WHO on Health and Economic Productivity

The current issue of the World Health Organization's annual flagship publication, titled The World Health Report 1999: Making a Difference, *is the first issued under Gro Harlem Brundtland, WHO's Director-General, who assumed the office in 1998. In her preface to the 121-page report Dr. Brundtland identifies four major challenges to be addressed in order to improve the world's health: the need to reduce the burden of excess mortality and morbidity suffered by the poor; the need to counter potential threats to health resulting from economic crises, unhealthy environments, or risky behavior; the need to develop more effective health systems; and finally the need to invest in expanding the knowledge base that made possible the twentieth-century revolution in health.*

Chapter 1 of the report discusses health and development; subsequent chapters address the problems of emerging epidemics and infectious diseases and of maternal and child disability and mortality; health systems development; and the challenges of rolling back malaria and combating the tobacco epidemic. Chapter 1 consists of two parts: the first documents the twentieth-century revolution in human health, the second discusses the inadequately explored problem of the relationship between health and economic productivity. This second section of Chapter 1 is reproduced below in full, with the permission of WHO. (The endnotes were renumbered.)

The global gains in health documented above constitute, arguably, humankind's most dramatic achievement. In our era it is *possible* for every individual to expect to live a long and substantially disease-free life. This accomplishment transcends the need for economic valuation. Health gains have intrinsic value. That said, two particular reasons exist for assessing the economic consequences of better health:

—Understanding health's economic role may help to understand the sources of another of humankind's great accomplishments of the 20th century—widespread rapid economic growth. To the extent that better health has contributed to increased growth rates, investing in health can become a tool of macroeconomic policy.

—Conquering poverty constitutes the central task for development policy at the beginning of the 21st century. Despite rapid economic growth, over a billion humans still exist in absolute, degrading poverty. Because ill-health traps people in poverty, sustained investment in the health of the poor could provide a policy lever for alleviating persistent poverty.

Research has begun to provide clearer evidence of the economic benefits of improving health. But data sets underpinning the research—on characteristics of countries over time or on large numbers of households within a country at a given time—rarely permit conclusive determination of cause and effect. Conclusions drawn from the literature remain, therefore, suggestive rather than definitive. Those conclusions do, though, accord with common sense: healthier people are more productive. Health differences have played a significant role in determining why some countries have grown more rapidly than others, although technological advances and physical capital accumulation may have been more important still. What is the evi-

dence? This section summarizes the literature by, first, reviewing cross-country macroeconomic analyses, then by turning to microeconomic comparisons across households. It closes with a brief discussion of the multiple pathways through which better health influences economic outcomes.

Macroeconomic evidence

Since publication of Adam Smith's *The wealth of nations* over two centuries ago, economists have sought answers to the question of why some countries are wealthy and others poor. Why have economic growth rates differed? The main empirical tool now used to study economic growth is cross-country analysis of the relationship between economic growth (typically measured in terms of the growth rate of per capita GDP) and a range of variables believed to account for why growth rates differ *(1,2)*. Among the factors being explored are: levels and patterns of educational attainment (schooling); population growth, density and age structure; natural resource abundance; personal and government saving (investment rates); physical capital stock; economic policy, for example, the degree of trade openness; the quality of public institutions; and geography, for example, the location and climate of a country.

Recent research has added several specific health indicators to these factors, and looked at the links between them and economic growth. There are direct links between economic performance and health indicators such as life expectancy. Some variables, such as geography and demography, indirectly link health with economic growth. Geography, particularly tropical location, is highly correlated with disease burden, which in turn affects economic performance *(3)*. Demography, on the other hand, is determined in part by health status, and has a direct effect on economic growth through the age structure of the population, in particular the ratio of the working age to the total population.

A major result to emerge from recent research is that survival rates or life expectancy are powerful predictors of income levels or of subsequent economic growth. The studies consistently find a strong effect of health on economic levels or growth rates. Interestingly, economic historians have concluded that perhaps 30% of the estimated per capita growth rate in Britain between 1780 and 1979 was a result of improvement in health and nutritional status *(4)*. That figure lies within the range of estimates produced by cross-country studies using data from the last 30 or 40 years *(5)*.

Health improvements also influence economic growth through their impact on demography. For example, in the 1940s, rapid improvements in health in East Asia provided a catalyst for a demographic transition there. An initial decline in infant and child mortality swelled the youth population, and somewhat later prompted a fall in fertility rates. These asynchronous changes in mortality and fertility, which comprise the first phase of the demographic transition, substantially altered East Asia's age distribution. After a time lag, the working-age population began growing much faster than the young dependent population, temporarily creating a disproportionately high percentage of working-age adults. This bulge in the age structure of the population created an opportunity for increased rates of economic growth. By introducing these demographic considerations into an empirical model of economic growth, analyses undertaken for the Asian Development Bank (ADB) were able to show that East Asia's changing demography can explain perhaps a third to half the economic "miracle" experienced between 1965 and 1990 *(6,7)*.

The ADB study cautions that although a "demographic gift" provides an opportunity for increasing prosperity, it by no means guarantees such results. East Asia's growth rates were achieved because government and the private sector were able to mobilize this burgeoning work force by successfully managing other economic opportunities. Adopting new industrial technologies, investing in basic education and exploiting global markets allowed East Asia to realize the economic growth potential created by the demographic transition. The next phase for East Asia will involve less favourable dependency ratios consequent to population ageing. In contrast, both South Asia and Africa are now entering the period when demographic factors can enhance growth pros-

pects. Appendix 1 describes ongoing work assessing linkages between health and income in the Americas.

Analysts are extending this research in several ways. One line of work, analysing the effects of climate on income, concludes that countries in tropical regions suffer important disadvantages relative to those in temperate zones. In addition to the effects of climate and geography on soil quality, this work suggests that an important causal mechanism through which this effect operates is the interaction of tropical climates and tropical diseases, particularly malaria which can have a significant cost in terms of economic performance *(3)*. Another line of analysis suggests that the interaction of exogenous demographic changes with human and physical capital development can lead to a virtuous cycle of growth, enabling a country to break free of a poverty trap *(8)*.

Microeconomic analysis

Unlike macroeconomic studies that compare the performance of countries over time, microeconomic analyses study the link between health and the income of households and individuals. Until recently, much of the microeconomic literature has dealt with the impact of education and training on labour outcomes. Recent individual and household level studies have, however, paid more attention to health (particularly nutritional aspects of health) and are reaching increasingly consistent findings *(9)*.

Several examples provide an indication of the results of this research. In Indonesia, men with anaemia were found to be 20% less productive than men without it. In one of the few experimental studies in the literature, the anaemic men were randomly assigned to one of two groups in a clinical trial—they received either an iron supplement or a placebo. Those who were initially anaemic and received the iron treatment increased their productivity nearly to the levels of non-anaemic workers, and the productivity gains were large when weighed against the costs of treatment. Thus the effects of improved health were found to be greatest for the most vulnerable, that is, the poorest and those with the least education. Appendix 2 provides more detail on another study, also from Indonesia and also involving an intervention. Here the intervention (introduction of user fees) resulted in lower levels of nutritional status and productivity among those initially poor *(10)*.

A careful statistical analysis of the effects of illness on wages and labour supply in Côte d'Ivoire and Ghana found that wages were significantly lower, in both countries, for each day of disability. Ill-health in the form of disability, in these poor communities, contributed to their continuing poverty *(11)*.

At the household level, it is also possible to measure directly the economic burden created by particular diseases. Tuberculosis provides a relevant example. The economic costs of tuberculosis are made up of two main elements. First, there are the direct costs of prevention and treatment (drugs, health care provider fees, transport, and costs of subsistence at a health centre). Second, there are the indirect costs of labour time lost because of illness. Given these two components of cost, there are several ways in which tuberculosis affects economic outcomes. Tuberculosis-related morbidity directly increases household and public sector expenditures. It reduces labour inputs and can reduce human capital as a result of declines in school attendance. In a case study of costs of improving tuberculosis control in Thailand in 1995, the cost of treatment was estimated to be US$ 343 per case. The researchers also estimated the total indirect cost of lost productivity in Thailand as a result of morbidity associated with treated and untreated cases of tuberculosis, amounting to $57 million.

Pathways of influence

Delineating potential pathways of influence sheds light on health's role within the larger web of determinants of income levels and growth rates. A paper presented to the World Health Assembly in 1952 foreshadowed much of the current work on understanding these pathways *(12)*.

There is evidence that adult health depends in part on child health and itself directly influences labour productivity. Per capita income is defined as the level of income divided by total population. Clearly,

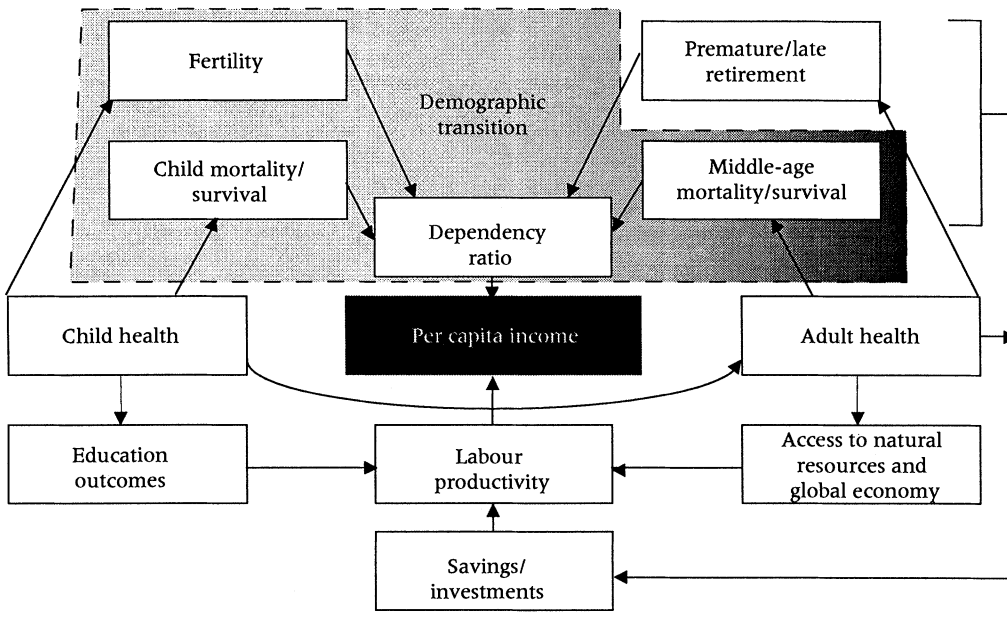
the total population consists of economic dependents as well as the economically active. Improved adult health will improve the dependency ratio both by reducing mortality among the economically active and by reducing premature retirement that results from illness *(13)*, and this ratio changes as a result of demographic transition (see Figure 1, upper part). In Jamaica, for example, individuals with chronic disease were found to be more likely to retire than those who are healthy *(14)*. Better adult health directly affects productivity by increasing work output and reducing absenteeism. Less obviously, geographically specific diseases—onchocerciasis (river blindness) in West Africa is an example—deny communities access to valuable land or productive resources. And high levels of illness in a community may weaken links to the global economy *(15)*—links that through the movement of ideas, goods and capital help create the conditions for more rapid growth (see Figure 1, lower part).

Investments both in physical capital and in education underpin labour productivity. A rapidly growing literature documents the effects of ill-health on children's enrolment, learning and attendance rates in school. Many of the conditions affecting schoolchildren (e.g. intestinal worm infections and micronutrient deficiencies) respond to inexpensive but effective interventions. Recent studies in the psychological literature point to steady, long-term gains during the 20th century in the general intellectual ability of the populations of the high income countries (where data were available to generate trends). One suggested determinant of this trend lies in improved health and nutritional status *(16)*.

The ADB's studies on Asia point strongly to the effect of better health on capital formation. Expectations of a longer life appear to stimulate savings.

Economists should never forget the intrinsic value of health—or that today's health systems have the tools to vastly improve the welfare of the poor at modest cost. But neither should health professionals forget an important message for presidents and finance ministers: investing in health accelerates economic growth and is one of the very few viable approaches to rolling back poverty.

FIGURE 1 Links between health and income



Appendix 1 Assessment of the links between health and productivity: A PAHO initiative

In recent years, WHO Member States in the Region of the Americas have expressed interest in improving the understanding of linkages between investments in health, economic growth and poverty reduction. In response, a joint PAHO/Inter-American Development Bank/UNECLAC study has been initiated aiming at elucidating relations between investments in health, economic growth and household productivity. Preliminary data from Latin American and Caribbean countries show that growth in GDP is statistically associated with life expectancy, as has been found in other studies for a wider sample of countries. Life expectancy at birth alone is one of the strongest explanatory variables of growth in GDP.

Estimates based on data from Mexico throw some light on the timeframe in which health affects economic indicators. High life expectancy at birth for males and females has an economic impact 0–5 years later. The impact of male life expectancy on the economy is greater than that of female life expectancy, probably because of the higher level of economic activity among males. The results suggest that for any additional year of life expectancy there will be an additional 1% increase in GDP 15 years later. Similar findings were observed for schooling. In this case, the correlation between female life expectancy and schooling is greater than that for male life expectancy, probably because of the larger role that women play in child-rearing.

This work drew the implication for economic policy that the relationship between health improvement variables and economic growth is sufficiently significant in the long term to justify sustained national commitment to investing in health. Continued work by PAHO—and its collaborators—should further elucidate these linkages at both the household level and the national level.

Contributed by the WHO Regional Office for the Americas/Pan American Health Organizaiton.

Appendix 2 User fees, health outcomes and labour force participation in Indonesia: A two-year study

In an intervention study in Indonesia—the Indonesian Resource Mobilization Study (IRMS)—the effect of changes in prices of publicly provided health services on labour force participation was examined. In the experiment, user fees at public health centres were raised in randomly selected test districts, while fees were held constant (in real terms) in neighbouring control districts. A baseline household survey was conducted at the end of 1991, prior to the intervention, and the same households, evenly divided between those that were subjected to the fee increase and those that were not, were surveyed again two years later. The experiment involved 6000 households in several districts in each of two provinces. One of the provinces was well-to-do and one was poor. Equal numbers of control and test households were selected from each province.

Use of health care declined in test areas, relative to controls, as did some health status indicators. Using self-reports about limitations in their ability to perform activities of daily living—such as walking 5 kilometres, carrying a heavy load 20 metres, or having spent a day in bed in the previous month—the follow-up study in 1993 showed that the great majority of those where prices had been raised showed at least some ill effects. In IRMS, higher prices are associated with greater difficulty walking 5 kms, more limitations on daily activities and more days spent in bed. For example, both men and women in the test districts reported having had to spend an average of a third of a day in bed more than the control group because of illness. But the effects were much greater among the poor, among men over 40, and among women in households with low economic and educational status. Men in the bottom quartile of per capita income in the test areas reported losing almost a full day more of activity compared to the control group.

Moreover, the follow-up study showed significant declines in labor force participation in the test area among the more vulnerable groups. Men in the over 40 age group had a slight tendency to drop out of the labour market in the test area. Among all women in the survey, both in the control and test groups, labour force participation dropped from 50% to 46% between 1991 and 1993, but there was a 7.3 percentage point difference between those in the test and control groups, to the disadvantage of those paying higher health fees. In the test districts, labour force participation for women with no education fell 14%. Women over 40 were also likely to have high dropout rates from the labour market in the areas where health costs had gone up.

Wage rates for men were also affected. While on average both test and control groups increased their nominal wages by 30% in the two years, the increase came 15% sooner in the control areas. The comparative slippage in the test areas was particularly great for older workers, whose health is presumably a greater factor in their work performance.

SOURCE: Dow WH et al. *Health care prices, health and labor outcomes: Experimental evidence.* Santa Monica CA, RAND, 1997 (unpublished paper).

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