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ORIGINAL PAPER

Increasing HIV Prevalence Among Drug Users in Western Guangdong Province, China, 1995–2005

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Abstract Sentinel surveillance data from 1995 to 2005 for drug users in Guangdong province, China, showed an increasing prevalence of HIV in the West region while stabilizing in the East and Center. Several factors were significantly associated with HIV infection including gender, age, sharing needles, years injecting, engaging in commercial sex, and being part of the migrant population of Guangdong. Data help effectively prioritize and target HIV prevention efforts for drug users.

Keywords Injection drug users · HIV prevalence · Risk behavior · Guangdong · China

Introduction

In 2005, the total number of persons projected to be living with HIV in China was adjusted downward from previous estimates largely based on an increase in the amount and quality of surveillance data (Lu et al. 2006). Total estimates of HIV prevalence were also downward adjusted for Guangdong province for similar reasons. However, despite the downward adjustments, the epidemic continues to expand in some populations in China while stabilizing in others (Lu et al. 2006). Surveillance activities must maintain high vigilance to detect shifts in HIV prevalence, identify behaviors that drive transmission, and target prevention interventions.

In China, as in many parts of the world, sentinel surveillance serves as a primary tool to track the HIV epidemic (Lu et al. 2006). In concentrated epidemics, as prevail in China, the approach is to measure HIV prevalence in facilities or sentinel sites where trends in HIV infection are likely to appear. For drug users, these sites are primarily mandatory detoxification centers.

We present the results of sentinel surveillance in Guangdong province in southern China from 1995 to 2005 (N for all years combined = 48,160, including 33,570 injection drug users). Guangdong's HIV epidemic is driven by injection drug use, accounting for 81.5% of cumulative cases with known transmission risk and 69.6% of reported cases with known risk in 2006 (unpublished). Guangdong is a coastal province (see Fig. 1) that experienced early rapid economic growth and is one of the most severely affected by HIV/AIDS (Lu et al. 2006). There are over 78 million officially registered residents and an estimated 16 million unregistered migrants from other areas of China seeking employment (Guangdong Provincial Bureau of Statistics 2005; Committee of Guangdong Yearbook Compilation 2006). These unregistered migrants are often underserved by social and health programs and may be at higher risk for HIV in many areas of China including Guangdong (Li et al. 2007a; Yang et al. 2007). The Center region of Guangdong, the Pearl River Delta, is one of the most economically developed in China and includes the capital and largest city of Guangzhou along with the major cities of Shenzhen, Zhuhai, Zhongshan, Foshan, Jiangmen, and Dongguan. The West region (Zhaoqing, Zhanjiang,

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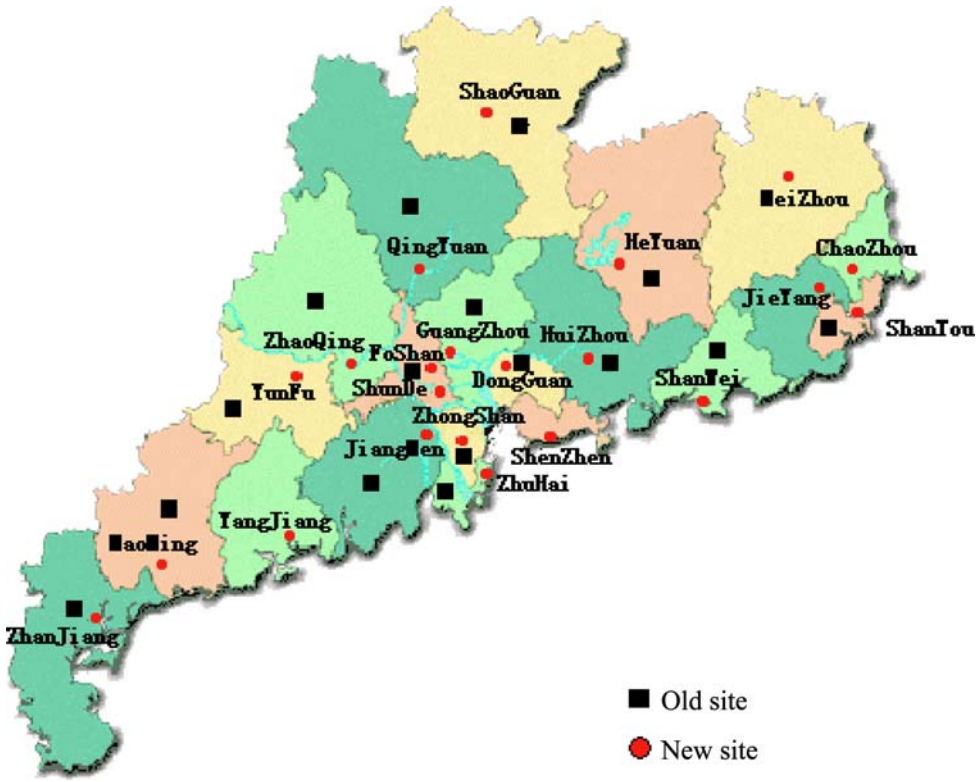

Fig. 1 Guangdong province, China, with locations of sentinel surveillance sites for drug users

Qingyuan, Yunfu, Yangjiang, and Maoming) borders Guangxi (an autonomous region with high prevalence of HIV and a large drug using population) and lies on a major route of heroin trade from the Myanmar border through Yunnan province towards the north of China. In 2003, the mean HIV prevalence among drug users in sentinel sites in Guangxi was 17% compared to 4% for Guangdong (Zhu et al. 2006). The East region (Shaoguan, Huizhou, Shanwei, Heyuan, Chaozhou, Meizhou, Jieyang, and Shantou) has reported relatively lower numbers of HIV infections than the Center and West.

Methods

The standard methods of sentinel surveillance using code-linked anonymous testing are detailed elsewhere (Pappaioanou et al. 1990). Briefly, a consecutive sample of a targeted 400–800 drug users detained for mandatory detoxification in one or two predefined periods are included at each site each year. Basic demographic and risk information is abstracted from intake forms and a specimen is obtained from left over blood collected for routine syphilis screening. The specimen is tested for HIV antibodies with an ELISA. If non-reactive, the specimen is classified as negative; if reactive, two ELISA are run in parallel. If both are reactive, the specimen is classified as positive. The number of sites increased over time, from 3 detoxification centers in 1995 to 49 in 2005, representing all 21 prefectures of Guangdong and two sites where drug users from all over the province are held. The province-wide sites may hold persons for up to one year (versus six months at the regional sites) and include persons with multiple past detoxification and women also detained for commercial sex work. Of note, intake forms ask all persons sexual risk questions, including exchanging sex for money or drugs, regardless of the reason for being detained.

While the sentinel surveillance approach is widely used to track the course of the epidemic in many countries, it is well worth noting the limitations of the methodology. First, because these are not representative community-based samples, data from drug users in mandatory detoxification centers may not be generalizable to the larger target population. The sample is of registered drug users. The number of unregistered drug users is likely to be many times the number of registered users and they may be younger, engaging in more risk, or less likely to access services. Persons may also under-report illegal behavior in the context of compulsory detoxification centers. Population size estimates of IDU in Guangdong suggest that the majority of drug users pass through detoxification centers; however, at least one local community-based survey suggests that HIV prevalence may be higher among drug users sample outside detoxification centers (Li et al. 2007b).

We used Cox regression analysis (SPSS, version 13.0) to characterize the temporal trend in HIV prevalence and

identify risk factors for infection, creating a virtual time variable for each observation, and designating each sentinel site as a stratum to control for clustering and varying amounts of time that the different sites were included. A forward stepwise process identified variables that were independently associated with HIV infection at $P < 0.05$.

Results

HIV prevalence was highest in the Center (4.6%) and West (4.6%), lowest in the East (1.6%), and intermediate in the province-wide sites (3.3%). The majority was 25 years or older (regional range 72.1–75.2%) and male (81.5–92.2%). Registered Guangdong resident status was lowest in the Center (66.1%) and highest in the West (94.1%), reflecting the relative economic development of the regions. Recent injectors (<1 year) ranged from 18.8% in the Center to 0.5% in the province-wide sites, the latter due to the referral of drug users with multiple detoxification histories. Reported needle-sharing in the last year was highest in the West (40.7%) and lowest in the Center (27.6%). Engaging in commercial sex by men (i.e., paying for sex) ranged from 19.3% in the West to 28.0% in the province-wide sites. Engaging in commercial sex by women (i.e., being paid for sex) ranged from 16.5% in the East to 55.7% in the provincial sites, the latter reflecting the referral of drug users also detained for sex work.

Table 1 Predictors of HIV infection among drug users in Guangdong province, China, 1995–2005

Region	Model	Adjusted hazards ratio (95% CI)
West	Year (per year)	1.20 (1.04–1.38)
	Not registered as Guangdong resident	2.55 (1.61–4.03)
	Years injecting[a]	1.33 (1.13–1.56)
	Shared needles	1.92 (1.56–2.36)
	Male, engaged in commercial sex	1.33 (1.04–1.69)
Center (Pearl River Delta area)	Male	1.70 (1.24–2.34)
	Not registered as Guangdong resident	2.96 (2.44–3.60)
	Years injecting	1.24 (1.08–1.43)
	Shared needles	1.75 (1.47–2.09)
East	Not registered as Guangdong resident	3.21 (1.95–5.28)
	Years injecting	1.45 (1.09–1.93)
	Shared needles	2.10 (1.41–3.13)
Province-wide sites	Age over 25 years	2.83 (1.71–4.70)
	Female, engaged in commercial sex	3.14 (1.20–8.19)

[a] Adjusted hazards ratio per category: <1 year, 1–5 years, >5 years

HIV prevalence significantly increased over time for the West, while stable in the Center, East, and province-wide sites (Table 1). Significant predictors of HIV infection in the West included not being an officially registered resident of Guangdong, years of injection, sharing needles, and being a male engaging in commercial sex. Not being registered in Guangdong, years injecting, and sharing needles were also associated with HIV infection in the Center and East. Male gender was associated with HIV infection in the Center, while older age and being a female engaging in commercial sex were associated with HIV infection in the province-wide sites.

Discussion

The sentinel surveillance system of Guangdong province successfully identified an area of rising HIV transmission and factors driving the epidemic in different locations. These data can assist in more effectively targeting HIV prevention efforts. The high and rising HIV prevalence in the West merits high priority, while continuing efforts in the Center and East to prevent further spread, particularly through reduction in injection through scaling up methadone maintenance programs or harm reduction such as scaling up of the current pilot needle/syringe-exchange programs (NSEP). While we do not see a broad correlation between needle sharing rates and number or size of NSEP across the various regions, previous evaluation of NSEP programs in pilot areas found encouraging decreases of needle sharing rates after their implementation (Lin et al. 2004). Scale up of harm reduction programs have in fact progressed rapidly in Guangdong in recent years. By 2005, there were 131 NSEP pilot programs in Guangdong. Before 2005, there were only 3 methadone maintenance sites, increasing rapidly to 32 in 2006 and to 41 in 2007. In addition, in all regions efforts to reach the migrant population are needed. The travel patterns of this population may also result in wider dissemination of HIV. Findings also point to the potential for bridging of HIV infection from drug users to other populations through sex work (Hesketh et al. 2005).

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