

Global Health 101

THIRD EDITION

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04538-3

Production Credits

VP, Executive Publisher: David D. Cella
Publisher: Michael Brown
Associate Editor: Lindsey Mawhiney
Associate Editor: Nicholas Alakel
Production Manager: Tracey McCrea
Senior Marketing Manager: Sophie Fleck Teague
Manufacturing and Inventory Control Supervisor: Amy Bacus
Composition: Cenveo® Publisher Services
Cover Design: Kristin E. Parker
Rights & Media Manager: Joanna Lundeen
Rights & Media Research Coordinator: Mary Flatley
Media Development Editor: Shannon Sheehan
Cover Image: © Randy Plett/Stone/Getty Images
Printing and Binding: RR Donnelley
Cover Printing: RR Donnelley

Library of Congress Cataloging-in-Publication Data

Skolnik, Richard L., author.
Global health 101 / Richard Skolnik.—Third edition.
p. ; cm.
Global health one hundred one
Global health one hundred and one
Includes bibliographical references and index.
ISBN 978-1-284-05054-7 (pbk.)
I. Title. II. Title: Global health one hundred one. III. Title: Global health one hundred and one.
[DNLM: 1. Global Health. 2. Health Services Accessibility. 3. Public Health. WA 530.1]
RA441
362.1—dc23
2015014288

6048

Printed in the United States of America
19 18 17 16 15 10 9 8 7 6 5 4 3 2 1

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ABOUT THE EDITOR

Richard K. Riegelman, MD, MPH, PhD, is Professor of Epidemiology-Biostatistics, Medicine, and Health Policy, and Founding Dean of The George Washington University Milken Institute School of Public Health in Washington, DC. He has taken a lead role in developing the Educated Citizen and Public Health initiative which has brought together arts and sciences and public health education associations to implement the Institute of Medicine of the National Academies' recommendation that "...all undergraduates should have access to education in public health." Dr. Riegelman also led the development of The George Washington's undergraduate major and minor and currently teaches "Public Health 101" and "Epidemiology 101" to undergraduates.

The Importance of Global Health

Why should we care about the health of other people, especially that of people in other countries? Actually, for a number of critical reasons, the health of people everywhere must be an important concern for all of us.

First, diseases do not respect boundaries. Human immunodeficiency virus (HIV) has spread worldwide. A person with tuberculosis can infect 15 people a year, wherever they are. The West Nile Virus came from Egypt but occurs today in many countries. In addition, there is an important risk of a worldwide epidemic of influenza. Clearly, the health of each of us increasingly depends on the health of others.

Second, there is an ethical dimension to the health and well-being of other people. Many children in poor countries get sick and die needlessly of nutrition-related causes or from diseases that are preventable and curable. Many adults in poor countries die because they lack access to medicines that are customarily available to people in rich countries. Is this just? Are we prepared to accept such deaths without taking steps to prevent them?

Third, health is closely linked with economic and social development in an increasingly interdependent world. Children who suffer from undernutrition may not reach their full mental potential and may not enroll in or stay in school. Sick children from low- and middle-income countries are less likely than healthy children to become productive adults who can contribute to the economic standing of their family, community, or country. Adults who suffer from AIDS, tuberculosis, malaria, and other diseases lose income while they are sick and out of work, which contributes in many ways to keeping their families in an endless cycle of poverty.

Finally, the health and well-being of people everywhere have important implications for global security and freedom. High rates of HIV/AIDS have contributed to destabilizing some countries, as more teachers and health workers died than were trained, and as insufficient numbers of rural workers grew and harvested crops. Outbreaks of other diseases, such as cholera, the plague, SARS (Severe Acute Respiratory Syndrome), and Ebola, for example, threaten people's ability to engage freely in economic pursuits and can have devastating economic and social consequences. An outbreak of cholera in 1991 cost Peru about \$1 billion, the plague in 1994 cost India about \$2 billion, and SARS in Asia in 2003 cost the economies of Asia a staggering \$18 billion in lost economic activity.

Indeed, these factors have increased interest in global health both within universities and among university students. The aim of this book, therefore, is to examine the most critical global health topics in a clear and engaging manner. The book will provide the reader with an overview of the importance of global health in the context of development, examine the most important global health issues and their economic and social consequences, and discuss some of the steps that are being taken to address these concerns. It will also provide numerous "success stories," as examples of effectively dealing with important global health problems.

This book is intended to provide an introduction to global health for all students. This includes students who have never studied public health before and who will not take additional public health courses in the future. However, it also includes those students, whether they have studied public health before or not, who may wish to pursue additional studies in public health later.

This book is largely based on an undergraduate global health course that I taught at The George Washington University in Washington, DC and now teach at Yale. The text seeks to “speak” to the reader in a manner one would find in an exciting and motivating classroom. In addition to covering key concepts in global health and frameworks for the analysis of global health issues, this book also contains numerous examples of on-the-ground experiences in addressing key global health problems.

Very few introductory materials on global health are available to students or their professors. Hopefully, this book will help to close that gap by providing a foundation for enhanced studies in public health, global health, and economic and social development.

THE ORGANIZATION OF THE BOOK

This book is organized in several parts that closely follow the topics mentioned previously. Part I introduces the reader to the basic principles of global health, key measures of health, and the concepts of the health and the development link. Chapter 1 introduces readers to some key principles, themes, and goals of global health. Chapter 2 examines the determinants of health, how health is measured, and how health conditions change over time and as countries develop economically. Chapter 3 looks at the links between health and development, touching upon the connections between health and education, equity, and poverty.

Part II reviews cross-cutting themes in global health. Chapter 4 examines human rights and ethical issues in global health. Chapter 5 covers health systems. This chapter reviews the purpose and goals of health systems and how different countries have organized their health systems. The chapter also reviews the key challenges that health systems face, the costs and consequences of those challenges, and how some countries have addressed health system challenges. Culture plays an extremely important part in health, and Chapter 6 examines the links between culture and health. This chapter reviews the importance of culture to health, how health is perceived in different groups, the manner in which different culture groups seek health care and engage in health practices, and how one can promote change in health behavior.

Part III reviews the most important causes of illness, disability, and death, particularly in low- and middle-income countries. The chapters in this part of the book examine environmental issues, nutrition, women’s health, child health, and adolescent health. The book then looks at communicable diseases, noncommunicable diseases, and unintentional injuries.

Part IV examines how cooperative action can address global health issues. Chapter 15 reviews the impact on health of conflicts, natural disasters, and other health emergencies. Chapter 16 examines how different actors in the global health field work both individually and cooperatively to address key global health problems. Chapter 17 reviews how science and technology have helped to improve public health and how further advances in science and technology could help to address some of the most important global health challenges that remain.

Part V focuses on careers in the global health field. Chapter 18 examines the types of careers in global health; the skills, knowledge, and experience needed to pursue these careers; and how you can get those skills, knowledge, and experience. The book ends with Chapter 19, which includes profiles of 21 actors in the global health field whose personal stories are meant to inspire you, as well as provide guidance about pursuing a career in global health if that is your interest.

Each of the chapters, other than those on working in global health and on profiles of global health actors, follows a similar outline. The chapters begin with vignettes that relate to the topic to be covered and which are intended to make the topic “real” for the reader. Some of these vignettes are not true in the literal sense. However, each of them are based on real events that occur regularly in the countries discussed in this book. Most chapters then explain key concepts, terms, and definitions. The chapters that deal with cross-cutting issues in the second and fourth parts of the book then examine the importance of the topic to enhancing global health, some key challenges in further improving global health, and what can be done to address those challenges.

The chapters that focus on health conditions look at the burden of disease related to these conditions; who is most affected by these issues; major risk factors for these burdens; and, the costs and consequences of these issues for individuals, communities, and the world. These chapters then examine what has been learned about how to deal with these health burdens in the most cost-effective ways, the future challenges in each of these areas, and some specific cases of successful efforts at addressing such challenges.

Most chapters contain “policy and program briefs” that are meant to briefly introduce you to and illustrate important global health topics, actors, and organizations.

Most chapters also contain several case studies. Some of these deal with well-known cases that have already proven to be models for global health efforts. Others, however, are based on experiences that show good promise, both for success and for providing lessons, but which have not yet proven themselves.

Each chapter concludes with a summary of the main messages in the chapter and a set of study questions that can assist the reader in reviewing the materials included in the chapter. Each chapter also contains endnotes with citations for the data that are used in the book. The book does not contain any additional lists of reference materials. Those wishing to explore topics in greater depth will find ample suggestions for additional reading in the endnotes.

The reader should note that the chapters are not in order of importance. Nutrition, for example, is fundamental to all health concerns. However, it only makes sense to cover nutrition in this book after establishing the context for studying global health and after covering some cross-cutting global health issues. In addition, you will note that there is no chapter called “globalization and health.” Rather, you will find that the relationships between globalization and health are integrated into all of the chapters. Some students may also wish to read Chapter 16 on global health policy, actors, and actions before they cover many of the other chapters. This may help them understand at an earlier stage how different actors have organized themselves to address key global health issues.

THE PERSPECTIVE OF THE BOOK

The book will take a global perspective to all that it covers. Although the book includes many country case studies, topics will be examined from the perspective of the world as a whole. The book also pays particular attention to the links between poverty and health and the relationship between health, equity, and health disparities. Special attention will also be given to gender and ethnicity and their relation to health. Another theme that runs through the book is the connection between health and development.

The book follows the point of view that health is a human right. The book is written with the presumption that governments have an obligation to try to ensure that all of their people have access to an affordable package of healthcare services and that all people should be protected from the costs of ill health. The book is also based on the premise, however, that the development of a health system by any country, as discussed further in Chapter 5, is inextricably linked to the value system and the political structure of that country.

The book covers key global health topics, including those that affect high-income countries. However, the book pays particular attention to low- and middle-income countries and to poor people within them. The rationale for this is that improving health status indicators within and across countries can only be accomplished if the health of the poor and other disadvantaged groups is improved. In addition, the idea of social justice is at the core of public health.

Global Health 101, Third Edition

What's New in the *Third Edition*?

OVERVIEW

The third edition of *Global Health 101* contains an extensive amount of new and revised information, while maintaining its clarity, simplicity, and ease of use by faculty and students.

The aim of the revision is to bring the book in line with the latest burden of disease data, offer unique content on key topics that are often insufficiently covered in introductory materials, such as immunization and adolescent health, and to make the book increasingly attractive to students and teachers alike with the addition of more case studies and profiles of global health actors.

The major substantive changes to the book are given below.

THE BURDEN OF DISEASE AND OTHER HEALTH DATA

One of the foundations for the book is data on the burden of disease. The third edition has updated all data on the burden of disease and related risk factors, largely using information from the *Global Burden of Disease Study 2010*, which was published in 2013.

Considerable progress continues to be made in many countries in improving health. This edition uses health statistics from 2012 or later, whenever possible, for all key data. This data is taken largely from WHO, UNICEF, the World Bank, and UNAIDS.

The reader will find that almost all tables and figures in the book that relate to the burden of disease and risk factors have been completely updated.

HEALTH SYSTEMS

This edition of the book includes revised, updated, and expanded comments about health systems in a number of settings.

HEALTH DISPARITIES

Equity and inequality are essential public health concerns. This edition explores equity and inequality issues for a variety of groups more deeply than the earlier editions.

NUTRITION

The place of nutrition in health has changed dramatically, with considerable growth in the share of populations that are overweight and obese, even in low- and middle-income countries. This edition features a completely redone chapter on nutrition

that covers nutrition issues from undernutrition to overweight and obesity in a single chapter. In doing so, it takes account of the latest global work on nutrition, including the *Global Nutrition Report* of November 2014 and the *Lancet Series on Maternal and Child Nutrition* of 2013.

CHILD HEALTH

This edition also features a considerably expanded chapter on child health, which includes an extensive new section on childhood immunization. The comments on immunization feature the history of the global program on immunization from its inception to the present. This section highlights the status of the world's work on immunization, the challenges it faces, and how the world is seeking to address those challenges.

ADOLESCENT HEALTH

The book includes a new chapter on adolescent health, an important but insufficiently covered topic in much of the literature on global health. The chapter is parallel in construction to the child health chapter and seeks to address: What do adolescents get sick, disabled, and die from? Which adolescents suffer from these problems? What are the risk factors and social determinants for these problems? What are their consequences? What have we learned can be done to address these issues?

PHARMACEUTICALS

Pharmaceuticals are an especially important issue for all health systems. This edition includes a new section on pharmaceuticals.

NONCOMMUNICABLE DISEASES

The share of the burden of disease that is noncommunicable has continued to grow. This edition features considerable additional information on noncommunicable diseases broadly, and on cancer, mental health, and essential surgery, in particular.

SCIENCE AND TECHNOLOGY

Science and technology continue to be used in increasingly diverse ways to meet Global Health needs. This edition features a range of new policy and program briefs on science and technology. These include, for example, new briefs on the use of mobile technologies for Global Health, telemedicine in India, and on new drugs and diagnostics for TB.

WORKING IN GLOBAL HEALTH

This edition continues to include two chapters on careers in Global Health. The chapter on working in global health has been updated. Eight new profiles of Global Health actors have been added to the chapter on Profiles of Global Health Actors.

CASE STUDIES AND POLICY AND PROGRAM BRIEFS

Case studies and policy and program briefs bring topics to life for students and faculty. This edition includes more than 25 additional "Policy and Program Briefs" of about 750 to 1,000 words each, which cover the range of key topics in the book. Some of the new briefs in this edition, for example, cover:

- Product development partnerships, such as AERAS for the development of TB vaccines;
- Vaccines, such as for polio and measles;
- Emerging infectious diseases, such as the Ebola virus and Cryptococcus in AIDS patients in Africa;
- Noncommunicable diseases, such as diabetes in the Pacific;
- Essential Surgery, as described in a recent *Lancet* Commission report;
- Mental Health, including comments on the gap between needs and action globally and on the growing numbers of people with dementia.

BLOG ON TEACHING GLOBAL HEALTH

The author will once again be preparing a monthly blog on teaching global health. The blog contains information about resources for teaching global health. It also includes lessons that the author is learning from his teaching of Global Health at three levels, as well as lessons that others have shared with him about their teaching experiences.

Prologue: *Global Health 101*, Third Edition

In the prologue to the previous editions, I wrote: “The issues of global health have finally arrived in the consciousness of the developed world through a unique union of efforts by former presidents, software pioneers, and rock stars. It is now time that students have a textbook . . . that systematically leads them through the issues of global health from basic principles, to the burden of disease, to examples of successful efforts to improve lives and livelihoods.” *Global Health 101* has fulfilled these expectations and more. It has become the classic textbook of global health and is now being used in a wide range of countries.

What can you as students and faculty expect from the third edition of *Global Health 101*? The third edition builds upon the strengths of the previous editions and provides substantial new and updated material.

Expanded chapters keep the textbook up to date and state of the art. The share of the burden of disease that is noncommunicable has continued to grow. The third edition features considerable additional information on noncommunicable diseases broadly and on cancer, mental health, and essential surgery. Pharmaceuticals are an especially important issue for all health systems. This edition includes a new section on pharmaceuticals. The place of nutrition in health has changed dramatically, with considerable growth in the share of populations that are obese, even in low- and middle-income countries. This edition features a substantially revised nutrition chapter, which deals with obesity as well as undernutrition. This edition also features a new major section on immunization and a new chapter on adolescent health.

Equity is essential to all public health concerns. This edition explores equity issues for a variety of groups more deeply than the earlier editions. Science and technology continue to be used in increasingly diverse ways to meet global health needs. This edition features new sections on the use of mobile technologies for global health.

As students you’ll enjoy and learn from the engaging videos, expand your knowledge using the web links, and test your understandings using the interactive questions and answers. The expanded chapters on careers in global health bring to life the opportunities provided by this growing and dynamic field.

For faculty, there are an abundance of additional resources to help broaden and deepen students’ understanding of global health.

Whether you are taking a global health course as part of general education, a major or minor in public health or global health, as part of your health professions education, or as part of your interest in international affairs, you will find the third edition an exhilarating experience that opens your mind and your heart to the world of global health.

Richard Riegelman, MD, MPH, PhD
Essential Public Health Series Editor

Foreword

The world has made enormous progress against some of the leading causes of premature death and disability. The number of children under 5 years of age who die each year has fallen substantially, but there are still more than 6 million child deaths each year. Despite substantial gains against diseases such as measles, almost 150,000 children still die of measles each year, as well. Progress has also been made against disability-causing infections such as polio, for which there are now fewer than 500 new cases a year, and it is hoped that eradication is in sight. The number of women dying a maternal death has also declined to below 300,000 per year and the number of new HIV infections in the world each year is also falling. Life expectancy at birth for the world as a whole is at its highest point ever and, as many have commented, never before have so many people lived so long. However, these gains still remain out of reach of the world's poor living in both industrialized and developing countries, and health inequalities must be addressed.

There is thus a substantial unfinished agenda in global health:

- Although the deaths of children under 5 have declined substantially, for example, who can accept that more than 6 million children a year still die before their fifth birthday? Although the number of maternal deaths has declined, as well, who can accept that almost 300,000 women die each year during or just after childbirth? Why has it taken the world 60 years after the development of polio vaccines to make this progress? And why are there still 2.1 million new HIV infections and 9 million new people who fall ill with tuberculosis each year?
- In addition to this, the world faces continuing threats from emerging and reemerging infectious diseases, such as the Ebola virus, which has caused a major epidemic in West Africa. The world has also failed to make sufficient progress in addressing the threats of resistance to medicines that treat bacterial, viral, and parasitic infections; in developing new medicines to replace those becoming less effective; and in developing vaccines that can prevent these infections. Moreover, we are also seeing the effects of climate change and increasing globalization on health, with the spread, for example, of the dengue and Chikungunya viruses.
- At the same time, an increasing share of the world's population is at risk of noncommunicable diseases, including those who live in low- and middle-income countries. More and more people are living longer, but many of them are also living longer with disabilities. Will we be able to keep tobacco consumption from continuing to increase in today's low-income countries as most higher income countries have done? Can all countries, including those that are low income, create an environment that will enable their people to avoid as much as possible the other "lifestyle" diseases that are spreading worldwide?

Many students flock to the study of global health to celebrate and learn from the progress made to date and to commit to addressing the important gaps that remain. Other students understand that a knowledge of global health is critical in today's

interconnected and globalized world. For both reasons, the demand for studies in global health has continued to grow worldwide and the need for coherent resources to help these students gain a solid foundation in the study of global health is critical.

In light of the progress in global health, the large unfinished agenda, the remarkable demand for learning about global health, and the ever-changing global health landscape, I am pleased to see this third edition of Richard Skolnik's book on global health.

Richard has laid out the fundamental concepts of global health studies in a clear and coherent manner that is data and evidence based and well illustrated. Most important, the book stresses issues of equity, social justice, a deep concern for the poor and marginalized, and the importance of value for money from investments in health. Grounding the book in the latest data on the burden of disease is invaluable and including in the book an increasing number of case studies and policy and program briefs helps to bring the contents of the book alive for students who are learning about global health for the first time, as well as those who already are familiar with or are practitioners of global health.

Richard brings to the writing of the book his personal experience of more than 30 years of work in global health; and another 13 years of teaching global health to undergraduates, graduate students in public health, and students in business and other professional schools.

The first two editions of Richard's book have been widely used, both in the United States and internationally. I am confident that this substantially updated and enlarged third edition will likewise be widely used by students who wish to gain basic understanding of key global health issues and by those who wish to obtain a strong foundation for further studies in global health.

David L. Heymann, M.D.

March 2015

Dr. Heymann is a professor of infectious disease epidemiology at the London School of Hygiene and Tropical Medicine and head and senior fellow of the Centre on Global Health Security, Chatham House (London). Dr. Heymann spent 15 years working with the U.S. Centers for Disease Control and Prevention (CDC) in disease control programs based in Africa and Asia and 10 years working on secondment from the CDC to the World Health Organization. He began this work with 2 years on smallpox eradication in India. He then worked in sub-Saharan Africa, beginning in 1976 in Yambuku, Democratic Republic of the Congo, where he was a member of the team that investigated the first Ebola outbreak. Dr. Heymann stayed on in Africa for 13 years to investigate future outbreaks of Ebola and other African infectious diseases. Following that, Dr. Heymann began a 22-year career at the World Health Organization, 10 of those on secondment from the CDC, beginning as a medical epidemiologist in the newly developed AIDS program. He then set up and directed the program on emerging infections and finally became assistant director-general in charge of infectious diseases.

Dr. Heymann is an elected member of the United States Institute of Medicine and the United Kingdom Academy of Medical Sciences. He has also received a variety of awards for his work in public health and infectious diseases, including the American Public Health Association Award for Excellence. In addition, Dr. Heymann has been named Commander of the Order of the British Empire (CBE) for excellence in public health.

Acknowledgments

This third edition of *Global Health 101* would not have been possible without the exceptional help provided to me in the development of the first and second editions. Thus, I repeat here the acknowledgements for those editions, before acknowledging those who helped with this edition.

THE FIRST EDITION

Many people graciously assisted me with the preparation of the first edition of this book, which could never have been completed without their help.

Four colleagues prepared initial chapter drafts and were the coauthors of the chapters indicated: Victor Barbiero for Communicable Diseases, Michael Doney for Unintentional Injuries, Heidi Larson for Child Health, and John Tharakan for Ethics and Human Rights. Vic also provided the Quotable Quotes at the beginning of the book.

A large number of individuals contributed case studies to the first edition. Florence Baingana prepared the case study on mental health in Uganda in Chapter 12. Sadia Chowdhury provided the case study on oral rehydration in Bangladesh in Chapter 5. Ambar Kulshreshtha prepared the case study of Kerala in Chapter 2. Nancy J. Haselow and Musa Obadia, assisted by Julia Ross, prepared the case study on vitamin A and Ivermectin in Chapter 5. Peter J. Hotez, Ami Shah Brown, and Kari Stoeber provided the case study on the Human Hookworm Vaccine Initiative in Chapter 16 of the first edition. Orin Levine prepared the case study on pneumococcal vaccine that is also in Chapter 16 of the first edition. Andrea Thoumi, a student at Tufts University, provided drafts of the case studies on fistula, the earthquake in Pakistan, refugees in Goma, motorcycle helmets in Taiwan, and speed bumps in Ghana. Andrea also prepared drafts of cases on cataract blindness in India and vitamin A in Nepal, based on *Case Studies in Global Health: Millions Saved*.

A large number of friends and colleagues also reviewed and commented on different book chapters, always adding great value as they did so. These people included Ian Anderson, Alan Berg, Florence Baingana, Stephanie Calves, Roger-Mark de Souza, Wafaie Fawzi, Charlotte Feldman-Jacobs, Adrienne Germain, Reuben Granich, Robert Hecht, Judith Justice, James Levinson, Kseniya Lvovsky, Venkatesh Mannar, William McGreevey, Anthony Measham, Tom Merrick, Elaine Murphy, Rachel Nugent, Kris Olson, Ramanan Laxminarayanan, Rudy van Puymbroeck, Richard Southby, Ron Waldman, and Abdo Yazbeck.

Several of my former students at The George Washington University, including Yvonne Orji, Sapna Patel, David Schneider, and Melanie Vant, provided background information for the first edition and reviewed various book chapters. Pamela Sud, then a student at Stanford University, also reviewed a number of chapters.

Andrea Thoumi not only helped me to prepare cases, as noted previously, but also provided background materials, helped with citations, and reviewed a number of chapters.

Jessica Gottlieb, Molly Kinder, and Ruth Levine, then of the Center for Global Development, were especially helpful to the preparation of this book. I am very grateful to them and to the center for agreeing to make *Case Studies in Global Health*:

Millions Saved the companion reader to my book. In addition, my book includes abbreviated versions of 16 of the 20 cases in *Millions Saved*, 14 of which the center graciously prepared for me. Jessica, Molly, and Ruth also reviewed many of the chapters of my book and Jessica Pickett, who then worked with the center, also commented on a chapter.

Jessica Roeder, my former colleague at the Harvard School of Public Health, was kind enough to take on a second job at night to help me prepare tables and figures.

I am also especially grateful to my daughter, Rachel, who worked with me almost full time for many months and assisted in preparing background information, tables, figures, and citations and reviewing and editing each chapter of the first edition.

Barry Bloom, then dean of the Harvard School of Public Health, was kind enough to prepare the preface for the first edition, for which I remain very appreciative.

I remain grateful, as well, to Sir George Alleyne, Dean Jamison, and Adrienne Germaine who very kindly wrote advance praise for the first edition. I am honored, of course, that three such distinguished people would do so.

The staff of Jones & Bartlett Learning, especially Katey Birtcher, Mike Brown, Sophie Fleck, and Rachel Rossi, were also immensely helpful to the preparation of the first edition.

THE SECOND EDITION

The second edition would also have been impossible without the extensive assistance of many people.

Roger Glass, the director of the Fogarty International Center of the United States National Institutes of Health, has honored me by preparing the foreword for this edition.

Elizabeth H. Bradley, professor of public health and faculty director, Global Health Leadership Institute at Yale University, and Prabhat Jha, Canada Research Chair in Health and Development and Director, Centre for Global Health Research at the Li Ka Shing Knowledge Institute, St. Michael's Hospital and Dalla Lana School of Public Health, University of Toronto, prepared advance praise for the book.

Joe Millum, of the National Institutes of Health, graciously coauthored the chapter on ethics and global health. Joe did marvelous work revising, expanding, and illuminating the text of the first edition to make the chapter more coherent, more enlightening, and more vibrant.

This edition of the book includes 30 new Policy and Program Briefs, many of which were written with the assistance of friends and professional colleagues who provided drafts of the briefs or other major inputs to the brief writing process. These people included Kate Acosta and Luzon Pahl of TOSTAN; Soji Adeyi of the Affordable Medicines Facility—malaria; Faruque Ahmed of BRAC; Lisa Beyer from the International AIDS Vaccine Initiative (IAVI); Aya Caldwell and Kris Olson of Massachusetts General Hospital; Susan Higman of the Global Health Council, Peg Willingham of Aeras; Dan Kammen, of the University of California, Berkeley and the World Bank, who prepared the draft of the brief on cookstoves; Linda Kupfer of the Fogarty International Center of the National Institutes of Health; Anjana Padmanabhan of The Global Network on Neglected Tropical Diseases; Jennifer Staple-Clark of Unite for Sight; Eteena Tadjigoueu from the Human Hookworm Vaccine Initiative; and Karen Van der Westhuizen and Patrizia Carlevaro of the Eli Lilly Corporation. Josephine Francisco and her mentor, Tom Davis, allowed me to prepare a brief about breastfeeding in Burundi that was based on Josie's master of public health research project. Josie also kindly reviewed the draft of the brief we prepared from her work.

Many former colleagues at the World Bank, World Health Organization, and Population Reference Bureau, as well as other friends, helped me assemble data and other resources for the book. These included John Briscoe, Dave Gwatkin, Rob Hecht, Dean Jamison, Pete Kolsky, Joel Lamstein, Kseniya Lvovsky, Colin Mathers, Kris Olson, Eduardo Perez, David Peters, and Abdo Yazbeck.

A number of colleagues and friends were also kind enough to review sections of the book or whole book chapters, including Leslie Elder of the World Bank, Robert Hecht of the Results for Development Institute, Peter Hotez of The George Washington University, Susan Higman of the Global Health Council, and Rachel Nugent of the Center for Global Development.

I am also exceptionally grateful to the friends and colleagues for whom I have so much respect and who allowed me to prepare a profile of them for the chapter we have added to the second edition called "Profiles of Global Health Actors." These wonderful people gave much of their time and energy to help us develop a profile about them. Their names appear in Chapter 18.

It would have been impossible, over any time frame, to have prepared this edition without the many former students I was sensible enough to employ for this effort. Laura Chambers, Becky Crowder, Lindsay Gordon, and Emma Morse served as

principal research assistants for the second edition. Lindsay and Laura gathered research materials and data, prepared graphs and tables, and drafted countless policy and program briefs, with which Emma also helped. Lindsay and Laura also developed the initial drafts of most of the profiles in Chapter 18. Becky and Emma reviewed each chapter of the book at each stage of writing and production. Becky, Emma, Laura, and Lindsay were instrumental to the preparation of the book and a delight to work with at all times.

The same enjoyment and many valuable inputs came from working with another group of former students who put in a substantial number of hours on data collection; the review of draft chapters, copyedited chapters, and page proofs; and the preparation of materials for the website. These major contributors to the book included Shannon Doyle, Elizabeth Gomes, Tae Min Kim, and Sara Walker.

A number of former students also assisted me with data collection for the book and the website, including Ahsan Butt, Tanvi Devi, Jenny Durina, David Hidalgo, and Mara Leff. Lisa Hendrickson commented on the brief on Calcutta Kids. Demitsa Rakitsa prepared the initial draft of the brief on HIV financing in Cambodia and South Africa. Candace Martin helped gather data, prepared references and materials for both the book and the website, and also helped to prepare the brief on sanitation in Indonesia.

My thanks also go to former students who allowed me to put on the book's website the policy briefs they wrote for my classes. Their names appear on their briefs on the website, unless they preferred to make their contributions anonymously.

Richard Riegelman, my former dean at the George Washington University, friend, and editor of the series of which my book is a part, provided irreplaceable help throughout the preparation of the first and second editions.

The staff of Jones & Bartlett Learning was a delight to work with and immensely helpful, including Mike Brown, Sophie Fleck, Maro Gartside, Catie Heverling, Nicole LaLonde, Carolyn Rogers, and Teresa Reilly.

THE THIRD EDITION

A number of colleagues, friends, former colleagues, and former students have been especially helpful to the development of this edition, including some who assisted with the earlier editions.

Richard Riegelman has been a wonderful editor of the series to which this book belongs. He has provided an enormous amount of assistance in the development of all three editions, across a range of areas. He also prepared the prologue for this edition.

David Heymann, the former assistant director-general of the World Health Organization, honored me by writing the foreword to this book, as well as allowing me to profile him in Chapter 19.

Joe Millum, a bioethicist at the National Institutes of Health, in his personal capacity, was the co-author of the chapter on ethics for the second edition. Joe also reviewed and helped me revise the ethics chapter for this edition.

Aviva Musicus, a former student, co-authored the nutrition chapter. She drafted the sections on overweight and obesity and worked closely with me to refine the chapter and to make it a coherent one.

Amy Davis, another former student, prepared the major new section on immunization.

Ian Anderson helped in the preparation of the Policy and Program Brief on diabetes in the Pacific, which was based on his own excellent work.

Lew Barker updated the Policy and Program Brief on AERAS.

Robert Davis reviewed in detail the new immunization section.

Tom Davis assisted in the preparation of the Policy and Program Brief on CARE groups.

Gregg Gonsalves reviewed the entire book, with a particular focus on human rights and social justice. Gregg's comments were extremely helpful to the preparation of the third edition.

Reuben Granich reviewed and provided valuable comments on the treatment of HIV/AIDS in the book.

Robert Hecht assisted in the development and review of a number of Policy and Program Briefs on the financing of global health activities.

Sue Horton provided me access to forthcoming publications on the economics of nutrition, so that I might benefit from them in preparing the nutrition chapter of this book.

Peter Hotez and his colleagues assisted me in the preparation of Policy and Program Briefs on the Global Network on Neglected Tropical Diseases and on the Human Hookworm Vaccine Initiative.

Steve Hyman reviewed a Policy and Program Brief on mental health based on some of his own excellent research and writing.

Prabhat Jha, and his colleagues at the University of Toronto assisted me in the preparation of a Policy and Program Brief on their Million Deaths Study on India.

As she did so ably on the first and second editions, my daughter, Rachel Skolnik Light, provided substantial editorial help on this edition.

Greg Martin reviewed the career chapters of the book and offered keen insights into how they could be improved.

Rachel Nugent provided an enormous amount of help with the book, by pointing me to resources, introducing me to people who could help me with the book, and reviewing a number of parts of the book, including the new sections on overweight and obesity.

Diana Weil reviewed and provided valuable comments on the sections in the book that refer to tuberculosis.

In addition, as on the first and second edition, I employed a substantial number of other former students to assist in a variety of efforts related to the book. These students, from Yale College and the Yale School of Public Health, are identified next, as is a student I employed from the George Mason University.

Hilary Rogers worked with me in conceiving the third edition, reviewing the entire second edition as a basis for the third, collecting data, preparing figures and tables, drafting some of the Policy and Program Briefs and Profiles, drafting some revisions to the book, and editing much that I wrote. Hilary, along with Stephanie Siow, also made major inputs to the new chapter on adolescent health.

Lindsey Hiebert took over Hilary Rogers' work when Hilary moved on to postgraduation employment. Lindsey worked tirelessly on the book in remarkable ways, no matter what other demands faced her. Among other things, Lindsey was exceptionally helpful in finding resources, reviewing the second edition for needed changes, drafting many Policy and Program Briefs, drafting an excellent new section on cancer, and putting together—literally—scores of tables and figures. Lindsey also reviewed all of my writing and many copyedited chapters and helped us to assemble the book into what I hope is a coherent one.

Michealla Baker, Stephanie Heung, and Rachel Wilkinson also played a major role in the preparation of the book. They drafted Policy and Program Briefs and tables and figures and reviewed numerous copyedited chapters of the book. Michaela also worked extensively on the web based materials for the book, including finalizing the video list. Rachel also made special inputs to the chapter on adolescent health and to the web-based bibliography.

Lauren Tronick and Laura Anderson also assisted me in the development of the book's web materials. Among other things, they reviewed and annotated countless videos. They also helped put together the extensive bibliography on global health resources. Laura also drafted several Policy and Program Briefs, including initiating the one on essential surgery.

Kevin Boehm, Emily Briskin, and Vivek Vishwanath also drafted Policy and Program Briefs for the book.

Justin Mendoza drafted a major new addition to the book on pharmaceuticals.

Katherine McDaniel, carefully read the entire second edition and kindly provided me with notes on errors, omissions, and phrases that needed editing before inclusion in the third edition.

Shannon Taylor, a graduate student at The George Mason University, drafted a Policy and Program Brief on oral health, incorporating materials on which Laura Anderson had also assisted.

I am also very grateful to the many people who gave so freely of their time so that I could include a profile or an updated profile of them in this edition.

The staff of Jones & Bartlett Learning was exceptionally helpful and continued to be a delight to work with and included Mike Brown, Sophie Fleck Teague, Chloe Favilene, Lindsey Mawhiney, Nicholas Alakel, and Tracey McCrea.

About the Author

Richard Skolnik has worked for more than 40 years in education, health, and development and is one of the world's most experienced teachers of global health. Richard is now a lecturer in the Department of Health Policy and Management at the Yale School of Public Health. He is also a lecturer in the practice of management at the Yale School of Management.

At Yale, Richard teaches an introductory global health course for undergraduates. He also teaches an undergraduate seminar, Case Studies in Global Health, that uses case studies to teach about combatting communicable diseases, reforming health systems, and making those systems better serve the poor. In addition, Richard teaches a course on global health to the MBA for Healthcare Executives Course at the Yale School of Management and a graduate-level introduction to global health at the Yale School of Public Health.

From 2001 to 2004 and from 2009 until 2011, Richard was a part-time lecturer in the Department of Global Health at the George Washington University (GWU), where he taught four courses per year of an introductory global health course for undergraduates. At GWU, Richard also supervised final research projects for master of public health students.

In 2007 and 2008, Richard was the vice president for international programs at the Population Reference Bureau (PRB). In 2005 and 2006, he served as the executive director of the Harvard School of Public Health PEPFAR program for AIDS treatment in Botswana, Nigeria, and Tanzania.

Until 2014, while teaching at GWU and Yale, Richard also worked as a consultant, largely with the Results for Development Institute and mostly working on the financing of HIV in Cambodia, India, and Nigeria.

Richard worked at the World Bank from 1976 to 2001, last serving as the director for health and education for the South Asia region. His work at the World Bank focused on health systems development, family planning and reproductive health, child health, the control of communicable diseases, and nutrition in low-income countries. He was also deeply engaged with tuberculosis (TB), HIV, leprosy, and cataract blindness control projects in India.

Richard has also participated extensively in policy making and program development at the international level. Richard coordinated the World Bank's international work on TB for 5 years, was deeply involved in the establishment of STOP TB, represented the World Bank with the Global Polio Eradication Initiative, served on a number of World Health Organization working groups on TB, and served three rounds on the Technical Review Panel of the Global Fund. Richard led two evaluations of the International AIDS Vaccine Initiative and also led an evaluation of the Global Alliance to Eliminate Leprosy.

In addition, Richard has served on advisory groups and faculty for the Harvard Humanitarian Initiative, the development of a women's health program at Harvard University, and the Global Health Leadership Institute at Yale University. He was also a member of an expert panel that reviewed the Framework Program of the Fogarty Center of the United States National Institutes of Health. He also served 3 years on the advisory board for the College of Health and Human Services at George Mason University. He now serves on the editorial advisory committee for *Disease Priorities in Developing Countries*, third edition.

Richard was an Undergraduate Public Health Teacher of the Year at The George Washington University and was asked in 2009 to deliver a lecture in the GWU “Last Lecture” series. Richard has given numerous guest lectures in a variety of forums and, in May 2011, was the commencement speaker for the George Mason University College of Health and Human Services.

Richard attended high school in Dayton, Ohio. He received a bachelor of arts degree from Yale University and a master’s of public affairs from the Woodrow Wilson School of Princeton University. At Yale, he participated in the Experimental Five-Year BA Program, under which he spent 1 year teaching high school biology in Laoag City, Philippines, living with the same family with whom he had lived as an exchange student in 1966. Upon graduation from Yale, Richard was selected for a fellowship by the Yale–China Association and spent 2 years teaching at The Chinese University of Hong Kong. In the summer between his 2 years at the Woodrow Wilson School, Richard was a research fellow at the Institute of Southeast Asian Studies in Singapore, where he authored a monograph on education and training in Singapore.

Richard has worked on health issues in Africa, Latin America and the Caribbean, the Middle East and North Africa, South Asia, and Southeast Asia. He has also studied and learned to varying degrees Cantonese, French, Ilocano, Mandarin, Spanish, and Tagalog.

Quotable Global Health Quotes

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

World Health Organization*

Public health . . . represents an organised response to the protection and promotion of human health and encompasses a concern with the environment, disease control, the provision of health care, health education and health promotion.

**Research Unit in Health and Behavioural Change,
University of Edinburgh****

Public health is the science and art of promoting health. It does so based on the understanding that health is a process engaging social, mental, spiritual and physical well-being. Public health acts on the knowledge that health is a fundamental resource to the individual, to the community and to society as a whole and must be supported by soundly investing in living conditions that create, maintain and protect health.

Ilona Kickbusch

Prevention is better than cure.

Desiderius Erasmus

Every patient carries her or his own doctor inside.

Albert Schweitzer

The doctor of the future will give no medicine, but will interest his patients in the care of the human frame, in diet and in the cause and prevention of disease.

Thomas A. Edison

Of all forms of inequality, injustice in health care is the most shocking and inhumane.

Martin Luther King, Jr.

It is health that is real wealth and not pieces of gold and silver.

Mohandas K. (Mahatma) Gandhi

. . . class differences in health represent a double injustice: life is short where its quality is poor.

Richard G. Wilkinson

Where once it was the physician who waged bellum contra morbum, the war against disease, now it's the whole society.

Susan Sontag

Health consists of having the same diseases as one's neighbors.

Quentin Crisp

Be careful about reading health books. You may die of a misprint.

Mark Twain

*World Health Organization. (2015). *Constitution of WHO: principles*. Retrieved from <http://www.who.int/about/mission/en/>.

**Research Unit in Health and Behavioural Change, University of Edinburgh. (1995). *Changing the Public Health*. Chichester: John Wiley & Sons.

Abbreviations

TERM	DEFINITION
ADB	Asian Development Bank
AfDB	African Development Bank
AIDS	acquired immune deficiency syndrome
APOC	African Programme for Onchocerciasis Control
ARI	acute respiratory infection
ART	antiretroviral therapy
AusAID	Australian Agency for International Development
BCG	Bacillus Calmette-Guérin (the tuberculosis vaccine)
BMI	body mass index
BOD	burden of disease
CDC	The U.S. Centers for Disease Control and Prevention
CFR	case fatality ratio
CHE	complex humanitarian emergency
CMR	crude mortality rate
CVD	cardiovascular disease
DALY	disability-adjusted life year
DANIDA	Danish International Development Agency
DFID	Department for International Development of the United Kingdom
DHS	Demographic and Health Survey
DTP	diphtheria, tetanus, and pertussis
EPI	Expanded Program on Immunization
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSU	Former Soviet Union

Gavi	The Vaccine Alliance
GBD	<i>Global Burden of Disease Study 2010</i>
GDP	gross domestic product
GNP	gross national product
GOBI	growth monitoring, oral rehydration, breastfeeding, and immunization
HALE	health-adjusted life expectancy
Hib	<i>Haemophilus influenzae</i> type b
HIV	human immunodeficiency virus
HPV	human papillomavirus
IAVI	International AIDS Vaccine Initiative
IBRD	International Bank for Reconstruction and Development (World Bank)
IDA	International Development Association (the “soft” lending window of the World Bank)
IDB	Inter-American Development Bank
IDD	iodine deficiency disorder
IDP	internally displaced person
IEC	information, education, and communication
IFFIm	International Financing Facility for Immunisation
IHD	ischemic heart disease
IMCI	integrated management of childhood illness
IMF	International Monetary Fund
IMR	infant mortality rate
IND	investigational new drug
IPT	intermittent preventive treatment
IPV	injectable polio vaccine
IQ	intelligence quotient
IRB	institutional review board
ITI	International Trachoma Initiative
ITN	insecticide-treated bednet
IUD	intrauterine device
LMICs	low- and middle-income countries
MCH	maternal and child health
MDG	Millennium Development Goal
MDR	multidrug resistant
MDT	multidrug therapy
MI	The Micronutrient Initiative
MMR	maternal mortality rate
MSF	Doctors Without Borders (Médecins Sans Frontières in French)
NCD	noncommunicable disease
NGO	nongovernmental organization

NID	National Immunization Day
NNMR	neonatal mortality rate
NTD	neglected tropical disease
ONCP	Onchocerciasis Control Program
OPV	oral polio vaccine
ORS	oral rehydration solution
ORT	oral rehydration therapy
PAHO	Pan American Health Organization
PDP	product development partnership
PEPFAR	President's Emergency Plan for AIDS Relief
PHC	primary health care
PMTCT	prevention of mother-to-child transmission
PPP	public-private partnership
RBM	Roll Back Malaria
RTI	road traffic injury
SDG	sustainable development goal
SIDA	Swedish International Development Cooperation Agency
SSB	sugar-sweetened beverage
STI	sexually transmitted infection
SWAp	sector-wide approach
TB	tuberculosis
TBA	traditional birth attendant
TFR	total fertility rate
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TT	tetanus toxoid
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Family Planning Association
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
WFP	World Food Program
WHA	World Health Assembly of the World Health Organization
WHO	World Health Organization
WHO/TDR	WHO Special Programme for Research and Training in Tropical Diseases
WTO	World Trade Organization
YLD	years lived with disability
YLL	years of life lost

