

Introduction to

GLOBAL HEALTH

SECOND EDITION

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PREFACE

On June 16, 2006, Bill Gates, founder of Microsoft and the richest man in the world, made headlines when he announced his intention to scale back his work at Microsoft to devote more time to the charitable foundation he had co-founded with his wife, Melinda.¹ Ten days later, even bigger headlines were made when Warren Buffett, the second wealthiest man in the world, made a surprising announcement—he was handing over most of his fortune to Bill Gates.² More precisely, the bulk of his accumulated wealth was going to the Bill & Melinda Gates Foundation, which focuses primarily on improving global health. As a result, the Bill & Melinda Gates Foundation, the largest philanthropic foundation in the world even prior to Buffett’s generous donation, doubled in value to more than \$60 billion.

What would inspire the wealthiest men in the world to develop such a passion for one cause? They had become aware of an awful reality: Every year, several million children die of diseases that are completely preventable. In an address to the World Health Assembly, the governing body of the World Health Organization, Bill Gates described the awakening of his philanthropic impulse:

I first learned about these tragic health inequities some years ago when I was reading an article about diseases in the developing world. It showed that more than half a million children die every year from “rotavirus.” I thought, ““Rotavirus?”—I’ve never even heard of it. How could I never have heard of something that kills half a million children every year!?”

I read further and learned that millions of children were dying from diseases that had essentially been eliminated in the United States. Melinda and I had assumed that if there were vaccines and

treatments that could save lives, governments would be doing everything they could to get them to the people who needed them. But they weren't. We couldn't escape the brutal conclusion that—in our world today—some lives are seen as worth saving and others are not. We said to ourselves: “This can't be true. But if it is true, it deserves to be the priority of our giving.”³

Gates ended his speech with a call to action:

I am optimistic that in the next decade, people's thinking will evolve on the question of health inequity. People will finally accept that the death of a child in the developing world is just as tragic as the death of a child in the developed world. And the expanding capacities of science will give us the power to act on that conviction. When we do, we have a chance to make sure that all people, no matter what country they live in, will have the preventive care, vaccines, and treatments they need to live a healthy life. I believe we can do this—and if we do, it will be the best thing humanity has ever done.

Since global health has become the object of attention for Bill Gates, Warren Buffet, and other influential world leaders, it has, not surprisingly, also developed rapidly as an academic and professional field. The Consortium of Universities for Global Health (CUGH), founded in 2009, reports that the number of undergraduate and graduate students at large universities majoring in global health studies doubled in just the 3 years from 2006 to 2009.⁴ By 2009, all of the top 50 liberal arts colleges ranked by *U.S. News & World Report* were offering at least one course in global health or public health, and nearly half offer a major, concentration, or other program of study in global or public health.⁵ The American Association of Medical Colleges reports that nearly one-third of medical students graduating in 2011 completed a global health experience during medical school,⁶ up from only about 15% of medical students in the 1990s and less than 10% in the 1980s.⁷ The trend toward higher enrollment in global health courses, programs, and experiences is expected to continue in the coming years.

Global health is not just about health in low-income countries; it is about common health problems faced by the human population as a whole. In today's interconnected world, our own experiences of health and well-being are literally inseparable from everyone else's. We cannot prevent the birds and insects that carry influenza, West Nile virus, and other infectious agents

from flying over national borders, just as we cannot inspect every imported banana or bean sprout for possible contaminants. The complexities of infectious disease, mental health, injuries, reproductive health, aging, nutrition, and other health-related issues require us to think beyond our households and immediate communities to regional, national, and global levels. Global health is relevant in the workplace too. No matter what the occupation—business, public service, education, medicine, religion, engineering, social work, community development, agriculture, manufacturing, or anything else—workers are involved in activities that intentionally or unintentionally impact human and environmental health close to home and around the world.

The study of global health helps us to make a positive difference in the world. It helps us to understand the causes and consequences of health concerns; to make connections between economics, politics, biology, medicine, sociology, psychology, and a host of other fields; to learn from others about effective and ineffective responses to critical problems; and, more generally, to make sense of the complexities of 21st-century life. A solid foundation in global health allows global citizens to assess their own vulnerabilities and health risks, to make informed choices about their career paths, and to make wise decisions about how to use their time and resources. Studying global health is an opportunity to explore important questions about how the world works, to develop intellectual and practical skills, and to engage with real-world challenges close to home and across the planet. This second edition of *Introduction to Global Health* provides a starting point for achieving those educational and personal goals.

REFERENCES

1. Markoff J, Lohr S. Gates to cede software reins. *New York Times*. 2006 Jun 16.
2. O'Brien TL, Saul S. Buffett to give bulk of his fortune to Gates charity. *New York Times*. 2006 Jun 26.
3. Gates B. Address to the 2005 World Health Assembly. Geneva; 2005 May 16.
4. *Saving lives: Universities transforming global health*. CUGH; 2009.
5. Hill DR, Ainsworth RM, Partap U. Teaching global public health in the undergraduate liberal arts: a survey of 50 colleges. *Am J Trop Med Hyg*. 2012;87:11–15.
6. *Medical school graduation questionnaire: 2011 all schools summary report*. Washington, DC: AAMC; 2011.
7. Drain PK, Primack A, Hunt DD, Fawzi WW, Holmes KK, Gardner P. Global health in medical education: a call for more training and opportunities. *Acad Med*. 2007;82:226–230.



NEW TO THIS EDITION

Global health as a field of study has matured a great deal since the first edition of this textbook was published, and the second edition of *Introduction to Global Health* has been updated to reflect the current state of the field (including, of course, all new statistics).

The first unit of the book focuses on the foundations of global health as an academic and professional discipline.

- Chapter 1 has a new emphasis on health transitions, which are the demographic, epidemiologic, and nutritional changes that occur in populations undergoing socioeconomic development.
- Chapter 2 is a new overview of global health metrics, the numbers that form the basis for evidence-based policy and practice. Chapter 2 also introduces the eight countries that are highlighted throughout the book as examples of the health profiles in different world regions and income strata: the United States, South Korea (the Republic of Korea), Poland, Brazil, China, India, Kenya, and Sierra Leone.
- Chapter 3 provides a brief overview of global health research methods. This chapter gives readers the tools to find, read, understand, and apply health research articles and reports, including the more than 550 sources cited in the textbook. Research skills allow readers to peruse the most up-to-date primary source material, an essential skill for a field as dynamic as global health.
- Chapter 4 is about the social determinants of health—the social, cultural, economic, political, and related factors that influence health status.

The second unit is about global health across the lifespan.

- Chapter 5 is an expanded chapter on infant and child health that emphasizes ways to prevent the most common causes of neonatal and pediatric death worldwide.
- Chapter 6 is a new chapter on the health of young adults that discusses mental health, injuries, maternal mortality, family planning, and other important global issues.
- Chapter 7 is a new chapter on chronic noncommunicable diseases (NCDs) and aging that highlights the diseases that are the most common causes of death and disability among older adults in every region of the world. These include cardiovascular diseases, cancer, chronic lung disease, diabetes, and sensory impairments.

The third unit is about global health biology and the environmental context of health.

- Chapter 8 focuses on drinking water, sanitation, energy, occupational health, and other aspects of environmental health.
- Chapter 9 has a new focus on infectious disease prevention and control. Behavior change, environmental control, vaccination, drug therapy, and other methods for preventing and treating diarrheal, respiratory, vectorborne, and other infections are described.
- Chapter 10 provides an in-depth look at HIV/AIDS, tuberculosis, malaria, and influenza, with new coverage of the major initiatives working to address these global concerns.
- Chapter 11 covers the complex issues of global nutrition.

The fourth unit is about global health policy and practice.

- Chapter 12 describes the various entities that pay for and implement public health programs, highlighting the many different career paths and volunteer opportunities for those with interests in global health.
- Chapter 13 is an expanded chapter that highlights several of the key emerging issues of globalization and global health, such as urbanization, emerging infectious diseases, nutrition and food safety, bioterrorism, and global environmental change.

- Chapter 14 is a new chapter focusing on health and human rights, access to health, health during disasters and humanitarian emergencies, and emergency preparedness and response.
- Chapter 15 summarizes the successes in global health to date and examines priority areas for global health in the 21st century.

A transition guide showing how the first and second editions of *Introduction to Global Health* relate is available from the publisher.



ABOUT THE AUTHOR

Kathryn H. Jacobsen is an associate professor of epidemiology at George Mason University. She earned an MPH in International Health and a PhD in Epidemiology from the University of Michigan. Her research portfolio includes analyses of the global burden of disease and field projects in Africa, Asia, and the Americas. Dr. Jacobsen's work has been published by the World Health Organization and in dozens of international peer-reviewed journals. She is also the author of *Introduction to Health Research Methods: A Practical Guide*, published by Jones & Bartlett Learning.

