POLICY FORUM: PUBLIC HEALTH

The Health and Wealth of Nations

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The positive correlation between health and income per capita is one of the best-known relations in international development (see figure). This correlation is commonly thought to reflect a causal link running from income to health. Higher income gives greater command over many of the goods and services that promote health, such as better nutrition and access to safe water, sanitation, and good quality health services.

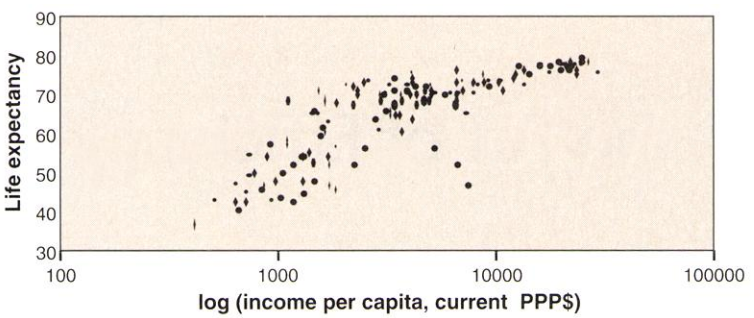
Recently, however, another intriguing possibility has emerged: that the health-income correlation is partly explained by a causal link running the other way—from health to income. Several mechanisms, falling into four main categories, could account for this relation:

Productivity. Healthier populations tend to have higher labor productivity, because their workers are physically more energetic and mentally more robust. They suffer fewer lost workdays from illness or the need to care for other family members who have fallen ill.

Education. Healthier people who live longer have stronger incentives to invest in developing their skills, because they expect to reap the benefits of such investments over longer periods. Increased schooling promotes greater productivity and, in turn, higher income. Good health also promotes school attendance and enhances cognitive function.

Investment in physical capital. Improvements in longevity create a greater need for people to save for their retirement. Insofar as increased savings lead to increased investment, workers will have access to more capital and their incomes will rise. In addition, a healthy and educated workforce acts as a strong magnet for foreign investment.

"Demographic dividend." The transition from high to low rates of mortality and fertility has been dramatic and rapid in many developing countries in recent decades. Mortality declines concentrated among infants and children typically initiate the transition and trigger subsequent declines in fertility. An initial surge in the numbers of young dependents gradually gives way to an increase in the proportion of the population that is of working age (*1*). As this happens, income per capita can rise dramatically, provided the broader policy environment permits the new workers to be absorbed into productive employment (*2*).



Life expectancy and income in purchasing power parity (PPP) dollars, 1997. [Source: World Bank (*14*)]

All these mechanisms offer plausible ways in which health improvements can lead to income growth. However, examining the data allows evaluation of how important these mechanisms are. Recent economic analysis indicates that health status (as measured by life expectancy) is a significant predictor of subsequent economic growth (*3*). This effect is above and beyond other influences on economic growth, emerges consistently across studies, and is strikingly large (*4*).

Suppose we compare two countries that are identical in all respects, except one has a 5-year advantage in life expectancy. On the basis of studies in several countries, real income per capita in the healthier country will grow 0.3 to 0.5% per year faster than in its less healthy counterpart. This represents a sizable boost to growth, given that, from 1965 to 1990, countries experienced an average per capita income growth of only 2% per year. Moreover, a gain of 5 years in life expectancy is well within the reach of most developing countries—since 1950, for example, life expectancy worldwide has increased by about 20 years.

As these health improvements fortify the economy, they also alleviate poverty. Economic growth is an exceedingly powerful way to reduce poverty among the 1.3 billion people living on less than US$1 per day. Available evidence indicates that increases in average income translate—percentage point for percentage point—into increases in the income of the poor. In addition, health improvements are disproportionately beneficial for the poor, as they depend on their labor power more than any other segment of the population.

Just as the direct effects of life expectancy on economic growth are important, so too are the indirect effects of improvements in health status that operate via demographic change. In East Asia, for example, the working-age population grew several times faster than the dependent population between 1965 and 1990. The whole process seems to have been triggered by declining child and infant mortality, itself prompted by the development of antibiotics and antimicrobials (such as penicillin, sulfa drugs, streptomycin, bacitracin, chloroquine, and tetracycline, all of which were discovered and introduced in the 1920s, 1930s, and 1940s), the use of DDT (which became available in 1943), and classic public health improvements related to safe water and sanitation (*5*, *6*). Health improvements can therefore be seen to be one of the major pillars upon which East Asia's phenomenal economic achievements were based, with the demographic dividend accounting for perhaps one-third of its "economic miracle" (*5*, *7*).

By contrast, poor health can slow the demographic transition and inhibit growth. In Sub-Saharan Africa, for example, a seemingly intractable disease burden induces many families to dissipate their resources among large numbers of children, creating a high-fertility, high-mortality poverty trap that impedes economic growth (*8*).

Patterns of energy use also mediate the interactions between health, demography, and income. The rural poor rely heavily on wood, dung, and other biomass. The resulting smoke and particulates are detrimental to human health and can diminish people's productivity. Across countries,

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there is a strong association between demographic and health indicators and the use of biomass in traditional ways. Infant and child mortality rates are elevated, and life expectancy is diminished, particularly for women who undergo higher exposure to smoke while cooking. Fertility rates are also high, partly to ensure enough children for firewood collection (*9*). Slow income growth is the end result.

Mutual Reinforcement

Traditionally, economists have treated health like any other consumer good and have assumed that the direction of causality was from income to health. We now have good reasons and strong evidence for believing that health improvements also stimulate economic development. These two views are, of course, compatible. The development process is inherently dynamic—with health improvements promoting economic growth, which in turn promotes better health. This "virtuous spiral" can transform an impoverished, disease-prone country into one that offers its people a much higher quality of life. Compelling examples of such a transformation can be found in East Asia and Ireland, and in the economic history of several wealthy industrial countries (*10*).

Health improvements and economic growth can be mutually reinforcing in another way. As rising incomes cause fertility to decline, there are consequent benefits to the health of mothers and children, via longer breast-feeding, less stress on women's reproductive systems, more opportunities for them to work outside the home, and increased resources for each child's upbringing. In turn, declines in fertility promote economic growth by allowing more of society's resources to be devoted to urgently needed investments in physical capital, infrastructure, and educational quality.

Regrettably, the mutual reinforcement between health and income can also operate in reverse. Declines in health status in some parts of the world are having staggering impacts on economic well-being. The AIDS epidemic in Africa is perhaps the most prominent example. About 8% of African adults are now HIV positive, with 56% of Sub-Saharan Africans not expected to reach age 60 (*11*).

The economic burden imposed by HIV/AIDS is enormous. The required costs of detecting and treating the infection and its clinical manifestations are well in excess of per capita public expenditures on health care in Sub-Saharan Africa. With more than 80% of global AIDS mortality occurring among people of working age, the income and output losses associated with the epidemic are daunting. A number of economic studies conclude that the AIDS epidemic is slowing the pace of economic growth and depleting the wherewithal to deal with other diseases—such as diarrhea, hepatitis, malaria, and tuberculosis—that are also ravaging health in many countries (*12*).

Russia provides another example. Its transition to a market economy, which began in the early 1990s, coincides closely with a precipitous fall in life expectancy, accounting for 1.4 to 1.6 million premature deaths during 1990–95, including disproportionately large numbers of working-age men. There are many reasons to believe that Russia's economic and political instability and plummeting incomes are to blame for this health crisis, which left the life expectancy of Russian males in the mid-1990s below the average for developing countries.

Among the factors that link falling incomes to the worsening of Russians' health are a further deterioration of the already poor Russian diet, increased alcohol consumption, mental stress, and the related surge in accidents and injuries. Negative income growth took a major toll on public spending on health care, and many parts of the Russian medical system have descended into chaos as a result. The health crisis is now having an impact on Russia's catastrophic economic performance. The effects are currently modest, but are indisputably negative and likely to worsen as the vicious spiral picks up momentum (*13*).

Health-Led Development

Conventional wisdom holds that income growth results in improved health, but that is only part of the health-income story. The remainder concerns the role of health as an instrument of self-sustaining economic growth and human progress. Poor health is more than just a consequence of low income; it is also one of its fundamental causes. To be sure, health and demography are not the only influences on economic growth, but they certainly appear to be among the most potent.

This contrasts with the standard view that health improvements reduce income per worker because a low death rate increases population growth, thereby lowering the capital-to-labor ratio and reducing labor productivity. A revolution in economic thinking has taken place over the past few decades, putting human capital, particularly educated workers, on a par with physical capital as an input into production. We would argue that increased health is another aspect of human capital that also enters into production. In addition, long life expectancy may be the fundamental force that creates the demand for education and encourages the domestic saving that is a key determinant of economic growth.

This perspective offers an exciting new possibility in international development: investing in health to help stimulate development. A focus on health cannot be the sole approach to improving living standards, nor may it even be the best. However, the evidence for viewing health as one of the more effective arrows in the development quiver is surely growing stronger.

References and Notes

1. Eventually, this process will lead to large cohorts of retired people. Although one might surmise that this will act as a drag on economic growth, the data indicate otherwise. Presumably, this is because many elderly people work (or enable others to work by minding their children), some of them continue to save, and many continue to impart their accumulated knowledge to others. Nevertheless, the demographic dividend is not permanent. Eventually, the large cohorts pass on, and their effect on the age distribution diminishes. Demographic change thus creates a window of opportunity for economic growth, but not one that remains perpetually open (*5*).
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3. For an up-to-date list of citations, see World Health Organization, *World Health Report 1999: Making a Difference* (WHO, Geneva, 1999).
4. See J. Strauss and D. Thomas [*J. Econ. Lit.* **36**, 766 (1998)] for a comprehensive review of related evidence, based on household surveys, of the links between health and productivity.
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8. D. E. Bloom and J. D. Sachs, *Brookings Pap. Econ. Act., Macroecon.* **2**, 207 (1998).
9. D. E. Bloom, P. Craig, P. N. Malaney, *The Quality of Life in Rural Asia* (Oxford University Press, Hong Kong, in press). These effects appear to be quite large. For example, a 40% increase in traditional fuel use (which corresponds to the difference between Vietnam and Malaysia) translates, on average, into one extra birth per woman over her lifetime, and a full percentage point rise in the population growth rate.
10. R. H. Steckel and R. Floud, Eds., *Health and Welfare During Industrialization* (Univ. of Chicago Press, Chicago, 1997).
11. D. E. Bloom, A. Rosenfield, River Path Associates, *A Moment in Time: AIDS and Business* (American Foundation for AIDS Research, New York, 1999).
12. World Bank, *Confronting AIDS: Public Priorities in a Global Epidemic* (Oxford Univ. Press, New York, 1997).
13. C. M. Becker and D. E. Bloom, *World Dev.* **26** (11), 1913 (1998).
14. World Bank, *World Development Indicators 1999* (World Bank, Washington, DC, 1999).

15. The authors appreciate comments provided by an anonymous reviewer and by participants at a May 1999 workshop cosponsored by the U.K. Department for International Development and the World Health Organization.