

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
<i>Summary</i>	
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	
<i>Cross-Cutting Themes</i>	
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 Médecin, 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
	<i>Infectious Disease, Reproductive Health, and Undernutrition</i>	
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 Médecin, 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 Médecin, 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, Nilanathi 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	
<i>Noncommunicable Disease and Injury</i>		
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	
	<i>Risk Factors</i>	
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	
	<i>Consequences of Disease and Injury</i>	
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
	<i>Strengthening Public Health Services</i>	
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 Sally K. Stansfield, Julia Walsh, Ndola Prata, and Timothy Evans	1017
Chapter 55	Drug Resistance Ramanan Laxminarayan, Zulfiqar A. Bhutta, Adriano Duse, Philip Jenkins, Thomas O'Brien, Iruka N. Okeke, Ariel Pablo-Mendez, and Keith P. Klugman	1031
Chapter 56	Community Health and Nutrition Programs John B. Mason, David Sanders, Philip Musgrove, Soekirman, and Rae Galloway	1053
Chapter 57	Contraception Ruth Levine, Ana Langer, Nancy Birdsall, Gaverick Matheny, Merrick Wright, and Angela Bayer	1075
Chapter 58	School-Based Health and Nutrition Programs 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	1091
Chapter 59	Adolescent Health Programs Elizabeth Lule, James E. Rosen, Susheela Singh, James C. Knowles, and Jere R. Behrman	1109
Chapter 60	Occupational Health Linda Rosenstock, Mark Cullen, and Marilyn Fingerhut	1127
Chapter 61	Natural Disaster Mitigation and Relief Claude de Ville de Goyet, Ricardo Zapata Marti, and Claudio Osorio	1147
Chapter 62	Control and Eradication Mark Miller, Scott Barrett, and D. A. Henderson	1163
<i>Strengthening Personal Health Services</i>		
Chapter 63	Integrated Management of the Sick Child Cesar G. Victora, Taghreed Adam, Jennifer Bryce, and David B. Evans	1177
Chapter 64	General Primary Care Stephen Tollman, Jane Doherty, and Jo-Ann Mulligan	1193
Chapter 65	The District Hospital Mike English, Claudio F. Lanata, Isaac Ngugi, and Peter C. Smith	1211
Chapter 66	Referral Hospitals Martin Hensher, Max Price, and Sarah Adomakoh	1229
Chapter 67	Surgery Haile T. Debas, Richard Gosselin, Colin McCord, and Amardeep Thind	1245
Chapter 68	Emergency Medical Services Olive C. Kobusingye, Adnan A. Hyder, David Bishai, Manjul Joshipura, Eduardo Romero Hicks, and Charles Mock	1261
Chapter 69	Complementary and Alternative Medicine Haile T. Debas, Ramanan Laxminarayan, and Stephen E. Straus	1281
<i>Capacity Strengthening and Management Reform</i>		
Chapter 70	Improving the Quality of Care in Developing Countries John W. Peabody, Mario M. Taguiwalo, David A. Robalino, and Julio Frenk	1293
Chapter 71	Health Workers: Building and Motivating the Workforce Charles Hongoro and Charles Normand	1309

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 (DCPI)* (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, *DCPI* 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.

DCPI 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 *DCPI* 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 *DCPI* 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” (Bremner, 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.

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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

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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,

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

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

INDEPTH	International Network of Field Sites with Continuous Demographic Evaluation of Populations and Their Health in Developing Countries	MR	mental retardation
		MRI	magnetic resonance imaging
		MSF	Médecins Sans Frontières (Doctors Without Borders)
INFECTOM	information, feedback, contracting with providers to adhere to practice guidelines, and ongoing monitoring	MTCT	mother-to-child transmission
		MVA	modified vaccinia virus Ankara
		NAFTA	North American Free Trade Agreement
IPT	intermittent preventive treatment	NAP	nonaffective psychosis
IPTi	intermittent preventive treatment in infancy	NCCAM	National Center for Complementary and Alternative Medicine
IPV	inactivated polio vaccine	NCE	new chemical entity
IRB	institutional review board	NDP	national drug policy
IRR	internal rate of return	NGO	nongovernmental organization
IRS	indoor residual spraying	NHA	national health account
ISDR	international strategy for disaster reduction	NHS	national health service
ISIC	international standard industrial classification of all economic activities	NIH	National Institutes of Health
		NIOSH	National Institute for Occupational Safety and Health
ITN	insecticide-treated net		
IUATLD	International Union against Tuberculosis and Lung Disease	NIPA	national income and product accounts
		NMR	neonatal mortality rate
IUD	intrauterine device	NO ₂	nitrogen dioxide
IUGR	intrauterine growth retardation	NORA	national occupational research agenda
JE	Japanese encephalitis	NO _x	nitrogen oxide and nitrogen dioxide
LAAM	levo-alpha-acetyl-methadol	NRA	national regulatory authority
LBW	low birthweight	NRT	nicotine replacement therapies
LDD	learning and developmental disability	NSAID	nonsteroidal anti-inflammatory drug
LDL	low-density lipoprotein	NSO	national statistics office
LE 20	life expectancy at age 20	NTD	neural tube defect
LF	lymphatic filariasis	OA	osteoarthritis
LIC	low-income country	OCP	Onchocerciasis Control Program
LMICs	low- and middle-income countries	ODA	official development assistance
LPG	liquid petroleum gas	OECD	Organisation for Economic Co-operation and Development
LRI	lower respiratory tract infection		
LSD	lysergic acid diethylamide	OEPA	Onchocerciasis Elimination Program for the Americas
MBB	marginal budgeting for bottlenecks		
MCE	multi-country evaluation of IMCI effectiveness, cost, and impact	OP	osteoporosis
		OPV	oral polio vaccine
MCH	maternal child and health	ORS	oral rehydration solution
MDA	mass drug administration	ORT	oral rehydration therapy
MDG	Millennium Development Goal	PAHO	Pan American Health Organization
MDMA	methylenedioxymethamphetamine	PAL	practical approach to lung health
MDR-TB	multidrug-resistant tuberculosis	PARIS21	Partnership in Statistics for Development in the 21st Century
MDT	multidrug therapy		
MEASURE	monitoring and evaluation to assess and use results	PCBs	polychlorinated biphenyls
		PCD	Partnership for Child Development
MIC	middle-income country	PCP	<i>Pneumocystis carinii</i> pneumonia
MMR	measles-mumps-rubella	PCR	polymerase chain reaction
MMT	methadone maintenance treatment	PCV	protein-conjugated polysaccharide vaccine
MMV	Medicines for Malaria Venture	PD	Parkinson's disease
MNCH	maternal, neonatal, and child health	PDOH	Philippine Department of Health
MOH	ministry of health	PDSA	plan-do-study-act

PFGE	pulsed-field-gel-electrophoresis	TB	tuberculosis
PHC	primary health care	TCA	tricyclic antidepressant
PHSWOW	public health school without walls	TDR	Special Programme for Research and Training in Tropical Diseases
PLACE	Priorities for Local AIDS Control Effort	TEHIP	Tanzania Essential Health Interventions Program
PM	particulate matter	THC	tetrahydrocannabinol
PMTCT	prevention of mother-to-child transmission	TINP	Tamil Nadu Integrated Nutrition Program
PopEd	population and family life education	TLTI	treatment for latent tuberculosis infection
ppm	parts per million	TLV	threshold limit value
PPPs	public-private partnerships	TM	traditional medicine
PRSC	poverty reduction support credit	TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
PRSP	Poverty Reduction Strategy Paper	UN	United Nations
PSV	polysaccharide vaccine	UNAIDS	Joint United Nations Programme on HIV/AIDS
PTA	parent-teacher association	UNEP	United Nations Environment Programme
PTCA	percutaneous transluminal coronary angioplasty	UNESCO	United Nations Education, Scientific, and Cultural Organization
PTSD	posttraumatic stress disorder	UNFPA	United Nations Population Fund
PZQ	Praziquantel	UNICEF	United Nations Children's Fund
QALY	quality-adjusted life year	UNIDO	United Nations Industrial Development Organization
RA	rheumatoid arthritis	URI	upper respiratory tract infection
R&D	research and development	USAID	U.S. Agency for International Development
RCT	randomized clinical trial	VAD	vitamin A deficiency
RDI	recommended dietary intake	VC	vital capacity
RESU	regional epidemiology and surveillance unit	VCT	voluntary counseling and testing
RHD	rheumatic heart disease	VERC	village education resource center
RNA	ribonucleic acid	VF	ventilation factor
ROP	retinopathy of prematurity	VIA	visual inspection after application of an acetic acid solution
RRT	renal replacement therapy	VL	visceral leishmaniasis
RSV	respiratory syncytial virus	VOI	value-of-information (techniques)
RTI	road traffic injury	VSL	value of a statistical life
rt-PA	recombinant tissue plasminogen activator	WFP	World Food Programme
SAFE	surgery, antibiotics to control the infection, facial cleanliness, and environmental improvements	WHA	World Health Assembly
SAR	search and rescue	WHO	World Health Organization
SARS	severe acute respiratory syndrome	WHO/TDR	WHO Special Programme for Research and Training in Tropical Diseases
SBP	systolic blood pressure	WHOCC	WHO Collaborating Center
SCC	short-course chemotherapy	WISE	work improvement in small enterprises
SD	standard deviation	WTO	World Trade Organization
SiC	significant caries (index)	YF	yellow fever
SMA	severe malarial anemia	YLD	year of life lived with disability
SO ₂	sulfur dioxide	YLL	year of life lost
SP	sulfadoxine-pyrimethamine	YLS	year of life saved
SSO	social security organization		
SSRI	selective serotonin reuptake inhibitor		
STATCAP	statistical capacity building		
STH	soil-transmitted helminth		
STI	sexually transmitted infection		
SWAp	sectorwide approach		

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