

POLICY

Integrating Cancer Control into Global Health

Harold Varmus* and Edward L. Trimble

Many in the global health community have recently proposed that current efforts be expanded to include diseases typically associated with advanced economies, such as heart disease, mental health disorders, diabetes, and cancers. Here, we discuss ways in which the National Cancer Institute's newly formed Center for Global Health plans to stem the rising cancer burden in developing countries.

Over the past two decades, the world's leading economies have given growing levels of attention to the health of people in low- and middle-income countries, with increasing evidence of success. These efforts to improve what is now called “global health” are founded, in part, on the conviction that better control of disease is generally a precondition, not just a consequence, of economic development; equally important, investments in global health are viewed as a manifestation of a nation's humanitarian concerns and a useful element in international relations (1–3). The ambitions of the global health movement have recently broadened. In this Commentary, we describe how a newly formed Center for Global Health at the National Cancer Institute (NCI) can contribute to improved control of cancer throughout the world, even in the poorest countries (Fig. 1).

EXPANDING THE FOCUS OF GLOBAL HEALTH

Most of the action in the emerging field of global health has been directed at disease-related problems in developing countries that traditionally are considered to be the most common, the most important, or arguably the most solvable: infectious diseases (especially malaria, tuberculosis, and HIV/AIDS); maternal and infant mortality; and nutritional deficiencies. Recently, however, numerous commentators have noted the need to give greater attention to those chronic and generally noncommunicable diseases that are the major focus of medical prevention, care, and research in advanced economies—cardiovascular diseases, obesity and diabetes, cancers, and mental disorders (4–7). As one highly visible example of this change in perspective, the United Nations has convened a High Level Meeting (September 2011) on

National Cancer Institute, National Institutes of Health, Department of Health and Human Services, Bethesda, MD 20892, USA.

*Corresponding author. E-mail: harold.varmus@nih.gov

noncommunicable diseases (NCDs) in the developing world, the first time that this prestigious forum has focused on health issues other than HIV/AIDS (8).

This broadening of objectives is partly a response to the success of current global health programs. The lengthening of life spans in many poor countries has allowed more people to reach later life stages during which NCDs are most common, and



Fig. 1. Combating cancer worldwide. NCI's new Center for Global Health promotes a collaborative effort to reduce the burden that cancers impose on people and countries around the world.

economic growth has fostered pathogenic changes in diet, physical activity, and other behaviors that increase the incidence of diabetes, heart disease, and cancer.

Rising numbers of cancer deaths in developing countries are among the significant consequences of a confluence of factors—population growth, population aging, and an increased prevalence of risk factors, such as obesity and the use of tobacco and

alcohol, all of which raise the incidence of certain cancers. In 2008, ~7.6 million people died from cancer worldwide, and 64% percent of these deaths occurred in developing countries. These numbers are up from 2002, when there were 6.2 million cancer deaths, and only 55% percent were in the developing world (9, 10). By 2030, the number of cancer deaths may rise as high as 13.2 million, with 69% percent occurring in developing countries.

Until recently, proposals to screen for, treat, and even prevent cancers and other NCDs in developing countries have taken a back seat to plans for controlling the traditional targets of global health with measures—such as vaccines and antibiotics, obstetrical care, and food—deemed more affordable and more effective in resource-limited settings. However, while these measures remain important and incompletely implemented, they are increasingly recognized as only one part of what might be done to advance global health. Furthermore, the distinctions between traditional approaches to global health and those required to combat NCDs are not always clear-cut.

For instance, about a quarter of life-threatening cancers in the developing world result from infections with viruses, bacteria, and parasites—examples include liver cancers associated with hepatitis B virus (HBV) and hepatitis C virus; cervical cancer caused by human papillomavirus (HPV); gastric cancer caused by the bacterium *Helicobacter pylori*; Kaposi's sarcoma, nasopharyngeal carcinoma, and Burkitt's lymphoma induced by herpesviruses; bladder cancer resulting from infection with *Schistosoma*, a parasitic flatworm; and various cancers associated with HIV infection. For some of these, effective prevention measures already exist: vaccines against HBV and some strains of HPV that protect against hepatic and cervical cancer, respectively; antimicrobial drugs for the treatment of gastric ulcers caused by *H. pylori* to prevent gastric cancer; and methods to prevent infection by *Schistosoma* and consequent bladder cancer.

Other prevention strategies for control of tobacco and alcohol abuse entail behavioral changes that offer multiple, long-term health benefits, generally at a low cost. Moreover, several kinds of cancer treatments that were thought to be prohibitively expensive for use in poor countries may now be affordable. For example, some effective cancer chemotherapies are no longer patent-protected, and the list will grow

substantially in the near future. In addition, other feasible components of cancer care extend well beyond inexpensive anticancer drugs and simple surgeries; these include analgesics and antiemetics for symptomatic control, some screening and diagnostic procedures, and methods for palliative care.

AN EXPANDED ROLE FOR THE NCI

For many years, the NCI has made substantial investments in research and training projects intended to improve the control of cancer internationally and to advance the general understanding of this complex set of diseases. But until recently, the NCI has not attempted to develop, in a systematic way, a well-orchestrated research program to promote progress against cancer worldwide.

In light of the needs, opportunities, and enthusiasm for an expanded view of global health, we have recently established the NCI Center for Global Health, which will develop an appropriate research strategy to help incorporate cancer control into global health programs; foster relevant research activities throughout the NCI's own extramural and intramural divisions; and work closely with the many potential collaborators who have displayed an interest in shared objectives. We will pursue these intentions, even in a period of fiscal constraint, through a process of consultation with those potential collaborators, development of public-private partnerships, consolidation of current international activities within NCI and other institutes, and the setting of new goals for NCI's engagement with cancer in the developing world.

Because NCI is a research agency, it will not provide cancer care or orchestrate prevention campaigns directly. But we view the canvas for the center's activities to be broad enough to include work on topics that are highly relevant to the pragmatic aspects of treatment and prevention in developing countries: the geographic and cultural patterns of disease, the organization and function of health care systems, and the monitoring of the effectiveness of cancer control strategies. We also recognize that many kinds of cancers appear at different rates in different parts of the world for different reasons—and it is important to explain these differences in order to reduce the cancer burden in all countries. Further, the ability to control cancer is influenced by prevailing systems of health care in various countries, and thus the nature of those systems and the conditions that produce them also warrant

attention. Finally, long-standing improvements in the control of cancer throughout the world will require the training of medical and scientific personnel who have vested interests in improving health in their own countries.

Because the center's research objectives are broad, while resources and personnel are limited, it will not be able to pursue all of these ambitions effectively on its own. For this reason, leaders at the NCI have begun conversations about our shared interests in global health with a variety of groups, including scientific and medical societies, such as the American Association for Cancer Research and the American Society for Clinical Oncology; universities and medical schools with global ambitions; cancer advocacy groups, including the American Cancer Society; pharmaceutical companies; and other research organizations in the United States and abroad, in the private and public sectors. In the near future, we will host a large meeting of representatives from interested parties to develop a set of goals for global health research on cancer.

For continued guidance, we are in the process of assembling three advisory bodies: one composed of colleagues from various components of the NIH that are engaged in global health (one of the five chief priorities of NIH director Francis Collins); another composed of representatives from other government agencies, including the Centers for Disease Control, the U.S. Food and Drug Administration, the United States Agency for International Development, and others with investments in global science and medicine; and a third composed of members of the types of nongovernmental organizations with which the center expects to have important interactions.

The NCI recently publicized its interest in funding research that aims to answer what we have called “provocative questions” (11). These questions—the product of a year of conversations with the NCI's scientific communities—are intended to draw attention to important issues that have been relatively neglected and may now be approachable with new methods and ideas. Strikingly, many of these questions are not only relevant to cancer in the developing world, they address problems that can be solved only by giving more attention to cancers in other parts of the globe: What accounts for changes in cancer incidence when people move from one region to another? Are unsuspected infectious agents

causative factors in cancers? Why are people resistant to behavioral changes known to protect against cancers?

We see questions of this sort to be effective starting points for the creation of a menu of research options for the new Center for Global Health. Other research questions that are perhaps tailored more specifically to improving cancer outcomes in poor countries can be viewed as challenges to those who seek involvement in this expanded domain of global health: Can vaccines be developed that will inhibit tumor induction by large DNA viruses such as Epstein-Barr virus? What are optimal methods for converting infectious disease-specific clinics in developing countries into centers for the control of NCDs? How can clinical trials of affordable antineoplastic agents be rigorously and ethically organized in countries with highly limited resources? What kinds of facilities are required in weak economies to retain and attract the surgeons and pathologists who are essential for initial, and often, curative treatment of many kinds of cancers?

It is clear that a movement toward worldwide cancer control has begun. This month's UN meeting on NCDs is perhaps the most visible sign politically, but other developments are also crucial. The widespread interest in the detailed molecular characteristics of human cancers—now organized into The Cancer Genome Atlas and the International Cancer Genome Consortium—includes efforts to compare the same tumor types arising in different countries, including those in the developing world (12, 13). Several organizations have announced initiatives to expand cancer treatment and prevention campaigns in poor settings (14, 15). Many governments, including China's, have launched tobacco control programs in accordance with the World Health Organization's Framework Convention on Tobacco Control (16). And efforts to reduce the cost of vaccines that prevent cancers that are common in the developing world have been successful (for example, for HBV) or at least widely discussed (for HPV), and are viewed with increasing optimism in the wake of the effective differential pricing strategies employed for treating HIV/AIDS in poor countries (17, 18).

We are launching the NCI's new Center for Global Health in the spirit of the initiatives already begun and in light of recent progress against infectious diseases, maternal-infant mortality, and nutritional

deficiencies. We hope to influence many kinds of investigators to work collaboratively to reduce the now-increasing burden of disease that cancers impose on the entire world.

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10.1126/scitranslmed.3002321

Citation: H. Varmus, E. L. Trimble, Integrating cancer control into global health. *Sci. Transl. Med.* **3**, 101cm28 (2011).

Science Translational Medicine

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Sci Transl Med **3**, 101cm28101cm28.
DOI: 10.1126/scitranslmed.3002321

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