

First, I needed a “baseline” to describe the expected demographic trends in the absence of HIV/AIDS: for this baseline, I chose the U.S. Census Bureau’s most recent population projections for the period from 2000 to 2025 for China, India, and Russia. Then, I had to make some basic presumptions about the nature of the local HIV/AIDS epidemics themselves.¹ These particular assumptions affect all subsequent calculations—but the only truly critical one was that the epidemics would be essentially “heterosexual” in nature. (As the previous discussion showed, that view is not the least bit unrealistic.) I assumed the HIV-positive population to be one million as of 2002 in Russia, two million in China, and four million in India—necessarily arbitrary figures, to be sure, but ones well within the range of informed assessments today.

Finally, I had to make conjectures about distinct future HIV “prevalence scenarios” for each of the three countries. That is to say, how bad would the epidemic become over time? Clearly, this was the trickiest—and most arbitrary—facet of the effort. I identified three “families” of scenarios for the disease, which I termed “severe,” “intermediate,” and “mild”—corresponding to high, medium, and low levels of HIV infection. (“Severe” is taken here to mean adult HIV prevalence by 2025 reaching as high as 10 percent in Russia, 7 percent in India, and 5 percent in China; “intermediate,” 6 percent, 5 percent, and 3.5 percent, respectively; and “mild,” 2 percent, 1.5 percent, and 1.5 percent.) These different scenarios, though quite arbitrary, fall well within the expectations of informed independent observers today.

CHRONICLE OF DEATHS FORETOLD

THE MODEL lays out a series of specific and staggering implications for the spread of HIV/AIDS in Russia, China, and India.

¹For the technically inclined, I assumed that 1) each epidemic got underway around 1985; 2) in each country, the median incubation period for HIV carriers between infection with HIV and the onset of AIDS is nine years; 3) life expectancy after the onset of AIDS averages two years; and 4) HIV epidemics in Russia, China, and India are all subject to the “standard heterosexual” distribution between the sexes and over age groups that has been witnessed in other low-income countries (especially those of sub-Saharan Africa). For computing demographic and epidemiological results, I selected the SPECTRUM software package developed by the Futures Group International for the U.S. Agency for International Development.

The magnitude of infection. First, the absolute magnitude of the Eurasian HIV/AIDS epidemic over the coming quarter-century will match or exceed that of the entire worldwide HIV crisis up to now. For example, under the assumptions of even a mild epidemic, the cumulative total of

new HIV cases in China, India, and Russia from 2000 to 2025 would be about 66 million, compared to UNAIDS estimates of about 65 million infected worldwide to date. The other scenarios predict even higher HIV totals: an intermediate epidemic would suggest nearly 200 million new HIV cases in the next 25 years, and a severe epidemic would lead to more than 250 million new cases (see Table 1).

The death toll. In each scenario, the cumulative death toll from AIDS over the next 25 years for Russia, China, and India vastly exceeds the total number of people killed by AIDS globally so far. UNAIDS estimates that AIDS—from its onset to the present day—has taken about 25 million lives. By contrast, a mild epidemic would project a cumulative total of about 43 million AIDS deaths for these three countries from 2000 to 2025. And the other projections look far worse. During an intermediate epidemic, for example, the hypothetical toll would be about 105 million, more than four times as many as have died to date (see Table 2).

On an annual basis, the numbers are equally astonishing. According to UNAIDS, the current annual aggregate death total from AIDS is about 3 million people per year. By comparison, the mild epidemic scenario suggests that Russia,

Table 1: Cumulative New HIV Cases, 2000–2025

	Mild Epidemic	Intermediate Epidemic	Severe Epidemic
China	32 million	70 million	100 million
India	30 million	110 million	140 million
Russia	4 million	13 million	19 million

NOTE: All figures in this table and the ones that follow are projections based on the model described on page 34.

Table 2: Cumulative AIDS Deaths, 2000–2025

	Mild Epidemic	Intermediate Epidemic	Severe Epidemic
China	19 million	40 million	58 million
India	21 million	56 million	85 million
Russia	3 million	9 million	12 million

Table 3: New AIDS Cases in 2015

	Mild Epidemic	Intermediate Epidemic	Severe Epidemic
China	1.2 million	2.6 million	3.9 million
India	1.0 million	3.0 million	4.9 million
Russia	0.2 million	0.5 million	0.7 million

India, and China would suffer a collective total of nearly 1.7 million deaths a year in 2010, and 2.3 million by 2015. In an intermediate-epidemic family of scenarios, deaths would top 3 million in 2010 and would approach 6 million in 2025.

New AIDS cases. In every scenario considered here, Russia, India, and China would each have to contend with massive numbers of new AIDS cases in the decade 2010–20. That result follows simply from the long incubation period between HIV infection and the onset of AIDS, and the large number of HIV carriers that each country is projected to accumulate between 2000 and 2015. The discussion also presumes that a cure for AIDS will not be found during this time frame.

The model's illustrative calculations, for example, suggest that China experienced "only" 30,000 new AIDS cases in 2000. By 2015, assuming just a mild epidemic, new AIDS cases in China erupt at a pace of nearly 100,000 per month. In India, the projected numbers are equally shocking. In 2000, according to these estimates, India was facing a significant burden of 100,000 new cases of AIDS a year. But even under a mild epidemic, the total would exceed one million a year in 2015, and would rise still higher for every year between 2015 and 2025 (see Table 3).

Population changes. The HIV/AIDS epidemics modeled here could significantly alter population dynamics in these Eurasian countries and might substantially reduce the future size of certain economically important population cohorts. Under the milder epidemic, for instance, the aggregate populations of India, China, and Russia would be almost 90 million lower in 2025 than Census Bureau projections (the baseline) currently anticipate (see Table 4). Worse, the cohort often labeled the "economically active" population—persons 15 to 64 years of age—would be about 44 million fewer than currently projected (see Table 5). Under less optimistic scenarios, the demographic impact is correspondingly greater.

Table 4: Population in 2025

	Without HIV	Mild Epidemic	Intermediate Epidemic	Severe Epidemic
China	1.46 billion	1.42 billion	1.39 billion	1.37 billion
India	1.38 billion	1.34 billion	1.30 billion	1.26 billion
Russia	0.14 billion	0.13 billion	0.12 billion	0.12 billion

In these projections, Russia is hit especially hard demographically. This trend occurs not simply because the model posits somewhat higher HIV rates for Russia than for India or China but also because Russia's population is projected to decline over the coming quarter-century—even in the absence of any worsening of its HIV crisis. Under the conditions of even a mild epidemic, however, that decline is projected to accelerate dramatically.

Table 5: Working-Age Population in 2025

	Without HIV	Mild Epidemic	Intermediate Epidemic	Severe Epidemic
China	1.0 billion	981 million	963 million	947 million
India	932 million	910 million	879 million	854 million
Russia	89 million	86 million	81 million	78 million

Reduced life expectancy. Finally, and in some ways most portentous, all of the scenarios point to either a stagnation or a reduction in national health levels as reflected by life expectancy at birth. This decline is an inescapable arithmetic consequence of the expected surge in mortality. In many ways, the future looks bleakest for Russia. For instance, under the severe epidemic scenario, Russian life expectancy would be a full decade lower a generation hence than it is today. The projections for China and India, although not as dramatic, are still deeply troubling (see Table 6).

This modeling exercise can be faulted in a number of respects—modeling exercises always can. What these separate scenarios commonly

Table 6: Life Expectancy in 2025

	Without HIV	Mild Epidemic	Intermediate Epidemic	Severe Epidemic
China	77 years	74 years	71 years	69 years
India	71 years	68 years	62 years	58 years
Russia	73 years	69 years	63 years	56 years

highlight, however, is this: reasonable, historically grounded assumptions about the future course of HIV/AIDS suggest the real possibility, and perhaps even the likelihood, of an unprecedented cost in human lives for Russia, India, and China in the years just ahead.

THE ECONOMIC CONSEQUENCES OF THE DISEASE

EURASIA'S HIV/AIDS EPIDEMIC will clearly have far-reaching economic ramifications in the coming decades. The number of dead, to begin with, threatens to be absolutely enormous. Furthermore, AIDS typically does not kill its victims immediately but subjects them to a prolonged period of gradually mounting debility and incapacity. This is a period, often extending for years, during which the victim's needs grow while his or her own ability to attend to them steadily diminishes. And AIDS does not kill randomly but instead tends to strike people in their prime reproductive ages—years that coincide in most populations with the highest rates of labor productivity. Given this combination of factors, what sort of impact can we expect an HIV/AIDS epidemic to inflict on the economies of Russia, India, and China?

This question has received surprisingly little rigorous consideration. Two decades into the epidemic, the state of economic thinking about this complex set of interactions can still be described fairly as introductory and exploratory. The emerging economic literature on the subject has identified some of the potential macroeconomic repercussions of AIDS-related illness and death. Population growth, labor supply, and savings rates all will be hurt—indeed the more comprehensive the framework employed, the more negative the conclusions seem to be.

Even so, a number of important potential economic ramifications of an HIV/AIDS epidemic in a low-income setting have as yet received little consideration. Two in particular deserve mention here. First, by curtailing adult life spans, a widespread HIV epidemic seriously alters the calculus of investment in higher education and technical skills—thereby undermining the local process of investment in human capital. Second, widespread HIV prevalence could affect international decisions about direct investment, technology transfer, and personnel allocation in places perceived to be of high health risk. These factors suggest that HIV breakout could have lasting economic consequences—in effect, cutting afflicted countries off from globalization. The long-run economic impact of these effects could be even more significant than the constraints the epidemic could impose on local labor supplies or savings.

Precisely calculating the prospective economic cost of HIV/AIDS for a society would be a highly exacting task (it would essentially require figuring out how much less a population would earn due to HIV, how much more it would be obliged to devote to covering the needs of AIDS victims, and the present value of the differences in those two amounts). This exercise would require detailed data that are simply unavailable today for any country. There is, however, an extremely simple alternative approach to thinking about the possible economic implications of these HIV/AIDS epidemics, one that may promise a serviceable first approximation of the macroeconomic impact. We might call this the “health-based productivity” approach.

Modern economic development has seen an important and well-documented shift in patterns of global economic performance: a continuing move away from natural-resource-based wealth and toward wealth generated by human knowledge and skills. Put another way, “human capital” has become a predominant and increasingly important factor in overall economic potential. In modern times, this trend has made for a robust link between health and productivity at the national level. This association holds both across nations at any given point in time, and also within particular countries over time.

It is possible that Russian life expectancy could be a full decade lower in 2025 than it is today.

Naturally, these simple patterns do not capture the complexity of the health-productivity relationship, nor do they indicate causal directions. On the one hand, wealth is an instrument that helps people afford lifestyle patterns that lead to better health. On the other hand, improvements in health can boost productivity by extending potential work-life, enhancing physical capacity, and facilitating learning. Regardless of these complexities, for any country, at any point in time, life expectancy is a fairly good predictor of per capita economic output.

THE HEALTH OF NATIONS

WHAT WOULD these HIV/AIDS projections for Russia, India, and China imply for each country's economic performance if we relied solely on a simple health-based productivity model? The answers can be computed by using World Bank data to estimate the recent (circa 1999) correspondence between national life expectancy and output per member of the "potential work force" (i.e., persons 15-64 years of age), and then combining these figures with the simulations of national life expectancy and potential work force size from the various HIV scenarios.

By this method, Russia's GNP per "person of working age" would be projected to rise by about 50 percent between 2000 and 2025 without HIV. Health-based productivity predictions, however, indicate that an HIV epidemic could radically reduce per capita productivity under any of the scenarios discussed earlier. Even with a mild epidemic, Russia's predicted output growth per working person would be less than half as great as under the "no HIV" baseline scenario. And if there was an intermediate epidemic, the predicted level of output would actually be lower in 2025 than it was in 2000.

For India, this method predicts about an 80 percent increase in GNP per working-age person over the next 25 years assuming the absence of AIDS. All of the HIV scenarios, however, would reduce that growth significantly. A milder epidemic, for example, would depress predicted growth by about two-fifths; under the intermediate epidemic scenario, output per working person would be no higher in 2025 than it is today.

China without AIDS would, by this method, experience a predicted increase in output per working-age person of more than 50 percent

during the next 25 years. But even a mild epidemic would cut that growth by half—or, to put it slightly differently, even an epidemic with a peak HIV prevalence rate of 1.5 percent would cut more than half a percentage point a year off China's long-term economic growth rate. Under an intermediate epidemic, output per working person would barely rise between 2000 and 2025. And under the most pessimistic of the scenarios, Chinese productivity over that same period would actually decline.

This method also permits the prediction of national levels of output, a set of figures that merits examination. In Russia, for instance, even though the model predicts a baseline increase of more than 50 percent in output per potential worker, national output would increase only by about 33 percent in the "no AIDS" case. This discrepancy results from the decline in the absolute number of Russians between the ages of 15 and 64. The HIV scenarios reduce Russia's future GNP not only by reducing predicted output per worker, but also by cutting the size of the 15–64 cohort. Thus, under conditions of a mild epidemic, Russia's national output would remain completely stagnant between 2000 and 2025. And under the intermediate epidemic scenario, Russia's GNP would be a shocking 40 percent lower in 2025 than it is today. Indeed, the model suggests that HIV/AIDS in Russia might, under a variety of scenarios, prevent the Russian economy from experiencing any growth in the years ahead.

To the extent that AIDS compromises a nation's health, it will also undermine economic potential.

For India, the model suggests that GNP absent HIV would be almost 170 percent higher in 2025 than in 2000—with growth driven both by a larger work force and by increasing worker productivity. Under the mild epidemic scenario, GNP would still rise substantially—but by about a third less over that quarter-century than the "no AIDS" baseline would have predicted. If there was an intermediate epidemic, predicted GNP in 2025 would be 40 percent lower than in the baseline scenario; national output would still grow, but growth would be cut by three-fourths over the next 25 years.

As for China, health-based predictions of economic output suggest relatively modest output growth of 80 percent between 2000 and 2025.

The mild epidemic scenario would be predicted to cut that growth by more than a third; an intermediate epidemic, by much more. The more pessimistic scenarios would suggest even more dramatic economic repercussions for the Chinese economy.

Health-based predictions of future economic output are admittedly an overly simplistic measure for assessing the prospective performance of extraordinarily complex societies. Even so, health and wealth are closely connected in the modern world. To the extent that HIV/AIDS compromises national health prospects, it also compromises economic potential.

A GATHERING STORM

IN THE DECADES AHEAD, the likelihood of HIV breakout into the general population in Eurasia will depend on the extent to which local Eurasian populations can avoid replicating the risk factors that led to such a breakout in sub-Saharan Africa. Fortunately, Eurasia enjoys some ecological protections that sub-Saharan Africa lacks. Nutrition in India, China, and Russia is generally superior to that in sub-Saharan states, and the burden of endemic disease is also distinctly lower. With respect to behavioral risks, we know very much less about the situation in China, India, and Russia than we would like. Sexual transmission patterns, the prevalence of risky sexual practices, and the extent of other dangerous practices (such as IV drug use) will do much to determine the future trajectory of the HIV/AIDS epidemic in these three countries. Amazingly, neither local nor international health studies have examined in any sustained manner these potentially deadly risk factors.

Despite the limits of our knowledge, available information suggests that major HIV epidemics are already underway in China, India, and Russia, and that local social mores and behavioral practices are set to further spread the disease. The precise trajectory that HIV/AIDS will follow in these three countries cannot be foretold at this time. But as the hypothetical scenarios show, even fairly mild epidemics (by sub-Saharan standards) could have a tremendous impact on long-term health and mortality trends in all of these countries. Indeed, China, India, and Russia together could experience more HIV infections and AIDS deaths over the coming quarter-century than the entire planet has thus far.

From a purely ecological standpoint (that is, focusing on nutrition and endemic disease), India probably stands a greater risk today than either Russia or China for an HIV/AIDS breakout. Yet in the simulations, the country whose economic prospects seemed most threatened by the disease was Russia. Two factors largely account for this result: the country's poor health performance, entirely irrespective of HIV, and, relatedly, the country's prospect for long-term population decline. In HIV/AIDS scenarios well within the realm of current informed expectations, Russia's economy 25 years hence might be no larger than it is today. In a world characterized by general economic growth, such a result would only increase Russia's marginalization both within the world economy and on the world stage.

But Russia's limited future economic prospects seem to be established already by a host of other factors that have nothing to do with HIV. From a geopolitical standpoint, then, the most pertinent question is whether the unfolding HIV/AIDS epidemics in China and India will be sufficiently powerful to alter the future economic or political balance between these two rising and ambitious states. To judge by these simulations, it is possible that HIV/AIDS could play such a role in the years ahead—and again, relying on these simulations, the balance of risks presently appears to weigh more heavily against India than against China.

On the other hand, and somewhat paradoxically, China may have more difficulty mounting an effective response to an emerging HIV crisis than would either Russia or India. The reasons have to do with constraints on anti-HIV/AIDS policies in China. In contemporary Eurasia, perhaps the most successful HIV-control campaign thus far has been Thailand's. The Thai campaign relied on cooperation between the government and civil society to educate the public about HIV and to intervene with high-risk groups. Analyses of the program by the World Bank and other groups have stressed the value of civil-society participation, as well as the importance of popular trust in the government in lending credibility to the state's massive public education effort. Whether China could replicate

Eurasian states are not doing enough to fight AIDS.

Thailand's approach is by no means clear. A public health campaign premised on the independence of nonstate actors and the population's confidence in its government could be rather more difficult for Beijing.

Even without these constraints, the prospects of a Thai-style campaign doing much for Russia or India still look grim. When Thailand inaugurated its muscular anti-HIV campaign, adult HIV prevalence was lower there than it is today in Russia and India. And even after Thailand's policies went into effect, the estimated number of HIV carriers more than doubled over the subsequent decade—the grim arithmetic of the disease being that newly diagnosed infections will add to the patient pool for some time, even if an effective program is diminishing the stream of newcomers.

Eurasian states' responses to their respective HIV crises may also be circumscribed by economic considerations. For now, the most effective medical intervention for prolonging HIV patients' lives is the complex "drug cocktail" of anti-retroviral drugs. It is true that many people with HIV in the advanced industrialized West have been given a new lease on life by taking these drugs, and that this has made the disease less of a life sentence than it was before. The problem with thinking that this advance represents a solution to the developing world's HIV/AIDS problems, however, is that the cocktail is extremely costly—typically \$15,000 or more per patient per year. Even the generic versions of the drugs, a year's supply of which can be manufactured for \$600, are not affordable by most countries for most of their people with AIDS. And even if they had the money, the unfortunate fact is that they would probably not spend it on this cause, because the cost of distributing the treatment (even assuming that the drugs were given away free) would often be more than the economic value to governments of the lives thus saved. The tragic truth is that until some kind of actual cure is discovered, most people with HIV/AIDS in the developing world are essentially doomed.

Despite this awful reality, there are still things states can do to at least contain the risk of contagion within their populations. Governments can competently monitor the spread of the disease and warn their citizens accordingly. They can engage in public education campaigns to apprise their people of the deadly risks they face with HIV, urging

The Future of AIDS

them to alter specific behaviors. They can attend to the explosion of curable sexually transmitted infections, since these have proved to be a leading indicator for HIV transmission. And they can intervene with groups at high risk of HIV to encourage lifestyles that will court fewer dangers. But governments in Eurasia are not yet doing enough of these things.

Hiv in the region may be likened to a gathering tempest, and the governments in Moscow, New Delhi, and Beijing to captains of vessels in its path. The storm, already within sight and rapidly advancing, is enormously powerful and capable of untold tragedy and destruction. From the captain's deck, however, officers continue to regard the approaching squall with curious detachment, unconcerned about its implications for their ship. When they come to their senses, the tempest will be even nearer than it is now—and they may discover that their ability to navigate out of harm's way is more limited than they would have supposed. 🌪