

Case Studies in Global Health: Millions Saved

Ruth Levine, PhD
and the What Works Working Group



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Dedication

*Dedicated to
public health workers around the world,
who save lives every day.*

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Prologue

The issues of global health have finally arrived in the consciousness of the developed world through a unique union of efforts by former Presidents, software pioneers, and rock stars. It is now time that students have a textbook and accompanying casebook that systematically leads them through the issues of global health from basic principles, to the burden of disease, to examples of successful efforts to improve lives and livelihoods.

Ruth Levine's text, *Case Studies in Global Health: Millions Saved* and Richard Skolnik's *The Essentials of Global Health*, completely and artfully fulfill this need. Both authors bring to their writing the clarity of thought and organization of scholars, the excitement of storytellers, and the commitment of activists to making a difference. Their casebook/book bundle takes the big picture population health perspective, building upon classic public health principles and extending them to include the impact of the health care system and the relationship of health to social and economic development.

Global health belongs as an integral part of public health education as taught in Schools and Programs in Public Health. In addition, the global health curriculum needs to reach beyond public health students to the future educated citizens who will make a difference in global health as clinicians, health administrators, lawyers, business executives, academics, politicians etc. All of whom will shape the world's future from global trade to international migration to environmental sustainability. Levine and Skolnik's casebook and book are, in many ways, designed to ensure that in the future the educated citizenry from Wall Street to Main Street understand public health issues and their impact on all of our lives.

I am proud that Levine's and Skolnik's efforts are part of our *Essential Public Health* series. The materials included in their books have been carefully coordinated with other books in the series to ensure that they utilize the same definitions and terminology. The content of the books has also been coordinated across the series to provide only intended overlap. You will find many of these books key to broadening and deepening your understanding of public health and global health. The full list of materials in the *Essential Public Health* series can be found at <http://www.jbpub.com/essentialpublichealth>.

I am confident that you will enjoy learning from the work of Levine and Skolnik. They literally bring to you the world of global health and arrange it before you so it makes sense. The links between health and social and economic development are indisputable and fascinating. You will find an abundance of examples of ways that you can impact global health as part of your career, no matter which direction you head. The authors take you on an adventurous journey through the world of global health. Enjoy the ride.

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

Series Page

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ABOUT THE EDITOR:

Richard Riegelman, MD, MPH, PhD is professor of Epidemiology-Biostatistics, Medicine, and Health Policy and founding dean at George Washington University School of Public Health and Health Services in Washington, DC.

Foreword

There is little doubt about the magnitude of the problems: Combined, AIDS, malaria, and tuberculosis kill 6 million people each year in developing countries, and another 7 million children die of infectious diseases that have long been forgotten in the rich world. This represents both the humanitarian tragedy of lives cut short and the loss of productivity that puts a drag on economic growth.

Does anything really work to solve profound health problems that face poor countries? Does development assistance from rich countries make any difference at all?

Under the auspices of the Center for Global Development's Global Health Policy Research Network, we invited 15 experts in international health, development economics, public policy, and other relevant fields to identify and examine experiences of large-scale success in international health--national, regional, or global programs that worked to improve health. To find those cases, we collaborated with the Disease Control Priorities Project of the National Institutes of Health and solicited nominations from many of the world's leading health authorities. The conclusions of the "What's Worked in Global Health" Working Group leave little doubt that some efforts to save lives and livelihoods through health interventions have worked and have done so at remarkably low cost compared with the benefits.

Published in 2004, *Millions Saved: Proven Success in Global Health*, told the stories of 17 of these successes. This casebook serves as an updated edition with three entirely new cases, revised data, and supplementary information. These 20 success stories (or, more formally, the evidence-based cases) show that major public health efforts can and have changed the world for the better--well beyond what would have occurred through income growth alone. The magnitude and profundity of current health challenges facing the developing world--from AIDS to chronic malnutrition to the looming threat of tobacco-related cancers--can seem daunting. But past challenges have been surmounted and serve as object lessons: Even in countries with few financial resources and limited health infrastructure, sensible and systematic efforts to improve health have worked.

Looking toward the future, the stories told here suggest essential elements of success. At a time when the international community is scanning the horizon for hints about how to "scale-up" health programs and systems to accelerate progress toward better health for the world's poorest children and their parents, a close look at these successes can tell us what factors may need to be in place today--individually or in combination--to increase the chances that "scaling-up" will work.

This effort puts to rest the notion that nothing works in global health. But it raises new challenges to tackle: The first is how we make sure there are more and even bigger successes in the future. If the humanitarian impetus isn't enough, surely the knowledge that economic progress is hastened by health improvements should spur scientists, public health workers, government officials, and funders to action. The second is how we make sure that we know what works and what doesn't. Rigorous evaluation should no longer be seen as an optional academic add-on to major

programs. It should be required so that both successful and failed experiences yield knowledge for smarter policymaking and program design in the future. Only with high-quality evaluation will we have a credible basis for claiming the effectiveness of foreign assistance. (Those interested in the opportunities to improve evaluation may wish to read *When Will We Ever Learn: Improving Lives through Impact Evaluation* (CGD 2006).)

I invite you to dip into this book—to learn a bit more about how people and institutions have worked together in impressive ways to save lives. This is inspiration for the challenges ahead.

Nancy Birdsall

President

Center for Global Development

Acknowledgments

This casebook, which started as the 2004 volume *Millions Saved: Proven Successes in Global Health* (Center for Global Development), owes both its inception and its completion to the contributions of many. We would first like to offer profound thanks to the members of the What Works Working Group, who took on the challenge of selecting success cases and who scrutinized every word to ensure that both tone and substance were appropriate. Our discussions about the criteria for success, the quality of the evidence base, and the commonalities across cases infused the work with a strong sense of purpose. And, although invisible to readers, the cases excluded and the conclusions discarded for lack of evidence are testimony to how seriously the Working Group members took their charge. Working Group members are profiled in the About the Authors section. We would also like to thank the editors of the Disease Control Priorities Project, whose close collaboration has guided our work since the very early days of the project. Furthermore, we are grateful to the authors of *Disease Control Priorities in Developing Countries*, 2nd edition (2006), who nominated success cases and shared expertise on each of the book's chapters.

Thanks are also due to several writers, who drafted cases, including Gail Vines, Jane Seymour, and Elaine Richman, and in particular to Phyllida Brown. We are also grateful to Ayesha Siddiqui, who devoted a summer internship to this project, and to Morissa Malkin, Steve Fishman, Nancy Hancock, Valerie Norville, Marla Banov, Madona Devasahayam, and Paul Karner, who contributed to the original book.

We thank Bruce Benton for his valuable additions to the onchocerciasis case in this version, and Disha Shah for her contributions to the new text boxes appearing in this edition. We thank Disha and her fellow students at George Washington University, Dawn Pepin, Edward Morgan, and Ami Joglekar, for excellent background research that provided a foundation for drafting new cases.

Many reviewers helped us to accurately represent both the central elements of each case and the nuances. The reviewers include Richard Adegbola, Mercy Ahun, Dariush Akhavan, Robin Biellik, Maureen Birmingham, David Brandling-Bennett, Joel Breman, Tim Brown, Jesse Bump, Donald Bundy, Flavia Bustreo, Sandy Cairncross, Anupong Chitwarakorn, Joseph Cook, Felicity Cutts, Isabel Danel, Lola Dare, Joy de Beyer, David DeFerranti, Ciro de Quadros, Shanta Devarajan, Chris Dye, Saskia Estupinan, Christa Fischer, William Foege, Olivier Fontaine, Kevin Frick, Rae Galloway, Suzanne Gilbert, Renato Gusmao, Ken Gustavsen, Davidson Gwatkin, Ross Hammond, DA Henderson, Eva Hertrampf, Janet Hohnen, Donald Hopkins, Robin Houston, Prabhat Jha, Jacob Kumaresan, Orin Levine, Jerker Liljestrand, Elizabeth Lule, Tom Merrick, Philip Musgrove, Luke Nkinsi, David Olson, Gordon Perkin, Frank Richards, Juan Rivera, Wiwat Rojanapithayakorn, Ebrahim Samba, Gabriel Schmunis, Christopher Schofield, Paul Schultz, Adelaide Shearley, **Ram Shrestha**, **Werasit Sittitrai**, **Peter Small**, **Alfredo Jose Solari**, **Jonathan Struthers**, Varachai Thongthai, RD Thulasiraj, Ernesto Ruiz Tiben, Corne van Walbeek, Judith Watt, Diana Weil, Keith West,

Derek Yach, Zaida Yadon, and Witold Zatonski. We also benefited from the published reviews of the original *Millions Saved* text, which were written by Brian Bilchik, Henry Mosley, Robert Northrup, James Phillips, and Robert Trautman. All remaining errors remain the responsibility of the authors.

Our colleagues at the Center for Global Development have been generous with their suggestions, constructive critiques, and moral support. We would particularly like to thank CGD President Nancy Birdsall, as well as Maureen Lewis, Sheila Herrling, Sarah Lucas, Lawrence MacDonald, and Steve Radelet.

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This book would not have been possible without the intellectual contributions and commitment of two outstanding young professionals in the field of development. Molly Kinder worked on the original *Millions Saved* and devoted the better part of two years to finding the cases, supporting the working group in all phases, and drafting several chapters. Jessica Gottlieb joined the Center for Global Development in 2005 and took on the challenge of updating the material and drafting two new chapters.

About the Authors and Contributors

Ruth Levine, PhD, is a Senior Fellow and Director of Programs at the Center for Global Development (CGD) and head of CGD's Global Health Policy Research Network. An expert on health and education, she was previously a Senior Economist at the World Bank and Social Sectors Advisor at the Inter-American Development Bank. She has worked in 14 developing countries and on global programs such as the Global Alliance on Vaccines and Immunization. Ms. Levine holds a doctoral degree in economics and public health from Johns Hopkins University and is coauthor of *The Health of Women in Latin America and the Caribbean* and *Making Markets for Vaccines: Ideas to Action*.

The What Works Working Group

The CGD's Global Health Policy Research Network convened the What Works Working Group to identify, describe, and analyze proven successes in global health. The Working Group includes 16 prominent experts in international health, development economics, public policy, and other fields. The Working Group collaborated closely with leading authorities on specific diseases and interventions through the Disease Control Priorities in Developing Countries Project of the Fogarty International Center of the US National Institutes of Health.

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Introduction

MILLIONS SAVED: PROVEN SUCCESSES IN GLOBAL HEALTH

One of the greatest human accomplishments has been the spectacular improvement in health since 1950, particularly in developing countries. With death rates falling steadily, more progress was made in the health of populations in the past half century than in many earlier millennia.

Average life expectancy—the age to which a newborn baby is expected to survive—was approximately 40 years in developing countries in 1950; 50 years later, life expectancy in these same countries has risen more than 60% to about 65 years today.¹ Each year, nearly four months are added to average life expectancy globally.² Most of the improvements in life expectancy are derived from the reduced risks to young children. The death rate among children under 5 has dropped dramatically around the globe, from 148 deaths per 1,000 children in 1955 to fewer than 59 deaths in 2000.

Economic growth only partially explains the overall improvement in health in the past 50 years in developing countries.^{3,4} In fact, researchers have estimated that income growth accounts for less than half the health gains between 1952 and 1992.⁵ The role of the technological innovation and diffusion, including the spread of health-related knowledge, is seen as a main driver of the improvement of health in recent decades, particularly in low-income countries.^{6,7} There is little doubt, in fact, that specific actions within the health sector have contributed to the improvements observed in global health over the past 50 years.

This book is about part of that success: major achievements in public health programs in the developing world. Not all of those achievements are included in this volume, by any stretch of the imagination, and in no way do the examples here represent the only health programs that have worked. By focusing on experiences that embody the deployment of resources within the health sector to achieve measurable improvement in human health, this book provides a sample of the national, regional, and global public health efforts that we know, with confidence, have saved millions of lives and improved millions more (see Box I-1).

These cases meet a set of rigorous selection criteria: being large-scale, having a duration of five years or more, employing a cost-effective intervention, and having a major impact on an important health problem (see Box I-2). Importantly, for these cases, as for a few others, sufficient investment was made in data collection and analysis to attribute changes in health conditions to the large-scale interventions or programs themselves. (The process of case selection, and the mandate, methods, and limitations of this review of success cases, is described in Appendix B.)

On the basis of impact alone, this sampling of major global public health successes is impressive: Mothers throughout Latin America no longer worry about their children contracting polio; huge regions of Africa are now habitable because river blindness is under control; women in Sri Lanka can give birth without fear of dying—in sharp contrast to women in most poor countries; China has made major inroads against tuberculosis; and much more.

But the stories are about more than the impact itself; they are about how that success came about. What are the common threads running through these success cases that provide useful hints about what might be needed to generate future success? How do these success stories arm policy makers and development practitioners to fight for more successes? And how do these stories challenge the assertion that foreign assistance makes little difference in people's lives?

BOX I-1 Success Case Summaries

Eradicating smallpox. A massive global effort spearheaded by the World Health Organization eradicated smallpox in 1977 and inspired the creation of the Expanded Programme on Immunization, which continues today.

Preventing HIV and sexually transmitted infections in Thailand. In Thailand, the government's "100% condom program" targeting commercial sex workers and other high-risk groups helped prevent the spread of HIV relatively early in the course of the epidemic. Thailand had 80% fewer new cases of HIV in 2001 than in 1991 and has averted nearly 200,000 new cases.

Controlling tuberculosis in China. To address the problem of tuberculosis (TB) patients' early dropout from treatment, a national TB program in China implemented the directly observed treatment, short-course (DOTS) approach in which a health worker "watches" patients with TB daily for six months as they take their antibiotic treatment. The program helped reduce TB prevalence by 40% between 1990 and 2000 and dramatically improved the cure rate in half of China's provinces.

Reducing child mortality through vitamin A in Nepal. Capitalizing on the discovery that vitamin A supplementation could save child lives, the government of Nepal began the National Vitamin A Program in 1995 that has averted nearly 200,000 child deaths.

Eliminating polio in Latin America and the Caribbean. Beginning in 1985, a regionwide polio elimination effort led by the Pan American Health Organization immunized almost every young child in Latin America and the Caribbean, eliminating polio as a threat to public health in the Western Hemisphere in 1991.

Saving mothers' lives in Sri Lanka. Despite relatively low national income and health spending, Sri Lanka's commitment to providing a range of "safe motherhood" services led to a decline in maternal mortality from 486 deaths per 100,000 live births to 24 deaths per 100,000 live births over four decades.

Controlling onchocerciasis in sub-Saharan Africa. A multipartner international effort begun in 1974 dramatically reduced the incidence and impact of the blinding parasitic disease and increased the potential for economic development in large areas of rural west, central, and southern Africa. Transmission has been virtually halted in West Africa today, and 22 million children born in the 11-country area are now free of the threat of contracting river blindness.

Preventing diarrheal deaths in Egypt. Using modern communication methods, a national diarrheal control program in Egypt increased the awareness and use of life-saving oral rehydration therapy, helping reduce infant diarrheal deaths by 82% between 1982 and 1987.

Improving the health of the poor in Mexico. Since 1997, Mexico's Progresa (now known as "Oportunidades") has provided a comprehensive package of education, health, and nutrition interventions to rural families through a conditional cash grants program, resulting in lowered rates of illness and malnutrition and increased school enrollment.

Controlling trachoma in Morocco. Since 1997, the incidence in Morocco of trachoma, the leading preventable cause of blindness worldwide, has been cut by more than 99% among children under 10 through a combined strategy of surgery, antibiotics, face washing, and environmental changes.

Reducing guinea worm in Asia and sub-Saharan Africa. A multipartner eradication effort focused on behavior change reduced prevalence of guinea worm by 99% in 20 endemic African and Asian countries. Since the start of the campaign in 1986, the number of cases has fallen from 3.5 million to less than 11,000 in 2005.

Controlling Chagas disease in the southern cone of South America. Through surveillance, environmental vector control, and house spraying, a regional initiative launched in 1991 has decreased the incidence of Chagas disease by 94% in seven countries in the southern cone of Latin America. Disease transmission has now been halted in Uruguay, Chile, and large parts of Brazil and Paraguay.

Reducing fertility in Bangladesh. In Bangladesh, strong leadership of the family planning program, a sustained outreach strategy, and a focus on access to services increased contraceptive prevalence from 3% to 54% (and correspondingly decreased fertility from 7 to 3 children per woman) over three decades, more than what would have been predicted based on changes in economic and social conditions alone.

(continues)

BOX I-1 Success Case Summaries

(continued)

Curbing tobacco use in Poland. Starting in the early 1990s, the transition to a market economy and a more open society paved the way for health advocates to implement strong tobacco controls in Poland, a country that had the highest rate of tobacco consumption in the world. A combination of health education and stringent tobacco control legislation averted 10,000 deaths a year, led to a 30% reduction in the incidence of lung cancer among men aged 20 to 44, and helped boost the life expectancy of men by four years.

Preventing iodine deficiency disease in China. China's introduction of iodized salt in 1995 reduced the incidence of goiter among children, from 20% to 9%, and created a sustainable system of private provision of fortified salt.

Preventing neural-tube defects in Chile. Through a successful partnership between the flour industry and the national government, Chile began fortifying wheat flour with folic acid in 2002. This intervention has prevented life-threatening neural tube defects in infants and saved the health system millions of dollars in treatment costs.

Eliminating measles in southern Africa. Measles vaccination campaigns in seven African countries nearly eliminated measles as a cause of childhood death in southern Africa and helped reduce the number of measles cases from 60,000 in 1996 to just 117 cases four years later. The number of reported measles deaths fell from 166 to zero.

Preventing dental caries in Jamaica. Between 1987 and 1995, Jamaica's National Salt Fluoridation Program demonstrated up to an 87% decrease in dental caries in schoolchildren and has been regarded as a model for micronutrient interventions.

Treating cataracts in India. An intensified cataract surgery program implemented in seven Indian states from 1994 to 2001, which was catalyzed by technical and operational innovations developed by a nongovernmental organization, saved more than 300,000 people per year from a lifetime of blindness.

Preventing Hib disease in Chile and the Gambia. A national Hib vaccination program in Chile reduced prevalence of Hib disease by 90% in the early 1990s. In 1997, the Gambia introduced Hib vaccines into its national immunization program and has virtually eliminated the disease from the country.

BOX I-2 What Is Success?

Each of the cases in this volume adheres to five selection criteria.

Scale. Interventions or programs that were implemented on a national, regional, or global scale. Programs were characterized as "national" if they represented a national-level commitment, even if they were targeted at a problem that affected only a limited geographic area. Programs implemented on a pilot basis, or within only a few districts, were excluded.

Importance. Interventions or programs that addressed a problem of public health significance. In this case, a measure of burden of disease—disability-adjusted life years (DALYs)—was used as an indicator of importance.

Impact. Interventions or programs that demonstrated a clear and measurable impact on a population's health. Demonstration of impact on process indicators—such as immunization rates—was not taken as a proxy for health outcomes. Rather, genuine changes in morbidity and mortality constituted the criteria.

Duration. Interventions or programs that were functioning "at scale" for at least five consecutive years. Sustainability, including financial self-sufficiency, was not used as a selection criterion.

Cost-effectiveness. Interventions or programs that used a cost-effective approach, determined by a threshold of about \$100 per DALY saved.

TAKE NOTE

Six “wows” emerge from a close review of the cases presented in this book.

Success Is Possible Even in the Poorest of Countries

These cases show that major health improvement is possible in the face of grinding poverty and weak health systems. Countries of every region in Africa and South Asia—places where the average citizen earns less than \$1,000 per year (often far less, closer to \$1 or \$2 a day)—have seen major public health successes. Several of the programs highlighted, such as the guinea worm and river blindness control efforts and the Vitamin A supplementation program, employed innovative interventions and involved the community to reach people in some of the most remote terrain on the planet. Other programs, such as those in Bangladesh that improved the health of mothers and children, brought needed health commodities and information through house-to-house visits to many low-income women, who, for cultural reasons, could not venture far from home.

Other programs have improved the health of poor people in middle-income countries through targeted incentives and support. For example, Mexico’s Programa de Educación, Salud y Alimentación (Progresá)—now known as Oportunidades—uses a tiered targeting strategy to provide income transfers to the most disadvantaged residents if they take their children for well-child services. In short, we found programs that successfully improved the health of people who are the hardest to reach.

Governments in Poor Countries Can Do the Job—and in Some Cases Are the Chief Funders

In almost all of these cases, the public sector does the daily work of reaching affected populations. This contrasts with the view that governments in poor countries are uniformly inefficient at best and hopelessly corrupt at worst. Through at least the narrow frame of these cases, we found that the public sector was integral to the successful delivery of services at scale in most instances, sometimes in collaboration with nongovernmental organizations (NGOs) or the business community. For example, in Sri Lanka, maternal mortality has been halved at least every 12 years since 1935, in large measure because of the services that are designed, delivered, and monitored within the public health system. In the southern cone of South America, it was the ministries of health that collaborated across borders to greatly diminish the threat of Chagas disease. In these and other instances, such as the measles initiative in southern Africa, the financial support depended not on donors but on local resources—another dimension of the public sector’s ownership of the success.

Technology, Yes—but Behavior Change, Too

Despite the fact that technological developments in global health are more likely to grab headlines—and in fact, do constitute a major element in many of these cases—very basic behavior change emerges as a prominent feature in a surprising number of instances. In the control of guinea worm in Africa, for example, families learned to filter their water conscientiously; in the fight against deaths from dehydrating diarrheal disease in Bangladesh, mothers learned and now teach their grown daughters how to mix a simple salt-and-sugar solution; and in Poland and South Africa, long-standing patterns of cigarette consumption have been dramatically altered through a combination of legal measures, taxation, and communication efforts. This is good news in light of the health challenges that now confront us, very few of which can be tackled through improved technology alone.

International Coalitions Have Worked

Many of the cases show the ways in which international agencies—now popularly termed *partners*—can break through institutional and bureaucratic walls to work for a common purpose. In no instance was this collaboration easy, and it was often the source of institutional friction and cumbersome processes. But the benefits are evident: Some parties bring funding, others bring technical capabilities in public health, and still others generate the political will to sustain the effort in the face of competing priorities.

Two examples demonstrate such collaboration: The guinea worm eradication campaign benefits from the participation of a large number of partners—the Carter Center, the US Centers for Disease Control and Prevention,

the United Nations Children’s Fund (UNICEF), the World Health Organization (WHO), the Bill & Melinda Gates Foundation, the World Bank, the UN Development Program (UNDP), NGOs, more than 14 donor countries, private companies (including Du Pont and Precision Fabric Groups, which have donated more than \$14 million worth of cloth for water filters), and the governments of 20 countries in Asia and Africa. Through interagency meetings, held three to four times a year, and annual meetings of coordinators of national eradication programs, exemplary coordination has been achieved among implementers and donors.

The international effort to control onchocerciasis (or river blindness) also demonstrates the power of partnership. The African Programme for Onchocerciasis Control has relied on the long-term participation of the World Bank, WHO, UNDP, the Food and Agriculture Organization, the governments of 19 African countries, 21 bilateral and multilateral donors, more than 30 NGOs, the pharmaceutical giant Merck, and more than 80,000 rural African communities. In both cases, a single coordinating body played a critical role, helping to unite the partners and spur momentum within the project.

Attribution Is Possible

It is indeed possible to know whether large-scale health programs are the key drivers of improved health. Although this might not sound surprising at first blush, policy makers in fact rarely have the opportunity to directly connect investments in major health (or other social) programs to outcomes that have as much meaning as lives saved. Typically, large initiatives, such as immunization programs, are judged by intermediate measures—for example, the number of children receiving vaccination services or the number of doses of vaccines procured. The actual health impact is assumed. In contrast, we insisted on finding evidence that the programs led to specific types of health improvements, and we were able to do so—in most cases because special data collection efforts had been made to look at those outcomes (see Box I-3).

A pathbreaking example of connecting investments to impact is the Progresa program in Mexico, which provided a package of education and health interventions to families through conditional cash grants. Progresa’s proponents in government saw the value of an external, independent impact evaluation as a way to establish the program’s credibility and help ensure its continuation during a political shift. When a rigorous evaluation demonstrated major impacts on health and welfare of the poor, Progresa survived the transition from one Mexican administration to the next and has inspired the creation of similar “conditional cash transfer” programs in Latin America and elsewhere.

BOX I-3 Attributing Success: How Do We Know?

In each of these cases, solid evidence—summarized in the respective case studies—confirms that the impact on health is largely attributable to the specific public health efforts rather than to broad economic and social improvements. In some instances, this confirmation comes through a randomized experimental design, which permits the comparison of the health of people who were included in a particular program with the health of people who have similar baseline characteristics and yet did not participate in the program. Such experimental designs are rare but not unknown: In Mexico, for example, the Progresa program of income transfers was scaled up in a way that was explicitly designed to assess the program’s impact.

In other instances, the confirmation comes indirectly from a composite of information about health changes that occurred simultaneously with a program’s implementation. In Sri Lanka, for example, the changes in specific causes of maternal mortality, such as hemorrhage, coincided with targeted improvements in health systems, such as the introduction of transfusion services. In the Gambia, the reduction of a disease that causes meningitis in children was so dramatic and so well documented following the nationwide introduction of Hib vaccine that little doubt exists about the cause of the epidemiologic change. And in other cases, such as the Bangladesh family planning program, statistical analyses provide the grounds for claims of success.

Success Comes in All Shapes

It is commonly held that in low-income countries, the only health programs that really work are those that are disease specific and centrally managed, delivering medicines and services outside of the routine health system. These are the so-called vertical programs—some of which are highlighted in this book. As the experiences chronicled in this volume attest, many other approaches also have worked, including initiatives that strengthen health systems to effect steady improvements in access and quality, such as the use of female community health volunteers to distribute vitamin A capsules and the improvements in eye care services. Also successful have been traditional public health interventions that employ community-wide interventions such as salt iodation, and legal and regulatory reforms such as tobacco control legislation in Poland. Perhaps more important, several of these stories break down the boundary between vertical approaches and efforts to strengthen health systems by showing disease-specific efforts that work together with routine health service delivery. For example, under the right circumstances a big push to immunize children can provide the much-needed organizational skills, funding, and motivation to improve basic pediatric health services. And virtually all disease-specific programs are made more successful when functioning training, logistics, surveillance, and referral systems are present in a country's health infrastructure.

CONNECTING THE DOTS FOR SUCCESS

Each of the chapters in this volume tells a unique story, specific to time and place. While they all reveal the tremendous improvements in the lives of millions that public health efforts can achieve, they vary vastly in the health conditions addressed and the interventions used. Each also is distinct in the factors that contributed to the accomplishments. They yield no single recipe that, if followed, will result in success.

Though no single recipe emerges, a remarkably consistent list of ingredients does: political leadership and champions, technological innovation, expert consensus around the approach, management that effectively uses information, and sufficient financial resources. In some of the cases, the participation of the affected community and the involvement of NGOs are also central features. Combined in particular ways, these elements appear to be the main contributing factors to success.

No *single* ingredient was enough in any case. By itself, political leadership could create an opportunity for funding and action, in the face of competing demands within and outside the health sector, but such leadership did not provide the road map to effectively deal with a health problem. That came from strong information sources that identified the breadth and nature of the problem and from appropriate technology that effectively addressed the problem. Implementation then depended on effective management, with close monitoring of processes and results. In many instances, success was derived from a type of collaboration across countries and institutions that defied bureaucratic battle lines.

Whether these factors would lead to success in other programs is a question that our methods did not permit us to answer. Because “failures” are not as well documented as successes, we were unable to undertake a comparative analysis, and so it is not possible to say definitively that these factors, if in place, would guarantee success in the future. However, the common elements suggest a working checklist that policy makers and planners could use to provide large-scale global health programs with greater chances of reaching their full potential.

MOBILIZING POLITICAL LEADERSHIP AND CHAMPIONS TAKES A LITTLE LUCK AND A LOT OF PREPARATION

Virtually all of the cases show the importance of visible high-level commitment to a cause. In Mexico, the director general of Social Security at the time, Santiago Levy, championed the design and evaluation of the Progres program, a demand-side program for helping poor families, and thereby helped the program to survive a key political transition to an opposition government. In Thailand, the government showed strong leadership and vision in its early efforts to curb a growing AIDS epidemic, making a bold commitment that led to one of the very few successes in HIV/AIDS prevention on a national scale. In South Africa, the strong will of the first health minister of the country's new government allowed for the successful passage of one of the most comprehensive and stringent tobacco control policies in the world, despite fierce opposition from the tobacco industry.

Other cases show the potential for champions to rally resources and international resolve. The near eradication of guinea worm from Africa and Asia is due in large measure to the personal involvement and advocacy of former US President Jimmy Carter and former African heads of state, General Amadou Toumani Touré of Mali and General Yakubu Gowon of Nigeria. These leaders visited endemic countries, mobilized the commitment of political and public health communities, and raised both awareness and financial resources. In the case of the control of onchocerciasis in 11 West African countries, then president of the World Bank Robert McNamara personally committed to spearheading a new initiative after witnessing the devastation the blinding disease caused.

In a few of the cases, political commitment was simply the serendipitous result of a leader's particular interest in taking on a cause. In others, however, political commitment came about because technical experts were able to effectively communicate that a "big win" was possible through the development of plans that were technically feasible, economically possible, and socially desirable. So, when US President Lyndon B. Johnson was looking for an initiative to mark "International Cooperation Year" in 1965, technical personnel from the US Communicable Disease Center* took advantage of the opportunity to promote the eradication of smallpox. And when Chile's minister of health was under fire after an outbreak of meningitis, public health researchers seized the moment to make the case for the national introduction of the Hib vaccine—even though the vaccine would not prevent the type of meningitis drawing public attention at the time. In these instances, the ability of the technical experts to make the most of a political opening was the seed of the success.

TECHNOLOGICAL INNOVATION WORKS ONLY WHEN THERE IS AN EFFECTIVE SYSTEM TO DELIVER AT AN AFFORDABLE PRICE

Many of the cases turn on the development of a technology—a drug, vaccine, nutritional supplement, or pesticide—that was appropriate for the conditions in the developing world. Commonly, the new technology permitted an existing program to work more effectively, achieving rapid health gains. For example, the regional initiative to eliminate Chagas disease in South America gained great momentum in the 1980s with the development of a synthetic pesticide that was both more effective and more acceptable to the population than the earlier one. The success of Morocco's trachoma program hinged in part on the use of azithromycin, an antibiotic that in the 1990s was found to be as effective in treating the blinding disease with one dose as a 6-week regimen of the predecessor treatment. The control of onchocerciasis in central and east Africa was possible only after the 1978 discovery that ivermectin, the drug originally developed for veterinary use, was an effective one-dose treatment for many of the most debilitating symptoms of the disease.

However, the development of a new health product is in no way a guarantee that the technology will take hold. In many of the cases in this volume, the technological innovation led to better health only because of a concerted and large-scale effort to make it available at a cost affordable to developing countries and donor agencies—often through a public-private partnership in which the private sector provided the product at concessionary prices or through a donation program, and the public sector (both national governments and donor agencies) took responsibility for distribution. These deals have frequently been brokered or facilitated through international NGOs. For example, one of the largest public-private partnerships is a collaborative effort between Merck and a range of nonprofit institutions, led by the Task Force for Child Survival and Development (an affiliate of Emory University), through which the pharmaceutical giant has donated approximately 470 million doses of ivermectin in the fight against onchocerciasis. Similarly, Pfizer has teamed with the Edna McConnell Clark Foundation and the Bill & Melinda Gates Foundation to provide one of the world's largest donations of a patented drug, Zithromax, as part of a global effort to eliminate blinding trachoma. Another successful public-private partnership is demonstrated by the union of the flour industry and the Chilean government to fortify flour with folate, preventing neural-tube defects.

AGREEMENT AMONG TECHNICAL EXPERTS STRENGTHENS THE SIGNAL, REDUCES THE NOISE

In addition to specific technology and improved medicine, many of the health interventions in this book have benefited from the implementation of new strategies to fight disease, based on technical consensus about the strategies'

* In 1970, the name was changed to the Center for Disease Control and in 1992 to the Centers for Disease Control and Prevention.

efficacy. For example, the World Bank and WHO helped China revamp its fight against tuberculosis, the leading cause of adult deaths in China, and recommended the introduction of the DOTS strategy—a way to package the elements of successful TB control. Subsequently China launched the world’s largest DOTS program in 1991. In the case of trachoma, the government of Morocco joined forces with WHO and an international partnership in the first national test of a comprehensive strategy to both prevent and treat the disease, including low-cost surgery, antibiotics, face washing, and environmental change. In each of these instances, and in nearly all others, the agreement about the right strategy by an expert community both within international technical agencies and in the broader international public health community was a central factor in the appropriate design of the programs. Such expert consensus does not occur magically, but rather through investment in scientific research and ongoing international expert meetings. With such consensus, programs were seen as fully credible and worth the outlays required.

NGOS COMPLEMENT AND KEEP A VIGILANT EYE ON PUBLIC ACTION

Most of the cases represent achievements of the public sector, but some show the special role that NGOs with broad reach and strong management can play, thus complementing the public sector. In Bangladesh, a national NGO carried out the world’s largest oral rehydration program, reaching more than 13 million mothers and preventing child deaths. NGOs have played a key role in the distribution throughout sub-Saharan Africa of ivermectin, the antibiotic that treats river blindness. And India’s Cataract Blindness Control Program scaled-up services and improved delivery of high-quality, low-cost eye care through nongovernmental collaboration, particularly with the innovative Aravind Eye Hospital.

Beyond service delivery, NGOs have a valuable role as watchdogs and advocates, going beyond what any public agency can do. For example, health-promoting NGOs in Poland and South Africa formed the backbone of advocacy efforts that led to sweeping tobacco control legislation in both countries.

NO TECHNOLOGY, FUNDING, OR CHAMPION TAKES THE PLACE OF GOOD MANAGEMENT ON THE GROUND

Without question, effective management is an essential element of each and every case. Good health service delivery requires that trained and motivated workers are in place and have the supplies, equipment, transportation, and supervision to do their job right. Although this does not happen without adequate funding, it also does not happen without good management—and in some instances strong management partially compensates for budgetary restrictions. For example, in the case of smallpox eradication, a quasi-military organizational structure was able to respond quickly to new information, managing the multiple logistical challenges of reaching every corner of the globe. During the polio campaign in the Americas, management at the country level was strengthened through the establishment of national interagency coordinating committees in each country. The committees worked with ministries of health to develop national plans of action, setting immunization strategies, and optimizing the use of resources. These plans of action now serve as an important management tool for planning other health interventions.

INFORMATION IS POWER

One facet of each and every case is the use and broad sharing of quality information, particularly in four ways:

- First, information *raises awareness* about a health problem, focusing political and technical attention. In China, for example, research showing that iodine deficiency posed a threat to children’s mental capacity prompted government action. In Honduras, a rapid method to estimate maternal mortality highlighted regional differentials, which led to a public-sector response. In Poland, research that linked smoking to the heavy disease burden there, particularly to the exploding cancer problem, helped raise awareness among policy makers and the general public and provided the foundation for initiating tobacco control legislation.
- Second, information in the early stages of a program *shapes design*. Through careful monitoring, program designers measure the effectiveness of various ways to address a health problem and discern which approach merits additional resources. In Egypt, for example, information from community trials and “rehearsals” and from market research revealed consumer preferences—essential for the design of a national oral rehydration program that depended in large measure on effective communication with mothers. In South Africa, research on the impact of tobacco excise taxes shaped the stringent taxes implemented in the late 1990s.

- Third, information *motivates*. In the guinea worm eradication campaign, information was disseminated in monthly publications that highlighted the progress of national programs. The information sharing helped keep countries motivated and focused and pressured those lagging behind. The campaign even used information to spark positive competition between rival countries.
- Fourth, information *facilitates midcourse corrections*. In the India cataract case, the collection of information demonstrated that the government's traditional approach of using "eye camps" was not working well, and many patients were obtaining no benefit from the cataract surgery. This led to the introduction of a better surgical approach and effective collaboration with NGOs.

COMMUNITY PARTICIPATION CREATES A TWO-WAY STREET

In some of the cases, the communities whose health is affected play a strong and active role in the success. Among the best examples are the community-directed ivermectin treatment program for river blindness, in which tens of thousands of communities across central and east Africa organize and manage local distribution of the drug, assuming full responsibility and thus increasing the likelihood of the long-term sustainability of the program; the guinea worm campaign across central and east Africa, in which "village volunteers" serve on the front line distributing filters, raising public awareness, and identifying and containing cases; the vitamin A program in Nepal, in which volunteers, often village grandmothers, distribute the nutrition supplements—a measure that proved crucial to the ability of the program to reach remote areas and sustain activity; and a community-based health education campaign to reduce trachoma in Morocco, which uses mosques, lodgings for young women, local associations, and schools as venues to communicate the program's messages of behavior change.

MORE PREDICTABLE FUNDING, AT ADEQUATE LEVELS, PERMITS THE SYSTEM TO WORK

Last but in no way least, each of these cases demonstrates that making public health programs work takes money. Not vast sums—in each of the cases, cost-effective and often low-cost interventions are employed, and the benefits far outweigh the costs—but steady, adequate funding ensures that the programs can be sustained long enough to have a major impact. In many of these cases, a large share of the funding came from donors—donors who can now claim a resounding public health victory: In the onchocerciasis control program, \$600 million over 28 years, contributed by many donors, has virtually halted transmission of the blinding disease in 11 countries—at an annual cost of just \$1 per person. A \$26 million[†] grant from the US Agency for International Development (USAID) to Egypt in 1981 helped the country prevent 300,000 child deaths from diarrheal disease—at the remarkable cost of just \$6 per treated child. In the guinea worm control program, about \$88 million from an extensive list of donors and NGOs has helped reduced guinea worm prevalence by more than 99%, cutting the number of people affected by this profoundly debilitating ailment from 3.5 million in 1985 to less than 11,000 in 2005.

The payoffs have been huge. Eradicating smallpox from the globe cost the donor community less than \$100 million; the United States, the campaign's largest donor, saves its total contribution every 26 days because it is not spending on treatment or vaccine. In the onchocerciasis control program, the economic rate of return has been estimated to be 17%—a yield that is comparable to investment in the most productive sectors, such as industry, transportation, and agriculture.

Donor investments in health do not always yield such resounding benefits, but these cases show the proven potential for donor dollars to save individuals, communities, and entire nations from the devastation of preventable death and disease. This is the type of impact that taxpayers in wealthy countries want to see from the foreign assistance budget: major improvements in the well-being of the world's poorest citizens.

THE CHALLENGES AHEAD

The need to learn how to succeed is urgent. Ancient problems remain unsolved, such as the differentials in health between the rich and the poor. Newer ones—from the AIDS pandemic to the growing prevalence of chronic disease—threaten future generations.

[†] Throughout, dollar figures are expressed in nominal terms, unless otherwise noted, and are US dollars.

AIDS

The soaring rates of HIV infection have had a devastating impact on life expectancy in many poor countries and have erased decades of steady improvements in sub-Saharan Africa. An estimated 25 million people are believed to be HIV-positive in Africa alone—a figure that represents nearly two thirds of the total global HIV burden, and 9 in 10 children with AIDS.⁸ In countries like Swaziland that have exceptionally high rates, it is estimated that more than one third of the population carries the disease. The death toll in the continent is staggering: 2.8 million adults and children died of AIDS in 2005 alone.⁸ As a result, life expectancy in southern Africa, the region with the highest prevalence rates in the world, has decreased from 62 years in 1995 to 48 years today, and is projected to fall even further to 43 years in the next 10 years.⁹

High Child Mortality in Africa

Child mortality has declined in low- and middle-income countries, but more than 11 million children under 5 still die each year, most from diseases that can be treated or prevented with known approaches. And the rate of improvement in child health has slowed dramatically in the past 20 years. From 1990 to 2001, for example, the number of deaths of children under 5 declined by 1.1% each year, compared with 2.5% per year during the years from 1960 to 1990. Even more troubling, while improvements have continued in places where child health is relatively good, it has been slowest in the places that historically have had the highest rates of child mortality. Since the early 1970s, sub-Saharan Africa has experienced a slower rate of decline in child mortality than any other area in South Asia.¹⁰

Inequality

There is nothing new about rich people being healthier than poor people. Higher income generally translates into better nutrition, better access and ability to effectively use health services, and greater ability to avoid hazards. But the persistence of these differentials—and the growing gap for some health conditions and some populations—must be taken as a caution on claims of success. In this, average success masks an important failure: The gap in mortality, life expectancy, and disease burden between industrialized and developing countries, and between rich and poor children within most countries, is wide. Ninety-nine percent of total childhood deaths in the world occur in poor countries.¹¹ The poorest 20% of the population within countries often has significantly higher under-5 mortality rates than the richest 20%. In Indonesia, for example, a child born in a poor household is four times more likely to die by her fifth birthday than a child born to a family in the richest population segment.¹² In short, although overall gains have been impressive, the benefits have not been evenly shared.

Cardiovascular and Chronic Diseases

Chronic diseases, and in particular cardiovascular diseases, have emerged as a “hidden epidemic” in developing countries.¹³ Estimates suggest that noncommunicable conditions such as depression, diabetes, cancer, obesity, respiratory diseases, and cardiovascular disease will grow from approximately 40% of the health burden in developing countries in 1998 to nearly 75% in 2020.⁵ Responding to the looming disease burden requires that the major risk factors (high cholesterol and blood pressure, obesity, smoking, and alcohol) be addressed through changes in diet, physical activity, and tobacco control and through new government policies to support these desired changes in behavior. There is hope: A small window of 10 to 20 years exists for countries to change behavior patterns and prevent the spiraling health crisis.¹³

TOWARD MORE SUCCESSES

Looking at the past is like shining a flashlight into a mirror: the reflection illuminates both what’s behind and what’s ahead. In almost all of the cases that we now call successes, there were moments when the disease seemed insurmountable, the technology was still on the drawing board (or too expensive or unusable in developing-country conditions), the funding was nowhere in sight, international agencies were squabbling, and no one appeared ready to take up the challenge. In these instances, a combination of science, luck, money, vision, and management talent came together to overcome daunting obstacles and transform the lives of millions of individuals and the prospects of families, communities, and entire nations.

In the end, the experiences documented in this book say three things loudly and clearly:

- *Success is possible—big success, lasting success, world-changing success.* As the cases themselves show, successes have spanned a vast range of diverse programs and interventions and in many instances have been supported by effective donor assistance and international cooperation. This observation competes with the prevailing sense that little can be done to ameliorate large-scale suffering in the poorest countries—particularly in the face of HIV/AIDS and malaria, for which the successes still are few and far between. And it serves as counterweight to the sense that public-sector action in general, and development assistance in particular, systematically fails to make real improvements in real lives.
- *The ingredients of success are within our reach and not dependent solely on the vagaries of chance.* Because we did not look systematically at failures, we cannot say definitively that combining the ingredients found in these cases will ensure success in future ventures. However, policy makers and planners would be well advised to consider using the common elements we identified earlier as a mental checklist: Are these in place when new initiatives are proposed? If not, what would be required to mobilize the predictable and long-term funding, the political support, the information base, the expert consensus, the managerial skills, and the other elements that form a common thread across these experiences?
- *We don't know enough about what's worked because scaled-up programs are rarely evaluated systematically.* We tapped only a small set of public health successes. In large part, this was because solid evidence of the health impact of many international health programs simply does not exist. In general, although very small programs (particularly pilot programs) may be evaluated, little research is done to estimate the health impacts of large-scale efforts. Even for well-known interventions that have received large amounts of donor support over many years, the base of evidence about what has worked (or not worked) in scaled-up programs—in terms of health outcomes, rather than process measures—is quite slim. The gap in evaluation inhibits the documentation of successes and prevents policy makers from being able to tell the difference between a well-told story and a hard fact as they make decisions about which programs to support. The lack of evaluation also reduces the chances for success in the first place. In many of these cases, high-quality evaluations that clearly established the causal link between programs and impact spurred greater investments, broader application, and ultimately, more success. Efforts to assess whether programs were yielding the desired benefits have been instrumental in securing continued funding. Employing rigorous evaluation methods that link inputs and impact in large-scale programs is far from simple and often requires financial and technical resources that are otherwise absorbed simply in operating a program. But without such evaluation, policy decisions are based on scanty information from small-scale experiences combined with a large dose of opinion and politics.

Each year, about 3 million children in poor countries die of diseases that can be prevented by immunizations; another 2 million die of the dehydrating effects of diarrheal disease. About half a million women in the developing world die in pregnancy or childbirth. Tobacco-related illness cuts short the lives of 4 million people in less developed countries each year, and cardiovascular disease claims the lives of more than 8 million. Last year alone, 3 million people in sub-Saharan Africa contracted HIV. These are the millions of reasons, and millions of chances, to succeed.

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Acronyms / Abbreviations

TERM/ACRONYM	DEFINITION
APOC	African Programme for Onchocerciasis Control
CDC	US Centers for Disease Control and Prevention
ComDT	community-directed treatment
DCPP	Disease Control Priorities in Developing Countries Project
DFID	UK Department of International Development
DOTS	directly observed short course strategy
DTP	diphtheria, tetanus, and pertussis vaccine
EPI	Expanded Programme on Immunization (immunization against diphtheria, pertussis, tetanus, poliomyelitis, measles, and tuberculosis)
FAO	Food and Agriculture Organization of the United Nations
GAVI	Global Alliance for Vaccines and Immunization
Hib	<i>Haemophilus influenzae</i> type b
HIV/AIDS	human immunodeficiency virus/acquired immune deficiency syndrome
IDB	Inter-American Development Bank
ICC	Inter-Agency Coordinating Committee
IEC	information, education, and communication
IEDC	Infectious and Endemic Disease Control Program (China)
IPV	inactivated polio vaccine
ITI	International Trachoma Initiative
MDG	United Nations Millennium Development Goals
MDR-TB	multidrug-resistant tuberculosis
Mercosur	Mercado Comun del Sur (Southern Cone Common Market)
MMR	maternal mortality ratio
NCDDP	National Control of Diarrheal Disease Project (Egypt)
NTD	neural-tube defect
OCP	Onchocerciasis Control Programme

ODA	official development assistance
OPV	oral polio vaccine
ORS	oral rehydration salts
ORT	oral rehydration therapy
PAHO	Pan American Health Organization
Progresa	Program de Educacion, Salud y Alimentacion (Education, Health, and Food Program)
SAFE	surgery, antibiotics, face washing, and environment
STI	sexually transmitted infection
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHA	World Health Assembly
WHO	World Health Organization