

THE LINKS OF PUBLIC HEALTH
AND ECONOMIC DEVELOPMENT

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THE LINKS OF PUBLIC HEALTH AND ECONOMIC DEVELOPMENT

I am really grateful to have the chance to spend an hour with you to talk about a subject of enormous importance. I am particularly gratified to be in London because so much of the global leadership on tackling the links between public health and economic development in the developing world originates in the UK – with its grand and esteemed tradition of leadership in science and in public health. I hope that after this evening I can bring back home to the USA some of that global leadership and transmit it to Washington! When I look down the list of attendees this evening, at both the remarkable individuals and at the number of leading institutions represented here, it makes me especially proud and honoured to be with you.

You may wonder why a macroeconomist is here to talk to you about public health? After all, for most of my academic life I was involved with setting exchange rates, liberalizing trade, or trying to help end hyperinflations. It is really only in the past five years that I have come to understand in some detail the importance of the topic tonight.

I GEOGRAPHY AND ECONOMIC GROWTH

If you will permit me a minute of personal digression, it may help to explain a little of the fundamental linkage of health and development. For many years I advised governments in different parts of the world on macroeconomic strategy. Turning the macroeconomic dials properly can make an enormous difference in improving the quality of life of people. It is a remarkable thing to see. When an economy such as Poland opens up to international trade and establishes the convertibility of its currency the stimulus to economic growth is quite profound. Sitting in a central bank or in a finance ministry, therefore, it is possible to do many good and helpful things for a lot of people through the use of macroeconomic tools.

What I also learned, however, were the very important things that macroeconomic policies cannot accomplish. It is my experience in many parts of the world, starting in Latin America, and then in Eastern Europe, the former Soviet Union, East Asia and in recent years in Africa, that economic crises often continue even after the

introduction of proper macroeconomic reforms. Indeed, a study released last week by the Organisation for Economic Cooperation and Development (OECD) talks about cases of macroeconomic liberalisation that were not followed by significant reductions of poverty.

As a result of such cases, I became more and more interested in the long-term sources of economic growth and decline, beyond the management of the macroeconomy. There is, of course, no single answer to why some countries fail to achieve sustained economic growth. When there is chronic economic stagnation, there are many potential explanations. I often chide my economist colleagues who think, 'governance' or 'corruption' or 'closed markets' or 'X' can explain all cases of economic failure. I remind them that a pathology textbook does not have just one page in it. Many things can go wrong with the complex human organism. When you are dealing with the complexity of human society, it is also the case that many things can go wrong.

Some of the pathologies that afflict economies are deep and difficult to overcome. They are 'congenital' – if I may use a bad analogy – to certain geographical locations in the world. The fact that not all places in the world have the same propensity to achieve economic growth is an admission that economists and policymakers do not like to make, but it is true. There are parts of the world that will have a tough time of it in economic development simply because of where they are.

After working to help Bolivia end a hyperinflation in the mid-1980s, I came to appreciate that Bolivia struggles partly because it is a landlocked country divided between a majestic altiplano at 12,000 ft above sea level in the Andes Mountains and a tropical lowland to the east. Bolivia has been landlocked since 1879 when it lost its coastline to Chile in the War of the Pacific, and it is has proven hard to achieve rapid and sustained rates of economic growth with the very high transportation costs and other difficulties associated with being landlocked and with the mix of highland and tropical lowland populations. These implications of geography might seem obvious, but amazingly you would not find them discussed in most textbooks on economic growth and development.

Economists, I have come to understand, look mainly at tables of numbers, much less frequently at maps, and very infrequently at topographical maps. They therefore miss some fairly obvious points:

that Andean countries have a hard time of it, just as do countries in the Altai mountain range such as Kyrgyzstan and Tajikistan. There are intrinsically deep reasons underlying this. All landlocked countries in poor regions of the world are having a hard time of it. My policy advice is that if you are going to be landlocked, do it like Switzerland – in the middle of Europe. At least you have rich neighbours! Do not make the big mistake of being landlocked in central Asia or in the Andes region or in the middle of Africa, because your neighbours are impoverished, you are impoverished and you'll have a very hard time getting to the coast to engage in growth-promoting international trade!

There was a second geographical pattern that, more and more, appeared to me to be a central feature of economic development and, that again is one that economists do not much talk about. It is a feature, indeed, that may represent the the most powerful single correlate of economic success and failure over the long period of the era of modern economic growth (roughly the period from 1820 to the present). Almost without exception, countries in tropical climate ecozones are poor. In the 30 or so economies that the World Bank defines as high-income economies there are only two that have a tropical ecology: Hong Kong and Singapore. The rest of the tropical world comprises either very poor or middle-income developing countries. It is also fair to say almost the converse: that if a country is in temperate zone it is probably fairly rich. If a poor country lies in a temperate ecozone then the chances are that it is either landlocked or a former Communist country, but rarely anything else. It is rare, in other words, to be a temperate zone economy and poor in the world; and it is equally rare to be a tropical zone economy and rich in the world. This is a very persistent pattern.

There are, thank goodness, some tropical economies that have achieved fairly good economic growth in the last 25 years, and they give us some hints of ways out of a tropical development trap. I'll return briefly to that point as well. The broad pattern, however, is an unmistakable climatic gradient that begins with rich countries in high latitudes, with countries getting poorer as one moves towards the Equator, and then countries starting to get richer again, as one moves further south to the temperate zones in the Southern hemisphere. Thus, the richest part of South America is the so-called Southern Cone – Chile, Argentina, Uruguay, Southern Brazil – in the temperate southern tip of the continent. The richest part of Sub-Saharan Africa, similarly, is the temperate-zone southern tip of the

continent. The richest part of the southern Asian region is Oceania – New Zealand and the temperate belt of Australia.

The temperate-tropical gradient works therefore in both the northern and the southern hemispheres, and even with countries such as Brazil that straddle the tropical and temperate zones (with a much richer temperate region in Southern Brazil compared with the poorer region of the tropical Brazilian Northeast). There is no ‘North-South divide’ in the world, as we are fond of calling the divisions between rich and poor countries. There is in fact a ‘temperate-tropical’ divide instead. The South is doing all right, thank you. It is the middle that is struggling!

This is a point that more and more came to worry me as I noticed the prevalence of palm trees in the troubled economies that I was advising. As you advise one finance minister after another, driving from meeting to meeting in verdent tropical settings, you ask yourself why you are spending so much of your time in the tropics rather than other places? With the exception of the cold-climate post-Communist countries, which are poor for quite apparent other reasons, you begin to ask the question ‘Is there something systematic going on in the tropics?’.

II THE IMPACT OF A TROPICAL ENVIRONMENT

I have spent the past few years trying to understand what is going on and I expect to spend a number of years further. What I have come to believe, however, and think that the data support (Sachs, 2001), is that the tropical environment creates particular difficulties in two spheres of human society: health and food production. These are deep difficulties, but they are areas that can be addressed through public policy.

The tropical environment tends to impose a high burden of infectious disease on human society. Throughout all parts of the tropical world, most notably but not exclusively in sub-Saharan Africa, there is a range of diseases – we call them ‘tropical diseases’ – that are endemic to hot climates and that are almost non-existent or have a very low foothold in the temperate zones. The most important of these is malaria, a disease that has powerfully shaped the global distribution of income and poverty.

Malaria is a disease that is fundamentally related to climate, for solid biological reasons. As I am sure that many people here know much better than I, the transmission of malaria by the *Anopheles* species of

mosquitoes involves a complex life cycle elucidated by British scientists 100 years ago – actually Italian scientists as well, but I will not get into the disputes tonight on the primacy of discovery! As you know, malaria transmission occurs when a female *Anopheles* mosquito takes a blood meal from an individual infected with the protozoan *Plasmodium*, and then takes another blood meal from a non-infected individual some days later, depositing the protozoan in the second individual. During that interval, the protozoan must make an important life-cycle change in the mosquito host, from a sexual (gametocyte) stage to a non-sexual (sporozoite) stage. Without that transformation, the mosquito is not infective. What is important from the point of view of disease ecology is that the transformation involves a race against time between the protozoan and the mosquito, because the life expectancy of the female *Anopheles* is about the same as the time it takes for the transformation of the plasmodium. If the mosquitos in one place tend to die first, human society is in luck: there is no stable transmission of malaria. If the mosquitos tend to die after the transformation has taken place, then it is the *Plasmodium* which is in luck. Malaria will be transmitted.

Climate matters fundamentally, because the warmer the outside temperature, the faster will be the life cycle transformation of the *Plasmodium*, and the more likely it is that the protozoan wins the race against time. Human society loses. Although there is a lot of variation, it requires roughly 18°C ambient temperature to sustain holoendemic malaria transmission. If a locale does not have at least 18°C all times of the year, the region is unlikely to have year-round malaria transmission. Even if the locale does have a warm enough temperature, the transmission of malaria still depends on rainfall, breeding sites, and the competence of the particular species of *Anopheles* that are present.

In places like southern Europe or southern United States, which had seasonal malaria, the hold of malaria was rather fragile because for many months of the year it could not be transmitted (or more technically, the force of infection was low at most times of the year, often less than the threshold of 1.0 needed for sustained transmission of the disease). With technological advances like DDT in the 1940s and 50s, it became possible in temperate zones to eradicate malaria or at least to dramatically control it.

In most tropical places with year-round transmission and competent mosquito vectors, it is still today extraordinarily difficult to bring

malaria under control. There are some new and effective approaches – such as the use of insecticide-impregnated bed nets – and some locations, such as urban settings, where success through vector control is possible. And fortunately, even when individuals contract the disease, medicines can keep them alive and clear the infection – if they receive prompt and appropriate medical care. Overall, malaria is a prime example of climate-determined disease ecology that powerfully shapes the economic development prospects of large parts of the world.

The second fundamental channel through which tropical ecology seems to impact economic development is through agricultural productivity, especially food productivity. That is, the amount of food output per unit of input seems to be lower in the tropics than in the temperate regions. (Agricultural productivity is often reported as output per hectare, but that is not an appropriate measure in the current context, where we are trying to isolate the effects of climate, because the amount of labour, fertiliser, tractors, and so on, used per hectare also vary across ecological zones. The appropriate analytical measure is output per unit of input, with the input measure defined as an appropriately weighted index of labour, fertilisers, etc.).

My best guess is that, if one properly measures the inputs and the outputs in food production, tropical settings show systematically lower food output than temperate zone settings, on average, even after taking account of the vast differences in agronomic conditions throughout the world in regard to soils, pests, precipitation, and other factors which also help to determine the productivity of agronomic systems. This temperate zone advantage is certainly true of wheat, the world's major staple cereal. Wheat does not generally grow much in the tropics except in upland areas where cooler temperatures create temperate conditions. But it is also true for crops like maize, which are grown both in tropical and temperate zones. Rice output per unit input tends also to be higher in temperate zone conditions.

Let me immediately say that there are hundreds of exceptions to my generalisation, but it is not I think wrong as a generalisation. As with infectious disease, the most important effects of climate on food production are probably related to high tropical temperatures. There are many links between ambient temperatures and food productivity. One is the effect of temperature on soil nutrients. High temperatures tend to cause rapid mineralisation of soil nutrients, which then tend to be leached by heavy tropical rainfall. When a peasant farmer cuts down a

part of the rain forest to plant crops, within two or three years the fertility of the soil usually diminishes sharply because the soil does not hold the nutrients. The tropical soil structure also often proves inadequate to hold fertilisers, because of low cation exchange capacity (CEC), which is a feature of high temperatures interacting with soil formation.

Exceptions occur where you have tropical areas that sit on wonderful volcanic soils, which have such high nutrients that they cannot easily be leached away. That is why Java is one of the most densely populated parts of the world. Much of the Indonesian archipelago cannot support high population densities. Java is special, it has volcanic soils with very high nutrients. If you go to neighboring islands like Sumatra and Sulawesi, there is much greater soil erosion and nutrient depletion, and much lower population densities as a result.

I will not talk further about food production in the tropics, except to say that if a location has low food productivity the long-term economic implications are often quite stark. Food productivity is so low that the rural population does not create a food surplus that can sustain a high rate of urbanisation. One of two things tends to happen. Either virtually all of the people work in subsistence agriculture, or the economy imports its food from abroad. Tropical environments with low food productivity therefore tend to be regions with very low urbanisation or, quite conversely, small urban conclaves like Hong Kong and Singapore that obtain their food through international trade. Since urban areas tend to be the engines of technological advancement, tropical regions with high concentrations of subsistence peasant farmers rarely achieve sustained and rapid economic growth.

We can now see three reasons why Singapore and Hong Kong are rich tropical economies that help to prove the rule about tropical underdevelopment. First, as little islands they can better control disease vectors such as *Anopheles* mosquitos. Mosquitoes do not drive across the causeway into Singapore. If you shoo them off, you can keep them off more easily than you can if connected by land to another mosquito-infested region, as is of course the case of most Sub-Saharan African countries. Second, there are of course no large rural populations in Hong Kong and Singapore grappling with the difficulties of tropical food production. Third, of course, these two city-state economies are blessed with fabulous locations, in the middle of great sea-based trade routes between Europe and Asia, and with wonderful natural harbours.

More generally, sustained economic growth in the tropics generally requires that economies do three things: procure foodstuffs through international trade; keep tropical diseases under control; and earn foreign exchange through non-food exports, in part to pay for food imports. Malaysia, a premier success story of rapid economic growth in the tropics in the past thirty years, has followed this trade-based pattern, becoming a major consumer electronics exporter (a sector which does not have any intrinsic climate-based disadvantage!).

III EXPLAINING DIFFERENTIAL GROWTH

I have made a very long digression into how I became more and more conscious of the importance of climate and health factors in the long-term success or failure of regions in economic development. I started to study these factors more systematically in quantitative form, using the tools of macro-economics and trying also to bring together a myriad of relevant studies of micro-economics, both case studies and historical studies.

There is a powerful message in the data. Macro-economists have a favorite list of variables that they use to explain why some countries achieve rapid growth and some countries have chronically low or negative rates of economic growth. For example, macroeconomists typically would suppose that differential patterns of economic growth across national economies during the time period 1970-2000 would be explained by initial income levels of 1970; initial levels of education of the population in 1970; the sizes of budget deficits during the period of observation; the average rates of tariffs and other trade distortions; the convertibility of the currency; the rates of inflation; the extent to which private property rights are protected; and a number of additional variables which macro-economists have found to be correlated with long-term economic growth. They would expect that countries would grow more rapidly to the extent that: they were poor in 1970 (with more room to 'catch up'), had high initial levels of education in 1970, maintained low budget deficits and tariff rates during the period 1970-2000, and maintained strong protection of property rights.

If one takes this kind of multivariate statistical framework where the growth of countries is associated with key economic characteristics of these countries, it turns out that *disease-related indicators* also are important in accounting for differences in economic growth. For

example, *countries that had high infant mortality rates in 1970 systematically had lower growth rates during 1970-2000*, even after controlling for the standard list of macroeconomic variables. Similarly, other measures of health – such as life expectancy or the proportion of a country’s population living in endemic malarious regions – are also highly predictive of economic growth. In general, a high disease environment is found to be a serious impediment to economic growth. The statistical magnitude of the effect of disease on growth is large, indeed larger than most of the macroeconomic variables.

For example, my colleagues and I have found in a number of studies that the differential economic growth of countries with holoendemic malaria transmission versus no malaria transmission is more than one percentage point per year. Our point estimate is that a holoendemic malarious region grows 1.3 percentage points more slowly per year than a non-malarious region. This is a fantastically large effect, signifying that over the course of decades, malarious countries will have achieved only a small fraction of the income levels of non-malarious countries. These models point very strongly to the fact that disease directly and strongly impedes economic growth, and this finding holds true even after controlling for the kind of key macroeconomic indicators that are so beloved by macroeconomists. There are many ways to tweak and test that proposition. In my opinion, they all point in the same direction: to the pervasive, deep and long-term effects of disease environment on broad measures of economic performance.

This macroeconomic evidence can be bolstered by many other kinds of evidence also showing how disease impedes economic development. Detailed evidence on these adverse effects of a heavy disease burden have been adduced in many kinds of studies, including household-based surveys, political science investigations, and historical studies of the effects of disease on society. Household-based studies repeatedly demonstrate the enormous costs of disease to individual household incomes, and the risks that a serious disease episode can throw a poor family into chronic poverty. Political studies have demonstrated that high rates of disease are associated with much higher levels of political and social instability, and with increased risks of major political upheaval and state failure. Historical studies have demonstrated that regions chronically burdened by high rates of infectious disease are also burdened by persistently low rates of economic development. Moreover, most of the great ‘takeoffs’ in

economic history – such as the rapid growth of Britain during the Industrial Revolution; the takeoff of the U.S. South in the early 20th century; the rapid growth of Japan in the early 20th century; and the dynamic development of Southern Europe and East Asia beginning in the 1950s and 1960s – were preceded by important breakthroughs in public health, disease control, and by improved nutritional intake.

IV HOW DISEASE IMPEDES ECONOMIC DEVELOPMENT

High disease burdens affect societies in fundamental ways. There are at least seven major channels through which disease impedes economic development.

The first channel is the lost productivity of individuals who experience bouts of illness or premature mortality. If you are sick, your productivity goes down. And it's also true that disease at almost any stage of the life cycle can cause persistent losses of labor force productivity. Childhood disease, for example, can have lifetime consequences for physical and cognitive development. Even intrauterine nutritional deficiencies can have lifetime consequences on physical and cognitive performance. Repeated bouts of malaria in childhood can lead to chronic anaemia which, if it does not kill the child, can cause them to drop out of school and impair cognitive and physical development. Then there are, of course, the productivity effects of adult disease episodes. Fatal illness leads to the death of workers who have accumulated education and on-the-job training, often in the prime years of their working lives in the case of HIV/AIDS. Bouts of adult illness or chronic disability impair individual productivity; workforce performance; cognitive capacity; physical stamina; time on the job; capacity to absorb on-the-job training, and the ability to care for children.

The second channel involves the demographic consequences of a high-disease environment. High infant and child mortality rates (defined as the number of deaths under the age of five per thousand live births) lead to very high fertility rates. Families replace lost children. They even 'horde' children in expectation of future mortality, by having more than enough children to compensate for their expectation of mortality. Risk-averse households in a high-mortality setting might have six or seven children on average to assure a high enough probability of at least one surviving son. This in turn has pervasive and adverse consequences on economic development.

Most importantly, when poor families have lots of children they cannot invest very much in the health and education of each individual child. The average level of investment in education therefore goes down. Often, as a consequence, a poor family will choose to educate the older son but not to educate the younger sisters or brothers.

Ironically, because very high fertility rates tend to overcompensate for the expected mortality rates of children, it is precisely the poorest parts of the world, with the poorest prospects for economic growth, where population growth is currently the fastest. Examples include tropical, landlocked countries like Niger, Chad, Mali, Central African Republic, Rwanda, Burundi, Zambia, and Malawi. These countries have population growth rates of as high as 3 per cent a year, implying a doubling of the population every 24 years or so. Because these are low-technology landlocked environments, where almost everyone is employed in subsistence agriculture, high population growth rates are translating into declining land-labour ratios, so that farmers have smaller and smaller plots and less food output per farm family.

The third channel through which disease impedes economic development operates through reduced household saving rates. When the time horizon of the household is shortened by low life expectancy, household saving, whether through investments in education or investments in financial markets, tends also to be reduced.

The fourth channel is the reduced productivity of enterprises that experience high rates of illness and premature mortality among their staff. Enterprises have 'organisational capital.' They invest heavily in sorting, organising, and creating collaborative networks of their employees. When enterprises are losing employees to high absenteeism and high death rates, as is occurring as a result of the AIDS pandemic right now, this organisational capital is undermined or destroyed. Disease affects enterprise productivity in other ways as well. For example, malarious environments are terrible places to put tourist hotels, or even export processing zones. So too are regions with high HIV/AIDS prevalence. Southern Africa is currently experiencing a collapse in foreign direct investment, and no small part of this I would suppose is the result of the AIDS pandemic.

Fifth, there is an erosion of 'social capital,' that is, the level of trust and cooperation within society at large. It was odd for me to appreciate at first – but I am becoming a believer the more I watch, learn and read the anthropological evidence – that the social

interpretation of disease matters a great deal in this regard. In many parts of Sub-Saharan Africa the AIDS pandemic is having a double effect. It is not only killing people by the millions but is also leading to a massive rise in social conflict because the disease is interpreted within a social conflict framework. The sick and dying are seen as victims of witchcraft, poisonings, unhappiness of the ancestors, and other malefactions. You find communities where for every person dying there is also a person being accused of witchcraft for having killed that person. It is often supposed that the dying individual must have done something to offend the spirits of the ancestors, to undermine the harmony of the family, and so forth. Thus, the pandemic is ripping society apart at the same time that it is causing individual human tragedy. (One of the reasons for such interpretations, incidentally, is that in many parts of sub-Saharan Africa, modern medicine is simply not present. There are no doctors giving drugs for AIDS. The prevalence of witchcraft as an interpretation of the disease exists because medicine has simply not stepped in. This is one of the great tragedies of the lack of an adequate international response to AIDS.)

A sixth channel is macroeconomic instability. Disease control requires substantial budgetary outlays – more than any of the hard-hit countries have available. On the other hand, disease undermines national economies, and revenue generation for the budget. That means that a heavy disease burden tends to widen fiscal deficits and thereby contribute to macroeconomic destabilisation. This is another channel through which a heavy disease burden can undermine economic progress.

A seventh, and obvious channel, is that disease directly impoverishes households through the outlays that households make, whether effective or ineffective, on disease prevention or treatment. Traditional healers, for example, are incredibly expensive – maybe a month of salary to go to a traditional healer who may give some fairly toxic concoction in response to an HIV infection. We have the double-whammy of a massive loss of household income and, at the same time, a completely ineffective or even dangerous response.

There is an eighth category of economic loss: the pain and suffering caused by disease beyond the lost income from disease. Economists sometimes count last what others count first, namely the enormous value in avoiding or treating disease because of the horrendous psychological consequences of illness and premature mortality.

Economists do come round to that by measuring the ‘willingness to pay’ for disease avoidance – and such willingness to pay is usually very high indeed. In the United States, people often demonstrate (through their labor market choices or other signals) a willingness to pay hundreds of thousands of dollars to avoid even modest probabilities of death. Such high willingness to pay demonstrates the enormously high economic value of health. A lot of that value is beyond the direct income-earning consequences of disease.

I regard the public health community as so beaten down by the finance ministers of the world that they ask for very little indeed. They say, ‘Okay. As long as the intervention costs only \$50 per life year saved, it’s cost effective. If it is more than that, we don’t want to do it. It’s too expensive’. We almost literally throw out human beings in this world – even though they could be saved at incredibly low cost. We need to rethink this.

\$50 for a life year? In the United State the norm is that if the life year saved costs less than \$100,000 a year, it is probably cost effective. So we have a standard for Africans of \$50 per life year and a standard for Americans at \$100,000 per life year. I regard that as nonsensical economics, not to mention morally repugnant. If we willfully discard people every time if it costs more than \$50 to save them, we throw out lots of good people in the world, and we utterly disrupt society.

This came home to me when I was working at my computer a few weeks ago. All of a sudden, a virus popped up on my computer screen. It was terribly frustrating; it debilitated the computer. I realised that if I were in Africa and this was a human infection, the result would be fatal. Fortunately, I am in a rich country and I was able to call a neighbour, who came in and did the appropriate computer virology to debug the computer. He gave it some kind of Windows ‘Interferon’ and got rid of the virus and saved the computer.

V THE INTERNATIONAL POLICY IMPLICATIONS

Let me turn, finally, to the question of international policy: What is to be done about all of this? The most distressing thing that I have learned as a macroeconomist working in the area of public health is that the international response to the heavy disease burden in the poor countries has been shockingly, indeed scandalously insufficient. The more closely I look, the more shocking I find the inadequacy of the response to be.

It turns out that the world community – a euphemism under the present circumstances – does very little about all of this. Of all the donor agencies, your own DFID is probably the most focussed on the issue of public health in poor countries, and it should be congratulated for its leadership in this area. Still, taken as a whole the international donor response to the disease burden in the poorest countries, especially in Sub-Saharan Africa, has been meager. The most recent data, for 1999, suggest that the global donor effort for all health programs in Sub-Saharan Africa totalled around \$865 million. For the 650 million people in sub-Saharan Africa, facing the greatest pandemic in centuries in HIV/AIDS, that \$865 million translates to about \$1.30 per African per year. That is the tragically insufficient sum total of our help.

We the rich countries in combination constitute a \$25 trillion-rich economy at this point, if you add together the US, Europe, Japan, and handful of other high-income countries. \$865 million is not a lot of that annual income. Just do the arithmetic. With \$25 trillion, 1 per cent of the annual national product is \$250 billion; one-hundredth of 1 per cent is \$2.5 billion. So \$800 million constitutes around one-third of one-hundredth of 1 per cent. One-hundredth of 1 per cent is like giving 1p out of every £100 of income. *One third* of that is therefore 3p out of every £1,000 of income. In other words, we in the rich countries have not even started to face up to the reality of the disease burden in the poor countries.

Because of the stinginess to date of rich countries, we have somehow got into the pattern of judging that it is not cost effective to save people even for very low amounts of money. Rather than discarding people in this reckless and morally indefensible way, we ought to be mobilizing enough donor support to expand dramatically the range of medical and public health interventions that are available to poor people.

You might ask why did I jump so quickly to the role of the donor countries, without asking what the developing world should do on its own or discussing the position of middle income countries? One reason is my limited time this evening to go into detail.

Secondly, the situation in the developing world is by far the most urgent. The killer diseases of malaria, HIV/AIDS, tuberculosis, acute respiratory infection, diarrhoeal disease, and deaths associated with childbirth are ones where there are effective, if imperfect, interventions, but no money or capacity to tackle them in these countries. By contrast

middle-income countries typically already have life expectancies around 70; infant mortality rates may be down to 35, and sometimes even lower, per thousand live births.

Third, middle income countries, if they are well governed, generally have the resources to face their own crises, at least to a substantial extent. I would not want to be categorical that it can all be done out of domestic resources. However, we have seen that, for example, with good leadership, Brazil has grasped the nettle with HIV/AIDS and has had a huge effect on the pandemic using its own resources.

I put the urgency on donor support for the low income countries, both because the disease burden is highest there and because the capacity to tackle it out of domestic resources is the least.

The poorest countries cannot possibly sustain adequate systems of public health out of their own meager resources. Again, the arithmetic is painfully obvious. Tropical Sub-Saharan Africa (Sub-Saharan Africa other than South Africa for these purposes) has an average *per capita* income of about \$310 per year. A country with \$310 per year income *per capita*, with glorious political leadership and no foreign debts could perhaps mobilise as much as 5 per cent of GNP in budgetary outlays for health. But even that sum would give just \$15 per person per year for public health. Actually, African countries do not achieve even \$15 per person per year. Spending is closer to \$7 per person per year, because the countries spend about 2¹/₂ per cent of GNP per year on health. The meager donor contribution of around \$1.30 per person per year is hardly responsive to this reality.

It is simply not possible to run an effective health system at \$15 per person per year, much less \$7 per person per year. It is no use bemoaning the corruption of the health services in Africa, or saying that without corruption that so much more could be accomplished, if there are not the resources to hire professional managers to run a professional system. At the meager levels of resources that are available, African health services cannot hire the needed managers, doctors, or nurses. It is no surprise that when one tours the primary health centres of Africa there is almost no diagnostic capacity; there are rarely any microscopes; there is generally no refrigeration, or perhaps two or three hours of electricity available per day to maintain refrigeration; there is rarely a telephone; there is almost never an ambulance; and there is rarely any kind of system of referrals from primary centers to district hospitals.

My guess is that we need donor support for Africa to reach \$10 to \$20 billion per year, and we should aim for the higher end. That would add around \$30 per person per year (given the 650 million people in Sub-Saharan Africa), which could make a substantial difference. But do not panic! That sum, while large, requires just \$10 to \$20 per person per year in the rich countries, since the combined rich-country population is about 1 billion people. We can easily afford that sum every year. It represents less than one-tenth of 1 per cent of our annual income.

VI CONCLUSION

In conclusion, what I have been saying in my work as Chairman of the Commission on Macroeconomics and Health for the WHO, in my own research, and in my own advocacy (or 'nagging mode') in the United States, Europe and Japan, is that we have to get serious about public health in the poor countries if we are to be serious about economic development. That will mean a lot more donor money, and a lot more focus of our attention on the startling and tragic disease burdens afflicting the world's poorest nations.

I will end on a piece of brighter news – at least, potentially brighter news. We need a new way of delivering health for the poorest countries, to fight disease in its own right and as part of a new strategy on global economic development. We need a global strategy and a global attack on the main killer diseases. We need an approach that takes account of local circumstances, but does not try to engage 23 separate donor agencies of the rich countries working separately with 49 sub-Saharan African countries, thereby producing more than 1,100 separate programmes.

For the last couple of years, I have been advocating that we need a global fund to mobilise real resources to fight disease, operating on the scale of \$10 to \$20 billion per year. The concept of a global health fund is now becoming a reality. This is wonderful and, I believe, potentially path-breaking news for the world. At a recent African Summit Meeting on HIV/AIDS in Abuja, Nigeria, the Secretary-General of the United Nations launched an appeal for a global health fund to fight HIV/AIDS, tuberculosis and malaria. Last week, to my delight, the Bush administration endorsed the concept and made a first contribution.

The good news is that we are finally gearing up to a global fight

against the main global pandemics. The bad news is that we have a way to go in raising the needed financing. The world's richest country, the United States, pledged an initial \$200 million to the fund. This is far from sufficient. In the coming weeks I hope that the United Kingdom, in addition to making a sizable pledge in its own right, will explain to its good and special friend across the Atlantic, over and over again, that we need more leadership – and financing – from the US side. We need perhaps 10 times the contribution that has been announced so far.

A large global fund to fight disease, disbursing billions of dollars per year, is politically possible. We can deliver \$20 billion effectively, without it being squandered, using country-driven programs better tailored to country needs, more easily monitored, and subject to independent expert review. The need, I believe, is so clear, so urgent, and so right, that we are likely to reach that goal.

REFERENCE

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