

# Cancer Education and Research in International Settings: Challenges and Opportunities

There are few cancer epidemiologists and biomedical scientists who have the skills and experience to implement studies in ethnically diverse settings, whether in other countries or among migrant populations in this country. Cancer education and research in international settings need to be defined as an important discipline in public health and biomedical cancer education to attract researchers and clinicians who are interested in cancer research and practice in special populations. Strategies developed and lessons learned through the implementation of such programs should have widespread applicability to other public health and biomedical cancer education.

## *The Global Burden of Cancer*

The World Cancer Report, issued by the International Agency for Research on Cancer (IARC) documents that cancer rates are set to increase at an alarming rate globally (Stewart and Kleiues, 2003). Cancer causes 6 million deaths every year, amounting to 12% of deaths worldwide. Cancer rates are projected to increase by 50 % to 15 million new cases by the year 2020, an increase of 5.6 million (55%) over the figure for 2000, and 70% of these cases will be in developing countries. Industrialized countries will also show a 50% increase in cancer incidence, due to increased longevity and lifestyle risk factors, such as obesity and exposure to environmental carcinogens (Cooney and Gruber, 2005).

## *Cancer in Developing Countries*

The developing countries, with their unique contrasts in lifestyles, environmental exposures, and diverse cancer profiles, provide an incomparable, and often neglected, opportunity for studying the mechanisms of environmental carcinogenesis (Magrath and Litvak, 1993). Such studies should eventually lead to the development of novel intervention approaches. Unfortunately, cancer research is much more difficult to conduct in the developing countries because of the lack of population-based registries, poor communication and transportation systems, deficiencies in infrastructure and financial support, and a limited number of trained cancer researchers. These difficulties could be overcome, to the benefit of all, if collaborations in cancer research between the developing and industrialized nations were to be greatly extended.

Populations in developing countries are subject to intense exposure to environmental contaminants, massive exposure to infectious agents, and characteristic familial patterns such as consanguinity. These risk factors, as well as changes in the age structure of the population, are expected to produce, in absolute terms, a 34% increase in the number of deaths from cancer by the year 2010 and an additional 32% by 2020. Studies conducted among these populations provide strategic opportunities for revealing causal associations and gene-environment interactions. In recent years, the National Cancer Institute (NCI) provided significant resources for foreign grants, contracts, and exchange programs in the area of cancer research. NCI supports research grants and foreign research contracts and those projects needed well-trained American cancer researchers at different levels of their

career to participate in different stages of study preparation, implementation, and supervision of research in foreign countries.

In addition to improving our understanding of health issues in the host countries, cancer research in international settings has shaped public health policies for disease prevention in the U.S. For example, research on Hepatitis B virus in Taiwan revealed the association between Hepatitis B viral infection and liver cancer (Beasley, 1988). It also shaped the national policy for HBV vaccinations of children in the U.S (Beasley, 1988).

## *Cancer in Minority Populations in the U.S*

Reports from the Surveillance, Epidemiology, and End Results (SEER) database indicate that cancer incidence, mortality, and survival rates in the United States vary by race and ethnicity (Clegg et al., 2002). These reports indicate the importance of conducting additional studies to clarify the epidemiologic, socioeconomic, medical, behavioral, and biological determinants of these differences among ethnic groups in the U.S. (Clegg et al., 2002; Swan and Edwards 2003).

Recent research has demonstrated that breast cancer tends to occur at a younger age in African-American women compared with white women, and to follow a more aggressive course. (Marie-Swanson et al., 2003; Bernstein et al., 2003). Hispanics have lower incidence and death rates from all cancers combined and from the four most common cancers (breast, prostate, lung and bronchus, and colon and rectum) compared with non-Hispanic whites (O'Brien et al., 2003). However, Hispanics have higher incidence and mortality rates from cancers of the stomach, liver,

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Received from University of Michigan School of Public Health, Ann Arbor, Michigan  
Address correspondence to Amr S. Soliman, 109 Observatory St., RM 2550, Ann Arbor, MI 48109-2029; phone: (734) 764-5469; fax: (734) 764-3192; e-mail: <asoliman@umich.edu>

uterine cervix, and gallbladder, reflecting in part greater exposure to specific infectious agents and lower rates of screening for cervical cancer, as well as dietary patterns and possible genetic factors (O'Brien et al., 2003). SEER research on Native Americans and Alaskans (AIAN) has shown that cancer incidence was stable or decreased among AIAN populations, although increased death rates and lower survival rates indicate the need for intensified application of cancer prevention and control measures, including screening and treatment (Swan and Edwards 2003). The universality of cancer is apparent, but cancer site-specific incidence patterns are varied in magnitude and reflect the complexity of multifactorial determinants.

#### *Benefits of Linking Minorities and International Studies*

Cancer patterns in minorities in the U.S. show similarities to distinct epidemiologic cancer features in developing countries, and studies of these similarities may improve our understanding of cancer epidemiology, risk factors, and pathways of carcinogenesis. For example, the pattern of breast cancer incidence seen in African-American women in the U.S. (i.e., younger age, more aggressive disease) (Marie-Swanson et al., 2003; Bernstein et al., 2003) is also seen in developing countries (Cheng et al. 2000). These similar patterns may indicate that the young-onset and aggressive pattern seen in developing countries is due to distinct genetic factors as postulated for African-Americans or that African-American patterns are due to viral infections such as reported in developing countries (Levine et al., 2004). As another example, subsets of colorectal cancer patients that are characterized by sporadic nature, lack of familial aggregation of cancers, and microsatellite instability exist at low frequency in U.S. white and minority populations as well as in international settings (Soliman et al., 2001; Jass 2003). Analysis of differences among these subsets may help shape the develop-

ment of screening guidelines based on common clinical and molecular features of tumors (Soliman et al., 2001; Jass 2003; Soliman et al., in press). By ascertaining colonic tumors with potential microsatellite instability on the basis of marked lymphocytic infiltration, the upper age limit for microsatellite testing could be raised to 55 or 60 years without compromising specificity (Jass, 2003).

#### *International Cancer Education in the U.S*

Graduate students in public health and biomedical sciences are instructed in the critical review and interpretation of research publications as a complement to the baseline cognitive knowledge gained in didactic presentations and assigned reading. However, without special programs, students do not usually have an opportunity to engage in hands-on research. Working with established scientists who conduct peer-reviewed, externally-funded research is a unique opportunity for students in the proposed special program.

Our recent search of websites of all 38 accredited U.S. Schools of Public Health and 125 accredited U.S. Medical Schools showed 5 M.P.H programs in the country with international concentrations, primarily on infectious diseases. In addition, most M.P.H programs target one or more local minority populations.

Tailored core curriculum and mentored research in special populations are needed to provide students' understanding of scientific method for research in international settings and their application to cancer research in U.S. minorities and underserved communities. Furthermore, structured practical field internship programs in cancer epidemiology and biomedical sciences can enhance students' skills and understanding of research in international settings. This in turn will help advance students' understanding of biological systems, improve cancer control in underserved minority populations in the U.S., and provide a unique opportunity for

learning, and motivation to pursue careers in cancer research and education in special populations.

Groups involved in international studies should work jointly to develop a mechanism to disseminate their experience and provide opportunities for other research and educational groups that are interested in developing their own international programs.

The focus of the dissemination to other U.S. public health and biomedical sciences programs should focus on U.S. institutions that have some form of existing field research internships as well as other institutions that do not have such experience. The dissemination would eventually provide an expansion to U.S. institutions that have existing programs and a model with practical assistance for U.S. institutions that have none.

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AMR S. SOLIMAN, MD, PHD