

VIEWPOINT

What the United States Has to Gain From Global Health Research

Roger I. Glass, MD, PhD
Fogarty International
Center, National
Institutes of Health,
Bethesda, Maryland.



Author Reading at
jama.com

As has been true for decades, the United States remains the global leader in biomedical research. Although that position is increasingly challenged by other countries, and US purchasing power for biomedical research has been significantly eroded over the last 10 years, the United States still invests more than any other country in research; leads in the number of publications, patents, and awards; and has an infrastructure that allows discoveries to progress to products. Given this strength, what more can the United States gain by investing in global health research?

It perhaps goes unnoticed that a number of key discoveries that have advanced the understanding of human health and disease have been the products of research conducted by US investigators working abroad, often in low-income settings. For example, the viral cause of hepatitis B and the understanding of kuru and the spongiform encephalopathies were both discovered by US investigators working in Asia; for their efforts, these investigators were awarded Nobel Prizes. Many basic concepts in medicine represent discoveries that demonstrate the importance of research in global health made by US collaborations abroad; examples include the prevention of cancer with a vaccine (eg, prevention of secondary liver cancer with hepatitis B vaccine, Taiwan), the detailed determination of the molecular basis of Huntington chorea (Venezuela), and expanding the understanding of the genetic basis of Alzheimer disease (Colombia).

In every field of medicine today, research partnerships in global health are extending the boundaries of knowledge of disease and strategies for diagnosis, treatment, or prevention. Many observers now appreciate that many of the future frontiers of biomedical discoveries may not be optimally pursued at home. Only by building partnerships with researchers overseas will the United States be able to maintain its competitive edge and accelerate the expansion of knowledge for understanding and the cures desired by all. Indeed, US researchers must take their science and innovation where the problems and opportunities exist.

During the past several decades, there has been a substantial shift in the concept of "global health." In the 20th century, the primary focus was on the detection and control of epidemics of infectious diseases at risk of being imported into the United States. The compelling argument given was that "infectious diseases know no borders." Perhaps the most substantial accomplishment of this US investment was achieved in the program to eradicate smallpox. In 1967, smallpox accounted for 1.5 million to 2.0 million deaths per year, and the cost of control was estimated at \$1.35 billion annually.¹ Ten years

later, the disease was declared eradicated at a total cost to donors of \$100 million; this global collaborative effort not only saved millions of lives but provided a return on investment estimated at 450:1 and still increasing every year.¹ Emerging infections such as avian influenza, severe acute respiratory syndrome, Ebola hemorrhagic fever, and extensively drug-resistant tuberculosis and now MERS-CoV will continue to pose serious threats to health and security in the United States and require greater global surveillance for earlier detection and quicker and more effective responses for control. This traditional value for investments in global health will always remain.

Interest in global health increased in the 1980s, when the epidemic of human immunodeficiency virus (HIV)/AIDS, first recognized in the United States, accelerated to reach global proportions. Because AIDS accounted for deaths among so many adults in Africa and rendered so many infants orphans, politicians successfully argued that the epidemic threatened the political stability and economic growth of sub-Saharan Africa. The US and global response to promote security and support health diplomacy led to unprecedented investments in research and implementation of programs for disease screening, treatment, and control. Research partnerships that developed between US and international investigators in countries most affected by the epidemic led to a continuing stream of discoveries—demonstrating that disease in persons with hemophilia could be prevented by screening the blood supply, that treating mothers at delivery with a simple intervention could prevent vertical transmission of HIV infection, that new treatment regimens could be developed for children and adults whose virus had become resistant to standard drugs, that early treatment could provide a form of prevention, that male circumcision could provide protection, and more.

These global collaborations in research expedited discovery and ensured access to new treatment regimens and prevention strategies that could benefit all patients with HIV in Africa, at home, and across the world. The success of these programs in AIDS treatment and prevention, and the demonstrable good will that they engendered among the populations affected, has raised the bar on the willingness of the US public to invest heavily in programs of global health that work and save lives. Now that tens of millions of people have been screened and counseled and millions have received treatment, the concept that the AIDS epidemic could end in a generation has taken hold. The success of the efforts against HIV/AIDS has also provided the opportunity to consider the next great challenge in global health—addressing chronic noncommunicable diseases (NCDs).

**Corresponding
Author:** Roger I. Glass,
MD, PhD, Fogarty
International Center,
National Institutes of
Health, 9000 Rockville
Pike, Bethesda, MD
20892
(glassr@mail.nih.gov).

During the past several decades, improvements in health worldwide, with the exception of populations in sub-Saharan Africa, have led to substantial increases in life expectancy at birth.² A child born in China, Vietnam, Latin America, or Bangladesh today can expect to live almost as long as a child born in the United States but to incur only a small fraction of the medical care costs. With this opportunity to live into middle age and beyond, they confront not only the burden of disease from infections but the full spectrum of the NCDs that affect everyone in the United States—cardiovascular disease, stroke, cancer, obesity, diabetes, mental illness, addictions, and more. As the United States struggles to address these problems, some novel solutions may be found abroad. For these diseases, there are no simple solutions, “eradication programs,” or massive global investments. This is exactly the time when the United States needs to partner globally—for good ideas, outstanding investigators, unique populations, and extraordinary opportunities to speed discoveries. The many new drugs and devices in the pipeline for diseases shared worldwide will need to be tested where these conditions are most prevalent, where investigators are equally concerned, and where the infrastructure for research is well established. The sooner essential studies are conducted, the sooner all will benefit from the cures.

No single country has the resources required to address these common problems adequately on its own. All will require research to determine what works, what does not work, and what would be most affordable. Although the United States has the highest health care costs in the world, life expectancy in the United States is only marginally longer than that in many low- and middle-income countries like China and Vietnam. Are there lessons in assessing the evidence for practice in terms of overscreening, overdiagnosing, and overtreating some diseases? Could comparative studies in global health delivery provide new evidence that could prolong a rich and healthy life at lower cost? It is likely that the lessons learned from studying the diagnosis and treatment of NCDs in low- and middle-income countries will be different than the lessons learned from studying infectious diseases and likely more difficult to implement in the United States because of differences in how health care is delivered.

Many interventions tried in resource-poor communities might provide lessons to improve the health of all US residents. The use of cell phones in Kenya and Haiti to access rural populations, ensure that patients take their medicine, and avoid the stigma of some follow-up treatments have been used in difficult-to-access populations in the United States as well.^{3,4} Campaigns to perform safe and effective cataract surgery by the tens of thousands at low cost in India and to repair cleft palates economically offer the prospect of simplifying access to care. The low-cost yet effective solutions to problems abroad might well be applied to address some health care needs in the United States.

In conclusion, the United States has already benefitted from research in global health. Major discoveries have occurred through collaborations with other countries, competitiveness has been expanded by enlisting new partners to research, and the nation's humanitarian spirit has been demonstrated by addressing some of the most compelling medical problems today and by assisting economic development. Now, as life expectancy in low- and middle-income countries approaches that in the United States, there is even greater urgency to cooperate and collaborate to confront these shared health problems. Whether that threat is an outbreak of severe acute respiratory syndrome or a new strain of influenza; the persistent problems of cancer, stroke, and heart disease; or the increasing epidemics of obesity and addictive disorders, the response will have to come from the collaboration of creative minds from around the world focused on how to most rapidly arrive at new and more effective solutions for prevention and treatment. Without an emphasis on global health, the United States risks falling behind in its leadership in biomedical research and its competitive position in commercialization of discoveries.

No country has a monopoly on smart people—these international collaborations benefit greatly from the good ideas and critical observations of others, providing the starting point for discovery. Through global health research, new treatments, preventive strategies, and cures may be rapidly identified for many of the diseases that people around the globe share and for which prevention and treatment could lead to longer, healthier lives.

ARTICLE INFORMATION

Conflict of Interest Disclosures: The author has completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

REFERENCES

1. Miller M, Barrett S, Henderson DA. Control and eradication. In: Jamison DT, Breman JG, Measham AR, et al, eds. *Disease Control Priorities in Developing Countries*. 2nd ed. Washington, DC: World Bank; 2006. <http://www.dcp2.org/pubs/DCP>. Accessed August 6, 2013.
2. Lozano R, Naghavi M, Foreman K, et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010 [published correction appears in *Lancet*. 2013;381(9867):628]. *Lancet*. 2012;380(9859):2095-2128.
3. Lester RT, Ritvo P, Mills EJ, et al. Effects of a mobile phone short message service on antiretroviral treatment adherence in Kenya (WelTel Kenya1): a randomised trial. *Lancet*. 2010;376(9755):1838-1845.
4. Trief PM, Izquierdo R, Eimicke JP, et al. Adherence to diabetes self care for white, African-American and Hispanic American telemedicine participants: 5 year results from the IDEATel project. *Ethn Health*. 2013;18(1):83-96.