

Chapter 1

The public interest in a private disease: An economic perspective on the government role in STD and HIV control*

Mead Over

Sexually transmitted diseases are painful and sometimes deadly. However, the same is true of many other diseases and also of pollution, crime, poverty, traffic accidents, and armed conflict. Governments in all countries, and especially in the poorest countries of the world, must struggle to fulfill a multitude of important roles with extremely limited resources. Should the prevention and control of sexually transmitted diseases be one of the short list of activities that are part of the irreducible core of government responsibility?

Some people would argue that sexually transmitted diseases (STDs) should not be on the short list. Starting from the premise that sexual activity is almost always a voluntary activity subject to individual control, many would argue that the individual should take responsibility for his or her own actions and should pay the penalty in health cost if poor luck leads to an STD. This chapter takes the contrary view. It shows how individual choices made with full information about risks and consequences can nevertheless lead to a socially undesirable outcome. The implication is that some government intervention to prevent and control STDs is socially desirable.

THE ECONOMIC FRAMEWORK FOR EVALUATING GOVERNMENT INTERVENTIONS

Government intervention in any realm is justified only if it improves social welfare relative to the situation that would obtain in the absence of such intervention. This statement is obvious, but difficult to apply to actual public expenditure decisions. One of the principal difficulties is that different observers can legitimately have different views of the proper definition of social welfare. The standard way to avoid paralysis by this difficulty in economics is to divide the problem of improving social welfare into two steps: first, the maximization of total national well-being (efficiency); second, the distribution of that well-being among social groups (equity). If government intervention net of its costs increases total national well-being, the intervention is said to enhance the efficiency of the economy. If the intervention also furthers equity by improving the distribution of social rewards or reducing poverty, so much the better. If the intervention worsens equity, then society must judge whether the increase in total welfare is large enough to justify the associated reduction in the equity with which it is distributed. A mixed policy that uses some of the extra social product owing to the intervention to improve the well-being of the poorest citizens or, alternatively, of those who lose most from the policy intervention, might be preferred.

In addition to the difficulty of defining social welfare, a second

important difficulty in evaluating a given intervention is properly characterizing the situation that would exist in the absence of the intervention. There are two aspects of this problem: defining the counter-factual and measuring the opportunity cost of the resources used in the intervention. In the case of sexually transmitted diseases, identifying what would happen in the absence of government intervention, the counter-factual, is often difficult. Ideally, governments should be able to draw on a body of scientific research that compares the rate of new sexually transmitted infection in a group that has benefited from a given intervention to that in an otherwise comparable group that has not received such an intervention. In fact, such controlled trials are all too rare.

The opportunity costs of an intervention are defined as the value of the resources in their next best use. Identifying the opportunity cost of the government resources is not difficult in theory, but often is in practice. For example, suppose that the next best use of resources spent on STDs is to use them instead to vaccinate children against measles. In theory, the opportunity cost of the resources is the value of the lives of the children who would have been saved by the measles vaccination program. However, comparing the lives of children saved from measles to the lives of adults saved from AIDS is not easy to do. In practice, attempts to compare the value of different lives by converting them all to a common metric such as the disability-adjusted life-year (or DALY) have met with less than universal acceptance, because of the inescapable arbitrariness of any proposed adjustment factors.

EFFICIENCY ARGUMENTS FOR GOVERNMENT INTERVENTION

This section and the box present several reasons that government should intervene to slow the spread of the AIDS epidemic despite the fact that it is primarily spread by private sexual acts between two consenting individuals.

THE CONVENTIONAL ARGUMENT FOR INTERVENTION

It is well accepted that government interventions that subsidize the prevention or treatment of airborne or waterborne infectious diseases or the prevention of vector-borne parasitic infections can enhance efficiency. To what degree do these arguments generalize directly to the case of sexually transmitted diseases, including HIV?

Starting from the premise that well-functioning markets will allocate social resources to maximize national output, economists have typically argued that specific market failures prevent people from reaching an efficient allocation of resources to treat or prevent infectious or vector-borne diseases. These market imperfections are "externalities" in the case of the infectious diseases and "public goods" in the case of the vector-borne diseases.

An "externality" occurs when a market transaction between two parties creates an unpriced effect on a third party. An example of such an unpriced effect is the beneficial impact on one's neighbor's health of one's own decision to seek treatment for an air- or waterborne infectious disease. The existence of an externality causes the market (in this case, the market for treatment of the disease) to fail because it prevents the individuals involved in the transaction from incorporating all of the social costs and benefits of their transaction. The health care provider may be considering all of his costs, including the opportunity costs of his workers, equipment and of his own time, when he decides the price he wishes to receive for the treatment. However, the patient does not take into account the benefits to his neighbor—and to his neighbor's neighbor—of his treatment, and so is willing to pay less for

*This chapter draws on Kremer¹ and Hammer² and on discussions with Martha Ainsworth, David Bloom, Paul Gertler, and Chris Jones.

treatment than the total worth of the treatment to him and his neighbor and his neighbor's neighbor. Because of the market failure, the patient will consume less than the socially optimal quantity of the treatment in question.

A pure "public good" is a good that has two specific attributes. It is "nonrivalrous" in consumption, meaning that its consumption by one person does not reduce its availability for consumption by another; and it is "nonexcludable" in consumption, meaning that if one person in a community consumes it, no other person in the same community can be feasibly excluded from consuming it also. Economic terminology distinguishes a "public good" from a "merit good," the latter being defined as a good that society prefers the poor to consume. For example, although food is a private, not a public, good, many societies guarantee a minimum amount of it to everyone on the grounds that it is a "basic need" or "merit good." (See later in this chapter for a discussion of health care as a merit good.) The eradication of a disease vector, like the anopheles mosquito, which transmits malaria, is a pure public good by this definition. Markets fail to produce the socially optimum amount of a public good, because each individual hopes that others will pay for it and he can "free-ride" on the others' largesse. Because of this market failure, the public good may not be produced at all unless the government intervenes and taxes everyone in order to finance its production.

EXTENDING THE ARGUMENT TO SEXUALLY TRANSMITTED DISEASES

In order to consider extending these arguments to STDs, reflect on an artificial example relating to an airborne infectious disease, tuberculosis (TB). Suppose that a person, B, rides to and from work every day in a carpool with person A and both know that A has TB. Suppose that both A and B live and work alone, so there is no risk of either infecting anyone else. B asks A if he is planning to seek treatment, but B responds that he has neither the time nor the money for doctors right now, especially since TB treatment is costly and time-consuming. Should the government be involved by, for example, subsidizing the TB treatment for A?

Leaving aside equity issues that might arise if A were poor (to be considered in the next section), there is no reason for the government to be involved in this case. It's true that A's condition imposes costs on B. In response to these costs, B can choose to abandon the convenient carpool arrangement or, alternatively, offer to help A pay for treatment. A and B will negotiate an agreement to share the costs of the doctor visit. The share of costs between them will be determined by their relative bargaining power in the relationship, so that either might end up paying much less for the treatment than he would have been willing to pay. If B is not sure whether A will comply with treatment, B can accompany A to the treatment sessions. The end result, however, will be an efficient outcome, as the two parties "internalize" the externality by their negotiated settlement.

But what if a third person is involved? Suppose the uninfected member of the two-person carpool, B, rides home in a different carpool at the end of the day with another uninfected person, C. That third person will clearly place some value on the continued non-infectious status of B. If C can be convinced that B is threatened by infection that could be prevented by paying for A's treatment, and again if the search costs of finding another evening carpool partner are significant, the probability of infection is high enough and the treatment cost is low enough, then C will be willing to contribute to the cost of curing A's TB. The willingness of C to contribute will increase the offer that B can make to A and enable treatment to occur when it otherwise might not have for lack of a sufficient offer by B.

The problem, and the reason that government intervention

might be efficiency enhancing even in this example of two-person carpools, is that person B may have no way to demonstrate to C that B has contributed to A's cure. In the absence of a reliable monitoring technique available to C, C will not be willing to offer as much to B as B's contribution to A's cure is really worth to C. This is the problem of asymmetric information and would be a reason that a government subsidy for TB treatment could enhance efficiency even in the absence of the free-rider problem appealed to in the preceding section.

To what degree do the two arguments for government intervention in the case of airborne infectious diseases, the public good and the asymmetric information arguments, also apply to an STD? An STD is typically transmitted in the course of a sexual contact between two individuals, not between one individual and an entire group. In the carpool example, the uninfected member had an incentive to contribute to the cure of the infected member. Thus, the free-rider problem does not arise with STDs in the same way as with air- or waterborne diseases. The straightforward public good justification for subsidizing treatment is not applicable. (However, the public good justification applies indirectly to HIV, through its exacerbating effect on the spread of air- and waterborne infectious diseases.)

Now consider the argument based on asymmetric information. Just as person B in the carpool example had no way of convincingly demonstrating to person C that B had protected himself by subsidizing A's treatment, a person who uses a condom in a sexual contact has no way of convincingly demonstrating this fact to another sexual partner in order to be compensated for it. To extend the analogy, suppose that person A is a sex worker, person B is a client of A, and person C is the client's regular sexual partner or "girlfriend." (In this example, the points can be made even more dramatically by reversing the genders of A, B, and C. However, data show that fewer wives than husbands have extramarital sexual relations.) If the girlfriend knew in advance that her partner frequents sex workers and could reliably monitor his condom use with the sex worker, she would be willing to compensate him in some way for using them and her willingness to compensate him would increase his willingness to use the condom with the sex worker. For example, she might be more willing to remain in the relationship with him or to have sex with him without a condom, if he could prove that he has used a condom with his other partners. Thus, it is the unavailability to C of a reliable way of monitoring B's condom use that produces the externality and the potential for efficiency enhancing government intervention.

However, the inability of a woman to monitor her partner's condom use with other partners is exacerbated by two additional considerations. First, in most societies a woman will be unaware that her regular partner is having sex with other women and would feel threatened by the knowledge. Indeed, a husband's announcement that he is having sex with other women would in many cultures be interpreted by the wife as a signal that he wants to dissolve the marriage. To imagine that she would compensate him for using condoms with other women requires imagining that she would remain in the relationship given his announcement that he is having sex with other women. Even supposing that she would remain, as in many cultures she would be required to do, the compensation she would be willing to pay would be reduced by the reduction in the utility of the relationship owing to the knowledge of the extramarital affairs. Since it is impossible to convey to the wife the utility *enhancing* message that her husband uses condoms with other women without simultaneously conveying the utility *reducing* message that her husband is having sex with those women, the man cannot be compensated for the true difference in the utility to his wife of condom use.

A second and more important reason that the market failure engendered by asymmetric information can be quite large in this case is related to the epidemiological dynamics of an STD epi-

dem. The sex worker, person A, does not typically restrict her services to a single man, B. She serves a series of people, with each of whom she has a relationship similar to her relationship to B. Whether or not she uses a condom with B will affect not only B and C, but also all of her other clients and their marriage partners. In all of these linked relationships a monitoring problem will arise that is similar to that among A, B, and C. Because of the dynamic chain of sexual relationships, an increase in condom use by A and B lowers the probability of infection not only of C, but also of all the other people in the chain. Because of the asymmetric information, the prevalence rate of STDs, including HIV, will be higher and condom use lower than in the absence of all of these externalities. This result is inefficient, because all of the interacting persons would prefer the situation with lower STD prevalence and

more condom use, but none of them, individually or jointly, has the power to make the trades that bring about this situation.

The degree to which the dynamics of an STD epidemic magnifies the positive externalities of a government intervention depends critically on how the intervention is targeted. For example, if person A, the sex worker in the preceding example, has relatively few partners and those partners are otherwise monogamous, strengthening her resolve to bargain for condom use will have a relatively small impact on the STD prevalence rate. On the other hand, if she has a great many partners, each of whom also has many partners, her condom use will have a large multiplicative effect on the epidemic.^{1,3,5,7} The greater the reduction in STD prevalence from the condom subsidy, the greater the efficiency gain from the intervention.

A diagram can help to show clearly how a government subsidy to condom use can improve the welfare of all parties involved, including the man who dislikes condoms, his regular partner (whom we call his wife) with whom he does not use a condom, and his casual partner (whom we call his "extramarital" partner).

The box figure displays the husband's utility from extramarital sex, H , as a function of the prevalence rate of HIV infection, P , in the upper half of the figure and the wife's utility (or rather her disutility) of the husband's extramarital sex, W , in the bottom half of the figure. The utility of the husband's extramarital partner is not shown in the figure, but is introduced in the discussion that follows.

Both husband and wife assume that condoms are perfectly protective, so both the husband's utility of extramarital sex with a condom, H_c , and the wife's disutility of his extramarital sex with a condom, $W_c < 0$, are horizontal lines, unaffected by the probability that the husband's partner is infected, P . In order to account for the fact that many men choose not to use condoms even when they know that their partners might be infected, the husband's utility from sex without a condom, H_n , is drawn as superior to his utility of sex with a condom, H_c , up until a relatively high prevalence rate.¹ However, the wife has no such preference regarding her husband's pleasure from sex without a condom. In fact, she would prefer he use a condom even in the absence of risk of an STD, in order to prevent his impregnating another woman. Therefore, her dislike of his sex without a condom is greater than her dislike of his sex with a condom even at zero prevalence rate.

Given that the probability of the husband's casual partner being infected with HIV is P_1 , the husband will prefer not to use a condom and will derive utility H_1 from the extramarital encounter. Assuming she is aware of his encounter, the wife derives disutility W_1 from it. As we argued in the preceding, the fact that the wife cannot monitor the husband's condom use means that she cannot offer him the trade of $W_c - W_1$ in exchange for his use of a condom.

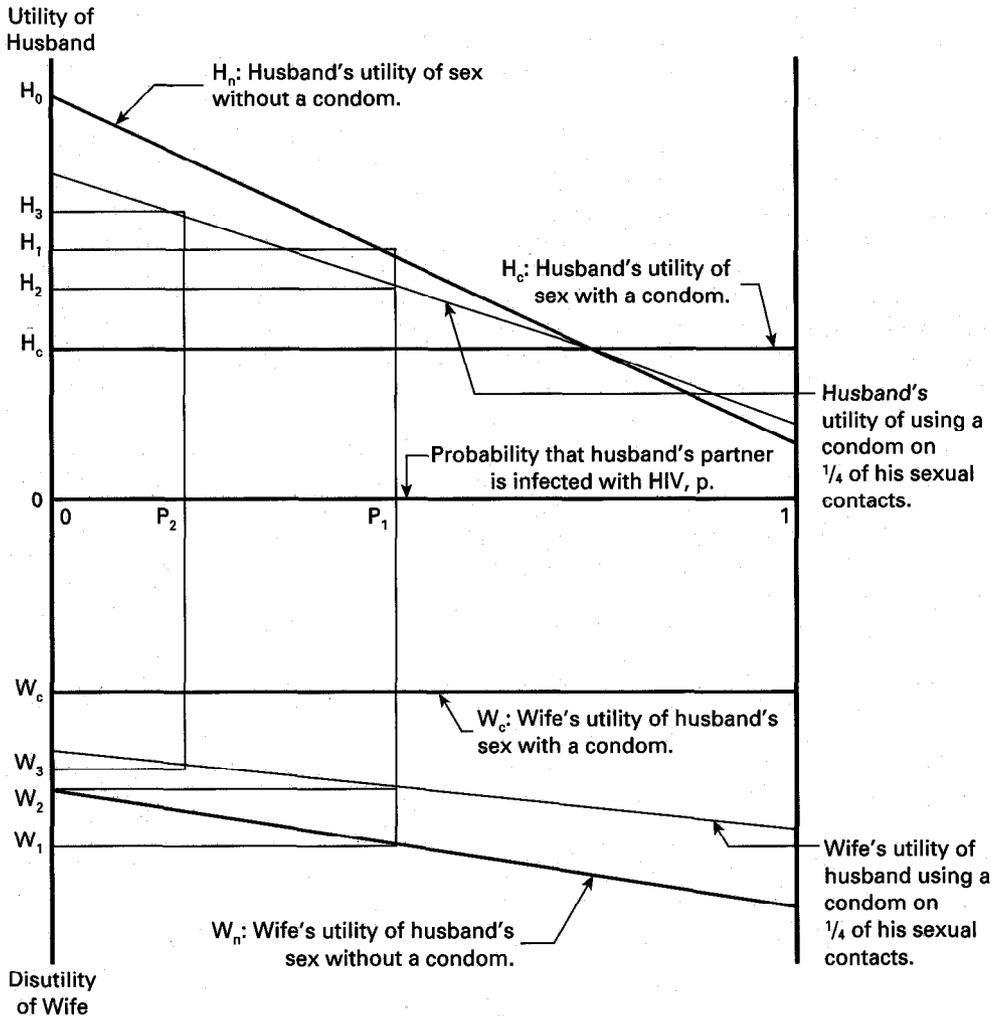
If most of the husband's casual partners have many other casual partners and believe themselves to be uninfected with HIV, they would prefer to use condoms to protect themselves from STDs, including HIV, and also from pregnancy, if they had the knowledge and bargaining power to impose their preferences. Now suppose that a government intervention changes the bargaining power between the husband and his casual partners so that one quarter of them succeed in insisting on a condom during intercourse. The immediate result will be to reduce the husband's utility from each encounter to a weighted average of H_n and H_c , which is illustrated by H_2 in box Fig. 1-1. However, the wife's utility will increase, from W_1 to W_2 , partially or perhaps completely offsetting her husband's utility loss. Depending on the

relative magnitudes of the two utility changes and the cost of the government intervention, the intervention may have already increased total social welfare. Since this change involves an increase in two people's utility at the expense of a decrease in another's, it is not a move to greater efficiency, but rather a redistribution of welfare from the husband to the wife and his casual partner.

The longer-term effect of the government intervention can improve the welfare of the husband as well as of the women and the casual partners and thus be unequivocally efficiency enhancing. By intervening such that one-quarter of all encounters are protected by condoms, the prevalence rate will be reduced from P_1 to some smaller number such as P_2 . This change will improve the utility of both the husband and the wife, with the husband attaining H_3 and the wife W_3 and will clearly improve the utility of the casual partners. If the prevalence rate drops far enough, as drawn in the box figure, the husband's utility will be increased even above his preintervention utility level of H_1 .

Since the husband's welfare is greater at H_3 with prevalence rate P_2 than at H_1 with prevalence rate P_1 , why was government intervention necessary to move him from zero to 25 percent condom use? The reason is that sexual partners do not have equal information about each others practices with others, i.e., asymmetric information. If all sexual partners could prove to subsequent partners that they had previously used a condom, then condom use would be adequately rewarded and the epidemic would naturally evolve from P_1 down to the lower level, P_2 . However, in the absence of a method for proving to subsequent partners that one has used condoms in the past, no partner faces the appropriate incentives for condom use. This is a genuine case of market failure, since the husband and all men like him would like to trade 25 percent condom use for a move from H_1 to H_3 . However, they can neither be compensated by their casual sexual partners nor by their wives for doing so. Owing to market failure, trades that would benefit all parties are not available.

How likely is it that an intervention that subsidizes an increase in condom use in extramarital sexual contacts will actually produce an efficiency gain? Or, in terms of the box figure, how likely is it that P_2 will be far enough below P_1 for H_3 to be above H_1 ? The answer depends on the number of extramarital partners the husband has and the number of partners each of his partners has. The greater the sexual activity of the husband and his partners, the larger the reduction in seroprevalence that will result from any given increase in the percentage of condom use. Thus, if the population of husbands and extramarital partners is heterogeneous, with some of them having more partners than others, a public intervention to facilitate condom use in these relationships will have the most positive externalities if it is targeted to the higher activity groups.



Box Fig. 1-1. The effect of the husband's extramarital sex on his utility and on his wife's disutility as a function of husband's condom use and the prevalence of HIV.

THE IMPLICATIONS OF HIV TESTING FOR GOVERNMENT INTERVENTION

HIV testing and the market for condoms

The discussion to this point has ignored the existence of blood tests for HIV infection and the fact that the cost of testing the blood or saliva of one's prospective partner for antibodies to HIV is rapidly decreasing. In a few years saliva tests will be available that cost only a few dollars, can be administered by anyone, and require only a few minutes. Soon thereafter it may even be possible to administer a test to one's prospective partner without his or her knowledge by, for example, obtaining a sample of bodily fluids on a piece of "litmus" paper. How will the availability of such technology affect the public economics of the HIV epidemic?

Given current technology, it is extremely difficult to test one's partner without his or her knowledge and the cost of testing is high relative to purchasing power in most developing countries. Thus, the availability of testing makes it possible, at substantial cost, for one to ascertain one's own infection status without informing one's partner. In this situation, individuals can use testing as a means of increasing the asymmetry of information between themselves and others in society, whether they be sexual partners, employers, or insurance companies. Such increased asymmetry has the potential of worsening the market failure problems described in the preceding section.

A government policy that would marginally reduce the asymmetry of information in some relationships would be to subsidize

testing of people only in pairs. For example, whether the government allowed private firms to offer blood testing services or offered such services itself, it would mandate that two people who declare themselves to be current or prospective sexual partners can be jointly tested and jointly informed of each others' results for the same price otherwise charged to individuals. Although there would be some leakage owing to misrepresentation by individuals who pretend to be partners in order to receive tests at half price, on balance such a policy would tend to improve the symmetry of information between sexual partners.

One possible negative result of such "partner-observed" testing has been stressed by Philipson and Posner. The demand for such testing would originate in peoples' desire to have sex without a condom. Suppose that a woman insists on observing the test of her prospective husband. If the man agrees, and tests negative, she will agree to marry him and he will have access to unprotected sex with her. However, if she is actually infected, then he may also become so. On the other hand, if he tests positive, she will refuse him and he will subsequently agree to unprotected sex with people whose lifestyle suggests a high probability that they are infected. If some of those are uninfected, he may infect them. Thus, "[i]n either case he substitutes potentially infecting sex for safe sex," thus generating a negative externality and potentially exacerbating the spread of the epidemic.⁶

The proposed policy avoids one prong of this dilemma by subsidizing only partner-observed joint testing. Thus, in the example, the partnership would have proceeded to marriage and the use of

unprotected sex only if both had tested negative, removing the possibility that the woman would subsequently infect the man owing to her current, unexpectedly positive, infection status. The other prong of the dilemma cannot be so easily avoided, but is less significant for the epidemic because the high-risk uninfected partner is likely to become infected soon whatever the behavior of the man under discussion.

As the advance of technology lowers the cost of testing and makes one's partner's infection status more easily available, the information asymmetries attributable to HIV, and therefore the public stake in its control, will decline. However, this decline will be slow in developed countries and even slower in developing ones. Substantial asymmetries are likely to remain for several decades, justifying continued government intervention to facilitate protected sexual intercourse.

HIV testing by employers of employees

In addition to the individual demand for HIV testing, there is a demand by some employers to test the blood of applicants or of current employees. Such employers apparently believe that, by identifying and excluding the HIV-positive candidates, they will reduce their health care and attrition costs and thus improve their profitability.

Regardless of the empirical validity of the employer's belief, the policy of screening workers and excluding or dismissing those who test positive, imposes negative externalities on the rest of society. First, since HIV infection is not related to current productivity, the practice of excluding workers by infection status effectively discriminates among workers based on their expected future decline in productivity or increase in health care expenditures. This practice could logically apply to workers over 50 years old, or female workers who might have children. Discrimination against workers based on attributes unrelated to their current productivity is inefficient, because it deprives society of the contribution that these groups could make to the economy. Furthermore, each firm that evades its share of the responsibility for the health care costs of HIV infected workers, forces these costs onto society at large. In a society where 10 or 20 percent of the prime-age work force is HIV infected, employer policies that discriminate against these workers will result in substantial social costs.

An additional reason to discourage employer discrimination is the possibility that employers who do not discriminate will have a greater incentive to sponsor workplace information and condom distribution programs, because they will bear some of the costs of HIV sickness. Governments throughout the world should encourage private firms to adopt a socially responsible approach to the HIV/AIDS epidemic, including workplace education programs and a refusal to screen workers for HIV.

HIV testing by health insurers

Potential purchasers of health insurance have information about the health risks they face that is unavailable to the insurance company. Those who believe themselves at greater risk are willing to pay more for health insurance and are more likely to buy it at any given premium than those who consider themselves healthy. The result is that the people who hold health insurance are typically more likely to be sick than those who do not, raising the cost of the health insurance premium over what it would be if everyone contributed. Although individual insurers can attempt to protect themselves from this "adverse selection" problem in a variety of ways, the only systematic solution to the problem, and arguably the most efficient one, is universal health insurance coverage financed by tax revenue. However, universal coverage is an expen-

sive option and beyond the reach of the poorest countries. By offering universal coverage, but restricting it to catastrophic problems only, a government can dramatically reduce the danger of adverse selection while limiting its own costs and stimulating the private health insurance market.

The HIV epidemic has doubly exacerbated the potential information asymmetry between the insurer and the insured. First, the insured has information about his or her own sexual behavior that the insurer does not have and that information has new pertinence for future health care costs. Second, the insured can have a blood test giving absolute knowledge of HIV status that is unavailable to the insurance company. Because it is possible to spend a great deal on medical care for HIV/AIDS, these two problems can destroy the health insurance industry, or prevent its establishment, in countries with even small seroprevalence rates. Since the health insurance industry provides a valuable product, this destruction would be a serious market failure.

Of course, the blood test for HIV can also be used by insurers to partially redress the imbalance of information between them and the insured. Use of the test enables insurers to limit the tendency of people to apply for insurance when they find out, or suspect, that they are HIV infected. Although one can empathize with individuals in this position, allowing them to buy insurance without revealing their HIV status would result in massive efficiency losses. In countries that have, or are launching, private health insurance industries, government should establish guidelines that protect the rights of infected persons while enabling the health insurers to protect themselves. A market-based approach that deserves further study is the creation of special insurance policies specifically for people who are HIV-infected, as has occurred in South Africa, for example.

SEXUALLY ACTIVE PEOPLE MAY HAVE INSUFFICIENT KNOWLEDGE OF THE RISKS AND HOW TO AVOID THEM

At the beginning of the HIV epidemic, when the disease was unknown, individuals making the decision to enter a sexual relationship or to provide commercial sex services did so with some knowledge, however incomplete, of the existing sexually transmitted diseases.

In the past 15 years, sexual behavior has become much more dangerous, yet the evidence suggests that people's knowledge has not kept abreast of the changes. For example, as late as 1993 surveys of sex workers in 13 states of India found that fewer than 50 percent had ever heard of AIDS in all but one state. And even in Africa, where infection rates are highest, up to 50 percent of women with a casual partner did not know that condoms could protect against AIDS.

To the extent that sexually active people are ignorant of the danger of unprotected sex and are not able to find the information they need to protect themselves, there is an argument for public intervention in the dissemination of information. However, since information is not a pure public good (it is nonrivalrous, but excludable), public dissemination is potentially justified only if private channels of information are not already doing an adequate job of supplying information to each risk group in accordance with the social benefits from that group's knowledge. In countries with active, unfettered press and radio markets, the profit motive is likely to encourage the dissemination of large amounts of information to the general public about anything related to human sexuality. For the general public, the main functions of the government can be to feed accurate information to the press, to provide "corrections" when the press appears to be giving misinformation and, as an example to the public, to advertise its inclusion

of persons known to be living with HIV or AIDS in the battle against AIDS and also in other high-profile community events. In countries where the HIV epidemic is just beginning and private sector media are reluctant, the government might take the initiative by an initial model information campaign and then withdraw funding from this activity while sending the signal that it encourages private sector dissemination efforts in the same vein.

However, the preceding argument that intervention efforts should be targeted to the most sexually active applies equally to public information about STDs and AIDS. Although more sexually active people have a greater self-interest in learning about STDs, the positive externalities associated with their knowledge suggest that they will nevertheless value such information at less than the social benefits of their acquiring it. Thus, there is a possible government role in subsidizing acquisition by the most sexually active of timely and accurate information about STDs and about protective strategies.

In addition to the basic facts about the transmission and health effects of HIV, sexually active people need to know the riskiness of unprotected sex in their own milieu. For example, the rational behavior modeled in the box presupposes knowledge by all parties of the prevalence rate of HIV infection in various population groups. Therefore, there is an important government role in facilitating and, if necessary, subsidizing disease surveillance efforts. To be as relevant as possible to individual decision making, surveillance data should be collected and publicized that is specific to each of the major urban centers in a country. If the prevalence rate can be collected for different risk groups within each urban center, it will be even more useful.

HIV TRANSMISSION EXACERBATION BY INFECTION WITH OTHER STDs

The preceding argument for the positive externalities associated with condom use applies equally to HIV and to the other STDs, although the consequences of infection and therefore the weight of the argument are stronger for the former. However, the fact that STDs have now been found in two important studies to substantially exacerbate the transmission of HIV means that all of the market failures that apply to HIV also affect the other STDs.^{4,5} Furthermore, STDs can be cured as well as prevented. Therefore, the epidemiological interaction between the HIV and the other STDs greatly strengthens the argument for subsidizing the treatment of the classic STDs.³

HIV TRANSMISSION AMONG DRUG USERS

The economic analysis of the externalities associated with using contaminated needles is identical to that of unprotected sex (e.g., in the box, the dangerous activity of the husband outside the household could be sharing needles with a fellow drug user, instead of extramarital sex). The reasons why the wife of a drug user can not sufficiently compensate her husband for using clean needles are identical to the reasons why she can not adequately compensate him for condom use. The policy conclusion is the same, also: Provided that it can be accomplished at sufficiently low cost, government subsidy of clean needles can enhance efficiency.

HIV AND EQUITY

The preceding sections establish that the HIV epidemic engenders several market failures and that government intervention could

increase social welfare, making many people better off. However, the HIV epidemic also creates or exacerbates several social inequities that many governments will also want to redress through government intervention.

PREVENTIVE INTERVENTIONS

One possible inequity relates directly to the preceding discussion of the efficiency gains from the man's condom use with nonregular sexual partners. That discussion made clear that the woman's ability to compensate the man for outside condom use could, subject to limitations on her ability to monitor his condom use, help to internalize the external costs of unprotected sex. However, in many societies the wife has little or no bargaining power in the relationship. If she has been unable to retain any of the benefits (i.e., the "gains from trade") accruing to their marriage, then she has no discretionary resources with which to compensate her husband, even if she wishes to do so. In particular, she may not have the power to refuse to have sex without a condom in sexual relations with her husband, or to refuse him his favorite meal or the repair of his favorite shirt, and thus may not be able to offer these compensations in exchange for his assurances of condom use outside. Although it is difficult to provide wives with more bargaining power in their current marriages, a government intervention that subsidizes the husband's condom use with outside partners (or taxes unprotected sex with those partners) will immediately redistribute welfare from the husband to the wife (see the box). For some societies, this may be reason enough for such interventions.

The preceding discussion has paid insufficient attention to the perspective of person A, the outside person in the triangular relationship, whether she is a sex worker or a noncommercial extramarital partner. (The feminine pronoun is used for clarity of exposition. The outside partner might, of course, be male.) If she has multiple partners and is well-informed, she is aware of being at high risk of HIV infection and is likely to prefer protected to unprotected sex. A government intervention that facilitates her access to condoms, increases her skill at negotiating condom use or, through persuasive public health messages targeted at her partners, reduces their resistance to condom use, will redistribute well-being toward her in the short run. This will be true whether or not the long-run benefit of reduced seroprevalence is enough to make her clients better off as modeled in the box. Redistribution from her client to her is likely to correspond to a transfer from a higher to a lower end of the income distribution. Such transfers would be consistent with a progressive policy toward income redistribution.

MITIGATION INTERVENTIONS

Orphaned children are a social problem whatever their cause, especially if they lose their parents when they are young. Since a high prevalence of HIV infection among reproductive age adults greatly increases the number of orphaned children, the epidemic is the occasion for increased attention to the plight of orphans. However, there is no obvious reason to single out AIDS orphans for special attention. In particular, some AIDS orphans are not poor or reside in households that are not poor, and therefore would absorb resources that could be better spent elsewhere on poverty relief. A concern for equity, properly construed, will target assistance efforts to the poorest orphans, regardless of the cause of their parents' death. To the extent that poor orphans can be identified, they can be a particularly useful target group for antipoverty safety net policies or for policies designed to mitigate the impact of the epidemic.

In popular use, the term "equity" is typically applied to issues of income distribution and redistribution. The discussion in this chapter has adopted the broader view that any redistribution of welfare from the better off to the worse off is equity enhancing. Thus, it is appropriate to consider the impact of public policy on the distribution of well-being between those who are free of infection and the HIV infected. On this dimension, at least, the former are better off than the latter and therefore might be the target of equity-motivated redistributive policies. Relevant policies include health sector policies that affect access to treatment and other policies that affect access to employment, housing, and so on.

Societies differ in their willingness to subsidize curative health care. Some societies argue that health care is a "basic need" or "merit good," and therefore that the government should assure access to basic health care for all citizens regardless of ability to pay. Other societies are skeptical of the claim that health care is different from many other goods and services with claims to being basic needs. These include not only education and basic nutritional requirements, but also roads, housing, and telephone service, for example. However, whatever the views of a specific society regarding the degree to which health care should be subsidized, a guiding principle for fair and compassionate treatment of HIV-infected people in the health care system should be comparability with the treatment accorded those suffering from other equally serious and difficult to treat illnesses.

Thus, a government that decides to provide antiretroviral medication, at a cost of thousands of dollars a year per patient, should be prepared to provide chemotherapy for cancer patients, heart surgery for heart disease patients, kidney dialysis and transplant for end-stage renal disease patients, and so on. Similarly, if opportunistic illnesses of the HIV-infected are treated at a subsidized rate, then the same subsidy should apply to the treatment of other infectious diseases. Once a government has accepted the argument that fairness for AIDS patients means fairness for cancer patients also, any proposed subsidy policy for all these similar diseases must be evaluated relative to the opportunity cost of the resources. The consequence will be that a poor country will cover a smaller share of costs for the average patient than a rich country with the same views on the degree to which health care is a merit good.

Unless a society is able to afford a 100 percent subsidy rate for treating all patients with AIDS or a similar expensive adult chronic condition, some patients will be unable to pay their portion of the cost of care. An equitable health care policy will make allowance for these patients by providing greater subsidies for the most indigent. However, the system of subsidies should be organized so that it benefits the poorest patients, regardless of the disease from which they suffer.

Government policies that oppose employment discrimination by HIV status have the advantage of enhancing efficiency as well as equity, and therefore are good candidates for implementation, provided that their cost is low. On the other hand, discrimination by health insurers according to the HIV status of the applicant reduces the asymmetry of information between the contracting parties and hence enhances efficiency. As discussed, such discrimination should be impeded only in countries with universal health insurance coverage.

RESOURCES FOR STDs NOW AND IN THE FUTURE

This last section of the chapter sums up the discussion and adds some final remarks in several areas. First, the section shows that the argument for government intervention in the cases of STD/HIV programs is at least as strong as the more traditional argument in favor of government control of TB. The section concludes by considering two kinds of interaction between culture and the

HIV epidemic. On the one hand, the epidemic is likely to affect cultural practices, especially sexual practices and some of these changes are likely to slow the epidemic. On the other hand, in the short run cultural preferences to avoid the subject of sexuality may impede HIV control to the great detriment of the populations concerned.

A COMPARISON OF STDs AND TB

Although the argument for subsidizing the treatment and prevention of TB is firmly based on the theory of public goods, that for STDs lacks that support, except indirectly through the disease's effect on other communicable diseases, especially including TB. On the other hand, as argued in the text and demonstrated in the box, the asymmetry in information between sexual partners produces a clear efficiency argument in favor of government intervention to control STDs, and particularly HIV. Furthermore, the more heterogeneous the sexual behavior of the population and the easier it is to target the most sexually active with STD treatment and with subsidies and persuasion to use condoms, the larger the efficiency gains from government intervention to control STDs and AIDS. Thus, in practice the allocation of resources between TB and STD/HIV control on efficiency grounds should depend on the costs of government interventions and the number of (both primary and secondary) infections that can be prevented.

Figure 1-1 shows conceptually how resources should be allocated between the two sets of interventions. Suppose that a given amount of budget is available that a health ministry must allocate between TB and STDs/HIV. The length of the horizontal axis AD in the figure represents that fixed budget. Then any point on the line in the figure, such as point B, represents a division of these resources between the programs. Measuring the dollars spent on STD/HIV control from the left of the figure, line MB_{HIV} represents the marginal benefit, measured in deaths averted, of every additional dollar spent on those programs. By ranking the STD/HIV programs from left to right according to the size of their benefit per dollar, the line MB_{HIV} can be drawn as downward sloping from left to right. Then construct a similar line labeled MB_{TB} , which slopes downward from the right axis of the figure. The point where the two lines cross will represent the most efficient division of resources between the two programs.

The division of resources between the two programs will clearly depend on the specifics of the country situation. Figure 1-1 shows the outcome in two situations in which the budget is the same and the prevalence and threat of TB are the same, but the prevalence rate of HIV infection differs. In a country with a low prevalence rate of HIV infection, the number of cases that can be prevented by a highly targeted program can be enormous, but expansion of that program beyond the small group of people who are most at risk has rapidly diminishing value. The result is that point B will be the most efficient allocation of resources between the two programs, with amount AB going to the STD/HIV program and BD going to TB control. In contrast, in a country where the infection rate among those with the largest number of partners is already high, the value of the first and most targeted dollar of STD/HIV control will be smaller. However, in the high-prevalence country the fact that STDs and particularly HIV are more widespread means that there can be substantial benefits from expanding the program to people who are less sexually active. In the high-prevalence country, this logic leads to the amount AC being spent on STD/HIV control, whereas the smaller amount CD is spent on TB control. (This discussion ignores the fact that HIV control will also slow the spread of tuberculosis.)

Once resources are optimally divided between the two programs, which in the high-prevalence country would be at point C,

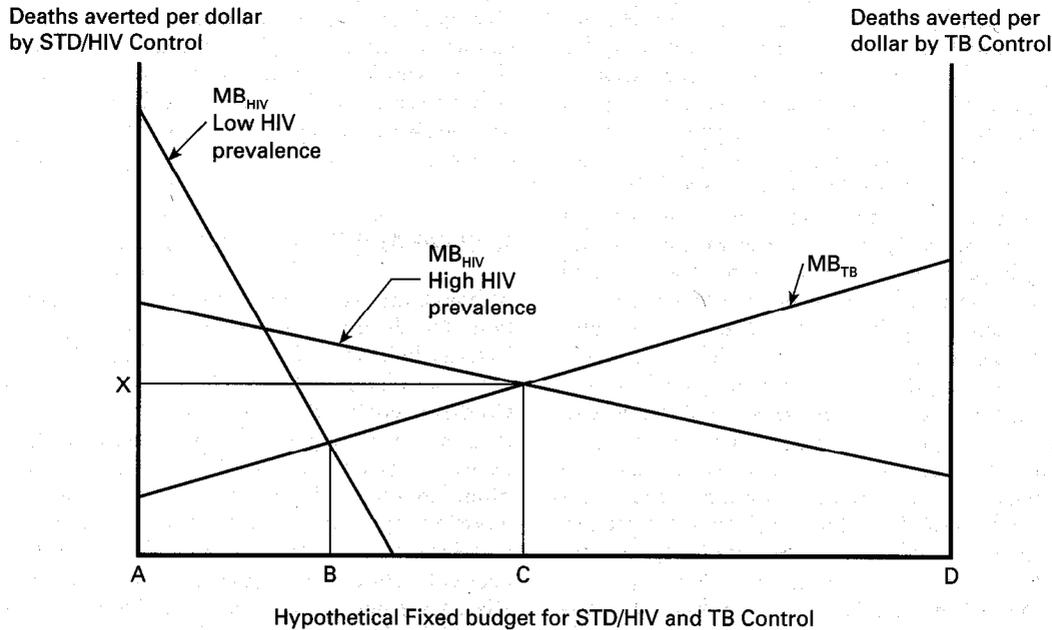


Fig. 1-1. Optimal division of fixed budget between STD/HIV and TB control in a low- and high-prevalence country.

the common marginal benefit of the two programs is given by X , which is the number of additional deaths the country could avert if the budget of the entire STD/HIV and TB program were expanded by one dollar. If this number is large in relation to similar values from other diseases and taking into account everything that individuals would do in the absence of government intervention, then the program manager can argue that the country should expand his budget for both TB and STD/HIV programs. Indeed a large value of X suggests that expanded allocations to health in general would improve overall social welfare.

How do STD/HIV programs and TB programs compare on equity grounds? Expenditures to prevent and control TB are broadly redistributive, because poverty is a risk factor for that disease. The correlation between socioeconomic status and risk of HIV is less clear, but there are strong redistributive arguments for intervention against HIV as a policy to redistribute social welfare toward the spouses and children of sexually active, multipartner adults.

Thus, in the abstract it is impossible to say whether the argument for government intervention is stronger for HIV or for TB. The answer depends partly on the current incidence rates of the two diseases in the country in question, on the actions that private individuals and firms would take in the absence of government intervention,² on the cost and managerial efficiency of the various disease prevention programs, and on the equity considerations in both programs. However, at least potentially, the public economics argument for prevention and control of HIV is as strong as that for TB.

LONGER-TERM SOCIAL ADJUSTMENTS TO HIV/AIDS

In view of the danger of the HIV epidemic and the clear market failures described in the preceding, it would be surprising if societies that have learned through hard experience that AIDS is fatal and sexually transmitted did not evolve mechanisms to internalize some of these externalities. Obvious areas for welfare-enhancing social innovation include the nature of the marriage contract and the degree of social acceptance accorded to condoms in extramarital and even in marital sexual relations.

In casual sexual relations, sex workers and others with multiple sexual partners will prefer condom use as long as they are uninfected. As time passes and new uninfected cohorts enter the commercial and casual sex markets knowing of the threat of AIDS, the proportion of such workers who are uninfected, and will demand risk premiums for sex without a condom in order to remain that way, will grow. The risk premium for sex without a condom will be higher in areas where infection rates are higher and will fluctuate over time in a countercyclical pattern to infection rate.⁶ However, in general, it can be expected that the trend toward increased acceptability of condom use will continue both in casual and marital sexual relations.

The existence of the HIV epidemic has dramatically increased the significance of past sexual experience and the potential costs of future marital infidelity and is thus likely to substantially change the bargaining process leading to marriage in societies where HIV prevalence is high. In such societies, new marriages may be based on implicit contracts that allow for more monitoring and less tolerance of extramarital affairs than did the marriages of the past. Even existing marriage contracts may be implicitly renegotiated, at least by spouses with the power to do so. However, these new more tightly monitored marriages will be even more subject to one of these sources of market failure than were the old, because with reinforced monitoring the spouse who is apprised of infidelity will be even more surprised than under the lax system of the past. Hence, the possibility of compensation by the spouse for condom use outside the marriage will be even more remote. As long as condom protection entails reduced utility to one partner in the sexual encounter and HIV remains a serious threat, there will be a role for government intervention to subsidize its use.

CULTURAL VALUE SYSTEMS AND THE EVALUATION OF HIV/AIDS POLICIES

This separation of the evaluation of a government intervention into efficiency and equity components ignores an important and influential feature of the HIV epidemic that affects all governments' decisions regarding the control of HIV: the fact that the

disease is primarily spread by behavior that most societies condemn or at least deplore. In most societies some behavioral responses that would slow the spread of AIDS (e.g., abstinence from extramarital sexual relations or intravenous drug use) are viewed as morally correct, and others (e.g., the use of condoms during extramarital relations or of clean needles to inject drugs) as facilitating immoral activity. Such societies are likely to attach more value to a government intervention that encourages abstinence than to one that subsidizes the use of condoms or clean needles, even if they have identical implications for economic efficiency and equity. Such social preferences are valid on their own terms and arguably may themselves be justifiable as efficiency and equity enhancing. However, to the extent that the policy of promoting abstinence rather than condoms or needles entails substantial losses of efficiency and equity as conventionally measured, societies and their governments must be aware of these costs before rejecting the more efficient and/or equitable policy options.

Governments have the option to ignore AIDS or to intervene only with messages that exhort people to be monogamous. Indeed, one way of eliminating the market failures described in the preceding would be for people to change their preferences away from multipartner and toward monogamous sexual relations. In view of the overwhelming evidence that a large minority of men and a smaller minority of women in most societies have many sexual partners over their lifetime, and the more limited evidence that AIDS is an insufficient threat to radically change this behavior, such exhortation is unlikely to correct the market failures or to

slow the epidemic. Societies that choose to condemn extramarital sex rather than to subsidize and facilitate protected sex are likely to pay large costs in terms of excess numbers of AIDS cases and reduced utility from sex both within and outside marital relationships.

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