

The AIDS epidemic and economic policy analysis

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ECONOMISTS have a vital role to play in helping public health officials and policy-makers understand the AIDS epidemic and design efficient policies to limit its impact. AIDS is first and foremost a public health problem, but it is a problem with deep economic roots and potentially devastating economic consequences. The main purpose of this article is to document this assertion.

The costs of AIDS

To understand the economic consequences of AIDS, a useful starting point is to examine the costs associated with this disease. These costs fall into four main categories. First are the personal medical care costs associated with AIDS, which capture the costs of detecting, treating and caring for people with AIDS. Second are the nonpersonal costs, such as the costs of blood screening, the costs of information, education and communication, and the costs of basic research on AIDS. Third is the cost of lost output and lost income because of AIDS morbidity and mortality. Fourth are the psychological costs associated with the epidemic, such as the pain and suffering caused by AIDS and the cost imposed upon people who must behave differently to avoid contracting or transmitting HIV.

The first two categories of AIDS costs jointly make up the direct costs of the epidemic, so named because they involve a direct diversion of scarce resources from other uses. The third category is referred to as the indirect cost of the epidemic. It is not an out-of-pocket cost like medical expenditures on AIDS patients. Rather, it is what economists term an opportunity cost, because it reflects the value of lost opportunities to work and produce the goods and services whose consumption yields satisfaction. Indirect costs are just as important a component of the total cost of the epidemic as direct medical costs. The epidemic's psychological costs are rarely discussed or quantified.

The first generation of economic research on the AIDS epidemic has involved measuring the direct costs of HIV and AIDS and the income foregone because of AIDS morbidity and mortality in many countries throughout the world. Every study of this issue of which we are aware concludes that AIDS is an unusually costly illness on a per case basis, for two main reasons. First,

many of the opportunistic infections with which AIDS is definitionally associated, such as tuberculosis, pneumonia and cryptococcal meningitis, are costly to treat relative to the cost of treating other common illnesses; and second, AIDS disproportionately afflicts individuals in their prime productive years, thereby causing a considerable loss of income to them and their families.

Economists have estimated that the lifetime personal medical care costs associated with AIDS are more than double India's per capita income, assuming that people with AIDS receive medical care that conforms fully to local protocols for the treatment of AIDS and the opportunistic infections with which AIDS is associated. The income lost because of AIDS morbidity and mortality is estimated to be far greater: more than ten times India's income per capita, in discounted terms¹. This estimate of the loss of private income should not be confused with social output losses, especially in a labour surplus setting, although the two concepts can be linked. Overall, these estimates of medical care costs and lost income indicate that each case of AIDS is quite costly in India, just as it is elsewhere in the world.

Economic determinants of HIV transmission

The contribution of economics to understanding the AIDS epidemic is not limited to quantifying its impact in monetary terms. Economics also provides a powerful way of examining the pattern of the epidemic's spread. The central idea is that HIV is not spread randomly, as tends to be the case with the bacteria that cause tuberculosis or the virus that causes the common cold. Rather, HIV is most often transmitted as a consequence of purposeful behaviour that often has a strong economic foundation. For example, some of the sex that contributes to the spread of HIV is sold on the street and through brothels^{2,3}. As another example, a close connection seems to exist between labour migration and HIV transmission⁴⁻⁷. This connection seems to arise because the behaviour of migrants is not easily subject to monitoring by their families and communities, because migrants often have considerable amounts of cash to spend, and because they may be lonely because of being separated from their families. In addition, because migrants are often poorly educated and not closely con-

nected to stable communities, making them aware of the behaviours that put them at high risk for contracting or transmitting the virus that causes AIDS can be challenging. All these factors increase the likelihood of migrants engaging in commercial sex, an activity that puts them at high risk for contracting HIV, and ultimately places their spouses and unborn children at risk.

India has a huge migrant population, both internal and international. For example, rural to urban migration is significant, especially in Maharashtra, Tamil Nadu and West Bengal. So too is the floating population of migrant workers⁸. India is also experiencing substantial cross-border population movements with Bangladesh, Nepal, and to some extent Myanmar, as well as strong migration flows to and from the Middle East and a growing influx of foreign tourists, business people, and others. Add to this a continuing process of economic reform, which is likely to promote the movement of people into, out of, and within India, and the situation is one of continuing and increasing vulnerability to the spread of HIV, especially among the general population.

We conclude from this reasoning and these examples that economists have a key role to play in understanding the nature of the HIV and AIDS epidemic and in assessing its impact. Economics is a crucial ingredient in any explanation of why HIV spreads so rapidly among lorry drivers, fishermen, sailors, construction workers, overseas contract workers, the military, commercial sex workers, injecting drug users, and commercial blood donors. That so many countries throughout the world share this pattern of spread is no coincidence.

Does government have a role to play?

Government intervention in the area of HIV/AIDS encompasses a myriad of activities aimed both at controlling the spread of HIV and coping with the immediate shock of the epidemic and its wide-ranging echo effects. Interventions may be justified on the grounds that they promote efficiency (that is, increase the size of the economic pie) or promote equity (achieve a more desirable distribution of the pie).

Intervention can promote efficiency if one individual's behaviour imposes costs upon others for which no compensation is paid, a market failure that economists refer to as a negative externality. As an example, an externality may arise if a person with AIDS and tuberculosis coughs or sneezes in public, and thereby subjects other nearby individuals to the risk of tuberculosis infection. Costs that are not easily deterred are being imposed without offsetting compensation. As another example, consider women who are powerless to negotiate the use of condoms with their sex partners, a situation that arises in many commercial sex establishments as well as in many marital relationships. To the extent these women are exposed, along

with their unborn children, to the risk of HIV infection, costs that are not easily deterred are again imposed without compensation, a classic market failure for which government intervention is a natural remedy.

Intervention may also promote efficiency if private individuals are poorly informed about the risks and costs of HIV transmission. Indeed, under certain conditions the government can improve well-being either by providing information about HIV and AIDS or by adopting tax, subsidy, or regulatory policies that induce people to act as if they had this information.

An equity justification for intervention could arise if the costs of the epidemic fall disproportionately upon the poor^{1,9}. If the government deems the ensuing distribution of economic well-being, under which the poor are further immiserized, to be socially undesirable, government intervention aimed either at preventing HIV transmission or redistributing resources is well justified.

Contribution of economic reasoning to policy-making

Even though making a case for some government intervention in the area of HIV and AIDS in Asia's developing countries is not difficult, the complexity of the mechanisms that lead to HIV infection and that determine their social and economic impacts make effective policy-making an especially challenging task. We offer three examples to illustrate this point.

The first example relates to HIV transmission via the sharing of needles among injecting drug users. To reduce the rate of HIV transmission, some policy-makers have suggested reducing the number of drug users by cracking down on the supply of opium. From an economist's perspective, however, destroying opium fields might actually promote HIV transmission, a result exactly opposite to the one desired. This could happen if a reduced supply of opium leads to an increase in its price, which in turn leads habitual opium smokers to cut back on their opium consumption by switching to injection, a far more efficacious mode of opium use¹⁰.

Throughout North America and Western Europe, policy-makers are increasingly responding to the problem of HIV transmission through the sharing of nonsterile injection equipment by establishing needle exchange programmes¹¹. Under these programmes, injecting drug users can receive new injection equipment at no charge in exchange for used injection equipment. Needle exchange programmes are controversial because they try to improve the conditions under which illegal drug use takes place, which critics claim promotes greater drug use. Nonetheless, preliminary evidence for the United States suggests that the rate of new HIV infection among injecting drug users who participate in such programmes is lower than the corresponding rate among nonparticipants¹².

As a second example, consider a policy of isolating or imprisoning seropositive commercial sex workers, as India did for a brief period several years ago in a highly publicized case in which 854 commercial sex workers, 457 of whom were HIV-positive, were moved from Bombay to Madras and confined³. On the surface, this policy might seem to be a sensible way to curb HIV transmission, because it prevents seropositive sex workers from selling sex. However, it fails to address the demand side of the market for sex, that is, the fact that certain individuals, be they foreign businessmen or native sailors, fishermen or migrant workers, will continue to demand and be willing to pay for sex. Under the economic conditions that currently prevail throughout most of the world, that demand will be satisfied by a new group of women who will supply sex commercially, not because they are social deviants, but because they lack better economic opportunities. Although these women may be seronegative when they enter the sex industry, without information about HIV and without the power to negotiate the use of condoms, they too will become infected and then infect others.

A third example concerns HIV testing. Some policymakers believe that mandatory testing is a useful approach to HIV prevention¹³. Their rationale is that people will respond altruistically to the knowledge that they are HIV-infected by curbing behaviours that put others at high risk of infection, especially if they receive appropriate counselling. Altruism is, however, not the rule in economic behaviour. Selfishness is much more common, and in this context might actually cause HIV testing to promote further transmission as people who learn that they are seropositive recognize that they no longer face a key disincentive to high-risk behaviour: the risk of HIV infection. Although research findings vary, a number of reputable studies have found evidence that positive HIV test results trigger increases in high-risk behaviour, thereby supporting the view that testing may promote HIV transmission^{14,15}.

These three examples are not meant to suggest that economic reasoning provides a complete explanation of individual decisions about drug consumption, the supply of and the demand for sex, or other high-risk behaviours. They do, however, illustrate one of the hallmarks of economists' approach to policy-making: the need to understand the mechanism that is generating undesirable outcomes as a prelude to effective policy design and implementation.

In the first example, the economics of drug injection suggests that a policy of destroying opium fields might increase drug injection more than it decreases drug use, the net effect being a higher rate of HIV transmission. This reasoning does not, of course, imply that the government should promote opium production as a way to drive prices down and encourage smoking in place of injection. While such a policy might, in principle, curtail the spread of HIV, it would probably do so quite slowly,

because heavy drug injectors rarely revert to smoking. More important, it might simultaneously increase the number of drug users, which is clearly not a desirable outcome. However, this bit of economic reasoning does help explain the calls for decriminalizing the sale, possession and use of drugs that one increasingly hears in North America and Western Europe. It also highlights the fact that many practical policies for HIV prevention may conflict with other social goals and policies. For example, needle exchange programmes may increase the number of drug users, early sex education and free contraceptives may encourage promiscuity, condom distribution in the prison system may condone illicit homosexual activity, and policies mandating the use of condoms in brothels may undermine the illegality of prostitution.

In the second example, a policy of imprisoning seropositive commercial sex workers is little more than a temporary solution, what might best be termed a band-aid solution, to the problem of HIV transmission. It ignores both the demand side of the market for sex and the readily available supply of additional sex workers.

In the third example, as already noted, mandatory testing may actually promote HIV transmission. This observation highlights the fact that the HIV epidemic can, in principle, be controlled without identifying a single HIV-infected person. As long as the population behaves carefully, a goal that is presumably promoted by the provision of information, those who are infected will not transmit the HIV and those who are uninfected will not contract it. Testing the blood supply and doing some testing for purposes of epidemiological surveillance may be desirable, but this testing can be done anonymously. Limiting the amount of testing that is done also affords the greatest protection to individual privacy, thereby limiting the ostracism and stigmatization that so often, so needlessly, and so counterproductively accompany the spread of HIV and AIDS.

Contribution of economic tools to policy-making

Good economic reasoning encourages policy-making directed at underlying problems, not at superficial symptoms. Economics also offers a set of tools that are often extremely useful for rational policy-making. These tools, known as cost-benefit analysis and cost-effectiveness analysis, are methods for evaluating the desirability of alternative policy options¹⁶. Both methods require us to estimate the costs of implementing alternative policies. Cost-benefit analysis also estimates the expected benefits corresponding to each alternative, and the optimal policy is the one that has the highest net benefit, that is, benefits less costs.

Cost-effectiveness analysis is closely related to cost-benefit analysis, except that it stops short of estimating

the monetary benefits of particular policies. Instead, it calculates and compares the cost of alternative methods of achieving a particular qualitative outcome.

As a brief illustration, suppose we wish to compare the following eight programmes for HIV prevention and control: (1) mass education through national television and radio; (2) mass education through the distribution of a one-page AIDS information sheet to every household in India; (3) a special HIV and AIDS information programme for Indian workers and tourists going abroad; (4) a special HIV and AIDS information programme for lorry drivers; (5) a programme to expand the provision of family planning services to unmarried individuals; (6) a programme to treat sexually transmitted diseases (STDs), which is important because STDs greatly increase the risk of HIV transmission; (7) a programme for screening India's blood supply for HIV; and (8) a community-based programme aimed at reducing the demand for drugs and promoting harm reduction among injecting drug users in Manipur and other areas with relatively heavy drug use. Using cost-benefit analysis we would estimate the number of HIV infections that each programme would avert and place a monetary value on those averted infections using estimates of the direct and indirect costs of the epidemic. We would then compare the estimated monetary value of averted infections and of any other expected consequences of each programme, such as control of STDs, fertility reduction, reduced drug use, lower crime rates, and so on, with the cost of each programme. Good programmes are those whose benefits exceed their costs, much like good investments are those that yield positive net returns.

Using cost-effectiveness analysis, we would not place a monetary value on the estimated number of averted HIV infections. We would simply calculate the cost per averted infection under each programme as a way to identify which of them offers the least expensive way to control the spread of HIV. Unlike cost-benefit analysis, which takes multiple programme impacts into account and indicates whether each programme is a good investment or not, cost-effectiveness analysis simply ranks alternative programmes in terms of their economic efficiency in achieving a particular outcome. As cost-effectiveness analysis does not require the monetization of programme benefits, it also requires fewer assumptions and calculations than cost-benefit analysis.

Cost-benefit and cost-effectiveness analyses provide a systematic, sensible and practical way of selecting among alternative policy options. Combinations of options may also be analysed, which is important if programmes complement each other. The analyses may be performed from the point of view of an individual, an organization, or society as a whole, and often yield different results depending upon whose point of view is adopted. Although these analyses are sometimes difficult to carry out because of data limitations and a vari-

ety of difficulties inherent in calculating and monetizing programme impacts, this is not always the case, as some recent cost-benefit analyses for China and Sri Lanka on the costs and benefits of screening the blood supply for HIV demonstrate^{7,17}.

Considerable work remains to be done in applying the tools of cost-benefit and cost-effectiveness analyses to the evaluation of policies designed to promote HIV prevention and control. Especially interesting would be analyses of HIV and STD prevention programmes that involve expanding the distribution of condoms in India and of programmes for both mass and targeted education about HIV and AIDS, especially programmes designed to reach migrants. In the absence of a cure for HIV and AIDS, information about safe behaviour and the necessary motivation to practise it are the only options even remotely resembling a vaccine against HIV transmission. HIV can spread fast, but so too can information. Indeed, information delivered through community-based programmes and channels of influence appears to be the most potent ally available in the effort to control further spread of HIV¹⁸.

Impact of AIDS on economic growth and development

Leaders in the global campaign against AIDS have repeatedly expressed the opinion that the AIDS epidemic is likely to have a substantial – perhaps even a catastrophic – impact on the macroeconomies of developing countries^{15, 19–22}. A variety of economic studies support these assertions. These studies indicate that in the hardest hit countries of Africa, the HIV and AIDS epidemic may diminish the annual growth rates of national income by as much as two-thirds of a percentage point, and diminish the annual growth rate of national income per person by as much as one-third of a percentage point through the year 2010 (refs 23–26). In relation to the growth rates of many of the world's economies, two-thirds of a percentage point is not as little as it may seem initially. Also, it adds up over time, which is important given that a biochemical vaccine against HIV infection and a cure for AIDS are nowhere in sight.

The economic simulation models and cost of illness calculations that support the prediction that AIDS will have dire macroeconomic consequences require many assumptions that are difficult to verify, but adopting a more direct approach to examining the impact of the epidemic on the growth rates of income per person is now feasible. We are in the second decade of the world AIDS epidemic, which has progressed relatively far in several countries, especially in Africa. For example, nearly 20% of the adult populations of Uganda and Zambia are infected with HIV. In Zambia, the cumulative number of cases of full-blown AIDS has already

reached 4% of the adult population. With this range of HIV experience, from low prevalence countries like China and Sri Lanka, to medium prevalence countries like India, Myanmar and Thailand, to high prevalence countries like Uganda and Zambia, we may examine whether countries that have experienced more severe AIDS epidemics have also experienced lower rates of economic growth, while controlling for other influences on economic growth and addressing the possible reciprocal influence of economic growth on the spread of the HIV.

Technical issues and other details aside, preliminary calculations based on data for 51 countries reveal that the AIDS epidemic has had only a small and statistically insignificant negative effect on income per person. These results resemble ones derived through similar analyses of the economic impacts of the world influenza epidemic of 1918-19 and the Black Death of the mid-1300s, both of which killed massive numbers of people in extremely short periods of time²⁸.

With these findings in hand, and given that India already has first-generation estimates of the economy-wide costs of the epidemic, the amount of attention devoted to the macroeconomic impacts of the AIDS epidemic can be reduced. This will give policy-makers and researchers an opportunity to focus greater attention on the impact of the epidemic on particular industrial and occupational sectors, on particular geographic regions, and on particular demographic groups, especially people living with AIDS and their families, women, the poor and other marginalized groups, such as homosexuals and drug users. These are the areas that health policymakers, economists, international organizations, nongovernmental organizations, and others concerned with the social and economic implications of the epidemic need to address most urgently. They involve complex issues that include matters of health, sociology, psychology, law, politics and economics. As research problems, they call for multidisciplinary approaches, mirroring their nature as multisectoral problems from the standpoint of policy design and implementation.

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