Disease Control Priorities in Developing Countries

SECOND EDITION

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Dedication

This book is dedicated to Bill and Melinda Gates, whose vision, leadership, and financing over the past decade have catalyzed global support for transforming the lives of the world's poor through inexpensive but powerful health interventions.

Contents

Foreword by Jaime Sepúlveda **xiii**

Preface **xvii**

Editors **xix**

Advisory Committee to the Editors **xxiii**

Contributors **xxv**

Disease Control Priorities Project Partners **xxxv**

Acknowledgments **xxxvii**

Abbreviations and Acronyms **xxxix**

Part One Summary and Cross-Cutting Themes **1**

Summary

Chapter 1 **Investing in Health** **3**
Dean T. Jamison

Chapter 2 **Intervention Cost-Effectiveness: Overview of Main Messages** **35**
Ramanan Laxminarayan, Jeffrey Chow, and Sonbol A. Shahid-Salles

Chapter 3 **Strengthening Health Systems** **87**
Anne Mills, Fawzia Rasheed, and Stephen Tollman

Cross-Cutting Themes

Chapter 4 **Priorities for Global Research and Development of Interventions** **103**
Barry R. Bloom, Catherine M. Michaud, John R. La Montagne, and Lone Simonsen

Chapter 5 **Science and Technology for Disease Control: Past, Present, and Future** **119**
David Weatherall, Brian Greenwood, Heng Leng Chee, and Prawase Wasi

Chapter 6 **Product Development Priorities** **139**
Adel Mahmoud, Patricia M. Danzon, John H. Barton, and Roy D. Mugerwa

Chapter 7 **Economic Approaches to Valuing Global Health Research** **157**
David Meltzer

Chapter 8 **Improving the Health of Populations: Lessons of Experience** **165**
Carol Ann Medlin, Mushtaque Chowdhury, Dean T. Jamison, and Anthony R. Measham

Chapter 9 **Millennium Development Goals for Health: What Will It Take to Accelerate Progress?** **181**
Adam Wagstaff, Mariam Claeson, Robert M. Hecht, Pablo Gottret, and Qiu Fang

Chapter 10 **Gender Differentials in Health** **195**
Mayra Buvinić, André Médici, Elisa Fernández, and Ana Cristina Torres

Chapter 11 **Fiscal Policies for Health Promotion and Disease Prevention** **211**
Rachel Nugent and Felicia Knaul

Chapter 12 **Financing Health Systems in the 21st Century** **225**
George Schieber, Cristian Baeza, Daniel Kress, and Margaret Maier

Chapter 13 **Recent Trends and Innovations in Development Assistance for Health** **243**
Robert M. Hecht and Raj Shah

Chapter 14 **Ethical Issues in Resource Allocation, Research, and New Product Development** **259**
Dan W. Brock and Daniel Wikler

Chapter 15 **Cost-Effectiveness Analysis for Priority Setting** **271**
Philip Musgrove and Julia Fox-Rushby

Part Two Selecting Interventions **287**

Infectious Disease, Reproductive Health, and Undernutrition

Chapter 16 **Tuberculosis** **289**
Christopher Dye and Katherine Floyd

Chapter 17 **Sexually Transmitted Infections** **311**
Sevgi O. Aral and Mead Over, with Lisa Manhart and King K. Holmes

Chapter 18 **HIV/AIDS Prevention and Treatment** **331**
Stefano Bertozzi, Nancy S. Padian, Jeny Wegbreit, Lisa M. DeMaria, Becca Feldman, Helene Gayle, Julian Gold, Robert Grant, and Michael T. Isbell

Chapter 19 **Diarrheal Diseases** **371**
Gerald T. Keusch, Olivier Fontaine, Alok Bhargava, Cynthia Boschi-Pinto, Zulfiqar A. Bhutta, Eduardo Gotuzzo, Juan A. Rivera, Jeffrey Chow, Sonbol A. Shahid-Salles, and Ramanan Laxminarayan

Chapter 20 **Vaccine-Preventable Diseases** **389**
Logan Brenzel, Lara J. Wolfson, Julia Fox-Rushby, Mark Miller, and Neal A. Halsey

Chapter 21 **Conquering Malaria** **413**
Joel G. Breman, Anne Mills, Robert W. Snow, Jo-Ann Mulligan, Christian Lengeler, Kamini Mendis, Brian Sharp, Chantal Morel, Paola Marchesini, Nicholas J. White, Richard W. Steketee, and Ogobara K. Doumbo

Chapter 22 **Tropical Diseases Targeted for Elimination: Chagas Disease, Lymphatic Filariasis, Onchocerciasis, and Leprosy** **433**
Jan H. F. Remme, Piet Feenstra, P. R. Lever, André Médici, Carlos Morel, Mounkaila Noma, K. D. Ramaiah, Frank Richards, A. Seketeli, Gabriel Schmunis, W. H. van Brakel, and Anna Vassall

Chapter 23 **Tropical Diseases Lacking Adequate Control Measures: Dengue, Leishmaniasis, and African Trypanosomiasis** **451**
Pierre Cattand, Phillippe Desjeux, M. G. Guzmán, Jean Jannin, A. Kroeger, André Médici, Philip Musgrove, Mike B. Nathan, Alexandra Shaw, and C. J. Schofield

Chapter 24 **Helminth Infections: Soil-Transmitted Helminth Infections and Schistosomiasis** **467**
Peter J. Hotez, Donald A. P. Bundy, Kathleen Beegle, Simon Brooker, Lesley Drake, Nilanthi de Silva, Antonio Montresor, Dirk Engels, Matthew Jukes, Lester Chitsulo, Jeffrey Chow, Ramanan Laxminarayan, Catherine M. Michaud, Jeff Bethony, Rodrigo Correa-Oliveira, Xiao Shu-Hua, Alan Fenwick, and Lorenzo Savioli

Chapter 25 **Acute Respiratory Infections in Children** **483**
Eric A. F. Simoes, Thomas Cherian, Jeffrey Chow, Sonbol A. Shahid-Salles, Ramanan Laxminarayan, and T. Jacob John

Chapter 26 **Maternal and Perinatal Conditions** **499**
Wendy J. Graham, John Cairns, Sohinee Bhattacharya, Colin H. W. Bullough, Zahidul Quayyum, and Khama Rogo

Chapter 27 **Newborn Survival** **531**
Joy E. Lawn, Jelka Zupan, Geneviève Begkoyian, and Rudolf Knippenberg

Chapter 28 **Stunting, Wasting, and Micronutrient Deficiency Disorders** **551**
Laura E. Caulfield, Stephanie A. Richard, Juan A. Rivera, Philip Musgrove, and Robert E. Black

Chapter 29 **Health Service Interventions for Cancer Control in Developing Countries** **569**
Martin L. Brown, Sue J. Goldie, Gerrit Draisma, Joe Harford, and Joseph Lipscomb

Noncommunicable Disease and Injury

Chapter 30 **Diabetes: The Pandemic and Potential Solutions** **591**
K. M. Venkat Narayan, Ping Zhang, Alka M. Kanaya, Desmond E. Williams, Michael M. Engelgau, Giuseppina Imperatore, and Ambady Ramachandran

Chapter 31 **Mental Disorders** **605**
Steven Hyman, Dan Chisholm, Ronald Kessler, Vikram Patel, and Harvey Whiteford

Chapter 32 **Neurological Disorders** **627**
Vijay Chandra, Rajesh Pandav, Ramanan Laxminarayan, Caroline Tanner, Bala Manyam, Sadanand Rajkumar, Donald Silberberg, Carol Brayne, Jeffrey Chow, Susan Herman, Fleur Hourihan, Scott Kasner, Luis Morillo, Adesola Ogunniyi, William Theodore, and Zhen-Xin Zhang

Chapter 33 **Cardiovascular Disease** **645**
Thomas A. Gaziano, K. Srinath Reddy, Fred Paccaud, Susan Horton, and Vivek Chaturvedi

Chapter 34 **Inherited Disorders of Hemoglobin** **663**
David Weatherall, Olu Akinyanju, Suthat Fucharoen, Nancy Olivieri, and Philip Musgrove

Chapter 35 **Respiratory Diseases of Adults** **681**
Frank E. Speizer, Susan Horton, Jane Batt, and Arthur S. Slutsky

Chapter 36 **Diseases of the Kidney and the Urinary System** **695**
John Dirks, Giuseppe Remuzzi, Susan Horton, Arrigo Schieppati, and S. Adibul Hasan Rizvi

Chapter 37 **Skin Diseases** **707**
Roderick Hay, Sandra E. Bendeck, Suephy Chen, Roberto Estrada, Anne Haddix, Tonya McLeod, and Antoine Mahé

Chapter 38 **Oral and Craniofacial Diseases and Disorders** **723**
Douglas Bratthall, Poul Erik Petersen, Jayanthi Ramanathan Stjernswärd, and L. Jackson Brown

Chapter 39 **Unintentional Injuries** **737**
Robyn Norton, Adnan A. Hyder, David Bishai, and Margie Peden

Chapter 40 **Interpersonal Violence** **755**
Mark L. Rosenberg, Alexander Butchart, James Mercy, Vasant Narasimhan, Hugh Waters, and Maureen S. Marshall

Risk Factors

Chapter 41 **Water Supply, Sanitation, and Hygiene Promotion** **771**
Sandy Cairncross and Vivian Valdmanis

Chapter 42 **Indoor Air Pollution** **793**
Nigel Bruce, Eva Rehfuess, Sumi Mehta, Guy Hutton, and Kirk Smith

Chapter 43 **Air and Water Pollution: Burden and Strategies for Control** **817**
Tord Kjellström, Madhumita Lodh, Tony McMichael, Geetha Ranmuthugala, Rupendra Shrestha, and Sally Kingsland

Chapter 44 **Prevention of Chronic Disease by Means of Diet and Lifestyle Changes** **833**
Walter C. Willett, Jeffrey P. Koplan, Rachel Nugent, Courtenay Dusenbury, Pekka Puska, and Thomas A. Gaziano

Chapter 45 **The Growing Burden of Risk from High Blood Pressure, Cholesterol, and Bodyweight** **851**
Anthony Rodgers, Carlene M. M. Lawes, Thomas A. Gaziano, and Theo Vos

Chapter 46 **Tobacco Addiction** **869**
Prabhat Jha, Frank J. Chaloupka, James Moore, Vendhan Gajalakshmi, Prakash C. Gupta, Richard Peck, Samira Asma, and Witold Zatonski

Chapter 47 **Alcohol** **887**
Jürgen Rehm, Dan Chisholm, Robin Room, and Alan D. Lopez

Chapter 48 **Illicit Opiate Abuse** **907**
Wayne Hall, Chris Doran, Louisa Degenhardt, and Donald Shepard

Consequences of Disease and Injury

Chapter 49 **Learning and Developmental Disabilities** **933**
Maureen S. Durkin, Helen Schneider, Vikram S. Pathania, Karin B. Nelson, Geoffrey C. Solarsh, Nicole Bellows, Richard M. Scheffler, and Karen J. Hofman

Chapter 50 **Loss of Vision and Hearing** **953**
Joseph Cook, Kevin D. Frick, Rob Baltussen, Serge Resnikoff, Andrew Smith, Jeffrey Mecaskey, and Peter Kilima

Chapter 51 **Cost-Effectiveness of Interventions for Musculoskeletal Conditions** **963**
Luke B. Connelly, Anthony Woolf, and Peter Brooks

Chapter 52 **Pain Control for People with Cancer and AIDS** **981**
Kathleen M. Foley, Judith L. Wagner, David E. Joranson, and Hellen Gelband

Part Three Strengthening Health Systems **995**

Strengthening Public Health Services

Chapter 53 **Public Health Surveillance: A Tool for Targeting and Monitoring Interventions** **997**
Peter Nsubuga, Mark E. White, Stephen B. Thacker, Mark A. Anderson, Stephen B. Blount, Claire V. Broome, Tom M. Chiller, Victoria Espitia, Rubina Imtiaz, Dan Sosin, Donna F. Stroup, Robert V. Tauxe, Maya Vijayaraghavan, and Murray Trostle

Chapter 54 **Information to Improve Decision Making for Health** **1017**
Sally K. Stansfield, Julia Walsh, Ndola Prata, and Timothy Evans

Chapter 55 **Drug Resistance** **1031**
Ramanan Laxminarayan, Zulfiqar A. Bhutta, Adriano Duse, Philip Jenkins, Thomas O'Brien, Iruka N. Okeke, Ariel Pablo-Mendez, and Keith P. Klugman

Chapter 56 **Community Health and Nutrition Programs** **1053**
John B. Mason, David Sanders, Philip Musgrove, Soekirman, and Rae Galloway

Chapter 57 **Contraception** **1075**
Ruth Levine, Ana Langer, Nancy Birdsall, Gaverick Matheny, Merrick Wright, and Angela Bayer

Chapter 58 **School-Based Health and Nutrition Programs** **1091**
Donald A. P. Bundy, Sheldon Shaeffer, Matthew Jukes, Kathleen Beegle, Amaya Gillespie, Lesley Drake, Seung-hee Frances Lee, Anna-Maria Hoffman, Jack Jones, Arlene Mitchell, Delia Barcelona, Balla Camara, Chuck Golmar, Lorenzo Savioli, Malick Sembene, Tsutomu Takeuchi, and Cream Wright

Chapter 59 **Adolescent Health Programs** **1109**
Elizabeth Lule, James E. Rosen, Susheela Singh, James C. Knowles, and Jere R. Behrman

Chapter 60 **Occupational Health** **1127**
Linda Rosenstock, Mark Cullen, and Marilyn Fingerhut

Chapter 61 **Natural Disaster Mitigation and Relief** **1147**
Claude de Ville de Goyet, Ricardo Zapata Marti, and Claudio Osorio

Chapter 62 **Control and Eradication** **1163**
Mark Miller, Scott Barrett, and D. A. Henderson

Strengthening Personal Health Services

Chapter 63 **Integrated Management of the Sick Child** **1177**
Cesar G. Victora, Taghreed Adam, Jennifer Bryce, and David B. Evans

Chapter 64 **General Primary Care** **1193**
Stephen Tollman, Jane Doherty, and Jo-Ann Mulligan

Chapter 65 **The District Hospital** **1211**
Mike English, Claudio F. Lanata, Isaac Ngugi, and Peter C. Smith

Chapter 66 **Referral Hospitals** **1229**
Martin Hensher, Max Price, and Sarah Adomakoh

Chapter 67 **Surgery** **1245**
Haile T. Debas, Richard Gosselin, Colin McCord, and Amardeep Thind

Chapter 68 **Emergency Medical Services** **1261**
Olive C. Kobusingye, Adnan A. Hyder, David Bishai, Manjul Joshipura, Eduardo Romero Hicks, and Charles Mock

Chapter 69 **Complementary and Alternative Medicine** **1281**
Haile T. Debas, Ramanan Laxminarayan, and Stephen E. Straus

Capacity Strengthening and Management Reform

Chapter 70 **Improving the Quality of Care in Developing Countries** **1293**
John W. Peabody, Mario M. Taguiwalo, David A. Robalino, and Julio Frenk

Chapter 71 **Health Workers: Building and Motivating the Workforce** **1309**
Charles Hongoro and Charles Normand

Chapter 72 **Ensuring Supplies of Appropriate Drugs and Vaccines** **1323**
Susan Foster, Richard Laing, Bjørn Melgaard, and Michel Zaffran

Chapter 73 **Strategic Management of Clinical Services** **1339**
Alexander S. Preker, Martin McKee, Andrew Mitchell, and Suwit Wilbulpolprasert

Glossary **1353**

Index **1357**

Credits **1401**

Foreword

The 1993 publication of the now classic book, *Disease Control Priorities in Developing Countries,* by Oxford University Press and of its companion document, the *World Development Report 1993: Investing in Health,* published by the World Bank that same year, constitute a landmark in the public health literature. For the first time, decision makers and public health practitioners had a comprehensive review of the cost-effectiveness of available interventions to address the most common health problems in the developing world. They were also provided with the useful metric known as disability-adjusted life years to calculate the burden of disease and the cost-effectiveness of interventions more accurately than in the past.

As was the case with the first edition, this second edition of *Disease Control Priorities in Developing Countries* will serve an array of audiences. One primary audience consists of people working in the health sector, ranging from those who are responsible for making evidence-based decisions to those who practice medicine and public health under often suboptimal field conditions. A second audience consists of people working in finance and planning ministries, who will benefit from the solid recommendations for improving the health of populations through sound resource reallocation and cost-effective practices.

PURPOSE

The purpose of this book is to provide information about what works—specifically, the cost-effectiveness of health interventions in a variety of settings. Such information should influence the redesign of programs and the reallocation of resources, thereby helping to achieve the ultimate goal of reducing morbidity and mortality.

FUNDAMENTAL POLICY CONSIDERATIONS

Although economic and budgetary constraints are clearly important considerations, money is not the only limitation. Additional factors fundamental to improving outcomes are the particular circumstances in each country, as well as the individual institutional capacities to deliver goods and services and to implement policies and processes.

Context-specific strategies and responses are essential, because application of the Disease Control Priorities Project's findings will vary according to each country's circumstances: one size does not fit all. Understanding that most health interventions require a minimum level of institutional capacity to deliver goods and services is equally important, and such capacity may have to be built up before money or physical inputs can yield any benefits. Accordingly, goals and priorities should be established and tailored to each country's context.

TRANSITION IN HEALTH

Every developing region is facing a transition in its epidemiological profile from an environment with high fertility rates and high mortality from preventable causes to one in which a combination of lower fertility rates and changing lifestyles has led to aging populations and epidemics of tobacco addiction, obesity, cardiovascular disease, cancers, diabetes, and other chronic ailments. The 20th century will be remembered for, among other things, witnessing the largest universal increase in life expectancy in history. While life expectancy is highest in the richest countries, the upward trend is apparent in almost every society. Moreover, in the past 50 years, variations in this health indicator across and within countries have decreased. This convergence of improved life expectancy and reduced variations, which has occurred even in the presence of widening income gaps in many regions, can be explained solely by the impact of knowledge expansion and direct public health interventions.

The increase in life expectancy worldwide will, however, soon reach a plateau, and a retraction has occurred in many countries. HIV/AIDS and civil unrest in Africa, vaccine-preventable diseases and alcoholism in Eastern Europe, and obesity in the United States have reduced—or will soon do so—the years of life their populations can expect.

SCALING UP EFFECTIVE INTERVENTIONS

The late Jim Grant, former executive director of the United Nations Children's Fund, was one of the first leaders with a vision for setting specific health goals and priorities within a time frame and on a global scale. He recognized the need to raise awareness of the dramatic disparities in children's health and to mobilize political will accordingly. His missionary zeal for universal child immunization and for organizing the first summit of world leaders for children's health and rights in 1990 permitted the scaling up of interventions of proven efficacy. The Millennium Development Goals are a natural consequence of that vision and an extremely useful instrument for maintaining both focus and social pressure. Achieving these ambitious goals will require not only the universal implementation of effective interventions that are currently available, but also the development of new interventions.

NEED FOR ONGOING RESEARCH

Today, most vaccines, medical devices, diagnostic tools, and drugs have been subjected to careful investigation in the laboratory, at the bedside, and in the field. However, not enough investment has gone into research to increase well-being and development globally. We need more epidemiological and health systems research to improve the efficiency of available interventions, technological research to reduce their costs, and biomedical research to develop new tools for dealing with as yet unsolved and emerging health problems.

OPPORTUNITIES AND CHALLENGES OF GLOBALIZATION

One of the greatest opportunities and challenges for international public health is globalization. We live in an era when the explosion of trade, travel, and communications is spreading new cultural influences and lifestyles faster than ever before, and the division between domestic and international health problems is becoming increasingly obsolete. At the same time, globalization also permits the spread of risks, pathogens, and other threats. The ever-increasing movement of people everywhere increases the potential for epidemics. Travelers, refugees, and displaced people are more vulnerable to infectious diseases, and their movement contributes to spreading pathogens into new areas. Overall, however, the positive consequences outweigh the negative ones, and cautious optimism about this irreversible trend is justified. Certainly, one of the most valuable contributions of globalization is the rapid accrual and spread of knowledge about useful tools for controlling disease and ways to implement those tools on a large scale.

In recent years, the huge advances in information technology have greatly boosted the globalization of knowledge. Ideally, this should become a tide that lifts all boats to yield global benefits. The challenge is to harness the information technology revolution to foster the growth of economies. One step in the right direction is the open access movement, which promotes and permits free and immediate access to research results and other components of knowledge transfer.

SPENDING MORE AND SPENDING BETTER

It is indeed a paradox to observe that even though the money spent on health worldwide has reached 10 percent of overall global income, that amount is both insufficient and poorly allocated. The World Health Organization's Commission on Macroeconomics and Health and several other global initiatives make a persuasive plea for a larger investment in health. At the same time, this book is dedicated to making the case for better spending—that is, deriving more health benefits from every dollar spent. The aim should be to reduce inequalities in health investment between and within countries: a 100-fold difference between the rich and the poor in money spent on health services still persists in many places. Despite a lack of clarity about what constitutes the optimum balance of health spending, a larger share should go to prevention. This book looks at several prevention options and clinical interventions that are not being fully implemented.

SELECTING INTERVENTIONS

This book persuasively makes the case that both clinical and public health interventions depend on the capacity of a given country's health system to deliver, noting that some interventions are more demanding than others in terms of infrastructure and human resources. Therefore, both the costs and the likelihood of success of the more complex interventions are a function of the health capacity in place. In addition, decisions about which interventions should be given priority will depend on assessments of the local burden of disease, local health infrastructure, and other social factors as well as on cost-effectiveness analyses. The following chapters identify the health system capacity needed for scaling up a given intervention. Even middle-income countries with relatively better health infrastructure often pursue sophisticated approaches to medical care that result in fewer health gains per amount of money invested. Every country, regardless of level of development, could benefit from the recommendations presented here.

DIAGONAL APPROACH

The medical literature has long debated which approach to delivering health interventions is more effective: vertical programs or horizontal programs. *Vertical programs* refer to

focused, proactive, disease-specific interventions on a massive scale, whereas *horizontal programs* refer to more integrated, demand-driven, resource-sharing health services. This is a false dilemma, because both need to coexist in what could be called a *diagonal approach*—that is, the proactive, supply-driven provision of a set of highly cost-effective interventions on a large scale that bridges health clinics and homes. This approach often starts vertically (polio vaccination, for instance) but moves toward an increasing number of interventions (for example, oral rehydration, other vaccines, residual spraying and bednets for malaria control, micronutrient supplementation, and supervised tuberculosis treatment), making full use of field health workers and existing infrastructure. This could well be the equivalent of a public health polypill.

MULTIDISCIPLINARY ORIENTATION

What makes this book unique, in addition to its comprehensive scope, is its truly multidisciplinary approach to disease control, which merges the best of the medical and economic sciences. Every recommendation has been carefully researched and documented. Evidence-based approaches must be the foundation for allocating scarce resources. The poor cannot afford anything but the most efficient methods for organizing and implementing health care. This book is a fundamental component for fostering equitable outcomes in health and development. It will inspire all those who seek the highly complex but attainable goal of universal good health for all members of the global community.

FACILITATING PROGRESS

We all share global responsibility: governments and international agencies, public and private sectors, and society and individuals all have specific tasks. We must all strive toward more equitable distribution of the benefits of new knowledge to reduce health and development gaps between rich and poor, between countries, and within countries. The second edition of *Disease Control Priorities in Developing Countries* is a new step in precisely the right direction. If we succeed in conveying the main lessons and messages of this book, public health in developing countries will progress farther and faster.

Jaime Sepúlveda, *Director, National Institutes of Health of Mexico, Mexico City, Mexico*
Chair, Advisory Committee to the Editors

Preface

In the late 1980s, the World Bank initiated a review of priorities for the control of specific diseases and used this information as input for comparative cost-effectiveness estimates of interventions addressing most conditions important in developing countries. The purpose of the comparative cost-effectiveness work was to inform decision making within the health sectors of highly resource-constrained low- and middle-income countries. This process resulted in the 1993 publication of the first edition of *Disease Control Priorities in Developing Countries* (*DCP1*) (Jamison and others 1993). That volume's preface stated its purpose as follows:

> Between 1950 and 1990, life expectancy in developing countries increased from forty to sixty-three years with a concomitant rise in the incidence of the noncommunicable diseases of adults and the elderly. Yet there remains a huge unfinished agenda for dealing with undernutrition and the communicable childhood diseases. These trends lead to increasingly diverse and complicated epidemiological profiles in developing countries. At the same time, new epidemic diseases like AIDS are emerging; and the health of the poor during economic crisis is a source of growing concern. These developments have intensified the need for better information on the effectiveness and cost of health interventions. To assist countries to define essential health service packages, this book provides information on disease control interventions for the commonest diseases and injuries in developing countries.

To this end, *DCP1* aimed to provide systematic guidance on the selection of interventions to achieve rapid health improvements in an environment of highly constrained public sector budgets through the use of cost-effectiveness analysis.

DCP1 provided limited discussion of investments in health system development. Other major efforts undertaken at the World Bank at about the same time, including the *World Development Report 1993: Investing in Health,* used the findings of *DCP1* and dealt more explicitly with the financial and health systems aspects of implementation (Feachem and others 1992; World Bank 1993). Closely related efforts in collaboration with the World Health Organization led to the first global and regional estimates of numbers of deaths by age, sex, and cause and of the burden (including the disability burden) from more than 100 specific diseases and conditions (Murray, Lopez, and Jamison 1994; World Bank 1993).

This second edition of *Disease Control Priorities in Developing Countries* (*DCP2*) seeks to update and improve guidance on the "what to do" questions in *DCP1* and to address the institutional, organizational, financial, and research capacities essential for health systems to deliver the right interventions. *DCP2* is the principal product of the Disease Control Priorities Project, an alliance of organizations designed to review, generate, and disseminate information on how to improve population health in developing countries. In addition to *DCP2*, the project produced numerous background papers, an extensive range of interactive consultations held around the world, and several additional major publications. The other major publications are as follows:

- *Global Burden of Disease and Risk Factors* (Lopez and others 2006), undertaken in collaboration with the World Health Organization
- *Millions Saved: Proven Successes in Global Health* (Levine and the What Works Working Group 2004), undertaken in collaboration with the Center for Global Development
- "The Intolerable Burden of Malaria: II. What's New, What's Needed" (Breman, Alilio, and Mills 2004), undertaken in collaboration with the Multilateral Initiative on Malaria
- *Priorities in Health* (Jamison and others 2006), a brief and nontechnical companion to this volume.

Each product of the Disease Control Priorities Project marries economic approaches with those of epidemiology, public health, and clinical medicine.

While general lessons emerge from the Disease Control Priorities Project, they result from careful consideration of individual cases. The diversity of health conditions necessitates specificity of analysis. Arrow clearly stated the need for

technical analyses to underpin health economics: "Another lesson of medical economics is the importance of recognizing the specific character of the disease under consideration. The policy challenges that arise in treating malaria are simply very different from those attached to other major infectious scourges (Arrow, Panosian, and Gelband 2004, xi–xii)." Chapters in this volume address this need for specificity, yet use cost-effectiveness analysis in a way that makes findings on the relative attractiveness of interventions comparable.

DCP2 goes beyond *DCP1* in a number of important ways as follows:

- While virtually all chapters of *DCP1* were structured around clusters of conditions, *DCP2* provides integrative chapters—for example, on school health systems, surgery, and integrated management of childhood illness—that draw together the implementation-related responses to a number of conditions. These and other chapters reflect *DCP2*'s inclusion of implementation and system issues.
- *DCP2* includes explicit discussions of research and product development opportunities.
- Although *DCP1* dealt with policy mechanisms to change behavior (or the environment), *DCP2* attempts to do so in a more systematic way. In particular, a number of chapters assess in depth the public sector instruments for influencing behavior change that were described briefly in *DCP1*: information, education, and communication; laws and regulations; taxes and subsidies; engineering design, such as speed bumps; and facility location and characteristics.
- Different interventions place different levels of demand on a country's health system capacity. *DCP2* builds on earlier work (Gericke and others 2005) in attempting, in some chapters, to identify which interventions require relatively less system capacity for scaling up and which require more.
- Although *DCP1* briefly discussed the nonhealth outcomes of interventions, *DCP2* does so in a more systematic way, including looking at the consequences of interventions (and intervention financing) for reducing financial risks at the household level. Other important nonhealth outcomes include, for example, the time-saving value of having piped water close to the home, the increased labor productivity of healthy workers, and the amenity value of clean air.
- An important element of *DCP1* was its assumption that to inform broad policy, major changes from the status quo need to be considered, not just marginal ones. For cost-effectiveness analysis, any major change needs to be informed by burden of disease assessments in a way not required for judging the attractiveness of marginal change, because the size of the burden affects total costs and the feasibility of extending the intervention to all who would benefit. This is particularly true when considering research and development priorities, but also applies to control priorities. In this regard, *DCP2* continues in the spirit of *DCP1* in assessing cost-effectiveness analyses of major changes, but it does so more systematically for each of the six regional groupings of low- and middle-income countries used throughout this volume (see map 1, inside the front cover).

What was becoming clear in 1990 is clearer today: focusing health system attention on delivering efficacious and often relatively inexpensive health interventions can lead to dramatic reductions in mortality and disability at modest cost. A valuable dimension of globalization has been the diffusion of knowledge about what these interventions are and how to deliver them. The pace of this diffusion into a country determines the pace of health improvement in that country much more than its level of income. Our purpose is to help speed this diffusion of life-saving knowledge.

The Editors

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George Alleyne, M.D., F.R.C.P., F.A.C.P. (Hon.), D.Sc. (Hon.), is director emeritus of the Pan American Health Organization, where he served as director from 1995 to 2003. Dr. Alleyne is a native of Barbados and graduated from the University of the West Indies in medicine in 1957. He completed his postgraduate training in internal medicine in the United Kingdom and did further postgraduate work in that country and in the United States. He entered academic medicine at the University of the West Indies in 1962, and his career included research in the Tropical Metabolism Research Unit for his doctorate in medicine. He was appointed professor of medicine at the University of the West Indies in 1972, and four years later he became chair of the Department of Medicine. He is an emeritus professor of the University of the West Indies. Dr. Alleyne joined the Pan American Health Organization in 1981, in 1983 he was appointed director of the Area of Health Programs, and in 1990 he was appointed assistant director.

Dr. Alleyne's scientific publications have dealt with his research in renal physiology and biochemistry and various aspects of clinical medicine. During his term as director of the Pan American Health Organization, he dealt with and published on issues such as equity in health, health and development, and international cooperation in health. He has also addressed several aspects of health in the Caribbean and the problems the area faces. He is a member of the Institute of Medicine and chancellor of the University of the West Indies.

Dr. Alleyne has received numerous awards in recognition of his work, including prestigious decorations and national honors from many countries of the Americas. In 1990, he was made Knight Bachelor by Her Majesty Queen Elizabeth II for his services to medicine. In 2001, he was awarded the Order of the Caribbean Community, the highest honor that can be conferred on a Caribbean national.

Mariam Claeson, M.D., M.P.H., is the program coordinator for AIDS in the South Asia Region of the World Bank since January 2005. She was the lead public health specialist in the Health, Nutrition, and Population, Human Development Network, of the World Bank (1998–2004), managing the Health, Nutrition, and Population Millennium Development Goals work program to support accelerated progress in countries.

Dr. Claeson coauthored the call for action by the Bellagio study group on child survival in 2003, *Knowledge into Action for Child Survival,* and the World Bank's 2005 report on *The Millennium Development Goals for Health: Rising to the Challenges.* She was a member of the What Works Working group hosted by the Center for Global Development that resulted in the report *Millions Saved: Proven Successes in Global Health* (2005). Dr. Claeson coauthored the health chapter of the *Poverty Reduction Strategy* source book, promoting a life-cycle approach to maternal and child health and nutrition. As a coordinator of the public health thematic group (1998–2002), she led the development of the strategy note *Public Health and World Bank Operations* and promoted multisectoral approaches to child health within the World Bank and in Bank-supported country operations, analytical work, and lending.

Prior to joining the World Bank, Dr. Claeson worked with the World Health Organization from 1987 until 1995, in later years as program manager for the Global Program for the Control of Diarrheal Diseases. She has several years of field experience working in developing countries; in clinical practice at the rural district level in Bangladesh, Bhutan, and Tanzania; in national program management of immunization and diarrheal disease control programs in Ethiopia; and in health sector development projects in middle- and low-income countries.

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Prabhat Jha is Canada research chair of health and development at the University of Toronto. He is also the founding director of the Centre for Global Health Research, St. Michael's Hospital; associate professor in the Department of Public Health Sciences, University of Toronto; research scholar at the McLaughlin Centre for Molecular Medicine; and professeur extraordinaire at the Université de Lausanne, Switzerland.

Dr. Jha is lead author of *Curbing the Epidemic: Governments and the Economics of Tobacco Control* and coeditor of *Tobacco Control in Developing Countries.* Both are among the most influential books on tobacco control. He is the principal investigator of a prospective study of 1 million deaths in India, researching mortality from smoking, alcohol use, fertility patterns, indoor air pollution, and other risk factors among 2.3 million homes and 15 million people. This work is currently the world's largest prospective study of health. He also conducts studies of HIV transmission in various countries, focusing on documenting the risk factors for the spread of HIV and interventions to prevent the spread of the HIV/AIDS epidemic. His studies have received more than $5 million in peer-reviewed grants.

Dr. Jha has published widely on tobacco, HIV/AIDS, and health of the global poor. His awards include a Gold medal from the Poland Health Promotion Foundation (2000), the Top 40 Canadians under Age 40 Award (2004), and the Ontario Premier's Research Excellence Award (2004). Dr. Jha was a research scholar at the University of Toronto and McMaster University in Canada. He holds an M.D. from the University of Manitoba and a D. Phil. in epidemiology and public health from Oxford University, where he studied as a Rhodes Scholar at Magdalen College.

Anne Mills, Ph.D., is professor of health economics and policy at the London School of Hygiene and Tropical Medicine. She has more than 20 years of experience in research pertaining to health economics in developing countries and has published widely in the fields of health economics and health planning, including books on the role of government in health in developing countries, health planning in the United Kingdom, decentralization, health economics research in developing countries, and the public-private mix. Her most recent research interests have been in the organization and financing of health systems, including the evaluation of contractual relationships between the public and private sectors and the application of economic evaluation techniques to improve the efficiency of disease control programs.

Dr. Mills has had extensive involvement in supporting the health economics research activities of the World Health Organization's Tropical Disease Research Programme. She founded, and is head of, the Health Economics and Financing Programme, which has become one of the world's leading groups in developing and applying theories and techniques of health economics to increase knowledge on how best to improve the equity and efficiency of developing countries' health systems. She has acted as adviser to a number of multilateral and bilateral agencies—notably, the United Kingdom Department for International Development and the World Health Organization. She guided the creation of the Alliance for Health Policy and Systems Research and chairs its board. Most recently, she has been a member of the Commission for Macroeconomics and Health and cochair of its working group on improving the health outcomes of the poor.

Philip Musgrove is deputy editor—global health for *Health Affairs,* which is published by Project HOPE in Bethesda, Maryland. He worked for the World Bank (1990–2002), including two years on secondment to the World Health Organization (1999–2001), retiring as a principal economist. He was previously an adviser in health economics at the Pan American Health Organization (1982–90) and a research associate at the Brookings Institution and at Resources for the Future (1964–81).

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Disease Control Priorities Project Partners

The Disease Control Priorities Project is a joint enterprise of the Fogarty International Center of the National Institutes of Health, the World Health Organization, the World Bank, and the Population Reference Bureau.

The Fogarty International Center is the international component of the U.S. National Institutes of Health. It addresses global health challenges through innovative and collaborative research and training programs and supports and advances the mission of the U.S. National Institutes of Health through international partnerships.

The World Health Organization is the specialized agency for health of the United Nations. Its objective, as set out in its constitution, is the attainment by all peoples of the highest possible level of health, with *health* defined as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

The World Bank Group is one of the world's largest sources of development assistance. The Bank, which provides US$18 billion to US$22 billion each year in loans to its client countries, provided US$1.27 billion for health, nutrition, and population in 2004. The World Bank is working in more than 100 developing economies, bringing a mix of analytical work, policy dialogue, and lending to improve living standards—including health and education—and reduce poverty.

The Population Reference Bureau informs people around the world about health, population, and the environment and empowers them to use that information to advance the well-being of current and future generations. For 75 years, the bureau has analyzed complex data and research results to provide objective and timely information in a format easily understood by advocates, journalists, and decision makers; has conducted workshops around the world to give key audiences the tools they need to understand and communicate effectively about relevant issues; and has worked to ensure that policy makers in developing countries base policy decisions on sound evidence.

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The Editors

Abbreviations and Acronyms

ACE	angiotensin-converting enzyme
ACER	average cost-effectiveness ratio
ACT	artemisinin combination therapy
AD	Alzheimer's disease
ADB	Asian Development Bank
ADHD	attention deficit and hyperactivity disorder
AED	antiepileptic drug
AHEAD	applied health education and development
AIDS	acquired immunodeficiency syndrome
AIN-C	atención integral a la niñez comunitaria
ALRI	acute lower respiratory infection
AMI	acute myocardial infarction
ANW	*anganwadi* worker
aP	acellular pertussis vaccine
APOC	African Programme for Onchocerciasis Control
ARF	acute rheumatic fever
ARI	acute respiratory infection
ART	atraumatic restorative treatment
ASD	autism spectrum disorder
ATLS	advanced trauma life support
AUD	alcohol-use disorder
AZT	Zidovudine
BCC	behavior-change communication
BCG	Bacillus Calmette-Guérin
BEmOC	basic emergency obstetric care
BINP	Bangladesh Integrated Nutrition Program
BMI	body mass index
BMT	buprenorphine maintenance treatment
BOD	burden of disease
BRAC	Bangladesh Rural Advancement Committee
BRFSS	behavioral risk factor surveillance system
BZA	benzimidazole anthelmintic
CABG	coronary artery bypass graft
CAD	coronary artery disease
CAM	complementary and alternative medicine
CAPP	Country/Area Profile Programme
CBA	cost-benefit analysis
CBE	clinical breast examination
CBHI	community-based health insurance
CBR	cost-benefit ratio
CDC	U.S. Centers for Disease Control and Prevention
CDD	control of diarrheal diseases
CEA	cost-effectiveness analysis
CEmOC	comprehensive emergency obstetric care
CER	cost-effectiveness ratio
CFR	case-fatality rate
CHA	community health aide
CHD	coronary heart disease
CHF	congestive heart failure
CHNP	community-based health and nutrition program
CHNW	community health and nutrition worker
CHOICE	choosing interventions that are cost-effective
CI	confidence interval
CKD	chronic kidney disease
CL	cutaneous leishmaniasis
CL/P	cleft lip and palate
CM	cerebral malaria
CMH	Commission on Macroeconomics and Health
CML	chronic myeloid leukemia
CO	carbon monoxide
COBRA	combination therapy for rheumatoid arthritis
COHRED	Council on Health Research for Development
COM	chronic otitis media
COPCORD	Community-Oriented Program for Control of Rheumatic Disease
COPD	chronic obstructive pulmonary disease
CoV	coronavirus
COX	cyclo-oxygenase
CRA	comparative risk analysis
CT	computed tomography
CVD	cardiovascular disease
CVS	chorionic villus sampling
CYP	couple-year of protection
DAH	development assistance for health
DALY	disability-adjusted life year
dBHL	decibel hearing level
DCP1	*Disease Control Priorities in Developing Countries*, first edition

DCP2	*Disease Control Priorities in Developing Countries*, second edition
DCPP	Disease Control Priorities Project
DDT	dichlorodiphenyltrichloroethane
DEET	N,N-diethyl-meta-toluamide
DF	dengue fever
DHF	dengue hemorrhagic fever
DHS	demographic and health survey
DMARD	disease-modifying antirheumatic drug
DMFT	decayed, missing, and filled teeth
DNA	deoxyribose nucleic acid
DOT	directly observed therapy
DOTS	directly observed therapy short course
DRC	Democratic Republic of Congo
DSM-IVTR	*Diagnostic and Statistical Manual of Mental Disorders*
DSS	dengue shock syndrome
DTP	diphtheria-tetanus-pertussis
EAP	economically active population
EBM	evidence-based medicine
ED	emergency department
EFA	education for all
EFM	electronic fetal monitoring
EHCAP	Effective Health Care Alliance Programme
EIR	entomological inoculation rate
ELISA	enzyme-linked immunosorbent assay
EMR	electronic medical record
EMS	emergency medical services
EPI	Expanded Program on Immunization
ESRD	end-stage renal disease
EUROSTAT	European Statistical Office
FA	folic acid
FBD	food-borne disease
FCTC	Framework Convention on Tobacco Control
FDA	U.S. Food and Drug Administration
FDC	fixed-dose combinations
FEFO	first expiry, first out
FETP	Field Epidemiology Training Program
FEV1	forced expiratory volume in one second
FGM	female genital mutilation
FHP	family health program
FIC	fully immunized child
FRESH	focusing resources on effective school health
FTE	full-time equivalent
G6PD	glucose-6-phosphate dehydrogenase
G-7	Group of Seven
GATB	Global Alliance for TB Drug Development
GAVI	Global Alliance for Vaccines and Immunization
GDP	gross domestic product
GET 2020	World Health Organization Alliance for the Global Elimination of Trachoma
GFHR	Global Forum on Health Research
GIS	geographic information system
GM	genetic modification
GMP	good manufacturing practice
GNI	gross national income
GNP	gross national product
GSE	glutathione S-transferase
GUSTO	global use of strategies to open occluded coronary arteries
HAART	highly active antiretroviral therapy for the treatment of HIV/AIDS
Hb	hemoglobin
HBV	hepatitis B virus
HDL	high-density lipoprotein
HepB	hepatitis B
HHV	human herpes virus
Hib	*Haemophilus influenzae* type B
HIC	high-income country
HIS	health information system
HIV	human immunodeficiency virus
HMN	Health Metrics Network
HPLC	high-performance liquid chromatography
HPS	health promoting school
HPV	human papillomavirus
HR	human resource
HRT	hormone replacement therapy
HSV-1	herpes simplex virus type 1
HSV-2	herpes simplex virus type 2
IAEA	International Atomic Energy Agency
IAP	indoor air pollution
IAVI	International AIDS Vaccine Initiative
ICD-10	*International Statistical Classification of Diseases and Related Health Problems,* 10th revision
ICDS	integrated child development services
ICER	incremental cost-effectiveness ratio
ICPD	international conference on population and development
ICT	information and communication technologies
IDA	International Development Association
IDD	iodine deficiency disorders
IDSR	integrated disease surveillance and response
IEC	information, education, and communication
IFF	International Finance Facility
IHD	ischemic heart disease
ILO	International Labour Organisation
IMCI	integrated management of infant and childhood illness
IMF	International Monetary Fund
IMR	infant mortality rate
INCB	International Narcotics Control Board

INDEPTH	International Network of Field Sites with Continuous Demographic Evaluation of Populations and Their Health in Developing Countries
INFECTOM	information, feedback, contracting with providers to adhere to practice guidelines, and ongoing monitoring
IPT	intermittent preventive treatment
IPTi	intermittent preventive treatment in infancy
IPV	inactivated polio vaccine
IRB	institutional review board
IRR	internal rate of return
IRS	indoor residual spraying
ISDR	international strategy for disaster reduction
ISIC	international standard industrial classification of all economic activities
ITN	insecticide-treated net
IUATLD	International Union against Tuberculosis and Lung Disease
IUD	intrauterine device
IUGR	intrauterine growth retardation
JE	Japanese encephalitis
LAAM	levo-alpha-acetyl-methadol
LBW	low birthweight
LDD	learning and developmental disability
LDL	low-density lipoprotein
LE 20	life expectancy at age 20
LF	lymphatic filariasis
LIC	low-income country
LMICs	low- and middle-income countries
LPG	liquid petroleum gas
LRI	lower respiratory tract infection
LSD	lysergic acid diethylamide
MBB	marginal budgeting for bottlenecks
MCE	multi-country evaluation of IMCI effectiveness, cost, and impact
MCH	maternal child and health
MDA	mass drug administration
MDG	Millennium Development Goal
MDMA	methylenedioxymethamphetamine
MDR-TB	multidrug-resistant tuberculosis
MDT	multidrug therapy
MEASURE	monitoring and evaluation to assess and use results
MIC	middle-income country
MMR	measles-mumps-rubella
MMT	methadone maintenance treatment
MMV	Medicines for Malaria Venture
MNCH	maternal, neonatal, and child health
MOH	ministry of health
MR	mental retardation
MRI	magnetic resonance imaging
MSF	Médecins Sans Frontières (Doctors Without Borders)
MTCT	mother-to-child transmission
MVA	modified vaccinia virus Ankara
NAFTA	North American Free Trade Agreement
NAP	nonaffective psychosis
NCCAM	National Center for Complementary and Alternative Medicine
NCE	new chemical entity
NDP	national drug policy
NGO	nongovernmental organization
NHA	national health account
NHS	national health service
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NIPA	national income and product accounts
NMR	neonatal mortality rate
NO_2	nitrogen dioxide
NORA	national occupational research agenda
NOx	nitrogen oxide and nitrogen dioxide
NRA	national regulatory authority
NRT	nicotine replacement therapies
NSAID	nonsteroidal anti-inflammatory drug
NSO	national statistics office
NTD	neural tube defect
OA	osteoarthritis
OCP	Onchocerciasis Control Program
ODA	official development assistance
OECD	Organisation for Economic Co-operation and Development
OEPA	Onchocerciasis Elimination Program for the Americas
OP	osteoporosis
OPV	oral polio vaccine
ORS	oral rehydration solution
ORT	oral rehydration therapy
PAHO	Pan American Health Organization
PAL	practical approach to lung health
PARIS21	Partnership in Statistics for Development in the 21st Century
PCBs	polychlorinated biphenyls
PCD	Partnership for Child Development
PCP	*Pneumocystis carinii* pneumonia
PCR	polymerase chain reaction
PCV	protein-conjugated polysaccharide vaccine
PD	Parkinson's disease
PDOH	Philippine Department of Health
PDSA	plan-do-study-act

PFGE	pulsed-field-gel-electrophoresis
PHC	primary health care
PHSWOW	public health school without walls
PLACE	Priorities for Local AIDS Control Effort
PM	particulate matter
PMTCT	prevention of mother-to-child transmission
PopEd	population and family life education
ppm	parts per million
PPPs	public-private partnerships
PRSC	poverty reduction support credit
PRSP	Poverty Reduction Strategy Paper
PSV	polysaccharide vaccine
PTA	parent-teacher association
PTCA	percutaneous transluminal coronary angioplasty
PTSD	posttraumatic stress disorder
PZQ	Praziquantel
QALY	quality-adjusted life year
RA	rheumatoid arthritis
R&D	research and development
RCT	randomized clinical trial
RDI	recommended dietary intake
RESU	regional epidemiology and surveillance unit
RHD	rheumatic heart disease
RNA	ribonucleic acid
ROP	retinopathy of prematurity
RRT	renal replacement therapy
RSV	respiratory syncytial virus
RTI	road traffic injury
rt-PA	recombinant tissue plasminogen activator
SAFE	surgery, antibiotics to control the infection, facial cleanliness, and environmental improvements
SAR	search and rescue
SARS	severe acute respiratory syndrome
SBP	systolic blood pressure
SCC	short-course chemotherapy
SD	standard deviation
SiC	significant caries (index)
SMA	severe malarial anemia
SO_2	sulfur dioxide
SP	sulfadoxine-pyrimethamine
SSO	social security organization
SSRI	selective serotonin reuptake inhibitor
STATCAP	statistical capacity building
STH	soil-transmitted helminth
STI	sexually transmitted infection
SWAp	sectorwide approach
TB	tuberculosis
TCA	tricyclic antidepressant
TDR	Special Programme for Research and Training in Tropical Diseases
TEHIP	Tanzania Essential Health Interventions Program
THC	tetrahydrocannabinol
TINP	Tamil Nadu Integrated Nutrition Program
TLTI	treatment for latent tuberculosis infection
TLV	threshold limit value
TM	traditional medicine
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNEP	United Nations Environment Programme
UNESCO	United Nations Education, Scientific, and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
URI	upper respiratory tract infection
USAID	U.S. Agency for International Development
VAD	vitamin A deficiency
VC	vital capacity
VCT	voluntary counseling and testing
VERC	village education resource center
VF	ventilation factor
VIA	visual inspection after application of an acetic acid solution
VL	visceral leishmaniasis
VOI	value-of-information (techniques)
VSL	value of a statistical life
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
WHO/TDR	WHO Special Programme for Research and Training in Tropical Diseases
WHOCC	WHO Collaborating Center
WISE	work improvement in small enterprises
WTO	World Trade Organization
YF	yellow fever
YLD	year of life lived with disability
YLL	year of life lost
YLS	year of life saved

All dollar amounts are U.S. dollars unless otherwise indicated.