

## Chapter 2

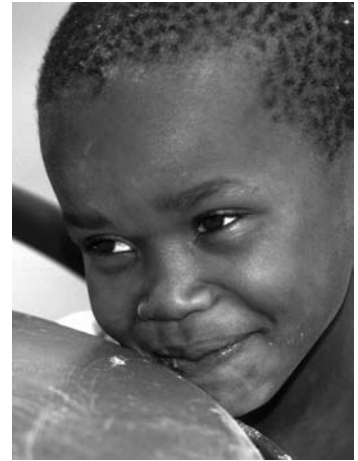
# Success in Addressing Priorities

At the most general level, priorities in health are clear: identify the cost-effective interventions for those diseases that impose the largest burdens—around the globe or in target regions or populations that exhibit grave need or inequity—and determine how to deliver those interventions effectively, efficiently, and equitably. Science and medicine have shown that many interventions can be effective. Combining this knowledge with economic analyses of cost-effectiveness identifies which interventions can achieve the greatest health gains with a given level of resources. Making such health gains a reality requires implementing the selected interventions, a challenge that countries with effective health systems are better able to handle, but one that countries without effective health systems can deal with by improving their existing health systems or constructing them where they are lacking.

Thus while health priorities are relatively easy to define, they are far more difficult to address, but doing so is possible. Indeed, investigators have carefully documented a number of recent public health successes in a search for lessons that will enable further successes.

The What Works Working Group, convened by the Center for Global Development's Global Health Policy Research Network, collected nominations from *DCP2* authors regarding successful public health interventions (Levine and others 2004). The working group examined the nominations and identified 17 cases that met 5 explicit criteria:

- They were implemented on a significant scale: national, regional, or global.
- They addressed a problem of major public health significance as measured by disability-adjusted life years (DALYs).



- They lasted at least five consecutive years.
- They were proven to be cost-effective, costing less than about \$100 per DALY averted.
- They documented evidence of a clear and measurable effect on health outcomes, not just coverage rates or process indicators.

The stories behind these 17 cases were then researched and published in *Millions Saved: Proven Successes in Global Health* (Levine and others 2004). *DCP2*, chapter 8 summarizes these cases and provides additional insights into these public health successes, including some of the factors that helped make success possible (box 2.1).

The 17 cases that emerged from the selection process are not the only public health successes, nor are they necessarily representative of public health successes in recent decades,<sup>1</sup> but the collection is a treasure trove for those involved in public health. All the cases have been carefully analyzed for lessons regarding leadership, financing, collaboration, strategies, role of the public sector, constraints, and much more.

An important message for policy making that emerges from this collection is that success can come in many forms. Countries have achieved successes in the most trying institutional contexts and policy environments; against diseases of many different kinds, both infectious and noncommunicable; and with many different intervention methods, including those based on providing products (for example, vaccines), providing services (such as prenatal care or simple surgery), promoting behavior change (for instance, using condoms, filtering water, or practicing good hygiene), or reducing environmental risks (for example, spraying larvicides or building latrines). Some key elements recur, namely, political leadership, technological innovation, expert consensus regarding the approach, effective use of information, and sufficient public financial resources, and some types of challenges may be easier to meet than others, but no single ingredient is sufficient and no single combination ensures success. Rather, these stories convey the message that success is possible, demonstrated, and varied.

The wide range of approaches adopted to improve health presented in *DCP2* further demonstrate this point. *DCP2* does not offer a single prescription for improving health, but assesses the many interventions

<sup>1</sup> Indeed, the *DCP2* authors nominated another 26 interventions as clear examples of success in public health, but these had to be set aside because of a lack of formal evidence regarding their effect on health. Thus the absence of more cases in Levine and others (2004) may be attributed more to weaknesses inherent in current evaluation practices than to any paucity of accomplishments in public health.

### Box 2.1 Successful Programs from Around the World

In addition to the six cases selected for discussion in the text, other public health successes presented in *DCP2* (chapter 8) include the following:

- *Improved health among children and adults.* In 1997, the Mexican government launched a new social welfare program design to help lift poor families out of poverty by providing cash payments in exchange for their participation in nutritional and supplementation programs, use of preventive and basic health care services, and children's school attendance. After five years, the children of participating families were 12 percent less likely to experience illness than those of nonparticipating families and their nutritional status had improved. Adult health indicators had also improved.
- *Chagas disease control.* In 1991, seven countries—Argentina, Bolivia, Brazil, Chile, Paraguay, Uruguay, and later Peru—joined forces as part of the Pan American Health Organization's Initiative for the Southern Cone Countries to combat Chagas disease through a combination of surveillance activities, house-to-house spraying, and other vector control methods. By 2000, disease incidence had fallen by 94 percent, and by 2001, disease transmission had been halted in Chile, Uruguay, and large parts of Brazil and Paraguay.
- *Diarrheal treatment.* In Egypt, the government launched a national program in the early 1980s to promote the use of locally manufactured oral rehydration salts by mothers by means of a four-part strategy that included: tailoring product design and branding to accommodate local preferences and customs; strengthening production and distribution channels, both public and private; training health workers; and engaging in social marketing and a mass media campaign. Between 1982 and 1987, infant and child mortality dropped by 36 and 43 percent, respectively. Mortality attributed to diarrhea fell 82 percent among infants and 62 percent among children.
- *Guinea worm control.* Twenty countries in Asia and Sub-Saharan Africa began a global campaign to eradicate guinea worm in the mid 1980s. Led by the Carter Center, the United Nations Children's Fund, the U.S. Centers for Disease Control and Prevention, and the World Health Organization, the campaign promoted improved water safety through deep well digging, environmental control, and the use of cloth filters for drinking water; health education programs; and case management, containment, and surveillance. By 1998, between 9 million and 13 million cases of guinea worm had been prevented, and global prevalence had dropped by 99 percent.
- *Family planning.* Since the 1970s, Bangladesh has promoted family planning through a door-to-door outreach program conducted by young, married women who provide information about limiting family size or spacing pregnancies and pertinent products. The outreach program is accompanied by an extensive media campaign. Contraceptive use among married women in Bangladesh is now approximately 50 percent, compared with only 8 percent in the mid 1970s, and the average number of children per family is 3.3, down from 7.0 during the same period.
- *HIV/AIDS prevention.* Thailand launched the 100 Percent Condom Use Program in 1991 to address the rising incidence of HIV/AIDS. The program provided boxes of

*(Continued on the following page.)*

“Between 1982 and 1987, infant and child mortality dropped by 36 and 43 percent, respectively. Mortality attributed to diarrhea fell 82 percent among infants and 62 percent among children.”

“By 1998, between 9 million and 13 million cases of guinea worm had been prevented, and global prevalence had dropped by 99 percent.”

“... measles cases reported annually . . . fell from 60,000 in 1996 to 117 in 2000.”

“Between 1990 and 1998, Poland experienced a 30 percent decline in lung cancer among men age 20 to 44, a nearly 7 percent decline in CVD, and a decline in the number of babies born with low birthweights.”

### Box 2.1 (Continued)

condoms to brothels free of charge, mandated the use of condoms among sex workers, and threatened brothels with penalties and closure for noncompliance. Condom use in brothels rose from 14 percent in 1989 to more than 90 percent by 1992. The number of new sexually transmitted infections fell from 200,000 in 1989 to 15,000 in 2001, and the rate of new HIV infections fell five-fold between 1991 and 1993–95.

- *Measles elimination.* In 1996, the seven southern African countries agreed to a coordinated immunization strategy, supported by improved surveillance and laboratory capacity, to eliminate measles by including it as part of routine immunization for all nine-month old babies and organizing nationwide catch-up and follow-up campaigns for children age 9 months to 14 years. The number of measles cases reported annually in the region fell from 60,000 in 1996 to 117 in 2000. The number of deaths attributed to measles fell from 166 to none during the same period.
- *Salt fluoridation.* In Jamaica, a formal agreement between the Ministry of Health and the country's only salt producer introduced salt fluoridation in 1987 to prevent caries. By 1995, the prevalence of caries in children between the ages of 6 and 12 had fallen by more than 80 percent.
- *Salt iodination.* China launched the National Iodine Deficiency Disorders Elimination Program in 1993. The government requires producers to iodize salt and has stepped up its monitoring and enforcement capacity to ensure compliance. Total goiter rates among children between the ages of 8 and 10 fell from 20.4 percent in 1995 to 8.8 percent in 1999.
- *Tobacco control.* Poland passed groundbreaking legislation in 1995, imposing strong warning labels on cigarette packages, banning smoking from enclosed workplaces, and prohibiting tobacco sales to minors. South Africa passed similar legislation in 1999 to strengthen a previously imposed tax of 50 percent on the value of the retail price of cigarettes. Between 1990 and 1998, Poland experienced a 30 percent decline in lung cancer among men age 20 to 44, a nearly 7 percent decline in CVD, and a decline in the number of babies born with low birthweights. In the 1990s, South Africa witnessed a 30 percent decline in cigarette consumption, especially among youth and the poor.
- *Tuberculosis control.* In 1991, China launched a 10-year program in 13 of its 31 mainland provinces to apply the DOTS strategy to TB control. Peru, previously one of 23 high-burden countries that collectively account for 80 percent of the world's new TB cases each year, launched a similar effort the same year. Within two years of initiating its program, China had achieved a 95 percent cure rate for new cases and a cure rate of 90 percent for those patients whose treatment had previously been unsuccessful. Between 1999 and 2000, the number of people in these provinces with TB declined by more than 37 percent. In Peru, the DOTS program achieved a case detection rate of 70 percent and an 85 percent cure rate. As a result, disease incidence declined 6 percent a year.

Source: Adapted from *DCP2*, chapter 8.

and implementation strategies that have worked in different places. This section presents just a few of these public health success stories, selected to illustrate some of the important messages in *DCP2* about the nexus between selecting cost-effective interventions and delivering them effectively. Specifically, these cases

- succeeded despite weak, or even absent, health systems (smallpox eradication)
- were conducted in ways that built or strengthened weak health systems (control of onchocerciasis [river blindness] and polio)
- were aimed directly at building a health system (improving maternal health)
- furthered existing health systems (*Haemophilus influenzae* type B [Hib] vaccination)
- moved beyond health systems (control of trachoma).

## SUCCESSSES DESPITE WEAK HEALTH SYSTEMS

Countries have implemented cost-effective interventions and accomplished major public health successes even under conditions of dire poverty, weak or nonexistent health care infrastructure, and civil unrest or war. Consider the worldwide eradication of smallpox. In 1980, the World Health Assembly declared that smallpox, which has been known since at least 1160 BC, was the first disease in history to have been eradicated. That eradication was accomplished through a global campaign that reached even the most distant rural parts of the world's poorest countries, war-torn countries, and countries whose health systems were barely functional.

Certain distinctive characteristics of smallpox shaped the strategy and influenced the success of the eradication. The disease was transmitted directly from person to person without any other hosts or vectors and was relatively easy to identify. Once an individual contracted smallpox, that person took 10 to 14 days to become infectious, but by then that individual was usually already bedridden, thereby reducing contact with others. People who survived the illness or were adequately vaccinated were immune for the rest of their lives. Thus features of the disease itself made its eradication feasible.

Essential technological breakthroughs for battling the disease included not only the actual smallpox vaccine but also the bifurcated

“Countries have . . . accomplished major public health successes even under conditions of dire poverty, weak or nonexistent health care infrastructure, and civil unrest or war.”

“. . . smallpox, which has been known since at least 1160 BC, was the first disease in history to have been eradicated.”

needle, which reduced costs and made vaccinating people easier. Sustained leadership and funding were also crucial to the eradication campaign, but were not at first readily available. Initially proposed in 1958, the campaign to eradicate smallpox did not really begin until 1967 because of fortuitous changes in leadership and staffing at the World Health Organization (WHO) and decisions in the United States to commit substantial funding to the campaign.

Another important turning point involved shifting from a strategy of generalized vaccination of entire populations to a strategy of surveillance and containment. This so-called ring strategy involved highly refined epidemiological surveillance, selective containment, and vaccination of patients and communities in response to specific outbreaks. This strategy was crucial to eliminating the last remaining reservoirs of smallpox in five countries—Bangladesh, Ethiopia, India, Nepal, and Pakistan—even when one or more of these countries were in crisis, were suffering from war or civil unrest, or were facing massive refugee flows or extreme poverty.

The campaign against smallpox developed an intervention strategy independent of the existence or nonexistence of health systems and infrastructure in any of the countries, and it achieved its goal. A disease that at the start of the campaign had been responsible for millions of cases and 1.5 million to 2.0 million deaths a year, and that left many survivors deeply scarred or blind, had ceased to exist only three decades later.

## SUCCESSES THAT STRENGTHENED WEAK HEALTH SYSTEMS

Countries have achieved other successful public health interventions in contexts of weak health systems and implemented them in ways that also strengthened these health systems. Controlling onchocerciasis in Sub-Saharan Africa and eliminating polio in Latin America and the Caribbean are two illustrations of this process.

Approximately 18 million people live in areas where onchocerciasis is endemic, 99 percent of them in Sub-Saharan Africa (*DCP2*, chapter 22). The disease is caused by a microscopic worm that infects humans through the bite of an infected blackfly that breeds in the fast-moving waterways of Sub-Saharan Africa. The victim's body is eventually infested with worms, resulting in a range of debilitating symptoms, including blindness. In endemic areas, more than a third of the adult

population may be blind, and infection often approaches 90 percent of the population. Because of fear of the disease, people abandoned vast areas of fertile riverside land.

Control efforts, which were launched in 1974, have included weekly aerial spraying of breeding sites to kill the blackfly that spreads the disease and distribution of a new drug, ivermectin, that kills the worms in human beings. The impact has been immense. Key features of the effort included collaboration by many organizations and agencies, public-private partnership with the producer of ivermectin, and long-term funding. Initial successes led to subsequent and larger commitments such that from 1974 to 2002, the control efforts halted transmission in 11 West African countries, prevented 600,000 cases of blindness, permitted 18 million children to be born free from the risk of river blindness, and rendered about 25 million hectares of arable land safe for resettlement and cultivation. The control efforts achieved this despite the extreme poverty of these countries, the dispersal of populations in remote villages, the countries' inadequate health systems, a shortage of health workers, and the imperative of maintaining activities (including uninterrupted weekly aerial spraying of larvicide) despite civil and regional conflicts and coups.

Follow-up programs have emphasized long-term sustainability, because killing all the worms requires annual drug treatment for 15 to 20 years, and to this end have pioneered a system of community-directed treatment. This is a framework through which thousands of communities organize and manage ivermectin treatment locally. In some areas, the coordinators of the ivermectin distribution program are the only health workers to reach every village. Indeed, some people have suggested that even though the community-directed treatment framework was originally designed for onchocerciasis control, it could become the backbone of health systems and be used to distribute vitamin A, azithromycin (to treat trachoma), albendazole (to treat lymphatic filariasis), and even vaccines and HIV/AIDS drugs. Thus "the impact of the successful ComDT [community directed treatment] system extends beyond the treatment and prevention of river blindness. The system offers a valuable entry point for other community-directed health interventions in neglected communities with little or no access to traditional health services and a vehicle for strengthening the overall health system in developing countries" (Levine and others 2004, p. 62).

The elimination of polio in Latin America and the Caribbean offers some parallels. As recently as 1988, 125 countries were endemic

"... from 1974 to 2002, the control efforts . . . prevented 600,000 cases of blindness, permitted 18 million children to be born free from the risk of river blindness, and rendered about 25 million hectares . . . safe for resettlement and cultivation."

"As recently as 1988, 125 countries were endemic for polio. By the end of 2003, . . . just six countries reported polio . . ."

for polio (*DCP2*, chapters 20 and 62). By the end of 2003, because of a massive, well-targeted vaccination and surveillance campaign, just six countries reported polio cases and none of these were in Latin America and the Caribbean.

The elimination of polio faces particular challenges because of the nature of the disease. The causative virus is extremely contagious and, while usually transmitted by fecal-oral contact, can survive for as long as two months outside the body, residing in pools, drinking water, food, and clothing. Transmission can go undetected because 90 percent or more of carriers develop no symptoms. When symptoms do develop, they are not always recognizable as polio. Indeed, one distinctive and confirmed case of polio paralysis implies that the community has another 2,000 to 3,000 contagious carriers whose only sign of infection may be a fever (Levine and others 2004, p. 40). Eliminating such a disease is challenging even where health systems are strong.

With the inclusion of the oral polio vaccine in the Expanded Program on Immunization as of 1977, the success of initial efforts in Latin America was impressive. By 1981, the incidence of polio in the region had been halved and the number of countries reporting cases of polio had dropped from 19 to 11. By 1984, coverage with the vaccine reached 80 percent. This improvement encouraged the Pan American Health Organization to mount an all-out campaign to eliminate polio from the region.

Launched in 1985, the campaign had a striking feature—the coordination among international, regional, and national public and private organizations. This unprecedented coalition pursued a strategy to strengthen surveillance so that health workers could identify, rapidly respond to, and contain any outbreaks. It also bolstered polio immunization coverage, so that even countries with less robust health infrastructures and weaker routine immunization programs could achieve impressive results. This was done through such means as national vaccine days, which took place twice a year and during which children under five were inoculated regardless of whether or not they had been vaccinated previously.

The polio campaign left an enduring legacy for health systems in Latin America and the Caribbean by tackling polio in such a way that the campaign became “a stepping stone to strengthening the entire Expanded Program on Immunization . . . , to improving health infrastructure throughout the region, and to establishing a greatly needed

“The polio campaign left an enduring legacy for health systems in Latin America and the Caribbean . . .”



surveillance system to monitor the impact of interventions on the reduction of polio and other diseases” (Levine and others 2004, p. 41). In addition to enhancing infrastructure and improving the capacity for disease control, the polio campaign also built capacity for national health planning in that countries are now adapting the process of developing annual action plans for the polio campaign for other initiatives, including improving and extending maternal and child health services.

## COST-EFFECTIVE INTERVENTIONS AIMED AT BUILDING HEALTH SYSTEMS

Vaccines will halt some diseases, and larvicides will wipe out some vectors, but such approaches have no bearing on prenatal care and childbirth. For these, a robust, functioning health system with equitable access is crucial for good results. The experience of Sri Lanka shows how this can be achieved.

Pregnancy and childbirth are natural events and typically require little or no medical intervention for either mother or baby (*DGP2*, chapter 26). However, if a woman is in poor health because of, say, malnutrition, malaria, immune deficiency, TB, or heart disease, she can face serious risks during pregnancy and childbirth. Reducing maternal and infant mortality requires preventive measures, such as proper nutrition and screening for possible risks. It also requires a sanitary environment for giving birth and swift, effective care in case of emergencies, such as obstructions at birth or hemorrhaging. Unsafe abortions are another major risk factor for women’s health. Where health systems are poor and populations consequently lack appropriate care, a much higher proportion of pregnancies can result in complications, illness, permanent disability, or death of the mother or child. *Millions Saved* notes that “interventions to detect pregnancy-related health problems before they become life-threatening, and to manage major complications when they do occur, are well known and require relatively little in the way of advanced technology. What is required, however, is a health system that is organized and accessible—physically, financially, and culturally—so that women deliver in hygienic circumstances, those who are at particularly high risk for complications are identified early, and help is available to respond to emergencies when they occur” (Levine and others 2004, p. 48).

“ . . . if a woman is in poor health because of . . . , malnutrition, malaria, immune deficiency, TB, or heart disease, she can face serious risks during pregnancy and childbirth.”

“In the 1950s . . . , Sri Lanka’s maternal mortality ratio was 500 to 600 per 100,000 live births. By 2003 it had plummeted to 60 . . . ”

“The success of Sri Lanka is related to maternal health specifically, but it could not have been achieved without building a robust, equitable health system overall.”

Despite its poverty, this is what Sri Lanka has provided. In the 1950s, estimates indicated that Sri Lanka’s maternal mortality ratio was 500 to 600 per 100,000 live births. By 2003 it had plummeted to 60, and skilled practitioners were attending 97 percent of births. This was an outcome of continued, dedicated efforts by the government to extend health services, including essential maternal health care, equitably. Sri Lanka has pursued its goal of building a system accessible to all in many different ways: it has purposely located facilities in rural areas, made care universally free, provided transportation networks, and strengthened referral systems. In developing human resources, it has paid particular attention to midwifery. Other basic attributes of the Sri Lankan system have been making good use of information for monitoring and planning, improving the quality of care, and targeting underserved populations.

The country’s step-by-step strategy to provide broad access to specific clinical services, to encourage the use of those services, and to systematically improve quality has been facilitated by its excellent civil registration system and reinforced by a good education system notable for its gender equity (89 percent of Sri Lankan women are literate, compared with the South Asian average of 43 percent). Moreover, its dedication to providing social services for all has been sustained and predates independence in 1948.

Sri Lanka has been and remains a poor country. It has achieved its exemplary performance in maternal health not only without major technological innovations but also without high levels of spending. Indeed, it accomplished all this on a spartan budget. Absolute national spending on maternal health was almost the same in the 1990s as it had been in the 1950s; but income growth over that interval meant that the share of gross domestic product (GDP) fell from 0.28 to 0.16 percent. Furthermore, financing was mostly domestic, coming from government revenues. *Millions Saved* suggests that “others can take inspiration from the country’s record: In the late 1950s, when the first efforts were made to address the problem of maternal deaths, the GNP [gross national product] of Sri Lanka was equivalent, in constant dollars, to the national income of Bangladesh, Uganda, or Mali today and far lower than that of Pakistan, Egypt, or the Philippines. In relative terms, Sri Lanka has spent far less on health—and achieved far more—than any of these countries” (Levine and others 2004, p. 54).

The success of Sri Lanka is related to maternal health specifically, but it could not have been achieved without building a robust, equitable health system overall.

## COST-EFFECTIVE INTERVENTIONS THAT FURTHERED EXISTING HEALTH SYSTEMS

Even where countries have strong, functioning health systems, specific needs for new initiatives arise, perhaps because of a new disease, a serious inequity, an obstinate problem, or a generalized need for improvement. Solutions can come from within the health system, especially if that system is open to ideas, conducts research, and looks for ways to improve its performance and the health of its population. Vaccination against *Haemophilus influenzae* type B (Hib) in Chile offers such a story (DCP2, chapter 20).

Hib disease includes Hib meningitis, which is particularly lethal, killing 20 to 40 percent of the children who contract it and fewer of the adults who contract it and leaving half the survivors with lasting impairments such as deafness or mental retardation. Worldwide, Hib disease is the leading cause of bacterial meningitis in children under five and the second most common cause of bacterial pneumonia deaths in this age group. An estimated 450,000 children die from Hib disease each year. A highly effective, and relatively expensive, conjugate vaccine against Hib has been available since the late 1980s.

Chile is a middle-income country with a modern health infrastructure and efficient immunization services where 95 percent of infants receive routine vaccines. In the late 1980s, Ministry of Health researchers undertook the first estimates of the incidence of Hib in the Santiago area. Until that time, no information about the extent of the disease in Chile had been available. The researchers analyzed clinical and laboratory records; matched the data with census records; and assessed the quality of the data, including the probability that it understated the true extent of the disease. They concluded that Hib was a widespread problem and had a high death rate in Chile.

Even though Hib vaccines were available, they were costly, and despite substantial proof of their efficacy (their biological protective effect), less evidence of their effectiveness (impact on a large population of infants receiving the vaccine under the normal conditions of a routine immunization service) was available. Thus the Ministry of Health devised and conducted an intent-to-vaccinate study, testing a combination of Hib vaccine with the usual diphtheria-pertussis-tetanus vaccine administered at 36 health centers in the Santiago area, and compared the outcome with that at 35 centers that did not offer the Hib vaccine.

“... combining diphtheria-pertussis-tetanus and Hib vaccines and delivering them within Chile’s established system was feasible...”

The results of this pilot program were dramatic. The study demonstrated not only that the Hib vaccine was effective but also that combining diphtheria-pertussis-tetanus and Hib vaccines and delivering them within Chile’s established system was feasible for health centers. As a result, in July 1996 the Ministry of Health introduced the vaccine into the routine immunization program for babies nationwide. The incidence of Hib meningitis in Chile has fallen by 91 percent and that of pneumonia and other forms of Hib disease by 80 percent.

While the cost of the vaccine was initially substantial, the Chilean government funded it in full with public funds from general taxes. The price has since fallen from around US\$15 per dose in 1996 to around US\$3 in 2003. In 1998, researchers concluded that the nation saves US\$78 for every case of Hib prevented, providing further evidence to support the public expenditure, which has continued.

The reasons behind Chile’s success included its existing research strengths and ability to act on the results. Having a delivery system already in place, with a routine vaccine program reaching 95 percent of infants, was also key. In other words, Chile’s successful Hib vaccine program was an intervention that succeeded by taking full advantage of the strengths of an already good health system.

## COST-EFFECTIVE INTERVENTIONS BEYOND HEALTH SYSTEMS

The preceding examples show that health interventions can succeed in situations of dire poverty and even during violent conflict. In addition, a look at the history of the unprecedented gains in human health in the 20th century reveals that improvements in health are not dependent upon economic development. As noted in chapter 1, technical progress—embodied in scientific knowledge, cost-effectiveness analyses, and managerial expertise—can define and deliver cost-effective interventions in almost any setting. Nonetheless, as the battle against trachoma in Morocco illustrates, the potential synergies between health interventions and improvements in general social conditions are significant (*DGP2*, chapters 50 and 67).

Trachoma is a disease of poverty. It is a highly contagious bacterial infection, and repeated infections lead to corneal scarring and eventually blindness, usually at the age of 40 to 50. The disease is spread

“The incidence of Hib meningitis in Chile has fallen by 91 percent and that of pneumonia and other forms of Hib disease by 80 percent.”

by direct contact with eye and nose secretions from affected individuals, by contact with contaminated towels and clothing, and by flies. Disease transmission is rapid and intense in conditions of overcrowding, poor hygiene, and poverty.

With economic development and improved hygiene, trachoma has disappeared from Europe and North America, but it continues to afflict the developing world, particularly the millions of people living in hot, dry regions where access to clean water, sanitation, and health care is limited. Children are its first victims. In endemic areas, prevalence rates in children age two to five years reach 90 percent. The disease also disproportionately affects women, who because of their close contact with children are infected two or three times more frequently than men. The heaviest burden of blindness from trachoma affects the populations of Sub-Saharan Africa. Trachoma is linked to poverty as both a symptom and a cause, because trachoma-related blindness strikes people in their economically most productive years.

Initially, Morocco handled trachoma as though it were primarily a medical problem. In the 1970s and 1980s, schoolchildren in the most affected provinces were treated with tetracycline eye ointment twice a year, but this did nothing to improve the standard of living among the rural poor. Thus, while trachoma virtually disappeared from developing urban areas, it pervaded poorer, rural areas. In the early 1990s, a national survey found that more than 5 percent of Morocco's population exhibited signs of trachoma and that virtually all the cases were concentrated in five poor, rural provinces.

In 1991, Morocco set up the National Blindness Control Program. This expansive partnership included the five government divisions responsible for health, education, employment, equipment, and water; international organizations; bilateral and multilateral agencies; and local nongovernmental organizations (NGOs). Between 1997 and 1999, the government incorporated the so-called SAFE (surgery, antibiotics, face washing, environmental change) community strategy into the National Blindness Control Program. This strategy worked as follows:

- *Surgery*: a simple, quick, inexpensive procedure to save patients' vision with a success rate of 80 percent. In Morocco, mobile surgical units staffed by doctors and specialized nurses performed the surgery.
- *Antibiotics*: one-dose azithromycin to treat active infections and reduce the community pool of infections. The government

“. . . trachoma has disappeared from Europe and North America, but it continues to afflict the developing world . . .”

“In the early 1990s, . . . more than 5 percent of Morocco's population exhibited signs of trachoma . . .”

“ . . . improved living conditions and community hygiene are essential for reducing the spread of trachoma.”

developed multiple strategies for distributing the donated drug based on the recognition that trachoma is a community disease and that reinfection is likely to occur if only isolated cases are treated.

- *Face washing*: regular face washing can break the cycle of reinfection and prevent bacteria from spreading. Information, education, and communication campaigns have proven effective in changing people’s behavior.
- *Environmental change*: improved living conditions and community hygiene are essential for reducing the spread of trachoma. The government oversaw the construction of latrines in 32 villages and the provision of potable water in 74 villages. Some 350 local village associations also undertook to build latrines, drill wells, and store animal dung safely so that it could be used for fertilizer without spreading flies. Access to potable water increased from 13 percent of all rural communities in 1992 to 60 percent in 2000. With the acknowledgment that reducing poverty and improving literacy among women is central to the fight against trachoma, the government undertook interventions to improve literacy among women and implemented economic programs to increase women’s incomes.

“ . . . Morocco has achieved a 75 percent drop in the prevalence of trachoma since 1999 and its complete elimination from some provinces . . . ”

The adoption of SAFE was driven by Morocco’s recognition that, as the head of the National Blindness Control Program observed, “Trachoma at the level of these regions is not strictly a medical problem; it is essentially the reflection of a socioeconomic problem . . . The real enemies are the disfavored rural communities, illiteracy, family overcrowding, lack of water, the accumulation of animal wastes, and the proliferation of domestic flies. In sum, the enemy to combat is not *chlamydia* but poverty” (quoted in Levine and others 2004, p. 86).

With a health program that intentionally moves beyond the health system to include and encourage broader aspects of economic development, Morocco has achieved a 75 percent drop in the prevalence of trachoma since 1999 and its complete elimination from some provinces—the most rapid progress against trachoma in a single country ever recorded.

## CONCLUSION

The brief discussion in this chapter has only touched on selected aspects of a few of the successful public health interventions discussed in *DCP2*. Much more can be learned from these stories, but perhaps

the greatest value is to dispel cynicism in the face of what sometimes appear to be overwhelming challenges.

Ironically, when public health interventions forestall epidemics and prevent diseases, they are invisible successes: it is only the failures that make the news. By documenting how millions of people have been saved through concerted action, *DCP2* and *Millions Saved* provide an opportunity to acknowledge, celebrate, and learn from successes; to appreciate their variety; and to assume a degree of informed optimism, which may be another ingredient essential to success.

“. . . when public health interventions forestall epidemics and prevent diseases, they are invisible successes . . .”

