for the centralized purchase of ARVs to treat all HIV-infected Russians for whom care is indicated, as required by the Federal law, and ARVs are not produced domestically. Recently, national treatment standards for PLWHA have been approved: as ARV provision is scaled up, having a standardized approach to treatment of HIV will be increasingly important, yet its implementation may remain problematic, particularly if the ARV supply is unreliable.

There are currently no national recommendations for adherence counseling and patient education for HIV-infected patients receiving HAART in the Russian Federation. With the recent expansion in access to ART in Russia, increasing attention must be given to the assessment and improvement of adherence to HAART, to ensure optimal delivery of care to HIV-infected individuals. The growing number of NGOs organized by HIV infected individuals to provide social and psychological support for other PLWHA, particularly drug users, may help. Indeed, some NGOs that provide care for HIV-infected drug users often recruit subjects from the community of PLWHA or former drug users as peer counselors or staff members. Peer counselors provide adherence and preventive education among PLWHA, and act as bridges between health care providers and HIV infected patients, assisting clients in obtaining care and advocating for their rights in hospitals, AIDS centers, and addiction clinics in addition to providing outreach activity for drug users, street youth and sex workers (Community of People Living with HIV, 2004).

## Conclusions

Russia faces a number of challenges in meeting the HIV/AIDS epidemic. Russia's fragmented public health system and systemic stigmatization of those infected with HIV, especially IDUs, have complicated the nation's response. At the same time, significant steps have been taken by NGOs to develop both prevention and treatment programs for marginalized groups and direct governmental investment in HIV treatment programs is expanding. Nonetheless, HIV/AIDS is not a challenge that will recede. A proactive response to this epidemic can serve as a model for the many other public health challenges that will be faced by Russia.

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# Chapter 25

# HIV in Central Asia: Tajikistan, Uzbekistan and Kyrgyzstan

Daniel Wolfe, Richard Elovich, Azizbek Boltaev,
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## Introduction

The Central Asian Republics of Tajikistan, Kyrgyzstan and Uzbekistan vary in size, gross national product, social and political organization, and ethnic composition. Nonetheless, a number of factors argue for their inclusion in a single chapter on Central Asian responses to HIV. The territories of the three countries overlap, with national borders originally demarcated under Stalin interlocking like a jigsaw puzzle. All three of the republics experienced disruption of social supports in general and health care financing in particular



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_25, 

following the collapse of the Soviet Union, as well as large scale internal and external migration. All sit on drug trafficking routes for opiates produced in Afghanistan and moved through Central Asia toward markets in Russia, Eastern and Western Europe. All reported sharply increasing rates of injection drug use and sexually transmitted diseases (STDs) in the early 1990s, and rapidly growing HIV epidemics concentrated among injecting drug users (IDUs) from 2000 onward. While HIV prevalence in all three republics remains relatively low, the growth of new cases in all three countries is among the fastest in the world. Finally, international donors such as the United States Agency for International Development (USAID), the United Kingdom's Department for International Development (DFID) and the World Bank have frequently treated the Central Asian republics as a unit for HIV prevention, giving grants meant to support similar activities in multiple countries.

Recently published material has examined what might be termed structural "drivers" of the Central Asian HIV/AIDS epidemic, including migration, drug trafficking, and sex work (Mounier et al., 2007; Renton et al., 2006). In addition to offering a brief overview of these underlying causes and related trends in HIV infection rates, this chapter will also detail *responses* to the HIV/AIDS epidemic in Uzbekistan, Tajikistan, and Kyrgyzstan, with a particular focus on programs intended to reach IDUs, among whom HIV cases remain overwhelmingly concentrated [see Figure 25.1]. The three countries vary in the quality and quantity of HIV prevention interventions, with differences structured in part by differential participation of governments, non-governmental organizations (NGOs), and international donors. A balance of these three elements is likely to shape the degree to which countries are able to respond effectively to HIV.

In keeping with analysis that urges a move beyond the individual to understand determinants of risk of HIV for IDUs (Rhodes et al., 1999), the chapter also focuses on the narcological dispensary, a structure central to government

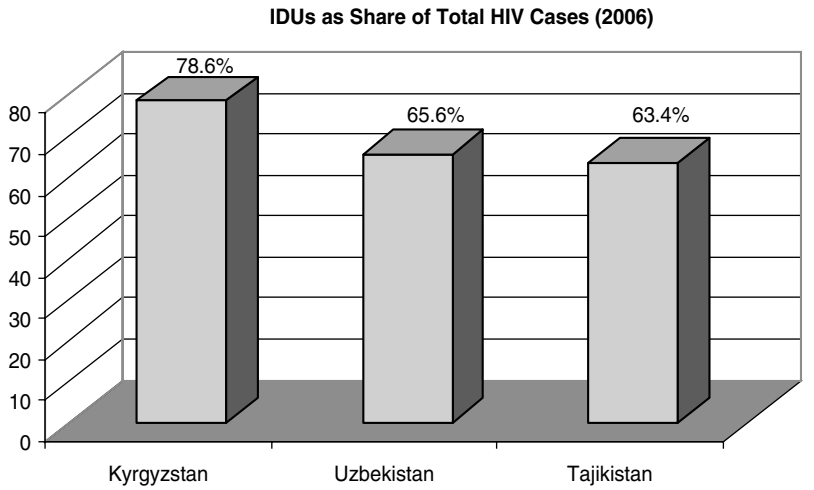


**Figure 25.1** IDUs as share of registered HIV cases, Uzbekistan, Kyrgyzstan, Tajikistan. Sources: Kyrgyzstan State Plan 2006–2010; Republican AIDS Centre Tajikistan; Republican AIDS Centre of Uzbekistan.

response to IDUs in all three countries. Narcologists serve as a primary point of contact between IDUs and the state, and so are central to an effective response to an HIV/AIDS epidemic concentrated among IDUs. Discussion of services for IDUs in the three countries includes examples of promising practices from each.

## Spread of HIV

### Political and Economic Background

The degree to which HIV risk can be considered a social rather than individual phenomenon is clear in Central Asia, where increases in opiate addiction, sexually transmitted infections (STIs), and HIV infection coincided with the collapse of the Soviet Union. The dissolution of the USSR delivered a series of economic shocks that resulted in hyperinflation and cuts in government spending at precisely the moment that newly independent national governments were called upon to articulate new structures and social supports. All three Central Asian Republics considered here experienced sharp declines in gross domestic product and public spending between the proclamation of their independence in 1990 and the marked increases in HIV infections a decade later. Between 1990 and 1997, public spending declined by approximately 67% in Kyrgyzstan and 48% in Uzbekistan (Pomfret, 2002). In Tajikistan, a five year civil war beginning in 1992 resulted in more than 60,000 killed, severe disruption of government and private sector economic activity, and precipitous declines in government spending (Godinho et al., 2005; Olimova & Bosc, 2003). By 1998, expenditures on social services had fallen to 15% of their 1990 levels (Pomfret, 2002).

The opening of borders and resurgence of national loyalties resulted in mass migration in Central Asia, including by Russian ethnics seeking to return to the motherland. All three countries experienced severe disruption of labor markets, pension systems, and salary payments to government employees. The result has been further population movement, primarily from rural areas to urban ones, and from poorer countries to richer ones within Central Asia and from Central Asia to Russia (Renton et al., 2006). Estimates from the International Labor Organization, the International Organization for Migration and national studies suggest that more than 150,000 people from Uzbekistan, 50,000 from Kyrgyzstan, and 100,000 Tajiks work in Kazakhstan, and as many as 2 million Central Asians are temporary labor migrants in Russia (Renton et al., 2006). In Tajikistan, nearly one in five individuals (18%) of employable age was estimated to have worked abroad between 2000 and 2002 (Olimova & Bosc, 2003). A 2005 study found that nearly 40% of women in Tajikistan reported that their husbands had left the country in search of work, and that three in four of these saw their husbands once a year or less (CARHAP, 2006a).

In Central Asia, the simultaneous weakening of national economic markets and the emergence of neighboring Afghanistan as the world's leading producer of illicit opiates encouraged illegal economic activity. In Tajikistan, where a third of the national border, much of it mountainous and difficult to police, is shared with Afghanistan, estimates suggest that 30–50% of economic activity is connected to the opiate trade (Parfitt, 2003; Stachowiak et al., 2006). Sex work

is another hallmark of post-Soviet economies in Central Asia: Uzbekistan has an estimated 25,000 sex workers, while Tajikistan and Kyrgyzstan each have an estimated 5,000 (Godinho et al., 2005). In all three countries, vulnerability to illegal activity is facilitated by illegal status. Uzbekistan, Tajikistan, and Kyrgyzstan all retain the *propiska* system that requires legal authorization for residence. Tens of thousands of internal migrants are de facto illegal, excluded from social supports and health care.

### STD and HIV Epidemiology

Economic and social transitions in newly independent Central Asian republics coincided with what a World Bank working paper termed four interlocking epidemics of STDs, drug use, tuberculosis, and HIV (Godinho et al., 2005). In Uzbekistan, for example, rates of syphilis notification by 1997 were 30 times that in 1990. Increases in Kyrgyzstan and Tajikistan were even more severe, with notification rates in 1998 increasing by nearly ninety fold in the same period. While increases had leveled off by 2003, annual STI notifications remained between six and 30 times higher than the number in 1991 (Renton et al., 2006).

Opiate injection, previously almost unknown in the region, also accompanied independence. Locally grown opiates had been used in medicinal teas or smoked recreationally in Central Asia for centuries, and plantations and manufacturing facilities in Kyrgyzstan provided medications for use in the USSR until 1973 (Zelichenko, 2004). Controlled by family and cultural norms or the state, reported drug abuse had been limited to solitary cases of hashish and opium dependence (Kyrgyz Republic, 2001; Open Society Institute, 2003). The mid-1990s marked a shift to injection of homemade preparations known as *khanka* or *khimshirka,* derived primarily from poppy and opium smuggled in from Afghanistan or from Tajikistan into southern Kyrgyzstan (UNODC, 2002; Zelichenko, 2004). The development of heroin processing facilities in Afghanistan led to use of smaller, prepackaged doses of heroin powder, which required less preparation and which could be more easily injected alone and in a variety of settings. At the start of 2000, for example, 70–80% of IDUs in Bishkek, Kyrgyzstan used *khanka*; by year's end, only 26% of users reported *khanka* use, while 76% reported use of heroin (Estebesova, 2003). While comparative data on HIV risk for heroin versus *khanka* injection remains limited, a study of injectors in Tajikistan found that recent injectors, as well as those injecting alone, were significantly more likely to be HIV-infected (Stachowiak et al., 2006).

Reports of all forms of drug use, and particularly opiate injection, have continued to grow rapidly after independence [see Figure 25.2]. Rates of registered drug use in Kyrgyzstan increased more than 600% between 1991 and 1999; IDUs were 10% of registered drug users in 1991, but 73.1% of all drug users by 2000 (Kyrgyz Republic, 2001). In Uzbekistan, the number of officially registered drug users increased by 800% between 1991 and 2005 (Godinho et al., 2005). In Tajikistan, the number of registered drug users increased more than 900% between 1995 and 2005, with 7,576 registered as of the close of 2005. Of those, 6,004 (79%) were heroin users, and the majority of these heroin injectors (CARHAP, 2006a).

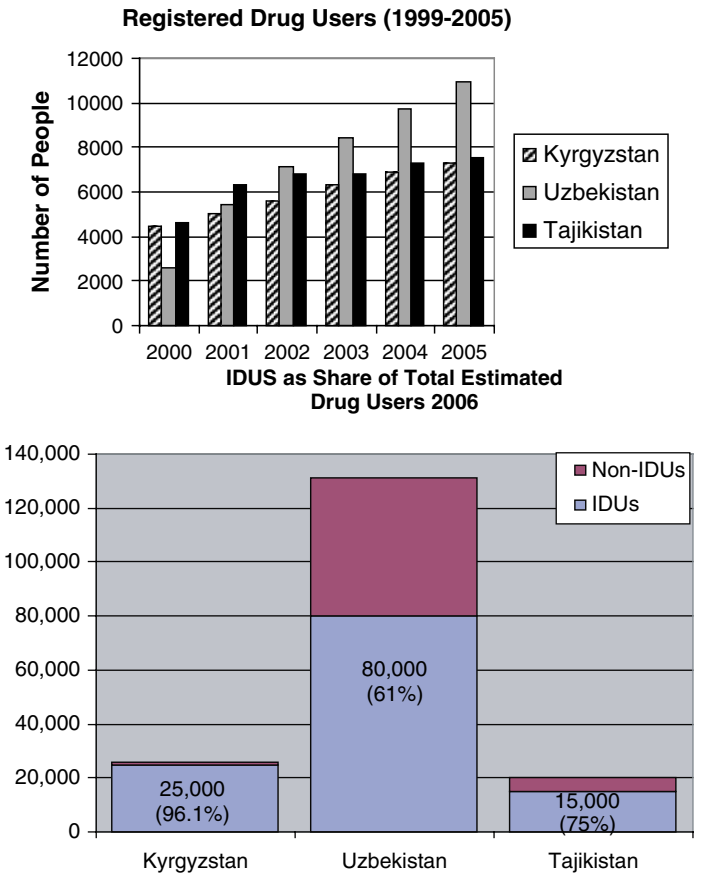


**Figure 25.2** Registered drug users in Uzbekistan, Tajikistan, Kyrygzstan.
Source: Godhino et al. (2005); Republican Narcological Centres of Uzbekistan, Tajikistan and Kyrygzstan, 2006.

Rapid assessments have found substantial HIV risk among IDUs. A United Nations (U.N.) rapid assessment in 2003 reported rates of needle sharing between 20 and 40% in Kyrgyzstan, 30% in Tajikistan, and 70% in Uzbekistan (UNODCCP, 2003). A 2005 study in Uzbekistan found that 31% of IDUs had used another person's syringe in the past month (CARHAP, 2006c). In Kyrgyzstan, 59% of IDUs with HIV had shared needles in the past month in 2006 (Kyrgyz Republic, 2006). Condom use among IDUs is also inconsistent. One study in Uzbekistan found that nearly four in five IDUs reported inconsistent condom use, though the study did not distinguish between HIV-positive or negative IDUs and excluded those participating in needle exchange programs (Todd et al., 2007).

Between 1999 and 2003 all three countries reported explosive increases of HIV infection [see Figure 25.3] driven by injection drug use. In Uzbekistan, where only 51 cases of HIV had been diagnosed prior to 1998, there were a total of 800 registered cases in 2001, and more than 3,500 in 2003 (Gotsadze, 2004). By January 2007 there were more than 10,015 cumulative cases, with some

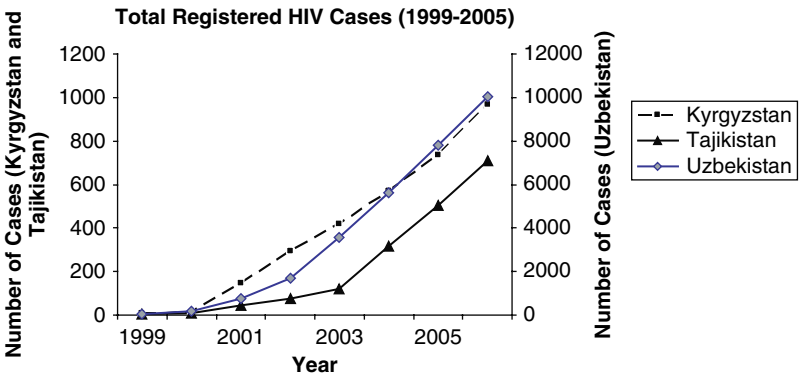


**Figure 25.3** Registered HIV cases in Kyrgyzstan, Tajikistan, and Uzbekistan.
Source: AIDS Foundation East-West, based on data from Republican AIDS Centres.

60% of these transmitted through injection. Kyrgyzstan, which was considered the last HIV-free country by the World Health Organization (WHO) in 1995, and which saw the first case of HIV diagnosed among a Kyrgyz citizen in 1996 (Bashmakova et al., 2003), experienced a nearly ten-fold increase in HIV cases between 2000 and 2001, and a fifteen fold increase between 2001 and 2006 (CARHAP, 2006b). As of January 2006, 826 cases of HIV had been registered, with 76% among IDUs (CARHAP, 2006b). In Tajikistan, there were seven diagnosed cases in 2000, 34 in 2001, and 710 cases by November 2006, 66% of them among IDUs.

Surveys have reported HIV prevalence among IDUs in Uzbekistan as high as 46% (Kurbanov et al., 2003), with sentinel surveillance data from 2004 showing HIV prevalence of 22% among IDUs in Tashkent (CARHAP, 2006c). In Tajikistan, a 2006 study of 489 active adult IDUs found overall prevalence of 12%, with infection rates higher among Tajiks (19%) and lower among Russians and Uzbeks (3.4%) (Stachowiak et al., 2006). Sentinel surveillance from Dushanbe and Khujand in 2005 reported prevalence of 15.8% among IDUs (Republic of Tajikistan, 2007b). In Kyrgyzstan, prevalence among IDUs, estimated at 6.4% in a CDC study in 2004, had reached 8% by 2005 (Kyrgyz Republic, 2006).

While HIV prevalence rates among sex workers are significantly lower than those among IDUs, high STI rates and frequency of sex work have led governments in all three countries to identify sex workers as target groups for HIV prevention. In Tashkent oblast in Uzbekistan, sentinel surveillance in 2004 found that 52.4% of sex workers had at least one symptom of an STI in the previous six months, and a prevalence of HIV of 3.6% (CARHAP, 2006c). In Kyrgyzstan, where cumulative contacts between sex workers and clients was estimated at more than a million annually, HIV prevalence data from Osh and Bishkek suggests an HIV prevalence of 2% (CARHAP, 2006b). Sentinel surveillance in Dushanbe and Khujand, Tajikistan found HIV prevalence of 0.7% among sex workers, and syphilis prevalence of 20% (NCC of Tajikistan, 2006). Sex workers who are also IDUs are at particularly elevated risk for both HIV and STIs. Sentinel surveillance in Taskhent found that sex workers who inject drugs in Tashkent oblast had an HIV prevalence of 57.7%, more than

fifteen times that of non-IDU sex workers, while 60% of sex worker IDUs in Tajikistan reported no condom use (CARHAP 2006a,c).

### Limitations of Data

Collected at a time of legal and social transition, data on drug use, HIV and STIs in the three Central Asian Republics raise multiple caveats about the relationship between changes in testing patterns and actual incidence of disease. In Tajikistan, for example, no HIV tests were performed during the civil war from 1992 to 1997, and in-country confirmation of positive HIV test results was unavailable until 2002 (NCC of Tajikistan, 2006). In Kyrgyzstan, positive HIV test confirmation in-country was not available until 2001, and voluntary testing in 2000 accounted for fewer than 1% of all those tested (Kyrgyz Republic, 2001). Support from the US Centers for Disease Control, the World Health Organization (WHO), the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), and other donors have helped to strengthen laboratories and create sentinel surveillance systems that comply with UNAIDS guidelines in all three countries, though the scope of such systems is limited (Godinho et al., 2005). Voluntary testing, while more available than before, is inconsistently implemented, with a lack of pre- and post-test counseling commonly reported (CARHAP, 2006a,d; Kyrgyz Republic, 2006).

### Barriers to Services

Independence in Central Asia did not mean freedom from Soviet concepts of health law. Governments of the new republics adopted many of the stringent requirements of the earlier era, including compulsory registration and treatment requirements for "socially dangerous" conditions such as alcoholism, drug addiction and STIs. These mandates, however, were no longer backed up by the same level of government resources: public health efforts, and health care more generally, were hampered by a lack of funds and infrastructure to procure or deliver medicines, conduct screening, or provide care. Even by the standards of post-independence Central Asia, health workers remained among the lowest paid workers. The fact that the *propiska* system continued to tie eligibility for care to legal residence further impeded efforts to allocate funds to or control health conditions like HIV or STIs that were concentrated in and spread among mobile or migrant populations.

Where funding shortfalls exist in the Central Asian healthcare system, it has often fallen to patients and their families to close the gap, either through informal payments for services that are officially free, or by provision of their own medicine, bedding, and food (EMCDDA, 2002). Informal payments to medical professionals had long been a feature of care in Soviet times, but independence marked a greatly increased burden on patients in Central Asia. A 1994 survey found that the cost of a single episode of inpatient treatment in Kyrgyzstan exceeded household monthly income about 20% of the time, while in Tajikistan costs of such an episode exceeded annual income for the poorest citizens (EMCDDA, 2001). This rise in fees occurred at a time when many were losing the ties to friends and relatives through whom such unanticipated expenses had traditionally been met (Kuehnast & Dudwick, 2004).

These general barriers to health care have been matched with particular disincentives for those seeking HIV testing or treatment, despite a move to establish "friendly clinics" offering counseling and confidential testing. Laws criminalize individuals who knowingly spread HIV or STIs while those who avoid medical examination are also criminalized. AIDS centers can provide only limited immune monitoring or treatment and until 2005, antiretroviral treatment (ART) was not available in Kyrgyzstan, Tajikistan, and Uzbekistan. Stigma toward people with HIV, IDUs, and sex workers has been commonly reported, and media portrayals and health campaigns frequently link active IDUs with death, disease, and inhumanity (Drug Control Agency of Tajikistan, 2007; Friedman et al., 2007).

While NGOs led by people living with HIV/AIDS (PLWHA) in all three countries have sponsored trainings and workshops aimed at diminishing negative portrayals in the media and reducing discrimination in health care settings (Kyrgyz Republic, 2007; Republic of Tajikistan, 2007a; Republic of Uzbekistan, 2007), fear of stigma continues to curtail public disclosure of serostatus. Indeed, even those working for NGOs of PLWHA rarely reveal their positive status publicly: fewer than half a dozen individuals in the three countries combined, for example, have been publicly identified as HIV-positive in the media. Involuntary disclosure of status by AIDS centers, by contrast, has been frequent. In Kyrgyzstan, regarded as the Central Asian country with the longest history of civil society involvement and most liberal government policies toward HIV, one third of people living with HIV report forced testing, violation of medical confidentiality, refusal of care, and other rights violations. Despite a 2005 law banning discrimination, social sanctions against those with HIV are powerful enough that no one has yet sought protection through the courts (Kyrgyz Republic, 2006). In Uzbekistan and Tajikistan, anecdotal reports suggest widespread stigmatization of IDUs and people with HIV (Gotsadze, 2004; Open Society Institute, 2003).

Legal vulnerability and vulnerability to HIV remain entwined in all three countries. All conduct *medicomilitzia* (doctor-police) raids, in which IDUs and sex workers are forcibly tested by police order. Those testing positive for STIs or illicit drug use are registered on government lists and can be subject to mandatory treatment, follow-up observation and in the case of STIs, future testing. Those with STIs are also required to disclose their previous sexual contacts to authorities, and police involvement in the process of contact tracing means that employers and community members may also be notified (Godinho et al., 2005). Registration as a drug user means forfeiture of driver's license and certain employment opportunities. In Osh oblast in the south of Kyrgyzstan, the majority of those taking HIV tests until 2002 had been forced to do so through *medicomilitzia* raids (Bashmakova, 2003). In Uzbekistan, those with syphilis can be detained for treatment for up to 28 days and STI clinics continue to rely on collaboration with the police to fill their beds. Raids in Tashkent oblast found 80 sex worker "dens," in 2006 (CARHAP, 2006e), and an estimated 3,000 sex workers were registered by police and subjected to regular compulsory examinations at the dermatovenereology service in Tashkent city alone (Boltaev, 2006). In Tajikistan, the criminal investigation department of the Ministry of Interior, working with medical institutions, registered more than 1,000 women with STIs in 2005 (CARHAP, 2006a).

The blurring of police enforcement and health care provision has fueled popular distrust of government systems, hampering efforts in all three countries to increase voluntary testing and treatment. Sex workers seeking to avoid registration or forced treatment, for example, have increasingly turned to "self treatment" of STI symptoms using medications obtained at pharmacies (CARHAP, 2006a; Godinho et al., 2005). A 2006 rapid assessment in Tajikistan speculated that declines in registration of drug users might reflect distrust of narcological treatment centers, rather than any actual decrease in incidence (CARHAP, 2006a). Registration practices are in flux: in Kyrgyzstan, narcologists have agreed to dispense with registration of clients voluntarily seeking drug treatment while continuing to register those brought by the police (Wolfe, 2005). In Uzbekistan, IDUs who can afford voluntary treatment in private facilities are not registered (Open Society Institute, 2003; CARHAP 2006c).

Homosexual activity is also criminalized in Tajikistan and Uzbekistan, a fact which likely contributes to the absence of officially reported HIV cases among or reliable estimates of men who have sex with men (MSM) in those countries. Despite their illegal status and the lack of good data on MSM, Global Fund grants in both countries include distribution of educational materials and condoms (and in Uzbekistan, 33,000 bottles of lubricant) to MSM (NCC of Tajikistan, 2004; Republican Emergency Anti-Epidemic Commission, 2003). In Tashkent, 34% of the registered HIV cases at the close of 2005 were of unknown origin (CARHAP, 2006e), which may reflect reluctance to reveal risk behavior to the authorities. Kyrgyzstan, where homosexual acts are not criminalized and where the government estimates there are as many as 36,000 MSM, is the only one of the three Central Asian countries considered here that has an officially registered NGO led by MSM. HIV prevention activities conducted since 1998 have included a hotline, educational events, and condom promotion activities (Kyrgyz Republic, 2006). Nonetheless, pressure from law enforcement and cultural norms prevent many from speaking openly about their sexual preferences (van der Veur, 2004). Widespread discrimination may help explain why, as of mid-2006, none of those with HIV in Kyrgyzstan reported infection via homosexual sex (Kyrgyz Republic, 2006).

## Responses to the Epidemic: Government, NGOs and International Donors

Governments in each country have taken action to address the challenge of the HIV/AIDS epidemic. Each has a multisectoral committee chaired by high-level politicians and has passed legislation meant to safeguard the rights of people with HIV to free treatment, equal access to education, and protection from discrimination (CCM of the Kyrgyz Republic, 2002; Gotsadze, 2004; NCC of Tajikistan, 2004; Republican Emergency Anti-Epidemic Commission, 2003). Each country signed the Declaration of Commitment emerging from the 2001 U.N. General Assembly Special Session on HIV, in which member states pledged to increase harm reduction interventions and HIV treatment. Each country has received one or more grants from the Global Fund to strengthen HIV care, treatment and support, formed a country coordinating mechanism including non-governmental and governmental representatives, and supported

a particular focus on prevention among sex workers and IDUs. Each has supplemented Global Fund support with additional monies from international donors for drug demand reduction, HIV prevention, and drug control, and begun efforts to establish services conducive to serving sex workers, including confidential HIV testing and integration of services with reproductive health.

These similarities, however, obscure significant variation in how the three countries have responded to HIV epidemics concentrated among IDUs. A closer look at the availability of opiate substitution treatment, needle exchange, and peer outreach that is most effective in addressing HIV epidemics concentrated among IDUs underscores the degree to which context shapes Central Asian responses to HIV.

### Uzbekistan

HIV treatment in Uzbekistan is supported by the Global Fund, with 277 people living with HIV/AIDS (PLWHA) receiving ART at the start of 2007 out of a government target of 700 (Republic of Uzbekistan, 2007). CD4 measurement is available only in Tashkent, requiring long trips for those people with HIV outside the capital, though the government is committed to expansion of immune monitoring services.

Government commitment to harm reduction is also clear and explicitly highlighted in the state program for HIV. In July of 2003 the Ministry of Health (MoH) endorsed the creation of 221 "*punkt daveria*," or "trust points" for needle exchange at narcological dispensaries, polyclinics and AIDS centers across the country. International donor support, including from the Swiss Agency for Development and Cooperation, the Japanese International Cooperation Agency, the UK's Department for International Development, the U.N. Office on Drugs and Crime (UNODC), USAID, the World Bank, the Red Crescent, and the Soros Foundation network have supported trainings, materials, and programs aimed at reducing HIV transmission in Uzbekistan. While donors have their own particular focus and restrictions – U.S. government funds, for example, cannot be used to pay for sterile syringes or injection equipment – many have included support for or trainings on work with IDUs. Drug demand reduction projects including those funded by the U.S., have also included harm reduction approaches, including a "break the cycle" training to discourage IDUs from initiating new users into injection (DDRP, 2006).

Official establishment of trust points, however, has not been synonymous with establishment of trust with IDUs. This is in part because trust points in Uzbekistan have dispensed with the street outreach and "user friendly" approaches that have been central features of harm reduction programs elsewhere. In Uzbekistan, emphasis at the trust point is on administration, with a room organized around a large desk on which accounting ledgers are prominently featured, and in which numbers of needles exchanged and returned is the central concern. Staff are frequently untrained, and often uninterested, in work with active IDUs. As with many Soviet-era government initiatives, expressions of political commitment were not accompanied by allocations of funding to realize them: many trust points lack a regular supply of needles and syringes (Boltaev, 2005), while some do not even have furniture, telephones, or the capacity to deliver anything but HIV testing (CARHAP, 2006d).

While an essential approach of successful harm reduction programs is to ensure a low threshold for services and to "meet users where they are," (Needle et al., 2004), trust points in Uzbekistan frequently understand their mission as more directive in nature. One trust point, for example, demonstrated efficacy by producing dozens of letters signed by IDUs in which they promised not to share their injection equipment with peers (Boltaev, 2005). Lack of outreach continues despite studies demonstrating the effectiveness of peer-based approaches, and research estimating that use of outreach workers could reduce costs by a factor of eight for each HIV infection averted (Boltaev, 2003).

International donors have supported efforts to strengthen links between government trust points and NGOs familiar with the needs and inclinations of IDUs, though these have been limited primarily to cities such as Tashkent and Samarkand. A regional AIDS center in Samarkand, for example, working with an NGO, offers needle exchange, counseling, a drop-in center and place to drink tea to more than 1,000 IDUs, and distributes more than half of its injection equipment through secondary exchange where IDUs themselves take sterile injection equipment to others (CARHAP, 2006d). In the period following the popular unrest and political changes known in Ukraine and Kyrgyzstan as "the color revolutions," however, NGO activities in Uzbekistan have been constrained due to government concern that NGOs were deviating from their charters. As in Russia, the Uzbekistan government has required that NGOs undergo complicated processes of re-registration with the government, and in some cases in Uzbekistan has impeded NGO ability to withdraw funds from banks. Some local NGOs, including those serving sex workers or IDUs were required to collaborate closely with government entities or to cease work, and multiple NGOs engaged in HIV prevention programs have closed. Many international NGOs in Uzbekistan have also stopped work following court hearings that found they had exceeded their mandates (Friedman et al., 2007).

If ties between NGOs and trust points are weak, links between the trust points and the police are strong. Compulsory treatment is the engine of narcological treatment and STI treatment for sex workers in Uzbekistan, and police are required by regulation to be present at narcological dispensaries where many trust points are located (CARHAP, 2006c). Police express confusion about a system that criminalizes the residue in a used syringe on the one hand and encourages IDUs to bring in used syringes to exchange for clean ones on the other (CARHAP, 2006d). Not surprisingly, IDUs report that they are less likely to use trust points the longer they have been using drugs (Boltaev, 2005).

The number of IDUs reached by HIV prevention programs in Uzbekistan falls far below levels needed to contain the epidemic. A 2006 assessment found that the six trusts points in Kattakugran had not exchanged a single syringe in the six months prior to the assessment, while others, such as that in Termez, were staffed only by a nurse and volunteer outreach workers (CARHAP, 2006d). Since October 2006 DFID funding has supported ten trust points in Tashkent to strengthen ties to NGOs and implement new services including counseling, detoxification, self-help groups and legal support. These efforts will help to improve needle exchange rates in the country where estimates consistently suggest that no more than 1 to 2% of active IDUs are participating in needle exchange (Boltaev, 2006; Republican Emergency Anti-Epidemic Commission, 2003).

### Tajikistan

If the experience of Uzbekistan underscores the importance of strengthening NGO involvement in providing services to IDUs, Tajikistan's highlights the importance of significant engagement by the state. The poorest of the former Soviet Republics, Tajikistan has faced substantial challenges in multiple areas of health care provision and economic development. As of 2002, more than three of every four citizens in Tajikistan lived on less than USD 2.5 a day (Olimova & Bosc, 2003), and by one estimate approximately one third of all citizens of working age had no employment (Republic of Tajikistan, 2002). Of 177 countries ranked by the United Nations in its 2006 Human Development report, only three spent a lower percentage of GDP on public health (UNDP, 2006).

International support for HIV prevention and treatment efforts includes grants from the Global Fund, USAID's Drug Demand Reduction Program, the World Bank, DFID, AIDS Foundation East West, UNODC, and the Soros Foundation networks. These efforts have not been sufficient to close basic gaps in infrastructure or to compensate for minimal health care spending (NCC of Tajikistan, 2006). Hospitals lack masks and gloves for protection against infection, and tests of donated blood are unable to detect recent infections (Republic of Tajikistan, 2007b). More than one in five of all those with HIV in Tajikistan were in the penal system in 2007 (Republic of Tajikistan, 2007b), yet government authorities had yet to institute HIV treatment or opiate substitution treatment there. Needle exchange in prison, supposed to be piloted under the terms of the 2004 Global Fund grant, was unavailable as of March 2007, while condoms and lubricants, to be made available to all prisoners under the terms of the same grant, remained restricted in 2006 to rooms for conjugal visits, with those carrying them outside liable for punishment (CARHAP, 2006a). Total government spending on HIV as of 2006 totaled around USD 310,000 or less than 4% of estimated need (NCC of Tajikistan, 2006).

State budget shortfalls are matched by limited government support for NGOs: while several NGO representatives, including one from the only registered association of people with HIV in the country, sit on the national coordination committee for HIV, the state strategy for 2007–2010 suggests that NGOs are unreliable partners, noting that they frequently fail to meet professional standards (Republic of Tajikistan, 2007b). In 2007, the government of Tajikistan required NGOs to re-register with the government, a move that parallels similar processes in Russia and Uzbekistan. Even prior to this tightening of controls, government authorities have limited NGO engagement in HIV prevention in sensitive areas, such as penitentiary institutions, though limited activities such as staff training, friendly clinics for STI treatment, and peer education have been conducted there for some time (Lapytov et al., 2006).

Tajikistan's response to HIV has changed as the epidemic has grown. In the provision of ART, Tajikistan has achieved its targets: 67 patients, or an estimated 90% of those in need, were receiving medication as of January 2007 (Republic of Tajikistan, 2007b). Anecdotal accounts, however, suggest that virtually none of those on ART are active IDUs, who make up the largest share of those infected. HIV testing and counseling has also increased sharply, with more than 124,000 tests delivered as of 2007 (Republic of Tajikistan, 2007a).

Further, despite some sensitivity around NGOs, the Tajikistan government has not exerted excessive control over international donor support or NGO activities, allowing for local variation and creativity in responses to problems of HIV prevention. While Global Fund support has been used to establish a network of government trust points for needle exchange that reached 1,656 IDUs as of April 2006; an additional network of NGOs, funded primarily by the Open Society Institute, reached more than twice as many IDUs and sex workers as the government clinics, although they have fewer needles and condoms to offer them (Lapytov et al, 2006).

Tajikistan is also increasing its commitment to reaching those who are the greatest share of HIV cases. The national program of 2007 calls for the opening of trust points for IDUs in all regions by 2010, for annual medical exams for 90% of registered people with HIV, and for provision of support to assist 100% of those on ART in adhering to their treatment regiments. The plan also calls for consideration of "the problem of introduction of substitution treatment and needle exchange in prisons" (Republic of Tajikistan, 2007b). The country's Global Fund application pledged sharp expansion of services for both IDUs and sex workers, including the establishment of 17 "friendly clinics" that will offer sex workers STI and gynecological treatment by trained staff equipped with proper medical equipment, medications, and condoms.

To date, however, the reach of HIV prevention services for IDUs and sex workers alike is extremely limited. Needle exchange is offered in only 12 cities and regions when HIV has been detected in 44, and even there reach only an estimated 8–16% of those in need (CARHAP, 2006a; Republic of Tajikistan, 2007a). Despite the establishment of eight "friendly clinics", the government estimates that nearly two thirds (60%) of sex workers in Tajikistan are not reached by any HIV prevention efforts (Republic of Tajikistan, 2007a).

The slow pace of providing HIV prevention in the country has provoked international alarm. In its November 2006 report, the U.N. Committee on Economic, Social and Cultural Rights expressed concern about the rapid spread of HIV among IDUs, prisoners and sex workers in Tajikistan, and urged the government to "establish time-bound targets for extending the provision of free . . . harm reduction services to all parts of the country" (U.N. Committee on Economic and Social Rights, 2006). While the national program in Tajikistan has in fact established such targets, it remains to be seen whether the government will have the resources or political will needed to achieve them (NCC of Tajikistan, 2006).

### Kyrgyzstan

Kyrgyzstan has frequently been cited as one of the most progressive former Soviet Republics, and the one with the greatest commitment to reform and health sector innovation (Godinho et al., 2005). While spending on social services plunged by nearly half between 1991 and 2000, by the end of 1996 the government spent more per capita on social programs than any Central Asian Republic except for far wealthier Uzbekistan (Pomfret, 2002). This appears to be the result both of a willingness to turn to foreign donors and of greater governmental flexibility. Unlike Uzbekistan, for example, Kyrgyzstan had few natural resources to sell in international markets, and some analysts suggest that

the country's nomadic past and relatively late entry into the Soviet Union left its government more flexible and less centralized (Wolfe, 2005). The emergence of the country's NGO sector, the most developed in Central Asia (USAID, 2001), was rapid after independence, and included the formation of a number of active HIV organizations. Representatives from these organizations sit on the national committee coordinating the country's response to HIV/AIDS.

Kyrgyzstan further laid the groundwork for fighting HIV/AIDS by repealing laws criminalizing homosexuality and "voluntary adult prostitution" in 1997 and 1998, respectively (Godinho et al., 2005). A 1998 law also removed penalties for being a drug user, although possession of even the amount of drugs in a used syringe continued to carry harsh criminal consequences (Wolfe, 2005). The Kyrgyz state program on HIV/AIDS from 2006 to 2010 emphasizes the development and expansion of a network of harm reduction programs as a major goal, acknowledges that "the main driving force of AIDS in the Kyrgyz Republic is drug use," and calls for alternatives to incarceration for drug related crimes that are limited to possession of small doses of drugs for private use (Kyrgyz Republic, 2006). In June 2007, the President signed reforms meant to "humanize" Kyrgyz legislation that included removal of criminal penalties for possession of small amounts of drugs, though as of this writing the new amounts punishable by incarceration had yet to be specified.

Needle exchange and sex worker projects in Kyrgyzstan have been profiled in domestic and international studies of best practices of HIV prevention (UNAIDS, 2006; Wolfe, 2005), and include peer- and clinic-based exchange, a pharmacy-based initiative in Bishkek, as well as confidential counseling and testing and treatment for HIV. NGO efforts to reach sex workers, which have included peer outreach, hotlines, counseling, referrals to free, confidential treatment for STIs, and a mobile STI clinic offering consultations, blood tests, and STI prevention information, report remarkable levels of coverage: a Bishkek NGO, Tais Plus, reports that 85% of sex workers in Bishkek have participated in its HIV prevention activities. Sex workers surveyed by Tais Plus in 1999 found only 13% condom use in more than 500 encounters with clients; by 2000, 81% reported condom use with their last client, and by 2002 the percentage reporting condom use in their last commercial encounter rose to 89.6% (UNAIDS, 2006). In a 2006 rapid assessment, sex workers reported rates of condom use for commercial clients of 92.6% (CARHAP, 2006b).

Kyrgyzstan was the first country in Central Asia, and remains the only country besides Moldova and Belarus in the Commonwealth of Independent States (CIS), to implement needle exchange in prisons. Begun with the support of the Ministry of Justice, these services have been expanded to 13 prison colonies in the country, and two colonies also have drug-free prison programs run by an NGO that includes former drug users as staff (Zelichenko, 2006). In 2002, Kyrgyzstan became the first country in the CIS to offer methadone maintenance treatment to opiate addicts (Wolfe, 2005). Following disruptions in supply that resulted in dismissal of half of the country's nearly 200 methadone patients in 2005, clinics in Bishkek and Osh have returned their enrollment to earlier levels. Additional methadone programs, each serving fifty individuals, are scheduled to open in Bishkek in 2007, as are new clinics in Tokmok, Kan, and Kara-Balta. The Global Fund grant calls for 1,500 to receive methadone by the end of 2008 (CCM of the Kyrgyz Republic, 2002).

In almost all instances, these innovations in HIV prevention have been the result of collaboration between government, international donors, and NGOs. While international donor support accounts for the vast majority of funds for harm reduction, Osh oblast and the city of Bishkek have both contributed funds to needle exchange efforts. The Ministry of Internal Affairs has been supportive of substitution treatment and of needle exchange in prisons, and has worked actively with NGOs to ensure provision of sterile injection equipment in penal institutions. Cooperation between the government and NGO sectors has been reflected in the movement of staff between the NGO and government sectors, as well as between sectors of the government. For example, the head of the largest NGO providing harm reduction services in Bishkek was formerly deputy of the city's narcological dispensary, the head of the AIDS center at the start of Kyrgyzstan's first Global Fund grant was formerly Deputy Minister of Health, and the governor of Osh oblast who allocated funds for needle exchange was formerly the Minister of Health.

These advances in HIV prevention, however, have not been consistent or complete. Centralized procurement of needles for prison-based needle exchange programs, for example, has meant shortages of supplies in a number of prisons far from the capital (Zelichenko, 2006), and NGO involvement in the program has been curtailed under a new Minister of Justice. The legal environment remains challenging, with police arresting or harassing needle exchange and substitution treatment clients. In 2007, Bishkek NGOs reported that police had launched "Operation Butterfly" to roundup and perform compulsory HIV and STI tests on those suspected to be involved in drug trafficking and sex work (SWAN, 2007). Drug users experiencing overdoses from heroin, particularly common during the "seasons of death," that mark the arrival of purer heroin after the harvest in Afghanistan, remain reluctant to call for medical assistance, fearing that information will be shared with police (Soros Foundation Kyrgyzstan, 2007).

Further, while varying estimates of the number of IDUs and sex workers make it difficult to decisively assess the extent of coverage, programs remain at limited scale. Programs providing sterile injection equipment are estimated to reach no more than 22.5% of IDUs, while coverage of sex workers is estimated at 40% (Kyrgyz Republic, 2007).

### Civil Society Responds in a Former Soviet Union State: Ukraine and Harm Reduction

The first country in the former Soviet Union to experience a widespread HIV outbreak, Ukraine has also been a regional leader in harm reduction and HIV treatment. The country has a well-established and highly organized network of people living with HIV whose advocacy helped highlight treatment interruptions and mishandling of the first Global Fund grant, which was subsequently transferred to a non–governmental organization. Syringe exchange programs under the Global Fund have grown from a handful supported by private foundations to more than 250 points covering an estimated 118,000 IDUs across the country (International HIV/AIDS Alliance in Ukraine, 2007), though definitions of "coverage" appear to emphasize quantity over quality. Recent innovations include a pharmacy-based exchange in Kiev that operates 24 hours, as well as a peer-based approach that draws on drug users' social networks to bring the increasing numbers of injectors of *vint*, a homemade amphetamine, into contact with harm reduction (IHRD, 2008).

While Russia and Central Asian countries have used registration requirements to constrain NGOs from receiving international support, the Ukrainian response to HIV/AIDS is largely NGO-led and internationally funded. A USD 151 million Global Fund grant, given jointly in 2007 to the International HIV/AIDS Alliance and the All Ukrainian Network of People Living with HIV/AIDS, is the largest ever awarded in the former Soviet Union. More than half of the funds will support HIV prevention, and the grant includes measures such as drop-in centers and integration of addiction and HIV treatment to increase the access of active drug users to ARVs (Country Coordinating Mechanism of Ukraine, 2007).

Treatment with methadone and buprenorophine, a linchpin for both prevention and treatment of HIV among IDUs, while not banned as it is in Russia, remains minimal in Ukraine. Buprenorphine treatment began in 2005; by 2007 nearly 550 individuals in the capital and eight regions were receiving medication, though without the take-home doses or pharmacy prescription that are the norm in Western Europe or the U.S. (IHRD, 2008). Under pressure from the All Ukrainian Network of PLWHA and other local advocates, the minister of health and the deputy prime minister for humanitarian issues have signed orders to authorize provision of methadone, a more affordable medication, and to allow expansion of treatment to some TB and HIV treatment centers. Global Fund targets call for provision of substitution treatment to up to 11,000 IDUs by 2011, with 3,500 patients supposed to receive methadone by the end of 2007 (Country Coordinating Mechanism of Ukraine, 2007). With no patients receiving treatment by September of 2007, this short-term target seems unlikely to be met. Ukraine has also yet to address the absence of substitution treatment in hospital wards, which essentially forces patients who get sick with HIV to give up the most effective treatment for their opiate dependence.

As elsewhere in the former Soviet Union, police and public health approaches are in tension in Ukraine. In April, 2007, each patient in a support group at an Odessa buprenorphine clinic had a story of police harassment (IHRD, 2008). "We have changed," one patient noted sadly, "but the police have not." Needle exchange points report regular police harassment, including extortion and use of painful withdrawal symptoms to coerce confessions for unsolved crimes. A project supported by the International HIV/AIDS Alliance is educating police about ARVs after reports that officers, insisting that any pills in the possession of drug users must be illegal, confiscated them.

Russia, Kyrgyzstan, and Tajikistan have relaxed drug penalties, but those caught with small amounts of opiates are still imprisoned in Ukraine in facilities where drug use continues and where needles, sometimes sharpened with glass by desperate inmates, are repeatedly shared. The United Nations' Human Rights Committee decried Ukrainian prison conditions in 2006, expressing concerns about the high incidence of HIV/AIDS and TB among detainees (UN Human Rights Committee, 2006). HIV prevalence among those incarcerated in Ukraine rose from 9% in 2003 to 14% in mid-2006 (IHRD, 2008). HIV treatment is extremely limited and methadone and buprenrophine are unavailable. Despite several memoranda committing to pilot needle exchange in two correctional facilities, the state penitentiary department has yet to start such programs. Improved services in prisons, and greater access to substitution treatment services, are among the demands being advanced by a growing network of drug user groups in the country.

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## Treatment for Opiate Dependence

### Narcological Dispensaries

Analysts of HIV prevention for IDUs in this region have increasingly urged attention to the structural, rather than individual, factors that help to determine the "risk environment" (Rhodes et al., 1999). One such structure in Central Asia is the narcological dispensary, often the first point of contact between drug users and the state. A subdiscipline of psychiatry, narcology is a legacy of the Soviet era, when the state committed addicts and alcoholics to locked facilities for blood purification procedures, aversion therapies, and, when deemed necessary, forced labor (Gilinsky & Zobnev, 1998; Rouse & Unnithan, 1993). The narcologist's reach historically extended well beyond the clinic: in Soviet times, each addict or alcoholic was required to have their names added to a central registry, to make periodic visits to the narcological center for follow-up observation, or to submit to home inspections to gauge conformity with social norms.

While work camps and medical inspections in Russia largely collapsed with the Soviet Union, narcology's emphasis on highly medicalized detoxification and monitoring as a variant of care remains intact in Central Asia. Although Tajikistan's compulsory treatment system is essentially defunct (Lapytov et al., 2006), those apprehended by the police are subject to forced treatment in both Uzbekistan and Kyrgyzstan. Some dispensaries remain open day and night to test those suspected of drug use by police and to register and prescribe treatment to those who test positive. The centrality of registration to narcological practice and social standing is such that all citizens in each country are required to visit narcologists to determine their registration status prior to obtaining a driver's license, a marriage license, or certain kinds of employment. Drug users and their families report that fear of registration is a major disincentive to seeking services (Elovich, 2007). Those who wish to avoid registration pay significantly higher fees at the few clinics providing private treatment (CARHAP, 2006d; Open Society Institute, 2003).

As with AIDS centers prior to the introduction of ART, narcologists' power to monitor frequently exceeds their power to treat. Medications such as methadone or buprenorphine are among the best studied and most effective means of reducing illicit opiate use (EMCDDA, 2001), yet these medications were available to fewer than 150 people in Kyrgyzstan (Subata & Pkhakadze,

2006), 150 in Uzbekistan, and none at all in Tajikistan in 2006. Despite repeated studies finding that detoxification alone "is not a treatment for drug-seeking behavior" (Gerstein & Harwood, 1990) and "an inadequate use of limited resources," (Center for Substance Abuse Treatment, 2006), many narcological dispensaries in Central Asia offer nothing beyond detoxification. Theoretically free, in practice detoxification is only available for fees that can be as high as twice the average annual per capita income (Open Society Institute, 2003). The process often involves medicating IDUs to the point of immobility for weeks with high doses of tranquilizers and anti-psychotics, and offering little or no psychosocial counseling. While the professional rationale is to minimize the pain of withdrawal, the social effect is to reinforce the idea that IDUs and those in their social networks have little role to play in chemical dependence treatment (Wolfe, 2007).

Part of a highly vertical health system in which different specialists claim exclusive authority to diagnose, monitor, and medicate, narcological dispensaries also operate independently of services to treat HIV, tuberculosis, or STIs. Of 18 million condoms sent by international donors to Kyrgyzstan between 1997 and 2000, for example, none went to narcological dispensaries (Kyrgyz Republic, 2001). IDUs who are co-infected with HIV or tuberculosis, a relatively common phenomenon in a country like Tajikistan, where those with a history of drug treatment are twice as likely to be HIV-positive (Stachowiak et al., 2006), may find themselves registered in multiple clinics but shunted from one to the next when they are in need of comprehensive care. It frequently falls to IDUs themselves to negotiate the geographic and metaphoric distances between clinics, and to determine what makes a desirable patient in each.

Where treatment is compulsory, opiate users are treated more according to legal requirements than to personal needs. An analysis of those in forced treatment in a Bukhara Narcological dispensary in Uzbekistan, for example, found that more than half were receiving levels of clinical interventions that did not respond to their treatment needs and that were more intensive than those indicated by individualized diagnostic assessment (Boltaev et al., 2004). While USAID, DFID, and UNODC have supported training opportunities for narcologists, these remain limited. In Tajikistan, for example, a rapid assessment found that 70% of that country's narcologists had received no in-service training or professional development in 14 years (CARHAP, 2006a). Limited staffing further impairs treatment delivery. In Ferghana in Uzbekistan, for example, one doctor is responsible for 60 voluntary and 90 mandatory treatment beds (CARHAP, 2006d).

As with HIV prevention and treatment services, most of those in need do not access even the rudimentary services offered for chemical dependence. A U.N. study of drug treatment in the three countries from 2003 to 2005 found that narcological clinics reached fewer than 10% of registered users in Bishkek and Tashkent (UNODC, 2006). Patients reported a four to six year period between starting drug use and accessing treatment, a gap which reflects the extent to which HIV prevention and drug dependence treatment opportunities are being lost.

Means of addressing drug use may have been inherited from Soviet times, but they have not necessarily remained static. Indeed, while narcology generally retains an emphasis on doctor-centered, highly medicalized treatment,

there are multiple examples of innovations at individual clinics or at programs that have reconceptualized treatment to include interventions performed outside the clinical setting. A case study from each country helps to underscore the ways that drug treatment is being reshaped into something more responsive to international best practice and patient needs.

## Promising Practices in Opiate Dependence Treatment

### *Methadone and Buprenorphine at the Tashkent (Uzbekistan) Narcological Dispensary*

In February 2006, more than 200 IDUs in Tashkent began to receive treatment with buprenorphine, a prescription medication shown to decrease cravings for and reduce illicit injection of opiates. The program, begun by the Tashkent narcological dispensary and endorsed by the MoH, was a pilot that sought to evaluate the viability of substitution treatment. Each case was discussed among a panel of doctors, resulting in a treatment plan including psychosocial and family counseling components. In October of 2006, another, smaller group of patients in Tashkent began receiving methadone treatment on a similar trial basis.

These programs are the culmination of work by local experts and international donors which began when officials from Uzbekistan's MoH took study tours to Asian and European countries to look at the feasibility of opiate substitution treatment. A Parliamentary motion in 2001 authorized exploration of a pilot project, and eventually procurement of medication was supported by the Global Fund. Preliminary results with those in treatment suggest improved family relations, decreased injection, and other favorable HIV risk related outcomes.

Difficulty enrolling enough HIV positive patients to meet Global Fund targets led the narcologist at the Tashkent dispensary to negotiate with the MoH and the Global Fund to relax entry criteria to include HIV-negative patients. Guidelines were also relaxed to allow interested patients to use treatment provided as a step toward abstinence from all drugs, as opposed to continuing on daily maintenance. As of February 2007, about 250 patients, about half of whom were PLWHA, had received methadone or buprenorphine; of the buprenorphine patients, half had transitioned to drug-free status. This has further enhanced the reputation of the program among IDUs and their relatives, and there is now a waiting list of approximately 100 patients. Substitution treatment patients in Tashkent are also informed about the availability of needle exchange, and some of those who relapse to heroin use become clients at a trust point. Plans call for expansion of maintenance treatment to other regions of Uzbekistan, with the goal of improving access to treatment in rural areas.

### *Needle Exchange, Drop in Centers, and Drug-Free Rehabilitation in Khujand (Tajikistan)*

In the West, drug use is often conceived of as an individual disorder, with sharing analyzed in terms of injection equipment or drug doses. In contrast, in Central Asia, drug users are frequently not a subculture so much as folded into existing structures, often including brothers, sisters, parents, and wives.

It is not uncommon to find a group preparing drugs in the kitchen while the mother sits in the living room. *Khanka* and *khimshirka* are prepared by small groups of IDUs according to different local recipes. Group members frequently organize themselves in different roles, with one member providing the money needed to purchase raw materials, another securing injection equipment, a third going to secure the chemical ingredient to break down the poppy and a fourth volunteering his home for the cooking (Friedman et al., 2007).

DINA, a NGO in Tajikistan, recognizes the value of social engagement in its efforts to rehabilitate patients from drug use. Its drug-free rehabilitation center in Palass, outside the city of Khujand, uses a therapeutic community approach where patients live and attend groups together, and tend to cattle and geese on a small farm that provides work therapy and sustains the community. What began as a treatment effort started by one brother for another grew to include friends of the family, and eventually, participants from all over the region.

Unlike traditional therapeutic communities in the West or the coerced treatment centers elsewhere in Central Asia, there is little emphasis at Palass on confinement or confrontation. While low stone walls line the property, they serve to mark out the boundaries of the facility rather than to lock patients in. Further, DINA sees drug-free rehabilitation as one point on a continuum of services for IDUs: the same organization runs a street outreach program in the city of Khujand providing clean needles, condoms, and HIV education and a drop-in center where IDUs and sex workers can come for crisis intervention and consultations with a physician and psychologist. The center, which has eight beds, allows people to remain for hours, days, or even weeks in an environment where drugs are not exchanged or consumed, but where participants do not have to be drug free or even committed to behavior change to attend.

### *A Continuum of Needle Exchange, Overdose Prevention, and Drug Free Treatment in Bishkek (Kyrzyzstan)*

A wooden board at the entrance of Sotcium, a harm reduction NGO, displays examples of the variety of injection equipment that IDUs in Bishkek have turned over to the organization: thick spoons and wider gauge needles for *khanka*, smaller and thinner ones for heroin solution, one-time use needles, insulin needles, and homemade injection apparatus. The display serves as proof that drug injection practices of IDUs are varied, and a reminder of the importance of building services based on what IDUs need, rather than on what a centralized fund has purchased or what a management office has determined is appropriate.

Sotcium provides needle exchange (with different gauge needles), secondary exchange by active drug users able to go places where outreach workers cannot, wound care, psychological support, referrals to physicians offering confidential counseling, STI testing and treatment, and a 24 hour hotline staffed by trained counselors to answer questions. Sotcium's needle exchange program utilizes cars and outreach workers who take sterile injection equipment to the houses of IDUs, as well as office based exchanges in city polyclinics where IDUs are able to slip in without being noticed. In 2007, Sotcium piloted an overdose prevention program with naloxone, a medication able to reverse the effect of opiates, and a pharmacy-based needle exchange that allowed drug users to present vouchers, similar to regular prescriptions, for sterile needles.

The pharmacy-based needle program had 600 clients shortly after its formation. The effort is too new for evaluation, though earlier studies found that rates of needle sharing among syringe exchange participants at Sotcium dropped from more than two thirds to only 18% in the first year of operation. Reuse of injection equipment also dropped, with 98% reporting multiple use before the start of the program and only a third doing so after twelve months (Estebesova, 2003).

Sotcium views drug free approaches, opiate substitution treatment, and needle exchange and overdose prevention as complementary. The main Bishkek office was established only steps away from the government-run methadone dispensary in Bishkek, some methadone patients work as needle exchange volunteers, and Sotcium's director is the former deputy of the narcological dispensary. The turn to needle exchange has not diminished commitment to support for abstinence: twelve step meetings are held in the same building where needle exchange is conducted, in the same room used for staff meetings that include salaried counselors (many of whom have family members who are drug users), former drug using clients, and professionally trained psychologists. Sotcium has also begun intensive outpatient treatment for those seeking to abstain from drug use.

## Conclusion

A structural analysis of responses to HIV/AIDS in Central Asia could easily focus on institutions other than those providing drug treatment. Prisons and pre-trial detention centers, for example, contain between 11 and 21% of those with HIV in the three countries (Open Society Institute, 2003; Republic of Tajikistan, 2007b), and so are critical to the course of the HIV epidemic. Only Kyrgyzstan offers needle exchange services in prison, none of the three countries has methadone or buprenorphine in penal institutions, and none offers HIV treatment in prison. Regulations and practices that aggregate infected and uninfected individuals in environments where high-risk behaviors continue and where protections against HIV are unavailable, as well as state failure to provide HIV treatment to those incarcerated or institutionalized, might thus be said to "cause" Central Asia's AIDS epidemic as much as individual patterns of injection and condom use.

Attention to the factors that structure the priorities and operations of international donors supporting HIV prevention and treatment in Central Asia is also needed. Despite a strikingly similar modus operandi among donors, including country and regional assessments followed by grants to support HIV prevention and treatment, coordination of effort has proved difficult. If a blend of NGO, government, and international donor commitment is desirable to address the HIV epidemic in Central Asia, so is a coordinated effort that prevents duplication and competition.

Responses to HIV in Central Asia highlight the difficulties and the possibilities of response to an epidemic concentrated among IDUs. Uzbekistan, Tajikistan, and Kyrgyzstan all demonstrate the tension in post-Soviet states between law enforcement and public health, and the importance of moving from highly specialized, siloed health care delivery to a more integrated approach

based on patient needs. Realizing universal access to HIV treatment in Central Asia, a goal to which all three governments have committed, will likely require measures such as those piloted by NGOs in parts of Russia, where drug users and people with HIV work as peer counselors to improve patient adherence and make the health system more responsive to patient needs. In this model, IDUs have been reconceptualized as partners in treatment rather than populations to be controlled. Sex workers and MSM, similarly, are likely to remain unreached by HIV prevention or treatment so long as they are regarded as socially suspect. Needle exchange, substitution treatment, and safer sex promotion can work in Central Asia, but only when attention is paid to the legal environment, professional regulations and practices that are a primary determinant of how or whether criminalized populations get any kind of care.

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# Chapter 26

# Drug Abuse and HIV Transmission in Iran—Responding to the Public Health Challenges

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_26, 

## Overview of the HIV/AIDS Epidemic

According to official reports, the first case of HIV infection in Iran was detected in 1986. Prior to 1995, the number of new, reported cases remained very low, never exceeding 5 per year. In 1995 there was a sudden surge, with a 30 fold increase in the number of newly infected, reported cases. Much of the increase was attributed to injection drug use, which had not been reported as a cause of infection in Iran until 1992. Since 1995, transmission via sharing of injection equipment became and has remained the most common mode of infection. By 2006, a cumulative total of 12,556 HIV positive cases (of whom 736 are diagnosed as having AIDS) and 1541 deaths due to AIDS had been detected in the nation and reported to Iran's Center for Disease Control (CDC). Extrapolating from the HIV prevalence found in injection drug users (IDUs), the suspected number of IDUs in the general population and the proportion of HIV cases resulting from injection drug use, the CDC estimates that reported cases account for only about 20% of the actual number of HIV-infected individuals in Iran, between 60,000 and 70,000 individuals (Iran Ministry of Health and Medical Education, 2006).

The Ministry of Health (MoH) requires that all cases identified through any means be reported to the MoH CDC, but mandatory HIV testing is not performed in Iran, and because of a lack of resources and skilled individuals, surveillance programs are very limited. Consequently, in Iran most cases are detected either through voluntary testing of drug users and other high-risk individuals or serological testing in medical settings for suspected or symptomatic cases. As a result, it is difficult to obtain reliable and valid estimates of HIV incidence or prevalence in the general population.

Of the reported approximately 12,500 individuals who are currently HIV-infected in Iran, men comprise 94.6% of the cases, with 40.8% and 29.7% in the 25 to 34 and 35 to 44 years old age groups, respectively while only 0.9% of reported cases were in children younger than age 14 years. In the majority (62.3%) of the infected cases, shared injection equipment by IDUs was identified as the mode of transmission. Sexual contact accounted for 7.4% of cases, while blood transfusion and mother-to-child transmission were responsible for 1.9% and 0.5% of the cases, respectively (Iran Ministry of Health and Medical Education, 2006).

In the remaining 27.9% of reported cases, the mode of transmission was unknown. In fact, during the most recent decade, a consistent finding in the official reports is the relatively large and increasing proportion of HIV positive individuals revealing or speculating no specific mode for their infections. While in 1998 only 8.2% had unknown mode of transmission, this proportion reached 28.1% in 2002. During the same period, the reported share of sexual contact related cases stayed in the range of 5–8%. It is speculated that the unknown cases are due to sexual contact, as the high stigma associated with extramarital sex and even higher stigma associated with male-to-male sexual activity in a conservative and traditional society prevents reporting these behaviors even to medical staff. Additionally, since most HIV testing is performed in settings providing drug abuse treatment and counseling, individuals with high-risk sexual behaviors, especially sex workers and men having sex with men (MSM), are less likely to be tested. Consequently, the influence of injection on HIV

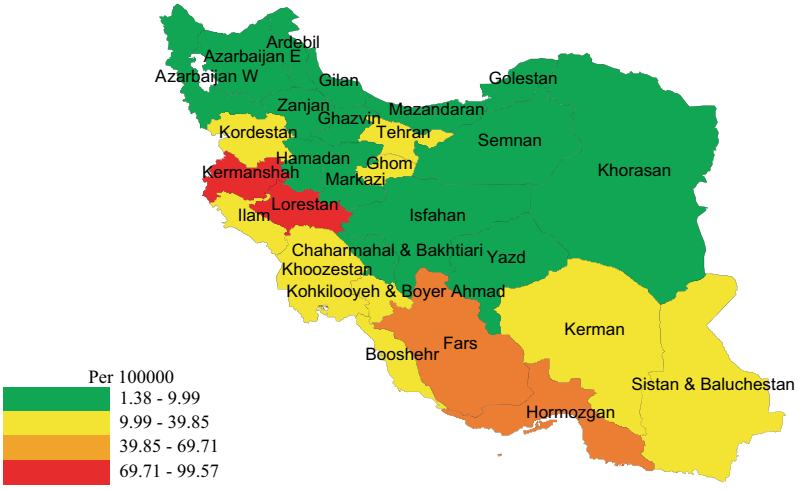


**Figure 26.1** Incidence of HIV infection in 2004 in different areas of Iran.
Source: Iran Ministry of Health and Medical Education, Center for Disease Management (January, 2006).

transmission in Iran may be overestimated in current statistics (Gheiratmand et al., 2005; Iran Ministry of Health and Medical Education, 2006).

HIV prevalence is not evenly distributed across Iran (see Figure 26.1). Based on identified cases, the average annual incidence of the disease over the total population varies in different provinces from 2.3 to 103.6 persons per one-hundred-thousand. It is not clearly known whether these disparities are due to differences in the prevalence of risky behaviors in different parts of the country, differences in the rate of initial introduction of HIV into different regions, or differences in the identification of cases, due to varying levels of services available in different provinces. Additionally, there is no consistency in the most common mode of transmission across different provinces. That is, even though the most common mode of transmission nationally is, in fact, shared injection equipment, there is at least one province where the proportion of infections resulting from sexual transmission has been just as high. The concentration of cases in various regions should be evaluated with caution as surveillance and case finding policies, and the prevalence of intravenous drug use and imprisonment for drug abuse charges vary among provinces; the latter two are thought to be involved in the high rate of HIV infection in western provinces.

## The Drug Scene in Iran

The drug abuse profile in Iran is dominated by abuse of opiate narcotics, which has plagued Iran for at least the past four to five hundred years, while historically and to the present the abuse of alcohol, cocaine and other stimulants has been of less concern. Opium abuse was recognized in Iran at least as far back as the 16th century, and references to opium consumption in medieval and classical Persian literature are abundant. The first official statistics on substance abuse were published in 1943, where the Opium and Alcohol Enforcement Society

estimated the number of opium addicts in Iran as to be one and half a million, out of a total population of 14 million. Another estimate in 1949 claimed that 11% of Iranian adults (1.3 million) were drug users (Razzaghi et al., 1999).

Iran was a major area for poppy production until 1955, when the first laws against the cultivation and use of opium were enforced. The total ban on poppy production was slackened in 1969 when the government permitted some limited and supervised cultivation. At the same time, a nationwide opium maintenance program (providing coupons for opium rations for opium dependent users 60 years and older) was initiated (Mokri, 2002; Razzaghi et al., 1999). By 1972, Iran's drug addicted population was estimated to be 400,000, with 105,000 registered opium users (Alemi & Naraghi, 1978). Heroin addiction appeared and spread through the nation beginning about four decades ago. In 1975, it was reported that there were 30,000 heroin users in the country, with some of them injecting (Razzaghi et al., 1999). Despite the more recent experience with heroin in Iran, opium appears to be more culturally rooted, is less stigmatized and is the drug of choice for the majority of narcotic abusers, even though the habit has diminished in some countries in the region (Mokri et al., 2005).

The proximity of Iran to Afghanistan is a crucial factor affecting opium and heroin use in Iran. Despite a temporary lull in production of opioids in 2001, due to severe restrictions imposed by the Taliban, there has been an immense increase in Afghan production of opioids since 1990. While in 1991 the annual production only slightly exceeded 2,000 tons, in 2005 and 2006 the figures were 4,100 and 6,200 tons, respectively. The 2007 estimate exceeds an astonishing record high of 8,200 tons. In fact, Afghanistan currently accounts for up to 93% of the worldwide opium production, and the pro-Western Afghan government has not been able to curb the rise. Despite Iran's attempt at border control and huge investments in the fight against trafficking, large quantities of Afghan opium and heroin cross the border (United Nations Office on Drugs and Crime (UNODC) *Afghanistan Opium Survey*, 2007; UNODC *World Drug Report*, 2007).

To illustrate the scale of the drug problem, it is noteworthy that in 2003, more than 95 tons of opium was seized in Iran, which is approximately 72% of the amount seized globally that year. In that same year, 17% of the global seizure of heroin, exceeding 16.4 tons, was also confiscated in Iran. Heroin seizure in Iran is 7 times the amount seized in the United States. In fact, Iran ranks first in global opiate seizures (UNODC *World Drug Report*, 2005). In a debated report, the Drug Control Headquarters (DCHQ) claimed that in 2002 more than 2,400 tons of opium and *shireh*, an opium concentrate, and 25 tons of heroin, worth more than 5 billion dollars in the local market, was consumed in the country (Iran Drug Control Headquarters, 2005).

Attaining reliable estimates of the prevalence and incidence of substance abuse in Iran is not possible. Social stigmatization along with criminal penalties for substance use discourages drug users from exposing their habits. Nationwide, systematic, population-based surveys of drug use are also not available. Instead, estimates of the prevalence of drug use and abuse and associated characteristics are based on available data from several venues, including treatment and rehabilitation centers, prisons and the judiciary system, very limited household surveys, opiate testing for issuing drivers' licenses, Rapid Situation Assessment (RSA) and Rapid Assessment and Response (RAR)

studies, annual confiscation of opiates by the police, and emergency room visits in general hospitals (Mokri, 2002). In the only available household survey, Ziaaddini and Ziaaddini (2005) reported opiate abuse and dependency in 17.1% and 5.3%, respectively of 1673 residents above 12 years of age in Kerman, southeast Iran.

The 1998 RSA report estimated the total number of drug users at 2,000,000, with approximately 600,000–1,200,000 addicts (i.e. 1–2% of the 60,000,000 population) and 800,000 recreational users. These estimates were based on a finding that about 25% of registered drug users reported participating in a drug rehabilitation or treatment program in the past decade and extrapolated from the total number of people who had received such services during the past decade (Razzaghi et al., 1999). The 2004 RSA estimated the total number of drug addicts between 1,200,000 and 1,800,000. This estimate was based on the percentage of street drug users in a survey sample who reported having been arrested (38.6%), imprisoned (29.5%) or enrolled in treatment (11.7%) during the year before the study, and the corresponding number of registered cases for the same time period. As the estimations were based only on street drug abusers, the figures might not apply to the whole population (Narenjiha, 2005). The World Drug Report (UNODC, 2005) estimates that 2.8% of the adult population aged 15–64 are opiate abusers.

Among the various estimates, figures obtained through an MoH study, the Epidemiology of Substance Abuse in Iran, which was based on emergency room visits in 2001, provide some of the most detailed data and are more commonly cited. The survey was conducted in 53 emergency rooms and on 5,212 randomly selected individuals referred for ER visits. Urine toxicology and interviews were performed. The authors used statistical adjustments to extrapolate the results for the general population. Based on these calculations, the MoH estimated that there are 1,700,000 problematic opium users (individuals meeting the DSM-IV criteria for opiate abuse or dependence) and an additional 1,800,000 casual users in Iran. The total number of individuals with heroin abuse or dependence was estimated to be at about 214,000. The same study concluded that problematic abuse of any opioid (including opium, heroin, *shireh*, mixed users and other illicit narcotics) afflicted a total of 2,547,000 people (Yassami, 2002).

### Injection Drug Use in Iran

Studies of drug users in Iran indicate that opium abuse remains considerably more prevalent than heroin use, and a minority of users are current IDUs. In the 1998 RSA, 16% of participants were intravenous drug users (IDUs), while in the 2004 RSA, 12.2% were, although the total number of drug abusers was estimated to be higher in 2004 than in 1998. Extrapolating from these findings to the general population, Razzaghi et al. (1999) estimated that there were about 166,000 IDUs in Iran in 1998. The MoH's 2001 study estimated the number of IDUs to be around 137,000 while the 2004 RSA provided an estimate of approximately 180,000 (Narenjiha, 2005; Yassami, 2002).

Drawing firm conclusions from these studies about a possible decrease in the proportion of drug users currently injecting is not possible, however, because of limitations in the study methodologies. Snowball recruitment of survey

participants, for example, could account for the observed differences, even in the absence of any actual differences, if the initial set of respondents in the later survey included a lower proportion of individuals currently injecting (and participants identified others in their drug-using circles that were similar to them with regard to their primary drug of abuse and method of using). According to the above estimates, heroin abuse comprises less than 15% of the opiate abusers, and IDUs constitute about 10% of the total cases. It should also be noted that in the above major studies, street drug users and prison inmates were overrepresented, making extrapolating to other populations difficult, and possibly leading to an overestimate of the number of injectors.

Interestingly, most injectors reported a 5–15 year history of non-injecting drug abuse, especially of smoking opium, before converting to injection. The most common reasons that drug users reported for moving from opium smoking to heroin injection were: to obtain a more powerful high (euphoria), difficulty maintaining a normal status by smoking, the proportionately higher costs of smoking and shortages and lack of availability of opium, especially of proper quality.

### Injection Drug Use and HIV Risk

Regarding HIV related risk behavior among IDUs, there are fewer studies and the results even more debated. While the 2004 RSA found that 85% of IDUs reported using sterile syringes as their common device for injection, the same study also found a lifetime history of sharing injection equipment of more than 50%. In other studies, up to 70% of IDUs had a history of lending or borrowing injection equipment.

The 2004 RSA found that 58.9% of IDUs had sex in the one month period preceding the study and that 43.2% of male IDUs interviewed, had during their life had sex with a partner to whom they were not married (26% with a non-spouse non-sex worker, 24% with a sex worker and more than 13% had sex with a man). Only 16.5% of interviewees used condoms consistently; while 47.6% never used a condom.

In a study of clients referred to a drop-in center, among 165 drug users with a history of injection drug use, Zamani et al. (2005) found a 15.2% HIV infection rate, while for the 390 never injected drug users in the same setting, this figure was only 5.4%. Among IDUs, one-third reported ever using a shared injection utensil. Of these, 62% reported that they had used a shared needle/syringe only outside prison, and 38% had ever injected a drug using a shared injection utensil (needle/syringe or handmade device) inside prison. The correlation between injection in prisons and HIV infection will be discussed later. In another study, Zamani et al. (2006) found that among 167 male IDUs who reported ever being sexually active, 54% reported having had 2 or more sexual partners, 16 reported ever having sex with another man in their lifetime, and only 53% (88 of 167) had ever used a condom during sex.

These findings highlight several trends. While opium smoking and ingesting are a large problem in Iran and comprise the largest component of the drug scene, they are not, it is presumed, contributing in a significant way to the HIV/AIDS epidemic. High risk injection drug abuse appears to comprise a much smaller component of the overall drug abuse picture in Iran but does

contribute substantially to HIV transmission. Drug abuse is largely a male problem, and high risk sexual behavior is prevalent among both IDUs and non-IDUs.

## Profile of Sexual Risk Behavior

Because of the stigmatization of many sexual behaviors and concerns about open discussion of sexual behaviors in Iran's conservative and traditional society, not much is known about the profile of sexual behavior in the general population. Premarital sex, extramarital relationships, homosexuality and commercial sex work are crucial areas of research, but research in this area is limited not only by the sensitivity of discussing these issues but also by official legislative prohibitions of many sexual behaviors and concerns about the possibility of criminal prosecution for admitting to engaging in these behaviors. According to current laws in Iran, extramarital sex and same gender sex are totally banned, and prosecution of perpetrators is actively pursued. Notably, the stigma associated with many sexual behaviors and concerns about the possibility of criminal prosecution for engaging in and reporting these behaviors also complicates development and implementation of effective counseling interventions to help reduce risks associated with sexual behaviors.

Despite the limited number of studies available, some research has been done. In one study of 15–18 year old males in Tehran, Mohammad et al. (2007) distributed 1,500 self-administered questionnaires to randomly selected households with at least one male in the age group and had a response rate of 92%. The study found that 27.7% reported a history of sexual intercourse and that of these 71.7% had more than one sexual partner. No estimate on female sexual behavior or condom use was available. A study on more than 4600 (55% female) 15–17 year olds students in Tehran by Tavoosi et al. (2004) found the level of correct knowledge regarding the effect of condom use in prevention, non-transmission of HIV/AIDS through food and non-transmission of HIV/AIDS through mosquito bites to be at 96%, 87% and 67% respectively.

One comprehensive study of 149 sex workers (mean age 28.3 years) arrested by the police found that although 15.7% reported a history of sexually transmitted infections (STIs), none of the sex workers tested positive for HIV, and only 4 cases of Hepatitis C (HCV) were detected (Jahani et al., 2005). The duration of sex work in the sample was 11.3 ($\pm$1.7) months, and 84% of the women reported a history of regular condom use. Condom use among sex workers was much lower in another study, however, in which only 24% of the sample reported regular use (Ardalan et al., 2002).

In the absence of direct measures of sexual behavior, data regarding STIs can be used to assess sexual risk and the risk of HIV/AIDS. In Iran, data on STIs is collected by the national network of medical universities. Their reports are based on clients referred to an associated network of health and treatment centers. In the period between 1992 and 2004, the annual number of symptomatic cases reported has quadrupled. The number of cases of genital lesions, which may be an even better indicator of the potential for an incipient HIV/AIDS epidemic, has grown by a factor of 6.2 over the same period, but the incidence of

syphilis has been low during these years (Iran Ministry of Health and Medical Education, 2006).

Some studies of patients with STIs have provided information on the sexual behaviors of participants. In one study conducted between 1997 and 2000, 100 male gonorrhea patients were studied. Twenty-four percent had been infected through their *sigheh*, a temporary marriage endorsed by the Islamic law but nowadays rarely accepted and practiced by the public, partners, and 64% by street prostitutes; 89% of contacts with prostitutes were unprotected. The study also noted that most of the prostitutes and professional *sigheh* wives were practicing survival sex, defined as sex in exchange for basic needs, including food or shelter (Zargooshi, 2002).

When it comes to homosexuality and men having sex with men, as a result of the extreme social and religious taboo along with punishments up to the death sentence, reliable information is almost non-existent.

These studies suggest that within a context of very limited information on sexual risk behaviors in the general public or certain high risk subgroups in Iran, the prevalence of STIs appears to be increasing, and there are indications that, at least for some, there are frequent extramarital sexual contacts, sex with sex workers and limited condom use.

## Prisons and HIV

Drug use under current laws in Iran is considered a crime, and users are subject to prosecution. Users are usually sentenced to payment of monetary fines and imprisonment. In most cases, while prison sentences are suspended, most convicted users are unable or unwilling to pay the fine and are sent to prison for anywhere between 45 days and 6 months. In 2006, approximately 48% of the 148,000 inmate population was in prison because of drug related charges. Considering the fact that imprisonment for drug abuse is generally of a short duration, and inmates have a high turnover rate, the number of people incarcerated annually because of substance use exceeds 400,000. It is estimated that between 30 and 60% of the total population of drug abusers have been imprisoned at least once in the last five years (Afshar, 2007).

The high rates of incarceration of drug users and the exposure of drug users while in prison to high risk drug and sexual behaviors has had grave consequences and has become a major health and social concern. While there is limited information about drug use and HIV risk in prison settings, some studies have found a connection between drug use, imprisonment and HIV. One large cross sectional descriptive study on the epidemiology of substance use in prisons sampled 1,201 randomly selected inmates with any kind of conviction from seven prisons and found that 30.7% had managed to use drugs after incarceration (Bolhari et al., 2002). In this study, while opium was the most common opiate abused in the prison, 10% of inmates reported a history of heroin injection, using shared injection equipment and handmade injection equipment, while in prison. A history of drug abuse before imprisonment was correlated with drug use in prison, although no significant correlation with drug use in prison was detected with regard to age, education, marital status, occupational status or reason for conviction. The authors concluded that drug abuse is quite

common in prison settings and involves not only many convicted drug users who fail to stay abstinent but also many convicts without a previous history of drug use who start using in prison.

A strong association between history of imprisonment and HIV infection has also been found. In a study by Farhoudi et al. (2003) of 369 newly admitted IDUs or ex-IDUs at *Ghezel-Hesar* prison with a mean duration of injection drug use of 24.0 ± 50.4 month, 81 (22.0%) tested positive for HIV. Among the HIV positive cases, 42 (51.9%) showed evidence of TB co-infection as well. Three hundred of the 369 (81.3%) had a past history of imprisonment. In this group, 77 (25.7%) cases were infected with HIV, while of those without a history of imprisonment history (69 inmates), only 4 (6%) were HIV positive. Study results also showed an association between HIV infection and: younger age; younger age at first drug injection; lower education level; tattooing inside prison; frequent sharing of drug injection equipment; frequent drug injection; using handmade instruments for drug injection; duration of drug injection; drug injection inside prison and duration of imprisonment. An additional remarkable finding of the study was that 5.7% of newly admitted prisoners (defined as individuals in prison for less than a week) and 21.3% of longer-term residents (inmates with more than 7 days in prison) had injected while in prison.

The issue of injection in prison settings is thus a major health hazard. Zamani reported a three fold higher HIV infection prevalence among individuals with history of injection drug use, and, of particular note, sharing injection utensils in prison accounted for most of the HIV infection in the sample of IDUs. Total length of lifetime incarcerations was found to be associated with higher prevalence of HIV-1 infection, and IDUs with a history of shared injection inside prison had a much higher HIV-1 prevalence in comparison with those who had never had a shared injection equipment in prison (OR, 10.00; 95% CI, 3.23–30.94). The prevalence of HIV-1 among IDUs with a history of shared injection only outside prison was not significantly higher than those who had never shared (P = .099) (Zamani et al., 2005).

These studies suggest the following conclusions: the majority of drug users in Iran get imprisoned sometime in their lifetime, drug use continues in prison settings, and sometimes conversion to riskier practices, including initiation of IDU or sharing of injection equipment, occurs. Additionally, many non drug users start using drugs in prison. Injection drug use in prison is highly associated with HIV infection in Iran and appears to play a prominent role in HIV transmission. The connection between injection drug use and prison provides real potential for an explosive HIV/AIDS epidemic.

## Intervention Programs

By the late 1990s, authorities began to grasp the importance of the HIV/AIDS threat to the nation, and initiated a number of relatively uncoordinated efforts to stop the twin epidemics of drug abuse and HIV/AIDS and raise public awareness about HIV/AIDS. Among these were mass media coverage and knowledge dissemination through lectures for the general public, students and specialized groups and through information brochures. Within a short period, however, the MoH recognized that more comprehensive and coordinated efforts were

necessary. Among the first attempts to address the drug abuse epidemic was the development of so called triangular clinics. Two years later, methadone maintenance treatment (MMT) programs for IDUs and at risk individuals, the first in Iran since such programs were closed down in 1979, were started.

The National AIDS Committee, which was formed in 2001, oversaw efforts against HIV/AIDS. Further, in order to reduce the harms related to injecting drug use and to prevent the spread of HIV/AIDS among IDUs, a subcommittee, the National Harm Reduction Committee, was constituted in the summer of 2002. The committee included representatives from the MoH, Drug Control Headquarters, the police, Iranian TV, the judiciary, the Prison Organization, the Welfare Organization and other organizations, research and academic centers and ministries. The committee stressed harm reduction measures, and, based on available domestic research and the input of some international consultants, resources were shifted to maintenance treatment, needle exchange and outreach for IDUs. Simultaneous counseling and antiretroviral therapy (ART), and more recently, highly active antiretroviral therapy (HAART), for HIV infected cases was also stressed.

### Triangular Clinics and Provision of HAART

Triangular clinic is an improvised name for clinics set up by the MoH intended to address 3 issues; injection drug use, STIs and HIV/AIDS. In October 2000, the first clinic was inaugurated in the city of Kermansheh, 500 km west of Tehran. Kermanshah was experiencing a rapidly growing HIV epidemic, and very high rates of injection drug use were reported from the city and adjacent towns. Following the opening of the clinic in Kermanesheh, policy makers realized the feasibility and efficacy of such centers, and the number of clinics was increased and services were set up in all major cities in the nation.

Triangular clinics are run by the MoH and each has one or two general practitioners, clinical psychologists, nurses and social workers on their basic staff. The main target groups for receiving services are HIV and HCV positive individuals. The services offered in the triangular clinics are heterogeneous and vary across the nation. The services may include; HIV voluntary counseling and testing (VCT); condom and sterile syringe distribution; education and counseling on addiction, HIV and STIs for clients and family members; and diagnosis and treatment of STIs. Some clinics have visiting medical specialists and offer HAART and treatment for opportunistic infections. Following the reintroduction of MMT in Iran in 2002, MMT has also been provided by some of the Triangular Clinics for HIV or HCV positive clients.

Currently, more than 120 clinics are functional nationwide and are officially known as a "center for counseling, surveillance and treatment of behavioral diseases." All services are free of charge. The exact scope of the services and number of clients served in the centers is not precisely known, but anecdotal reports claim that increasing numbers of people are coming in for testing, counseling and information. Some centers have served more than 2,000 individuals.

The Triangular Clinics constitute the largest provider of HAART for persons with HIV/AIDS. Currently the HAART first line regimen is composed of zidovudine, lamivudine, and efavirenz, with stavudine and nevirapine second line or later choices. Because of direct governmental funding mandated

by the MoH, the drugs are dispensed free of charge to HIV infected individuals through the triangular clinics. The number of people receiving HAART through such clinics fluctuates, although it is estimated that a total of between 400 and 600 individuals are receiving medications nationwide (Center for Disease Management, unpublished data, 2007). No data are available regarding programs or clinics providing treatment for HIV outside of the Triangular Clinics.

### MMT Programs

MMT was introduced as a pilot program at Tehran University of Medical Sciences in 2002. The decision to incorporate MMT as a part of health services in the nation was motivated by recognition not only of the importance of preventing HIV transmission associated with injection drug use but also of the need for effective treatment for opium or heroin addiction. The growing body of evidence on the effectiveness of substitution treatment in prevention of HIV in IDUs was an important determinant, but it should also be acknowledged that a large part of the impetus for implementing MMT originated from widespread frustration with the shortcomings of other approaches for treating addiction.

From 1979 to 1994, the laws in Iran did not permit any medical treatment of drug abusers, and all drug users were treated as criminals by the judiciary system. After 1994, the MoH and the Welfare Organization supported implementation of some outpatient clinics. Treatment consisted of detoxification followed by group or individual counseling. More than 70,000 clients received such treatment from 1995 to 2002. The limitations of this approach, which was associated with high rates of relapse, soon became apparent to clients, clinicians and policy makers, and it was obvious that many clients needed more than detoxification. As a result of these shortcomings, and in an attempt to revive demand reduction campaigns, pilot MMT programs were sponsored. Two United Nations Office on Drugs and Crime and one World Health Organization sponsored pilot studies clearly showed high retention rates and dramatic decreases in illicit drug use and HIV related risk behavior in MMT participants (Mokri et al., 2007; Razzaghi et al., 2005).

By 2003, the MoH declared MMT one of its core priorities. Corresponding manuals and guidelines were prepared allowing methadone to be offered in governmental, academic, triangular clinic and non-governmental organization (NGO) settings for IDUs and drug abusers with high HIV related risk behavior. The services offer MMT with no time or dose limit and are mostly free of charge or are provided at very low monthly costs of around USD 10 to clients. Ancillary services, including counseling and psychotherapy, urine toxicology monitoring, and follow-up, are not required or usually provided or available. Thus, despite their origins as primarily drug abuse treatment activities, the programs most closely resemble low-threshold services aimed at harm reduction. It is believed that HIV activists and harm reduction NGOs and also the National AIDS and the National Harm Reduction Committees were influential in steering the MMT programs towards primarily low threshold, HIV prevention measures.

By 2004, the annual manufacturing of methadone in Iran reached 600 kg, and MMT programs blossomed throughout the country. While it was estimated that a large proportion of those most at risk of HIV transmission (i.e., IDUs) should

have been reached and treated by MMT programs, inquiries revealed that most clients were not IDUs or those most at risk for HIV contraction or transmission. Instead, a large proportion of participants were non IDU heroin users or opium ingesting or smoking individuals. Although the services were designed as harm reduction activities, the populations actually receiving services were not the ones primarily at risk of HIV. The initial successes of MMT programs in attracting and retaining opium and heroin dependent individuals into treatment, reducing their drug use and improving their functioning tapped into the enormous reservoir of opioid dependent individuals in Iran. Demand for MMT increased considerably, leading to high black market prices for methadone and long waiting lists to enter treatment, both of which have persisted despite the insistence of governmental monitoring agencies on prioritizing MMT for IDUs and individuals displaying high HIV risk related behavior.

The dilemma then was how to target and provide services to an estimated 160,000–200,000 IDUs and underprivileged drug users while up to 2,000,000 non injectors, mostly opium users, were competing for services and flooding every newly established program. This difficulty was compounded by the fact that most clinics favored admitting and treating lower risk individuals, in part because of their presumed lower service needs, better response to treatment, and perhaps also less stigmatized status. Additionally, high risk clients were often less motivated and less able to compete for treatment.

Potential solutions included expanding services to an extent that both populations could be covered or trying to target existing programs to very high-risk populations, and excluding less at-risk individuals. A strategy comprising both of these approaches was selected.

In order to rapidly expand MMTs, the government decided to allow the private sector to participate in MMT programs. The MoH permitted general practitioners to initiate private substitution treatment centers. The centers, named agonist maintenance units or AMUs, comprise a minimum staff of 3, including a general practitioner, a clinical psychologist or social worker and full-time nursing staff for medication dispensation. The practitioners were required to participate in a 2 week training course and to procure the basic requirements for medication storage and dispensation in their private offices. The centers offer supervised methadone dispensation, weekly physician visits, weekly drug counseling and preferably, but not necessarily, urine toxicology. Guidelines were intended to minimize the requirements and treatment program and running expenditures, so that the centers would be functional in a very short period and operate and provide services at very low costs.

Each center was permitted to offer MMT to between 50 and 200 clients. The centers do not receive any funds or subsidies from the government and have to rely on direct payment by clients. Notably, substance abuse treatment is not covered by any insurance company in Iran. The very low price for methadone tablets and syrup provide an incentive for the centers. A 5 mg tablet costs about 1 US cent, and clients have to provide between USD 50 and 100 a month in order to receive the routine treatment. In 2006, up to 400 centers were inaugurated, and by mid-2007 around 700 centers were functioning. Governmental estimates claim that so far more than 20,000 individuals receive maintenance treatment through the centers. The MoH strongly recommended that the centers

give priority to enrolling and treating IDUs but did not exclude other clients as eligible for MMT.

The theoretical rationale for the private centers was to accommodate treatment for a large proportion of substance abusers, even relatively low risk individuals, in order to decrease the huge demand for treatment and ease access for higher-risk clients, who had, in the past, been neglected, in favor of the considerably less at risk opium users and heroin non-injectors. Despite this effort to increase overall treatment capacity sufficiently to ensure that the between 160,000 and 200,000 IDUs receive services, the vast number of opium users and heroin smokers continue to impede access to services for IDUs and the most underprivileged drug users. MoH reviews note that despite the formally requested prioritization for those most at risk for HIV, these individuals rarely gain access to services.

In an effort to expand treatment capacity even more, in 2006, buprenorphine was domestically manufactured at a relatively low price of USD 1.3 for an 8 mg tablet and offered to the AMUs. The AMUs were permitted to offer buprenorphine treatment to an unlimited number of clients in addition to their 50–200 patient limit for MMT. This move seems to have eased access, increased the number of clients receiving substitution treatment and has generated a reasonable level of additional income for private clinics.

### Drop-in-Centers and Outreach Programs

In order to access hard to reach populations, particularly IDUs, drop-in-centers (DIC) were implemented in 2003 in poor underprivileged areas in Tehran and other major cities. Such centers offer disposable injection devices, including needles and syringes, as well as boilers, cotton pads and condoms; printed materials on HIV and drug abuse; and a daytime shelter for homeless users. Outreach members stationed in DICs go outside the centers to dispense needles and materials as well as to encourage users to come to DICs and refer others to DICs. Most DICs are run by NGOs through governmental subcontracts. A few medical universities have established DICs as well.

A few months after establishing the DIC program, and after some needs assessment studies, it was decided to allow DICs the option of offering MMT as an additional service at the centers in addition to general harm reduction efforts. DICs that volunteered were allowed to start low-threshold MMTs, with minimum counseling and urine testing and no take-home methadone. In some centers, up to 300 clients are enrolled. So far, approximately 60 DICs are functioning, and more than half have MMT programs. DIC directors acknowledge that clients show more interest in MMT than in other harm reduction measures, and usually substitution treatment is considered more important by both staff and clients in comparison to needle exchange. The relatively lower appeal of needle exchange might result from the relative abundance of and ease of access to very low price sterile syringes in pharmacies on the one hand and from the huge demand for methadone on the other. In fact, many DICs have become mainly MMT programs for homeless and high-risk individuals, and the profile of clients in some DICs demonstrates the high HIV risk of those using these services. In one center, HIV and HCV infection rates were 25% and 78%,

respectively (Kumar, 2005). These findings suggest that the attempt to use DIC MMT programs to target individuals more at risk of blood born virus infections holds some promise.

### Prison Based Activities

Because needle sharing and HIV transmission are highly correlated with incarceration in Iran, in order to decrease the spread of HIV, the Prisons' Organization has implemented a significant amount of educational programs. Upon entering prisons, inmates begin receiving information on harm reduction through group education, multi-media education and distribution of pamphlets. Once inmates get settled, peer education and face-to-face counseling are also provided. In 2005, 319,301 inmates, which is almost half the number imprisoned during the year, benefited from such educational programs (Iran Ministry of Health and Medical Education, 2006).

As a central strategy for HIV prevention, methadone programs were also initiated in prisons. In fact, immediately after the effectiveness of community based MMT services was documented, prison programs were added. Currently, 59 prison-based MMT services with more than 8,200 clients are functioning nationwide (Afshar, 2007). Inmates, irrespective of reasons for incarceration, are eligible to receive methadone if they meet criteria for opiate dependence. The services are mostly low-threshold programs, with limited counseling or urine toxicology testing. Methadone intake is strictly supervised, and no take-away doses from the clinic are allowed. Injection drug use is not a prerequisite for receiving the services, and many opium users are among the care receivers. So far, no outcome data about the prison MMT programs has been officially published, but statements from the Prison Organization claim a high success rate and acceptance of MMT by both inmates and prison staff. Notably, the Prison Organization has found that implementation of MMT has led to a decrease of violence, injection drug use and drug abuse in the wards.

In addition to MMT, needle exchange, condom distribution and bleach programs have been implemented in a number of prisons. Condoms are formally intended to be dispensed for conjugal visits between inmates and their spouses, but in practice inmates have free access to condoms, which may allow them to avoid unsafe sex in the prison setting. No data on inmate sexual behavior or the impact of condoms are available, and security and political concerns impede research in this area. Bleach and needle programs have had less acceptance by staff and inmates. Prison officials acknowledge that inmates are reluctant to receive sterile injection devices and mostly favor methadone. In the few prisons where pilot needle and bleach programs were available, they are being replaced by MMT programs. In fact, a large quantity of domestic manufactured methadone in Iran is consumed through prison programs, and official government policies intend to increase considerably the number of clients served.

One major problem with the prison MMT program is lack of aftercare, as many inmates have difficulty receiving MMT through outpatient services after release from prison. The difficulty is mostly due to long waiting lists and limits on the availability of free or low-price MMT programs rather than

discrimination against former inmates. In a few cities, the Prison Organization has set up outpatient MMT services for ex-inmates, but due to limited number and geographical distribution of these services, many released prisoners discontinue methadone. This might be expected to lead to high relapse rates and recidivism.

## Conclusions

Faced with one of the highest population prevalences of opium and heroin dependence in the world and the prospect, fortunately not yet fulfilled, of an explosive epidemic of HIV/AIDS in the general population driven by injection drug use, Iran has made substantial changes in its public policy and approach to opioid addiction over the past decade. From 1979 to the early 1990s, Iran prohibited medical treatments for addiction and relied exclusively on supply side approaches and criminalization of drug users. Despite imposing severe penalties for heroin or opium use, drug use and addiction increased substantially during this period. The emergence of HIV/AIDS in Iran, and in particular transmission of HIV due to injection drug use, contributed to a growing sense of urgency about the need to implement effective HIV prevention and drug abuse treatment interventions. The first medical treatments for heroin and opium addiction permitted in Iran in the early 1990s included medical detoxification and drug counseling. Subsequently, naltrexone treatment was also made available, but these treatments had relatively limited reach into the vast numbers of addicted individuals, and relapse rates remained quite high even with these treatments.

Beginning in 2002, MMT was reintroduced into Iran. Since then, efforts have focused on developing a more comprehensive public health approach to ensure that MMT and other effective treatments (including buprenorphine maintenance) and HIV prevention interventions are available and provided to those most at risk of HIV transmission and most in need of services. The enormous reservoir of untreated opium and heroin addicted individuals, estimated to include between 1,200,000 and more than 2 million individuals, poses considerable challenges for scaling up drug treatment which is sufficient to reach the large number of IDUs (estimated to include between 160,000 and 200,000 individuals). Of particular note, recognizing that injection drug use in prison was strongly associated with an increased risk of HIV transmission, Iran has initiated MMT in prisons as well as in a variety of health care settings. Other harm reduction interventions provided in Iran include centers providing VCT, needle and syringe exchange and medical care for HIV and HCV.

While the health sector is in a race for implementing the necessary interventions in order to curb the major spread of HIV through sharing of injection paraphernalia, the profile of the epidemic seems to be changing from primarily drug users increasingly to their sexual partners and sexual transmission in the non drug user population. It is not clear whether the efforts will restrain the growth of an HIV epidemic in time or whether Iran will suffer a second and much larger wave of infection originated in drug users but mostly promoted through unsafe sexual practices.

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# Part V

## Latin American and Caribbean

# Chapter 27

# The HIV/AIDS Epidemics of the Americas

David D. Celentano, Chris Beyrer, Wendy W. Davis, and Carlos del Rio

What eventually became termed the HIV epidemic was first detected in 1981 in 11 homosexual men in the United States with very aggressive and rare malignancies (Kaposi's Sarcoma). The initial case reports of mostly men who had sex with men to the U.S. Centers for Disease Control (CDC) showed geographic clusters in Belle Glade, Florida, New York City, Los Angeles and San Francisco. Soon this mixed group of patients with severely compromised immune systems became colloquially referred to as the "Four H Disease" by the CDC, as it primarily involved homosexuals, heroin addicts, hemophiliacs, and Haitians. Naturally, Haitians were later found to have the same behavioral risks as all others infected with HIV, but the die was cast. The sad and discriminating legacy of the early stages of the nascent HIV epidemic in the United States forced the poorest nation in the Americas and one of the least economically developed in the world into an economic freefall that compounded an otherwise chaotic political situation in Haiti in the mid-1980s. With virtually no economic resources, political instability and international discrimination, one would have predicted a disastrous, expanding HIV epidemic in this island nation of the Caribbean. Nothing could be farther from the truth, and the Haitian response to their HIV epidemic offers useful lessons for other nations.

With an estimated 130,000 new infections in the Americas in 2007, the region has basically experienced a plateau in HIV/AIDS for the past decade. In the United States, the high rate of ART among HIV infected patients has led to a dramatic decline in mortality associated with AIDS. While this is the case in Canada and Brazil as well, many of the poorer nations in Central and South America and in the Caribbean have not yet been able to scale up ARTs to those in need. Racial and ethnic minorities in the U.S. bear the brunt of the epidemic, although they represent a small fraction of the population. Among its neighbors,



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_27, 

the poor, the marginalized and the disadvantaged are most frequently found to harbor HIV.

The United States experienced approximately 40,000 new cases of HIV per year for the past decade. About one-quarter of new cases are among persons who have not received HIV testing (often diagnosed when hospitalized with an AIDS-defining condition), which continues the transmission of HIV. African Americans and other ethnic minority populations account for the largest proportion of new cases, which are attributable in large part to drug use. IDU and MSM continue to be major players in the HIV epidemic in the U.S., while minority women (particularly African American women) are the fastest growing segment of the HIV epidemic. In both the U.S. and Canada, the HIV prevalence has continued to grow as life-saving treatments have been widely adopted and death rates have plummeted.

Two nations in the Caribbean dominate their neighbors in terms of HIV prevalence – the Dominican Republic and Haiti. Gaillard and colleagues (2006) suggest that behavior change in Haiti accounts for some of the declines recently seen in HIV prevalence among reproductive aged women (although mortality no doubt plays an important role as well). Recent prophylactic vaccine trials conducted in the Dominican Republic among female sex workers have seen few HIV seroconversions, suggestive of adoption of condom use with clients (Kerrigan et al., 2006). In the other island nations, HIV has been stable over the past several years.

In Latin America, Brazil is home to about a third of HIV infections in this sub-region. As was seen in Asia, while the epidemic originated among MSM, it shifted to IDUs and then to their heterosexual partners. The recent leveling of the Brazilian urban epidemic is attributable to harm reduction, adoption of prevention strategies and mortality, especially among IDUs (UNAIDS, 2006). Other important epidemics are found in Mexico and Colombia, attributable to MSM and IDUs

The four chapters in the Latin America and Caribbean section of this book demonstrate quite different HIV epidemic courses, with varying political climates, subcultures and affected populations, and the scale of the epidemics in terms of numbers infected and geographic terrain. Yet, there are some remarkable similarities in these four experiences – non-governmental organizations (NGOs) and civil society played central roles in prodding skeptical governments into action (albeit in quite different ways), and international funding, primarily through the Global Fund for AIDS, Tuberculosis, and Malaria and the President's Emergency Plan For AIDS Relief (PEPFAR), galvanized early (and relatively unsuccessful) attempts to expand access to life-saving medications, usually through NGO networks. In each of these chapters, we see a similar genesis to these epidemics and some familiar themes, with initial cases usually being among homosexual men, often with foreign partners, that very quickly shifted to heterosexual epidemics, often fueled by commercial sex work, unprotected sex (often with the explicit backing of the Roman Catholic Church), and a landscape of uncontrolled sexually transmitted infections. As with many parts of the world, women's risk usually emanated from the risks of her sole partner, usually her husband, in cultures of gender inequity and poverty. Early on, stigma and discrimination were the primary barriers to learning one's HIV status, and it would be facetious to state that stigma has diminished as HIV

expanded or epidemics matured. Nevertheless, bold approaches to controlling HIV can be seen in these examples, each taking a quite different approach, but most having the same endpoint – reduction of the epidemic expansion.

The Caribbean is the second most hard-hit geographic region in terms of HIV prevalence, although the absolute numbers of infected persons pales in comparison with southern Africa, Nigeria and India. Nevertheless, 1.6% of the population of adults is believed to be infected with HIV, the lion's share being on Hispaniola, with the rate in Haiti being nearly double that of its neighbor, the Dominican Republic. HIV/AIDS remains the leading cause of death among 25–44 year olds in Haiti and the Dominican Republic.

Unlike the African experience, HIV-1 in the Caribbean is almost exclusively clade B, the subtype found in the U.S. and Western Europe, with very few other known subtypes of HIV-1 in circulation. In the South and East sections of South America (Brazil, Argentina and Uruguay), clade D predominates, which is generally viewed as having an East African origin (McCutchan, 2006). While combined recombinant forms are the rule in Asia, the molecular epidemiology of HIV in the Americas has remained unique with separate B and D epidemics. Somewhat over 3 million HIV-infected individuals are found in North America, the Caribbean and South America.

Nearly three quarters of the 250,000 [with a range from 190,000–320,000] people living with HIV in the Caribbean are located in the Dominican Republic and Haiti. However, adult HIV prevalence is high throughout the region: 1–2% in Barbados, Dominican Republic and Jamaica, and 2–4% in the Bahamas, Haiti and Trinidad and Tobago. Cuba, with a prevalence below 0.1%, is the sole exception in the region. The UNAIDS estimated 27,000 [20,000–41,000] people became infected with HIV in 2006 in the Caribbean. Although HIV infection levels have remained stable in the Dominican Republic and have declined in urban Haiti, localized trends warn that these countries need to guard again possibly resurgent epidemics. In many respects, these mostly heterosexual HIV epidemics are tied to demand for sex work from both locals and tourists, reflecting both poverty and gender inequality. Men who have sex with men clearly exist, but remain largely hidden in this region due to a high level of homophobia.

Koenig and colleagues provide a rich explanation of the early Haitian epidemic, an embarrassing legacy of the international pariah status that Haiti endured, largely at the hand of U.S. government agencies (reflecting ignorance and institutionalized racism). In fact, as recently as 1990, five years after the CDC removed "Haitian" as a risk factor for HIV, the U.S. Food and Drug Administration banned voluntary blood donation from Haitians, despite clear epidemiologic evidence by that time that Haitians were no more likely than U.S. citizens to be a risk for HIV infected blood. Haiti alone accounts for 65% of the HIV cases in the Caribbean, so it has been a critical region of concern (UNAIDS, 2006).

One fundamental aspect of the Haitian response to the HIV epidemic was the formation of GHESKIO (the Haitian Study Group on Kaposi's Sarcoma and Opportunistic Infections) in 1982 – a collaboration of Haitian health professionals in collaboration with Cornell University (and expanded in more recent times). GHESKIO has provided critical epidemiologic evidence to track the Haitian epidemic, the clinical manifestations and course of HIV, and the

effectiveness of HIV treatments in this setting of extreme poverty. Importantly, they have also played a key role (with notably Partners in Health and other NGOs) in providing antiretroviral therapy to those in need, leveraging funds from international donors, and providing essential technical advice for HAART scale-up nationally. These actions have led to a two-fold decline in the national HIV prevalence from 1993 to 2003, a major achievement. This reflects a vigorous HAART campaign which is showing treatment effectiveness equivalent to that seen in the U.S. It may also reflect the large number of deaths that occurred early in the epidemic among those not able to access HIV medication.

Sharing the island of Hispaniola with Haiti is the Dominican Republic. Kerrigan, Barrington and Montalvo outline the history of the HIV epidemic in the Dominican Republic. They acknowledge a strong, proactive response early on in the HIV epidemic, generally led by the NGO community, despite having limited resources to draw upon. The NGO community is credited by Kerrigan and collaborators as the key to the prevention successes seen in the Dominican Republic. Indigenous NGO responses were bolstered by significant assistance from several U.S. organizations (principally, Family Health International and the Academy for Educational Development), funded by the U.S. Agency for International Development (USAID). While empirical data demonstrated significant behavior change among female sex workers (principally through improved rates of condom use with commercial partners), leading to a stabilization or decline in HIV prevalence, there has been relatively slow uptake of PMTCT, as only half of women receive any antenatal care. Further, the authors contend that most PLWHA do not know their HIV status, which clearly limits care-seeking and maintains HIV transmission. Not knowing one's HIV status is in part a function of the lack of widespread availability of voluntary counseling and testing outside of medical settings, fears of stigma and discrimination, and lack of resources, both financial and informational. The effectiveness of large-scale prevention programs has been limited by the institutional capacity to manage large sums of donor funds; this has been noted in the limitation of expenditures of Global Fund monies in support of antiretroviral treatment in the Dominican Republic. Finally, while HAART roll-out is continuing, there is concern that the government is not reaching newly identified cases, but rather enrolling patients previously seen in care. Nevertheless, prevalence data demonstrate moderation and leveling of the national HIV epidemic among several vulnerable populations, although surveillance could be markedly improved.

The HIV epidemics in Latin America are generally considered to be stable. Some 1.7 million people are living with HIV/AIDS, of whom two-thirds are found in Argentina, Brazil, Colombia and Mexico. UNAIDS (2006) suggests the important factors underlying continued HIV transmission regionally are poverty, migration, rural lack of information and rampant homophobia. Homosexual behavior is both publicly denied and often ignored, and is especially vilified by the Roman Catholic and protestant churches. Nevertheless, between 25–35% of reported AIDS cases in Latin America are believed due to sex between men.

HIV/AIDS and Mexico

Between 1981 and 1983 three individuals were diagnosed with AIDS in Mexico. Each had visited the United States (U.S.) in the previous five years. Since then, and through December of 2007, the Secretary of Health in Mexico has been notified of a total of 115,651 AIDS cases (Secretariá de Salud, 2007). Of these, 84% have been among males and 16% among females. The number of AIDS cases diagnosed peaked in 1999 when 8,760 new cases were reported and since then the number of cases of AIDS has declined to about 5,000 per year (Secretariá de Salud, 2007). The epidemiology of HIV/AIDS in Mexico is also changing. While men who have sex with men were once the predominant risk group in Mexico, women are increasingly at risk. In 2006, 20% of new cases of AIDS were among women and the overall proportion of cases attributed to heterosexual transmission is growing (Secretariá de Salud, 2007). The number of AIDS patients reporting injection drug use as a risk factor has also increased and is now the route of transmission reported in 3% of cases. Since the beginning of the epidemic in Mexico, 64,126 (65%) of reported AIDS cases have died (Secretaria de Salud, 2007).

The number of reported cases from states bordering the U.S. such as Baja California and rural states such as Chiapas on the border with Guatemala are also increasing. For example, in the city of Tijuana, which borders the city of San Diego, California, HIV prevalence estimates are high for high risk pregnant women (5.6–11.6%), injection drug users (2.3–6.5%), sex trade workers (4.8%) and men who have sex with men (MSM) (11–19%) (Brouwer et al., 2006). These high rates are attributed to injection drug use which is common among MSM and female sex workers in Tijuana and is prevalent among at risk pregnant women and their partners (Brouwer et al., 2006). Migration is also thought to contribute to these high rates.

Despite developments in border towns like Tijuana and other areas affected by migration, the HIV/AIDS epidemic in Mexico remains one which is concentrated among homosexual and bisexual MSM. A couple of different factors may have helped Mexico to avoid a generalized epidemic. Certainly, Mexico's early control of its blood supply through mandatory testing, prohibition of paid donations and the closure of plasmapheresis banks was an extremely successful public health intervention. The close collaboration of researchers and policy makers which has supported the rapid translation of research findings into evidence based prevention programs has also played a major role in Mexico's slowed HIV/AIDS epidemic. Success has also been achieved in the area of care. Mexico now provides universal access to antiretroviral medicines (ARVs) although some challenges persist such as shortages of antiretroviral medicines and procurement failures, difficult access to CD4, viral load and genotype testing and limited availability of trained providers. While Mexico's epidemic is similar in many ways to that of its neighbors, its prevention successes and the potentially interesting role that migration may play as the epidemic matures continue to provide a unique model.

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In South America, the cases of Peru and Brazil provide contrasts in political will, the power of civil society, and major differences in culture. Konda, Cáceres and Coates describe the social, political and cultural forces that have shaped the

scale and course of the HIV epidemic in Peru. Contrasts are seen in populations infected and affected by HIV across gender, in the diversity of sexual identification, by geography and urbanization. In the familiar refrain, the first case of HIV was identified in 1983 in a homosexual man who had lived in the U.S. for several years, who was repatriated to Lima in 1982. Unlike many other epidemics in developing countries in the Americas, Peru has largely experienced a concentrated epidemic among men who have sex with men (including a large and fluid bisexual population). Governmental response, as elsewhere, was initially characterized as denial, uncertainty and disorganization. Action was a function of the efforts of NGOs especially in responding to the prevention and care needs of those initially infected.

The epidemiology of HIV infection in Peru is not overly dissimilar to the situations in Haiti and the Dominican Republic, which originated as epidemics among MSM but later shifted towards becoming a heterosexual epidemic. In Peru, about a third of all HIV infections are attributable to MSM, which are varied in both identity (gay or homosexual, transgender and bisexual) and in HIV prevalence. However, some 60% of the HIV cases in Peru are attributable to heterosexual transmission, where female sex workers are implicated as being a high-risk source population (especially among the illegal street-based sex workers who escape the control of the health authority charged with HIV and STI control and surveillance). Another vulnerable population identified as being at high risk are prisoners, where sex between men may also lead to widespread HIV transmission. Importantly, while illicit drugs are rampant in the Andean region, there is little injection, and parenteral transmission is thought to be rare.

The issue of AIDS exceptionalism is raised in the chapter on Peru – where there was open criticism of the government's response to HIV/AIDS as the agency charged with HIV prevention and control was funded at a level some considered to be well beyond the size of the public health problem. Further, the government was charged with lack of cooperation and collaboration with the NGO and scientific communities. As the authors point out, while HIV reflected a reemergence of infectious disease in the U.S., Peru has a long and recent history of uncontrolled infections leading to significant morbidity and mortality. Nevertheless, in 1996 Peru's Congress passed legislation (conceived and backed by very strong, local NGOs) that established the right to medical care for HIV, confidentiality of HIV serostatus, the provision of voluntary counseling and testing, and expanded anti-discrimination statutes. While access to HIV care was limited, Global Fund support in 2004 was accompanied by liberalization of health care policy, guaranteeing access to life-saving medications. Rapid expansion of HAART has been seen following the initial rollout.

Brazil's response to the HIV epidemic has been unlike any other country's experience. As Bastos and colleagues point out, collaboration has been a hallmark of coping with rapidly expanding HIV prevalence. In the face of deep social inequity, the 1988 constitution guaranteed universal and equitable health care for all. By 1996, a law was passed granting free and universal access to antiretroviral medications. While it is commonly believed that universal access to HAART was achieved by breaking patents and the indigenous production of generic medications, Brazil was a signatory to the 1996 Industrial Property Law 9 years in advance of the World Trade Organization agreements. Charges of AIDS exceptionalism have also been raised in Brazil, but the social response

to the epidemic has been achieved through a progressive political agenda that included all major stakeholders, including progressive elements of the Catholic Church. The uptake of HAART is currently expanding, with 161,000 Brazilians on treatment financed directly by the federal government (although distributed and monitored through the national health system), with patient management the responsibility of primary care providers.

The remaining problems that Brazil confronts are quite serious. HIV cases exist throughout this vast country, although the resources and response have not been equally shared. There is low utilization of prenatal care and hence low access to VCT among pregnant women. It is thought that up to two-thirds of the HIV infected population is aware of their HIV status, but little is known about the extent of the epidemic in certain vulnerable populations, including female sex workers and migrant laborers. However, the identification and treatment of HIV among injection drug users, a very large population of primarily cocaine users, has been a model of the harm reduction approach.

In these four case studies of HIV response in the Americas, there are a number of similarities. Initial responses by governments were quite limited, often characterized as being in denial, that HIV was an 'American disease' that would be confined to the U.S. and would not affect their citizens. However, the role of activism was key to forcing a response, often in very unstable political climates. Each of these countries has a recent history of being led by dictatorships that wreaked economic havoc and brutality upon its citizenry. Nevertheless, grassroots movements in each country led to social movements that eventually partnered with civil society, NGOs and governmental bodies to form the local response to HIV prevention and care, and were partners in successful applications to international agencies for expanding access to antiretroviral medications.

Concerns regarding stigma and discrimination associated with an HIV diagnosis are raised by each of the chapter authors. Due to fears of one's serostatus becoming known, many persons who might otherwise seek anonymous (or confidential) HIV voluntary counseling and testing remain unaware of their HIV status. Of course, being ignorant of one's HIV status thereby precludes seeking and accessing appropriate treatment of HIV disease, but it also provides the opportunity for the further transmission to sexual partners (whose only behavioral risk is being monogamous), to their offspring through vertical transmission and to drug-sharing partners. Stigma and fears of discrimination have not abated as HIV prevalence has mounted – in some cases, stigma has increased, setting up higher barriers to accessing essential HIV care.

Data limitations are raised in each of these chapters on HIV in the Caribbean and Latin American regions. For example, Bastos and colleagues note the important role that female sex workers and migrant laborers might play in the current and future Brazilian epidemic, but decried the lack of any surveillance data; further, low utilization of antenatal care limits the generalizability of data on HIV prevalence in pregnant women. Further, they report on the notable lack of program evaluation of any prevention programs in Brazil, similar to the concerns noted by Kelika and colleagues in Peru. Measurement and evaluation of prevention efforts have rarely been systematically applied, so we are often in doubt about what elements of programs lead to behavior change, decreased barriers to prevention or care services, or to identifying incentives to

join programs. This was also cited by Kerrigan et al. in the case of Dominican Republic. Koenig and colleagues point out the very weak HIV surveillance system that existed in Haiti, but GHESKIO collaborators were able to conduct surveys among specific populations to guide prevention and care initiatives. Finally, the important role of the Global Fund has been critical for the wide expansion of access to HAART in several of these countries in the Americas, although concern with the ever-widening need for treatment in the future was consistently raised as key economic, medical and political issues.

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# Chapter 28

## Epidemiology, Prevention and Care of HIV in Peru

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_28, 

## Introduction

The first case of acquired immunodeficiency syndrome (AIDS) in Peru was diagnosed in 1983; the patient was a gay man who had lived in the United States (U.S.) for several years, returning to Peru in 1982. Although the physicians at the public hospital where the patient was admitted had not yet seen this illness, they knew about AIDS in the U.S. and realized that AIDS and their patient's illness were one and the same. Although in hindsight the inevitability of additional cases is clear, at that point many believed that the epidemic was a problem isolated to the U.S. that would not affect Peru on a large scale.

Since then, the HIV/AIDS epidemic has not only become apparent, it has gone through various stages. The initial AIDS case did portend the direction of the epidemic and since 1983 HIV/AIDS in Peru has been concentrated among men who have sex with men (MSM). Although other vulnerable groups exist, such as female sex workers and prisoners, the main burden of the epidemic remains among MSM. HIV/AIDS has spread throughout the country, although the coastal and Amazonia regions are more affected than the highlands and this remains a primarily urban epidemic.

The government's response to the HIV/AIDS epidemic has also gone through various stages ranging from denial to action, while passing through periods of uncertainty and disorganization. Efforts have included peer education among both sex workers and MSM and the initiation of serologic and behavioral surveillance programs. As in other parts of the world, the action of non-governmental organizations (NGOs) and private voluntary organizations have been of immeasurable importance both for their direct work in prevention and care of people living with HIV/AIDS (PLWHA), as well as their advocacy efforts which have positively influenced the government's response to HIV/AIDS.

In this chapter we will present information on the epidemiology of HIV/AIDS, discuss the history of the epidemic and the response both of the government and NGOs, the successes and failures of these efforts, and the current realities of the epidemic in Peru.

## Epidemiology of HIV in Peru

HIV and AIDS are both reported to the Ministry of Health (MoH) in Peru, a procedure that has been mandatory since 1989. The Peruvian General Directorate of Epidemiology collects data on the reported cases and as of November 2006 there were 19,399 AIDS cases and 27,738 cases of HIV reported to the government (OGE, 2006b). The vast majority of these cases are sexually transmitted and most are found in the capital, Lima. The trajectory of the epidemic is described in greater detail below.

### Concentrated HIV Epidemic

The World Health Organization (WHO) in their 2004 report entitled, "Second generation surveillance for HIV: The next decade" defined a concentrated HIV epidemic as one in which high risk groups have an HIV prevalence of 5%

**Table 28.1** HIV prevalence among the general population between 1986 and 2003, Peru.

| General population (1987–2003) | | | | |
|---|---|---|---|---|
| **Population** | **Year(s)** | **Sample size** | **HIV prevalence** | **Authors** |
| Visa Applicants, Lima and Provinces | 1987–1992 | 21,562 | 0.3% | (McCarthy et al., 1996) |
| Military Recruits, Lima | 1995 | 480 | 0.2% | (Cáceres et al., 1997) |
| Blood donors, Lima | 1996 | 18,373 | 0.4% | (MoH, 2006) |
| ANC 15–24 year olds, Lima | 1996 | 3,566 | 0.3% | (MoH, 2006) |
| ANC 15–24 year olds, Lima | 1997 | 3,450 | 0.6% | (MoH, 2006) |
| ANC 15–24 year olds, Lima | 1996–1997 | 12,752 | 0.5% | (Hierholzer et al., 2002) |
| Men 18–30, Chiclayo | 1997 | 437 | 0.5% | (Cáceres et al., 1999) |
| Men 18–30, lquitos | 1997 | 432 | 0.2% | (Cáceres et al., 1999) |
| Men 18–30, Cusco | 1997 | 405 | 0.0% | (Cáceres et al., 1999) |
| ANC 15–24 year olds, Lima | 1998 | 3,990 | 0.2% | (MoH, 2006) |
| ANC 15–24 year olds, Lima | 1999 | 3,622 | 0.3% | (MoH, 2006) |
| ANC 15–24 year olds, Lima | 2000 | 9,583 | 0.2% | (MoH, 2006) |
| ANC 15–24 year olds, Provinces | 2002 | 9,978 | 0.2% | (MoH, 2006) |
| Pregnant women, Lima | 2003 | 12,438 | 0.5% | (Alarcon et al., 2003) |

Abbreviation: ANC, antenatal clinics.

or more and the general population has an HIV prevalence of less than 1% (UNAIDS/WHO, 2004). This is the situation in Peru, where HIV prevalence in the general population remains well below 1% (Table 28.1). In Peru, the highest risk group for HIV remains MSM.

HIV transmission in Peru is predominantly sexual, with 96% of cases reported to the MoH stemming from sex, with approximately 36% of these infections being due to sex between men (MoH, 2006). The proportion of infections associated with homosexual or bisexual sex among men has dropped in the last ten years, with more infections being associated with heterosexual transmission (MoH, 2006), and there has been a consequent reduction in the male to female ratio of HIV infection. Approximately 3% of infections are due to vertical transmission and 1% due to parenteral transmission (MoH, 2006). The significant lack of parenteral transmission is primarily due to the lack of injection drug use, which is not the case in other areas of Latin America, notably the southern cone of South America (UNAIDS, 2006b).

### *HIV Among Men who have Sex with Men (MSM)*

Since the onset of the HIV epidemic in Peru, the primary risk group has been MSM. The prevalence of HIV among MSM is generally found to be between 5 and 15% (UNAIDS, 2006a). The lower rate of 5% is found in MSM populations in urban settings other than the capital, Lima, while the higher rates are encountered in Lima (Table 28.2). Additionally, there are differences in prevalence among distinct groups of MSM as defined by their sexual identification. The group with the highest risk are men who identify as transvestites, many of whom are sex workers, who had an HIV prevalence of 30%, followed by men who identify as homosexual or gay who had an HIV prevalence rate of 18% and finally, men who identify as bisexual who had a 15% prevalence of HIV infection (Tabet et al., 2002).

**Table 28.2** HIV prevalence among vulnerable groups between 1986 and 2002, Peru.

| Vulnerable Groups (1986–2002) | | | | |
|---|---|---|---|---|
| **Population** | **Years(s)** | **Sample size** | **HIV prevalence** | **Authors** |
| MSM, Lima | 1986–1990 | 4,300 | 26.2% | (McCarthy et al., 1996) |
| MSM, Lima | 1998 | 1,328 | 16.0% | (MoH, 2006) |
| MSM, Lima | 1998–2000 | 7,041 | 13.9% | (Hierholzer et al., 2002) |
| MSM, other | 1998–2000 | 4,514 | 5.3% | (Hierholzer et al., 2002) |
| MSM, Lima | 2002 | 451 | 18.5% | (Tabet et al., 2002) |
| MSM, Lima | 2002 | 1,360 | 22.3% | (MoH, 2006) |
| MSM | 2002 | 1,923 | 8.0% | (MoH, 2006) |
| MSM | 2002 | 3,280 | 13.9% | (Lama et al., 2006) |
| Registered FSW, Lima | 1986–1990 | 5,973 | 0.6% | (McCarthy et al., 1996) |
| Clandestine FSW, Lima | 1986–1990 | 146 | 9.6% | (McCarthy et al., 1996) |
| Registered FSW, Lima | 1992 | 400 | 0.6% | (Sanchez et al., 1996) |
| Registered FSW, Lima | 1994 | 801 | 0.8% | (Sanchez et al., 1996) |
| Registered FSW, Lima | 1998 | 1,402 | 1.6% | (MoH, 2006) |
| Registered FSW, Lima | 1998–2000 | 3,375 | 1.2% | (Hierholzer et al., 2002) |
| Registered FSW, Provinces | 1998–2000 | 4,936 | 0.6% | (Hierholzer et al., 2002) |
| Registered FSW, Provinces | 2002 | 4,418 | 1.1% | (MoH, 2006) |
| Clients of Registered FSW, Other | 2002 | 4,373 | 0.5% | (MoH, 2006) |
| Prisoners | 1999 | 6,963 | 1.1% | (Carcamo et al., 2003) |

Abbreviation: MSM, men who have sex with men; FSW, female sex worker.

Given the concentration of the epidemic in the MSM population, the vast majority of research on HIV in Peru is focused on MSM. As shown by the results of the Tabet *et al.* study, this research has identified the dangers of grouping all MSM into one collapsed category (Tabet et al., 2002; Cáceres et al., 2006b). Although the term 'men who have sex with men', based on a behavioral definition, was created to avoid the consequences of stigma, it artificially brings together groups that are considerably diverse in many aspects, including sexual identity (Cáceres et al., 2006b). This lack of nuance in categorization has marred prevention efforts by trying to treat all MSM alike and ignoring issues of sexuality. Prevention programs often only reach MSM who self-identify as gay, homosexual or transgender, while bisexual men who do not identify as such are more likely to be missed.

***HIV Among Female Sex Workers***

Female sex workers are another high risk group, although the HIV prevalence among female sex workers is generally estimated at between 1 and 2% (McCarthy et al., 1996; Campos et al., 2003). This low prevalence may, however, be deceptive as sex workers who test HIV positive often stop coming to government-promoted monthly health check-ups and become street-based sex workers, no longer participating in surveillance programs. Women who were initially counted in official HIV/AIDS statistics then, would not be included in subsequent sentinel surveillance studies. While female sex work is legal in Peru, it is legal only for brothel-based sex workers who seek and receive monthly medical exams. The rates of HIV infection found among other sex workers, notably street-based sex workers, are likely to be higher (Table 28.2).

The rate of HIV infection among street-based sex workers was found to be 9% between 1985 and 1990 (McCarthy et al., 1996), although in subsequent studies this figure was 1%, mirroring rates found among brothel-based sex workers (Sanchez & Gotuzzo, 1994; Cáceres & Mendoza, 2004b).

***HIV Among Prisoners***

Prisoners comprise another high risk population, although very little research has been done among this population. An epidemiological surveillance study in 1999 found that the prison population had an HIV prevalence of 1.1% (Carcamo et al., 2003) (Table 28.2). Another study conducted by Doctors without Borders in 2004 yielded an estimated prevalence rate of 2.0%, more than double that found in the general population of Peru (MSF, 2005). The MoH mentions the need for continued surveillance among the population of prisoners (MoH, 2006); however, because of funding constraints they have not been included in surveillance efforts to date. The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) provided funding to conduct a surveillance study within the prisons in 2004, however, the results have not yet been released (DGE, 2006). The vulnerability of this population is acute and for the prisoners for whom conjugal visits are allowed, the risk to their female partners must also be addressed. Doctors without Borders has been working in Peruvian prisons since 1998 to combat HIV infection and to address the myriad health problems experienced by this population.

***HIV in the General Population***

In the general population the prevalence of HIV is estimated through the testing of pregnant women. The prevalence is estimated to be approximately 0.3% (MoH, 2006) and this rate has not changed substantially in the past 10 years (Table 28.1). Despite the low prevalence of HIV in the general population, approximately 50% of HIV/AIDS cases in the country are found within the general population. The MSM population, while a relatively small segment of the overall population, contributes the majority of the other 50% of cases.

**Urban/Rural Divide**

The majority of HIV infection remains in the cities and urban areas of Peru where approximately 60% of Peru's population lives. Approximately 77% of all HIV/AIDS cases are in the capital, Lima, where roughly one third of the countries' population resides (MoH, 2006). Peru is divided into 24 regions and a time delay map would show AIDS case reporting first only in Lima (1983–1987), followed by regions with large cities including Arequipa and Chiclayo (1987–1992), and by 1992 there was at least one case of AIDS reported in every region. As of 2006, the diffusion of HIV/AIDS in Peru continues, although concentration in Lima and other large cities remains the trend. Additionally, the majority of cases continue to be reported on the coast and in the Amazonian regions of the country. The highlands continue to report very few cases, with most of the regions in this area of the country reporting less than 10 cases a year (OGE, 2006a). There have been isolated reports of HIV clusters in rural communities; although these are the exception and not the rule (Zavaleta et al., 2007).

### Male to Female Ratio

While at the onset of the HIV epidemic, the male to female ratio was 18:1, this ratio decreased substantially over the first ten years of the epidemic, and since the mid-1990 s it appears to have stabilized at around 3:1 (MoH, 2006). This decrease in the male to female ratio appears to have resulted from the transition in the epidemic from one primarily affecting MSM to one also affecting men who had sex with both men and women, in a country where male bisexual behavior is rather common (Paris et al., 2001; Konda et al., 2005; Cáceres et al., 2006b). However, such a shift did not necessarily imply the heterosexualization of the epidemic since most women affected were monogamous (Alarcon et al., 2003; Johnson et al., 2003; Goodreau et al., 2005). The lack of generalization is evidenced in the HIV prevalence among pregnant women, which has stayed at approximately 0.3% over the past decade.

### Surveillance Efforts

The MoH began HIV surveillance efforts in 1996, following WHO guidelines for surveillance in concentrated epidemic settings. These efforts have primarily focused on MSM, female sex workers, and 15–24 year old pregnant women. Biennial surveillance efforts took place with MSM and female sex workers between 1996 and 2002 using sentinel surveillance locations, primarily Sexually transmitted infection (STI) clinics (MoH, 2006).

**S**entinel surveillance efforts with high-risk populations have used snowballing techniques and peer outreach workers to recruit eligible participants. These studies grew with each iteration, incorporating more participants and recruitment locations. Recruitment efforts attempt to recruit regardless of HIV status, however, as previously stated some individuals may avoid surveillance studies once they have tested HIV positive, leading to an artificially lower prevalence estimate. Partly due to limited funding, new surveillance surveys did not take place again until late 2006.

**S**entinel surveillance among women attending antenatal clinics (ANC) only occurs in MoH hospitals and health centers, which serve approximately 75% of the country's pregnant women (MoH, 2006). Those women who attend private clinics, EsSalud (Social Security clinics, serving people with semi-public work-related insurance), and clinics of the military and police are not included in the MoH's surveillance. Although the rates among the private clinics would most likely be lower than those of the government clinics, the effect of the exclusion of EsSalud and the military and police health centers is less well understood.

### Estimation of the Number of People Living with HIV/AIDS (PLWHA)

Estimates of the number of people living with HIV/AIDS (PLWHA) range from 24,000 to 93,000. The upper limit is based on the median of the MoH's estimate (MoH, 2006). Estimating the number of PLWHA involves: (1) partitioning the total population into segments based on demographic attributes, e.g. age groups, gender, urban-rural residence and sexual orientation; (2) using appropriate estimates of segment size; and (3) using plausible estimates of HIV prevalence for each segment. The sum of these estimates of PLWHA per segment then would yield the national estimate. All existing national estimates

share the same logic, although they vary in terms of the: (1) segments defined; and (2) estimates of population size and HIV prevalence per segment. One such estimate took into account age group, gender, the percentage of MSM, and further sub-divided the MSM into those at lower and higher risk of HIV infection, as well as the urban/rural divide of HIV prevalence. This resulted in an estimate of approximately 45,249 PLWHA (Cáceres et al., 2006c).

Another estimate, operationalized through UNAIDS Spectrum modeling, yielded the MoH 2005 estimate of 93,000 (with 56,000–150,000 as the lower and upper ranges) (MoH, 2006). The main discrepancy between the two estimates is the size of the MSM population to which a high HIV prevalence is attributed. Given the high prevalence observed in sentinel surveillance among MSM, the combination of sub-segments and specific prevalence used may largely impact the total estimate (Cáceres et al., 2006b).

### Estimation of the Incidence of HIV

Data on HIV incidence provide additional information on the HIV epidemic. Three studies have estimated the incidence of HIV infection in MSM. The first was calculated from a cohort of high-risk MSM studied from 1998 to 2000 by the MoH. The results of this study yielded an HIV incidence estimate of 3.5/100 person-years (MoH, 2006). The second study published in 2007, retested samples from sentinel surveillance in 1996, 1998, 2000, and 2002 again using sensitive/less sensitive EIA. The results of this studied yielded estimates of 11.3%, 4.8%, 12.4% and 8.3% incidence per year (Sanchez et al., 2007).

A model of HIV incidence based on the total number of HIV cases reported to the MoH has also been constructed. This model calculated the incidence rate ratio (IRR) for the 1983–1995 and the 1996–2005 periods. The IRR for 1983–1995 was 2.07 per year (95% CI 1.97–2.19) and 1.09 (95% CI 1.09–1.10) for 1996–2005 (Cáceres et al., 2006c). This drop in incidence may be interpreted as a sign of stabilization in the epidemic. These estimates are based on the HIV case reporting databases of the MoH, which include reporting biases and surveillance biases, but take into account cases among non-MSM.

## HIV Prevention in Peru: Community and Political Response to the Epidemic

The history of the response to the HIV epidemic in Peru is varied and the level of response and importance given to the epidemic has changed drastically over the years. The history of this response has been described in various publications and from a variety of view points, including those internal and external to the government (Cueto, 2001; Cáceres, 2006; Cáceres et al., 2006a; MoH, 2006). These responses can be divided into several periods: 1983 to1987, 1988 to 1996, 1996 to 2001, 2001 to 2003, and 2003 to the present (Figure 28.1). The government's role in HIV prevention has been intricately linked to the political will of the MoH and the programs have changed over time, direction and scope in accordance with this will.

The first period of the response to the HIV/AIDS epidemic, 1983–1987, was somewhat lethargic. The first case of AIDS in Peru was diagnosed in an

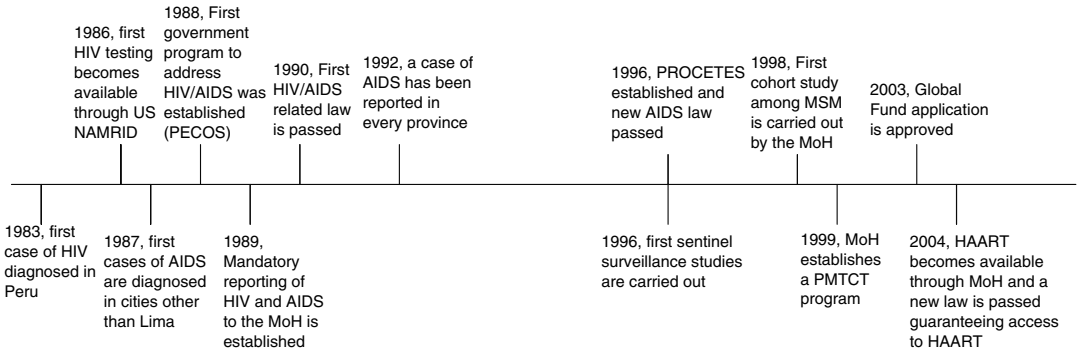


**Figure 28.1** Timeline of important events in Peru's HIV epidemic (1983–2006).

individual whose infection appeared to have occurred while he lived in the U.S. Given this, there was the sense that AIDS had not really reached Peru. The next several cases were similar in that all were gay or bisexual men who had either lived abroad or had sex with foreigners. This cluster of cases encouraged a narrow definition of the AIDS risk group and perpetuated the idea that HIV transmission native to Peru was not occurring. Even though doctors working with AIDS patients understood that transmission was most likely occurring in the country, the government and the public, informed primarily through an ill-informed and sensationalistic media, were convinced that this was a problem solely of the U.S. and gay men with U.S. sex partners. This attitude appears to have added to the complacency of the government's response (Cueto, 2001; Cáceres, 2006). It should also be noted that the political and economic environment was in chaos in the mid and late 1980 s under the dual strains of economic collapse and terrorist insurgencies (Cueto, 2001).

Despite the government's lack of response, other actors and organizations began to work to address the burgeoning epidemic. There was a response from civil society, stemming primarily from within the most affected communities, and NGOs began working during this time. Additionally, the presence of a U.S. Naval Medical Research Institute Detachment (NAMRID) helped to establish the first rounds of HIV testing and surveillance in 1986. The studies organized by NAMRID became the *de facto* surveillance mechanism and helped provide evidence of the growth of the epidemic (McCarthy et al., 1996; Cueto, 2001).

In 1988, the Peruvian government established the first AIDS-related program, the Special Program for the Control of AIDS (PECOS, by its Spanish acronym) (MoH, 2006). This signified the beginning of the second period of the government's response to the epidemic, 1988–1996. However, even after the establishment of PECOS, the government's response was not overly energetic. The actions of PECOS were more tentative and exploratory than an organized governmental response to the epidemic, the result, in part, of the limited funding provided PECOS. In 1990, the first law related to HIV/AIDS was passed in the Peruvian Congress. The law included a call for monitoring at risk groups defined as homosexuals (Cueto, 2001; Cáceres, 2006; Cáceres et al., 2006a). Although this law was never implemented, the focus on narrowly defined risk groups speaks to the atmosphere in the country at the time, which

considered HIV and AIDS to be solely linked to homosexual behavior and led to a context of blaming MSM for HIV in Peru.

Several of the NGOs working throughout this period received international funding to aid their work both for HIV prevention and for the care of PLWHA. At this point, funding was mainly provided by the Dutch organization HIVOS, the United States Agency for International Development (USAID), and private Peruvian donors. These organizations were also instrumental in lobbying the government to mount an adequate and effective response to the epidemic as well as advocating for the rights of PLWHA. PLWHA were often mistreated or even refused care by health professionals, out of fear based on poor knowledge of transmission as well as prejudice resulting from assumptions about lifestyles (Cueto, 2001).

In 1996, a doctor and founding member of one of the most influential NGOs working on HIV, Via Libre, was appointed to head a new government program to respond to the epidemic. This appointment resulted from Via Libre's pressure on the government to improve their response to HIV/AIDS (Cueto, 2001). The establishment of the Program for the Control of Sexually Transmitted Diseases and AIDS (PROCETSS, by its Spanish acronym) marked a substantial shift in the government's response to HIV/AIDS. This shift took place within the administration of Alberto Fujimori. PROCETSS received funding from the government to establish a coordinated response to HIV and sexually transmitted infections (STIs) by initiating peer staffed outreach programs for both MSM and female sex workers. They also established 33 PROCETSS offices outside of Lima; this was the first organized effort to respond to HIV/AIDS outside of the capital. Additionally, PROCETSS established the first surveillance program and made HIV and AIDS case notification mandatory.

There were several criticisms of PROCETSS, the first being that the high level of importance and funding given to PROCETSS was not commensurate with the actual problem of HIV/AIDS in Peru. Even with the Peruvian MoH's overly high estimate that there were 50–100 thousand PLWHA in Peru in 1996, Peru suffered from many other diseases which also presented a real threat. Unlike the developed world where HIV represented the unexpected re-emergence of infectious disease, Peru has high rates of other infectious diseases such as tuberculosis (TB) and malaria that continued to cause more morbidity and mortality than HIV/AIDS. Despite this, PROCETSS became the second highest funded public health program in the country, second only to the childhood vaccination program (Cueto, 2001). Another criticism was that PROCETSS mirrored the dictatorial rule of the Fujimori government and did not do enough to work with scientists or the large NGO community that had emerged in response to HIV/AIDS (Cueto, 2001; Cáceres, 2006).

In 1996, new HIV/AIDS legislation was passed in the Congress, resulting from the lobbying efforts of Via Libre and PROCETSS. This law adopted non-discriminatory language and established several protections for PLWHA including the right to medical care and the illegality of refusing to treat a PLWHA or refusing employment due to an HIV diagnosis. Additionally, the law established the right to confidentiality of HIV positive individuals and the need for pre and post-test counseling for HIV testing. While this law was not implemented for some time, as the customary implementing regulation had not

been released, its existence speaks to the changing attitude of the government toward HIV/AIDS (Cueto, 2001; Cáceres, 2006).

An additional problem in this time period was the lack of action on the part of PROCETSS and the government to secure treatment for HIV/AIDS patients. Highly active antiretroviral therapy (HAART) became available in 1996, however in contrast to the developed world and some developing countries like Brazil, these drugs remained inaccessible to most PLWHA in Peru. Although in 1997–1998 the drugs became available for purchase in Peru, their cost per month was prohibitive for the vast majority of PLWHA.

In mid 2001, with the election of Alejandro Toledo, the MoH was given over to Dr. Luis Solari, a conservative Catholic who was not supportive of HIV prevention work nor of activities with vulnerable populations such as MSM and female sex workers. He also openly opposed what he described as an over-emphasis on condoms and tried to undermine them as unsafe and ineffective in preventing disease transmission. In 2002, another conservative Catholic, Dr. Fernando Carbone, was appointed as MoH, a post he would hold until 2003. These two years of conservative control of the MoH were characterized by a lack of action in the area of HIV/AIDS and a reduction in HIV/AIDS related funding, especially for prevention (Cueto, 2001; Cáceres, 2006). They did however support the acquisition of funding for treatment, including an application to the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund).

Since 2004, the government's response to HIV/AIDS has been highly influenced by support from the Global Fund. This support has influenced recent HIV/AIDS policy, including a law passed in 2004 which guaranteed HAART for PLWHA who required it. The Global Fund provided partial funding for treatment for the first two years of the HAART program in Peru, while the government agreed to supply the remaining funds and to continue funding treatment after Global Fund support was no longer available. The specifics of this program are described in more detail later in this chapter. It remains to be seen, however, if the government will be capable of sustaining this level of support for all of those in need.

## Government and Ministry of Health Response to HIV Prevention

The role of the government in the prevention of HIV/AIDS in Peru has had a rocky history, beginning with a disorganized and anemic response, which evolved into a response that although well funded and well organized nonetheless has failed to provide a sustained effort to increase safer sex and prevention outside of narrowly defined risk groups. However, the efforts of NGOs, researchers, doctors, as well as those affected by the epidemic in pressuring for effective government action have been substantial and have led to a response that has improved markedly over the years.

### *Peer education and Periodic Medical Check-Ups for MSM and Female Sex Workers*

In 1996, PROCETSS initiated a peer-education program which included referral to STI reference centers where medical check-ups were performed for both MSM and female sex workers. These periodic medical check-ups include

HIV testing for MSM and HIV testing for a nominal fee for female sex workers. This fee is levied so that testing can remain voluntary for sex workers, although HIV testing is required to get a certificate of health from the MoH. These services comprise the only HIV voluntary counseling and testing (VCT) services for non-pregnant women in Peru. Under this program, peer educators from among both MSM and female sex workers were recruited and paid a small stipend to distribute condoms and pamphlets to their peers and for encouraging other MSM and female sex workers to attend STI reference centers for testing and treatment. This innovative strategy which was the first official effort to reach MSM, particularly poor, less educated, high risk men, ultimately encouraged a new wave of sexual minority organizing in inner cities of Peru. Indeed, the program's training engendered a cadre of informed and empowered MSM who went on to organize other MSM in their communities. Several female sex worker led organizations were also formed subsequent to these interventions.

Over time, a lack of monitoring and evaluation has resulted in a decrease in the quality of the program and the decreasing effectiveness of prevention messages. The use of a stipend system for peer outreach workers that valued recruitment quotas over actual need or effectiveness of interventions has also lessened the impact of the program. The lack of information on program evaluation or the number of people it has reached has also been a barrier to maximizing its impact. Sentinel surveillance among MSM indicates an increase in condom use throughout this period (Sanchez et al., 2007), and while this evidence is ecological, it is important nonetheless. This program is still in place in 2007, with little change from its initial approach ten years ago. In the absence of program evaluation, it is difficult to judge the impact that this intervention has had.

### *HIV Testing of Pregnant Women and the Prevention of Mother to Child Transmission*

In 1996, the MoH established a program to prevent mother-to-child transmission (PMTCT) through the provision of Zidovudine (AZT) to HIV-positive mothers and their children. In 1999, free screening for all pregnant women was established. In 2004, a law was passed requiring HIV testing for pregnant women. Despite both the program and the law, only around 50% of pregnant women were screened for HIV infection in 2004 (Garcia et al., 2000; MoH, 2006). Barriers to higher rates of testing included ineffective screening activities in obstetric wards and national health centers as well as problems with regular supplies of test kits. Tests are given along with counseling and are free to all pregnant women. At present, under Global Fund support, a program to prevent vertical transmission is in place, which promotes testing among pregnant women, ensures rapid testing at delivery for women who have not been tested, and ensures ARV prophylaxis to prevent infection during pregnancy, delivery and post-partum (Peru AIDS Project supported by GFATM, 2004–2008). New projects funded by the Global Fund will complement this program.

The MoH estimates that 450 children are infected with HIV via vertical transmission per year. This is based on the prevalence rate of 0.2–0.3% among pregnant women, the number of live births per year, and an approximate 30% transmission rate of HIV to an infant via vertical transmission either during the pregnancy, delivery, or post partum (MoH, 2006). Newborns are only followed up for HIV testing if their mother is known to be HIV-positive; given

that approximately 50% of pregnant women are not tested for HIV during the course of pre-natal care, their children are also not tested for HIV. This leads to an under registration of vertical transmission and a missed opportunity to incorporate HIV-positive children into the health system, where they could receive care. These figures may be changing now, given the implementation since 2005 of a project supported by the Global Fund, aimed at reaching 100% screening coverage of pregnant women, and providing prophylactic regimes to those women testing positive.

***HIV/AIDS Prevention in the General Population***

It is often noted that although specific strategies for high-risk groups have been implemented, few prevention efforts among the general population have been initiated (Cueto, 2001; Gotuzzo, 2004). This lack is compounded by the stigma surrounding HIV/AIDS, which influences how people outside of the targeted high-risk groups view their risk. This lack of risk perception undermines the adoption of preventive behaviors, such as condom use. Apart from heterosexual men and women, this also affects the risk perception of non-gay or homosexually identified MSM, as HIV risk is linked to a sexual identity instead of sexual risk behavior.

## HIV/AIDS Related Research

Peru has emerged as a center for HIV research over the past 10–15 years. There are several recognized contributing factors for this, including that key investigators in infectious diseases were trained in the U.S. in public health during the onset of the HIV/AIDS epidemic in that country and the high HIV incidence rate among MSM, which makes this a good setting for studies of HIV prevention in this population. Additionally, the presence of the U.S. Naval Medical Research Center, a medical research facility with a modern laboratory that opened in 1983, facilitated early HIV diagnostic testing that was not being done anywhere else in the region. There were also large research and training grants awarded to prominent Peruvian medical universities that established a cadre of researchers in infectious diseases who have maintained an interest in HIV/AIDS research. This led to various Peruvian researchers gaining large grants for HIV research from the US National Institutes of Health and has established Peru as a leading hub for MSM-related HIV research.

There remains a need to increase locally relevant research and to more fully integrate the local community, particularly representatives of vulnerable populations, in the research process and to enhance social control of research. This interaction would increase the social value of research, enrich the research community perspectives in ongoing studies, and in the long run would protect research as a social practice.

## NGOs and HIV Prevention

Since the beginning of the HIV/AIDS epidemic in Peru, NGOs have played a large role in prevention efforts in response to HIV. These organizations have created and maintained peer support groups for PLWHA and their families, led education efforts in the general population and among health care providers to

decrease stigma and increase awareness, and advocated for the care and human rights of PLWHA. Before 2003, USAID was the most important international funder of AIDS work, and they focused on prevention and research activities. In more recent years, NGOs have become key implementers of projects supported by the Global Fund.

However, despite their influential work, there is a lack of a shared understanding of the epidemic and its main trends (Cáceres, 2006). In some ways these distinct perspectives of the epidemic sustain specific niches created by each NGO and lessen the impact that these organizations might have with a more unified effort. The lack of monitoring and evaluation has also prevented civil society organizations from implementing adequate quality control of their work, due to a failure in viewing these activities as being a key part of successful interventions.

As of 2007, three separate HIV/AIDS projects funded by the Global Fund will be in place in Peru. The most recent is a third 5-year project, funded in the sixth round of the Global Fund in 2006 which joins projects funded in the Global Fund's second round in 2003, and fifth round in 2005, for a total of close to USD 80 million. Most of this funding is supposed to pay for prevention and training, while treatment is almost entirely funded by the Peruvian government. This drives Peru to a new and positive context where there is a need for careful evaluation of what has been done, as well as serious implementation of effective interventions with comprehensive community involvement.

## HIV Care in Peru

### Care of PLWHA

While public healthcare in Peru is theoretically free to those who cannot afford private insurance, the reality is quite different given that the MoH does not have the funds to provide health care to all of those in need. Multiple co-infections, including TB and multidrug-resistant TB (MDR-TB), experienced by PLWHA in Peru cause substantial morbidity and often lead to out-of-pocket expenses that are detrimental and/or prohibitive to care. In addition to resource limitations, the effects of stigma continue to affect the care and treatment of PLWHA by health care personnel. PLWHA can feel that the prejudice with which they receive care is worse than the effects of the disease without care. Additionally, many PLWHA feel the need to hide their illness from family and friends resulting in limited social support.

### The Implementation of HAART in Peru

A 2004 report commissioned by the MoH and the Global Fund reported that approximately 9,000 Peruvians were in need of HAART (Cáceres et al., 2004a). Through MoH financing and a grant from the Global Fund, HAART became available through the MoH in May 2005. Although drugs had been available previously, these were only available for out of pocket purchase, which was not feasible for the vast majority of those in need of treatment. In 2004, the Peruvian government committed to providing the money for treatment and

passed a law stating that the provision of HAART to those who needed it was mandatory.

HAART was made available through the several reference or referral hospitals of the MoH that have served HIV/AIDS patients since the beginning of the epidemic; these are tertiary care centers with infectious disease specialists. These reference centers are primarily located in Lima, not only because this is the epicenter of the epidemic, but also because most of the advanced medical care in the country occurs in Lima.

Within 18 months of HAART rollout, approximately 60% of those in need were receiving HAART through the MoH, Social Security, and Armed Forces health care programs (Sebastián, 2005). This achievement should be recognized, as this indicates reaching 60% of those in need within the first year of the program. Sustained efforts are needed to not only reach the remaining 40% estimated to be in need of HAART, but also to continue to provide quality care to those already receiving HAART. This will include training additional health care personnel in the implementation of HAART, assuring the supply of medications, and implementing sufficient support services to assure adherence to the HAART regimens. While the MoH has tried to link social services to the provision of HAART, the resources available are limited and case workers often do not have sufficient time to adequately serve their patient population. Additionally, even though the medications of HAART are free through the MoH, other medications needed for the treatment of HIV or diagnostic testing, may not be covered and must be paid for out of pocket.

The rollout of free HAART was initially concentrated in Lima, which has the highest prevalence of HIV and the greatest number of hospitals equipped to treat PLWHA. The coverage of treatment provision in other parts of the country is still below the levels in Lima, although even in Lima, medications are sometimes inaccessible. To achieve the levels of success in AIDS care accomplished in other areas of the world, Peru will need to work to assure the availability of the medications and adequately trained providers; without this the promise of HAART will not be realized.

### International Multi-Sectoral Response: Global Fund

Given its increasing gross domestic product, Peru, like much of Latin America, has not been a focus of international support for development. With international health aid in Peru also relatively minimal, support from the Global Fund has had an enormous impact on health related organizations at every level in Peru. The first application for Global Fund money was put together in 2001, but the proposal was rejected. This was due in part to the lack of a coordinating mechanism which was a funding requirement. In 2003, CONAMUSA, a country wide coordinating mechanism, was established; and a new application was submitted to the Global Fund. This application was approved, granting USD 24 million to HIV/AIDS and USD 26 million to tuberculosis. Of the USD 24 million granted to the country for HIV/AIDS, part of the money was allocated to pay for the provision of HAART during the first two years of the five year grant, while the remainder of the funding was to be used for prevention and surveillance activities (Cáceres, 2006).

## Successful Strategies Employed to Confront the HIV/AIDS Epidemic

The level of awareness of HIV and AIDS, especially among high-risk populations such as MSM and female sex workers, is high and this is most likely due to both the educational and outreach activities of NGOs and the government's peer education program (Cáceres et al., 2006c). Behavioral surveillance among high-risk groups and the general population show an increase in condom use, although this may be related to a parallel increase in casual sex (Cáceres & Mendoza, 2004b; Cáceres et al., 2006c). Surveillance among MSM has also showed increased condom use at last sex, although only with regular partners (Sanchez et al., 2007).

Comprehensive program evaluation and periodic surveillance with timely sharing of the results remains essential for evaluating the success of different prevention strategies. The first comprehensive analysis of MSM surveillance data, covering the period between 1996 and 2002, was not published until 2007 (Sanchez et al., 2007) and there are no published reports on rates of infection among female sex workers or ANC populations. The Global Fund has recently supported several analyses of HIV surveillance data, and it is expected that these analyses will help to improve MoH programs.

Peru's exemplary implementation of its first Global Fund grant, allowed CONAMUSA to successfully apply for two additional projects in 2005 and 2006. This success was due to a highly satisfactory performance in the implementation of Global Fund-supported projects, as well as Peru's ability to move past the numerous bureaucratic problems experienced by its neighbors. In Latin America, Peru is the second highest recipient of Global Fund AIDS funding after Haiti, a country with a generalized epidemic. The receipt of these funds represents many opportunities as well as many challenges.

## Conclusions

### Political Challenges in Meeting HIV/AIDS Prevention and Care

As HIV continues to be concentrated among MSM and other high risk and highly marginalized populations, efforts to provide adequate prevention and care are stymied by stigma. Even when technically adequate health services are available to vulnerable populations, their willingness to use these services is limited due to feelings of being poorly treated or blamed for their risk behaviors or illness. Although fear among health professionals that led to situations of refusal to care for HIV patients earlier in the epidemic have dissipated due to increased knowledge regarding transmission, the attitude that PLWHA 'deserve' their illness because of 'inappropriate' behavior still remains among many health professionals.

This attitude of blaming the victim has also influenced allocation of funding for HIV prevention programs. Since the onset of the epidemic, NGOs representing PLWHA and high risk populations worked not only to provide services to those in need, but also to advocate for a more organized governmental response to the epidemic. It has been argued that this response occurred in 1996 with the

formation of PROCETSS (Cueto, 2001). However, the government's response has not been consistent since that time. Between 2001 and 2003 when the MoH was under the direction of conservative Catholics, funding for HIV/AIDS was reduced. Since 2003 funding levels for the current HIV/STI national strategy (the bureaucratic successor of PROCETSS) have been restored, although the reduction of the status of the HIV/STI authority in the MoH and the emergence of other actors (e.g. organization implementing Global Fund projects) may have limited the MoH's ability to provide guidance to national HIV/STI efforts. There are numerous and not necessarily concordant interests at play, making transparency and consensus building on the basis of technical analysis and principles of health and human rights critical.

### Public Health Realities and HIV/AIDS in Peru

Despite the relatively low prevalence of HIV, the groups that are affected by the epidemic continue to be at high risk of infection and improved prevention and care efforts focused on their specific needs are needed. Although the leveling off of the male to female ratio of HIV infection does not indicate the generalization or heterosexualization of the epidemic, prevention and surveillance efforts are needed to continually monitor this situation to ensure that this does not occur. In addition, there are several highly marginalized risk groups that have been ignored by current prevention efforts, including clandestine sex workers and prisoners. The effort to provide prevention programs to these groups has not been adequately addressed by the government. NGOs have stepped in to provide prevention interventions not implemented by the government, although their efforts lack consistency and sustainability.

In Peru, as in other countries, the advent of treatment cannot be at the expense of prevention. The legacy of stigma and discrimination remain and although efforts for prevention and care have improved in the government, substantial work remains. Not only are the issues of the mistreatment of PLWHA in health care facilities still in existence, there are additional insidious vulnerabilities which are revealed in this epidemic including the disempowerment of women, homophobia, and poverty. To neglect addressing these issues which make communities in Peru vulnerable to HIV infection, because of the advent of effective treatment, would be a huge mistake.

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# Chapter 29

## AIDS in Brazil: The Challenge and the Response

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_29, 

## Introduction

The HIV/AIDS epidemic commenced in Brazil, the fifth largest country in the world, in the early 1980s during a time of profound social and political change. As the military dictatorship, which had taken power in 1964, gradually lost support, a political process known as *abertura*, "opening", began. During the late 1970 s, there was a gradual recovery of political rights and by the early 1980s Brazil held its first post-dictatorship democratic elections. During this time, new political and community leaders, as well as non-government organizations (NGOs), lobbied for public health, social security and medical care reforms. In 1988, Brazil adopted a new Constitution which guaranteed universal and equitable provision of health care to all Brazilians. As HIV/AIDS became a growing public health problem, both the social will and a public framework to fight the epidemic were developing; advocacy by the public health sector and by social activists played a fundamental role in shaping the nation's early response to the epidemic.

In the mid 1980s/early 1990s, people living with HIV/AIDS (PLWHA) sued local and federal governments for failing to uphold the constitutional right to health in the context of HIV/AIDS. They first sued for the right to treatment of opportunistic infections, and later for antiretroviral drugs (ARVs) such as Zidovudine (AZT). These court cases and social mobilization paved the way for a 1996 Law, Law 9.313, which established free and universal access to ARVs. A tremendous amount of social mobilization by civil society groups held the government accountable for its commitments to providing health services to treat PLWHA and clearly stood in contrast to other illnesses. Brazil's early inclusion of highly active antiretroviral therapy (HAART) in the Brazilian HIV/AIDS program played a major role in its success in combating the AIDS epidemic over the years, and has distinguished Brazil from most other developing countries that did not offer treatment to PLWHA until much later.

However, major achievements in terms of comprehensive management and care of PLWHA took place in a context of deep social inequality. Brazil has one of the world's most inequitable wealth distributions (BMoH – IDB, 2005). In 2005, 46.9% of the national income was controlled by the wealthiest 10% of the population, while only 0.7 % was controlled by the poorest 10% (UNDP, 2005). As a consequence, Brazil's Human Development Index (HDI) ranking is relatively low given its per capita Gross Domestic Product. Indeed, almost a quarter of Brazilians earn less than USD 2 a day (UNAIDS, 2006) (See Table 29.1).

Wealth, health and income disparities also vary widely by geographic region as do degrees of urbanization, economic development (Szwarcwald et al., 2002), and access to health care infrastructure (Almeida et al., 2000). Socioeconomic disparities, geographic diversity, and the size of the country have all complicated the Brazilian response to HIV/AIDS. While universal access to HAART was quickly implemented in major metropolitan areas with well-functioning health systems, drug logistics and patient monitoring systems remain fragmentary in more remote Brazil, where health infrastructure development requires significant time and financial investment (Bastos et al., 2001).

Despite these challenges, the history of the Brazilian HIV/AIDS epidemic has been characterized by collaboration between the Brazilian Ministry of Health (BMoH), NGOs, and international organizations. While dispensing and

**Table 29.1** Basic indicators, Brazil.

| Indicators | Values |
|---|---|
| Population (2004) | 181 586 000 |
| Gross Domestic Product per capita (2003) | 8694 PPP US$ |
| Birth Rate (2003) | 18.3 per 1000 inhabitants |
| Total Fertility Rate (2003) | 2.1 |
| Mortality Rate (2003) | 6.1 per 1000 inhabitants |
| Life Expectancy at Birth (2004) | Women 72 years<br>Men 68 years |
| Infant Mortality Rate (2003) | 24.1 per 1000 live births |
| Maternal Mortality Rate (2003) | 73 per 1000 live births |
| Adult Literacy Rate (2004) | 89% |
| Urban Population (2004) | 83% |

Source: IDB 2005. Indicadores e Dados Básicos para a Saúde. RIPSA.

monitoring treatment remains the responsibility of public health care providers and is financed by the federal government (Galvao, 2002), NGOs and local governments play a key role in the full implementation of initiatives aiming to prevent new infections among vulnerable populations, especially among hard-to-reach/mobile populations, such as injecting drug users (IDUs) and long-distance truck drivers (Fonseca et al., 2002; Malta et al., 2006). Partnerships between the federal government and the World Bank have also financed prevention efforts (The World Bank, 1998a, b).

Brazil's size, geopolitical and economic importance, and the uniqueness and relative success of its HIV/AIDS program may offer important insights to other nations struggling to curb the epidemic. This chapter addresses key aspects of Brazil's response to the HIV/AIDS epidemic, beginning with an overview of the major trends in the epidemic. Essential aspects of prevention, and management and care are also explored. Relationships between federal and local governmental initiatives and civil society, challenges of monitoring and evaluating public policy response to the epidemic and efforts to finance a comprehensive response are all reviewed. Finally, components of Brazil's response are considered in the context of national monitoring initiatives as well as global responses to the HIV/AIDS epidemic.

## The HIV/AIDS Epidemic in Brazil: Main Epidemiological Findings

### Major Epidemiological Trends: HIV/AIDS Cases

The first cases of AIDS in Brazil were reported in the early 1980s. They were initially concentrated in the large metropolitan regions of the South and Southeast, principally along the Rio/Sao Paulo corridor, primarily among relatively affluent men who had sex with men (MSM) and recipients of contaminated blood products (Barcellos & Bastos, 1996). Since the onset of the HIV/AIDS epidemic in Brazil, AIDS prevalence and incidence have varied widely across

subpopulations and geographic regions. These varied trends have often been referred to as "sub-epidemics" in Brazil.

The epidemic subsequently spread to injecting drug users (IDUs), their sexual partners, and MSM living in urban areas throughout Brazil (Lowndes et al., 2000). This second phase of expansion of the HIV/AIDS epidemic took place in the late 1980s and early 1990s. After 1993, the epidemic was characterized by a rapid increase in heterosexual transmission of HIV. During this phase of expansion, the epidemic which had previously been largely confined to urban areas spread to all of Brazil's geographic regions, resulting in increasing numbers of HIV infections among women. There has been a progressive "feminization" of the epidemic; the male to female ratio has evolved from 5.9:1 in 1989 to 1.4:1, today (BMoH, 2006a). With an increase in the number of cases in women, the number of infants infected through vertical transmission also grew substantially (Szwarcwald et al., 2000a; Brito et al., 2005).

Statistics from the BMoH collected over time, reveal these trends. Between 1980 and 1985, among accumulated HIV/AIDS cases in 15 to 49 year olds: MSM represented 76% of all cases; IDUs represented 13% of all cases; and men represented 96% of all cases. In 1994, the proportion of accumulated cases attributed to MSM had fallen to 38%, while cases attributed to IDUs grew to 28%, and men represented 82% of all cases. By 2001, MSM accounted for 27% of all accumulated cases, male IDUs accounted for 21% of accumulated cases, and women represented 29% of all cases. The remaining cases include those with an unknown exposure category (∼10% over time) and a residual category of people who received blood transfusions/blood products/transplants (∼0.5%, over time) (BMoH, 2006a).

Despite these trends, IDUs and MSM are still at higher risk for contracting HIV and have a higher incidence of HIV than the heterosexual population (Fonseca & Bastos, 2007). Very high prevalence rates of HIV (over 45%) have been found among southern IDUs (Caiaffa et al., 2003). Sex workers also remain at risk with moderately high HIV prevalence rates (7%) (Trevisol & Silva, 2005). HIV/AIDS in Brazil is also increasingly affecting poor residents of smaller municipalities. The proportion of newly diagnosed AIDS cases among unemployed and unskilled workers, and among individuals with no more than a primary school education has grown over the last two decades (Fonseca et al., 2000; Fonseca et al., 2002; Fonseca et al., 2003).

Mother-to-child transmission accounts for approximately 3% of all HIV/AIDS cases in Brazil. Although a decrease in HIV/AIDS cases reported in infants has been noted since 1997, such data may not be accurate due to significant delays in reporting pediatric cases. In 2000, HIV reporting among pregnant women became mandatory. Since then, 31,921 new HIV infections among pregnant women have been reported (BMoH, 2006a), corresponding to an overall prevalence of 0.41% (95%CI 0.29%–0.53%) among Brazilian pregnant women (Szwarcwald & Souza Júnior, 2006). One of the main problems currently faced by Brazilian health authorities is the less than optimal use of prenatal services among women of low socioeconomic status. Many women do not attend prenatal care regularly and those that use public prenatal services are seldom counseled and tested for HIV (Souza Junior et al., 2004).

The HIV/AIDS epidemic in Brazil is also characterized by geographic and regional differences. While the epidemic is still concentrated in large, urban

centers, the percentage of HIV/AIDS cases in urban areas has been declining over time. In the 1990s, cities with 500,000 inhabitants showed the lowest growth rates, with a tendency towards stabilization, while smaller cities showed a much faster rate of growth (Szwarcwald et al., 2000a). In the Southeast, where the epidemic is older and more mature, HIV/AIDS rates have largely stabilized (BMoH, 2006a) while the South has the largest HIV/AIDS incidence and one that continues to increase (Hacker et al., 2006).

### People Living with HIV/AIDS and AIDS Deaths

As of June 2006, a total of 433,067 HIV/AIDS cases had been reported to the BMoH (2006a). Many people are unaware of their status, however, and estimates suggest that there were approximately 600,000 people living with HIV/AIDS (PLWHA) between the ages of 15 and 49 years in Brazil at the end of 2000 (Szwarcwald & Castilho, 2000), and that despite regular updates these estimates remain unchanged (e.g. Szwarcwald & Carvalho, 2001; Szwarcwald & Souza Junior, 2006). While HIV prevalence in Brazil is moderate in comparison to most developing countries, Brazil's population of over 180 million explains the country's high number of PLWHA (UNAIDS, 2006).

Between 1980 and 2005, a total of 183,074 AIDS deaths were reported to the BMoH. In 1996, the year HAART was introduced, AIDS death rates per 100,000 inhabitants were 9.6, decreasing to 6.0 in 2005. The decline in AIDS related mortality per 100,000 inhabitants has been especially pronounced in the Southeast (16.3 in 1996 versus 8.0 in 2004). Mortality has declined less in the South (8.9 in 2004), where AIDS incidence has risen among IDUs (Hacker et al., 2006). Overall, AIDS-related mortality decline has been more pronounced among men than women (BMoH, 2006a).

The first study to document the survival of adult patients living with AIDS in Brazil, published in 1992, summarized data from a national sample (Chequer et al., 1992) and found a much shorter median survival time for patients in Brazil (5.1 months after AIDS diagnosis) than was seen in developed countries at that time. Substantial increases in survival were seen, however, in the late 1990s and the present decade. Median survival time was much longer for patients diagnosed in 1996 (58 months), who started their antiretroviral (ARV) therapy with HAART, instead of mono/dual ARV therapy (Marins et al., 2003).

### The Challenge of Equity

The impact of the HIV treatment and prevention programs has been tangible throughout Brazil, and among different social strata and regions (Hacker et al., 2004; Brito et al., 2005). However, inequitable distribution of treatment and prevention benefits remains a problem in Brazil. Geographic disparities in the number and accessibility of HAART dispensing units persist; the urban Southeast (72 million people) has over 320 ARV dispensing units, while the vast Brazilian North (13 million people) is served by just 29 units (BMoH, 2006b). In spite of the much higher HIV prevalence in Southeastern Brazil, the paucity of clinics in Northern Brazil may impede access to treatment in the most rural parts of the country. Counseling, testing, and other preventive services are also concentrated in the South and Southeast regions of Brazil. Surveillance data for

some hard-to-reach populations, including sex workers and migrant laborers, remain sparse.

## Prevention

### Prevention in Context

Although a predominantly Catholic country, under the strong influence of conservative forces, solidly represented in the Congress and other political fora, Brazil's initiatives to curb the HIV/AIDS epidemic have been progressive. Both mass media and targeted education and propaganda campaigns have been launched by the BMoH as part of its HIV prevention program. Mass media campaigns using radio, television, and newspapers have focused on raising awareness about risk factors for HIV transmission, including drug use and unprotected sex, decreasing stigma and fostering support for PLWHA. Sexual topics have been discussed openly in Brazilian schools and Brazilian mass media campaigns have been among the most explicit of any governmental information campaigns in the world. Surveys conducted by the BMoH suggest that HIV/AIDS knowledge and awareness in Brazil are quite high (Fonseca & Bastos, 2007).

Initiatives targeting at-risk populations, such as pregnant women from underserved communities, youth, IDUs, MSM, and sex workers have also been promoted by both the government and NGOs. Publicly-sponsored prevention campaigns have also focused on combating stigma among MSM, sex workers, and other vulnerable populations. Although such campaigns have been seldom evaluated, it is generally assumed that they have contributed to observed decreases in HIV prevalence among these sub-populations. The Brazilian government and NGOs are also actively involved in sexually transmitted infection (STI) and HIV/AIDS programs targeting sex workers, MSM, IDUs, and adolescents.

Among the general population, a key aspect of STI and HIV/AIDS prevention, together with mass media campaigns, is the broad distribution of condoms. Indeed, despite an ongoing, sometimes acrid debate about the promotion of condoms, between the Roman Catholic Church and activists, and within the Catholic church between traditional priests who condemn both sex outside of marriage and condom use and liberal priests who have committed to condom promotion, the government has distributed millions of condoms every year. Condom sales increased dramatically during the 1990s; 53 million condoms were sold in Brazil in 1992, 70 million in 1993, and 350 million in 2000 (Levi & Vitoria, 2002).

### Prevention Success Story: HIV/AIDS Among IDUs in Brazil

Latin America produces 95% of all globally available cocaine. Brazil shares borders with the world's main coca producers, including Peru, Bolivia and Colombia. Moreover, major cocaine trafficking routes cross Brazil. While a proportion of cocaine shipments from Brazil go either directly or, increasingly, via Africa to Europe (UNODC, 2006), a share of shipments are consumed in Brazil. Since cocaine users inject more frequently than opiate users, cocaine use

raises individual and population HIV risk (Davis et al., 2006). Among adults (≥14 years old), 9.8% of male AIDS cases reported to the BMoH as of the end of 2006 were among IDUs. IDU is less prevalent among women; only 4.7% of all female AIDS cases reported in the same period were attributable to IDU (BMoH, 2006a).

Previous studies carried out by a research group at FIOCRUZ (Oswaldo Cruz Foundation) show that Brazil, due to its size and strong social and cultural heterogeneity, harbors many different HIV/AIDS sub-epidemics, with pronounced differences within its IDU population (Bastos et al., 2005; Hacker et al., 2006). To date, IDUs have had a negligible role in the HIV/AIDS epidemic in the less industrialized areas in northeastern Brazil, with the exception of the state of Bahia (Andrade et al., 1998; Dourado et al., 2006), the southernmost state of this region. However, IDUs have played a central role in the HIV/AIDS sub-epidemic in the industrialized southeast, especially in the state of São Paulo, and, more recently, along the southern coast from São Paulo to Brazil's southernmost border (Hacker et al., 2006).

The IDU-associated HIV/AIDS epidemic in Brazil initially followed the main cocaine shipment routes, from the western border to main ports located in the southeast (Barcellos & Bastos, 1996; Bastos et al., 2002). This phenomenon is similar to the clustering of HIV/AIDS among IDUs along heroin routes in Asia (Beyrer et al., 2000). As shown by previous studies (Kalichman, 1993; Fonseca & Castilho, 1997), IDUs are concentrated in the richest socioeconomic regions of Brazil, but the vast majority of them belong to the poorer and less educated strata of Brazilian society.

Cocaine trafficking, cocaine consumption and the spread of HIV and other blood-borne infections became the hallmark of the Brazilian southern coastal sub-epidemics in the late 1990s, with explosive IDU-related HIV epidemics in some municipalities located along the coast of the states of Santa Catarina and Rio Grande do Sul (Hacker et al., 2006). In some municipalities in this coastal strip, over 50% of all reported HIV/AIDS cases have been among IDUs. This helps explain the fast and sustained spread of HIV in the south among women (many of them partners of IDUs) and their offspring. This also explains the less significant decline in AIDS-related deaths compared to other Brazilian regions (Bastos, 2002).

In order to quickly respond to the synergy of cocaine trafficking/consumption and the HIV/AIDS epidemic, Brazil has included harm reduction strategies in its public health agenda since the mid 1990s. Purchase and possession of injecting equipment are legal in Brazil. The number of needle and syringe exchange programs (NSEP) operating has grown steadily since the first publicly-sponsored NSEP began in 1994 with the support of NGOs and the World Bank. As of November 2006, approximately 150 NSEPs were operating in Brazil, more than in any other middle or low-income country, the vast majority funded by the BMoH and state/municipal health secretariats (BMoH, 2006b). Studies suggest that NSEPs in major urban areas have successfully reduced rates of needle sharing and HIV prevalence (Bastos et al., 2005). However, many NSEPs lack managerial capacity, proper stock management, and a stable and well-trained staff (Fonseca et al., 2006), which have resulted in less than optimal outcomes in some settings (Hacker et al., 2006; Bastos et al., 2006b).

Brazil provides treatment and care to the largest number of IDUs living with HIV/AIDS outside high-income countries (Aceijas et al., 2006). Despite this accomplishment, the management of HIV-positive cocaine users remains a challenge. There are several reasons for this including the dynamic nature of cocaine dependence, the limitations of most drug treatment centers and HIV referral units in Brazil, which lack well-trained and motivated staff and the absence of an effective pharmacotherapy to avoid the frequent relapses cocaine dependents typically experience (Vocci & Elkashef, 2005; McCance-Katz et al., 2001). Other impediments to proper management and care of HIV-positive cocaine users include stigma, poverty and the strong overlap between drug consumption, trafficking and overt violence in the region. Some successful experiences in specialized case-management to address the clinical and psychosocial needs of this population, however, have been implemented since the early 1990s (Malta et al., 2003).

A collaborative regional effort is currently also being implemented between the Pan-American Health Organization, the BMoH and some reference centers to improve the access of drug users living with HIV/AIDS to HAART in the Latin American region. Local experts developed guidelines for the management of HIV-positive cocaine users which will be distributed in regional public health facilities free of charge. Several trainings and meetings have been implemented in the region, targeting mainly health professionals, political leaders, affected communities and local NGOs.

## Collaboration and Conflict: Prevention Strategies and the Role of Civil Society

Civil society organizations and gay activism had a key role in shaping the Brazilian response to the HIV/AIDS epidemic, particularly during the 1980s (Daniel & Parker, 1993; Parker, 1993; Parker et al., 2000). In the early 1980s, the Brazilian federal government largely ignored AIDS; the epidemic was viewed as a problem of gay men, sex workers and other marginalized groups, rather than a general public health threat. In response, NGOs and the São Paulo state Health Ministry filled the AIDS education void by campaigning for and shaping more effective prevention strategies. Newly formed AIDS NGOs played a key role in the development and implementation of most prevention programs targeting hard-hit populations, such as sex workers and MSM.

In this period, because there were no effective treatments for PLWHA, contracting HIV was associated with strong social stigma and PLWHA frequently faced discrimination. As a result, the social consequences of contracting HIV were equally as dire as the health consequences. It was in this social context that Brazil's first AIDS programs developed. These programs, based in São Paulo, were grounded in a human rights-based approach and focused on including vulnerable populations in program implementation, countering stigma and discrimination, educating the general population about HIV risks, and preserving the human rights and civil liberties of PLWHA. AIDS activists and public servants within the São Paulo health ministry used political activism to stimulate public policy debates about HIV/AIDS and effectively used the mass media to disseminate their messages.

Civil society movements fostered the adoption of local prevention campaigns, initially in the larger metropolitan cities such as São Paulo and Rio de Janeiro. In 1985, a partnership between gay men, human rights activists, and health professionals launched the first AIDS NGO in Brazil, GAPA, an AIDS Prevention and Support Group, in São Paulo. GAPA soon became a key model, fostering the development of similar NGOs in other cities throughout the country. In Rio de Janeiro, researchers, health professionals and gay activists founded Brazilian Interdisciplinary AIDS Association (ABIA), in 1986, and in 1989 the first self-identified HIV-positive advocacy group, Grupo Pela VIDDA, run by PLWHA was launched.

Throughout the late 1980s and early 1990s, the rebirth of grassroots civil society movements after 25 years of dictatorship led to the organization of NGOs targeting AIDS and many other health and social challenges all over the country. Productive collaboration between NGOs and the government alternated with periods of dissent and eventual conflict. These periods included the political turmoil that culminated in the impeachment of President Fernando Collor de Mello, protests against health budget cuts implemented by President Fernando Henrique Cardoso, in his first term (Bastos et al., 2001), and when ABIA and other NGOs initiated litigation against agreements reached by the BMoH and drug companies over the costs of some ARVs, during President Luis Inácio Lula da Silva's first term.

Since the early 1990s, however, the Brazilian AIDS Program has managed to sustain its commitment to preserving the human rights of marginalized communities such as IDUs and transvestites as a key focus of its policies. For instance, in 2005, the Brazilian government rejected USD 40 million in grants to fight HIV/AIDS, because it required grantees to sign a statement condemning prostitution, which the Brazilian government believed only increased stigma and reduced the efficacy of prevention campaigns (Hinchberger, 2005). NGOs representing sex workers, IDUs, gay and lesbian, bisexual and transgender populations, PLWHA, and other groups affected by the epidemic have received significant funding from the government to implement prevention initiatives (Berkman et al., 2005). Interestingly, the fact that the federal government provides core funding for most NGOs and that there are close links between NGOs and the BMoH (with a high commuting rate of key personnel between the government and different organizations) may have impacted the autonomy of such institutions.

### Youth Focus

Adolescents and young adults comprise another key population to be targeted by prevention strategies. The BMoH started promoting lectures, workshops and debates related to HIV/AIDS, STIs and unwanted pregnancy prevention in public schools in the mid-1990s for students aged 14 years or older. This initiative resulted from a collaborative effort of the BMoH, the Brazilian Ministry of Education and the United Nations Educational Scientific and Cultural Organization (UNESCO). According to a study conducted by Camargo (2003), 60.2% of all Brazilian public schools have some kind of STI/AIDS prevention programs; 29.7% of elementary schools and 96.2% of high-schools. Some schools also

offer a special training to adolescents who would like to become peer-educators within their own school.

Wherever the local parents' advisory boards do agree, the government also provides free condoms inside public schools. This continues to cause controversy and is usually condemned by the Catholic Church and conservative groups. As a result, such initiatives have been implemented only recently and are restricted to some contexts and municipalities. Only 10% of all public schools actually provide free male condoms for their students (Camargo, 2003).

Paiva and colleagues (Paiva et al., 2006) found that approximately 68% of Municipal Health Secretariats all over Brazil allocate resources for STI and HIV/AIDS prevention in their respective public school networks. However, the majority (88%) do not distribute male condoms. Lack of trained human resources is one of the primary reasons indicated by the program coordinators for the failure to implement prevention initiatives with youth in schools, with 35% stating they do not possess the necessary trained staff. In order to reach youth who are not currently attending public schools, the BMoH initiated in 2005 several interventions targeting street children and youth living in rehabilitation facilities/shelters. These initiatives have not yet been evaluated.

## Management and Care of People Living with AIDS

### Access to Antiretroviral Medicines

In 1991, though the federal government had committed to providing AZT to PLWHA, it was not widely available (Bastos et al., 2001). During the following five years, NGOs and activists filed lawsuits against state, local and federal governments for failure to uphold the 1988 Constitutional guarantee of health care, which they argued included drugs for AIDS treatment. Ultimately a Brazilian federal law passed in 1996 guaranteed universal free access to ARVs and any other medications for AIDS and associated conditions. This law centralized formerly disparate AIDS treatment policies in Brazil and helped stabilize access to drugs for AIDS treatment.

As of June 2005, approximately 161,000 HIV-infected individuals in Brazil were taking HAART. This corresponds to approximately 27% of the estimated 600,000 PLWHA (BMoH, 2006a). Brazilian treatment guidelines state that any symptomatic HIV-infected individual or asymptomatic HIV-infected individual with a CD4 count below 200 cells/$mm^3$ is eligible to receive free HAART. Individuals with CD4 counts of between 200 and 350 cells/$mm^3$ are monitored closely and considered for treatment (BMoH, 2006b).

Currently, 17 ARVs, including nucleotide reverse transcriptase inhibitors; protease inhibitors; non-nucleotide reverse transcriptase inhibitors; and one entry inhibitor, which is reserved for late-stage AIDS patients, are distributed by over 600 dispensing units located throughout Brazil. Antiretroviral treatment (ART) in Brazil is both administered and financed publicly. Only public clinics accredited by the federal government can dispense ARVs. Outpatient services, clinics, and hospitals can all apply for accreditation, which requires previous experience working with PLWHA, demonstration of sufficiently trained staff, and basic pharmacy and laboratory capabilities (BMoH, 2006b).

While drugs for HAART are financed by the federal government, responsibility for distribution and monitoring of HAART is shared between municipal,

state, and federal governments in accordance with the delegation of health care responsibilities under Brazil's National Health System, the Sistema Único de Saúde. Primary care doctors are responsible for the day-to-day treatment and follow-up of PLWHA, including prophylaxis and treatment for opportunistic infections, both before and after AIDS diagnoses. When complexities in care arise, an individual is usually referred to secondary or tertiary care centers, most of which are jointly supervised and run by the federal government, universities, and research centers. The federal government is responsible for setting national treatment standards and guidelines, accrediting primary, secondary and tertiary care units for the treatment of AIDS, and maintaining national networks for AIDS case notification, patient monitoring, and medication tracking (Bastos et al., 2001; Levi & Vitoria, 2002; Galvao, 2002; Teixeira et al., 2004).

### Treatment Monitoring

As Brazil launched its ambitious plan to provide universal access to ARVs, health professionals and managers realized that while an appropriate infrastructure was solidly established in a few reference centers, such as university and research institutes located in the southeast and south, many facilities were seriously deficient. As a consequence, the decision was made to establish national networks on CD4 counts, viral loads and more recently on HIV genotyping (Bastos et al., 2001). These national treatment standards and national networks for patient monitoring have been crucial in ensuring universal access to quality HAART despite heterogeneity in resources, laboratory capacity, and trained staff between Brazilian regions, localities and health facilities (Melchior et al., 2006).

Nationwide laboratory networks provide ongoing patient follow-up, including CD4 counts and viral loads, and track medication prescriptions. However, regional disparities have complicated the effective implementation of national networks. While reference centers in major urban areas are linked via the internet, dispensing units in other regions of Brazil often rely on paper reporting for AIDS treatment services. Delays in return of laboratory results vary widely by region.

### Adherence and Viral Resistance

Despite the undeniable impact HAART has on patient quality of life, treatment adherence can present challenges in resource-limited settings. The bureaucracy of drug distribution as well as planning errors in producing and purchasing ARV drugs may pose problems, such as halts or interruptions in medication delivery (Chequer et al., 2002). Fortunately, such interruptions have been extremely rare in Brazil (Melchior et al., 2006). The emergence and transmission of HIV strains resistant to HAART have also been cited as potentially disastrous consequences of expanded access to HAART in resource-limited settings. While available evidence suggests that resistant HIV is becoming an increasing problem in Brazil, as it is in the U.S., Europe, and other settings where HAART is widely available, drug resistance among both treatment-experienced and treatment-naïve populations observed to date in Brazil remains no higher than in developed nations (Petersen et al., 2006).

A 2004 national study of adherence to HAART was conducted by the group QUALIAIDS, in the Department of Preventive Medicine, University of São

Paulo (USP). The overall level of ART adherence was 75% and important associations with the nature of therapeutic schemes and duration of treatment were found (Nemes et al., 2004). Other research has explored different aspects of adherence, including patients' difficulties managing complex drug regimens (Remien et al., 2007), the need to improve provider's training and reduce their caseloads (Malta et al., 2005), and to improve patient-provider communication, including increasing the frequency of open-ended, nonjudgmental dialogue initiated by care providers (Fehringer et al., 2006).

## Monitoring and Evaluating the Brazilian HIV/AIDS Program: Current Challenges and Main Achievements

### The Pressing Need to Monitor and Evaluate

It is difficult to attribute Brazil's apparent success in controlling the HIV/AIDS epidemic to any one aspect of its comprehensive treatment and prevention strategy. However, the fact that the Brazilian government made the containment of their HIV epidemic a high political priority facilitated development and sustainability of its broad HIV/AIDS program. Free and universal access to HAART in 1996 resulted in population-wide reductions in AIDS mortality (Marins et al., 2003; Hacker et al., 2004). Universal access may also have contributed to the subsequent stabilization observed in AIDS incidence by decreasing HIV transmission. Moreover, HAART may reduce the infectivity of HIV-infected individuals (Porco et al., 2004), provide incentive for HIV testing, and decrease the stigma surrounding HIV infection (Castro & Farmer, 2005; Montaner et al., 2006).

Many issues remain, however, in research and the broader public health agenda. There is a concern that gains from HAART may be reverted at the individual and population level in the foreseeable future in Brazil and globally (Blower et al., 2000; Boily et al., 2004, 2005). The impact of HAART on behavior change in Brazil has not been thoroughly explored. Changes in transmission dynamics secondary to the recomposition of social networks is another issue which needs to be evaluated. In addition, few data are available about the efficacy of specific prevention initiatives. The World Bank's 2004 Program Assessment document noted that Brazil has not conducted sufficient monitoring and evaluation to ascertain the impact of its prevention programs in reducing HIV transmission (Vaillancourt, 2004).

Evaluation of public hea1th programs is not a common practice in Brazil and local expertise in monitoring and evaluation is somewhat limited. The World Bank's 2004 assessment prompted Brazil's National AIDS Program to create a Monitoring and Evaluation Project designed to foster ongoing monitoring and evaluation programs. Building a comprehensive evaluation plan involved three dimensions: international cooperation, capacity building in evaluation and the construction of a monitoring system of AIDS-related indicators.

### Implementing MonitorAIDS

This monitoring system, MonitorAIDS, was developed by the BMoH/National AIDS and STD Program (NAP), the Department of Information on Health

of the Center for Scientific and Technological Information at FIOCRUZ and the Centers for Disease Control and Prevention's Global AIDS Program Office in Brazil. This user-friendly web-based monitoring system assembles data from BMoH information systems, surveys and specific studies. Indicators were developed to facilitate effective monitoring of HIV/AIDS and other sexually transmitted diseases (STDs), to enable evaluation of current NAP programs, and to use to benchmark program performance in future evaluations (Rugg et al. & HIV Prevention Indicators Field Collaborative, 2000). Indicators are presented in two ways. The first (Monitoring Classification) is based upon the HIV/AIDS Survey Indicator Database in which indicators are organized by programmatic area. The second mirrors the logic model of the National Evaluation Plan, issued by the BMoH in 2000, and regularly updated thereafter (Bastos, 2002). Indicators proposed by UNGASS (United Nations General Assembly Special Session on HIV/AIDS) were also adopted in the development of MonitorAIDS. Two groups of indicators, which were closely related to the monitoring of the epidemic dynamics among vulnerable populations (Barbosa-Júnior et al., 2006) were given priority and were analyzed in 2002 and 2005 as part of the monitoring of the progress of the UNGASS Declaration of Commitment (UNAIDS, 2002, 2005).

Within MonitorAIDS, monitoring indicators are classified in three broad areas: Contextual Indicators, Program Indicators, and Impact Indicators. Contextual indicators include demographic and socioeconomic features of the population, as well as national health system indicators. Program indicators are divided into fourteen sub-areas related to NAP activities. These sub-areas contain indicators related to individual vulnerability, prevention strategies, care, AIDS surveillance and STD prevention and control. Impact indicators analyze the impact of STD/AIDS control efforts on morbidity and mortality. In addition, equity was considered as one of the key principles in the analysis of indicators since social factors are fundamental in determining patterns of morbidity, mortality and access to healthcare in Brazil.

Several information systems from the BMoH and a number of specific studies were used for estimating the MonitorAIDS indicators. Key studies were: (a) Brazilian Army Conscripts Surveys (BMoH, 2002b; Szwarcwald et al., 2000b; Carvalho, 2001; Szwarcwald et al., 2005a); (b) PCAP-BR (Survey of Knowledge, Attitudes and Practices of the Brazilian Population) (Szwarcwald et al., 2005b; BMoH, 2006d); (c) Parturient Sentinel Surveillance Study.(Szwarcwald & Castilho, 2000; Szwarcwald & Carvalho, 2001; Souza Junior et al., 2004); (d) Brazilian Multi-center Collaborative Project on Mother-to-Child Transmission of HIV (Brazilian Pediatric Society, in cooperation with the NAP); and (e) STD and AIDS Accounts.(BMoH, 2000a).

## The Brazilian Response as Tracked by MonitorAIDS

Information provided by MonitorAIDS has been used to formulate policies, select appropriate interventions and optimize implementation of national program activities at national, state and municipal levels. Following are some of its main findings:

### Knowledge About HIV Transmission

In the 2004 Survey of Knowledge, Attitudes and Practices of the Brazilian Population, 91% of those surveyed cited "having sexual relations" as a means of transmitting HIV while 67% answered the five traditional questions proposed by UNGASS correctly, showing that Brazil ranks as one of the highest countries internationally with respect to HIV knowledge (United Nations, 2004).

### Sexual Practices

Results from the same survey reveal that approximately 90% of the Brazilian population aged 15–54 years is sexually-active and 81% were sexually active in the year prior to the study. About 20% of participants reported having more than 10 lifetime partners and 7% of those aged 15–24 years reported having more than 5 casual partners in the last year. Condom use is more frequent among the young and among those with casual partners: 74% of participants 15–24 years of age reported using a condom during their last sexual relations and 59% reported regular use of condoms with casual partners. Overall condom use varied from 58% in the highest socioeconomic class to 48% in the lowest (United Nations, 2004). Studies with Brazilian Army conscripts found that regular condom use among young males increased from 38%, in 1997, to 46–50% during the period of 1999–2002 and that condom use increased most with paid sexual partners (Fonseca & Bastos, 2007).

Indicators on knowledge and sexual practices show that populations with the lowest socioeconomic status have the worst level of information about transmission of HIV, the highest rate of sexual contact and frequently practice risky sex. Moreover, analyses by equity show that women from the lowest socioeconomic levels have the least access to the health system, for accessing periodic gynecological exams, getting prenatal care or for having an HIV test.

### HIV Testing

HIV testing is encouraged and provided freely in public health clinics. Twenty-eight percent of the sexually-active population has been tested at least once in their lifetime. A larger proportion of women aged 25–39 years have been tested because of their access to prenatal care. Important differences were noted in HIV testing history by socioeconomic status for both males and females. Forty-three percent of sexually-active women from the highest-socioeconomic level have been tested compared to 28% from the lowest levels (Fonseca & Bastos, 2007).

### Vulnerable Populations

For concentrated epidemics such as Brazil's, interventions targeted to at-risk populations can significantly reduce the incidence and prevalence of HIV (Boily et al., 2002). Additionally, the network of sexual contacts between groups at low-risk and those at high-risk are particularly important to the epidemic, in such a way that very small changes in the rate of contact between the general and core, high-risk populations, can decrease or significantly increase the dissemination of HIV/AIDS (Boily & Masse, 1997).

In this context, indicators that monitor epidemic dynamics among some especially vulnerable populations have been prioritized. The NAP has been dedicated to the development, adaptation, and sharing of sampling methodologies for hard-to-reach populations. Such activities are geared towards estimating the size of such vulnerable populations, as well as obtaining more information regarding their knowledge, attitudes, and practices using special sampling procedures, such as Respondent Driven Sampling and Time Location Sampling (Heckathorn, 1997; McFarland & Cáceres, 2001; Stueve et al., 2001).

In 2004, the National Survey on Knowledge, Attitudes and Practices of the Brazilian Population included questions about sexual orientation, sexual partnership in the last year and questions on the (mis)use of legal and illegal substances. In this way, it was possible to measure the size of vulnerable populations, through the recognition of populations of MSM, IDUs, sex workers and their clients. Among men aged 15–49 years it was estimated that 3.2% have sex with other men. This corresponds to approximately 1.5 million men in the country. Among sexually-active men, 3.5% are MSM; 2% reported only having sex with other men and 1.5% reported having sex with both men and women. Among women 15–49 years of age, 1% reported receiving money or gifts in exchange for sex in the last year, whereas 4.6% of men aged 15–49 paid at least once to have sex in the previous year. As for injecting substances: 0.9% of respondents reported that they had injected drugs at least once in their lifetime (1.4% males; 0.4% females) and 0.2% said they currently inject drugs (excluding drugs used for medical purposes) (Fonseca & Bastos, 2007) .

### Mother-to-Child Transmission

Prior to the institution of appropriate prophylaxis (according to the protocol ACTG 076 and subsequent developments, as reviewed by Mofenson & McIntyre, 2000), Brazil had a vertical transmission rate of 16% (Tess et al., 1998). Recently, an evaluation conducted by the Brazilian Pediatric Society reported a 7% vertical transmission rate for Brazil. However, there was great variation between regions, with 15% reported for the North region and 6% in the South.

Although the interventions to reduce mother to child-transmission of HIV have had a great impact, it is estimated that only 57% of infected pregnant women had access to HAART in 2000. The reasons for this are varied and include: absence of prenatal care, initiation of prenatal care in the last trimester, prenatal attention without request for an HIV test, failure to receive timely results of the HIV test, and failure to receive HIV test results. Access to HAART comes with HIV testing coverage which is defined as the proportion of women who attended prenatal care visits (at least one visit), requested HIV testing during pregnancy and knowledge of HIV test result before labor. Huge inequalities are seen in HIV testing coverage between the Northeastern (31%) and Southern regions (78%); illiterate mothers (26%) and those who have completed basic education (64%) (Souza Junior et al., 2004). Despite the fact that prophylactic resources to reduce transmission are available throughout the country, coverage of HIV testing during pregnancy among women of the lowest socioeconomic status remains insufficient.

### Prevalence of HIV Infection in the Brazilian Population

In 2004, HIV prevalence among the population aged 15–49 years old was estimated at 0.61%, corresponding to approximately 594,000 infections (209,000 women and 385,000 men). These numbers were similar to those obtained in the 2000 study. At the same time, HIV prevalence among male conscripts in both 1998 and 2002 was estimated to be 0.09% (Szwarcwald et al., 2000b, 2005b). These results may be an indication that the prevalence of HIV is stabilizing as a result of efforts to control dissemination of the infection within the Brazilian population.

## Financing the Response to HIV/AIDS in Brazil: Achievements and Challenges

### The Contribution of Domestic Funds and International Loans

Since 1994, the World Bank has loaned Brazil a total of USD 425 million for AIDS programs. Brazil has contributed USD 325 million to match World Bank contributions. Though World Bank loans do not finance the costs of production, procurement, delivery or monitoring of ARVs in Brazil, the first two World Bank loans helped establish important health system infrastructure and human resource training that has facilitated implementation of Brazil's large-scale treatment program. Similarly, the third World Bank loan, first dispersed in 2003, focuses on infrastructure development for decentralization of AIDS care and treatment services (Brazil AIDS and STD Control Project: World Bank Staff Appraisal Report 1993; Project Appraisal Document on a Proposed Loan in the Amount of $165 Million to the Federative Republic of Brazil for a Second AIDS and STD Control Project, 1998; Brazil AIDS and STD Control III, 2003).

The procurement, production and distribution of ARVs have been funded by the Brazilian government which has adopted several strategies to reduce the costs of HAART. Brazil, with the tenth largest pharmaceutical industry in the world and several government run drug factories, has produced generic drugs since the 1950s. Between 1971 and 1997, Brazil did not recognize intellectual property rights for drug processes and products. In the early 1990s, both public and private sector Brazil began producing some generic ARVs to meet new population demand. However, under pressure from the United States government to recognize intellectual property rights and improve the quality of generic medicines, Brazil adopted an Industrial Property Law in 1996, nine years before official requirements by the World Trade Organization (WTO) (WTO, 1995; Brazil, 1996). The new law recognized drug product and process patents and restricted public and private drug production to drugs introduced in the Brazilian marketplace before May of 1997. In November of 1996, the Brazilian Congress approved Brazil's law guaranteeing free and universal access to HAART for all PLWHA (Lei 9.313, 1996). As a result of these two laws, the state was required to provide free and universal access to HAART to all PLWHA, but generic drug production was restricted to drugs introduced before May of 1997.

In 1998, to meet increasing population demand for HAART, Brazil began producing generic ARVs on a large scale. Today, Brazil's public drug factories produce the eight drugs in its current treatment guidelines that were

introduced in Brazil prior to May of 1997. The remaining eleven patented drugs in Brazil's guidelines are imported from multinational pharmaceutical companies (Grangeiro et al., 2006; Pinheiro et al., 2006; Galvao, 2002; Nunn et al., 2007). Since 2001, Brazil has successfully negotiated deep drug discounts for five of the patented medicines consuming a large part of its treatment budget, by threatening to issue a compulsory license. Under WTO rules, a compulsory license allows governments to produce or grant a third party authority to produce a drug without consent of the patent holder in cases of national public health emergency, among other limited circumstances (WTO 1995, 2001; Grangeiro et al., 2006).

### Fluctuating Costs: Prospects for the Near Future

Local production of generic ARVs and steep discounts for patented medications have resulted in large cost savings in providing free and universal access to HAART. Recent research finds that price negotiations saved Brazil USD1.2 billion from 2001 to 2005 (Nunn et al., 2007). Both local production and price negotiations have also resulted in declines in average per patient per year (PPPY) HAART costs. In 1997, average PPPY HAART costs were USD 4,860, but dropped to USD 1,945 in 2001 as a result of Brazil's strategy of scaling local ARV production in the late 1990s. Between 2001 and 2003, PPPY HAART dropped even further to USD 1,120 due to price negotiations and improving efficiencies in local ARV drug production. However, between 2003 and 2005, in spite of continued price negotiations, the average cost of HAART increased to USD 2,577 (Nunn et al., 2007) .

A small share of cost increases can be attributed to the rising cost of producing generic drugs locally. Most of the cost increases, however, stem from the increasing number of patients taking newer, patented medicines (Grangeiro et al., 2006; Nunn et al., 2007). As patients live longer, they tend to experience undesirable side effects, clinical failures and/or develop resistance to drugs. They usually switch from first to second or third line drug regimens. Most second and third line ARVs are under patent and are therefore ten to twenty times more expensive than locally-produced generics (Grangeiro et al., 2006; Nunn et al., 2007). Additionally, Brazil provides an exceptionally high standard of care relative to other developing countries. For example, the 2006 World Health Organization (WHO) Guidelines for HAART in resource-limited settings recommends 12 ARVs. Brazil, in contrast, offers 18 drugs; many of the patented drugs offered as second and third line therapies in other developing countries are now considered first line therapies in Brazil. Brazil even offers salvage therapy for late-stage AIDS patients (BMoH, 2006c; WHO, 2006).

In the near to long-term, Brazil will face several clinical and ultimately financial challenges associated with long-term HAART. Challenges presented by PLWHA living longer, and emerging drug-resistant HIV strains will be compounded by increasing numbers of patients developing side-effects associated with long-term HAART and increasing numbers of patients requiring salvage therapy due to repeated virological and clinical failures. Because these clinical problems require complex case management and further reliance on patented ARVs, they ultimately also become economic challenges.

AIDS activists and public officials often cite the rising costs of AIDS treatment as a threat to the sustainability of the treatment program. However, a close look at health expenditure trends finds that total public health expenditure rose in tandem with HAART costs and that even as HAART costs doubled, ARVs accounted for only approximately 3% of total public health expenditure for each year from 2001 to 2005. Moreover, because overall drug costs increased dramatically from 2001 to 2005, HAART costs declined from 50 to 36% of total public drug costs (BMoH – CAA, 2005). Because BMoH spending increases have more than offset HAART cost increases, to date, rising HAART costs seem not to have directly imperiled other public health or drug spending in Brazil. However, if costs begin to rise more than general health system spending, the increasing cost of HAART may eventually pose an economic challenge for Brazil's Health Ministry.

## International Cooperation

### The Broad Context

Since 2001, Brazil has been very active in several international fora, promoting greater access to medicines in developing countries and sponsoring resolutions at the UN Commission and Sub-Commission on Human Rights, the World Health Assembly (WHA), UNGASS and the WTO. In 2001, at the WHA, the WHO's supreme decision-making body, Brazil sponsored resolutions that called for creation of a global fund for major infectious diseases. That resolution was ultimately approved and the Global Fund to Fight AIDS Tuberculosis and Malaria, which was created later that year, began dispersing funds in 2003. Brazil's 2001 WHA resolutions also led to WHO endorsement of generic drug use; improved WHO drug quality standards; and inclusion of ARVs in the WHO Essential Medicines List, which includes the minimum drugs that all countries should make available to their populations (WHA, 2001a, b). In other resolutions since 2003, Brazil, in collaboration with other developing countries, has also spearheaded efforts to change global research and development paradigms to address neglected diseases (WHA, 2003, 2006).

Brazil also sponsored a resolution entitled, "Access to Medication in the Context of Pandemics such as HIV/AIDS" at the UN Commission for Human Rights. That resolution defined access to medicines as part of the fundamental human right to health, and that resolution was re-affirmed and expanded from 2002 to 2005 (UNCHR, 2001). In 2001, Brazil was also involved in shaping the 2001 WTO Doha Ministerial Declaration to reflect developing country public health interests. The Doha Declaration on the TRIPS Agreement and Public Health affirmed the right of developing countries to declare national emergencies and issue compulsory licenses in cases of public health emergency (WTO, 2001; Abbott, 2002). In addition to allowing Brazil to preserve its tradition of threatening to issue compulsory licenses to induce discounts from pharmaceutical companies, the WTO's recognition of important exceptions to the TRIPS agreement also legitimized the links and associated challenges between trade agreements and public health problems. This has provided momentum for

ongoing global institutional reforms related to essential medicines and AIDS treatment.

All of these international contributions have helped change global thinking about access to essential medicines and drugs for AIDS treatment. In part as a result of these global institutional contributions, AIDS treatment has become a reality in many developing countries.

### Regional Collaboration

South-south cooperation in the field of HIV/AIDS has been pursued by both the Brazilian government and different NGOs since the onset of the HIV/AIDS epidemic. Since 1996, Brazil has been a key partner of the Group for Horizontal Technical Cooperation in HIV/AIDS for Latin America and the Caribbean (the Group) (BMoH, 2000b). The 1996 summit of the Group, which was held in Rio de Janeiro, brought together representatives and leaders from ten countries. At the summit, goals of cooperation were defined and a rotational Technical Secretariat created. Support from UNAIDS has brought increasing cooperation and membership. In 2000, 21 countries had joined the Group. The Group has been pivotal in drug procurement initiatives in the region, including promoting price negotiations for ARVs (Chequer et al., 2002).

Brazil's international cooperation program, conducted in partnership with the Ford Foundation was officially launched on May 22, 2002, with an initial appropriation of USD 1 million for ten pilot projects of USD 100,000 each (BMoH, 2002a). Through these projects Brazilian experience and expertise in HIV/AIDS management and care has been shared with less developed countries as they implement domestic initiatives to establish/scale up ARV treatment. Brazil's government contributes technical assistance, training in HIV/AIDS treatment and management of ARV procurement and delivery logistics, and generic medicines produced by Brazil's state-owned drug companies, such as Farmanguinhos (a branch of the Oswaldo Cruz Foundation – FIOCRUZ) (Pinheiro et al., 2006). In one example, Brazil's contributions to the epidemic in Paraguay and Bolivia, while modest in terms of scope, have been essential as both Paraguay and Bolivia have been facing political instability and a shortage and discontinuity of funds. For about 800 patients in each country, Brazilian generics have provided a stable source of first line treatments (Pimenta et al., 2006).

### Providing International Support

Brazil has been also working in close cooperation with several countries in Lusophone Africa, including Angola, Mozambique, Cape Verde, Guinea Bissau, and Sao-Tome. Brazil has supported a variety of initiatives including: in Cape Verde, prevention of mother-to-child transmission of HIV; in Guinea Bissau preliminary programs in management and care; and in Mozambique an educational program called, "Estamos Juntos" ("We're Together"), which trains teachers and develops educational materials targeting issues such as HIV prevention and sexuality (United Nations, 2006).

Brazil has worked to fully implement UNGASS goals domestically, and has helped countries from Latin America and Lusophone Africa, through technical cooperation and advocacy, to overcome obstacles in their full implementation of UNGASS goals (Bastos et al., 2006a).

## Final Remarks

Brazil's reforms of the 1980s produced a health care system based on human rights principles rather than ability to pay. This commitment played a major role in shaping the nation's response to the HIV epidemic, as is particularly evident in Brazil's provision of free and universal HAART. This policy of unrestricted access to high-quality medicines has led to dramatic declines in AIDS-related morbidity and mortality across regions, social strata and among both men and women. Furthermore, current data suggest that Brazil's challenges with adherence to medications and the transmission of resistant HIV strains are no greater than in developed countries. In the more than 25 years of the epidemic, Brazil has maintained a concentrated epidemic, with a prevalence of infection of HIV in the general population of less than 1% (Brito et al., 2001). Indeed in most regions, especially the southeast, the epicenter of Brazil's epidemic, incidence is declining.

Despite these successes, challenges remain. Dramatic disparities between socioeconomic groups and geographic regions in Brazil remain a challenge to the realization of free and universal access health services both within the HIV program and across the Brazilian health system. Access to both treatment and prevention services need to be improved in remote regions of Brazil, and more effectively targeted at marginalized populations. Expanded clinical, behavioral and laboratory monitoring should be coupled with efforts to improve patient adherence to medications and clinical follow-up, and prevention services should be targeted to individuals receiving treatment (Kerrigan et al., 2006; Fehringer et al., 2006). It will also be important to extend important lessons learned in the successful implementation of the NAP program to other parts of the Brazilian health system which remain poorly funded and less organized than the HIV/AIDS program. Horizontal integration of the heretofore vertical HIV program in the larger Brazilian health system, would improve both HIV care and the health system itself.

Ultimately, much of Brazil's success in the HIV/AIDS epidemic can be attributed to support from the federal government. Federal provision of a legal and organizational framework has proved crucial to the success of Brazil's program. In particular, federal laws and institutional support fostered the production of generic drugs and the negotiation of pricing agreements with drug companies, strategies that have made universal HAART access financially feasible. National laboratory networks have played a major role in ensuring quality of care in regions with less health care infrastructure. Human rights and activism also played a major role in both generating and sustaining political and financial commitments to Brazil's HIV/AIDS program. These efforts should be encouraged and ideally, integrated with public policy responses to the epidemic.

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# Chapter 30

## The State of HIV/AIDS in the Dominican Republic: Guarded Optimism amidst Sustainability Concerns

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D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_30, 

## Introduction

The Dominican Republic (DR) is often portrayed as a country where a proactive response to HIV/AIDS occurred early on in the course of the epidemic, allowing for significant control of viral spread. In recent years many in the field of HIV prevention have specifically highlighted the apparent stabilization and/or decline in HIV prevalence in the DR and spoken with guarded optimism about the gains made within the country. Indeed, successful HIV prevention efforts have been implemented in larger cities within the country, particularly among vulnerable population groups such as female sex workers. What was thought in the early 1980s to be the beginning of a generalized HIV/AIDS epidemic has fortunately not come to fruition for this Caribbean nation. Additionally, after many years of struggle on the part of people living with HIV/AIDS (PLWHA), social activists, and non-governmental organizations (NGOs), access to HIV treatment and care is finally and slowly occurring. The ability of the DR to sustain and expand ongoing HIV prevention and care efforts beyond larger cities to less frequently reached geographic areas remains to be seen. Recent uncertainty regarding the flow of funding from international donors has only added to such concerns. These trends highlight the need for continued commitment from both the Dominican government and civil society to ensure that the achievements made to date are not lost and that current gaps in HIV/AIDS programming and policy are effectively addressed.

## Epidemiology

### Situating the Impact of HIV/AIDS in the Dominican Republic within the Caribbean Context

The Caribbean is considered the second most affected geographical region in the world in terms of HIV prevalence, after Sub-Saharan Africa, with approximately 1.6% of adults (1.1–2.2) estimated to be infected within the region. There are an estimated 330,000 people living with HIV/AIDS in the Caribbean, with a wide range surrounding this estimate (240,000–420,000) (UNAIDS, 2006a). Together, the DR and Haiti, which share the large island of Hispaniola, comprise the majority, or nearly three-quarters, of all HIV infections in the Caribbean (UNAIDS, 2006a). While Haiti has a significantly higher overall HIV prevalence rate and perhaps more than double the number of people living with the virus, HIV/AIDS has certainly taken its toll on the DR. Currently there are an estimated 66,000 individuals living with HIV (56,000–77,000) in this country of 9 million people, with approximately 62,000 adults (15 years and older) and 3,600 children (14 years and under) infected with the virus (UNAIDS, 2006a). Conservative estimates suggest that there have been approximately 34,050 deaths attributable to HIV/AIDS in the DR (UNICEF, 2006) since the beginning of the epidemic in the 1980 s to the present. Additionally, HIV/AIDS currently ranks as the leading cause of death among 25 to 44 year olds in the DR (PAHO, 2006).

## Guarded HIV-related Optimism for the Dominican Republic and the Caribbean Region

Despite the continued seriousness of HIV/AIDS in the Caribbean, and in the DR in specific, there is some room for guarded optimism. The Caribbean is the only region in the world where the overall number of people living with HIV/AIDS did not increase during 2005 (UNAIDS, 2005). With regard to the DR in particular, the rates of HIV/AIDS have stabilized considerably and/or declined among specific sub-groups and in certain areas of the country. In the mid-1990s, after several years of documented increases in the country's overall HIV prevalence rates, it was projected that the DR would be experiencing a generalized HIV epidemic by the year 2000, with a general population prevalence of over 5% (Gomez, 1996). Fortunately, these prior modeling projections did not come to pass. There may not be one clearly agreed upon conclusion regarding why the HIV epidemic in the DR has not progressed to the extent originally projected. However, the innovative and effective HIV/AIDS prevention efforts developed and implemented by the strong cadre of community-driven NGOs in the DR are certainly a critical component to the HIV-related behavior change documented among key population groups such as sex workers, men who have sex with men (MSM), and youth.

Instead, it is currently estimated, based on the most recent population-level sero-prevalence study conducted in the DR, that 1% of the adult population (15 to 49 years of age) is infected with HIV (DHS, 2003). UNAIDS has recently stated that the DR appears to be "seeing some rewards", in terms of HIV/AIDS, as a result of their response to the epidemic (UNAIDS, 2005). Based on the Dominican government's national sentinel surveillance system, the HIV prevalence rate among pregnant women in Santo Domingo has declined from 1997 onward among those specific surveillance sites which have been tracked annually from 1991 to 2004. HIV prevalence among pregnant women at these specific sites has remained fairly stable during that seven year time period, hovering around 1.4% (DIGECITSS, 2006a). This type of encouraging trend points to the potentially influential role of HIV prevention efforts in the DR, particularly in the more central areas of the nation's capital. However, in the more recent HIV sentinel surveillance data collection rounds several additional surveillance sites were added to complement existing sites. Significantly higher HIV prevalence rates were found in several of these sites, which are located in peripheral areas of the capital city such as Villa Mella, a poorer area located on the edge of Santo Domingo. A 2.3% prevalence rate was observed in that local prenatal clinic for the year 2005 (DIGECITSS, 2006a).

## Surveillance of and Geographic Variation in the Prevalence of HIV within the Dominican Republic

The DR's national surveillance system began in 1991 and has been largely concentrated since its inception on sex workers and pregnant women, and to a lesser extent on predominantly male sexually transmitted disease clinic attendees. For the last 15 years it has conducted annual HIV sero-prevalence studies with pregnant women, a group often used in HIV surveillance as a proxy for the general population, and sex workers in different regions of the country to the extent financially possible (SESPAS/PROCETS, 1996). Funding for the national HIV

surveillance program has fluctuated significantly over time and in turn so has the scope and consistency of the data collected.

Taking all sentinel surveillance sites into account, the national median HIV prevalence for pregnant women in the DR for the year 2005 was 2.3% (DIGECITSS, 2006a). Outside of Santo Domingo one finds that HIV prevalence rates among pregnant women are significantly higher in a variety of geographical areas throughout the country. Based on the most recent sentinel surveillance data available from the Dominican government, HIV prevalence rates in several other key cities are more than double those observed within Santo Domingo. Tourist areas of the country, in particular, have higher HIV prevalence rates, including 4.09% in Boca Chica, a popular destination located right outside of Santo Domingo, 2.26% in Puerto Plata, a prominent tourist town in the Northern part of the country, and 2.80% in La Romana and 4.5% in Higuey, both located in the Eastern sector of the country. Even non-tourist areas within the country such as San Juan La Maguana, a smaller town to the West of Santo Domingo known for high levels of migration, has a current HIV prevalence rate of 2.60% among pregnant women (DIGECITSS, 2006a). Such statistics have generally not yet been highlighted by international organizations in their recent descriptions of the HIV epidemic in the DR. Yet, geographic variations in the intensity of the epidemic are critical to take into account in order to plan effectively for future HIV prevention funding and implementation needs.

## The Differential Burden of HIV in the Dominican Republic Among Vulnerable Groups

In addition to geographic variation, there is a clear distinction in the way that HIV/AIDS has impacted different population groups within the DR. In terms of documented levels of HIV prevalence, HIV has taken a significant toll on three key socially vulnerable groups within the DR including sex workers, MSM, and Dominican-Haitian residents living on *bateys* or sugar cane plantations. Heightened levels of HIV among these sub-groups have been the nature of and the norm for the HIV epidemic in the DR from its inception and continue to be the case at present.

In the case of sex workers, current HIV prevalence rates range between 3 and 5% in Santo Domingo, and are approximately 3% in Puerto Plata and 5% in La Romana (DIGECITSS, 2006a). The national median HIV prevalence rate was 3.3% among sex workers in 1991 and stood at 9% by 1993. From the mid-1990 s to the year 2000, the median HIV prevalence rate among this sub-group was between 5 and 7% indicating a trend towards stabilization (DIGECITSS, 2000). The most recent national median HIV prevalence rate for sex workers is 3.6%, based on 2005 surveillance data, indicating a potentially important trend towards a decline in HIV prevalence rate nationally among this population group (DIGECITSS, 2006a). While the data above suggest an important drop in HIV prevalence among sex workers at the national level, there have been significantly higher levels of HIV documented among sex workers in the DR in the not so distant past. For example a 12.4% prevalence rate was found in the year 2000 in the town of Baní within the province of Peravia in the Southwestern region of the country, where little to no HIV prevention efforts has taken

place. Unfortunately, no follow-up surveillance has been conducted in that area to further understand the nature or temporal trajectory of these higher rates of infection since the year 2000 (DIGECITSS, 2000).

Much less is known about the prevalence of HIV among MSM and residents of *bateys* as these groups has never been formally included within the Government's ongoing HIV sentinel surveillance program, despite clear indications of their heightened vulnerability to infection. The most recent data regarding MSM comes from a multi-city (Puerto Plata, Samaná and Santo Domingo) prevalence study of MSM in the DR which found an overall prevalence rate of 11% (UNAIDS, 2005). This is basically the same (11.7%) rate documented by one of the only other HIV prevalence studies conducted among MSM in the DR, which was carried out back in 1993 (UNAIDS, 2006c), suggesting that the prevalence of HIV has remained fairly stable, but that no major declines have occurred among these men.

The situation among Dominican-Haitian *batey* residents is also quite concerning with the most recent population-based research documenting an HIV prevalence rate of 5% among general *batey* residents, indicating that the rate among this sub-group is five times that of the overall general population within the DR (CESDEM, 2003). Gaining a clearer picture of and responding to the social conditions within *batey* communities in the DR will be critical to stemming the spread of the HIV epidemic within this sub-group which has historically suffered from an overall lack of health and social services as well as access to many other types of basic human rights.

## The Temporal Evolution of the Epidemiology of HIV/AIDS in the Dominican Republic

The first case of HIV was documented in the DR in 1983. It wasn't until 1987, however, that all diagnosed or treated HIV/AIDS cases were required by law to be reported to the government. Early in the epidemic the majority of reported HIV/AIDS cases in the DR were documented among men. In 1984, for example, the male to female ratio of HIV/AIDS cases was 7:1 (Calderon et al., 1993). These dynamics have shifted significantly over the years. Currently, the male to female ratio stands at approximately 2:1 with 63% of all accumulated HIV/AIDS cases among males and 37% among females (DIGECITSS, 2006b). Similarly, we now find that the large majority of transmission, or 76% of all HIV/AIDS cases reported from 1983 to 2005, corresponds to heterosexual sex. During the early years of the epidemic, the proportion of cases attributable to heterosexual transmission was, however, significantly less, representing 48% of cases during the period 1983–1987 (DIGECITSS, 2006b). With the shift towards heterosexual transmission, the proportion of cases attributable to MSM has also dropped dramatically from 23% during the period 1983–1987 as compared to 7% of all accumulated HIV/AIDS cases. While injection drug use is generally thought to be quite uncommon in the Dominican context, the proportion of HIV/AIDS cases attributable to injection drug use has increased over the last few years, rising from 2% during the period 1983–1987 to 5% during the period 1998–2002 (DIGECITSS, 2006b). This rise indicates the need for further inquiry and intensified HIV prevention and care efforts among substance users.

## Prevention

### The Importance of Non-Governmental HIV/AIDS Organizations in the Dominican Republic in Reaching Socially Vulnerable Groups

Organized HIV prevention efforts in the DR began in the late 1980 s within the National STD(sexually transmitted diseases)/HIV/AIDS control program, then referred to as PROCETS. Targeted educational HIV prevention efforts were originally implemented with key population groups such as sex workers, MSM and youth via PROCETS. These initial efforts led to the development of several important NGOs which would later take over the health education efforts initiated by PROCETS, and expand these activities into the realm of community development and social mobilization.

Some of the key NGOs developed during the early years of the epidemic included the Centro de Orientación e Investigación Integral (COIN) and the Centro de Promoción y Solidaridad Humana (CEPROSH), formerly known as COVICOSIDA, serving sex workers, as well as, Amigos Siempre Amigos serving MSM. Key NGOs focused on youth also developed early on including the Centro de Animación Sociocultural and the Instituto Dominicano de Desarrollo Integral, both of whom have worked together on Project Acuario, a successful community-based peer education project implemented in poorer communities in Santo Domingo during the 1990 s. Additionally, Profamilia, a key reproductive health organization with national reach, began to advocate, early on in the epidemic, for the importance of integrating sexual health education into Dominican public schools. Local NGOs were also organized to respond to the specialized needs of Haitian-Dominicans and those living on *bateys* including groups such as Movimiento Sociocultural de Trabajadores Haitianos and Movimiento de Mujeres Dominico-Haitianas. Since 1997 an organized coalition of local HIV-related NGOs has been in existence in the DR which is now comprised of more than 30 HIV/AIDS organizations (Caribbean Health Research Council, 2004). The Coalition is active in stimulating and facilitating complementary and cooperative work among local NGOs as well as informing government policy and engaging with civil society as it relates to HIV/AIDS in the DR.

### The Importance of Bilateral Funding for Non-Governmental HIV Prevention Activities

Historically, the majority of HIV/AIDS prevention funding for educational programming through NGOs in the DR, such as those described above, came from the United States Agency for International Development (USAID). USAID has awarded several large umbrella contracts since the late 1980 s with international NGOs, such as Family Health International (FHI) and the Academy for Educational Development (AED), to help guide and manage local prevention efforts in coordination with USAID. In turn, FHI and AED established a multitude of contracts with local NGOs to implement HIV/STI (sexually transmitted infections)/AIDS prevention activities within key population groups such as sex workers, MSM, youth and *batey* residents. Both organizations tended to manage much of the HIV/AIDS mass media and communications campaigns which

were geared towards the general public and youth, working in partnerships with local advertising and media organizations.

The FHI AIDSCAP Project, for example, ran a series of TV and radio spots to support its community-based prevention activities among youth during the 1990 s. Its "Solamente Una Vez" (a popular romantic balled entitled, "Just Once") media campaign was recognized both nationally and internationally for its innovation and impact on HIV-related awareness (FHI, 2007). In addition to AIDSCAP (1992–1997), umbrella projects led by FHI over the years have included AIDSTECH, (1987–1992), a technical assistance project, and the USD 35 million CONECTA project (2002–2007) which seeks integrated and complementary solutions for HIV/AIDS, Reproductive Health and Child Survival. AED led the AcciónSIDA umbrella project (1996–2000) which provided for the expansion of HIV/AIDS/STI services, promoted prevention and control activities and improved the availability and use of data. Population Services International has also been active in the area of condom social marketing in the DR for the last several years, establishing an office in country in 2003.

## Reducing HIV-Related Vulnerability within the Female Sex Industry of the Dominican Republic: Dominican Sex Workers as HIV Prevention's 'Unsung Heroes'

The country's [Dominican Republic] epidemic [HIV] hinges to a considerable extent on HIV transmission between sex workers and their clients (UNAIDS, 2006b).

The DR is generally considered to have a large female sex industry relative to the size of the country with over 100,000 women estimated by local groups to make a living from the exchange of sex for money (COIN, 2000). Both a strong locally based demand for sex work as well as sex tourism is part of the country's expansive female sex industry. Given the pervasiveness of sex work throughout the DR as well as the higher HIV prevalence rates documented among sex workers, as compared to the general population, considerable importance has been placed on this social group throughout the history of the HIV epidemic in the DR. As such, the significant levels of behavior change that have occurred among sex workers over the last two decades and the important declines and/or stabilization of HIV prevalence rates among this group, is one of the DR's important success stories in terms of HIV prevention. So much so that female sex workers, and the organizations that have supported them in the DR, might be considered HIV prevention's 'unsung heroes'. The work of several important NGOs can be highlighted as having contributed significantly to the prevention gains achieved among female sex workers which have had an important impact in curbing the expansion of the HIV epidemic throughout the DR.

In 1990, when prevention efforts led by COIN and COVICOSIDA were just underway, Knowledge, Attitude and Practice (KAP) surveys among bar-based sex workers in Santo Domingo documented consistent condom use rates of 67% between sex workers and their new clients. By 1996, consistent condom use rates among establishment-based sex workers and their new clients had reached over 90% in both Santo Domingo and Puerto Plata and have generally remained at those levels since that time period. During those initial years a sex worker-led peer educator network was established in both of these two cities, where sex work is quite prevalent (CESDEM, 1996). The peer education

program that developed sought to situate and engage sex workers regarding their sexual health and HIV/STI prevention by first starting with core psychosocial concepts and processes such as self-worth and social solidarity from a gender perspective. In turn, not only did HIV knowledge and safer sexual behaviors rise dramatically during the 1990s, but a larger social movement dedicated to promoting and protecting the human rights of sex workers grew as well. In 1996 the Movimiento de Mujeres Unidas (MODEMU) was established and to date works across the country creating awareness of the social conditions surrounding many sex workers in the DR, including violence, discrimination and violations of their legal and labor rights (Moreno & Kerrigan, 2000).

By the mid 1990s, a solid base of technical knowledge and personal and social empowerment existed among the sex worker communities of Santo Domingo and Puerto Plata as a result of the work of COIN, CEPROSH and MODEMU. Looking to further gains achieved by exploring and responding to the relationship between social solidarity and safer sex, these groups began to lay the ground work for an innovative new project aimed at encouraging environmental-structural support for condom use and HIV prevention. In this new phase of intervention activities not only sex workers, but other key stakeholders in the female sex industry such as establishment owners, managers and employees, as well as groups within the Dominican government providing clinical health services to sex workers and environmental health services to sex establishments, were involved by local NGOs in HIV prevention programming. Emphasis was also placed on trust and intimacy with regular paying partners and the non-paying partners of sex workers in terms of HIV-related vulnerability and condom use.

In 2000, an intervention research project compared the effectiveness of an integrated government policy and community-based solidarity model implemented in Puerto Plata to a solidarity-only based model in Santo Domingo ((Kerrigan et al., 2004). The combined government policy and community solidarity model implemented in Puerto Plata proved to be considerably more effective, and cost-effective, than the community-based model alone (Kerrigan et al., 2006; Sweat et al., 2006). Consistent condom use between sex workers and their regular paying and non-paying partners in the last month, which has been historically low and hard to change for example, increased significantly by almost three-fold from 13% to 29% over the initial intervention period. Additionally, the prevalence of STIs among participating sex workers dropped by almost 40%, declining from 29% at pre-test to 16% at post-test during the same observation timeframe (Kerrigan et al., 2006). Since that time, funding constraints have limited the scale-up process of the effective environmental-structural intervention models, leaving many concerned that an important opportunity to extend an evidence-based, cost-effective HIV prevention program is being missed. This type of gap in programming could have important implications on the epidemic in the future given the central role that HIV prevention among sex workers has played in curbing the epidemic to date throughout the DR.

### The Dominican Government's Role in the Prevention of HIV/AIDS

In 1987 a National HIV/AIDS/STI Control Program (PROCETS) was established in the DR. At first, PROCETS was heavily involved in targeted

educational efforts with vulnerable population groups geared at reducing HIV/STI-related risk behavior. Over time, however, the Dominican government would hand most of these educational activities over to local NGOs. In turn, PROCETS focused a significant amount of its initial energy on establishing the country's HIV sentinel surveillance system to monitor the course of the HIV epidemic. Additional program activities in which PROCETS or the National HIV/AIDS Program has been historically active include the development and monitoring of clinical guidelines and norms for STI screening, treatment and management within the public health sector, as well as HIV/STI prevention efforts within the country's prison system.

In 2000 the National HIV/AIDS/STI Control Program was upgraded to an official department within the Dominican Ministry of Health. In turn PROCETS became DIGECITSS or the Dirección General de Enfermedades de Control de Infecciones de Transmisión Sexual y SIDA. While maintaining a focus on HIV surveillance and STI norms, and HIV counseling and testing, DIGECITSS also introduced a comprehensive national Prevention of Mother to Child Transmission (PMTCT) program. During its first year (2000–2001) over 40,000 pregnant women from eight different hospitals within the country were involved in the PMTCT program. Positive findings from the initial evaluation include the fact that 89% of mothers who tested positive for HIV within the scope of the program were provided with nevirapine at the time of delivery as were 98% of their children upon birth (Perez-Then et al., 2003).

A key barrier to providing nevirapine coverage detected in this initial evaluation was the low rate of HIV testing among women receiving prenatal care at the hospitals included in the program (23,067/42,666 or 54%) (Perez-Then, 2003). In 2003, the rate of HIV testing among pregnant women seen within the PMTCT program was relatively the same (approximately 50%) as were the rates of nevirapine distribution provision ($>$80% among mothers and $>$90% among children) (Caribbean Health Research Council, 2004). These findings highlight the continued importance of creating and implementing strategies to increase the consistency and quality of voluntary counseling and testing (VCT) in public health facilities and ensuring the availability of rapid test kits in order to facilitate PMCTC and to link women and their families into HIV treatment and care.

## COPRESIDA and their Engagement with International Funding Streams for HIV/AIDS

An additional governmental body related to HIV/AIDS, COPRESIDA, was established by decree of the Executive Branch of the Dominican government in 2001. COPRESIDA, comprised of representatives of key governmental institutions including the departments of Health, Education, Tourism, the Armed Forces and Police, as well as NGOs, the private sector and people living with HIV/AIDS (PLWHA) was formed with the goal of mobilizing and leveraging high-level political will and support for the prevention of HIV/AIDS and the care of PLWHA (Caribbean Health Research Council, 2004). The newly formed COPRESIDA was awarded the DR's first HIV/AIDS loan from the World Bank in 2001 and since then, COPRESIDA has become the recipient

of other key support and funding from multi-lateral donors and international foundations, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) and the Clinton Foundation.

The World Bank loan was part of a large scale, multi-country Caribbean HIV/AIDS prevention and care initiative. A total of USD 30 million was allocated to COPRESIDA for this project which was funded through 2007. The Bank initiative has been coordinated with other international donors such as the Global Fund. The Global Fund established a partnership with COPRESIDA in 2002 and has to date approved of almost USD 50 million in funding for HIV prevention and care activities, with an emphasis on the roll-out of treatment for PLWHA. Only a third of this funding has been distributed to COPRESIDA (approximately USD14 million) through the Global Fund mechanism, however, because of concerns about COPRESIDA's ability to effectively manage and disperse the monies they have received from international donors. Indeed, local NGOs who submitted proposals to COPRESIDA in 2001 for multi-year national projects of a wide scale and potential impact, for example, did not begin to see even small amounts of short-term funding until 2006. COPRESIDA's failure to effectively manage the large amounts of much needed funding that have been allocated to the Dominican people over the last five years has been a tremendous disappointment to local and international agencies working in the country as well as PLWHA and at risk individuals. Many eagerly await improvements in COPRESIDA's planning, management and disbursement systems amidst growing fears that if they do not succeed international funding sources may begin to dissipate.

## Care

### Creating a National HIV/AIDS Treatment and Care Program in the Dominican Republic

The health care system in the DR has been described as "fend for yourself" due to the lack of affordable care, low coverage of insurance, and overlapping public and private systems that do not consistently offer quality services for their target populations (La Forgia et al., 2004). Given this reality, in addition to the stigma surrounding HIV and the intense poverty experienced by many PLWHA in the DR, negotiating the public health care system in pursuit of HIV-related care including both medication and other support services, can be a daunting challenge. One of the key allies in the struggle to gain access to medication for PLWHA in the DR has been REDOVIH, an umbrella network of people living with HIV throughout the country. REDOVIH was established in 1997 and now has a membership of over 2,000 people (Caribbean Health Research Council, 2004). In 2002, REDOVIH submitted a legal suit before the Inter-American Human Rights Commission in Washington, D.C. protesting the lack of access to anti-retrovirals (ARVs) in the DR (Stern et al., 2006). While the Commission ruled in favor of REDOVIH and ordered the Dominican government to provide immediate ARVs to the PLWHA who had signed the petition, the Dominican government did not immediately accept the ruling and access to treatment was further delayed (Stern et al., 2006). Finally, in

response to both local and international pressure following this suit, a national program to coordinate HIV/AIDS treatment and care efforts was created within DIGECITSS in 2003. Starting around that time period, with funding from the Clinton Foundation, limited access to ARVs began in the DR, with 500 PLWHA initially receiving medication (Caribbean Health Research Council, 2004).

### Barriers to Facilitating Access to HIV/AIDS Treatment in the Dominican Republic

While 66,000 individuals are now estimated to be living with HIV/AIDS in the DR based on UNAIDS estimates, the official number of notified cases of HIV/AIDS is dramatically lower, with only 17,660 cases currently having been reported to the Dominican government (DIGECITSS, 2006b). The vast disparity between these two figures highlights the fact that the large majority of PLWHA still do not know they are infected. This gap has profound implications for both prevention and care efforts. Increasing access to HIV treatment and care for those in need cannot occur if HIV counseling and testing efforts are not first effective at encouraging people to learn their status and referring them to psychosocial support services, as needed, to facilitate their transition into the country's national program. While limited research has been conducted on the topic of HIV/AIDS-related stigma in the DR, the large gap between reported and projected HIV/AIDS cases, points to the need for intensified intervention research on this crucial topical area.

### The Scope and Coverage of the National HIV Care Program in the Dominican Republic

By 2004, 18.0% of PLWHA enrolled in the national care program in the DR were receiving highly active anti-retroviral therapy (HAART) (885/5041) and in 2005 coverage increased to 29% (2,374/8,261) (DIGECITSS, 2006b). In October 2006, 9,870 PLWHA were enrolled in the national program, 3,708 (37.6%) of which were receiving HAART (DIGECITSS, 2006b). A total of 45 governmental and non-governmental organizations ranging from large municipal hospitals to small NGO clinics function as Comprehensive Care Units or Unidades de Atención Integral (UAI) within the national care program with trained multidisciplinary teams of doctors, nurses, social workers, and psychologists, providing integrated care and ARVs (DIGECITSS, 2006b). Most of the UAI directly facilitate or are affiliated with support groups for PLWHA that address the daily experience of living with HIV and the need for ongoing emotional, material and informational support. Five of the UAI are located in municipalities that serve predominantly *batey* populations, where disproportionate levels of HIV have been found (DIGECITSS, 2006b). Additionally, over half of the country's current HAART recipients (55.6%) receive care through NGOs, highlighting the central role of the non-governmental sector in the provision of health services (Batista et al., 2006).

While the number of PLWHA receiving HAART has increased rapidly in a relatively short period of time, only 25% of the estimated 15,000 PLWHA

needing HAART in the DR are receiving it (WHO, 2006). One concern is that most of the increase in people on HAART in recent years has occurred among individuals who were already receiving care through the national program as opposed to newly identified cases (Batista et al., 2006). One possible explanation for the lag in HIV diagnoses is that although a network of 75 HIV VCT sites was established in conjunction with the 2002 demographic health survey (DHS) in the DR, the ongoing availability of affordable and confidential testing services with counseling services has not been consistent (Human Rights Watch, 2004).

Additionally, illegal testing, often in facilities that do not offer pre or post-test counseling, is fueled by tourist and free trade zone industries which are not necessarily committed to linking those individuals who are found to be HIV positive to available services (Human Rights Watch, 2004; Stern, 2004). A related concern is that even among those people who are tested and receive their results, getting enrolled in the national program for comprehensive care and medication remains a bureaucratic challenge hampered by both structural and psychological barriers. Additional barriers to further scale up of current ARV distribution efforts in the DR include lack of a public laboratory infrastructure for CD4 and viral load testing, chronic shortages in ARVs, and access to affordable medications for opportunistic infections (International Treatment Preparedness Coalition Report Card, 2005).

### Challenges in the Funding, Coordination, and Long-Term Sustainability of HIV-Related Treatment and Care Efforts

Funding for the equipment and restructuring of participating clinics in the national care program in the DR has come from several international donors including the Clinton Foundation's HIV/AIDS Initiative, the USAID/FHI Conecta project, and the World Bank, among others (Caribbean Health Research Council, 2004). Perhaps one of the most polemical sources of funding has been the Global Fund, which, as mentioned earlier, approved a nearly USD 48 million grant to the DR in January 2003, with one of its goals being to increase access to treatment among PLWHA (Global Fund, 2007). Despite the fact that the DR has received substantial amounts of money from several international donors for its HIV care efforts, only the Global Fund grant allows for procurement of ARVs (Schiff, 2005). Concerns about COPRESIDA's ability to manage funds has led to delays in the Global Fund's disbursement of funds and, as a result, chronic shortages and stalled distribution of ARVs.

The dependence of the Dominican government on external funding for the procurement of ARVs and its inability through COPRESIDA to organize effectively to receive and disperse funds, calls into question its political commitment to long-term sustainability of ARV provision in the DR. Human rights organizations have been highly critical of the Dominican government's response to the need for medication and integrated care for PLWHA, citing lack of political will to solve both immediate and long-term needs, despite the availability of substantial funding (Schiff, 2005). Additionally, recent questions surrounding the political motivations of high level COPRESIDA authorities have created uncertainty with regard to receipt of the remaining USD 33 million in the grant (Montero, 2007).

## Lessons Learned from Experiences in the Provision of Integrated HIV/AIDS Care

While the sustainability of the current HIV treatment and care program remains a significant concern, individual experiences at some of the clinics where ARV distribution has started provide a more humane and inspiring view of the situation. Amidst all of the political, bureaucratic, and financial challenges, care providers across the country have started to confront the overwhelming task of identifying, enrolling, and providing ongoing quality care to men and women living with HIV/AIDS who could have died without it.

One such group, PROFAMILIA has been providing reproductive health services in the DR since 1966. In 2004, PROFAMILIA joined with the International Planned Parenthood Federation and clinicians from Columbia University to establish an integrated HIV treatment and care program for PLWHA at two of its reproductive health clinics. One of the unique aspects of PROFAMILIA's approach is that the services for PLWHA have been integrated into their other reproductive health services as opposed to creating a separate HIV clinic (Caram et al., 2006). Patients, who have experienced stigma or who have concerns about the stigma associated with being seen at an HIV clinic, appreciate PROFAMILIA's integrated model and report that they do not feel they stand out as different in the waiting room (Caram et al., 2006). Another key element of PROFAMILIA's program is the relationship it encourages between clinical care staff and patients by maintaining close communication and providing ongoing support through an interdisciplinary team of psycho-social care providers. As of mid-2005, 165 clients were receiving care at PROFAMILIA, 67 of which were on HAART. Based on early monitoring and evaluation reports of the program during 2004 and 2005, outcomes have been positive with over 90% of PLWHA on HAART reporting adherence to their drug regimens (Caram et al., 2006).

Another model clinic is the Centro de la Familia Casa de Paz (CDP) at the Complejo Micaeliano in La Romana. The CDP was the first and until recently only UAI offering HAART at no cost in the Eastern region of the DR, where HIV prevalence rates have traditionally been amongst the highest in the country. Being located in La Romana where sugar cane plantations are still quite active, the CDP reaches a diverse population, including individuals from the many surrounding *bateys*, who are often the most marginalized and discriminated against group in the DR. The team at the CDP is composed of highly trained doctors, nurses, and social workers who have received technical support and training from a team of physicians from Columbia University. Like PROFAMILIA, the providers at CDP offer comprehensive services and support to PLWHA and extend their care beyond the walls of the clinic going into the community itself if necessary to provide follow-up to their patients. A total of 520 PLWHA were enrolled at CDP by February 2006, 330 of which (64%) had initiated HAART (Rodriguez et al., 2006). One of the main challenges faced at this clinic has been the high level of mortality among PLWHA due to severe immuno-suppression before starting medication, especially among men (Rodriguez et al., 2006; Manana et al., 2005). These findings highlight the importance of early detection of HIV and early initiation of HIV treatment and care. Again, improvements in

access to and the uptake of quality HIV counseling and testing are essential in making such goals possible in the future.

## Conclusions

*Epidemiology*: The most recent population-based research in the DR, conducted in partnership with the 2002 DHS, indicates that the current overall HIV prevalence rate is approximately 1%. However, recent sentinel surveillance of pregnant women by the Dominican government shows an HIV prevalence of 2.3% (DIGECITSS, 2006a), raising concerns that the country's overall prevalence may not be as stable, or in decline, as recently thought within the international HIV/AIDS community and UNAIDS. As of early 2007, the DHS process was again underway in the DR. This process, which again includes an HIV testing component, will hopefully help to illuminate the current state of the HIV/AIDS epidemic overall as well as across different geographic sectors and population groups throughout the country.

*Prevention*: The DR's response to HIV/AIDS has been characterized by innovative programs on the part of NGOs working in partnership with the Dominican government. While numerous KAP surveys have documented significant, positive changes in sexual behavior among groups ranging from sex workers, to MSM, to youth, to *batey* residents (AIDSCAP, 1997), the efforts of NGOs are beyond measure in many ways. Many of them have continued to reach out to vulnerable communities across the country in spite of uncertain or decreasing funding for many years. Their resilience and impact cannot be measured in statistics alone.

*Care*: While the last few years have seen a dramatic increase in the availability of HAART and improved quality of care services for PLWHA, delays in ARV distribution due to bureaucratic backlogs at local and international levels have impeded continuous access. For all of the examples of successful implementation, many people have suffered and died waiting to receive care that should have been available much earlier. While current support from the Global Fund is expected to improve the flow of medication and expand access to thousands more PLWHA, the question of how the Dominican government will continue to guarantee and sustain the supply of HIV medication and high quality care remains a pervasive concern.

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# Chapter 31

# Public Health Aspects of HIV/AIDS in Haiti: Epidemiology, Prevention and Care

Serena Koenig, Fernet Leandre, Dan Fitzgerald, Paul Farmer, Joia Mukherjee, Warren Johnson, and Jean William Pape

## Introduction

Haiti is the poorest country in the western hemisphere and one of the poorest in the world, ranking 154/177 on the human development index (UNDP, 2006). Decades of political instability have contributed to worsening poverty and deteriorating health conditions, leaving Haiti with the worst health statistics in the hemisphere. Life expectancy is less than 52 years, 65% of Haitians live in extreme poverty, the annual per capita health expenditure is a mere 8 USD, and there is just one physician for every 10,000 people (World Bank, 2004).

The history of human immunodeficiency virus (HIV) in Haiti is closely linked to that of the United States (U.S.), as these were the two countries where the syndrome of acquired immune deficiency (AIDS) was first recognized. For Haiti, the history of HIV/AIDS represents stigma, discrimination, and racism at the hands of the scientific community, the Centers for Disease Control (CDC), the U.S. Food and Drug Administration (FDA), and the American media, as Haitians were initially associated with the epidemic and at times blamed for it. This resulted in unprecedented national stigmatization and devastating economic, social, and psychological consequences, decimating the tourist industry in this island nation.

Despite enduring ongoing political difficulties and limited economic resources, Haiti has mounted one of the world's most successful responses to the HIV/AIDS epidemic. Haiti is one of the few countries in the world with a declining prevalence; the percentage of Haitian adults living with HIV dropped from 6.2 to 3.1% between 1993 and 2003 (UNAIDS, 2006). In 2006, the most



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_31, 

recent survey of Haitian adults (10,757 women and 4,958 men) showed an HIV prevalence of 2.2% (IHE/GHESKIO, 2006). This trend is attributed to nationwide prevention efforts and the Haitian government's intervention to ensure a safe blood supply early in the epidemic. Haiti is also in the process of scaling-up highly active antiretroviral therapy (HAART) nationwide, with one-year treatment outcomes that rival those of the U.S. (Severe et al., 2005; Mukherjee et al., 2006).

## Epidemiology

### The Early Years of the Epidemic: The Association of Haiti and HIV/AIDS

In 1980, physicians in California and New York began reporting cases of Kaposi's sarcoma and pneumocystis carinii pneumoniae (PCP) among otherwise healthy young homosexual men in a pattern that had never been seen before. Alerted to the possibility of a new epidemic, the CDC began a national surveillance program for these diseases in the U.S. in June 1981 (CDC, 1981). Subsequent reports described cases among recipients of blood transfusions, intravenous drug users, hemophiliacs, and heterosexual partners of affected patients. Shortly thereafter, the CDC reported 34 cases of the syndrome in Haitians residing in the U.S. (CDC, 1982) and 11 cases of Kaposi's sarcoma were reported among previously healthy young people in Haiti (Liautaud et al., 1983).

The classic risk factors of homosexuality, intravenous drug abuse, or use of blood products were rarely identified among HIV-positive Haitians in the U.S. (Moskowitz et al., 1983; Jaffe et al., 1983; Pitchenik et al., 1983). The CDC therefore inferred that Haitians were at increased risk as a group, and HIV/AIDS became known as the "4H Disease", affecting homosexuals, heroin addicts, hemophiliacs, and Haitians, though actually, risk factors among Haitians were no different from other groups in the U.S.

> The high percentage of males among the early Haitian cases (89%) should have pointed to homosexuality as a probable risk factor for these patients, particularly since most AIDS cases in the U.S. were occurring among male homosexuals. The difficulty of obtaining reliable data on homosexuality in a culture where the subject is taboo was not raised by the investigators and the information obtained from Haitian patients was not questioned. (Pape, 2000).

These CDC investigators stigmatized Haitians as a risk group, but the racial identity of other patients was never revealed.

> Reported AIDS cases may be separated into groups based on these risk factors: homosexual or bisexual males −75%, intravenous drug abusers with no history of male homosexual activity −13%, Haitians with neither a history of homosexuality nor a history of intravenous drug abuse −6%, persons with hemophilia A who were not Haitians, homosexuals, or intravenous drug abusers −0.3%, and persons in none of these groups – 5%. (CDC, 1982).

By February 1983, 1000 cases of HIV/AIDS had been reported in the U.S. "All but 61 of the patients could be classified into one or more of the following groups: homosexual or bisexual men, intravenous drug abusers, Haitian natives, or patients with hemophilia (Jaffe et al., 1983)."

At this time, the economic plight of Haiti was already in the news, with thousands of refugees landing in Miami to escape extreme poverty and the Duvalier regime. The association between Haitians and HIV/AIDS rapidly spread though the media. Haitians were depicted as the principal cause of the epidemic in the U.S., drawing upon images of voodoo, "boat people", and poverty. Medical journals published theories as well:

> Even now, many Haitians are voodoo *serviteurs* and partake in its rituals. . .Some also are members of secret societies such as Bizango or 'impure' sects, called '*cabrit thomazo*,' which are suspected to use human blood itself in sacrificial worship." (Greenfield, 1986). Others proposed that: "Haitians may have contracted the virus from monkeys as part of bizarre sexual practices in Haitian brothels (Sabatier, 1988).

(of note, Haiti has never had monkeys, either wild or in captivity). In an article published in the New England Journal of Medicine, the authors speculated a one-way hypothesis (i.e., the virus could pass from Haiti to the U.S. but not the other way around): "if a viral agent were imported into the United States from Haiti by vacationing homosexuals, it might quickly spread within the homosexual community . . ." (Viera et al., 1983).

The effects on tourism were immediate and devastating. The Haitian Bureau of Tourism estimated a decline from 75,000 visitors during the winter of 1981–1982 to fewer than 10,000 by the following year (Farmer, 1992).

> Already suffering from an image problem, Haiti has been made an international pariah by AIDS. Boycotted by tourists and investors, it has lost millions of dollars and hundreds of jobs at a time when half the work force is jobless. Even exports are being shunned by some. (Chaze, 1983).

Haiti's economy never recovered.

It is now generally accepted that HIV/AIDS originated in Africa, in those areas where human, monkey and chimpanzee populations interact. Yet the entrenched connection between AIDS and a possible Haiti origin continues. This controversy includes debate about the first introduction of the virus to the western hemisphere, and whether this occurred first in Haiti or in the U.S. Two groups suggest that HIV could have been brought from Africa to Haiti, and then on to the U.S., based upon analyses of viral envelope sequences (Worobey et al., 2007; Korber et al., 2000). However, this theory is not substantiated, nor is it confirmed by epidemiological data. There is no evidence that the HIV virus was present in Haiti before it was reported in the U.S. One of the virologists advocating this theory recently stated: "Both give the merest suggestion of Haiti being earlier – but with overlap in the error estimates." (Cohen, 2006). The lack of well preserved archival specimens from Haiti and the Caribbean during the critical early phase of HIV-1 viral introduction to the region may make resolution of this conflict unlikely.

Epidemiology studies suggest that the virus traveled to the U.S. first, and then to Haiti, either from American tourists or Haitians returning to their homeland. Blood samples drawn from Haitian adults during the course of a 1977–1979 outbreak of Dengue Fever were later tested and found to be negative for HIV (Pape & Johnson, 1988). In addition, an American blood banking company was buying blood from impoverished Haitians for a decade before the first AIDS cases were reported in the U.S., but no case of HIV was ever documented in

one of the American recipients. Furthermore, Haitian pathologists completed thousands of autopsies in patients who died at the Hospital Albert Schweitzer and the University Hospital (l'Hopital de l'Universite d'Etat d'Haiti) in the 1970s and 1980s, and not a single AIDS defining illness was diagnosed before 1978 (Pape et al., 1983; Pape et al., 1985). These findings, while not refuting the "Haiti first" theory, strongly suggest that it is unlikely, wherever HIV first emerged in the Americas, that Haiti played any role in the early dissemination of HIV-1 into the population.

In 1985, the CDC finally removed Haitians from the risk group category for HIV/AIDS (CDC, 1985), but this action was never publicized, and many people still associate AIDS with Haiti. In February 1990, the FDA enacted a new set of regulations excluding all Haitians from donating blood in the U.S. In response, thousands of Haitians around the country marched in protest, and the ban was lifted several months later. "This controversy, similar to the one opposing Haitians to the CDC's decision, could have been avoided; instead, it contributed to tarnish the Haitian image abroad as well as at home." (Pape, 2000).

### Risk Factors for HIV in Haiti

Concerned that a new and worrisome epidemic was developing, 13 health professionals formed the Haitian Study Group on Kaposi's Sarcoma and Opportunistic Infections (GHESKIO) in collaboration with Cornell University in 1982. GHESKIO has continuously studied the epidemiology, clinical features, and treatment of HIV/AIDS since that time. In 1983, they published the first case series on HIV/AIDS in a developing country. Using CDC criteria, a total of 61 cases of AIDS were diagnosed retrospectively from June 1979 to October 1982 (Pape et al., 1983). These cases were similar to those seen in the U.S., except there were fewer cases of PCP and atypical mycobacteria, and more cases of tuberculosis (TB). Mean survival after diagnosis was also much lower among the GHESKIO cohort (less than six months versus over a year).

GHESKIO researchers also conducted a variety of studies to determine the most common risk factors for HIV/AIDS among Haitians. After the completion of careful analyses, it was clear that the first cases of AIDS in Haiti were recorded among the same population groups as those of the U.S. Eighty-five percent of patients were male, and 80% lived in Port-au-Prince, most in the suburb of Carrefour, a flourishing center of male and female prostitution (Pape et al., 1983). As stated by Dr. Jean William Pape:

> Indeed, a careful and appropriate questioning of our first patients in Haiti led to the finding that, in 1983, 72% had recognized risk factors for AIDS, the most frequent being closeted homo/ bisexuality (50% of the total; 65% of males) followed by a recent history of blood transfusion (22% of the total; 48% of females). (Pape, 2000).

Over the next three years, a dramatic shift occurred in the pattern of HIV transmission in Haiti. The proportion of cases attributed to homo/bisexuality plummeted from 50% in 1983 to a mere 1% in 1987 (Pape & Johnson, 1988). Since 1985, the dominant mode of transmission has been heterosexual intercourse, as the blood supply was protected early in the epidemic and intravenous drug use, being rare, has never been a significant risk factor for HIV/AIDS in

Haiti. As heterosexual contact became the predominant route of transmission, more women became infected. In 1983, HIV was five times more common among males than females. With each passing year, an increasing proportion of cases have been female. By 1985, the male:female ratio had dropped from 5:1 to 3:1, and then to 2.3:1 in 1987, and 1.6:1 in 1990. By 2000, an equal number of men and women were infected. The balance then shifted; in 2006 the prevalence among adults was 2.3% for women and 2.0% for men (Cayemittes et al., 2006).

Poverty and gender inequality make Haitian women particularly vulnerable to exposure to infection with HIV and other sexually transmitted infections (STIs) (Fitzgerald et al., 2000; Farmer, 1992, 1999; Farmer et al., 1996). Nearly 30% of women attending prenatal clinics in one Haitian town reported having entered a sexual relationship out of economic necessity; these women had over six times the risk for HIV infection and double the risk for syphilis (Fitzgerald et al., 2000). In a Haitian slum, illiteracy and low socio-economic status were associated with positive syphilis tests among pregnant women. HIV seropositivity was associated with unemployment in their partner (Behets et al., 1995).

In rural Haiti, Partners In Health (PIH) found HIV status was not affected by number of lifetime sexual partners (2.7 among HIV-positive women and 2.4 among HIV-negative women) but rather the professions of these partners. A history of sexual contact with soldiers or truck drivers was strongly associated with a diagnosis of HIV disease. "Salaried soldiers and truck drivers who are paid on a daily basis" can provide some measure of economic security for impoverished peasants (Farmer, 1999). The transient lifestyle of soldiers and truck drivers, however, also allows greater access to sex workers and has been associated in other countries with higher rates of HIV infection (UNAIDS, 1998;Gawande et al., 2000; Malta et al., 2006) Another study conducted at the same PIH site further demonstrated the importance of economic stability. The risk of acquiring a sexually transmitted disease (STD) quadrupled for women working as domestic servants while working as a market vendor (hence having personal income) cut the risk in half (Smith-Fawzi et al., 2003).

As increasing numbers of women became infected with HIV/AIDS, the virus spread to their children through vertical transmission. Halsey et al. (1990) found that among 4588 pregnant women living in an urban slum, 443 (9.7%) were HIV-positive. The estimated rate of mother-to-child transmission was 25%. Mortality among HIV-infected children was also high. Infants born to HIV-positive mothers were more likely to be premature, of low birth weight, and malnourished. By 12 months of age, 23% of infants born to HIV-positive mothers had died, compared with 11% of those who were HIV-negative; by 24 months, respective mortality rates were 31 and 14%.

Indeed, the growing numbers of infected children was chillingly clear. In 1987, 3.6% of AIDS cases in Haiti were in children. By 1989, it was up to 6.6%. Though grim, these statistics likely underestimated the actual rate of pediatric infection, as the surveillance system was weak, HIV-infected infants had a high rate of early death, and it was difficult to establish an HIV diagnosis within the first 15 months of life due to the presence of maternal antibodies (Pape, 1987). In subgroups of children at risk for infection, HIV prevalence was significantly higher. During 1987 and 1988, GHESKIO researchers surveyed at risk pediatric groups, and found a prevalence of 8% among infants in the dehydration unit of

the University Hospital, 16% in the pediatric TB hospital, and 33% in an urban orphanage (Pape & Johnson, 1988). Two years later, prevalence in the same orphanage had increased to 55%.

### HIV/AIDS Prevalence in Haiti

The Caribbean region has the second highest HIV prevalence in the world, after sub-Saharan Africa (UNAIDS, 2007a). Haiti bears the overwhelming burden of disease, with more than 70% of the Caribbean cases in Haiti alone (UNAIDS, 2007b). Careful studies have been conducted at regular intervals in Haiti to estimate disease prevalence. Pregnant women have been systematically studied when they present for prenatal care at multiple sites around the country. In addition, a national study of 10,000 Haitian households (Cayemittes et al., 2006) was conducted in 2005–2006 to evaluate HIV prevalence and other important public health data.

After it was introduced into the population, the HIV virus spread rapidly in Haiti, particularly among those living in extreme poverty. As noted earlier, blood samples collected in a 1977 Dengue Fever study were negative for HIV (Pape & Johnson, 1988). Less than a decade later, in 1986, 8.4% of healthy women receiving prenatal care in the urban slum of Cite Soleil were found to be HIV-infected. The prevalence increased to 9.9% in 1987, and 10.5% in 1989. Women appeared to acquire infection soon after becoming sexually active, as suggested by the high seropositivity rates observed in pregnant women 14–19 years of age (Boulos et al., 1990).

Throughout the 1980s and 1990s, HIV prevalence remained high in Haiti. Two studies conducted at GHESKIO showed that between 1986 and 1992, prevalence in Port-au-Prince increased from 6 to 8% and in the rural areas (Pape et al., 1990) it increased from 2 to 4% (Pape et al., 1992). The highest rates were found in patients referred from other clinics for HIV testing (50% positive), hospitalised patients with TB (54% positive), sex workers on the street (from 53 to 72% positive), and patients with STDs (24%).

Sentinel surveillance surveys were conducted in 1993 and 1996 by the Ministry of Health (MoH), l'Institut Haitien de l'Enfance (IHE), and GHESKIO to detect the prevalence of HIV, syphilis, and hepatitis B among pregnant women seeking prenatal care in each of Haiti's medical departments. In 1993, HIV/AIDS prevalence was 6.2% among pregnant women. In 1996, it remained elevated at 5.9% (UNAIDS, 2006).

Shortly thereafter, however, prevalence began dropping. In the sentinel survey conducted in 2000, prevalence among pregnant women was down to 4.5%, and by 2003, it had decreased to 3.1% (UNAIDS, 2006). The most recent survey, conducted in 2006, demonstrated a prevalence rate of 2.2% among Haitian adults (Cayemittes et al., 2006). Mathematical models have been developed to determine the reasons for the decline in HIV prevalence. One group (Hallet et al., 2006) found that the decrease in prevalence could only be replicated in their model through decreases in HIV risk associated with safer sexual behaviors. Another (Gaillard et al., 2006) attributed the major reasons for the decline in HIV prevalence in Haiti to the more rapid progression from the acquisition of HIV infection to death and early interventions to secure the blood supply. They also found an increase in abstinence, fidelity, and condom use.

## HIV/AIDS Prevention

### Nationwide Prevention Efforts

The MoH in Haiti has a long history of working with private partners in HIV/AIDS. GHESKIO was the first group in Haiti to directly address the epidemic. It was created by a group of Haitian health care professionals in 1982 with three main objectives: operational research, patient care, and training of community leaders and medical personnel for the treatment of HIV/AIDS, TB, and other communicable illnesses. In the 1980s, GHESKIO conducted a variety of studies to elucidate the risk factors for HIV/AIDS, and then developed effective prevention strategies.

In the early years of the epidemic, GHESKIO researchers found that blood transfusions were an important mode of HIV transmission. In 1985, nearly 4% of all blood donors were HIV-infected, and 40% of HIV-positive Haitian women had a history of receiving a transfusion (Pape et al., 1985). At this time, the Haitian Red Cross and the Public Blood Bank were both responsible for collecting and distributing blood, but the blood bank was buying blood from impoverished patients who used the money to support their families. In response to data linking HIV transmission and blood transfusions, the Haitian MoH closed the Public Blood Bank in 1986, established the Red Cross as the only organization authorized to collect blood and provide transfusions, and instituted mandatory behavioural and laboratory screening of all blood products for HIV and other transmissible infections. As a result, blood transfusion has not been an important mode of HIV transmission in Haiti since instituting these controls. Ongoing studies have demonstrated that significant disease transmission has been prevented through the provision of a secure blood supply early in the epidemic.

Nationwide prevention strategies were otherwise limited until the fall of the Duvalier regime in December 1986. In 1987, the first National AIDS Commission was formed, and AIDS was declared to be a priority disease in Haiti. A year later, the commission was expanded to include representatives of the press, the clergy, and the Ministries of Health, Education, Information, Social Affairs, and Transportation. Within the MoH, an AIDS Coordination Bureau was created to coordinate the action of all non-governmental organizations (NGOs) and lead the fight against HIV/AIDS. Unfortunately, many potentially decisive actions were short-lived during this period, due to political strife and frequent changes in government. The AIDS Coordination Bureau remained operational until 1991, when President Aristide was forced from power in a *coup d'etat* and all foreign aid was then blocked.

During this period of political strife in the 1990s, over 30 NGOs worked to augment the weakened governmental response and the nationwide prevention campaign continued. They implemented awareness campaigns, prevention strategies, youth education efforts, emergency hotline services, and provided social support and medical care for those with HIV/AIDS (See Table 31.1 for a comprehensive list of NGOs and the services they provided.).

Most importantly, these NGOs worked with the government to develop a national strategy for the prevention and treatment of STIs. Multiple studies around the world had demonstrated that HIV transmission was enhanced in the

**Table 31.1** NGOs operating in Haiti through political strife of the 1990s

| Organization | Year started HIV-related work in Haiti | HIV prevention | Care and support for PLWHA | Antiretroviral therapy | Infrastructure development and technical support | Training |
|---|---|---|---|---|---|---|
| American Red Cross and Haitian Red Cross*** | 1986 | XXX | | | XXX | |
| Association des Medecins Haitiens a l'Etranger* | 1996 | | XXX | | | |
| Association Medicale Haitienne*** | 1983 | XXX | XXX | | | XXX |
| Center for the Promotion of Women Workers* | 1995 | XXX | | | | |
| Center for Health and Development (CDS)** | 1985 | XXX | XXX | | | |
| Espoir Anaise** | 1993 | | XXX | | | |
| Fame Pereo* | 1985 | XXX | XXX | | | XXX |
| Family Health International*** | 1992 | XXX | | | XXX | |
| Filles de la Charite* | 1990 | | XXX | | | |
| Fondation pour la Sante Reproductrice et l'Education Familiale (FOSREF)*** | 1988 | XXX | XXX | | | |
| Foundation Esther Boucicault Stanislas* | 1996 | XXX | XXX | | | |
| Futures Group/Health Policy Initiative* | 2000 | | | | XXX | |
| GHESKIO*** | 1982 | XXX | XXX | XXX | XXX | XXX |
| Hopital Albert Schweitzer* | 1982 | XXX | XXX | | XXX | XXX |
| Hopital de Fermathe* | 2002 | XXX | XXX | | | |
| Hopital de l'Universite d'Etat d'Haiti (HUEH)* | 1983 | XXX | XXX | | | |
| Institut Haitien de l'Enfance*** | 1988 | | | | XXX | |
| International Child Care (ICC)/Grace Children's Hospital*** | 1995 | XXX | XXX | | | |
| John Snow International* | 2002 | | | | XXX | |
| Konesans Fanmi*** | 1988 | XXX | XXX | | | |
| Management and Resources for Community Health (MARCH)** | 1991 | XXX | | | XXX | |
| Management Sciences for Health*** | 1995 | XXX | XXX | | XXX | |
| Ministry of Public Health and Population*** | 1982 | XXX | XXX | XXX | XXX | XXX |
| National Alliance of State and Territorial AIDS Directors* | 2002 | | | | XXX | |

**Table 31.1** (continued)

| Organization | Year started HIV-related work in Haiti | HIV prevention | Care and support for PLWHA | Antiretroviral therapy | Infrastructure development and technical support | Training |
|---|---|---|---|---|---|---|
| Partners In Health** | 1986 | XXX | XXX | XXX | XXX | XXX |
| Petits Frères et Sœurs* | 1988 | XXX | XXX | | | |
| Plan International** | 2001 | XXX | XXX | | | |
| Population Services International (PSI)*** | 1989 | XXX | | | XXX | XXX |
| Promoteurs Objectif ZeroSIDA (POZ)** | 1995 | XXX | XXX | | XXX | XXX |
| Save the Children*** | 1985 | XXX | XXX | | XXX | |
| Sogebank Foundation *** | 2002 | | | | XXX | |
| UNAIDS*** | 1996 | XXX | XXX | | XXX | XXX |
| Volontariat pour le Developpement d'Haiti (VDH)*** | 1988 | XXX | XXX | | | |

**Working in One Department.*

***Working in More Than One Department.***

****Working at the National Level.*

presence of a second STI (Stamm et al., 1988; Keet et al., 1990). GHESKIO confirmed these studies in Haiti, showing that a genital ulcer increased the risk of HIV transmission by nearly seven times, and a positive syphilis test nearly tripled the risk. Nationwide efforts to improve the management of STIs followed. From 1992 to 1994, GHESKIO conducted studies to determine the type of infection responsible for each presenting genital symptom (such as urethral discharge). They then developed algorithms for the diagnosis and treatment of STIs based on symptoms, rather than test results, as laboratory tests were too expensive and technically demanding for widespread use. They treated patients for the most likely infections to cause their presenting symptoms, with the goal of preventing disease-related complications and stopping further disease transmission. Over the next four years, the MoH, GHESKIO, and other local organizations trained over a thousand health care providers from around the country in this strategy for the diagnosis and treatment of STIs.

In addition, Haitian healthcare providers were early advocates for HIV/AIDS treatment. PIH, an NGO affiliated with Harvard Medical School and Brigham and Women's Hospital, developed a highly effective model for the provision of HIV/AIDS services in resource-poor settings. In 1985, they opened a community clinic and hospital complex with their Haitian sister organization Zanmi Lasante, in the rural village of Cange. In addition to providing comprehensive medical care, they worked with local community leaders to develop and disseminate HIV prevention messages that reflected HIV risks in the rural areas. As new interventions for the management of HIV patients became available in industrialized nations, they were implemented in Cange. When studies showed that zidovudine was effective in preventing mother-to-child transmission of HIV, it was made available in Haiti. In 1998, PIH launched the "HIV Equity Initiative" to provide antiretroviral therapy (ART) to the sickest AIDS patients using the community health worker model that had been developed for the treatment of TB. The PIH model became one of the first success stories for the treatment of HIV in a resource-poor setting, and has since been duplicated around the world (Farmer et al., 2001).

In 2001, the Aristide government launched a five-year strategic plan for a government-led national response to HIV/AIDS. As First Lady of Haiti, Mildred Aristide, noted in her presentation to the United Nations General Assembly Special Session on HIV/AIDS meeting in 2001;

> Despite limited resources, Haiti has been able to mount a defence against AIDS. They include an aggressive prevention campaign, a program to prevent mother-to-child transmission, the launching of a trial vaccination program, and limited antiretroviral drug treatment for people with HIV . . .The goals of the 5-year strategic plan that Haiti will begin to prepare have been set: reduce the HIV/AIDS infection rate by 33%, reduce the level of sexually transmitted diseases by 50%, and reduce mother-to-child transmission by 50%. The approach is multi-sectoral, under the leadership of our Ministry of Health with the close collaboration of NGOs active in the treatment and prevention of HIV/AIDS and activist Haitians living with HIV/AIDS.

She further noted that the annual sale of male condoms had increased from 2 million in 1990 to nearly 12 million in 2000.

## Results of Prevention Efforts: Behavior Change and Decrease in STI Prevalence

Considering the political upheaval over the past two decades in Haiti, HIV/AIDS prevention efforts have had remarkable success. The sale of condoms has dramatically increased, the prevalence of syphilis has declined, and most importantly, the prevalence of HIV among adults has dropped by over 50% in the last decade. Though it is theoretically simple for behavioral changes to occur with improved education and availability of condoms, it is difficult to change behaviors in the midst of desperate poverty, political instability, and gender inequality.

In the early years of the epidemic, GHESKIO clinicians discovered a certain amount of resistance by patients to changing their behaviors when only implementing safer sex messages. In the mid 1980s, clinicians convinced a mere 10% of the men and 7% of the women with AIDS to discontinue unprotected intercourse. In 1991, they found that discordant couples (one partner infected) had as much unprotected intercourse as concordant couples (both partners infected), regardless of the gender of the infected partner, and that pregnancy rates were similar in the HIV-positive and HIV-negative partners of male AIDS patients (12 and 14%, respectively) (Deschamps et al., 1996). This strongly suggested that the idea of an asymptomatic partner spreading HIV was not entirely understood, perhaps partly due to Haitian cultural beliefs (Farmer, 1992). Initially HIV was considered to be a disease that was "supernatural", targeted to the afflicted individual, and therefore not transmissible to uninfected partners.

However, as time progressed, education and counseling strategies led to increasingly beneficial results. In 1996, Deschamps et al. found that counseling increased the proportion of discordant couples that were using safe sexual practices to 45% and that condom use was clearly associated with a marked reduction in the incidence of HIV infection (Deschamps et al., 1996). In 1999 and 2003, Knowledge and Behavioral Surveillance Surveys (BSS) were conducted among young adults (15–24 years old) in Port-au-Prince. The proportion of respondents with excellent knowledge of HIV/AIDS increased significantly by 2003, to over 50% in nearly all age and gender groups. Safer sexual practices were also adopted. Recently conducted studies have demonstrated that 90% of sex workers in Port-au-Prince used a condom at last sexual contact. The percentage of males in the 2003 BSS who had used condoms at last sexual contact increased to 52% among the 15–19 year olds and 63% among 20–24 year olds. Though younger females lagged behind, 88% of females in the older group reported condom use with last intercourse (Family Health International [FHI], 1999; FHI, 2003).

Initially, STI prevalence was high in Haiti. In 1994, 47% of pregnant women in a Port-au-Prince slum had at least one STI: 35% had trichomoniasis; 11% had syphilis; 10% had chlamydia; and 4% had gonorrhea (Behets et al., 1995). Among women seeking prenatal care at GHESKIO, 48% had at least one STI. In the medium-sized town of Deschapelles in 1996, Fitzgerald et al. found that 37% of pregnant women had an STD: 25% had trichomoniasis; 7% had syphilis; 11% had chlamydia; and 2% had gonorrhea (Fitzgerald et al., 2000). From 1999 to 2001, at the PIH women's health clinic in rural Haiti, the

prevalence of trichomoniasis was 13%, chlamydia was 5%, syphilis was 4%, and gonorrhea was 1% (Smith-Fawzi et al., 2003).

However, as national prevention campaigns resulted in safer sexual practices and as algorithms for STI treatment were expanded nationwide, the prevalence of STIs in Haiti declined. In national prevalence studies (conducted along with HIV testing), syphilis prevalence peaked at 7.6% in 1993, and then progressively dropped to 3.5% by the year 2003 (See Figure 31.1). Though national prevalence studies have not been conducted for other STIs, it is expected that they have declined in parallel with HIV and syphilis.

### Prevention of Mother-to-Child Transmission [PMTCT]

Each year, an estimated 260,000 infants are born in Haiti (Ministry of Health and Population, 2005). Nearly 80% of them are delivered outside of a health care setting (Institut Haitien de l'Enfance, 1999). Approximately 6,400 of these pregnancies occur in HIV-positive women. Before treatment to prevent mother-to-child transmission (PMTCT) became available, up to 27% of infants contracted HIV through vertical transmission (Jean et al., 1999). In the United States, the rate of vertical transmission is lower than 1% due to effective maternal therapies (Mofenson, 2003). In the last 10 years, simpler regimens involving zidovudine and nevirapine have been shown to be effective in resource-poor settings as well, decreasing transmission substantially. These regimens have also been implemented in Haiti.

PIH developed a community-based approach to PMTCT with the goal of providing an equivalent level of care to that which was available in industrialized nations. The provision of prenatal care and maternal health services is one of the

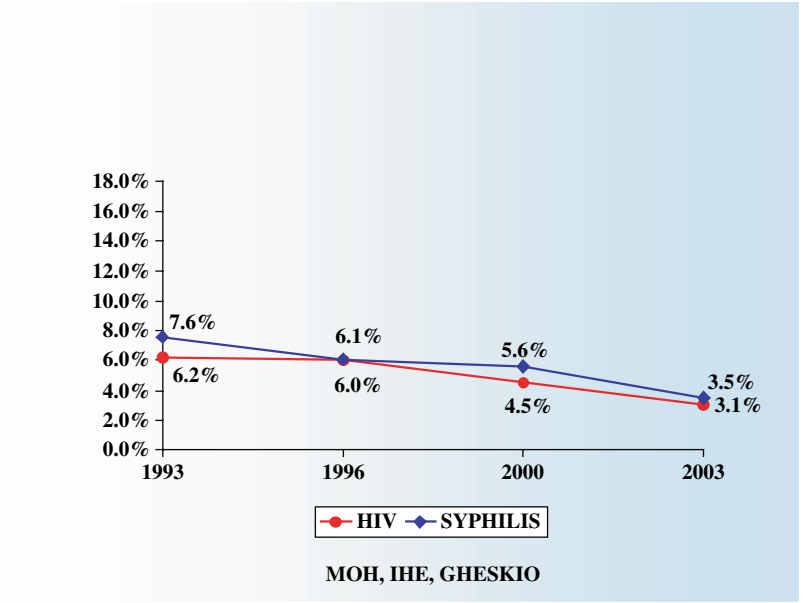


**Figure 31.1** National HIV and syphilis Seroprevalence in Haiti (1993–2003).

"four pillars" of comprehensive HIV care at PIH (along with HIV prevention and treatment, TB management, and diagnosis and treatment of STDs). These services were provided in the broader context of providing comprehensive medical care to all.

GHESKIO and the MoH began a PMTCT program in 1999 to provide PMTCT services to women in urban areas. In addition to targeted interventions for PMTCT, they also addressed the broader mandates of family planning, treatment of co-existing infections, and primary obstetrical and pediatric care. All women were offered HIV and syphilis testing, reproductive health services, treatment for STIs, screening and treatment for TB, and HIV care.

The MoH worked with GHESKIO, PIH, and other organizations to develop national guidelines for Haiti. Initially, they recommended the use of zidovudine, starting at 36 weeks gestation for mothers, and for the infants' first week of life. Due to concerns about the development of drug resistance, single-dose nevirapine was used only for women who presented too late for zidovudine treatment. Now that triple drug therapy with HAART has been shown to be more effective than zidovudine or nevirapine, its use is being scaled-up in pregnant women. In addition to HAART, pregnant women receive ferrous sulfate, folic acid, and tetanus toxoid. Infants are given formula (if feasible and with maternal consent), cotrimoxazole prophylaxis, and early testing for HIV, with immediate HAART for all infants who test positive. At GHESKIO and at PIH, all services are provided free-of-charge. The provision of PMTCT at GHESKIO and PIH sites led to dramatic increases in the number of pregnant women accepting voluntary counseling and testing (VCT), and dramatically lowered the rate of vertical transmission of HIV (Behforouz et al., 2004). Currently, PMTCT programs are being scaled-up at other sites all around the country.

## HIV/AIDS Treatment

### Presenting Illnesses and the Natural History of HIV/AIDS in the Pre-HAART Era

Among the first 61 cases of HIV/AIDS described in Haiti, the most common presenting illnesses were Kaposi's sarcoma, candida esophogitis, and TB (Pape et al., 1983). One hundred percent of patients presented with weight loss and all patients had diarrhea at some point during the course of the illness. Additional studies confirmed these findings. Guerin et al. found that esophogeal candidiasis, intestinal cryptosporidiosis, and TB were the most frequent opportunistic infections (OIs) and that significant weight loss (95%), diarrhea (95%), fatigue (95%), chronic fever (90%) and skin lesions (54%) were also common (Guerin et al., 1984). PIH conducted a study of 200 patients consecutively diagnosed with HIV and found that TB, chronic enteropathies, and Slim's Disease (weight loss without localizing symptoms) were the most common presenting diagnoses (Farmer et al., 2001).

In the pre-HAART era, it was also found that patients died more rapidly in Haiti compared to those in more developed settings. Studies from the U.S. demonstrated that the average time from acquisition of HIV infection to AIDS and death was 10 and 12 years, respectively. GHESKIO followed 42 patients with documented dates of HIV seroconversion from 1985 to 1997 and found

that the median time from sero-conversion to first HIV symptoms was 3 years, time to AIDS diagnosis was 5.2 years, and time to death was 7.4 years. This was probably caused by multiple factors, including poor nutritional status and high rates of concomitant infections such as TB and diarrheal disease, which occur more frequently in less developed settings such as Haiti (Deschamps et al., 2000).

### HIV and Tuberculosis

The TB burden in Haiti is the highest in the Latin American and Caribbean region (USAID, 2006). In Haiti, 80% of the adult population is infected with *Mycobacteria tuberculosis* as evidenced by a positive skin test to purified protein derivative. HIV/AIDS has exacerbated the TB epidemic, as it has in other countries. Up to 10% of patients dually infected with HIV and latent TB (skin test positive) develop active TB each year, and over 50% will have TB by the time they develop another OI. GHESKIO demonstrated that isoniazid prophylaxis could prevent the development of active TB in the majority of these patients (Pape et al., 1993). They also showed that isoniazid prophylaxis had a positive impact on the natural history of HIV/AIDS by delaying the onset of HIV-associated signs and symptoms, AIDS, and death.

Until recently, it was felt that multidrug-resistant (MDR)-TB rates were low. However, GHESKIO conducted a cross-sectional study of MDR-TB prevalence at their HIV testing center between January 2000 and December 2002 (Joseph et al., 2006). All patients with TB symptoms were screened for TB, including sputum culture. All *Mycobacteria tuberculosis* isolates (n = 330 patients) underwent drug susceptibility testing; MDR-TB was documented in 16 (6%) of the 281 patients with primary TB. Of the 115 patients who were HIV-positive with primary TB, 11 (10%) had MDR-TB. Of those with recurrent TB, 10 (20%) of 49 patients had MDR-TB.

For the past decade, PIH has been the only organization treating MDR-TB in Haiti, serving as the national referral center for all cases. Treatment outcomes have been outstanding, equal or superior to those of industrialized nations. GHESKIO is in the process of opening up an additional MDR-TB treatment center, in collaboration with the MoH and PIH, to improve the diagnosis and treatment of MDR-TB across the country.

### The Advent of AIDS Treatment in Haiti: The Partners in Health Model

In 1996, HIV/AIDS mortality in the industrialized world plummeted, with the provision of HAART. However, HAART was deemed too expensive and too complicated for use in resource-poor settings; consequently, efforts there were focused only on prevention. PIH argued for treatment for everyone, regardless of ability to pay, or of country of residence. In 1998, they launched the "HIV Equity Initiative" to provide directly observed HAART using their successful community-based TB treatment model. Patients were selected exclusively on the basis of their clinical status, with the sickest patients treated first. A clinical algorithm was used to identify those patients in the greatest need of treatment. The care component included an uninterrupted supply of HAART, but with only modest laboratory infrastructure; CD4 cell counts and viral loads were not available in rural Haiti at the time (Farmer et al., 2001).

HAART was supervised by community health workers (accompagnateurs) who visited the patients once or twice per day to provide directly observed treatment (DOT-HAART). This system had been developed ten years prior for the provision of directly observed treatment for TB. The accompagnateurs created the structural backbone of the program, linking the clinic with the villages, which are scattered throughout the countryside. The accompagnateurs were widely respected in their communities, and received training on the clinical management and treatment of HIV infection and the importance of confidentiality and emotional support for the patients.

During the program review, we learned that accompagnateurs were sharing food with their patient-neighbors, babysitting, and running errands. Some of the accompagnateurs were themselves receiving antiretrovirals from their own accompagnateurs. Something far more complex and beneficial than DOT – a 'virtuous social cycle' – occurs when neighbors are enlisted in the struggle against tuberculosis and HIV infection. (Behforouz et al., 2004).

The clinic staff at PIH also provided social support for the patients. A social worker conducted a detailed assessment of a household's financial situation, evaluated the patient's social network, and identified potential barriers to adherence or treatment response. Monthly patient meetings were conducted to exchange information and strengthen program responsiveness. By the spring of 2002, about 12% of the more than 2000 HIV-positive patients followed in the clinic were being treated with HAART. Outcomes were excellent. The clinical response to therapy was favorable in 59 of the first 60 patients. In a subset of 21 patients whose viral loads were monitored, 18 (86%) had no detectable virus in their blood (Farmer et al., 2001; Koenig et al., 2004). The PIH model became one of the first success stories for the treatment of HIV/AIDS in a resource-poor setting, and has since been duplicated around the world.

### The Impact of the Global Fund for AIDS, TB, and Malaria

Prior to the Global Fund for AIDS, TB, and Malaria (Global Fund), GHESKIO was only able to provide HAART on a limited basis. Due the high cost of HAART at the time, and the large number of patients being seen (5,000–8,000 at any given time), they had to develop priorities for the use of their limited resources. Initially, GHESKIO focused on the treatment and prevention of OIs (such as TB) and the management of STIs, which were the major cofactors for HIV transmission. They also provided extensive prevention services. In 1998, they began providing HAART in three situations: occupational exposure, treatment of rape victims, and PMTCT. At PIH, the successful DOT-HAART project was limited only by an inability to find significant donor support for an integrated HIV prevention-and-care project in rural Haiti. The program could not be widely expanded until additional funds became available (Farmer et al., 2001).

In 2002, Haiti submitted an application to the newly formed Global Fund to request funding for the development of a Haiti-wide program for HIV testing, PMTCT, treatment of OIs, diagnosis and treatment of TB, and HIV prevention and treatment. In March 2003, they received the first disbursement of a 5-year, USD 67 million grant. The First Lady, Mildred Aristide, served as the first head of Haiti's Country Coordinating Mechanism for this successful proposal.

Strong foundations were already in place in Haiti, with national guidelines developed by the MoH, political commitment from the highest levels of government, and NGOs with an international reputation for providing high quality health services (See Table 31.1). Once resources from the Global Fund became available, services were immediately expanded across the country.

With the release of the Global Fund monies, the widespread use of HAART in Haiti finally became feasible. To ensure that HAART was used wisely, PIH, Brigham and Women's Hospital, GHESKIO, Cornell University, and the Harvard Division of AIDS convened a meeting called "From Models to Implementation" in April 2003. Over 100 HIV/AIDS experts gathered from Haiti, the United States, and around the world. There were attendees from the U.S. President's AIDS Initiative (PEPFAR), the Global Fund, the National Institutes of Health, the International AIDS Society, UNAIDS, WHO, the Haitian Ministry of Health, and world experts from several major academic medical centers. Physicians at GHESKIO and PIH presented posters and lectures on the clinical manifestations of HIV in Haiti, presenting diagnosis and treatment outcomes, and strategies to expand access to care. The participants worked together to discuss the most effective interventions to scale-up HIV prevention and treatment services in Haiti.

Since that time, treatment scale-up has progressed throughout the country. HAART is provided in accordance with the guidelines of the MoH and the WHO (WHO, 2006), based on the clinical stage of disease and CD4 cell count. First-line ART regimens include zidovudine, lamivudine, and efavirenz or nevirapine. Stavudine is used in select cases. For patients who fail first-line treatment, tenofovir, abacavir, and lopinavir/ritonavir are available, though most patients (>97%) have remained on first-line therapy (Severe et al., 2005; Mukherjee et al., 2006).

The MoH has worked with PIH to revitalize eight clinic-hospital complexes in the rural Central Plateau. Each facility has undergone extensive renovations, with a functioning pharmacy, laboratory, space for clinical examination, and generator-powered electrical supply. Additional staff have been hired (physicians, nurses, pharmacists, and administrators) as needed to provide comprehensive medical, pediatric, and obstetric care, and the DOT-HAART model has been reproduced at each site. At each clinic, there was an approximately ten-fold increase in ambulatory visits within 3 months of expansion. In the year 2006, PIH provided 885,853 patient encounters (clinic visits or hospital admissions). An additional 895,766 patient visits were provided at home by community health workers or other medical personnel (PIH, unpublished data).

One site (Walton et al., 2004) tracked the numerous health improvements that followed. In the first 14 months of the HIV treatment rollout in the town of Lascahobas, general medical visits increased by ten-fold, over 200 patients were diagnosed and treated for TB (as compared with 9 patients the year before), 120 patients were treated with HAART, prenatal services were added, vaccination access expanded, a small inpatient unit was built, and staff morale and community participation improved.

In Port-au-Prince, GHESKIO began offering universal HAART free-of-charge to all patients in need of treatment in March 2003. Results have been outstanding. The first 1004 GHESKIO patients had treatment outcomes that rival those in the U.S. In adults and adolescents, the median increase in CD4 cell count from baseline to 12 months was 163 cells/mm$^3$. Viral load was

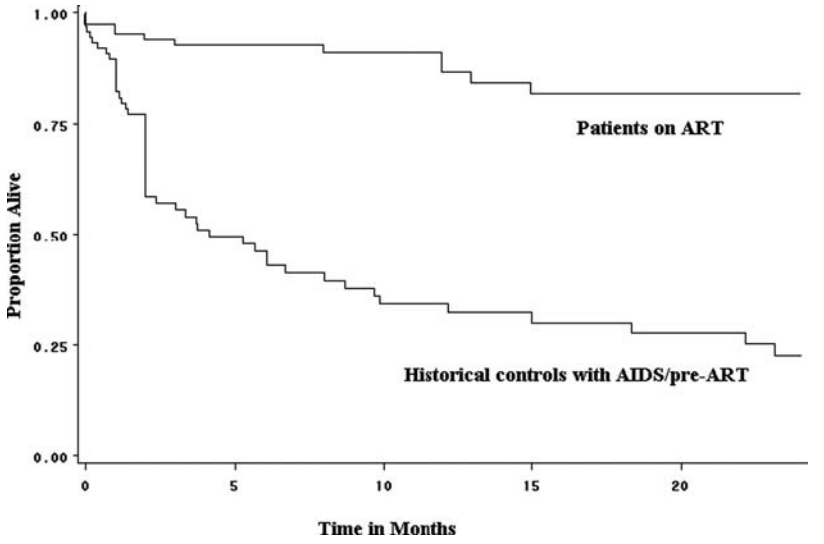


**Figure 31.2** Kaplan Meier estimate of survival in the first 910 HIV infected adults and adolescents treated with HAART at GHESKIO compared to survival of 99 historical controls diagnosed with AIDS before HAART was available.

undetectable in 76 of 100 patients who were followed for 48–56 weeks (Severe et al., 2005). Eighty-seven percent of adults and adolescents were alive after one year. Prior to the provision of HAART, one-year survival was only 30% (See Figure 31.2).

GHESKIO has developed an integrated health care program to treat HIV, other STIs, and TB, as these diseases are tightly linked, with overlapping risk factors (Peck et al., 2003). The advantage of this strategy is that an individual at risk for HIV (or already infected) who comes to the local health center for any of a number of services can be quickly identified and offered access to a package of HIV services. All patients who present for care at GHESKIO are provided with voluntary counseling and testing for HIV, screening for syphilis and other STIs, screening and treatment for TB, counseling and family planning services, nutritional support, and comprehensive HIV treatment, including HAART. This model is now being expanded across the country. GHESKIO and the MoH have trained providers at a network of 25 public and private sites throughout Haiti, rendering them capable of providing an integrated HIV care and prevention plan. GHESKIO continues to provide ongoing training for health care workers in counseling, in the management of TB, in the treatment of OIs, in the use of HAART, and in the provision of PMTCT. In the year 2006, GHESKIO trained 630 laboratory technicians, 258 social workers, 2186 nurses, 785 physicians, 39 pharmacists, and 6478 community leaders (GHESKIO report to PEPFAR, 2006).

### The Impact of the President's Emergency Plan for AIDS Relief

In 2003, President Bush announced PEPFAR. It was the largest commitment ever made by any nation for an international health initiative dedicated to one disease. Haiti was one of the recipient countries, receiving over USD 40 million

per year. These funds are being distributed through the CDC and United States Agency for International Development (USAID) to bolster the ongoing expansion of HIV-related prevention and treatment services throughout the country. PEPFAR has supported efforts to PTMCT, increase safe sexual behaviors, provide condoms, and expand access to HAART. They have also provided financing for mobile HIV counselling and testing clinics, provider training programs, and hospital renovations.

The MoH received funding to develop laboratory infrastructure and counselling, testing, and treatment services. Many of the same organizations that were part of the Global Fund grant are also PEPFAR recipients. PEPFAR has also expanded services at some existing centers, and added new organizations as well, whose services seek to complement and expand upon the groundwork already laid by established institutions (See Table 31.2 for a comprehensive list of organizations providing new services since 2003.).

GHESKIO, PIH, and the MoH are working with NGOs across the country to continue to expand HIV services, with funding and technical support from the Global Fund and PEPFAR. In 2006, 166,000 (86%) of the 193,000 Haitians tested for HIV were in the PIH-GHESKIO-MOH network. Of these patients, 44,145 (27%) were pregnant women. All women who tested positive were provided with comprehensive PTMCT services. In 2006, within the GHESKIO network, 8,955 patients (8.9%) tested positive for HIV and in the PIH network, 2,987 (4.6%) tested positive. All patients who met the WHO criteria were started on HAART. At the end of 2006, over 9,400 people were being treated with HAART in Haiti; of these, 7240 (77%) were receiving treatment in the PIH-GHESKIO-MOH network. By April 2007, the cumulative number of patients who had been treated with HAART in Haiti was 12,316 (PIH, unpublished data)

## Conclusions and Future Challenges

Despite ongoing political difficulties and limited resources, Haiti has mounted one of the world's most successful responses to the HIV/AIDS epidemic, as evidenced by its decline in prevalence and the country-wide scale-up of services. International funding has played a contributing role in the programmatic successes in Haiti, but later advances would not have been possible without the strong network of institutions (as shown in Table 31.1) that were firmly established and already providing prevention and treatment services for HIV/AIDS at the time that funding became available. These organizations have proven that treatment outcomes rivaling those of developed countries can be attained even in the midst of adverse conditions in deeply impoverished settings. Now that funding has become more widely available with support from the Global Fund and PEPFAR, the number of institutions (see Table 31.2) involved in the prevention and care of HIV has increased exponentially, and we expect that this will be reflected in further declines in prevalence and ongoing expansion of access to HAART in Haiti.

In order to continue lowering the prevalence of HIV/AIDS in Haiti, the public health infrastructure must be strengthened under the guidance of the MoH. HIV services must be further expanded, with the goal of providing

**Table 31.2** Organizations providing newly implemented services (Note that all services offered prior to 2003 are listed in Table 31.1)

| Organizations not: Organizations providing newly implemented services (note that all services offered prior to 2003 are listed in Table 31.1) | Date service was offered | HIV prevention | Care and support for PLWHA | Antiretroviral therapy | Infrastructure development and technical support | Training |
|---|---|---|---|---|---|---|
| Association Entre Aide Dame Marie (AEADMA)* | 2004 | XXX | | | | |
| CARE International*** | 2004 | XXX | XXX | | XXX | |
| Catholic Relief Services*** | 2004 | XXX | XXX | XXX | XXX | |
| Center for Gynecological Prevention and Family Education (CEGYPEF)* | 2003 | XXX | | | | |
| Centre Bernard Mews* | 2004 | XXX | XXX | XXX | | |
| Centre Communautaire de Martissant* | 2004 | XXX | | | | |
| Centre de Bienfaisance de Pignon (CBP)* | 2003 | XXX | XXX | XXX | | |
| Centre de Sante de Bizoton* | 2004 | XXX | | | | |
| Centre de Sante le Pretre* | 2004 | XXX | | | | |
| Centre de Sante Lumiere (FINCA)* | 2004 | XXX | | | | |
| Centre de Sante Pierre Payen* | 2004 | XXX | | | | |
| Centre de Sante Portail Leogane* | 2004 | XXX | XXX | XXX | | |
| Centre de Sante Ste-Elisabeth* | 2004 | XXX | | | | |
| Centre de Sante Ste Helene* | 2004 | XXX | | | | |
| Centre Medical Beraca* | 2004 | XXX | XXX | XXX | | |
| Centre Medical Charles Colimon* | 2004 | XXX | XXX | XXX | | |
| Centre Medical de Ouanaminthe* | 2004 | XXX | XXX | | | |
| Centre Medico Chirurgical (CMC)* | 2004 | XXX | | | | |
| Center for Health and Development (CDS)** | 2007 | | | XXX | | |
| Child Survival Alliance of Haiti* | 2004 | | | | XXX | |
| Clinique Communautaire de Delmas 75* | 2004 | XXX | | | | |
| Clinique St Paul* | 2004 | XXX | | | | |
| Concern Worldwide* | 2004 | XXX | XXX | XXX | XXX | XXX |
| Creative Associates* | 2003 | XXX | | | | |
| Fame Pereo* | 2004 | | | XXX | | |
| Family Health International*** | 2004 | | XXX | | | |
| Filles de la Charite* | 2004 | | XXX | | | |
| Foundation Esther Boucicault Stanislas* | 2004 | | | XXX | | |
| Fondation pour le Developpement de la Famille Haitienne (FONDEPH)*** | 2004 | XXX | | | | |
| Food for the Poor* | 2004 | XXX | XXX | XXX | | |

(continued)

**Table 31.2** (continued)

| Organizations not: Organizations providing newly implemented services (note that all services offered prior to 2003 are listed in Table 31.1) | Date service was offered | HIV prevention | Care and support for PLWHA | Antiretroviral therapy | Infrastructure development and technical support | Training |
|---|---|---|---|---|---|---|
| Foundation for International Community Assistance (FINCA)∗ | 2004 | XXX | | | | |
| Haitian Health Foundation∗ | 2004 | XXX | | | | |
| HCR de Port Salut∗ | 2004 | XXX | XXX | | | |
| Hopital Adventiste de Diquini∗ | 2003 | XXX | | | | |
| Hopital Albert Schweitzer∗ | 2004 | | | XXX | | |
| Hopital Alma Mater∗ | 2004 | XXX | XXX | XXX | | |
| Hopital Armee du Salut/Clinic Bethel∗ | 2004 | XXX | XXX | XXX | | |
| Hopital Claire Heureuse de Marchand∗ | 2004 | XXX | | | | |
| Hopital de Camp-Perrin∗ | 2004 | XXX | | | | |
| Hopital de Carrefour∗ | 2004 | XXX | XXX | XXX | | |
| Hopital de Fermathe∗ | 2007 | | | XXX | | |
| Hopital de Fort-Liberte∗ | 2004 | XXX | XXX | XXX | | |
| Hopital de Jean Rabel∗ | 2004 | XXX | XXX | | | |
| Hopital de la Communaute Haitienne∗ | 2003 | XXX | XXX | XXX | | |
| Hopital de la Mission∗ | 2004 | XXX | | | | |
| Hopital de l'Universite d'Etat d'Haiti (HUEH)∗ | 2005 | | | XXX | | |
| Hopital de Sacre-Coeur∗ | 2004 | XXX | | | | |
| Hopital Esperance de Pilate∗ | 2004 | XXX | XXX | XXX | | |
| Hopital Evangelique de Bombardopolis∗ | 2004 | XXX | XXX | XXX | | |
| Hopital Grande Riviere du Nord∗ | 2004 | XXX | | | | |
| Hopital Immaculee Conception des Cayes∗ | 2004 | XXX | XXX | XXX | | |
| Hopital la Providence des Gonaives∗ | 2003 | XXX | XXX | XXX | | |
| Hopital Lumiere Bonne Fin∗ | 2004 | XXX | | | | |
| Hopital Notre Dame de Petit-Goave∗ | 2004 | XXX | XXX | XXX | | |
| Hopital Sacre Couer de Milot∗ | 2004 | XXX | XXX | XXX | | |
| Hopital St Antoine de Jeremie∗ | 2003 | XXX | XXX | XXX | | |
| Hopital St Boniface Fonds des Blancs∗ | 2004 | XXX | XXX | XXX | | |
| Hopital St Michel de Jacmel∗ | 2003 | XXX | XXX | XXX | | |
| Hopital St Nicholas∗ | 2004 | XXX | | | | |
| Hopital Ste Catherine Laboure∗ | 1989 | XXX | XXX | | | |
| Hopital Ste Croix de Leogane∗ | 2004 | XXX | XXX | XXX | | |
| Hopital Sainte Therese de Miragoane∗ | 2004 | XXX | XXX | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Hopital Universitaire Justinien* | 2003 | XXX | XXX | XXX | | XXX |
| Interchurch Medical Association*** | 2004 | | | | XXX | |
| International Child Care (ICC)/Grace Children's Hospital*** | 2004 | | | XXX | | |
| I-Tech (University of Washington)*** | 2004 | | | | XXX | XXX |
| JHPIEGO*** | 2004 | XXX | | | XXX | XXX |
| John Hopkins University*** | 2004 | XXX | | | XXX | |
| La Fanmi* | 2004 | XXX | | | | |
| Management and Resources for Community Health (MARCH)** | 2003 | | XXX | XXX | | |
| Management Sciences for Health (MSH)*** | 2004 | | | XXX | | |
| Mission Evangelique Baptiste du Sud-Haiti (MEBSH)* | 2004 | XXX | | | | |
| Oeuvre de Bienfaisance de Carrefour (OBCG)* | 2004 | XXX | | | | |
| PACT* | 2003 | XXX | XXX | | | |
| PATH* | 2004 | | | | XXX | |
| Petits Frères et Sœurs* | 2004 | | | XXX | | |
| Promoteurs Objectif ZeroSIDA (POZ)** | 2004 | | | XXX | | |
| Protestant Churches of Haiti*** | 2004 | XXX | | | | |
| Sante Communautaire MEBSH Bonne Finne* | 2004 | XXX | | | | |
| Serve Haiti | 2007 | XXX | XXX | | XXX | |
| Service and Development Agency (SADA)* | 2004 | XXX | | | | |
| Tulane*** | 2003 | | | | XXX | |
| University of Maryland*** | 2004 | | | | XXX | XXX |
| University of Medicine and Dentistry of NJ*** | 2004 | XXX | XXX | XXX | | |
| World Concern (AERDO)*** | 2003 | XXX | XXX | | | |
| World Hope International | 2007 | XXX | XXX | | XXX | XXX |
| World Relief*** | 2004 | XXX | XXX | | XXX | |
| World Vision*** | 2003 | XXX | XXX | | | |

**Working in One Department.*

***Working in More Than One Department.***

****Working at the National Level.*

comprehensive care, including the provision of HAART to 20,000 people by the end of 2008. As HAART is scaled-up across the country, adherence must be monitored, and the TB program must be strengthened to adequately address the HIV/TB epidemic, including the management of MDR-TB. Human resources must be augmented with innovative delivery models, such as the training of nurses to work as physicians' assistants (and prescribe ART), and the network of community health workers must be expanded. Adjuvant social services, such as nutritional supplementation and transportation subsidies, must be included in order for HIV/AIDS treatment programs to reach the most vulnerable patients. Furthermore, it will be critical to improve women's economic and educational opportunities. However, even though there are challenges ahead, Haiti is well on the way to providing universal treatment for all who are afflicted with HIV.

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# Chapter 32

# HIV/AIDS Prevention, Treatment and Care: Present Status, Future Needs and Some Possible Solutions

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## Introduction

At the close of 2006, according to UNAIDS (2007) 33.2 million persons were estimated to be living with HIV, with 2.5 million new infections and 2.1 million deaths being registered that year (see Figure 32.1 for global AIDS death regional data). These numbers point to the profound impact HIV/AIDS is having on the most affected countries. Economies are being decimated, and the number of children orphaned by AIDS continues to rise (see Figure 32.2). Despite billions of dollars invested in international cooperation on HIV/AIDS prevention, treatment and care, viral transmission appears still out of control in too many communities and countries. Deaths continue to mount even as rapid scale-up of life-saving treatments are rolled out in some of the poorest nations on earth, especially in hard-hit Sub-Saharan Africa. In upper-income countries such as the U.S., Canada, Australia and Western Europe, the death rate attributed to HIV has plummeted due to widespread availability of antiretroviral treatments, sparing lives but adding to a rising HIV prevalence and an aging AIDS population with multiple chronic challenges to well-being. The cost of combination antiretroviral treatments have declined precipitously, from over USD 15,000/per patient per year to as low as USD 150/year today in some low and middle income countries. Concerns regarding the optimal allocation of scare resources have been noted in many settings where there are insufficient public resources to cover all patients requiring treatment.

The Global HIV Prevention Working Group is a coalition convened by the Bill & Melinda Gates Foundation and the Henry J. Kaiser Family Foundation. It issued a report in June 2007 entitled, *Bringing HIV Prevention to Scale: An Urgent Global Priority* (Global HIV Prevention Working Group, 2007). They chronicled our failures and the continuing barriers to scale-up, as well as



D.D. Celentano and C. Beyrer (eds.), *Public Health Aspects of HIV/AIDS in Low and Middle Income Countries*,
DOI: 10.1007/978-0-387-72711-0_32, 

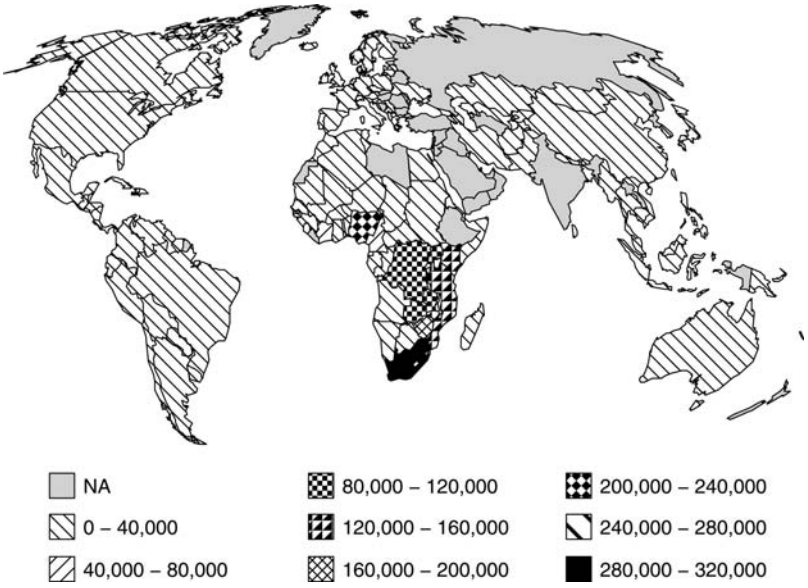


**Figure 32.1** AIDS Deaths (adults and children), 2005 (Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org. Data Source: UNAIDS , *2006 Report on the Global AIDS Epidemic*, May 2006). Note: Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

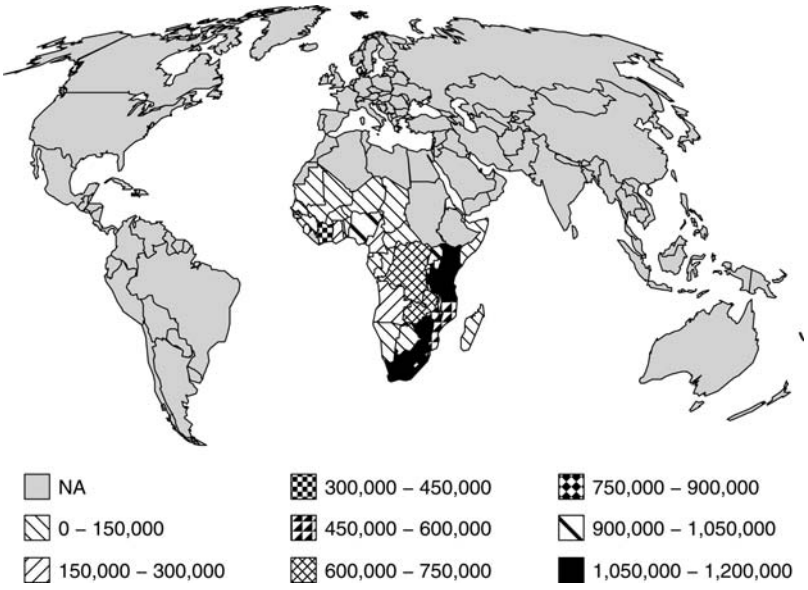


**Figure 32.2** Children Orphaned by AIDS (less than 18 years old), 2005 (Adapted from The Kaiser Family Foundation, GlobalHealthFacts.org. Data Source: UNAIDS, *2006 Report on the Global AIDS Epidemic*, May 2006). Note: Countries for which no data were available or where estimates were given as a range and that range can not be incorporated into ranges already designated in the figure are marked NA.

factors associated with determining the feasibility of scaling-up prevention (see Box 32.1). While acknowledging the remarkable successes of HIV prevention demonstration projects, they conclude that most of the world's population at risk for HIV infection have little or no access to the basic prevention methods for HIV risk reduction. These include inadequate access to condoms, insufficient HIV testing, low treatment rates of STI, woefully inadequate prevention of mother-to-child transmission, remarkably low accessibility of prevention services for highly vulnerable populations (IDU, MSM, and sex workers), and on-going iatrogenic infections in healthcare settings.

**Box 32.1** Bringing HIV Prevention to Scale: Barriers to Scaling up HIV Prevention*

1. Access to HIV Prevention: A Global Failure
   - Condom coverage is low (~9%) and global supply is inadequate
   - <12% of sub-Saharan Africans know their HIV status
   - <20% of those with an STI receive treatment
   - Only 11% of pregnant women receive treatment to prevent mother-to-child HIV transmission
   - Prevention services for the most vulnerable populations reach <10% of MSM and IDU and only 20% of sex workers
   - Unscreened blood products are still transfused in the developing world
2. Barriers to HIV Prevention Scale-up
   - Inadequate funding of needed programs
   - Misallocation of resources by recipients and by donors
   - Limitations of human capacity and brain drain
   - Fragmentation of services
   - Stigma and discrimination
3. Scaling-up HIV Prevention
   - Governments must establish a process to guide a national strategic plan for HIV with regular reviews to determine progress
   - Donors must increase the scale of funds to meet demands, and prioritize with recipient governments
   - Technical support must be strengthened and better coordinated
   - HIV services must be integrated with tuberculosis, STI treatment and reproductive health services with training and needed supplies
   - Evidence-based research should be used to assure optimal and cost-effective strategies for scale-up services
   - Civil society should be included in monitoring progress towards meeting HIV prevention, treatment and care goals and advocate for universal access to services

* Global HIV Prevention Working Group, 2007.

The Global HIV Prevention Working Group (2007) also identified a series of barriers to scale-up, which have been nearly universally experienced globally. These include inadequate financing, misallocation of resources, limitation in human capacity, services fragmentation and on-going stigma and discrimination that limit accessing existing services. Nevertheless, several success stories internationally, many already reviewed in the chapters in this book, offer a number of strategies that can assist with ramping up HIV prevention, treatment and care efforts. We review some model successes in "HIV Success Stories" below. The improvements recommended by the Global HIV Prevention

Working Group (2007) include urging governments to establish a transparent national HIV plan with performance indicators to gauge progress and with regular reviews to allow revision to strategic plans. It is also recommended that donors increase their commitment financially while aligning their priorities to national strategies and avoiding politically motivated program components which are not supported by sound evidence bases (such as the U.S. insistence on abstinence-based prevention).

Multilateral and technical agencies are urged to strengthen and coordinate evaluations and support recipients in the use of tools and strategies. HIV services must be coordinated with other services, especially those associated with tuberculosis, STI management and reproductive health care services, along with adequate training and supply management of these services. Research should focus on supporting host governments to meet their priorities, by guiding operational research to promote evidence-based cost-effective strategies to meet national goals. Finally, civil society should be brought into the effort as full members, particularly in the evaluation of national strategic goals, and as advocates for universal access to HIV prevention, treatment and care. As is outlined in Box 32.1, we have a long way to go to meet these necessary objectives, but the will is there.

## HIV Success Stories

Bertozzi et al. (2007) reviewed elements of successful HIV prevention efforts. They noted the following common features: (1) high-level support from political leaders; (2) active engagement of religious leaders and civil society using a multi-sectoral approach; (3) population-based interventions to influence social norms; (4) open discussion about sexuality and HIV/AIDS; (5) strategies to overcome stigma and discrimination; (6) improved STI identification, prevention and treatment; and (7) interventions focused on "bridge" populations, especially female sex workers, bisexual men and IDUs.

In HIV prevention circles, there are four success stories that are routinely cited (for example, see Global HIV Prevention Working Group, 2007). These include the Thailand 100% condom campaign reviewed in Chapter 18; the remarkable halving in HIV prevalence over the decade of the 1990s in Uganda, addressed in Chapter 13; the national Brazilian universal access to antiretroviral medications and campaigns to overcome stigma and discrimination, reviewed in Chapters 7 and 29; and the successful condom distribution program in Senegal, which appears to have kept the HIV epidemic at bay (although in a society where circumcision is the norm), which is in distinct contract to the high burden of HIV infection experienced by Senegal's neighbors, Cote d'Ivoire and Guinea-Bissau (see Chapter 12). The lessons that can be learned from these successes have been widely disseminated and the principles are clear; however, implementation is a far more difficult task in many situations.

## Where are the Gaps? What are the Issues?

It is clear from the review of the epidemiology and social forces at work in the global HIV epidemic that there are several key factors that have hampered societal responses to the HIV epidemic. Some reflect behaviors (e.g., sexual

concurrency, male preference for younger partners, use of female sex workers to 'protect' and ensure the virginity of future potential wives), some support deep rooted social values (such as homophobia, gender inequality, class and racial divides), and others reflect socioeconomic realities that occur in low- and middle-income countries, where migration for employment and frequent absence from home lead to risk-taking behaviors that increase the likelihood of HIV acquisition. One cannot discuss the worldwide HIV pandemic without making reference to drug use, particularly heroin injection and, more recently, to the burgeoning epidemic availability worldwide of amphetamine-type stimulants (including methamphetamine, ketamine, ecstasy and other stimulants) associated with increasing HIV risks primarily through sexual risk-taking. As has been shown in the many chapters in the sections on South and Southeast Asia and Eastern Europe and Central Asia, it is drug use which is the driver of these expanding HIV epidemics. While harm reduction approaches have been shown to be effective in reducing the HIV burden in many settings, this strategy is politically unwelcome by many governments (especially the U.S.), and hence it has been slow to diffuse globally. Nevertheless, the chapters in this volume on both Malaysia and The Islamic Republic of Iran demonstrate that a pragmatic approach to HIV prevention can allow for harm reduction principles to peacefully co-exist in Muslim societies – a change that has quietly occurred over the past several years.

In light of the lack of effectiveness to date in preventive vaccines (Chapter 5) and topical microbicides (Chapter 6), prevention (Chapter 2) and treatment and care (Chapters 3 and 4) are even more urgently needed. Improving access, expanding the pharmaceutical menu, and integrating HIV services with associated needs (particularly, tuberculosis, STI and reproductive health) are especially required. At the same time, long-standing prejudices (of drug users, MSM, sex workers) and attendant stigma and discrimination are major barriers to accessing existing services. Improving the dismal rate of HIV testing, whether through traditional HIV voluntary counseling and testing strategies or the newly proposed "opt-out" strategy (in which HIV testing is to be considered to be a routine medical test like cholesterol testing), is essential in order to assist people with HIV to seek timely HIV care. Political and religious leadership will be essential over the long-term to address these lingering social and cultural problems. As the chapters on advocacy (Chapter 8) and the political milieu (Chapter 9) demonstrate, HIV prevention, treatment and care options can be influenced directly by important insiders. However, transparency has rarely been a hallmark of ministries of health, especially in low-income countries beset by poverty. But the inclusion of civil society in HIV planning, services provision and evaluation is an essential component of a successful response to HIV epidemics globally. We review what is needed for an optimal national HIV program in the final section of this chapter.

## Optimal Program Design

What would an optimal national HIV/AIDS program look like? In the third decade of the global response to HIV/AIDS we have seen some remarkable examples of success in prevention, treatment and care, and in the overall national-level responses to HIV/AIDS that have allowed for balanced and effective programs.

We now know enough to understand some of the key programmatic features of success. Much of what has worked has been strongly evidence and data driven—but there have been harder to measure features like political will, leadership, and genuine national mobilization that while not easy to formally assess, are unmistakable when underway—or when missing. The countries that have responded best to AIDS—Brazil, Australia, Uganda, Senegal, and Thailand at her best periods, have all shared marked degrees of national mobilization. And they have been fortunate in having political leadership willing and able to make HIV/AIDS responses a part of national policy across sectors, going beyond health to include HIV/AIDS efforts in defense, education and finance ministries, among others. How political will to address an issue is developed and channeled is perhaps the subject of another book—but there is no question that where we have seen HIV infection rates come down, and AIDS treatment rolled out to those in need, political leadership to make these changes happen has virtually always been part of the equation for success. National mobilization in the case of HIV/AIDS has consistently involved grass-roots efforts and the engagement of people living with HIV/AIDS. This is a unique aspect of HIV and played a prominent feature in the response in the developed world. Where public health has succeeded in this pandemic, it has included the public and health authorities in an active dynamic, and with steady attention to the rights of individual and communities, as well as to the responsibilities of the state.

In HIV prevention a critical feature has been accurate assessment of the scale, scope, and direction of HIV spread. Successful prevention efforts have been those based on reasonable surveillance systems, like Thailand's, which could help programs address actual needs and changing epidemics. This has come to known as the "know your epidemic" paradigm. While this seems intuitively obvious, it has not always been easy to fit efforts to actual risks—and it has long been politically more appealing to provide prevention programs for "deserving" populations, like general population reproductive adults, then for those who may be most in need of them in a given epidemic context; sex workers, drug users, migrant workers or gay and bisexual men. The list is all too long of countries with concentrated HIV epidemics in drug users, for example, which have failed to implement prevention for this population, and spent scarce resources on populations at little initial risk. Ignoring the epidemic you do have, unfortunately, has often allowed for wider, and much more difficult to address epidemics. The list of early successes in control is short and sobering.

A key component of HIV prevention programs has been expanding access to HIV voluntary counseling and testing (VCT) services—again a mainstay of virtually all successful HIV prevention programs. VCT has also been the key link between prevention and treatment efforts, since knowing one's status is the first, essential step to accessing AIDS care. Early efforts to promote VCT in the absence of treatment services were controversial, and heavily criticized in the period from 1996 to 1997, the advent of effective AIDS therapy, to 2002–2003, when the treatment rollout began to reach those in need in low and middle income countries. It is now well recognized that VCT efforts are best implemented where referral to services, including treatment, is a real option, and patients who receive an HIV diagnosis are at the start, not the end, of AIDS services.

Providing VCT and prevention of mother-to-child transmission (PMTCT) services is a key element of prevention efforts. This is true for several reasons.

First, PMTCT with antiviral agents (initially AZT, zidovudine, and later nevirapine and other agents) was the first effective biological intervention developed based on ARVs. This meant that for many countries, including Thailand and Uganda, the first real introduction of any ARVs in countries was for this purpose. Second, PMTCT mandated the development of testing services, diagnostics, and laboratory capacity to support those services. When ARV rollouts did begin, they often have done so using this initial infrastructure. Thirdly, PMTCT has also been a gateway into testing for other family members—the women themselves, but also their male partners and older children.

The integration of prevention and treatment for other sexually transmitted diseases with HIV services has also marked most successful HIV/AIDS programs. Thailand, Brazil, and Uganda have all had marked success in integrating these programs and in insuring that both treatment programs benefit from the synergies of improved detection and treatment of STD that occur when AIDS programming expands. In a related fashion, HIV prevention services for drug users can help strengthen substance abuse programs, and countries which have responded well to drug use have generally built HIV services into existing or expanding drug counseling and treatment programs. VCT services linked to needle and syringe exchange programs are one example, directly observed therapy for methadone and ARV or TB medications is another.

A balance of prevention and treatment services is a crucial aspect of effective AIDS programs. Both are needed—but their demands, staffing, and approaches can be strikingly different in varying contexts. Countries which have embarked on ARV provision without first having achieved control of HIV spread—South Africa might be an example, as McIntrye and colleagues point out in this volume, can see ever expanding treatment needs. As the philanthropist Bill Gates put it in his remarks to the World AIDS Conference in Toronto in 2006, "We can't treat our way out of this epidemic."

Most successful HIV/AIDS treatment programs have adapted the continuum of care model, providing some level of clinical and laboratory monitoring to patients in early stages of infection, then providing anti-viral therapy when indicated, as well as prophylaxis for relevant opportunistic infections. Where food security is an issue, many ARV programs have found that inclusion of nutritional support is key to patient outcomes, and this has often meant food supplementation at the household, not simply the patient level. Palliative and end-of-life care has remained a critical component, even as many AIDS patients have responded to therapy and no longer need hospice services—but AIDS is still a life-threatening illness, and patients will still need pain management and support services to die with dignity. The lack of pain medication for the dying in many low-income settings has recently been seen as both a public health and a human rights issue—and it is increasingly understood that pain relief is a human right.

Treatment programs need to include screening, diagnosis and management of the most important of all HIV co-infections, tuberculosis (TB). TB-HIV interactions are increasing understood, and the global expansion of TB in the past several decades is now acknowledged to be largely an outgrowth of the HIV epidemic. This has been particularly true of the latest manifestation of this deadly interaction—extremely drug resistant or XDR-TB, a nearly untreatable variant of multi-drug resistant TB that has emerged in a number of populations,

especially in southern Africa, with high HIV and TB rates, and poor TB drug and treatment control programs.

Finally, treatment of pediatric AIDS has lagged in low and middle countries. Optimal programs are those that have made the extra program effort to identify and treat children with HIV disease, made pediatric formulations available, and provided the support to care givers and families to insure that these vulnerable children are managed on therapy.

Programs that work across the spectrum of HIV spread and AIDS treatment are dynamic and change as the evidence suggests they need to change. This means that HIV/AIDS policy makers are aware of the evidence and respond to it. The HIV pandemic has been one of the most intensely studied in human history. We have gone from no effective drugs in the 1980s, to a handful in the 1990s, to more than 6 classes of agents, and literally hundreds of possible treatment regimens today. As HIV/AIDS has changed, programs have had to engage with the research community, respond to findings, and to adapt. A prevention example has been the recent success of adult male circumcision as an effective tool for prevention of HIV acquisition for men. Now that three trials have found efficacy, what are governments to do? Provide circumcision services to all adult men? Promote the intervention? Encourage it in infancy, when trauma is minimized? We will find similar challenges should an effective (or partially effective) HIV vaccine or microbicide become available. Successful programs will be those which can adapt to new understandings and implement new innovations. Those that cannot adapt to changing epidemic dynamics will likely find the virus assisted, rather than controlled, by stalled program efforts.

Finally, wherever HIV has spread, the people it has affected have swiftly become vulnerable to fear, stigma, discrimination, and social exclusion. Successful programs have worked at educating the public to reduce fear; making discrimination in jobs, housing, health care, and other domains illegal; and at working across an array of social sectors to promote inclusion of people with HIV and affected family members. The protection and promotion of the human rights of the affected has been critical in prevention, treatment, and mitigation of impact programs. This was true in the early and frightening years of the epidemic, when AIDS really was a death sentence, and it is true today—where HIV stigma remains a potent barrier to services in countless settings. In the most affected countries and regions, this has also meant a critical focus on survivors—AIDS orphans, widows, and elders, all generally impoverished and excluded by the death of family members. Support programs for affected families and communities will be a necessary part of the AIDS response for many years to come—regardless of how effective treatment has become or whether we find new prevention tools. Protecting the vulnerable children and youth who have lost parents to AIDS is also likely to be a prevention challenge in years to come—and must be achieved if we are not to see HIV infection become a vicious circle for the most vulnerable among us.

## Conclusions

Richard Horton, writing in the influential medical journal *The Lancet*, reviewed 10 key questions that he felt were inadequately addressed by the HIV research community at their XVI International AIDS Conference held in Toronto,

Canada in August 2006 (Horton, 2006). His questions are provocative, and sum up where we as global inhabitants need to go. First, he asks why we refuse to acknowledge that funding gaps exist in our scale-up of services for HIV internationally. If the U.S. can spend a billion dollars a day on a war in Iraq, the paltry donation to PEPFAR should be seen as that. Next he asks why the health, economic, social and cultural context of HIV/AIDS not appreciated. As one example, he points out that the international commitment to the reproductive health rights of women made in Cairo in 1994 have not been addressed, let alone integrated with HIV prevention services. He then moves on to the question of why we seem to overly rely on findings from clinical science based on laboratory findings or randomized trials rather than also appreciate the contributions from the social sciences, pointing out that the marginalized in our societies are those at greatest risk for HIV, but the least likely to be involved in either services utilization or research.

A key issue raised by Horton (2006) is that we take compartmentalized approaches to addressing the global HIV pandemic—where epidemiologists talk to one another, but dialogue with bench scientists or advocates is often sidelined. Scholarly boundaries exist but must be broken down if we are to achieve headway in tackling this most persistent of viral epidemics. He also speaks about the politically motivated research agenda of donor governments (he cites the focus on abstinence-based education in Africa), whose agenda is misaligned with the reality of human behavior. Equally important is the insistence that civil society be a full partner in all discussions of HIV efforts, taking advantage of community and its power to both make change happen but also to integrate change into its value system. Next, he raises the issue of stigma and discrimination, which are pervasive in most societies, and deeply ingrained in our values. "Communities are erased, phobias are fermented, and human vulnerabilities are criminalized. AIDS exposes the profoundest prejudices in our society, and we do too little to reverse their pernicious effect" (Horton, 2006, p. 717). He concludes by asking why we are failing to adequately respond to the AIDS pandemic. Clearly, responding to his questions will provide some of the answers, if not resolving the many issues.

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Dr. Celentano's research has focused on behavioral epidemiologic problems affecting population health. His first studies were on problem drinking among women and social factors associated with cancer screening among older women and minority populations. In 1983 he joined a research collaboration that ultimately fielded the Multi-Site AIDS Cohort Study of the natural history of (what was to become know as) AIDS among men who have sex with men, a study which is now celebrating its twenty-fifth year in the field. He was a member of the team that developed the AIDS Links to the Intravenous Experience (ALIVE) Study, a two-decade investigation of the epidemiology of HIV and the natural history of AIDS among injection drug users, in Baltimore. He began international HIV research in Thailand in 1990, where he has maintained a collaboration with Chiang Mai University, with continuous funding from the National Institutes of Health ever since. Dr. Celentano is Principal Investigator of the Southeast Asia Clinical Trials Unit and is PI of a number of other multi-site Collaborative Agreements and Investigator-initiated grants in Thailand. He has also had projects in India, Malawi, South Africa, Vietnam and China.

Dr. Celentano has published approximately 350 articles in the peer-reviewed literature, as well as scores of chapters in the scientific professional literature and has collaborated on three Institute of Medicine reports on HIV infection. In 2006, Dr. Celentano was awarded an honorary PhD in Science (health science) from Chiang Mai University at its 40th Commencement Ceremony. The award, which was presented by Crown Princess

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studies aimed at preventing STI/HIV transmission among drug user populations in Thailand. Intervention studies among both injection and non-injection drug users have been conducted in collaboration with researchers from the Johns Hopkins Bloomberg School of Public Health and incorporate both behavior modification and drug treatment. Dr. Aramrattana is also involved in NIH related research on community involvement in HIV prevention and is a member of the Substance Use Working Group and the Network Evaluation Committee of the HIV Prevention Trials Network.

**Judith D. Auerbach, PhD**
Deputy Executive Director for Science and Public Policy
San Francisco AIDS Foundation
San Francisco, California, U.S.A.

Judith Auerbach, PhD is Deputy Executive Director for Science and Public Policy at the San Francisco AIDS Foundation (SFAF), where she is responsible for developing, leading, and managing SFAF's local, state, national, and international policy agenda. Prior to joining SFAF, Dr. Auerbach served as Vice President, Public Policy and Program Development, at amfAR (The Foundation for AIDS Research), where she managed its Public Policy Office in Washington, D.C. and coordinated programmatic activities across the foundation. Prior to amfAR, Dr. Auerbach was Director of the Behavioral and Social Science Program and HIV Prevention Science Coordinator in the Office of AIDS Research at the National Institutes of Health (NIH). She also has served as Assistant Director for Social and Behavioral Sciences in the White House Office of Science and Technology Policy, as a Senior Program Officer at the Institute of Medicine of the National Academy of Sciences, and as Associate Director for Government Affairs of the Consortium of Social Science Associations. Dr. Auerbach received the 2004 Feminist Activist Award from Sociologists for Women in Society, the 2005 Mentor Award from the Public Leadership Education Network, and the 2006 Research in Action Award from the Treatment Advocacy Group.

**Ruanne V. Barnabas, MBChB, DPhil**
Post-doctoral Research Fellow, HIV Vaccine Trials Network
Fred Hutchinson Cancer Research Center
Seattle, Washington, U.S.A.

Dr. Ruanne Barnabas received her MBChB cum laude from the University of Cape Town and completed her medical internship and community service in South Africa. She was awarded a Rhodes Scholarship to attend the University of Oxford, where she received her MSc in Epidemiology with distinction and DPhil in Medicine. Her doctoral thesis estimated the potential impact of human papillomavirus (HPV) vaccines on cervical cancer, using mathematical models of infection and disease. As a Post-doctoral Research Fellow with the HIV Vaccine Trials Network, Dr. Barnabas is using mathematical modeling to gain insight into infectious disease epidemics. In addition to her work with HPV, she is also studying the epidemiologic synergy between HIV and HSV-2, malaria and/or TB using both empiric data and models to better understand HIV susceptibility and transmission, and, consequently, HIV epidemics.

**Clare Barrington, PhD, MPH**
Assistant Professor, Department of Health Promotion, Education and Behavior
The Arnold School of Public Health
University of South Carolina
Columbia, South Carolina, U.S.A.

Clare Barrington, PhD, MPH completed her doctoral degree in the Social and Behavioral Interventions Program of the Department of International Health at the Johns Hopkins Bloomberg School of Public Health. There she actively collaborated with Deanna Kerrigan on the impact evaluation of an environmental-structural HIV prevention intervention among female sex workers in the Dominican Republic. Her doctoral dissertation examined the influence of social network norms on condom use among the male partners of female sex workers in the

Dominican Republic. She has recently joined the faculty of the Department of Health Promotion, Education and Behavior at the Arnold School of Public Health at the University of South Carolina.

**Emily Bass**
Senior Publications and Program Advisor
AIDS Vaccine Advocacy Coalition
New York, New York, U.S.A.

Emily Bass is a writer and AIDS advocate with the AIDS Vaccine Advocacy Coalition (AVAC), a non-profit organization dedicated to accelerating ethical development and global delivery of new HIV prevention strategies. Previously, she was senior writer at the International AIDS Vaccine Initiative, and a member of the founding staff of *HIV Plus* magazine. Her AIDS- and health-related journalism has appeared in the *Lancet*, the *Lancet Infectious Disease, Out, HIV Plus, Salon* and other publications. Over the past ten years, she has worked with U.S.-based groups and international coalitions on various campaigns to expand access to life-saving treatment for people with HIV/AIDS in the developing world, focusing specifically on women's priorities and agendas. In 2004, she received a Fulbright grant which supported research for a book on AIDS treatment roll-out in Uganda.

**Francisco I. Pinkusfeld M. Bastos, MD, PhD**
Senior Researcher, Health Information Department
Oswaldo Cruz Foundation (CICT/FIOCRUZ)
Rio de Janeiro, Brazil

Francisco I. Pinkusfeld M. Bastos, MD, PhD, is a senior researcher at the Oswaldo Cruz Foundation (FIOCRUZ), Brazil. Dr. Bastos has extensive experience assessing populations at high-risk of HIV infection in Brazil, an area in which he is well published. He has also worked on many analyses of the status and trends of the HIV/AIDS epidemic in Brazil. Dr. Bastos has been involved in the planning and management of several multi-city projects, including the World Health Organization's project on HIV/AIDS and viral hepatitis among injection drug users and a variety of protocols within the NIH-sponsored HPTN cooperative network.

**William Blattner, MD**
Associate Director, Institute of Human Virology
Professor, School of Medicine
University of Maryland
Baltimore, Maryland, U.S.A.

William A. Blattner, MD is Associate Director of the Institute of Human Virology (IHV) and Professor in the School of Medicine at the University of Maryland. Dr. Blattner co-founded IHV and is currently the director of IHV's Epidemiology and Prevention Division. Since 1980, Dr. Blattner has pioneered studies of the epidemiology and prevention of the human retroviruses, HIV and HTLV. Today, Dr. Blattner's research employs broad-based population and clinical research strategies to advance understanding of HIV pathogenesis, risk factors, and prevention, focusing on HIV preventative vaccines. He is director and Principal Investigator for the IHV Clinical Trials Unit, where his work focuses on accelerating the testing of HIV vaccine candidates and developing cohorts suitable for efficacy trials. Dr. Blattner also leads an affiliated IHV-Nigeria international program in West Africa. To date, this program has provided antiretroviral medication for about 50,000 patients and is partially modeled on IHV's HIV/AIDS prevention and treatment programs in Baltimore.

**Azizbek Boltaev, MD**
Regional Harm Reduction Adviser
Central Asian Regional HIV/AIDS Program, GRM International
Tashkent, Uzbekistan

Azizbek Boltaev, MD, is a regional harm reduction advisor to the British government's Department for International Development funded Central Asian Regional HIV/AIDS Program (CARHAP), and an initiator

and the former head of the department for medico-social rehabilitation at the Bukhara Regional Addiction Clinic in Uzbekistan.

**Anne Buvé, MD, PhD**
Senior Lecturer and co-head, HIV/STI Epidemiology and Control Unit
Department of Microbiology, Institute of Tropical Medicine
Antwerp, Belgium

Dr. Ann Buvé is senior lecturer and co-head of the HIV/STI Epidemiology and Control Unit of the Department of Microbiology, Institute of Tropical Medicine in Antwerp, Belgium and is the acting chairperson of the Institute's Institutional Review Board. She received an MD in 1978 and a PhD in 2001 from the University of Antwerp and an MSc in Epidemiology in 1990 from the London School of Hygiene and Tropical Medicine. She spent a decade working as a district medical officer in Zambia and Sierra Leone. Her research interests include the epidemiology of HIV and other sexually transmitted infections in developing countries, especially in Africa, the development of interventions to reduce the spread of HIV and implications for the management of patients dually infected with tuberculosis and HIV. Dr. Buvé has been on the editorial board of the journal *AIDS* since 1996 and was an expert for France's Agence Nationale de Recherches sur le SIDA from 1997 until 2003.

**Carlos Caceres, MD, DrPH**
Professor and Vice-Dean, School of Public Health
Cayetano Heredia University
Lima, Peru

Carlos F. Caceres, MD, PhD is professor at Cayetano Heredia University in Peru and Vice-Dean of the School of Public Health. He is the co-Principal Investigator of two community HIV prevention trials in Peru, and a member of the PAHO/UNAIDS Epidemiological Network and the Regional Advisory Panel of the World Health Organization's Human Reproduction Program. Dr. Caceres is the President of the International Association for the Study of Sexuality and Culture in Society, is on the board of directors of the Monitoring the AIDS Pandemic Network and has served as director of a five-year Ford Foundation program on sexuality, health and human rights He is also a member of the editorial board of multiple international public health and sexuality journals and is a criticism editor of the HIV/AIDS Cochrane Collaboration group.

**Willard Cates, MD, MPH**
President, Research
Family Health International
Research Triangle Park, North Carolina, U.S.A.

Dr. Ward Cates is President of Research at Family Health International. Before joining FHI twelve years ago, Dr. Cates was at the Centers for Disease Control (CDC) for two decades, where he directed STD/HIV Prevention efforts and headed CDC's abortion surveillance activities. Dr. Cates received a combined MD-MPH degree from the Yale School of Medicine, trained clinically in Internal Medicine at the University of Virginia Hospital and is board certified in Preventive Medicine. Dr. Cates is an Adjunct Professor of Epidemiology at the University of North Carolina-Chapel Hill School of Public Health and a Clinical Professor in UNC's Departments of Medicine and Obstetrics/Gynecology. Dr. Cates is a Member of the Institute of Medicine, National Academy of Sciences, the American College of Preventive Medicine, and past President of the Society for Epidemiologic Research. Dr Cates has authored or co-authored over 400 scientific publications, is the co-author of *Contraceptive Technology* and was co-editor of *Sexually Transmitted Diseases*, 2nd edition.

**Suwat Chariyalertsak**, **MD, DrPH**
Associate Professor, Department of Community Medicine
Deputy Director, Research Institute for Health Sciences
Chiang Mai University
Chiang Mai, Thailand

Dr. Suwat Chariyalertsak is an Associate Professor in the Department of Community Medicine, Faculty of Medicine, Chiang Mai University and currently serves as Deputy Director of the Research Institute for Health Sciences (RIHES), Chiang Mai University. Dr. Chariyalertsak received his MD from Mahidol University, an MSc in clinical tropical medicine at Mahidol University, an MPH in Health System management at Tulane University and a DrPH in Infectious Diseases Epidemiology at Johns Hopkins University. His background has been in health systems research and the epidemiology of HIV/AIDS in northern Thailand. Since 2000, Dr. Chariyalertsak has worked primarily in HIV/AIDS prevention and clinical trial research. He has helped design, implement and evaluate studies in serodiscordant couples and others populations receiving ART and is the principal investigator of a major study on the efficacy of community-based volunteer counseling and testing and prevention of HIV infection in men who have sex with men in Thailand.

**Thomas J. Coates, PhD**
Director, UCLA Program in Global Health
Michael and Sue Steinberg Endowed Professor of Global AIDS Research
Division of Infectious Diseases, Department of Medicine
David Geffen School of Medicine
University of California, Los Angeles
Los Angeles, California, U.S.A.

Thomas J. Coates, PhD is the Michael and Sue Steinberg Endowed Professor of Global AIDS Research within the Division of Infectious Diseases at UCLA and directs UCLA's Program in Global Health. He co-founded the Center for AIDS Prevention Studies at UCSF in 1986 and directed it from 1991 to 2003. He was also the founding Executive Director of the UCSF AIDS Research Institute, leading it from 1996 to 2003. Dr. Coates is currently finishing a nationwide clinical trial of an experimental HIV preventive intervention focused on high-risk men as well as domestic trials of post-exposure prophylaxis. Internationally, he is directing a 46 community-randomized clinical trial in South Africa, Zimbabwe, Tanzania and Thailand to determine the impact of strategies for destigmatizing HIV on HIV incidence community-wide, is leading a prevention clinical trial in South America as part of a 5-country effort, and has a trial in China to determine the impact of prevention in the context of care. He is co-principal investigator of the NIAID funded HIV Prevention Trials Network, and is conducting policy research domestically and internationally. Dr. Coates was elected to the Institute of Medicine in 2000.

**Patrick Dakum, MBBS, MPH**
Resident Chief of Party, Institute of Human Virology, Nigeria
Abuja, Federal Capital Territory, Nigeria
Adjunct Professor, University of Maryland
Baltimore, Maryland, U.S.A.

Patrick S. Dakum, MBBS, MPH, an adjunct professor at the University of Maryland, is The Chief of Party, Institute of Human Virology, Nigeria, (IHVN) West Africa. IHVN is currently providing AIDS care, treatment and antiretroviral medication to approximately 50,000 patients under the President's Emergency Plan for AIDS Relief (PEPFAR). Dr. Dakum is also Project Director of the Public Health Program of the Institute in Nigeria. He has served as the Commissioner for Health and Information with the Plateau State Government, Nigeria and as Board Chairman for the Plateau State Hospitals Management Board. As a Member of the Governing Council of the University of Jos, he chaired various committees and Boards within the University system. Dr. Dakum has also worked as Program Manager for CEDPA –USAID, Program Adviser for UNFPA, Public Health Consultant to Help International, Program Officer for AVSC International, and Resource Intensification Strategy Coordinator for a USAID multi partner project.

**Wendy W. Davis, EdM**
Research Coordinator, Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Wendy Davis is a research coordinator with the Department of Epidemiology at the Johns Hopkins Bloomberg School of Public Health. She received her master's degree from Harvard University's School of Education, and worked for the American Psychiatric Association on the development of the fourth edition of the Diagnostic and Statistical Manual for Mental Disorders, the DSM-IV. She was the DSM-IV Project Coordinator and later the DSM-IV Editorial Coordinator and project coordinator for the DSM-IV Primary Care version. While at the APA she authored and edited numerous papers about the DSM-IV, was the editor of a series of columns on specific issues in the development of DSM-IV for the journal *Hospital and Community Psychiatry* and was an editor of the four volume DSM-IV Sourcebook. At Hopkins, she is involved in a series of projects considering HIV/AIDS and marginalized populations, in the U.S. and internationally, and has written and edited numerous chapters and papers in this area.

**Guy De Bruyn, MBBCh, MPH**
Project Director, Perinatal HIV Research Unit
University of Witwatersrand
Chris Hani Baragwanath Hospital
Johannesburg, South Africa

Dr. Guy de Bruyn received his medical degree from the University of the Witwatersrand in 1994 and after additional training in South Africa completed an internal medicine residency at Baylor College of Medicine and an infectious diseases fellowship at the University of Washington. Between 2001 and 2004, Dr. de Bruyn was a fellow in the HIV Vaccine Trials Network Core Operations, based at the Fred Hutchinson Cancer Research Center in Seattle, Washington. Since joining the Perinatal HIV Research Unit in 2004, his work has also included clinical trials of novel HIV prevention approaches, such as the latex diaphragm and HSV-2 suppression, and studies of early HIV infection.

**Achamyelesh Kifle Debela, MD**
Deputy Director, Armed Forces General Hospital
Addis Ababa, Ethiopia

Colonel Achamyelesh Kifle Debela, MD, MPH is the Academic Dean of the Defense Health Sciences College in Debre Zeit, Ethiopia and is affiliated with the Armed Forces General Teaching Hospital in Addis Ababa. At this hospital, Dr. Achamyelesh has also served as Associate Dean, Deputy Medical Director, head of training and documentation, member of the hospital management board, head of the Pediatrics Department, head of the outpatient department and general practitioner. She also holds an honorary Assistant Professorship in the Department of Pediatrics and Child Health at Addis Ababa University. Dr. Achamyelesh has been a leader in Ethiopia's efforts to combat HIV/AIDS for the past decade, serving as a member of numerous HIV/AIDS related organizations including the Ethiopian National HIV Council and the national HIV/AIDS Prevention and Control Office's National Review Board. She helped to craft the Ministry of Defense's five-year strategic plan for prevention and control of HIV/AIDS as well as its guidelines for the provision of antiretroviral therapy. Dr. Achamyelesh received her medical degree from Addis Ababa University and her MPH degree from the Johns Hopkins Bloomberg School of Public Health.

**Jack A. DeHovitz, MD, MPH**
Professor, Preventive Medicine and Medicine
SUNY-Downstate Medical Center
Brooklyn, New York, U.S.A.

Jack A. DeHovitz, MD, MPH is board certified in Medicine, Preventive Medicine and Infectious Diseases, and has been working in Central and Eastern Europe since 1990. Dr. DeHovitz holds joint appointments as Professor in the Department of Preventive Medicine and Community Health and in the Department of Medicine, Division of Infectious Diseases at State University of New York Downstate Medical Center (SUNY-DMC), and in addition is Director of The HIV Center for Women and Children at SUNY-DMC. Dr. DeHovitz currently directs HIV services at SUNY-DMC, and serves as Principal Investigator or co-investigator on numerous clinical trials and natural history studies. Training programs directed by Dr. DeHovitz include the Fogarty International

Center funded AIDS International Training and Research Program (AITRP) and SUNY DMC's Nicholas A. Rango HIV Clinical Scholars Program.

**Carlos del Rio, MD**
Professor of Medicine and Vice Chair, Department of Medicine
Director, Emory AIDS International Training and Research Program
Co-Director, Emory Center for AIDS Research (CFAR)
Emory School of Medicine
Atlanta, Georgia, U.S.A.

Dr. Carlos del Rio is Professor of Medicine and Vice Chair in the Department of Medicine at Emory University School of Medicine and Adjunct Professor of Global Health at the Rollins School of Public Health of Emory University. He is also co-Director of the Emory Center for AIDS Research and Director of the Emory AIDS International Training and Research Program. Dr. del Rio is a native of Mexico where he was Executive Director of the National AIDS Council of Mexico (CONASIDA, the Federal agency of the Mexican Government responsible for AIDS Policy throughout Mexico), from 1992 to 1996. Since that time he has been at Emory where he has been involved in patient care, teaching and research.

**Roger Detels, MD, MS**
Professor, Department of Epidemiology
School of Public Health
University of California, Los Angeles
Los Angeles, California, U.S.A.

Roger Detels MD, MS, began his research career at the U.S. Naval Medical Research Unit in Taipei, Taiwan in 1966 and his research in HIV/AIDS in 1981. Professor Detels is the director of the UCLA Center of the Multicenter AIDS Cohort Study and he has directed research projects in China, India, Vietnam, Cambodia, Thailand, Myanmar (Burma), Philippines, Indonesia, Laos, Taiwan and Thailand. He is also the director of the UCLA/Fogarty AIDS International Training and Research Program, which has trained over 100 health professionals from Asia, Southeast Asia, South Asia, Eastern Europe and Latin America. Professor Detels has served as Dean of UCLA's School of Public Health and Chair of its Department of Epidemiology and has been president of the Society of Epidemiologic Research and the International Epidemiological Association. Professor Detels was an editor of the first and second editions of the *Oxford Textbook of Public Health*, and the senior editor for all subsequent editions.

**Ann Duerr, MD, PhD, MPH**
Associate Director (Scientific Support) of the HIV Vaccine Trials Network, Seattle
HIV Vaccine Trials Network Core Operations
Fred Hutchinson Cancer Research Center
Seattle, Washington, U.S.A.

Dr. Ann Duerr received her BSc from McGill University, her PhD from the Massachusetts Institute of Technology, her MD cum laude from Harvard Medical School and completed a Preventive Medicine Residency at the Johns Hopkins School of Hygiene and Public Health. Dr. Duerr joined the U.S. Centers for Disease Control in 1991, as chief of the HIV section in the Division of Reproductive Health, National Center for Chronic Disease and Health Promotion. Under her direction, the HIV section expanded, gained international recognition for its expertise in clinical trials related to HIV and reproductive health of women and launched several seminal multi-national efforts. These included the HIV Epidemiology Research Study (HERS); research to increase awareness of refugee women's health; an investigation of HIV transmission in Thai couples; an initiative on microbicide research; and the ongoing Breastfeeding Antiretrovirals Nutrition (BAN) trial. Dr. Duerr has received numerous honors including the Surgeon General's Exemplary Service Award, the Public Health Service Special

Recognition Award and has served as a consultant to the World Health Organization and UNAIDS. Since 2003, Dr. Duerr has been the Associate Director (Scientific Support) of the HIV Vaccine Trials Network, Seattle.

**Richard Elovich, MPH**
Fellow, National Development and Research Institutes, Inc.
New York, New York, U.S.A.

Richard Elovich, MPH, is a medical sociologist and a fellow at the National Resource Development Institute in New York. Mr. Elovich was an organizer of the first needle exchange program in New York City, and is the former Director of HIV Prevention for the largest AIDS NGO in the U.S. He is an international consultant with experience working in Asia and the former Soviet Union, and was senior consultant to the USAID-funded Drug Demand Reduction Program in Uzbekistan, Kyrgyzstan, and Tajikistan.

**Paul Farmer, MD, PhD**
Maude and Lillian Presley Professor of Medical Anthropology
Department of Social Medicine, Harvard Medical School
Associate Chief, Division of Social Medicine and Health Inequalities
Brigham and Women's Hospital
Boston, Massachusetts, U.S.A.

Dr. Paul Farmer is the Maude and Lillian Presley Professor of Medical Anthropology in the Department of Social Medicine, Harvard Medical School and Associate Chief of the Division of Social Medicine and Health Inequalities at Brigham and Women's Hospital. He is a co-founder of Partners In Health, an international charity organization that provides direct health care services and undertakes research and advocacy activities on behalf of those who are sick and living in poverty. Dr. Farmer and his colleagues have pioneered novel, community-based treatment strategies for infectious diseases (including HIV/AIDS and multidrug-resistant tuberculosis) in resource-poor settings in Haiti, Peru, Russia, and Rwanda. He is the author of four books and co-editor of two other books.Dr. Farmer has received numerous awards in the last decade and in 1993 was awarded a John D. and Catherine T. MacArthur Foundation "genius award" in recognition of his work. Dr. Farmer received his Bachelor's degree from Duke University, and his MD and PhD in Anthropology from Harvard University.

**Dan Fitzgerald, MD**
Assistant Professor, Division of International Medicine and Infectious Diseases
Weill Cornell Medical College
New York, New York, U.S.A.

Daniel Fitzgerald, MD is an Assistant Professor of Medicine at the Weill Medical College of Cornell University, and research scientist at the Haitian Study Group of Kaposi's Sarcoma and Opportunistic Infections (GHESKIO) in Port-au-Prince, Haiti. Dr. Fitzgerald has been working in Haiti for 12 years, and is an expert on the management of HIV/AIDS and TB in resource-poor settings. He has conducted several clinical trials comparing strategies for the prevention, diagnosis, and treatment of HIV/AIDS and TB, and was the senior author of a study which showed HIV/AIDS treatment outcomes in Haiti that rivaled those of industrialized countries. He is currently the co-director of an NIH-funded randomized trial to evaluate if earlier initiation of therapy can further increase life expectancy among HIV/AIDS patients in Haiti. Dr. Fitzgerald is also an expert on the ethics of conducting research in resource-limited settings, and has published several articles on this topic.

**Joel E. Gallant, MD, MPH**
Professor of Medicine and Epidemiology
Associate Director, Johns Hopkins AIDS Service
Johns Hopkins University School of Medicine
Baltimore, Maryland, U.S.A.

Joel E. Gallant, MD, MPH is Professor of Medicine in the Division of Infectious Diseases at the Johns Hopkins University School of Medicine in Baltimore, Professor of Epidemiology at the Johns Hopkins Bloomberg School of Public Health, and Associate Director of the Johns Hopkins AIDS Service. He has conducted dozens

of clinical trials on the treatment of HIV infection and is an investigator in the HIV Prevention Trials Network (HPTN), the Multicenter AIDS Cohort (MACS), and the AIDS Clinical Trials Group (ACTG). Within the HPTN and ACTG he has been involved in international clinical trials, especially in Chiang Mai, Thailand. Dr. Gallant is co-author, with John G. Bartlett, of the *Medical Management of HIV Infection,*which is updated annually and is editor-in-chief of the Johns Hopkins HIV Guide, a web-based educational tool. He is the author of *100 Questions and Answers about HIV and AIDS,*a book for people with HIV infection.

**Jane Galvão, PhD, MA**
Senior Program Officer for HIV/AIDS/STI
International Planned Parenthood Federation/Western Hemisphere Region
New York, New York, U.S.A.

Dr. Jane Galvão is the Senior Program Officer for HIV/AIDS/STI with the International Planned Parenthood Federation/Western Hemisphere Region (IPPF/WHR) in New York which works with IPPF/WHR member associations in the Latin American and Caribbean region. She holds a PhD in Public Health and an MA in Social Anthropology, and has been actively involved in HIV/AIDS programs in her native Brazil for a number of years. Dr. Galvão was the Executive Director of the Brazilian Interdisciplinary AIDS Association (ABIA) from 1993 to 1999 and worked with the Brazilian Ministry of Health's National AIDS Program from 1999 to 2001. In 2001, Dr. Galvão undertook a postdoctoral fellowship in the Fogarty International AIDS Training Program at the School of Public Health, University of California, Berkeley and was a researcher and postdoctoral fellow at the Institute for Global Health, at the University of California, San Francisco, from 2002 to 2004, before joining IPPF/WHR.

**Vivian Go, PhD, MPH, MA**
Assistant Professor, Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, USA

Dr. Vivian Go is an Assistant Professor in the Infectious Diseases Program of the Department of Epidemiology at the Johns Hopkins Bloomberg School of Public Health. Her research has primarily focused on understanding and responding to the social context surrounding HIV prevention in South and Southeast Asia. She has integrated qualitative and quantitative methods to examine barriers to HIV prevention among marginalized populations. Over the last decade, she has worked in collaboration with the Vietnamese government to develop and evaluate HIV prevention interventions for injection drug users.

**Gregg Gonsalves**
Coordinator, AIDS and Rights Alliance for Southern Africa
Windhoek, Namibia

Gregg Gonsalves is an AIDS activist who works with the AIDS and Rights Alliance for Southern Africa (ARASA), a regional network of human rights and HIV/AIDS organizations in the countries of the Southern African Development Community. He is currently the coordinator of ARASA's program on capacity building for access to HIV and TB prevention, treatment, care and support. This program is training communities on the science of HIV and TB in order to develop local education and advocacy efforts on both diseases. Previously, he was director of prevention and treatment advocacy for Gay Men's Health Crisis and co-founder and policy director of the Treatment Action Group, both in New York City.

**Glenda Gray, MD**
Executive Director, Perinatal HIV Research Unit
University of Witwatersrand
Chris Hani Baragwanath Hospital
Johannesburg, South Africa

Glenda Gray, MD is an Associate Professor in the Department of Paediatrics, based at the University of the Witwatersrand, as well as the Executive Director of the Perinatal HIV Research Unit. Her initial research focus

was in the field of mother to child transmission of HIV-1 and paediatric HIV treatment and in 2002 she was awarded the Nelson Mandela Health and Human Rights Award for work done in the prevention of mother to child transmission in South Africa in conjunction with her colleague James McIntyre, MD. Since 2000, Professor Gray's research has also focused on the development of an HIV vaccine and HIV prevention research. Professor Gray's team led the first HIV phase IIb vaccine trials in South Africa and was responsible for the clinical development of South Africa's first HIV vaccines. A member of the Academy of Science of South Africa, Professor Gray recently served on a study panel which conducted a scientific inquiry into nutritional influences on human immunity with special reference to HIV infection and active TB in South Africa.

**Mariana de Andrea Vilas-Boas Hacker, PhD**
Research Associate, Oswaldo Cruz Institute (IOC/FIOCRUZ)
Rio de Janeiro, Brazil

Dr. Mariana Hacker is a statistician with masters and doctoral degrees in Epidemiology. In the last several years, in a collaborative effort of the Brazilian government's Health Information Department and the Oswaldo Cruz Foundation, she has provided analysis for primary Brazilian HIV/AIDS databases. She has also analyzed data from a variety of different HIV/AIDS related studies. Her HIV/AIDS work has had a specific focus on drug abusing individuals and other vulnerable populations. Dr. Hacker is also studying the epidemiology of Hansen's disease.

**Nguyen Tran Hien, MD**
Director, National Institute of Hygiene and Epidemiology
Hanoi, Vietnam
Dr. Nguyen Tran Hien is the director of the National Institute of Hygiene and Epidemiology (NIHE), a leading scientific research institute in Vietnam in the area of epidemiology, medical microbiology, immunology and molecular biology, vaccine development and production. He has extensive experience in HIV/AIDS surveillance, prevention and control in Vietnam and is Chairman of the National Committee of HIV/AIDS Surveillance and Chairman of the Committee of HIV/AIDS Prevention and Control for the Northern Region, Vietnam.

**Christopher J. Hoffmann, MD, MPH**
Research and Clinical Fellow, Division of Infectious Diseases, Department of Medicine
Johns Hopkins University School of Medicine
Baltimore, Maryland, U.S.A.

Christopher Hoffmann, MD, MPH, MSc is a Fellow in the Division of Infectious Diseases of the Department of Medicine, Johns Hopkins School of Medicine and a Project Manager at the Aurum Institute for Health Research in Johannesburg, South Africa. In the past he has worked on HIV prevention and HIV care in Swaziland and in South Africa. His current research is focused on the clinical epidemiology of HIV care, including HIV – hepatitis B co-infection, HIV – TB co-infection, and the emergence of antiretroviral resistance in southern Africa. He has recently evaluated early side effects, treatment failure, and hepatitis B related impact during antiretroviral therapy (ART) in a workplace ART program in South Africa.

**Thaung Htun, MD**
United Nations Representative
National Coalition Government of the Union of Burma
New York, New York, U.S.A.

Dr. Thaung Htun is a Burmese physician and graduate of Rangoon University Medical School, who was actively engaged in the 1988 democratic uprising in Burma. He now represents the democracy movement as a representative of the National Coalition Government of the Union of Burma (NCGUB) to the United Nations, and is active in health and humanitarian policy. Dr. Thaung Htun also serves as Secretary of the Foreign Affairs Committee of the NCGUB, member of the Finance Committee of the NCGUB, member of the Strategic Coordinating

Committee of the Burmese democracy movement in exile and Executive Director of the Burma Fund, Policy Think Tank of the NCGUB.

**Warren Johnson, MD**
Chief, Division of International Medicine and Infectious Diseases
Weill Cornell Medical College
New York, New York, U.S.A.

Warren D. Johnson, Jr., MD is the B.H. Kean Professor of Tropical Medicine and Chief of the Division of International Medicine and Infectious Diseases at the Weill Medical College of Cornell University. He is also the Coordinator of the Weill-Cornell-Bugando Training Program and co-director of the Tropical Medicine Research Center at the Federal University of Bahia, in Salvador, Brazil. He has directed the Cornell research and training programs in Brazil since 1969 and in Haiti since 1980. Dr. Johnson is the director of two NIH Fogarty international training grants in Haiti and the co-director of three Fogarty training grants in Brazil. Dr. Johnson has served in several different capacities for the American Board of Internal Medicine and many other organizations. He was elected to the Brazilian National Academy of Science, and has received a National Institute of Allergy and Infectious Disease merit award for studies of the "Natural History of HIV infection in Haiti" and numerous other honors and awards.

**Seth C. Kalichman, PhD**
Professor, Department of Psychology
University of Connecticut
Storrs, Connecticut, U.S.A.

Seth C. Kalichman received his PhD in Clinical-Community Psychology from the University of South Carolina in 1990 and is now a Professor in the Psychology Department at the University of Connecticut. His research focuses on social and behavioral aspects of HIV/AIDS, particularly sexual risk behavior and behavioral intervention research and has been continuously funded by the National Institutes of Health since 1992. Dr. Kalichman has directed the Southeast HIV and AIDS Research and Evaluation (SHARE) Project, a research program within the AIDS Survival Project in Atlanta, Georgia and has ongoing projects in South Africa. He is editor of the journal *AIDS and Behavior* and has authored and edited five books in the area of HIV/AIDS prevention and care services.

**Adeeba Kamarulzaman, MBBS, FRACP**
Professor, Infectious Diseases
University of Malaya Medical Centre
Kuala Lumpur, Malaysia

Adeeba Kamarulzaman, MBBS, FRACP is a Professor of Infectious Diseases at the University of Malaya Medical Centre. She is directly involved in both the treatment and preventative aspects of HIV/AIDS in Malaysia through her clinical and academic appointments as well as her role as the President of the Malaysian AIDS Council, the leading HIV/AIDS NGO in Malaysia. Her research encompasses clinical as well as epidemiological and socio-behavioural aspects of HIV particularly focusing on the interaction between injecting drug use and HIV.

**Saidi H. Kapiga, MD, MPH, ScD**
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Harvard School of Public Health
Boston, Massachusetts, U.S.A.

Saidi H. Kapiga, MD, MPH, ScD is an adjunct Associate Professor in the Department of Population and International Health at the Harvard School of Public Health. Dr. Kapiga has extensive research experience in the areas of epidemiology of sexually transmitted infections and HIV, topical microbicides and prevention of

mother-to-child transmission of HIV infection. Much of his recent research has focused on a cohort of women at increased risk of HIV in northern Tanzania. Results from this study have been used to examine factors associated with HIV incidence and shedding of HIV in the genital tract, and to assess interactions between socio-demographic factors, alcohol use and HIV acquisition. Dr. Kapiga has recently joined the faculty of the Department of Epidemiology and Population Health at the London School of Hygiene and Tropical Medicine (LSHTM) where he is directing LSHTM projects in Mwanza and Moshi, Tanzania.

**Milly Katana**
Lobbying and Advocacy Officer, Health Rights Action Group
Kampala, Uganda
Milly Katana is the director of the International HIV/AIDS Alliance country office in Uganda and director of a USAID supported project which aims to build capacity of groups of people living with HIV/AIDS (PHA) by strengthening innovative approaches to HIV/AIDS prevention, care, support and treatment. Formally a global advisor supporting the implementation of the United Nations (UN) Learning Strategy on HIV/AIDS both in the workplace and country programs, she pioneered the expanded implementation of the U.N. Personnel Policy on HIV/AIDS. As a founder of Health Rights Action Group-Uganda, Katana led advocacy campaigns on health policy and organized community groups and people living with HIV/AIDS. She has published and presented extensively on PHA involvement in HIV programs, and has served representational roles on local, national, regional and international bodies including the Global Fund, the Global Network of People Living with HIV/AIDS, the Network of People Living with HIV/AIDS in Uganda and the National Joint Planning Committee for the National Strategic Response to HIV/AIDS in Uganda 2000–2005.

**Deanna Kerrigan, PhD, MPH**
Adjunct Assistant Professor, Social and Behavioral Interventions,
Department of International Health
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.
Program Officer, Sexuality and Reproductive Health
The Ford Foundation
New York, New York, U.S.A.

Deanna Kerrigan, PhD, MPH, is an Assistant Professor in the Social and Behavioral Interventions Program of the Department of International Health at the Johns Hopkins Bloomberg School of Public Health. Much of her recent research has focused on understanding and responding to the social context surrounding HIV prevention and care initiatives within Latin America and the Caribbean. In particular she has been active in the development and evaluation of efforts to situate HIV prevention and care within a larger framework and process of community mobilization and development. Over the last decade she has worked in collaboration with several NGOs in the Dominican Republic to formulate and assess environmental-structural HIV prevention interventions within the country's female sex industry. Dr. Kerrigan has recently joined the Ford Foundation as a Sexuality and Reproductive Health program officer based in Rio de Janeiro, Brazil.

**Serena Koenig, MD, MPH**
Instructor in Medicine, Harvard Medical School
Division of Social Medicine and Health Inequalities
Division of Infectious Disease
Brigham and Women's Hospital
Boston, Massachusetts, U.S.A.

Dr. Serena Koenig is an instructor in medicine at Harvard Medical School, and is on the faculties of the Division of Social Medicine and Health Inequalities and the Division of Infectious Disease at Brigham and Women's Hospital. She has been based in Boston and Haiti for the past eight years, working with Partners in Health and GHESKIO (Haitian Study Group of Kaposi's Sarcoma and Opportunistic Infections). At GHESKIO, she conducted the first costing analysis of HIV/AIDS treatment using patient-level data in a deeply impoverished setting. She is currently conducting several studies to evaluate the clinical outcomes and cost of a variety of

HIV/AIDS and TB treatment strategies. She divides her clinical time between the infectious disease and internal medicine services at Brigham and Women's Hospital and a clinic in Haiti. Dr. Koenig is the former Medical Director for Partners in Health's Haiti Programs. She completed her internal medicine residency and infectious disease fellowship at the Brigham and Women's and Massachusetts General Hospitals, and is board-certified in both specialties. She completed her MPH at the Harvard School of Public Health.

**Kelika Konda, MHS**
Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Ms. Kelika Konda is a doctoral graduate student in Epidemiology at the Johns Hopkins Bloomberg School of Public Health. In 2005, she received a Master's degree in Social and Behavioral Interventions from the Johns Hopkins Bloomberg School of Public Health's Department of International Health. She has worked with the Peru site of the NIHM HIV/STD Prevention Trial, led by Drs. Tom Coates and Carlos Caceres, since 2003 and conducted her Master's internship research there.

**Marie Laga, MD, PhD, MSc**
Professor
Head, HIV/STI Research and Intervention Unit
Institute of Tropical Medicine
Antwerp, Belgium

Marie Laga, MD, PhD, MSc directs the HIV/STI Research and Intervention Unit for the Institute of Tropical Medicine which is involved in the coordination of applied research on and technical assistance to HIV/AIDS and STI related projects in developing countries, primarily Africa. She has worked in the HIV/AIDS field since 1984 in several African countries including Burundi, Kenya, Democratic Republic of Congo, and Cote d'Ivoire. She has also conducted several short term missions to Africa and Asia to evaluate HIV/AIDS interventions, and the design and implementation of HIV/AIDS control and training programs. As part of a Sabbatical leave, Dr. Laga spent two years (2001–2003) in Abidjan, Cote d'Ivoire, as director of Projet Retro-CI, a large Centers for Disease Control (CDC) funded HIV/AIDS intervention program which focused on prevention, care and capacity building. Dr. Laga has trained in the United Kingdom at the London School of Hygiene and Tropical Medicine and was a visiting scientist in the CDC's AIDS program.

**Fernet Leandre, MD**
Director, TB/HIV/AIDS Program
Partners in Health, Zanmi Lasante
Cange, Haiti

Fernet Léandre, MD, has directed Zanmi Lasante's HIV/AIDS/TB/STI Program in central Haiti, one of the first in the world to treat HIV-positive poor people with antiretroviral therapy in an impoverished setting, since 1998. With support from one of the first Global Fund to Fight AIDS, Tuberculosis, and Malaria awards, Zanmi Lasante, under Dr. Léandre's leadership, and in partnership with the Haitian Ministry of Health, has re-opened clinics in six additional sites in Haiti's rural Central Plateau. More than 3,000 patients are now receiving antiretroviral therapy for advanced AIDS through this program. Dr. Léandre is active in the Caribbean-wide CHART/CDC/GAP/I-TECH HIV training initiative for health care workers, and he serves as a medical and technical consultant to Partners In Health's AIDS treatment project in rural Rwanda. Dr. Léandre has also served as a Lecturer in the Department of Social Medicine at Harvard Medical School.

**Li Li, PhD**
Research Sociologist, Department of Psychiatry and Behavioral Sciences
Semel Institute Center for Community Health
University of California, Los Angeles
Los Angeles, California, U.S.A.

Li Li, PhD is a Research Sociologist in the Department of Psychiatry and Behavioral Sciences at UCLA and Semel Institute-Center for Community Health. Over the past two decades she has worked in the areas of HIV prevention and intervention, substance abuse treatment, and health promotion and services. Dr. Li's research has focused on social and cultural issues related to conducting research in developing countries and has received research grants to examine HIV related stigma among service providers in China and to study Chinese families and children impacted by HIV/AIDS.

**Dmitry Lioznov, MD, PhD**
Director, Center for Preventive Medicine
Head, Center for Chronic Viral Infections Research
Assistant Professor, Department of Infectious Diseases and Epidemiology
Vice-Rector for Nursing Education
Pavlov State Medical University
St. Petersburg, Russia

Dmitry Lioznov, MD, PhD is the Director, Center for Preventive Medicine; Head, Center for Chronic Viral Infections Research, and Assistant Professor, Department of Infectious Diseases and Epidemiology at Pavlov State Medical University in St. Petersburg, Russia. He also serves as Vice-Rector for Nursing Education. An infectious diseases specialist, Dr. Lioznov has been involved in numerous clinical, research and training programs related to HIV/AIDS, viral hepatitis, drug addiction, and public health.

**Monica Malta, MPH**
Researcher, Social Science Department
Oswaldo Cruz Foundation (ENSP/FIOCRUZ)
Rio de Janeiro, Brazil

Monica Malta, MPH is a Psychologist and Researcher in the Social Science Department of the Sergio Arouca School of Public Health, Oswaldo Cruz Foundation and a consultant to the Pan American Health Organization (PAHO) in Brazil. In 2005 she was a NIDA/NIH visiting researcher in the Mental Health department of the Johns Hopkins Bloomberg School of Public Health. Much of her recent research and publications have focused on the care of people living with HIV/AIDS, in particular drug users and disenfranchised populations in Brazil.

**Nicole Franck Masenior, MHS**
Senior Research Coordinator
Center for Public Health and Human Rights
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Nicole Franck Masenior, MHS, is the Senior Research Coordinator for the Center for Public Health and Human Rights at the Johns Hopkins Bloomberg School of Public Health. Here she works on several projects with ethnic Burmese partners including the delivery of reproductive health interventions to remote areas of eastern Burma and also studies of how infectious diseases in Burma impact neighboring regions such as China and India. Prior to joining the Center, she lived in Mae Hong Son, Thailand and conducted research inside the refugee camps along the Thai-Burma border. She received her public health training in social and behavioral interventions in the Department of International Health at Johns Hopkins University.

**Richard Matendo, MD, MSc**
Project Manager, PMTCT Pilot Project GTZ/UNC
Hospital General de Kinshasa
Kinshasa, Democratic Republic Congo

Dr. Richard Matendo received his MD from the University of Kinshasa in 1989 and his Master of Sciences in Disease Control from the Prince Leopold Institute of Tropical Medicine, in Antwerp, Belgium in 2007. He is the Project Manager and Technical Coordinator for HIV/AIDS Prevention of Mother to Child Transmission, for joint research projects of the University of North Carolina and Kinshasa School of Public Health. Previously,

Dr. Matendo served as a project coordinator and a field research assistant for HIV/AIDS projects in Kinshasa. He has also served as head of the Wamba-Luadi Health Zone/ Province of Bandundu in the Democratic Republic of Congo (DRC), Director of the General Referral Hospital and as a clinician and deputy in the Paediatrics' Department of the Kimpese General Referral Hospital in the Province of Bas-Congo in the DRC.

**Ian McGowan, MD, PhD, FRCP**
Professor of Medicine
University of Pittsburgh School of Medicine
Magee-Womens Research Institute
Pittsburgh, Pennsylvania, U.S.A.

Ian McGowan, MD, PhD, FRCP is a Professor in the University of Pittsburgh School of Medicine. He graduated in medicine from the University of Liverpool, UK and subsequently received his PhD from Oxford University in the area of mucosal immunology and HIV infection. He has worked within the pharmaceutical industry on antiretroviral drug development and was responsible for the clinical development of tenofovir disoproxil fumarate at Gilead Sciences. His current areas of active research are HIV-associated gastrointestinal disease and microbicide development. Dr. McGowan is the Co-Principal Investigator of the NIH sponsored Microbicide Trials Network and has acted as a consultant to both the Centers for Disease Control and the World Health Organization on microbicide development. In addition he is a member of the Antiviral Advisory Committee of the United States Food and Drug Administration.

**James McIntyre, MD**
Executive Director, Perinatal HIV Research Unit
University of Witwatersrand
Chris Hani Baragwanath Hospital
Johannesburg, South Africa

James McIntyre, MD, is an Executive Director of the Perinatal HIV Research Unit of the University of the Witwatersrand, South Africa, which is based at the Chris Hani Baragwanath Hospital, in Soweto, and is one of Africa's largest AIDS research centres working in HIV prevention, treatment and care, and HIV vaccine development. Professor McIntyre leads the CIPRA-SA "Safeguard the household" collaborative South African research program, which is funded by the U.S. National Institutes for Health. An international authority on mother-to-child transmission of HIV and HIV in women, Professor McIntyre has published widely in this field. He has served as a consultant to the World Health Organization, UNAIDS and UNICEF, advising on HIV and pregnancy treatment guidelines. Professor McIntyre and his colleague Dr. Glenda Gray were jointly awarded the 2002 Nelson Mandela Award for Health and Human Rights, and the 2003 "Heroes in Medicine" award from the International Association of Physicians inAIDS Care (IAPAC).

**Corinne Merle, MD, MSc**
Lecturer in Epidemiology, Infectious Disease Epidemiology Unit
London School of Hygiene and Tropical Medicine
London, U.K.

Corinne Merle, MD, MSc is a Clinical Lecturer in Epidemiology at the London School of Hygiene and Tropical Medicine. Her main research interest is in Tuberculosis and HIV care in developing countries, with a current focus on HIV treatment delivery in developing countries. Dr. Merle has worked as both a clinician and a clinical epidemiologist in Europe and Africa for over a decade. She collaborates with the Evidence for Action on HIV Treatment and Care research consortium which is funded by the U.K. Department for International Development and has partners in India, Malawi, Uganda, the United Kingdom and Zambia.

**Lisa A. Mills, MD**
Infectious Diseases Fellow
Division of Infectious Diseases, Department of Medicine
Johns Hopkins University School of Medicine
Baltimore, Maryland, U.S.A.

Lisa A. Mills, MD is an Infectious Diseases Fellow at Johns Hopkins University School of Medicine and a PhD candidate in the Graduate Training Program in Clinical Investigation at the Johns Hopkins Bloomberg School of Public Health. Dr. Mills began her work on HIV/AIDS and malaria in Africa in 1999 as a Fogarty International Health Fellow. She conducts clinical research and provides clinical care at two institutions in Uganda, the Rakai Health Sciences Program (RHSP)/ National Institutes of Health International Center of Excellence in Research (NIH-ICER) and the Infectious Diseases Institute (IDI) at Makerere University. She has received support from the Gilead International Exchange Fellowship administered by the Infectious Diseases Society of America (IDSA) and the U. S. National Institutes of Health K12 Grant Program.

**Azarakhsh Mokri, MD**
Assistant Professor, Department of Psychiatry, Tehran University of Medical Sciences
Director, Department of Clinical Sciences, Iranian National Center for Addiction Studies
Tehran, Iran

Azarakhsh Mokri, MD is an Assistant Professor in Psychiatry at the Tehran University of Medical Sciences and Director of the Department of Clinical Sciences at the Iranian Nation Center for Addiction Studies (INCAS). For the last 10 years he has been active in substance abuse treatment in Iran and has performed several nationwide studies on the efficacy of various interventions in substance abuse treatment and reduction of HIV related risk behavior in opiate abusers. He inaugurated methadone and buprenorphine maintenance pilot campaigns in Iran in 2002 and 2004, respectively, and has also actively pursued the training of health workers, the expansion of various treatment services and evaluations of the efficacy of treatment services in governmental, NGO and private settings. Through INCAS, Dr. Mokri has established a network of substance abuse treatment centers called SATNET, in Iran. Currently there are more than 700 of these centers with 1,400 member physicians. Many SATNET members are actively involved in ongoing training efforts, joint research and publication, and surveillance programs.

**Luis Moreno Montalvo, BA**
Research and Evaluation Director
Centro de Orientación e Investigación Integral (COIN)
Santo Domingo, Dominican Republic

Luis Moreno Montalvo, BA is a sociologist who has worked with the Centro de Orientación e Investigación Integral (COIN), one of the first and most active HIV/AIDS NGOs in the Dominican Republic, for over fifteen years. He is COIN's research and evaluation director and has overseen numerous formative and evaluative studies examining the socio-cultural context of female sex work in the Dominican Republic. He has also supervised impact evaluation efforts for peer education, community development and environmental-structural HIV prevention interventions among female sex workers in the Dominican Republic. Mr. Montavlo is a consultant to the Presidential Commission on HIV/AIDS in the Dominican Republic.

**Joia Mukherjee, MD, MPH**
Medical Director, Partners in Health
Assistant Professor, Division of Social Medicine and Health Inequalities
Brigham and Women's Hospital and Harvard Medical School
Boston, Massachusetts, U.S.A.

Dr. Joia Mukherjee trained in Infectious Disease, Internal Medicine, and Pediatrics at the Massachusetts General Hospital and has an MPH from the Harvard School of Public Health. She is an Assistant Professor in the Division of Social Medicine and Health Inequalities at the Brigham and Women's Hospital and Harvard Medical School where she teaches medical students, residents and fellows in the fields of infectious disease, global health and health disparities. Since 2000, Dr. Mukherjee has served as the Medical Director of Partners In Health, an international medical charity with clinical programs in Haiti, Rwanda, Lesotho, Malawi, Peru, Mexico, Russia, and inner-city Boston. In this capacity she is involved in programmatic and clinical work to provide health care and reduce health disparities by developing public sector, community based programs with local colleagues in those countries. Additionally, Dr. Mukherjee consults for the World Health Organization on the treatment of

HIV and MDR-TB in developing countries and is a member of the Executive Board of Health Action AIDS, an HIV/AIDS advocacy and education campaign conducted with Physicians for Human Rights.

**Courtney Mulhern-Pearson, MPH**
Policy Analyst, San Francisco AIDS Foundation
San Francisco, California, U.S.A.

Courtney Mulhern-Pearson, MPH, is a policy analyst for the Science and Public Policy department of the San Francisco AIDS Foundation (SFAF), where she is responsible for monitoring, analyzing and advocating on a range of HIV-related public policy initiatives at the federal, state and local levels of government. Prior to joining SFAF, Ms. Mulhern-Pearson worked for the Centers for Medicare and Medicaid Services where she led outreach efforts on the Medicare part D drug benefit targeting HIV providers. Ms. Mulhern-Pearson completed her undergraduate degree in Sociology at the University of California, San Diego, and studied abroad at Carlos III University in Madrid, Spain. She received her Masters in Public Health with an emphasis on Health Policy and Management from the University of California, Berkeley. Her current research interests include expanding HIV testing and new HIV prevention technologies, in particular microbicides.

**Abdulsalam Nasidi, MBBS, PhD**
Director, Special Projects, Federal Ministry of Health
Chairman, IHV/UMB AITRP International Fogarty
Abuja, Nigeria

Abdulsalam Nasidi, MBBS, PhD is Director of Special Projects in Nigeria's Federal Ministry of Health, an Adjunct Professor at the Institute of Human Virology (IHV), University of Maryland, and has been the Chairman of IHV's International Fogarty program in Nigeria since 2002. Dr. Nasidi coordinates several committees for the Federal Government of Nigeria both locally and at the international level. He has been the Federal Ministry of Health's Representative to the Nigerian-Brazilian Trade delegation and the World Health Assembly and is currently responsible for coordinating the Nigeria Health Sector Response on the Avian Influenza Pandemic. Dr. Nasidi is the Co-Principal Investigator of the Nigerian Sero-Conversion Panel Project in collaboration with the Centers for Disease Control and IHV and is a World Health Organization Consultant/Facilitator and Vice President of the Conference on Emergency Preparedness on Diseases caused by Hemorrhagic Fever viruses. Dr. Nasidi has received several national and international awards including, in 2002, the Order of the Niger, the Nigerian National Honor.

**Amy Nunn, ScD**
Corporate Relations Manager
Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria
New York, New York, U.S.A.

Dr. Amy Nunn received her master's and doctoral degrees from the Harvard School of Public Health. She is currently a Corporate Relations Manager at the Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria (GBC). GBC is a non-profit organization that mobilizes the private sector response to the AIDS, tuberculosis and malaria epidemics and is the focal point of private sector efforts for The Global Fund. Dr. Nunn has conducted domestic and international research on a variety of health policy topics, including reproductive health, health system decentralization and HIV/AIDS. A former Fulbright scholar, she is the author of *The Politics of Life and Death: The History of AIDS Treatment in Brazil.*

**Babatunde Osotimehin, MD**
Executive Chairman, National AIDS Control Agency
Professor of Clinical Pathology, College of Medicine
University of Ibadan
Abuja, Nigeria

Babatunde Osotimehin, MD is a Professor of Clinical Pathology at the University of Ibadan's College of Medicine and has been Director-General of Nigeria's National Agency for the Control of HIV/AIDS since

2002. He is the Project Manager for the World Bank assisted initiative HIV/AIDS Program Development and coordinates the activities of the Social Sciences and Reproductive Health Research Network which is composed of sociologists, economists, physicians and lawyers. Dr. Osotimehin pioneered the establishment of the innovative Leadership Enhancement and Training Program for Population and Reproductive Health in Nigeria. He is a consultant to many international organizations such as the World Bank, UNFPA, UNICEF, the David and Lucille Packard Foundation and is a member of many international organizations including the International Advisory Group of the Population Program Area of the John D. and Catherine T. MacArthur Foundation.

**Jean William Pape, MD**
Professor, Division of International Medicine and Infectious Diseases
Weill Medical College of Cornell University
New York, New York, U.S.A.
Director, GHESKIO Centers
Port-au-Prince, Haiti

Jean William Pape, MD is Professor of Medicine, Division of International Medicine and Infectious Diseases, Weill Medical College of Cornell University, and Director and Co-Founder of the Haitian Study Group of Kaposi's Sarcoma and Opportunistic Infections (GHESKIO). He is an internationally renowned expert in the epidemiology, clinical management, and treatment of HIV/AIDS, TB, diarrheal disease, and sexually transmitted infections. He has made significant public health contributions in Haiti, and has proven that it is possible to deliver state-of-the-art medical care even under challenging economic and political conditions. Dr. Pape is a member of the Executive Committee of the AIDS Clinical Trials Group of the National Institutes of Health, and has published extensively on the management of HIV, TB, and diarrheal disease in Haiti. He has been elected into the Institute of Medicine of the National Academy of Science, and has received many national and international awards, including the French Legion of Honor, and the Haitian Leon Audain Award. He has built GHESKIO into an international center of excellence for HIV-related clinical and operational research, training, and clinical care.

**Dilshod Pulatov**
The Head
Expert Commission Under Coordination Counsel on Drugs and HIV Prevention
Sogd District
Khujand, Tajikistan

Dilshod Pulatov is a specialist at the Center on Licit Drug Control and Drug Abuse Prevention of the Ministry of Health of the Republic of Tajikistan, and head of the expert working commission of the Coordination Council on HIV and Drugs Prevention in Sogd Province.

**Vu Minh Quan, MD**
Assistant Professor, Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Vu Minh Quan, MD is an Assistant Professor of Epidemiology at the Johns Hopkins University Bloomberg School of Public Health. He was a Medical Officer at the National AIDS Bureau of Vietnam, an Epidemic Intelligence Service (EIS) officer and medical epidemiologist at the U.S. Centers for Disease Control and Prevention (CDC) before joining the Johns Hopkins University in 2003. He is an investigator and field director for several HIV/STD randomized, controlled prevention trials in Vietnam and Thailand.

**Karina Razali, PhD, MSc**
Lecturer
Department of Social and Preventive Medicine
University of Malaya
Kuala Lumpur, Malaysia

Karina Razali, PhD has recently completed her doctoral degree in HIV epidemiology at the National Centre in HIV Epidemiology and Clinical Research, Sydney, Australia. Her candidacy was conducted under a scholarship from the University of Malaya, Kuala Lumpur, Malaysia where she has been attached as a lecturer of epidemiology at the Department of Social and Preventive Medicine since 2000. Her research is focusing on the use of mathematical models in the study of HIV and hepatitis C virus epidemiology, particularly in the Asia-Pacific region.

**Mary Jane Rotheram-Borus, PhD**
Professor, Department of Psychiatry
UCLA Center for Community Health
University of California, Los Angeles
Los Angeles, California, U.S.A.

Mary Jane Rotheram-Borus, PhD has spent the past 20 years developing, evaluating and disseminating evidence-based interventions for children and families. She has worked extensively with adolescents, especially those at risk for substance abuse, HIV, homelessness, depression, suicide and long-term unemployment. Dr. Rotheram-Borus has directed and implemented several landmark intervention studies that have demonstrated the benefits of providing behavior change programs and support to families in risky situations. Dr. Rotheram-Borus has ongoing projects in Uganda, China, Thailand and South Africa, as well as the United States. She has received numerous grants from the National Institute of Mental Health and the National Institute on Drug Abuse to design prevention programs for children and families at high risk for HIV, mental health problems, suicide, and substance abuse and has received HIV prevention-related research grants from the University-wide AIDS Research Program, the World AIDS Foundation and the W.T. Grant Foundation.

**Mauro Schechter, MD, PhD**
Professor of Infectious Diseases, Federal University of Rio de Janeiro, Brazil
Rio de Janeiro, Brazil
Adjunct Professor of Epidemiology,
Graduate School of Public Health at the University of Pittsburgh
Pittsburgh, Pennsylvania, U.S.A.
Dr. Mauro Schechter is Professor of Infectious Diseases at the Federal University of Rio de Janeiro, Brazil. He is also an Adjunct Professor of Epidemiology at the Graduate School of Public Health at the University of Pittsburgh, and an Associate in the Department of International Health, at the Johns Hopkins University Bloomberg School of Hygiene and Public Health. Dr. Schechter received his Medical degree from the Universidade Federal do Rio de Janeiro, Brazil, and his MSc and PhD degrees from the University of London, England. Dr. Schechter has extensive experience in the conduct of studies on the natural history, treatment and prevention of HIV infection. He has sat on numerous international advisory boards and blue-ribbon panels and is a member of consensus panels on antiretroviral therapy convened by the World Health Organization and by the International AIDS Society-USA. Dr. Schechter is the Epidemiology Section Editor for *AIDS Research and Human Retroviruses*.

**Richard Schottenfeld**
Professor of Psychiatry
Yale University School of Medicine,
New Haven, Connecticut, USA

Richard S. Schottenfeld, MD is a Professor of Psychiatry at Yale University and an experienced clinician, teacher and clinical researcher who has focused on improving the efficacy, accessibility and availability of addictions treatment in the United States and, over the past decade, internationally, in developing and transitional countries, including Malaysia and Iran. In clinical trials and clinical epidemiologic studies, Professor Schottenfeld has developed new programs that integrate addictions treatment and general medical services and has evaluated the pharmacological and behavioral components of different treatments for opioid dependence and other addictive disorders. He has served as Director of the Substance Abuse Treatment Unit of the Connecticut Mental Health Center and CEO of the APT Foundation in New Haven, where he oversaw development of a

multi-component drug abuse treatment program providing innovative ambulatory and residential treatment for addictive disorders. He was also the founding Director of the Addiction Psychiatry Residency Training Program and of the drug abuse clinical research post-doctoral training program at Yale.

**David Serwadda, MD, MMED, MPH**
Dean, Makerere University School of Public Health
Kampala, Uganda

David Serwadda, MD, MMED, MPH is Dean of the Makerere University School of Public Health. In the early 1980s, Dr. Serwadda was involved in the initial investigation that established the existence of HIV infection among the rural populations of Uganda. He has been active in describing the clinical manifestations of HIV in Uganda and for the last 25 years has been involved in the evaluation of population based HIV prevention community trials, in Rakai district in Uganda. Recently, he and colleagues have completed population based trials of the effect of male circumcision on HIV acquisition. Dr Serwadda has been actively involved in a number of HIV prevention committees both in Uganda and internationally. He is currently a co-chair of the Global HIV Prevention Working Group.

**Anjali Sharma, MD**
Assistant Professor, Division of Infectious Disease, Department of Medicine
SUNY-Downstate Medical Center
Brooklyn, New York, U.S.A.

Anjali Sharma, MD is an Assistant Professor in the Department of Medicine, Division of Infectious Diseases at State University of New York Downstate Medical Center (SUNY-DMC), and is the Director of SUNY-DMC's adult inpatient HIV service. She has substantial experience in global health and is currently investigating the utility of directly administered antiretroviral therapy for the management of HIV-infected drug users in a methadone program in Estonia.

**Kathleen J. Sikkema, PhD**
Professor of Nursing, Psychology and Neuroscience,
and Psychiatry and Behavioral Sciences
Duke University
Durham, North Carolina, U.S.A.

Kathleen J. Sikkema, PhD, Professor of Nursing, Psychology and Neuroscience, and Psychiatry and Behavioral Sciences at Duke University is a clinical psychologist with emphases in health and community psychology. She is also the Director of the Social and Behavioral Science Core in Duke's Center for AIDS Research (CFAR). Her expertise is in the conduct of randomized, controlled HIV prevention and mental health intervention trials. Dr. Sikkema's research is focused on the development and evaluation of HIV risk behavior change interventions, the conduct of community-level HIV-related coping and secondary prevention intervention trials and on the development of group intervention models to assist persons with HIV disease who are coping with HIV-related stressors such as AIDS-related loss and bereavement, traumatic stress due to childhood sexual abuse, and the trajectory of HIV as a chronic illness across the lifespan.

**Leickness Chisamu Simbayi, D.Phil**
Acting Executive Director, Social Aspects of HIV/AIDS and Health Programme
Human Sciences Research Council
Cape Town, South Africa

Professor Leickness Simbayi received his Doctor of Philosophy from the University of Sussex in the United Kingdom. He is a deputy executive director of the Social Aspects of HIV/AIDS and Health research programme and head of the Behavioural and Social Aspects of HIV/AIDS unit. He is also regional coordinator for the Southern Africa Development Community (SADC) of the Social Aspects of HIV/AIDS Research Alliance (SAHARA). Professor Simbayi's research uses an Applied Health Psychology approach and focuses on HIV/AIDS and sexually transmitted infections (STIs), stress and burnout, substance abuse, and traditional

healing. He is currently involved in several projects on the behavioural and social aspects of HIV/AIDS, especially in behavioural surveillance among the general population as well as in various sub-sectors of the economy. Professor Simbayi is also studying theory-based HIV risk reduction interventions which address issues such as repeat STI infections, alcohol use, gender violence, stigma and discrimination, and positive prevention among people living with HIV/AIDS.

**Nicole Simmons, MHS**
Research Associate, Department of International Health
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Nicole Simmons, MHS, is a Research Associate in the Department of International Health at the Johns Hopkins Bloomberg School of Public Health. She has spent the past six years providing technical assistance on the worldwide roll-out of antiretroviral therapy, in Ethiopia and Thailand, as well as serving as a coordinator and investigator on several large HIV prevention clinical trials. Ms. Simmons is the lead Johns Hopkins investigator on a large Center for Disease Control sponsored cohort study, the Advanced Clinical Monitoring of Antiretroviral Therapy in Ethiopia, which is designed to investigate the longitudinal effectiveness of ART as delivered in Ethiopia, and is also working on an assessment of behavioral risk for spreading HIV among Ethiopian patients. She has also worked in the U.S. and Eastern Europe on health and social policy and international development and for several years was a journalist.

**Sudha Sivaram, DrPH, MPH**
Assistant Scientist, Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Sudha Sivaram, DrPH, MPH is an Assistant Scientist in the Infectious Disease Program at the Department of Epidemiology at the Johns Hopkins Bloomberg School of Public Health. Dr. Sivaram has worked for over 15 years in the field of HIV/AIDS and reproductive health research on community-based interventions that are ethical, beneficial, and sustainable. Her research on HIV/AIDS has considered structural, environmental and individual factors and their association with HIV risk. At the structural level, her research focuses on poverty alleviation efforts such as micro-credit and factors such as social capital and access to technology, to understand how they influence both participation in HIV prevention programs and adoption of HIV prevention behaviors. At the individual level, she examines the role alcohol use, intimate partner violence and gender differentials play in HIV acquisition and transmission. Dr. Sivaram has collaborated with a wide range of international and national agencies and governments including the USAID, the World Bank and the District of Columbia.

**Sunil Solomon, MBBS, MPH**
Medical Officer, YR Gaitonde Centre for AIDS Research and Education
Chennai, India

Sunil S. Solomon, MBBS, MPH is the medical director of the YR Gaitonde Centre for AIDS Research and Education, Chennai, India. He has extensive experience in the epidemiology and management of HIV/AIDS disease in India and is particularly interested in drug abuse and HIV in India. Dr. Solomon is involved in a cohort study of over 1000 IDUs in Chennai which is examining the natural history of drug abuse, HIV and Hepatitis C among IDUs. Dr. Solomon is also a PhD candidate in the Department of Epidemiology at the Johns Hopkins Bloomberg School of Public Health.

**Suniti Solomon, MD**
Director, YR Gaitonde Centre for AIDS Research and Education
Chennai, India

Dr. Suniti Solomon is the director and founder of the Y.R. Gaitonde Center for AIDS Research and Education (YRG CARE), a leading HIV/AIDS care and support centre in Chennai, India. Dr. Solomon is the Principal Investigator in India of several pioneering HIV research studies including the U.S. National Institute of Allergy

and Infectious Diseases' HIV Prevention Trial Networks, an NIH sponsored study that is measuring stigma in health care settings in Southern India and a Phase III study for a candidate microbicide. She is also the Director of the Southern India program of the Brown-Tufts Fogarty AIDS Training and Research Project, President of the AIDS Society of India and a member of India's State Planning Commission. Dr. Solomon's experience covers a wide range of aspects related to HIV infection, from biomedical to socio-economic. She and her colleagues documented the first evidence of HIV infection in India in 1986 and as a Professor of Microbiology at the Madras Medical College and Government General Hospital she set up the first voluntary testing and counseling centre and AIDS Research Group in Chennai.

**Sheena G. Sullivan, MPH**
Project Manager for Research
The National Center for AIDS/STD Control and Prevention
Chinese Center for Disease Control and Prevention
Beijing, China

Sheena Sullivan is a researcher with the National Center for AIDS/STD Control and Prevention at the Chinese Center for Disease Control and Prevention in Beijing. She began working in health research in 1996 and since that time has participated and published in a broad range of fields, including community genetics, chronic disease epidemiology and HIV/AIDS. Her work has extended across several different cultural contexts in both Australia and Asia. Since 2004, she has worked in her current position focusing on harm reduction among IDUs and interventions that address the needs of people living with HIV/AIDS in rural communities.

**Voravit Suwanvanichkij, MD, MPH**
Research Associate, Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health
Baltimore, Maryland, U.S.A.

Voravit Suwanvanichkij, MD, MPH is a faculty member of the Department of Epidemiology at Johns Hopkins Bloomberg School of Public Health, based at the Hopkins partner institution, Chiang Mai University, in Chiang Mai, Thailand. Dr. Suwanvanichkij, a native of Thailand, completed his undergraduate, medical and public health training at the Johns Hopkins University. Dr. Suwanvanichkij has been affiliated faculty of the Center for Public Health and Human Rights since 2004, and has been actively involved in health and human rights efforts in Burma. He is interested in exploring the political, social, and economic contexts that drive the spread of infectious diseases in Southeast Asia.

**Celia Landman Szwarcwald, MA, PhD**
Senior Researcher, Health Information Department
Professor of Biostatistics at the National School of Public Health
Oswaldo Croz Foundation (CICT/FIOCRUZ)
Rio de Janeiro, Brazil

Celia Landman Szwarcwald, MA, PhD is a Senior Researcher at the Department of Information on Health/FIOCRUZ and a Professor of Biostatistics at the National School of Public Health/FIOCRUZ, in Rio de Janeiro, Brazil. As a consultant to the Brazilian Ministry of Health since 1997, she has been involved in the analysis of several national databases and has participated in the planning, sampling and data analysis of many national surveys in Brazil. Working with the National Program of STD and AIDS and the Center for Disease Control's Global AIDS Program Brazil, Dr Szwarcwald planned and expanded the on-line monitoring system MONITORAIDS. She is also involved in the formulation of statistical procedures for Respondent Driven Sampling data analysis and is conducting a survey among anti-retroviral treatment patients focused on quality of life and responsiveness of the Brazilian health system.

**Nalini Tarakeshwar, PhD**
Manager, Program Monitoring, Evaluation and Learning
The Children's Investment Fund Foundation
London, U.K.

Dr. Nalini Tarakeshwar received her PhD in Clinical Psychology from Bowling Green State University, Ohio in 2002. Her research has focused on studying the impact of HIV and AIDS on the psychosocial functioning of families and children, mainly in the U.S. and in India, and the implementation of culturally-relevant interventions to cope with this impact. Dr. Tarakeshwar has been an Assistant Professor in the Yale University School of Medicine and the Duke University Medical School and is now with the Children's Investment Fund Foundation in the U.K. She manages the Foundation's monitoring and impact evaluations of its HIV/AIDS, education, and water, sanitation and hygiene programs in India, Africa, and other low resource settings.

**Paulo Roberto Teixeira, MD**
Senior Coordinator, São Paulo DST/AIDS State Program
São Paulo, Brazil

Dr. Paulo Teixeira studied medicine at São Paulo State University, specialized in Dermatology at São Paulo Federal University and in public health at São Paulo Public Health School. He created the first AIDS prevention and control program in Latin America, in 1983, in the state of São Paulo and coordinated that program from 1983 to 1987, and in subsequent years as well. He has also worked as a consultant to the Pan-American Health Organization (PAHO) and a technical consultant to the Joint United Programme on HIV/AIDS (UNAIDS) for Central America and the South Cone. In 2000, Dr. Teixeira became director of the Brazilian National AIDS Program at the Ministry of Health. Dr. Teixeira helped to organize the Global Fund to Fight AIDS, Tuberculosis and Malaria and later directed the AIDS Program of the World Health Organization (WHO), in Geneva. Currently Dr. Teixeira is the Senior Coordinator at the São Paulo DST/AIDS State Program, and a UNAIDS and WHO consultant.

**Marco Vitória, MD**
Senior Medical Officer
HIV/AIDS Department at the World Health Organization Headquarters
Geneva, Switzerland

Marco Vitória, MD is a Senior Medical Officer in the HIV/AIDS Department at the World Health Organization Headquarters (WHO-HQ/HIV) in Geneva, Switzerland. He has been involved with HIV/AIDS clinical management and Public Health at local and regional levels in Brazil since 1987. He coordinated the STD/AIDS Program of the State of Minas Gerais from 1996 to 1997 and was the Medical Officer for Treatment and Care at the National STD/AIDS Program, Brazilian Ministry of Health, from 1998 to 2003. Since 2003 he has been working in WHO-HQ/HIV with normative and programmatic aspects of HIV care and treatment scale up initiatives, particularly in resource-limited settings.

**Judith N. Wasserheit, MD, MPH**
Director, HIV Vaccine Trials Network
Member, Program in Infectious Diseases
Fred Hutchinson Cancer Research Center
Professor of Medicine, University of Washington
Seattle, Washington, U.S.A.

Dr. Judith Wasserheit is Professor of Medicine and Global Health and Vice Chair of the Department of Global Health at the University of Washington in the Schools of Medicine and Public Health and Community Medicine and is an Affiliate Investigator at the Fred Hutchinson Cancer Research Center. Dr. Wasserheit received her BA from Princeton University, her MD from Harvard Medical School, and her MPH from the Johns Hopkins University. From 1989 to 1992, she led the development of the newly established Sexually Transmitted Disease (STD) Research Branch at the National Institute of Allergy and Infectious Diseases and from 1992 to 2001 directed the Centers for Disease Control and Prevention's national STD Prevention Program. Dr. Wasserheit served as Director of the HIV Vaccine Trials Network and has had extensive experience in STD research, policy development and program implementation both in the United States and in developing countries including India, Indonesia, Egypt, Columbia, Thailand and Zambia. Dr. Wasserheit is a member of the editorial board for *Sexually Transmitted Diseases* and has received numerous honors and awards. In 2006, she was elected to the Institute of Medicine of the National Academies. She is also a Paul G. Rogers Society Global Health Research Ambassador.

**Helen A. Weiss, PhD**
Senior Lecturer, Infectious Disease Epidemiology Unit
Department of Infectious and Tropical Diseases
London School of Hygiene and Tropical Medicine
London, U.K.

Helen Weiss, PhD is a Senior Lecturer in Medical Statistics and Epidemiology at the London School of Hygiene and Tropical Medicine. Her work focuses on epidemiological studies of the dynamics of HIV infection in sub-Saharan Africa, especially factors associated with HIV prevention. Most recently, she has been involved in the design and analysis of several randomised controlled trials of the impact of HSV episodic and suppressive therapy on HIV transmission in sub-Saharan Africa, including the first randomised trial of the impact of suppressive therapy on HIV acquisition in Mwanza, Tanzania. Dr. Weiss has also been interested for many years in the potential role of male circumcision in HIV prevention and has published widely on this topic.

**Dawit Wolday, MD, PhD**
Ethio-Netherlands AIDS Research Project (ENARP),
Ethiopian Health and Nutrition Research Institute
Addis Ababa, Ethiopia

Dr. Dawit Wolday received an MD from Gondar College of Medical Sciences in Ethiopia in 1987, an MSc in Medical Microbiology in 1993 from Faculty of Medicine, Addis Ababa University, Ethiopia and a PhD in Immunology from Karolinska Institute in Stockholm, Sweden in 2000. For the last 15 years, he has conducted several research projects in resource-poor settings. His interests include research on HIV/AIDS and its interaction with other infectious diseases, in particular sexually transmitted infections, and training of young Ethiopian/African scientists in HIV/AIDS. He serves on the editorial board of the *AIDS* journal and is a member of the Steering Committee of the African AIDS Vaccine Programme (AAVP)/WHO. He is a founding member of the Ethiopian Public Health Laboratory Association and has served on several other National and International Advisory Committees.

**Daniel Wolfe**
Deputy Director, International Harm Reduction Development Program
Open Society Institute
New York, New York, U.S.A.

Daniel Wolfe is director of the International Harm Reduction Development Program at the Open Society Institute. He was formerly community scholar at the Center for History and Ethics of Public Health at Columbia University and a Revson Fellow at Columbia University. Mr. Wolfe has served as a health policy and communications consultant for a variety of non-profit organizations including the New York Academy of Medicine, the Ford Foundation, the International AIDS Vaccine Initiative, and UNAIDS and has written widely about the intersection of drug policy and HIV prevention.

**Zunyou Wu, MD, PhD**
Director, The National Center for AIDS/STD Control and Prevention
Chinese Center for Disease Control and Prevention
Beijing, China

Zunyou Wu, MD, PhD is Director of the Chinese Center for Disease Control and Prevention's National Center for AIDS/STD Control and Prevention, and a guest Professor at UCLA's School of Public Health. Dr. Wu conducts operational, scientific research at the grassroots level with sex workers, injecting drug users, former plasma donors, migrants, men having sex with men, and HIV infected individuals in China. As an experienced epidemiologist, he was also involved in controlling SARS in Beijing. Findings from his research presented in national workshops have led to the development of national technical guidelines. Dr. Wu is active in promoting more supportive policies and environments for controlling HIV/AIDS in China. He is a leader in the field of HIV prevention strategies and oversees the overall technical implementation of detection, prevention and treatment of HIV/AIDS in China.

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