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The Health and Poverty of Nations: from theory to practice

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Abstract Health is both a direct component of human well-being and a form of human capital that increases an individual's capabilities. We argue that these two views are complementary and that both can be used to justify increased investment in health in developing countries. In particular, we argue that the large effect improved health has on household incomes and economic growth makes it an important tool for poverty reduction. We survey the literature on the link between improvements in health and improved economic growth at the national level and also the link between improvements in health and improved productivity and wages at the household level. The theoretical arguments and related empirical evidence demonstrate a large effect of health improvements on productivity, household incomes, and economic growth. Given the large payoffs to health that exist in developing countries, we assess how health can be improved. We also argue that the income gains that result from health interventions can potentially feed back into better health in a process of cumulative causality, suggesting a fundamentally new rationale for greater spending on health in developing countries. In addition, we contend that, for health sector policies to be successful, there needs to be deep institutional change at the international, national, and local levels that puts greater emphasis on the health sector, and in particular that focuses on the health needs the poor themselves identify as important. The HIV/AIDS epidemic represents the major challenge for health in many developing countries today. We use this as a test case showing how successful health interventions require not just increased spending, but also a profound commitment to change by all sectors of society.

Key words: Health, Health Sector, Poverty, Economic Growth, Poverty, Productivity, HIV/AIDS

Introduction: health for all

In 1978, at the Alma-Ata Conference, ministers from 134 countries met together with representatives of the World Health Organization (WHO) and

UNICEF and made a declaration calling for “health for all by the year 2000”. The Alma-Ata Declaration described health as “a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity.” Health is a “fundamental human right”, with the attainment of the highest possible level of health “a most important world-wide social goal”. By 2000, it stated, everyone should enjoy “a level of health that will permit them to lead a socially and economically productive life”. Achieving this goal would require economic and social development, as well as action within the health sector. But primary health care, “based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families”, was believed to be key to attaining the target.

By 2000, there had been significant health improvements, with increases in life expectancy in 163 of 184 countries for which data are available (between 1975 and 1995).¹ Expenditure on health has also risen, with global spending on health accounting for approximately 8% of the world’s gross domestic product (GDP).² However, there are massive disparities in the health status of rich and poor countries and the goal of ‘health for all’ has clearly not been met. A child born in Japan in 1999 could look forward to 74.5 years of healthy life (measured in disability-adjusted life expectancy (DALE)), with children in another 23 countries expecting to enjoy longer than 70 years of healthy life. In 51 countries, however, children can expect less than 50 years of healthy life, with the three least healthy countries (Malawi, Niger and Sierra Leone) having DALEs of less than 30 years. In addition, standards of health have declined in some countries. In some republics of the former Soviet Union, for example, life expectancies have been in long-term decline since the 1950s (see Becker and Bloom, 1998a), while HIV/AIDS is having a devastating effect on health in many countries in sub-Saharan Africa (see Bloom *et al.*, 2000a).

Although the Alma-Ata goal of worldwide health has not been achieved, health is increasingly seen as a central issue in global arenas. The international AIDS conferences in 2000 and 2002 received unprecedented media coverage, and political leaders are increasingly recognizing the scale and insidious nature of the AIDS crisis. Renewed attention is also being paid to other infectious diseases, after a period of neglect and stagnation. The importance of the epidemiological transition in developing countries, as chronic and ‘lifestyle’ diseases add to the burden of infectious disease, has also drawn attention. Simultaneously, there are remarkable changes taking place in our understanding of the place of health in the process of social, economic, and political development in general, and the reduction of poverty in particular. The way we think about health has fundamentally changed.

The recent report of the WHO’s Commission on Macroeconomics and Health (World Health Organization, 2001), and in particular the report by Working Group One on Health, Economic Growth, and Poverty Reduction (Wagstaff, 2001), has drawn renewed attention to the relationship between health and poverty, and between health and economic growth. The report, which sees ill health as a “dimension of poverty”, advocates investing in

health as a means of working toward poverty reduction and raising living standards. It further suggests that unless donors make the required additional investments to improve health in developing countries, it will not be possible to meet the United Nations' Millennium Development Goals, some of which — improving maternal health, reducing child mortality, and reversing the spreads of AIDS, malaria and other major diseases by 2015 — specifically focus on health.

The objective of this article is to present an overview of the links between health and human development and of the various justifications for attempts to improve global health. It explores in some depth the economic rationale for devoting resources to health, within the context of a view of development as a complex process involving physical, human, and social capital, as well as technological progress and the accumulation of knowledge. It concentrates, in particular, on the relationship between health and poverty and on the possibility of using better health as a tool for poverty alleviation. Finally, it discusses the nature of reforms needed to produce better health outcomes, and explores the contribution that historical neglect of the reform process has had for the world's failure to meet the Alma-Ata targets. An understanding of the importance of health should be used to drive the reform process more effectively, to build political commitment, and to help facilitate institutional change. From the public health movement of the nineteenth century, through the use of antibiotics and other twentieth-century medicines, to recent campaigns against new or re-emerging infectious diseases, health is improved by a potent mixture of knowledge and new forms of human organization and behavior. It is one thing to invest in research. Deploying that knowledge to create a mandate for change is what really counts.

The nature of health

A right to health

Since the Alma-Ata declaration, there has been an expansion and a corresponding re-orientation of the justification for devoting resources to health. The three types of justification mentioned in the declaration — that health is a basic human right, a vital social goal, and a crucial element in the development of strong economies — still hold true, but our understanding and appreciation of each of these areas has expanded. The goal of health for all may not yet have been met, but we have acquired knowledge for mounting a new attempt.

The implementation of international human rights is a relatively recent concept, dating from the Nuremberg War Crimes Tribunal and the establishment of the United Nations (UN) in the aftermath of World War II. Human rights are commonly defined as rights that are shared equally by all human beings, as a direct consequence of their humanity. The assertion of their universal nature therefore was intended to weaken the absolute sovereignty of states, with states held responsible for respecting the human rights of

their citizens (Dunne and Wheeler, 1999). Some of the rights recognized in the International Bill of Human Rights relate directly to health,³ but the Alma-Ata declaration goes further. By declaring health to be a “fundamental human right”, it asserts that people are entitled to be well and to have a certain level of quality of life, above and beyond their right to receive medical treatment when they are sick.⁴ Furthermore, the obligation to fulfill this entitlement is primarily that of governments, working with the ‘world community’ as appropriate. Health therefore is something the state owes its citizens.

The difficulty with implementing the right to health is that people have several fundamental rights, and national governments (particularly in poor countries) have limited resources. In practice, a minister may have inadequate resources to allocate between education, health and security against crime, all of which may be regarded as providing for peoples’ rights.

Health and society

The Alma-Ata declaration views better health as a “most important world-wide social goal”. Health is essential to building strong societies, with improved health leading to social development, improved quality of life, and conditions more conducive to world peace. The importance of a socially based understanding of health — with health having social determinants, social impacts, and social remedies — is advanced by recent research. Inequality, for example, has emerged as a significant predictor of health outcomes, with some researchers arguing that an egalitarian society may enjoy an average life expectancy 10 years higher than a non-egalitarian one (Rodgers, 1999). Health, in other words, is thought to be influenced by *relative* income, suggesting that levels of health can be regarded as a signal of the socio-economic environment within which people live, as well as to how rich or poor a society is on average. Inequality can affect health through a variety of social factors, such as access to life opportunities, levels of social cohesion and psychosocial explanations, such as hopelessness, lack of control, isolation, and chronic stress (Kawachi *et al.*, 1999). Poor health, in turn, further contributes to these social factors, draining social capital and creating conditions where sections of a society become trapped in a cycle of self-reinforcing social exclusion.

Levels of health have great effects on society as a whole, and broad social action is needed to tackle health problems. Amartya Sen (1999) has repeatedly emphasized that it is not necessary for a country to be rich for it to be healthy, nor is economic development sufficient to achieve improvements in health status. While richer societies tend to be healthier, the connection is not automatic. A variety of factors, such as how a society *chooses* to organize itself and deploy its resources, what freedoms and opportunities it offers its citizens, and what measure of control it gives them over their lives, determine the strength of the relationship.

Health may have an impact on political stability.⁵ A 1998 study commissioned by the Central Intelligence Agency (CIA) found that the best model

for predicting a state's failure is based on high levels of infant mortality, low openness to trade, and a low level of democracy (Esty *et al.*, 1998). More concretely, wars damage health, by killing and injuring soldiers and civilians and destroying infrastructure and social structures. In the eastern Democratic Republic of Congo, of the 1.7 million excess deaths between August 1998 and May 2000, only 200 000 were attributable to direct acts of violence; the rest came from ill health that resulted from the conflict.⁶ It can also be argued that ill health helps cause war. Combatants in many modern conflicts are drawn from the socially excluded, even if they only act as proxies for more powerful interests. Poor health shortens people's time horizons and makes them more likely to engage in conflict — many of the millions of orphans created by the AIDS epidemic in Africa may be easy targets for those recruiting for the region's mercenary armies.⁷

Health leads to wealth

The third justification the Alma-Ata declaration makes for the importance of health is its relationship with the economy. On a macro level, health is a major cornerstone of economic development, while at the micro level, health is essential to ensuring people can achieve a more "economically productive life". Increasingly, research is showing that a healthy population is an engine for economic growth. This new thinking supplements and, to a certain extent re-aligns, the traditional justifications of spending on health, which were rooted in humanitarian and equity arguments.

The classical view of the relationship between health and economic development is that wealth leads to health, with health an output of the development process. This view is supported by the broad correlation between average GDP and life expectancy at the national level. However, it is not possible to show that this correlation is fully explained by a causal link running from wealth to health. There is little evidence that periods of rapid health improvement follow periods of high income growth (Bloom and Canning, 2001). According to WHO research analyzing data from 1952 to 1992, income growth is less important to improving health outcomes than other factors, such as access to health technology. In the period studied, average per capita income increased from \$1530 to \$2560 (in 1985 international dollars). If the income-mortality relation had remained as it was in 1952, infant mortality would have dropped from 144 per 1000 to 116 per 1000 by 1992. In reality, however, it fell much more sharply to 55 per 1000, with factors other than rising wealth affecting the outcome (World Health Organization, 1999). Similarly, Lant Pritchett and Lawrence Summers find that 40% of differential mortality improvements between countries can be accounted for by differences in their income growth rates. Again, a significant proportion of health gains is left unaccounted for (Pritchett and Summers, 1996). Richard Easterlin, meanwhile, argues that while richer societies are in a better position to improve health, it is not inevitable that they will do so. Health shifts are not prompted by the market; public health is an area of pervasive and ongoing market failures. Like economic growth, health

improvements rely to a large extent on new technologies, exploited through new institutions, new investment and new labor requirements. However, “the nature of the new technology and associated requirements is quite different from those for economic growth”. Again, it is a matter of choice at a societal level, with strong policies and political commitment having a profound impact on the health of a nation, whatever the size of budgets (Easterlin, 1999; Easterly, 1999).

Alongside the link from wealth to health runs a strong causal relationship *from health to wealth*. From this viewpoint, health is seen as a form of human capital and therefore an input into the growth process, as well as an output, with countries with educated, healthy populations in a better position to prosper, especially in a favorable policy environment (Bloom and Canning, 2000). The link from health to wealth appears to operate through a number of distinct mechanisms, including the following.

- *Demography*. Improvements in health set off a demographic transition from high to low fertility and mortality. However, the lag between declines in mortality and fertility results in a ‘baby-boom’ generation, which can kick-start a period of economic growth as it enters the workforce. This effect is called the demographic dividend and its realization is heavily reliant on policies that allow extra workers to be absorbed into the workforce (Bloom *et al.*, 2002a).

East Asia provides a compelling example of how improvements in public health contributed to economic growth via demographic change. From the late 1940s onwards, largely through improved sanitation, safer water, and the development of broad-spectrum antibiotics and antimicrobials (e.g. penicillin, sulfa drugs, streptomycin, bacitracin, chloroquine, and tetracycline were discovered and introduced between 1920 and 1940, and the anti-malaria drug DDT was used from 1943), public health in East Asia improved dramatically. From the 1950s onwards, there were significant and sustained declines in infant and child mortality — infant mortality (the number of babies who die before their first birthday) in Asia as a whole dropped from 175 per 1000 in 1950 to 52 per 1000 in 1995 (Asian Development Bank, 1997). A greater number of surviving babies created a disproportionately large cohort of children. As parents realized that they no longer needed so many children in order to attain an ideal family size, fertility subsequently declined, leaving the large cohort of children as a baby-boom bubble, which, as it aged, slowly worked its way through the population structure.

When the baby-boomers reached working age (the working-age population rose from about 55% of East Asia’s total population in 1965 to 70% in 2001), a beneficial policy environment that focused on education, labor-market flexibility, and openness to foreign trade enabled the region not only to absorb this swollen demographic group into the workforce, but also to reap the benefits of the increased capacity for economic production that the larger labor supply offered. Between 1965 and 1990, annual per capita income rose by over 6%, and one-third of East Asia’s ‘economic

miracle' has been attributed to its capturing of the demographic dividend (Bloom and Williamson, 1998; Bloom *et al.*, 2000b, 2002a).

- *Education.* As fertility falls, parents are likely to invest more in educating their children to a higher level. Healthy children attend more school and are better able to learn when in school. Nutritional deficiencies, infectious diseases, disabilities, reproductive problems, injury, poisoning, and substance abuse all have measurable effects on learning (Ruger *et al.*, 2001). By themselves, the educational benefits of tackling these problems greatly exceed the costs (Jamison and Leslie, 1990). Most importantly, lower mortality provides greater security that investment in a child's education will not go to waste, and rising life expectancies offer a longer horizon over which to recoup the benefits of investments in education, thus acting as a fundamental driver of economic growth and human development.
- *The labor market.* Healthier workers are physically and mentally more energetic and robust. They are more productive and earn higher wages.⁸ They are also less likely to be absent from work due to illness (or illness in their family). Illness and disability reduce hourly wages substantially, with the effect especially strong in developing countries where a higher proportion of the workforce is engaged in manual labor (Ruger *et al.*, 2001). Although it has been argued that surplus labor markets make sick workers easy to replace, a recent study on the effect of AIDS on nearly one thousand firms in sub-Saharan Africa found that replacing the skilled staff who add value to a company's output and contribute to *improvements* in a country's productivity presented a significant problem. Firms took an average of 24 weeks to replace professional staff who had died of AIDS, compared with 2 or 3 weeks replacing less skilled staff (Biggs and Shah, 1997). Furthermore, improvements in public health can lead, as we have seen, to lower fertility and smaller families. Women are therefore freer to work and contribute to a country's economic productivity.
- *Investment.* Healthy people expect to live longer and are more likely to save for retirement, increasing the amount of investment available to the domestic economy (see Bloom *et al.*, 2002). Particularly in developing countries that are just beginning their demographic transition, these increases in longevity can set off a savings boom; workers save more for retirement but the low life expectancy in the past means there are fewer retirees who are dissaving. Of course this is a temporary phase until the baby boomers have died and left behind a steady age structure, but temporary, in demographic shift terms, may mean 50 years or more and, if a healthy banking infrastructure is in place, poorer countries can capitalize. This type of savings boom has already been seen in Taiwan, Japan, and South Korea.

Healthy populations are also magnets for foreign direct investment, offering external investors the labor-market strengths discussed earlier. Tourism, which is among the world's biggest industries, is also affected by poor health. Perceptions of a country are vitally important for tourism and if a country's image is tarnished by health problems (as the recent foot and mouth outbreak in the UK has shown), its tourism industry inevitably suffers.

These factors can reinforce each other, creating ‘virtuous spirals’ that can provide a remarkable boost to development. Indeed, formal analysis suggests that, if two countries are compared, identical in every respect except one has a 5-year advantage in life expectancy, the healthier country will experience growth in income per capita that is 0.3–0.5 percentage points faster than its counterpart.⁹ This analysis is backed up by empirical studies.¹⁰ It is estimated that 30% of the estimated per capita growth in Britain between 1780 and 1979 can be attributed to improvements in health and nutritional status (Fogel, 1997).

However, there is nothing inevitable about these gains. In 1965, the population of Latin America had a life expectancy of 60 years, compared with 59 years in East Asia. From 1965 to 1990, the growth rate of its working age population was 0.5 percentage points higher than that of the total population; in East Asia, it was 0.7 percentage points higher. However, despite broadly similar demographic and health conditions, East Asia’s economy grew explosively, while economic growth in Latin America was stagnant. Latin America’s policy environment — with poor labor-market policies, a lack of openness to world markets, and an inadequate education system — was quite different from East Asia’s and did not offer the same favorable conditions for positive interactions to develop (Bloom and Williamson, 1998; Bloom *et al.*, 2000c, 2002a). Latin America, in other words, has, therefore, failed to take advantage of its demographic opportunities (Bloom *et al.*, 1999).

In summary, health has a *potential* impact on wealth, and wealth has a *potential* impact on health. Improvements in either raise the possibility of improvements in the other. The policy environment then determines the success with which potential rewards are converted into actual gains. Policy-makers are therefore challenged by a new rationale for investing in health, but also by the need to produce a policy environment in which the investment will gain most returns.

Policy and priorities

Health is considered in the Alma-Ata declaration as a right, a social goal, and an economic imperative, with all three justifications providing different insights into the nature of health and its importance to the modern world. As a human right, attention is directed to the individual and especially to the poor, who suffer the bulk of the world’s ill-health. As a social goal, the focus turns to the importance of good health for communities as a whole, with health essential to the accumulation of social capital, and broad-based social action the foundation of health improvements. Finally, the bi-directional links between health and wealth act as a reminder that, in the long-term, sustained economic growth is unlikely without sustained health improvements, and *vice versa*.

For developing countries, this understanding of health poses two major challenges. First, it underlines the centrality of political commitment to health improvements and the importance of implementation. Improvements

in health require systemic change and rely on many factors. As Jane Thomason argues, health reformers often make the naïve assumptions that, when presented with an ostensibly rational reform program, governments will adopt the recommended policies and then have the capacity to achieve results; communities will become enthusiastic consumers of new services; and reforms will not have unintended consequences.¹¹ In practice, these assumptions have not held true and are at the heart of Alma-Ata's failure to meet many of its objectives.

Second, it asks policy-makers to make crucial decisions about the balance of their objectives in prioritizing health. Health is a critical problem for poor countries, but it is especially critical for the poorest people within these countries. They are the most likely to see their human rights denied, in ways that damage their health. They are usually excluded from social services, while their ill health is itself a potent cause of their social exclusion. And their health is disproportionately important to their economic welfare. In a number of ways, therefore, improving the health of the poorest people can make a dramatic difference to their quality of life. However, because the poor have so many other problems and deficiencies, health improvements alone are not sufficient for them to escape poverty, but are just one of many necessary conditions. We will therefore first discuss the nature of the relationship between health and poverty, and then conclude by exploring the issues surrounding the implementation of health reforms, adopting a somewhat pragmatic viewpoint by asking the question 'what will work?' rather than 'what is best?'

Health and poverty

The health of the poor. Recent decades have seen development agencies tightening their focus on poverty reduction, with many adopting ambitious poverty reduction targets. The Development Assistance Committee of the Organisation for Economic Cooperation and Development established widely recognized targets. These aim to halve the proportion of the world's population living in extreme poverty between 1990 and 2015, with extreme poverty defined as living on less than US\$1/day. Simultaneously, many in the development community have been arguing that income levels provide an unsatisfactory measure of development success, with average GDP per capita criticized for failing to account for distribution of resources and for acting as an inadequate proxy for the wider concept of quality of life (Bloom *et al.*, 2001b). The Human Development Index, introduced in 1990 by Mahbub ul Haq and colleagues, reflects achievements in "the most basic human capabilities — leading a long life, being knowledgeable, and enjoying a decent standard of living" (United Nations Development Programme, 1999). The UN Millennium Development Goals have reflected this broader thinking by setting targets for a variety of other Quality of Life indicators, as well as income. The targets for global health, which are more specific and less ambitious than those in the Alma-Ata declaration, include: a reduction by two-thirds in the under-5 mortality ratio and a reduction by three-quarters in

maternal mortality, by 2015; and halting and beginning to reverse the spread of HIV/AIDS, malaria and other major diseases by 2015.¹²

A heightened concern for the health of the poor is rooted in the knowledge that across the world, within and between countries, ill health disproportionately afflicts poor people. According to the WHO, if those living in absolute poverty (less than \$1/day) are compared with those who are not poor, the poor are estimated to have a five times higher probability of death between birth and 5 years of age, and a 2.5 times higher probability of death between the ages of 15 and 59 (World Health Organization, 1999). Causes of greater ill health among the poor are manifold and inter-related. Poor nutrition, for example, weakens the body's defenses against infection. Infection, in turn, weakens the efficiency of absorption of nutrients. However, many of the illnesses that affect the poor are considered 'avoidable' — in other words, they are infectious diseases for which treatment or successful prevention programs exist. Five childhood conditions (diarrhea, respiratory infections, malaria, measles, and perinatal conditions) are responsible for 21% of all deaths in low-income and middle-income countries, whereas less than 1% of deaths in high-income countries arise from these causes. In addition, the poor face a series of new health problems. Behaviors such as drinking alcohol, smoking tobacco, and abusing drugs are increasingly taking their toll. Accidents and violence are also claiming larger numbers of lives. Road traffic accidents, self-harm, deliberate violence, and war are growing in importance, and by 2020 could rival infectious diseases worldwide as a source of premature mortality (Murray and Lopez, 1996).

The fact that health standards are now declining for many people is beginning to have a political impact. Alan Lopez, Coordinator of WHO's Epidemiology and Burden of Disease Team, comments: "healthy life expectancy in some African countries is dropping back to levels we haven't seen in advanced countries since medieval times".¹³ There is evidence that policy-makers are listening to, and are alarmed by, this message. In January 2000, the UN Security Council held a debate on the impact of AIDS on peace and security in Africa. It was the first time in 50 years that a health issue had been considered a security issue. The inclusion of health targets in the Millennium Development Goals is further evidence of a shift in thinking — although, as the 2002 Human Development Report (United Nations Development Programme, 2002) suggests, many countries are very unlikely to meet these targets. The complacency of the late twentieth century — where many assumed that diseases like tuberculosis (TB) would continue retreating, as health standards steadily increased — has been shaken.

Why health is so important to the poor. Amartya Sen (1999) has characterized poverty as "capability deprivation", where a person lacks the "substantive freedoms" he/she needs to lead "the kind of life he or she has reason to value". This freedom has two facets: opportunity and security. Opportunity requires education and a range of political and economic freedoms. In Latin America, for example, a worker with 6 years of education earns an average of 50% more than someone who has not attended school. The gap increases

to 120% for those with 12 years of education (i.e. completing secondary school), and exceeds 200% for those with 17 years of education (i.e. receiving a university diploma) (Inter-American Development Bank, 1999). The ability to take advantage of opportunities, however, is contingent on the degree of risk an individual faces. As Anthony Giddens argues, risk is the mobilizing dynamic of a modern industrial society, but also a negative and uncontrollable force that inhibits action.¹⁴ In other words, where there is insufficient insurance against future ill health or where health services are inadequate, individuals may be less likely to undertake the 'positive' risk associated with entrepreneurial activity. Given that differing levels of entrepreneurial activity may account for as much as one-third of the variation in economic growth experienced by countries, the security offered by improving health standards may have a significant impact on the opportunities that people enjoy (Reynolds *et al.*, 1999). This is especially the case for the poor, for as the World Bank has noted, "the body is poor people's main asset, but one with no insurance".¹⁵ Ill health therefore imposes a higher level of risk on the poor. When their principal asset is struck down by disease, injury or some other form of ill health, they cannot earn the money needed to provide themselves (and usually others, too) with food or medicines. In other words, a health shock is more likely to be catastrophic.

Health also has less visible effects on the well-being of the poor. Ill-health often leaves a person able to work, but reduces their productivity (World Bank, 1993). In Indonesia, for example, men with anemia (where there is a decreased ability of the red blood cells to provide adequate oxygen supplies to body tissues) were found to be 20% less productive than men without it. When the anemic men were treated with iron their productivity increased nearly to the levels of the non-anemic men (World Health Organization, 1999). There is also a clear relationship between health and success in education. Healthy children are able to learn better, and become better-educated (and higher-earning) adults. In a healthy family, a child's education is less likely to be interrupted due to their ill-health or the ill-health of their family.

There is evidence that these effects are also felt at a macro level. Econometric estimates of the relationships between health, economic growth, income distribution, and poverty allow one to simulate the consequences of recent and foreseeable improvements in life expectancy on poverty. The simulations cover 31 countries for which sufficient data are available, with a combined population of 3.1 billion as of 1990. They suggest that if life expectancy had been 10% higher in 1990, this would have had a strong positive effect on income growth and a modest negative effect on income inequality over the following 25 years. Both effects serve to reduce poverty, with the estimates suggesting these health improvements alone would lead to a modest reduction in absolute poverty (i.e. about 30 million people) by 2015. Two-thirds of these would have lived in India and one-third in Africa, mirroring the huge importance of health for regions at an early stage of development (Bloom *et al.*, 2002c). This analysis does not provide a guide for achieving this improvement, however, leaving unanswered the

crucial issues of whether poverty reduction is best achieved via policies aimed at achieving broad-based health improvements or health improvements directed specifically at the poor.

Poverty traps. Ill-health not only affects the poor disproportionately, it also causes poverty. A family struggling to survive economically cannot afford to be ill; not only because they cannot afford medicine and health care, but because of the loss of earning power that illness causes. The World Bank reports that in an analysis of case studies of people and households that have become poorer, the single most common reason was illness, injury, or death.¹⁶ A health crisis can quickly reverse any progress the poor have made in moving up from subsistence. In one study from northwest Bangladesh, for example, eight out of 21 TB patients had been forced to sell land or livestock to meet the costs of their treatment and to compensate for loss of income (Croft and Croft, 1998). In Uganda, meanwhile, eight out of 10 TB patients involved in paid work had either lost their job or closed their businesses, while five out of 34 had been forced to remove their children from school (Saunderson, 1995).

Poverty also encourages poor people to make sub-optimal choices that have damaging effects on their health. For example, low income forces people to the bottom of the 'energy ladder', where wood, dung, and other biomass are used, rather than, say, liquefied petroleum gas, which requires often substantial deposits for canisters and up-front expenditures for cooking devices. There is a clear association between the use of biomass in traditional ways and respiratory illness and heart failure (Smith, 1987). Low income and poor health, therefore, combine to form a poverty trap, with low incomes leading to the use of biomass for fuel, which encourages high fertility since it is often children who are used to collect wood and dung (Bloom *et al.*, 2001b).

Poverty traps happen at a regional as well as a household level. Widespread illness reduces the economic potential of an area. The WHO estimates that the total indirect cost of lost productivity in Thailand as a result of morbidity associated with tuberculosis in 1995 amounted to \$57 million, while John Gallup and Jeffrey Sachs state that, "[C]ontrolling for factors such as tropical location, colonial history, and geographical isolation, countries with severe malaria had income levels in 1995 only 33% of countries without malaria, whether or not the countries were in Africa".¹⁷ In addition to inhibiting agricultural productivity, Africa's geography abets the presence of serious diseases, and ill-health may have contributed to the continent's high desired family sizes and the concomitant high dependency burden. Between 1965 and 1990, Africa's annual income growth was 4.3 percentage points lower than that of East and South-East Asia. Almost all of this difference can be accounted for by differences in health, age structure, and geography.¹⁸

Russia, meanwhile, provides a recent example of a downward spiral of ill-health pushing a developed country into a poverty trap. The transition to a market economy, starting in the early 1990s, caused economic and political

instability, as well as plummeting incomes. This occurred alongside a dramatic fall in life expectancy, accounting for 1.4–1.6 million premature deaths during 1990–1995. Russian male life expectancy in the mid-1990s was below the average for many *developing* countries, severely affecting the work force. Contributing to this were a further deterioration of an already poor diet, increased alcohol consumption, mental stress, and a related rise in accidents and injuries. Meanwhile, negative income growth bit into public health care spending, bringing chaos to an already overstressed health system (Becker and Bloom, 1998b). Poor health can thus act as a significant drag on an economy — and its ability to generate the wealth that can mitigate its effects.

Helping or hindering. The 1993 World Development Report was a pioneering publication, presenting for the first time a complete, coherent, and well-disseminated case for the application of rational decision-making to the allocation of resources within the health sector. It noted the unevenness of health gains in different countries and also considered the importance of disability, as well as premature mortality. It measured the global burden of disease in disability-adjusted life years (DALYs) and detailed the distribution of the loss of DALYs by cause and region.¹⁹ Using this data and data on the quantity and distribution of public health-related expenditure, it concluded that world health spending was misallocated, inefficiently applied, and substantially directed towards the affluent, rather than the poor. Too much government money, it argued, was spent on advanced tertiary health facilities. The report estimated that if half the money spent on advanced facilities was re-allocated, developing countries could reduce their burden of disease by 25%, saving the lives of 9 million infants per year. Five policy areas were identified as being especially important for low-income countries: improved primary schooling, especially for girls; investment in public health activities with high cost-effectiveness, such as vitamin A and iodine supplements, or immunization programs; investment in district health care infrastructure to deliver a range of basic clinical services; reduction of waste, especially through the more effective use of pharmaceuticals; and the decentralization of health systems, to allow for greater community control and to migrate financing to the community level (World Bank, 1993).

Simple health interventions still appear highly cost-effective. The WHO estimates that eight or nine of the leading 10 causes of ill-health for under 5 year olds could be successfully tackled for less than \$100 per DALY saved (World Health Organization, 2000). However, health systems, defined by the WHO as “all the activities whose primary purpose is to promote, restore, or maintain health” may not be the most important source of good health in developing countries. The WHO reports little independent connection in developing countries between health status and health inputs such as doctors or hospital beds, total health care expenditure, or public spending on health. There are widespread disparities in outcomes from different levels of health expenditure. Pakistan and Uganda, for example, spend similar amounts per person on their health systems, and have similar income levels. However, a child born in Pakistan has a DALE of 55 years; in Uganda, the DALE at birth

is only 32.7 years (World Health Organization, 2000). Meanwhile, anecdotal evidence shows the inadequacy of poor people's interaction with health systems. The World Bank's consultation with the poor identifies corruption and rudeness of health staff as two key reasons for not using government health facilities. Travel to the nearest health center is also seen as too expensive and time consuming, creating a disincentive for people to seek out treatment. Waiting times, as well as travel times, are often longer than a family, dependent on one or a few earners, can afford. There are often drug shortages, or drugs that are meant to be free are being charged for, or are too expensive. Costs are prohibitive — families often sell livestock and property to get healthcare — and even then they may not have enough money. Poor people complain of discrimination at health care centers, and they have plentiful experience of poor-quality treatment (World Bank, 1998). In many cases, health services are both ineffective and expensive, draining scarce resources for little result.

Within this context, policy-makers and health professionals must ask piercing questions about priorities for health-related expenditure, about the effective implementation of new programs and health sector reforms, and about the nature of the failings of existing health services. Many primary health care systems appear to have failed because they have been inadequately conceptualized. They operate with little understanding of the needs of the population they are supposed to serve, and offer poor-quality services because little attention has been paid to judging their effectiveness. So as well as being 'results-driven', the health sector needs to be 'customer-focused'. As with any service, a failure to listen to the expressed needs of users is the most common cause for failure. Paul Farmer, for example, has vehemently criticized the argument that it is not cost-effective to cure multidrug-resistant TB in poor countries, when TB is "no more untreatable in urban Peru than in New York". In achieving high success rates, the right treatments were important, of course, "but a comprehensive, convenient, and user-friendly approach clearly had an impact too" (Farmer, 1999). Health reforms are critically reliant on public trust and there is little reason for the public to trust when it thinks it is getting a raw deal.

From theory to practice

Outcomes

Health needs to be judged in terms of outcomes, not inputs: judged by the improvement in health delivered by any new program or health reform, rather than by the financial and political resources lavished on launching the program or reform. This orientation causes problems for many of the agencies currently devoted to improving health. Historically, many ministries of health have tended to judge their effectiveness by the number of new facilities they have constructed, the number of health professionals employed, or their success in cutting waiting lists or improving access to services. They have not tended to judge effectiveness through consulting hard data on a

population's improving health standards, or by analysis of which inputs have produced which health outputs. Equally, health ministries have tended to operate in isolation from other government departments. Their expertise has lain mostly in service delivery and the provision of facilities, such as hospitals. They generally have less skill in financing issues, regulation, and incentives — and no mandate to consider wider strategies for improving health outcomes. Many donors have also been guilty of seeing health in isolation from other development issues, and of focusing on inputs rather than outputs of development activity. The World Bank, for example, has admitted favoring loan quantity over loan quality and has only recently undertaken reforms aimed at focusing on 'development results'. Finally, donors have had a poor understanding of the fungibility of health spending, whereby aid to particular projects or sectors is offset by a diversion of government funds from these areas to others. In essence, aid flows add to the total government budget but often does little to influence the allocation of this budget (Feyzioglu *et al.*, 1998).

Success and failure

A focus on health outcomes requires consideration of why some health policies, reforms, and projects do better than others. Whatever the quality of its design, an initiative that is starved of money will typically have limited success. A well-designed, well-funded initiative can still fail if there is insufficient capacity to deliver results or if it has failed to take account of broader social or economic features. Values, meanwhile — the standards by which priorities are set and decisions are taken — are vital if change is to ripple through an organization and different ways of operating are to be accepted (Christenson and Overdorf, 2000). Most broadly, reformers must recognize that change is often a political process, not just a technical exercise.

The difficulty in achieving reform requires that implementation be studied with the same analytical intensity as policy design. Improved data collection methods are required to disaggregate the different factors that led to a reform's success or failure, while there must be increased attention to the dissemination of research findings. Currently, there are huge gaps between the availability of data and its use for reform. More effective dissemination would aim to 'sell' research findings to relevant audiences, underlining the general importance of data-based decision-making and the specific relevance of a particular finding to a health issue. Beyond the use of data, the management and organization of the reform process is currently under-explored. There is a significant body of expertise in the world's business schools in this area and, while there are clear differences between the operation of private, non-profit, and public-sector organizations, there is clear potential for cross-over of management expertise.²⁰

Any broad-based effort to improve health relies on a range of partnerships between public, private, and civil society actors. These are often necessary at an international level (e.g. in vaccine initiatives), where the

complementary skills and perspectives of the public and private sectors have been vital to moving health issues up the agenda and achieving results. Similarly, at the national level, few developing country governments have the capacity to make the necessary improvements to health on their own. Private expenditure on health is typically high in developing countries and is close to or over 50% of total health spending in many. Private sector provision is also common. Non-government organizations also have a vital role to play, especially in areas where government is weak, either centrally or on the ground, and where new types of services need to be pioneered.

Knowledge for health

Knowledge is at the heart of improving health, and, although not strictly necessary, strategies to enhance the development and deployment of knowledge are often vital to effective implementation.²¹ Knowledge is important at many levels. Internationally, it is essential to raising awareness of health, after a period when spending on health has been stagnant, with bilateral donors only spending about 2.1% of their budget on health and a further 6.6% on water and sanitation.²² It is also vital to the development of new health technologies, especially those that tackle the health problems of poor people, an area where the market currently makes exceptionally poor provision. At a national level, it allows for decisions regarding the allocation of resources and the design of reform programs. Without sufficient human capital at a national level, major health reform will prove impossible to achieve. Indeed, resources should be devoted to investment in human capital and to knowledge generation simultaneously with, or even in advance of any reform effort (Data for Decision Making, 2000). Finally, knowledge about health is critical to individuals and families. In the Indian state of Kerala, for instance, higher than expected health outcomes coincide with high levels of education and well-coordinated efforts to promote health messages to the population. Some of these efforts are indirect. For example, the state has an unusually highly developed grassroots science communication organization, the Kerala Sastra Sahitya Parishad (Kerala Science Literature Association), which was started in 1957 by a group of science writers and activists, and now has 60 000 members. By promoting awareness of science, it has helped develop an understanding of health and the nature of infectious disease. It has also worked on a series of environmental issues. Half a million homes have installed its high-efficiency wood burning stoves, with a consequent impact on indoor air quality and respiratory health, especially of women and children (Raychaudhury, 2000). The experience of Kerala is consistent with the experience of Western countries, where a growing awareness of how diseases were transmitted coincided with rapid health improvements, not because treatments immediately became available, but because of changes in people's behavior (Easterlin, 1999; see also Bloom *et al.*, 2001c).

The development of knowledge is not synonymous with the provision of information, however. For example, awareness of AIDS is now high in sub-Saharan Africa, with the vast majority of people having heard of the

disease in countries for which data are available. Many people also understand that the disease is sexually transmitted. However, this has had little impact on the course of the epidemic, in stark contrast to the experience of developed countries. In the latter, gay communities were able to deploy knowledge to great effect, with condom use, in particular, preventing the epidemic from reaching the endemic levels now common across sub-Saharan Africa (Bloom and Glied, 1992; Caldwell, 2000). This disparity is grounded in the fact that the development and deployment of knowledge is not a passive process. Information about AIDS circulated around gay communities, but this information was translated into knowledge capable of combating the epidemic by an explosion of organizations dedicated to working on AIDS and by a significant shift in culture, whereby certain forms of behavior that had previously been acceptable were no longer considered legitimate. This behavioral change was enforced not through formal rules, but through a changing series of informal constraints.

Improved knowledge about health can have impacts that are both modern and dramatic. Until the turn of the twentieth century, for example, TB was accepted as a disease common to rich and poor, with an estimated 10% of all deaths in the US due to the disease. However, in 1882 Robert Koch identified the tubercle bacillus and, just 11 years later, a report by Dr Hermann Michael Biggs to the New York City Board of Health issued TB recommendations based on the theory that the disease was both communicable and preventable. This knowledge led to rapid formal and informal institutional change. New organizations were created to service new testing and reporting regimes, while the consumptive hospital movement marked a radically new way of tackling disease. Behavioral change was also marked. Hospitals carried signs saying 'spit is poison', while notices in public places warned that spitting on the floor spread disease. In 1904, the National Association for the Study and Prevention of Tuberculosis was founded, later renamed the National Tuberculosis Association and now known as the American Lung Association. Mass fundraising highlighted the broad nature of the campaign. US TB cases fell 90% from 1900 to 1920, and by another 90% between 1920 and 1950 (Ruggiero, 2000).

Various barriers can prevent a new discovery from having immediate, practical effects. When Merck discovered the effectiveness of the drug Ivermectin, previously used as a highly profitable veterinary drug, in the prevention of river blindness, it was faced with a dilemma. While the drug could be expected to have a significant impact on the global disease burden, there was no economically viable market for its distribution. The company decided to donate the drug, but only after it had fought and won internal battles, and faced criticism from the pharmaceutical industry, worried that a precedent was being set. It then had to work with the public sector, in order to create an understanding of the benefits of the donation and then the structures through which the drug could be distributed. Indeed, the early years after the donation proved disappointing and it was only after investing many years in the Mectizan Program, which attempted to create the infrastructure needed to use the drug, that the company was able to ensure that

the product was widely used, to the point where the disease is now targeted for eradication. This experience is being repeated with other drug donations and, as is shown by the recent bitter controversy over access to AIDS drugs, there is still considerable disagreement about the respective rights of intellectual property holders, rich and poor patients, national governments, and multinational organizations.

The process by which knowledge is generated, shared, and used by organizations is complicated. Ultimately, far-reaching changes in institutional culture, along with a questioning of dominant political beliefs, may sometimes be required if organizations are to use knowledge to contribute significant improvements in health status.

Achieving change

Much innovation has come from the exceptional efforts and personal commitment of a small number of people, who have been termed 'social entrepreneurs'. Social entrepreneurs are devoted to increasing the value generated outside the private sector. The Grameen Bank, for instance, was founded by Professor Muhammad Yunus, with the belief that "millions of small people with their millions of small pursuits can add up to create the biggest development wonder". Grameen now has 2.3 million borrowers, 94% of whom are women, and is the largest rural financial institution in Bangladesh. Repayment is enforced by local communities and default rates are lower than in the commercial sector. In addition, borrowers commit themselves to '16 decisions', covering the need to improve standards of housing, nutrition, family size, health, education, sanitation and investment. Grameen has also trained 4000 people from 100 countries, as well as establishing 223 replication programs in 58 countries. Yunus' commitment, in other words, has led to widespread change in the way people live — change that goes far beyond access to small amounts of credit.²³

In Zambia, meanwhile, a new government was elected in 1991 on a reform platform, and Dr Katele Kalumba committed the government to a radical overhaul of the health system, described in a new Strategic Health Plan. The heart of the plan was to create "a society in which Zambians create environments conducive to health". Again, the commitment has led to institutional renewal. The health care system has become more client focused. Local health centers, for example, are being re-structured to meet the patient's perceived needs and to encourage fewer to bypass a local center in order to seek care directly from a more distant and expensive hospital. Equally, relationships with donors have changed. Previously, donors made funding decisions at the project level, because of a lack of leadership from national government. Now the government sets clear rules for donors, to which all donors have agreed. Only areas that are included in the strategic plan can be funded (World Bank, 1996). These issues are not specific to Zambia. The WHO, for example, has recently criticized the primary health care movement for its focus on the presumed needs of service users, rather than people's actual demand for care. It heralds a 'third generation' of health reforms, which

is demand led rather than supply led, as governments move away from provision towards supervision and financing, and money follows patient needs rather than organizational structures (World Health Report, 2000).

Innovation is also driven from below. In recent decades, an explosion of non-governmental and community-based organizations have acted as effective advocates for health and have also delivered pioneering programs. In Ceara, in Brazil, for example, the Long Live the Child program reduced the burden of infant mortality by 35% (Rademacher *et al.*, 2000). Community members are trained in the basics of infant and childcare. They visit area households monthly, on foot or bicycle, carrying a backpack of basic medical supplies. They promote breastfeeding, monitor children's growth, teach mothers to prevent diarrhea-related dehydration, and educate mothers on the importance of cleansing drinking water. In six years (between 1987 and 1993), 7240 health agents visited the homes of 4 million people at a cost of US\$500 000, around 12 cents per visit, significantly improving the health outcomes of millions of people. A development NGO, Save the Children, meanwhile, has pioneered the concept of the 'positive deviant'. Fieldworkers in Thanh Hoa province in Vietnam worked with villagers to understand why children from some families had better nutrition and health indicators than others, even though they had the same resources as their neighbors. They found these families supplemented their diet with sweet-potato greens as well as shrimps and crabs from rice paddies, and fed their children at least three times a day, rather than the twice a day customary in the community. Although these food sources were freely available, they were generally regarded as unsuitable for young children. These 'positive deviants' had an extraordinary effect on the rest of the community once a mechanism was set up to diffuse their knowledge. Within 2 years, 80% of the children participating in the project were no longer malnourished.

One of the principal difficulties facing those attempting to drive forward health reform is deciding between a large number of possible interventions. Essentially, there are three different approaches to producing or protecting good health. The first delivers medical interventions, such as vaccines and drugs, primary health care centers, or clinics. The second delivers non-medical health interventions, such as strengthening health systems, training medical personnel, building better health information systems, and developing more effective systems for procuring, storing, and developing pharmaceuticals and other medical equipment. The third uses non-health interventions to provide health benefits by, for example, providing clean water and improved sanitation, or offering better basic education, communications infrastructure or governance. Relative investment in each of these areas must be decided strategically and developed specifically in each country.

Finally, tackling the problem of corruption is especially important, as this often acts as a significant barrier to access by the poor. A recent World Bank consultation with the poor emphasizes this. Many poor people reported being asked to pay for medicines that were supposed to be free, and corruption was cited as a major factor by those who had decided to avoid formal services altogether.²⁴

Conclusion

The notion of health-led development is not a new one — it surfaced at Alma-Ata and is also found in the 1993 World Development Report. Recent research has, however, developed the idea beyond just being a possibility; we now have concrete evidence that health plays an important role in determining both individual and national income. Health, seen as a form of human capital and not just an output from the development process, deserves to join education as a key policy instrument for promoting the success of developing countries. Virtuous spirals are possible in countries with young, educated, healthy populations and pro-growth policies. Once moving, they offer the chance of dramatic change in a country or region's prospects. Conversely our awareness of the importance of illness in contributing to poverty traps has also been heightened.

On its own, however, this knowledge can have little impact. It needs to be used to drive and direct real change. This change must occur at the international, national, and local level — and its impact must also be felt by families and individuals. To take HIV/AIDS as an example, efforts to control the epidemic have been impeded by the failure of the global community to marshal adequate resources and to develop structures through which those resources can be used. It is only recently that we have seen world leaders speak regularly about the crisis and this delay left a situation where research into a vaccine was left on the back burner.

The challenges are no less great at the national level, where deep institutional change is needed if countries where the epidemic is strongest or continuing to gather force are to fight back against the virus. Institutional change is needed to influence patterns of sexual behavior and gender relations, as well as the context within which political, social, and business decisions are made. As has been seen in countries such as Senegal, Thailand, and Uganda, where responses to the epidemic have been partially successful, enlightened leadership is essential, combined with bottom-up support for progressive cultural change. Public, private, and civil society must find more effective ways to work together, with every organization — religious, political, social, or commercial — collaborating to achieve results. And these results are relatively easily demonstrated. Is the prevention campaign slowing or reversing the infection rate? Are treatment protocols helping a growing number of the sick? Clear policy backed by robust needs analysis, excellence in program design, and a dedication to implementation will be needed. Most important, however, will be a focus on the needs of audiences for prevention campaigns and patients for treatment services. HIV/AIDS, then, encapsulates a number of lessons that are general to efforts to use health to lead development.

The importance of political support, organizational reform, and an approach that is dictated by end users and results rather than professional providers and inputs — these are lessons that we have learned since Alma-Ata. They may allow us to bring that declaration's still-distant goals into reach.

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Notes

- 1 The 21 countries in which life expectancy declined are Armenia, Belarus, Botswana, Bulgaria, Burundi, Cote d'Ivoire, Estonia, Kenya, Latvia, Liberia, Lithuania, Malawi, Russian Federation, Rwanda, South Africa, Tanzania, Uganda, Ukraine, Zaire, Zambia, and Zimbabwe. By contrast, the infant mortality rate increased in only three countries (Armenia, Belarus, and Iraq).
- 2 World Health Organization (2000). It is worth noting that low-income and middle-income countries account for only 18% of world income, and only 11% of global health spending.
- 3 The right to life, for example, is recognized in both the Universal Declaration of Human Rights (article 3) and the International Covenant on Civil and Political Rights (article 6). More specifically, the right to health care and social services is recognized in the Universal Declaration (article 25) and the International Covenant on Economic, Social and Cultural Rights (article 12), while article 25 of the Universal Declaration also asserts that "everyone has the right to a standard of living adequate for the health and well-being of himself and of his family" (Donnelly, 1999).
- 4 Mann *et al.* (1994). The American Declaration on Rights is less stringent on this issue, but still refers to the right to "those sanitary and social measures necessary to ensure health".
- 5 For a more detailed discussion of the links between health and foreign policy, see David E. Bloom, Jordan Kassarow and River Path Associates, *The United States and Global Health*, unpublished manuscript, 2000.
- 6 Mortality Study, Eastern Democratic Republic of Congo, International Rescue Committee, June 2000 [<http://www.theirc.org/mortality.htm>].
- 7 Doyle (1983). The Clinton administration, in declaring HIV/AIDS to be a threat to America's national security in 2000, recognized that the devastating effects of the virus have the potential to destabilize the hardest hit countries — with war possibly resulting.
- 8 See, for example, Schultz (2002). See also Bloom (2001a).
- 9 See Bloom and Canning (2000). See also World Health Organization (1999).
- 10 For a review of such studies, see Bloom *et al.* (2002b).
- 11 Jane A. Thomason, 'Health Sector Reform in Developing Countries: A Reality Check', 1997 [<http://www.acithn.uq.edu.au/conf97/papers97/Thomason.htm>].
- 12 World Bank 'Millennium Development Goals' (available at www.developmentgoals.org).
- 13 'WHO issues new healthy life expectancy rankings: Japan number one in new "healthy life" system', press release, World Health Organization, 4 June 2000 [<http://www.who.int/inf-pr-2000/en/pr2000-life.html>].
- 14 Anthony Giddens, The BBC 1999 Reith Lectures [http://news.bbc.co.uk/1/hi/english/static/events/reith_99/default.htm].
- 15 'Poverty trends and voices of the poor', The World Bank Group, 1999, p. 35 [<http://www.worldbank.org/poverty/data/trends/index.htm>].
- 16 'The voices of the poor' [<http://www.worldbank.org>].
- 17 'Malaria, climate, and poverty' CAER paper 48 [<http://www.cid.harvard.edu/caer2/html/content/papers/paper48/paper48.pdf>].

- 18 Bloom and Sachs (1998). This paper also explores the geographic roots of inter-regional differences in health and age structure.
- 19 This paper makes reference to DALYs and to the related DALES, but we note that the use of DALYs to prioritize alternative health-related policies has been controversial for a few reasons. First, since DALYs are a measure of health outcomes, their exclusive use in priority setting would ignore other non-health benefits of policy such as the promotion of equity, insurance against risk, convenience, and peace of mind. Second, DALY measurement requires difficult value judgments concerning the discounting of future health benefits, age weighting, disability weighting, and the ideal length of life, on which little consensus exists. Third, allocating public resources on the basis of producing the most DALY gain for a given expenditure of resources ignores the ability of households to privately purchase some cost-effective services. It also ignores the ability of the private health sector to supply them. Standard efficiency arguments in economics would rationalize public expenditure on cost-effective interventions only under circumstances of market failure. For a thorough review of the criticisms of the use of DALYs, see Anand and Hanson (1997).
- 20 See, for example, for some work applying business ideas to the educational field, 'Does six sigma belong in sixth grade?' in *Strategy + Business*, 19 (second quarter, 2000).
- 21 Cuba provides an instructive counter-example. Both life expectancy (now 76 years) and the infant mortality rate (now seven per 1000 live births) improved tremendously over a several-decade period, primarily due to the government's decision to prioritize health care. Developing new knowledge was not key to this transformation.
- 22 UK Department for International Development, 'International Co-operation in Health', *World Health Opportunity Meeting Report*, London, 13 May 1999 [<http://www.riverpath.com/library/library.html>].
- 23 'A short history of Grameen Bank', Grameen Bank, 17 July 2000 [<http://www.grameen-info.org/bank/hist.html>].
- 24 Deepa Narayan with Raj Patel, Kai Schafft, Anne Rademacher and Sarah Koch-Schulte, *Voices of the Poor: Can Anyone Hear Us?* New York, published for the World Bank, Oxford University Press, 2000 [<http://www.worldbank.org/poverty/voices/reports.htm#cananyone>].

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The Health and Poverty of Nations: from theory to practice

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