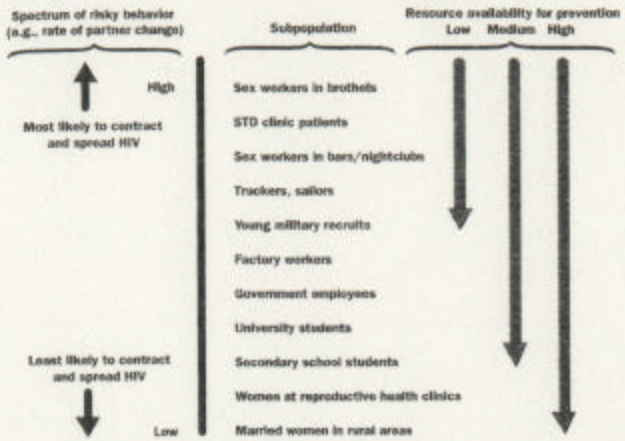
greater than 1. They may also have the resources to subsidize to a greater extent services for the poor and to extend prevention subsidies to subpopulations that are unlikely to spread HIV to others.

At an operational level it is impossible to determine the actual or potential reproductive rate of HIV for any group of individuals. However, using information about the average number of partners, condom use, and injecting behavior from surveys and epidemiological surveillance, subpopulations in a given country can be ranked from those with the highest-risk behavior (those most likely to contract and spread HIV) to those with the lowest-risk behavior. Figure 3.5 shows a stylized view of the ranking of several subpopulations in a hypothetical population according to the extent of risky behavior at a specific point in time, and how the scope of prevention efforts would expand to include groups with increasingly less-risky behavior depending on the availability of resources. Once the highest-priority subpopulations have been effectively reached, programs can be expanded to cover those with progressively less-risky behavior, provided that sufficient resources are available. Indeed, if sustained behavior change is achieved in the highest-priority groups, the relative priority assigned to other groups will increase. Of course, no ranking of this sort can apply to all countries, or even to a single country over time. To overcome problems in locating the people most likely to contract and spread HIV at any given point in time, it is essential that policymakers and program managers finance collection of the necessary information for cost-effective use of the scarce resources available for HIV prevention.

In concluding, we return to the important epidemiological point that countries at the nascent stage of the epidemic have a unique opportunity to act early, to make a few key investments, and largely prevent an HIV epidemic. Not all countries with low levels of infection will necessarily go on to experience an HIV epidemic, even without government action. However, our inadequate understanding of the distribution of different behaviors in the population and the links between different subpopulations make it difficult to predict which among the countries will be so lucky and which will not. Furthermore, even in countries where high-risk behavior is relatively rare, patterns of sexual and injecting behavior can change with economic and social conditions. Interventions at the nascent stage are the most effective and will likely involve far less total cost than if implemented after HIV has saturated subpopulations with high-risk behavior. Further, because the number of people in these subpopulations is small relative to the entire population, the absolute costs of prevention will be relatively low.

Figure 3.5 Resource Availability and Program Coverage



Note: This is a hypothetical example only and is not meant to reflect the situation in any particular country.
Source: Authors.

In setting priorities, governments should first ensure that the subpopulations most likely to contract and spread HIV are effectively reached with preventive interventions. As additional resources become available, prevention efforts can be expanded to cover groups that are progressively less likely to contract and spread HI

These recommendations are not meant to limit the scope of government involvement if there are ample resources and public will to undertake even more. Rather, our intention is to point out the minimum set of activities that all governments should be engaged in to improve the efficiency and equity of prevention programs and a rational order in which to expand these activities if HIV spreads or more resources become available.

The National Response

NEARLY ALL DEVELOPING COUNTRIES HAVE RESPONDED IN some way to the challenge of HIV/AIDS, often with the active assistance of donor countries and multilateral institutions. But developing countries' AIDS prevention efforts are diverse

and generally undocumented, making it difficult to evaluate the extent to which high-priority policies are already being implemented.

AIDS in the World II includes a survey of managers of national AIDS control programs in 118 countries, covering such issues as political commitment, organization, coordination, management, preventive and treatment responses, program evaluation, and human rights (Mann and Tarantola 1996).[21] However, to date there has been no systematic evaluation of developing countries' responses to the epidemic, and in particular of the priority and effectiveness of different activities. The overwhelming impression left by the *AIDS in the World II* survey and by many national AIDS control plans is that many countries have launched a collection of AIDS prevention activities without clear-cut priorities; indeed, many programs do *not* focus on preventing infections among people most likely to contract and spread the virus. The reasons for this are only partly due to a lack of understanding of the importance of these priorities; domestic political considerations and the preferences of international donors for particular programs are probably also responsible. Nevertheless, in such an environment, limited resources are likely to be stretched very thin, and the cost-effectiveness of public expenditure on prevention is likely to be low.

How well have these prevention efforts corresponded to the priorities recommended in this chapter? Available information is scarce, but it suggests that policy performance could be improved in at least three areas: provision of the information necessary to combat the epidemic and plan sound programs (public goods); ensuring prevention of HIV among those most likely to contract and spread it (reducing negative externalities); and making sure that poor people have access to the means to protect themselves (equity).

Expanding the Information Set

The limited evidence available suggests that as much as one-quarter of all developing countries have yet to initiate systematic monitoring of HIV prevalence. A background study for *AIDS in the World II* classified countries into four groups according to whether HIV sentinel surveillance sites were planned (but not yet operating), limited, many, or extensive (Sato 1996). The distribution of 123 developing countries in these four groups is shown in table 3.5; data for individual countries are

Table 3.5 Distribution of Countries, by the Number of Sentinel Surveillance Sites and the Stage of the Epidemic, January 1995

Stage of epidemic	*Planned sites*	*Limited sites*	*Many sites*	*Extensive sites*	*No information on sites*	*Total (%)*	*Number of countries*
Nascent	21	59	3	3	14	100	29
Concentrated	7	48	36	5	5	100	42
Generalized	0	5	52	43	0	100	21
Stage unknown	16	58	3	0	23	100	31
Total (%)	11	46	23	10	11	100	
Number of countries	14	56	28	12	13		123

Source: Tabulations based on data in table 2 of the statistical appendix.

in table 2 of the statistical appendix to this report. The good news is that more than three-quarters of these countries reported having at least limited sites for HIV sentinel surveillance as of January 1995. Countries at the generalized stage of the epidemic were most likely to have many or extensive sites, while those at the concentrated and nascent stages were most likely to have limited sites. However, one in five developing countries at the nascent stage of the epidemic reported no sentinel surveillance sites, and for another 14 percent the extent of sentinel surveillance was unknown. If we add all the countries reporting only planned sites to those countries for which information about sites was inadequate to determine their extent, we find that 27 countries—more than one-fifth of countries at all stages of the epidemic—were not reporting any operating HIV sentinel surveillance sites in January 1995.

Even in those countries that have some form of sentinel surveillance, information on HIV prevalence among those most likely to contract and spread the virus is often lacking. Our classification of countries by stage of the epidemic requires information on HIV prevalence in at least one subpopulation presumed to practice riskier-than-average behavior and, if HIV prevalence exceeds 5 percent of one of these groups, prevalence among women attending antenatal clinics. Although delays in the receipt of reports probably account for some missing data, available information was insufficient to classify 31 developing countries by stage of the epidemic, usually because of a lack of information on those presumed on average to practice riskier behavior—sex workers, injecting

drug users, men who have sex with men, the military, and STD patients.[22] Among the 123 developing countries we attempted to classify, 43 countries (35 percent) had no information on HIV prevalence in any group with presumed high-risk behavior during the last 5 years. While it is more convenient to monitor HIV trends among blood donors and women attending antenatal clinics, regular monitoring of HIV prevalence early in the epidemic among those who practice high-risk behavior is much more important. Because of the potential for explosive growth of HIV among injecting drug users, HIV prevalence in this group should be monitored at least once a year and preferably more often (AIDSCAP and others 1996, Chin 1990).

In addition to ensuring more and better monitoring of HIV prevalence, governments urgently need information on patterns of sexual behavior, condom use, and drug-injecting behavior. As we saw in chapter 2, the heterogeneity of behavior and the extent of mixing between people with high- and low-risk behavior determine the baseline shape of the AIDS epidemic. Countries at all stages of the epidemic need information on the prevalence and distribution of risky behaviors among representative samples of men and women to understand the likely path of the epidemic and how the epidemic can be minimized. However, this information remains scarce. Fewer than 20 developing countries are known to have undertaken sexual behavior surveys, such as those sponsored by GPA or DHS, that could provide such information.

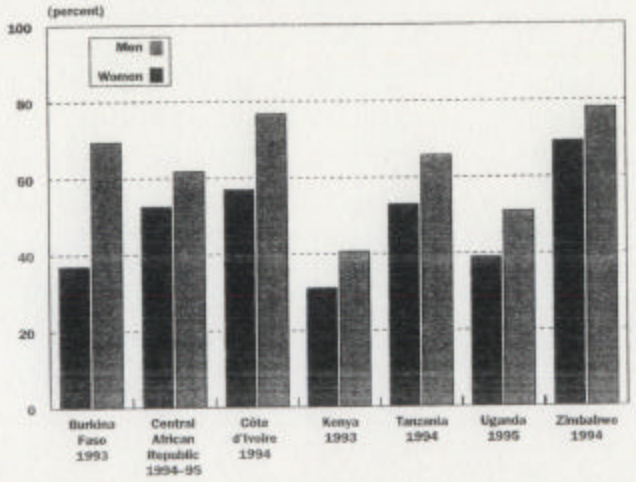
Finally, evaluations of HIV prevention programs often fail to measure the costs of interventions or their impact, reporting instead on indicators of process and implementation (Mann and Tarantola 1996). Information on costs and impact is important not only for assessing the most efficient allocation of resources, but also for demonstrating the effectiveness of interventions to change behavior among those most likely to contract and spread HIV and the spillover benefits to the low-risk population. Developing countries need better information on the costs and effects of pilot interventions, which interventions affect whose behavior, and at what cost.

Preventing Infection Among Those Most Likely to Contract and Spread HIV

The *AIDS in the World II* survey shows that most countries have at least a few interventions that focus on people most likely to contract and spread HIV, but most of these programs achieve only limited coverage (Mann and Tarantola 1996). To arrest the epidemic, the coverage of preventive measures directed toward these groups needs to be expanded considerably.

For example, recent DHS surveys in seven African countries—all of which have been very hard-hit by the AIDS epidemic—reveal that only 40 to 70 percent of men and women with a recent nonregular partner named condoms as a means of preventing HIV transmission (figure 3.6). In countries such as Tanzania and Uganda, where nearly everyone knows someone who has died of AIDS, such low awareness of the benefits of condom use is shocking. Given this low level of knowledge, it is not surprising that consistent condom use is also low. In Malawi, for example, a recent survey found that only 30 percent of people who had nonregular partners consistently used condoms (Lowenthal and others 1995). In Côte d'Ivoire, only 5 percent of those in "high-risk relationships," including relationships in which one partner was infected, reported using

Figure 3.6 Percentage of People with a Recent Nonregular Partner Who Are Aware That Condoms Prevent HIV Transmission



Note: A nonregular partner means a casual partner or a sex worker. The reference period for these countries varied.
Source: DHS data.

Even in countries with widespread epidemics, many women and men with a recent, nonregular sexual partners are not aware that condoms prevent the spread of HIV.

condoms during every act of intercourse (Coleman and others 1996). Condom use in Uganda has increased substantially, especially among the young, but is still far short of adequate coverage (Asiimwe-Okiror and others 1997, Stoneburner and Carballo 1997). In contrast, Thailand has been extraordinarily successful in raising condom use, particularly among those at higher risk of contracting and spreading HIV; and there is clear evidence of declines in HIV prevalence among some population groups (box 3.11).

Although many people practicing high-risk behavior are difficult to reach for prevention, some people whose circumstances may put them at higher risk of HIV infection are part of "captive" populations that can be readily identified: the military, police, and prisoners (box 3.12). Because governments usually have much easier access to these organized groups than to injecting drug users, sex workers, or others with many casual partners, it should be possible for governments to reach nearly all members of each of these groups with preventive interventions. Have governments done this?

The Civil-Military Alliance to Combat HIV and AIDS conducted a survey of prevention activities among the militaries of 50 countries, about half of which were low- and middle-income countries (Yeager and Hendrix 1997).[23] Although individual country results are not available (countries were assured that responses would be confidential), the aggregate data clearly reveal that prevention programs in the military often fall short of complete coverage. For example, 80 percent of the responding countries indicated they had policies supporting condom use by the military, but only 55 percent indicated they had "written plans to operationalize these policies." The most specific condom promotion policies were found in African militaries, which have been very hard hit by HIV. It is striking that about 20 percent of the responding militaries do not distribute condoms at all, while most of the others offer condoms free of charge but only if requested by a soldier.

Low coverage of other groups of people presumed to practice riskier-than-average behavior can be seen in a small survey of UNAIDS Country Programme Advisers conducted for this report. The survey asked the advisers who work in 32 developing countries to identify groups of people with high-risk behavior and to comment on the extent to which programs focused on prevention in these groups; the approximate percentage of each group covered; and the extent of government encouragement and finance of these programs. Although the results reflect the assess-

Box 3.11 Thailand's Response

BETWEEN LATE 1987 AND MID-1988, HIV PREVALence among injecting drug users in Bangkok exploded from 0 percent to more than 30 percent. In response, local and national governments launched an extensive risk reduction program among injecting drug users that included training on how to disinfect injecting equipment and education on HIV prevention. By 1989 a survey in Bangkok found that 59 percent of users had stopped sharing needles, while others had reduced sharing or were using sterile equipment. Nationwide, HIV prevalence in injecting drug users stabilized at 35 to 40 percent (Brown and others 1994).

Meanwhile, the sexual transmission of HIV was increasing. The first round of national sentinel surveillance in mid-1989 detected 44 percent HIV prevalence among brothel-based sex workers in the northern city of Chiang Mai; brothel-based sex workers elsewhere in the country had HIV prevalence rates of 1 to 5 percent. In addition, a national behavioral survey in 1990 found that 22 percent of Thai men ages 15 to 49 had visited sex workers the previous year. By then, Thai NGOs and the government had begun efforts to improve public awareness of HIV and to promote condom use; knowledge of how HIV is spread and how it can be prevented was nearly universal, and condom use was increasing nationwide.

Efforts were stepped up dramatically in 1991, when the government of Prime Minister Anand Panyarachun mounted an extensive and intensive national prevention effort with a greatly expanded budget. Government ministries, NGOs, businesses, and communities began working together to promote condom use, reduce risky behavior, change norms regarding commercial sex, improve STD treatment, and provide care and support for those affected by HIV. By 1996 the government was providing more than $80 million annually for HIV/AIDS prevention and care.

An essential component of this response is the "100% Condom Program" which aims to enforce consistent condom use in all commercial sex establishments. Condoms are distributed free to brothels and massage parlors, and sex workers and their clients are required to use them. Local coalitions of government officials, health officers, and police check compliance by tracing the contacts of men seeking treatment at government STD clinics. Brothels that fail to comply may be closed. Extensive efforts to reach the clients of sex workers have been crucial to the success of the campaign. Through mass media campaigns, education and skills building in workplaces and schools, and peer education efforts, condom use during commercial sex rapidly became the norm among Thai men who purchased sexual services.

Results have been encouraging. Condom use in brothels increased from 14 percent of sex acts in 1989 to more than 90 percent by 1992 (box figure 3.11a). The number of new STD cases among men treated at government clinics dropped from nearly 200,000 annually in 1989 to about 20,000 in 1995. Most strikingly, HIV prevalence among young male conscripts entering the Royal Thai Army has declined from a peak of 4 percent in mid-1993 to 1.9 percent by late 1996 (box figure 3.11b). The Thai response is a compelling example of the principles presented in this chapter. Epidemiological and behavioral data needed to design effective programs were collected and broadly disseminated. Acknowledging and working with the commercial sex industry, rather than against it, the Thai program developed ways to change the behavior of sex workers and their clients, while simultaneously promoting changes in social norms. With commercial sex transmission slowed, increasing efforts are now being devoted to addressing the social and developmental determinants of risk through programs such as con-

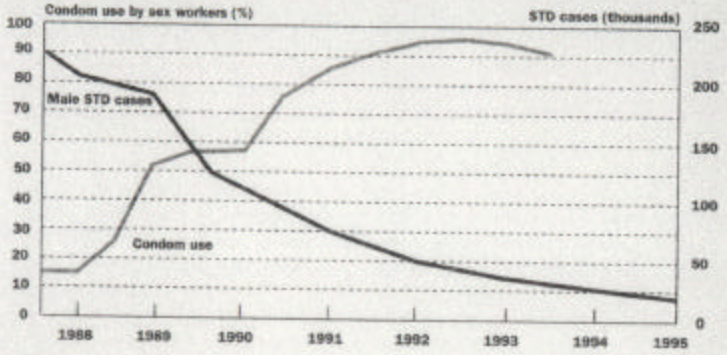
(Box continues on the following page.)

Box 3.11 *(continued)*

tinued schooling and work opportunities for young rural women to keep them from entering sex work.

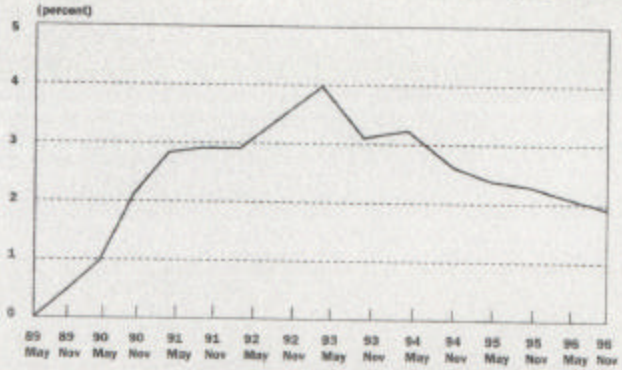
Of course, Thailand's response would have been even more effective—and the current epidemic smaller—had the extensive prevention efforts been launched earlier. Obstacles encountered in launching the program and the ways in which these were ultimately overcome are discussed in chapter 5.

Box Figure 3.11a Rising Condom Use by Sex Workers and Declining STDs in Thailand, 1988–95



Source: Rojanapithayakorn and Hanenberg 1996.

Box Figure 3.11b Declining HIV Prevalence among Young Thai Army Conscripts, 1989–96



Source: Data from Division of Epidemiology Public Health and Army Institute of Pathology, Royal Thai Army.

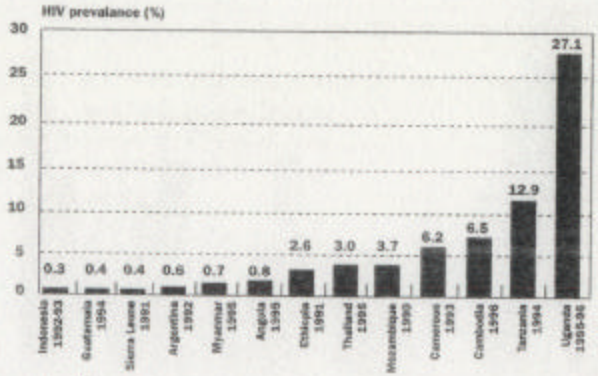
Box 3.12 STDs and HIV in the Military

BOTH THEIR DEMOGRAPHIC CHARACTERISTICS and their occupation put members of the military at high risk of acquiring STDs and HIV and of passing them on to others (Miller and Yeager 1995). Military recruits are generally young, sexually active men, and often unmarried. They may be easily influenced by peer pressure, especially when stationed away from home. In time of war, the risks of contracting HIV and STDs may seem low relative to the risk of death in combat. For these reasons, military personnel often have STD and HIV infection rates higher than the general population (box figure 3.12).

Sexually transmitted diseases are likely to be particularly rife in military units far from home. Over a five-year period in the 1830s, for example, 32 to 45 percent of British soldiers stationed in India were hospitalized for sexually transmitted diseases, compared with only 2 to 3 percent of Indian soldiers (Farwell 1989). While the Indian soldiers were often married and lived with their wives and families, very few British soldiers were allowed to marry and all were far from home, where social norms might have tempered their sexual habits. In the early 1890s, the mean rate of admission for STDs among British troops on home soil was half the rate among British troops in India. During the 1960s, STD rates among U.S. Army troops stationed in the continental United States (30 per 1,000 troops per year) were one-ninth to one-fifteenth the rates among troops stationed in Vietnam (262 per 1,000), the Republic of Korea (344 per 1,000) and Thailand (453 per 1,000) (Greenberg 1972).

The military is one group—a potentially large one—in which government can act decisively to prevent STD and HIV transmission through information, condom programs, and STD treatment. Monitoring interventions and their impact in the military is also easier than for other subpopulations.

Box Figure 3.12 HIV Prevalence in the Military



Source: Statistical appendix, table 1.

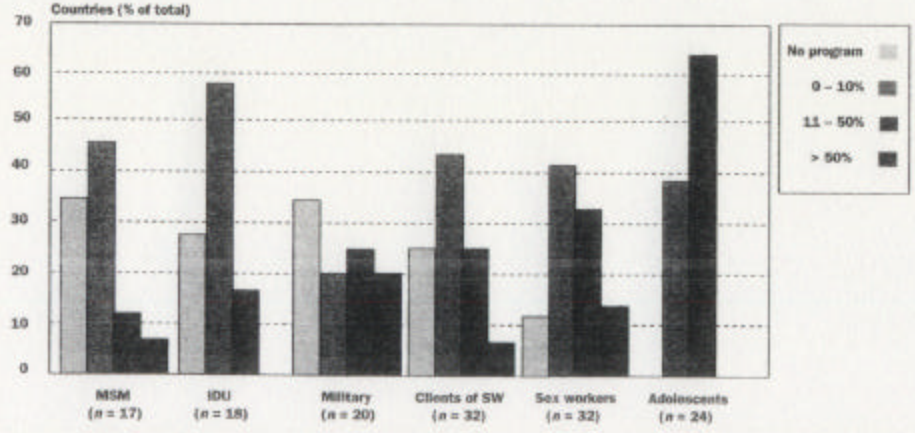
ment of the advisers rather than the national AIDS program managers and cannot be generalized beyond the countries surveyed, they nonetheless reveal tremendous scope for improving outreach to those who are most likely to contract and spread HIV.[24] Respondents named adoles-

cents as the subpopulation most likely to be the recipient of an intervention, financed either by government or the private sector (figure 3.7). All countries had at least one program focused on youth, even though in many of the countries it is not clear to what extent adolescents engage in risky behavior. About nine out of ten countries reported a public or private program focused on sex workers, while about seven out of ten countries had a program focused on injecting drug users; a slightly lower proportion of countries had programs that focus on the military and on men who have sex with men. However, respondents estimated that these programs on average covered only about one-half of the relevant group with high-risk behavior. Coverage was highest for adolescents and the military, and lowest for men who have sex with men and injecting drug users.

In most of the countries assessed by UNAIDS Country Programme Advisers, prevention programs did not reach the majority of people most likely to contract and spread HIV.

The UNAIDS Country Programme Advisers also reported that governments were least likely to finance and most likely to impede prevention programs targeted to men who have sex with men and injecting drug users (figure 3.8). Although six out of ten governments funded

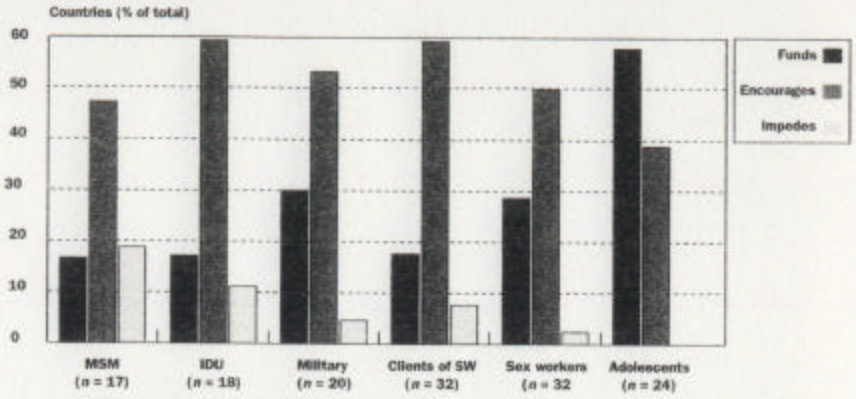
Figure 3.7 Coverage of Subpopulations with High-Risk Behavior, Estimates of UNAIDS Country Programme Advisers in 32 Countries



n Number of countries responding.
MSM Men who have sex with men.
IDU Injecting drug users.
SW Sex workers.

Source: Authors' calculations, based on Country Programme Adviser survey results.

Figure 3.8 Government Support for Prevention Targeted to Groups with High-Risk Behavior, Estimates of UNAIDS Country Programme Advisers in 32 Countries



n Number of countries responding.
MSM Men who have sex with men.
IDU Injecting drug users.
SW Sex workers.

Source: Authors' calculations, based on Country Programme Adviser survey results.

prevention programs for adolescents, only about one-third did so for the military and for sex workers. Two advisers indicated that the government in their country promoted prevention for the general population of heterosexuals, but neither encouraged nor discouraged programs for those most likely to contract and spread the virus.

Most of the countries assessed did not fund prevention programs focused on those most likely to contract and spread HIV; they were most likely to impede programs targeted to injecting drug users and men who have sex with men.

To summarize, while some prevention programs have attempted to encourage safer behavior among those most likely to contract and spread HIV, coverage is generally low. The fact that governments may have logistic and political difficulties in reaching groups such as sex workers and injecting drug users, while understandable, does not detract from the urgent need to assure the fullest possible coverage of these groups. Often these obstacles can be overcome through government funding and support of NGOs. Moreover, in many countries coverage is low even among "captive" populations, such as the military; where this is the case, governments have an opportunity to inexpensively reach these groups with information and other prevention interventions. Effective interventions with broad coverage of those with high-risk behavior will go a long

way toward preventing infection among others engaging in high-risk activities and among the lower-risk population.

Improving the Equity of Prevention Programs: Expanding Condom Use

The effectiveness of government programs in ensuring access to prevention for the poor has rarely been evaluated. However, improving equity of access to condoms is one of the major objectives of condom social marketing programs and free government distribution of condoms. Have they improved equity?

Condom availability and use in general have expanded considerably, partly as a spontaneous response to HIV and partly as a result of social marketing and other public, private, and donor-sponsored programs. As of 1996, 60 developing countries had functioning condom social marketing programs, although not all were on a national scale. This was twice the number in 1991.[25] Many of these programs are supported by international donors through three major contractors—DKT International, Population Services International (PSI), and Social Marketing for Change (SOMARC); others, for example, in Botswana, India, South Africa, and some Latin American countries, are also subsidized by national governments. In some countries, such as Indonesia, condom brands launched through social marketing have been taken up by for-profit distributors. Social marketing aside, nearly three-quarters of the 70 countries that responded to condom distribution questions in the *AIDS in the World II* survey provide condoms through a national AIDS control program (Mann and Tarantola 1996). The likelihood of having a condom social marketing program is more strongly related to the increased spread of HIV/AIDS than is government condom distribution (table 3.6). This is partly because government condom distribution includes distribution through government family planning clinics and health services. Finally, in many countries, such as Brazil, Thailand, and Vietnam, unsubsidized commercial sales have risen.

However, the extent to which these programs disproportionately help poor people to obtain condoms is not clear. As we have seen earlier in this chapter, in most countries, people with higher incomes and education are more likely to use condoms. Providing subsidized condoms to low-risk individuals who would have purchased them at market prices would neither improve equity nor reduce the epidemic. Likewise, while condom use has risen in both the subsidized and commercial market, it is still not clear the extent to which subsidized programs have squeezed out private sales. This is likely to be an important issue in older condom social marketing programs, after their initial effect on popularizing condoms and generating greater demand has worn off.

Table 3.6 Condom Social Marketing and Government Condom Distribution Programs, by Stage of the Epidemic

Stage of the epidemic	*Percentage of countries with*	
	CSM programs, 1996	*Condom distribution by NACP, 1992*
Nascent	31	71
Concentrated	67	79
Generalized	90	100
Unknown	13	58
Total (%)	49	77
Number of countries	123	70

CSM Condom social marketing
NACP National AIDS control program.
Source: Statistical appendix, table 2.

A second way in which these programs promote equity is by encouraging condom use among those most likely to contract and spread HIV, forestalling or slowing the epidemic before it reaches the poor. Unfortunately, relatively little is known about the extent to which condom social marketing programs are used by those with the highest rates of partner change—which is the key to their effectiveness in slowing the epidemic. Surveys of sexually active adults confirm that people are far more likely to use a condom for sex with a casual or extramarital partner than a steady partner or a spouse (Agha 1997, Coleman and others 1996, Lowenthal and others 1995, Tchupo and others 1996). But they do not show whether these programs reach people with the *highest* rates of partner change. Do these programs lower the costs of condom use sufficiently to bring about high-use rates among sex workers, soldiers, truck drivers, and other people with many partners? By selling through nontraditional outlets like bars and hotels, condom social marketing programs are probably much more likely to reach people with risky behavior than are conventional programs that distribute condoms through health clinics. If the majority of individuals with the highest rates of

partner change *are* reached through these programs, there may be substantial cost-saving if the programs involve a lower subsidy per condom than free distribution. Furthermore, such programs may avoid the political controversy and possible stigmatization that may arise with more targeted programs.

Additional research on the sexual behavior and the economic status of those who use subsidized condoms, and the extent to which those with the highest rates of partner change use condoms from these programs, will help greatly to demonstrate and improve their cost-effectiveness.[26]

That said, many countries still lack vigorous condom programs that specifically prevent HIV and other STDs. Many condom social marketing programs, for example, in Bangladesh, Colombia, Costa Rica, Pakistan, and Sri Lanka, as well as recently launched Chinese programs in Yunnan Province and Shanghai, are oriented primarily toward family planning, with little if any marketing for STD and HIV prevention (DKT International 1997; Kang 1995; "Signs of Change . . ." 1996; "Sri Lankan Condom Sales . . ." 1996). Even in some African countries with concentrated or generalized HIV/AIDS epidemics—for example, Mali, Niger, and Senegal—family planning and reproductive health are the main themes of the programs. Depending on the country, such themes may be less controversial than HIV and STD prevention. However, they may also fail to reach those with the highest rates of partner change. For example, sex workers and young, sexually active men do not frequent health or family planning clinics. Furthermore, women who need condoms for STD prevention may be reluctant to obtain them from community health or family planning clinics, even if free of charge, because of inconvenience, an unreliable supply, or a desire for anonymity. These problems can be overcome if condoms are promoted specifically for HIV and STD prevention and if they can be readily and cheaply obtained in nontraditional outlets readily accessible to people in situations that tend to be conducive to casual and commercial sex. Such locations include pharmacies, kiosks in red-light districts, bars, nightclubs, hotels, truck stops, and military bases (box 3.13). In Peru, socially marketed condoms are sold in three-quarters of the pharmacies and in strategically placed vending machines (Futures Group International 1995a).

One way for governments to stimulate demand for condoms for disease prevention is to end restrictions on condom advertising. But even when there are no legal barriers, open promotion of condom use can be extremely controversial if it is seen as encouraging promiscuity. Messages must convey useful information and at the same time be directed to the appropriate populations so as to avoid offending influential leaders and segments of the public. Religious leaders in particular may have strong negative reactions to condom promotion if they are not informed about the benefits of condom use or if they are confronted with messages they find offensive. In Uganda, religious sensitivities led to an unofficial ban on promoting condoms on television and radio from 1991 to 1995 (Buwembo 1995). In the Philippines, with a nascent epidemic, opposition by the Catholic Church to artificial contraception extends to condoms for prevention of HIV and STDs (SOMARC 1996). In Niger, conservative religious groups defaced billboards advertising the SOMARC-sponsored social marketing of condoms (Futures Group International 1995b).

Sponsors of social marketing of condoms and other birth control methods have nevertheless found ways of generating support, even among critics. For example, they work closely with religious leaders, potential critics, and local spokespeople before launching condom promotion campaigns to explain the many advantages of condom use (prevention of HIV and other STDs; infertility arising from STDs; unwanted pregnancy, abortion, and withdrawal of pregnant teenagers from secondary school; and the promotion of child spacing, which reduces child

Box 3.13 Preventing HIV on the Road to Ho Chi Minh City

VIETNAMESE TRUCK DRIVERS HAVE A SAYING: Never, ever, ever hit a child along the road because, well, he might be yours. It's no secret that with all those days and nights on the road and all that time away from home, truckers seek out amorous company.

Ho Duc Cu is matter-of-fact about the issue. It is near sunset, and he is sitting at a noodle shop at the Goods Transportation Company truck stop on the outskirts of Hanoi, drinking tea from a ceramic bowl and getting ready to haul 10 tons of tractor equipment south to Ho Chi Minh City (formerly Saigon).

"It's a three-and-a-half day drive from here to Saigon," Cu says. "For a lot of drivers, that means two to three women along the way."

The Vietnamese government has widely publicized the risks of HIV/AIDS, so most truck drivers understand what the disease is and how to avoid it. However, it was only after DKT International, a U.S.-based condom social marketing company began promoting the sales of *Trust* and *OK* condoms in Vietnam that truckers had ready access to reliable protection.

Cu finishes his tea and walks over to his Russian-made truck. Inside the driver-side door is a pouch containing a handful of *OK* condoms. "I'm gone from my wife and kids 26 days out of every month," Cu says with a faint grin. He adds that not only are *OK* condoms dependable, but you can buy them at locations along most roads throughout Vietnam.

Source: DKT International (n.d.). Used by permission.

and maternal mortality). They test promotional messages with their intended audience and with potential critics to avoid giving offense and maintain a low profile until a basis for success is firmly established. Condoms marketed under names like *Trust, Protector, OK,* and *Couples' Choice* encourage the view that condom use is safe, modern, and socially responsible, irrespective of whether they are used for family planning or disease prevention. More explicit messages about condoms will sometimes be more readily accepted among the people who need condoms the most.

* * *

This chapter has provided evidence that people will adopt safer behavior, particularly people at high risk of contracting and spreading HIV, and that governments have many ways, direct and indirect, to influence individual behavior. It has identified prevention activities in which governments have a unique role, since private individuals will not finance them sufficiently, and it has outlined important considerations in determining the cost-effectiveness of public spending on HIV/AIDS prevention. The chapter highlighted two areas in which most governments can greatly improve the effectiveness of their efforts to prevent HIV, given sufficient political commitment. The first is to increase the amount and quality of information collected concerning the nature and extent of risky sexual and injecting behavior in the population, trends in the incidence and prevalence of HIV, and the costs and effects of alternative preventive interventions in the local context. The second is to use this information to ensure that prevention programs result in safer behavior among the subpopulations that are most likely to contract and spread HIV and to ensure access to prevention among the poor. Neither of these issues is easy to resolve; however, both are easier to tackle than the very difficult decisions that are thrust upon governments in countries with widespread epidemics. These are the topics of our next chapter.

Notes

1. Other useful references include Adler and others (1996); European Commission (1997); Dallabetta, Laga, and Lamptey (1996); Gerard and others (1995); Lamptey and Piot (1990); and Nicoll and others (1996).

2. See, for example, the work of Becker (1981) and reviews of the literature by Birdsall (1988) and Strauss and Thomas (1995).

3. "Costs" here are not limited to the monetary costs of treatment or prevention. Costs of becoming infected include suffering and premature death and the stigma and discrimination sometimes suffered by people with AIDS and their families. The costs of engaging in safer behavior include, for example, any social stigma associated with purchasing condoms or obtaining treatment for STDs, as well as the time, inconvenience, embarrassment, or monetary costs of obtaining them.

4. Information programs encouraging safer behavior should not be expected to have much of an effect on the behavior of the low-risk general population, since these individuals may correctly conclude that they face relatively little risk. This explains the lack of relation found in many studies between knowledge of the risks of HIV (which in some hard-hit countries approaches 100 percent) and behavior change in the general population (Sepulveda 1992, for example).

5. Since 1996 the import tax and sales tax have been reintroduced. Nearly one-third of the cost of running the condom social marketing program goes to pay the sales and import taxes (*background paper,* Pyne 1997).

6. An estimated one-third of the 750,000 heroin users in the United States, for example, are considered to be occasional users who are not addicted (National Research Council 1989). However, the addictiveness of drugs depends on their purity. In Yunnan Province, China, located adjacent to the Golden Triangle of opium production in Southeast Asia, injected heroin is more than 80 percent pure, most likely making it far more addictive than in the United States and more difficult to stop (McCoy and others 1997).

7. A 620-place drug rehabilitation center in Ku ming, the capital of Yunnan Province in China, featu a three-month program, primarily for injecting hero users, that encourages their complete rehabilitation a support from family members (McCoy and others 199 Among the patients are those who were arrested a many who voluntarily enroll. The price charged to p tients is $120 for those who are mandated treatment a $220 for those who voluntarily enroll. Families are portedly willing to pay this price, which includes all th apy, drugs, room, and board, finding it cheaper than su porting the drug habit of their relatives. However, amo patients followed after treatment, 80 percent return to jecting within two years.

8. The same general arguments—high costs and hi relapse rates—apply to programs that rely on methado a synthetic drug that, taken orally, removes the craving heroin without inducing euphoria. Moreover, beca methadone is only effective against heroin addiction, does not substitute for other injected drugs.

9. This change in behavior occurred at a time wh Thailand had neither needle exchange nor methad treatment programs.

10. However, the programs are much less successfu promoting condom use than at modifying risky inject behavior (Normand, Vlahov, and Moses 1995). O drug injectors are infected, preventing the spread of H to others through sex is extremely difficult; thus, early plementation of harm reduction strategies among inj ing drug users is critical to preventing the spread of HI

11. The evaluations were undertaken in Austra Canada, the Netherlands, Sweden, the United Kingd and the United States.

12. Both the study by Serwadda and others (1992) Rakai and Barongo and others (1992) in Mwanza note education is no longer significant in multivari regressions. However, other intermediate behavioral v ables are typically included as explanatory variables in th studies, masking the effect of education (which may b determinant of all of them) and leading to bias in the e

ıates. The educational differences in rural Mwanza are statistically significant for women and men, and they remain gnificant in multivariate regressions (although whether ndogenous regressors were included is unknown).

13. This result from the GPA sexual behavior surveys : net of the impact of age and occupation. Several other udies had similar findings. For example, greater school- ıg is associated with a higher probability of casual partnerships among men in DHS data from Burkina Faso, the Central African Republic, Côte d'Ivoire, and Uganda *background paper,* Filmer 1997). In rural areas of Kenya, Tanzania, and Zimbabwe, educated women are more kely to engage in casual sex than are uneducated women, ut in urban areas the relation is reversed. In Côte Ivoire, men and women from wealthier households with a car and good housing) were more likely to have asual partners.

14. The absolute levels of condom use in figure 3.2 are ot comparable across countries, since the reference peiod for the DHS question about casual partners and conom use was as short as one month (in the Central African Republic and Zimbabwe) and as long as one year (in Haiti nd Tanzania).

15. Prevalence among those with 0–6 years of schooling was 1.46 percent, among those with 7–9 years was .06 percent, and among those with more than 9 years of chooling, 0.65 percent. These prevalence rates were meaured per 100 person-years of observation (Carr and oth- rs 1994). Since the WHO/GPA data on sexual behavior rom about the same time period showed that men with igher income and education were more likely to have ommercial or casual partners, it is likely that condom use vas already on the rise among Thai men before the brunt f the HIV/AIDS epidemic hit.

16. The underlying sexual behaviors in these four opulations are summarized here as: (a) commercial sex; b) commercial and casual sex; (c) casual sex only; and (d) erial monogamy. The first three populations allow some oncurrent partnerships, but the last does not. Also, both b) and (d) have commercial and casual sex. For more deail, refer back to chapter 2.

17. Women in stable relationships are monogamous n populations (a) and (d), but are not necessarily monogamous in populations (b) and (c). However, their rate of partner change is very low. Although condoms are used for contraception in many developing countries, they are usually not the preferred method of family planning for married couples; DHS surveys conducted in the 1990s found that condom use among married couples ranged from 0 to 3 percent (Curtis and Neitzel 1996).

18. In the population with an epidemic fueled by commercial sex, the increase in condom use among men with casual and commercial partners from 5 to 20 percent represents 20 percent consistent condom use with sex workers only. For the simulations of condom use, it is assumed that if either partner wants to use a condom, a condom will be used.

19. The cost-effectiveness might have been substantially higher had the authors included estimates of the number of secondary infections averted.

20. Mills and others (1993) found that STD treatment costs for similar interventions in Mozambique and South Africa also amounted to roughly $10 per episode of STD treated.

21. The survey of the managers of national AIDS control programs in 187 countries was conducted between December 1993 and June 1994. Of these, 118 responses were received, for a response rate of 75 percent. However, the quality of the responses varied from "complete and detailed" (about one-quarter of the responses) to "sparse and general" (half of the responses, which received individual follow-up). For more information on the survey methodology, see Mann and Tarantola (1996), box 30.1, pp. 315–17.

22. For these countries there were no data whatsoever on groups presumed to have high rates of partner change, data were from very small samples (fewer than 100 people), or data were too old (from 1990 or earlier).

23. Questionnaires were sent to 120 countries; the response rate was 42 percent. The low response rate and the high participation of industrial countries means that the results cited here are not representative of developing countries but are nevertheless true for the 50 countries that participated in the survey. Countries that responded included 15 in Africa, 8 in Latin America, 6 in Asia and the Pacific, 12 members of NATO, and 9 European countries not in NATO.

24. Only the 43 countries with UNAIDS Country Programme Advisers were surveyed. Responses were received from 26 advisers representing 32 countries, for a response rate of 70 and 74 percent, respectively. Among the 32 countries, 15 were from Africa, 7 from Asia, and 5 each were from Eastern Europe and Latin America and the Caribbean. The countries are: Barbados, Belarus, Benin, Bulgaria, Burkina Faso, Cambodia, China, Congo DR (formerly Zaire), Côte d'Ivoire, Cuba, Dominican Republic, Eritrea, Ethiopia, Ghana, Haiti, Indonesia, Kazakhstan, Kenya, Lao PDR, Moldova, Mozambique, Pakistan, Philippines, Rwanda, Senegal, South Africa, Togo, Uganda, Ukraine, Venezuela, Vietnam, and Zambia.

25. Condom social marketing began in eleven countries in 1996: Albania, Chad, China (Yunnan Province and Shanghai), Republic of Congo, Guinea-Bissau, Lesotho, Madagascar, Myanmar, the Russian Federati Senegal, and Uzbekistan.

26. The costs of condom social marketing progr are better documented than is their impact on HIV tr mission or the extent to which they are used by the p The cost per condom sold over a five- to six- year pe through 1995 in eighteen Sub-Saharan African s marketing programs was $0.19 (1995 dollars), inclu the cost of the commodity and overhead (Guy Stall thy, PSI, personal communication). The net costs ra from $0.08 to $0.20, depending in part on whether project was new, which raised costs. Cost recovery to program is only about $0.01 per condom. A revie CSM programs in ten countries (Bolivia, Congo DR merly Zaire], Côte d'Ivoire, the Dominican Repu Ecuador, Ghana, Indonesia, Mexico, Morocco, and Z babwe) found that net costs ranged from $0.02 to $ per condom sold, including the value of donated cond (Mills and others 1993).

CHAPTER 4

Coping with the Impact of AIDS

WHILE SOME COUNTRIES STILL HAVE THE opportunity to avert a full-scale AIDS epidemic by acting early to change the behavior of those at highest risk, others already have large numbers of infected people across many groups in the population. Chapter 1 presented evidence of the terrible impact of HIV/AIDS on individual welfare, in terms of human suffering and losses in life expectancy. What can be done to mitigate the impact of the AIDS epidemic on people and society? There are many impacts of the AIDS epidemic that cannot be quantified—for example, the emotional pain experienced by infected individuals and their families and the psychological damage wrought on surviving family members. These impacts are very important, but how to respond to them is beyond our expertise and best left to others. This chapter considers the economic aspects of three types of impacts—on infected individuals, on the health sector generally, and on surviving household members—and the ways in which government policies can help people to cope, given the many other pressing demands for scarce public resources.[1]

The first part of the chapter shows that there are affordable, effective, and humane ways for governments in low-income countries to help ease the suffering of individuals infected with HIV. However, both governments and individuals in the poorest countries should be wary of funding expensive treatments with uncertain benefits. The second part of the chapter suggests how governments can cope with the increased demand for and scarce supply of health care brought on by the AIDS epidemic in ways that are effective and compassionate, as well as fair and affordable. The third part proposes a strategy for developing countries to address the

needs of poor families hit by the AIDS epidemic in the context of other poverty programs. The chapter concludes with a summary of the policy recommendations for governments attempting to cope with the impact of HIV/AIDS on health care and poverty.

Health Care for the Person with AIDS

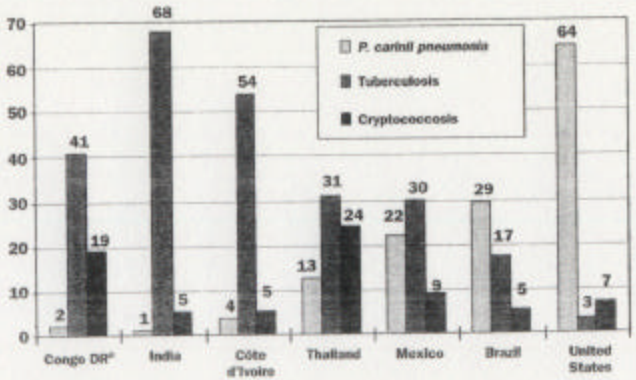
WHAT IS THE HEALTH IMPACT OF HIV/AIDS ON AN infected individual over the course of the disease? Are there effective, affordable treatments for people with AIDS in low-income countries? To answer these questions, this part of the chapter reviews the many illnesses that often afflict people with HIV/AIDS, the available treatments, and their cost. It distinguishes between three types of care: relief of symptoms, such as headache, pain, diarrhea, and shortness of breath, which is sometimes called palliative care; prevention and treatment of opportunistic illnesses (OIs); and antiretroviral (ARV) treatments, which attempt to combat HIV itself. Next it presents the amounts that developing countries are actually spending to care for people with HIV/AIDS. While this amount is often large relative to a country's GNP per capita, it is usually too little to buy all the drugs needed to treat opportunistic illnesses, much less to pay for antiretroviral therapy. The section closes with a review of programs to assist with the home care of people with HIV/AIDS.

The discussion finds that although treatment of HIV itself is difficult and extremely expensive, some of the symptoms and opportunistic illnesses typically suffered by people with AIDS can be treated simply and at low cost. Some infectious diseases associated with HIV, especially tuberculosis, are somewhat more expensive to treat, but because they are infectious there are sound reasons for governments to subsidize treatment of any infected individual who would not otherwise get treated, regardless of the individual's HIV status.

Palliative Care and Treatment of Opportunistic Illnesses

The pattern of opportunistic illnesses differs from country to country, depending on which diseases are prevalent, and the quality and amount of treatment available. The natural history of HIV illness and several of the most important opportunistic illnesses are defined in box 1.2. Figure 4.1 presents the proportion of AIDS patients who suffer from each of three OIs—tuberculosis, cryptococcosis, and *Pneumocystis carinii pneumonia* (PCP)—in six developing countries and the United States. Tuberculosis is most common in the three poorest countries, the Congo DR (formerly Zaire), India, and Côte d'Ivoire, becoming less common as per capita income rises. At the other end of the income gradient, PCP is most common in the United States, and is also common in the middle-income developing countries, Brazil, Mexico, and Thailand, but is rarely reported in the three lower-income countries. Cryptococcosis, a generic name for a group of fungal diseases that includes cryptococcal meningitis, shows no consistent pattern by income level, but infects at least 5 percent of people with HIV in all six countries. Among these three diseases, and indeed among all OIs, tuberculosis spreads most readily from people with HIV to others. As we discussed in chapter 1, tuberculosis greatly exacerbates the health impact of HIV in many developing countries, particularly in Africa and India, where it is the most common opportunistic infection.

Figure 4.1 Percentage of AIDS Patients with Three Opportunistic Infections, Seven Countries



Note: Since only three of the 20 or more OIs are included, and since a patient may suffer from many OIs before death, percentages for a given country need not total 100 percent.

a. Formerly Zaire.

Source: Background paper. Perriëns 1996; Kaplan and others 1996.

The pattern of opportunistic ill differs across countries, depen which diseases are prevalent a quality and amount of treatmen available.

Because of the variation in symptoms and in opportunistic illnesses, the cost and number of health care episodes for an HIV-infected person vary widely. Table 4.1 presents rough estimates for the average costs of pharmaceutical and inpatient palliative care of symptoms, prevention of tuberculosis and PCP, and curative care of the more common opportunistic illnesses. Estimated lifetime cost per patient for this care ranges from $300 to $1,000, depending on which drugs are used and the cost per day of inpatient care.

How effective are these treatments? In the early stages of HIV illness, palliative treatment can inexpensively relieve some of the pain, discomfort, and incontinence that otherwise rob people of the ability to enjoy life and contribute to their family and their community. Without symptomatic treatment, dehydration that results from diarrhea and nausea can kill in a few days. Fever and headache can be disabling for days or weeks. As shown in the top panel of table 4.1, drugs for palliative care are quite cheap. Hence, all but the poorest HIV-infected patients and their families are likely to be willing and able to buy these drugs, provided they are available. The sad truth is that these drugs are often not available, an issue we discuss below.

Moving down the table, we see that the opportunistic illnesses that commonly arise early in the course of AIDS can also be treated quite inexpensively. Treatment for thrush, toxoplasmosis, and pneumonia/septicemia can buy one to four years of life at an additional drug cost of $30 to $150—all but the very poor would probably be willing and able to pay for these treatments.

Rarer opportunistic illnesses like the fungal diseases tend to occur later in the course of the HIV infection and are more difficult and expensive to treat. For example, in the United States the average life expectancy after diagnosis with cryptococcal meningitis, the most common of the cryptococcosis diseases, is 320 days, while in the Congo DR, perhaps because of later diagnosis, this drops to 180 days, even with expensive state-of-the-art drugs (*background paper,* Perriëns 1996). Since a patient in the Congo DR might survive 30 days without treatment, such drugs would extend life by about 150 days for about $870. In Thailand earlier diagnosis would result in treatment extending life by perhaps 330 days for $1,740. Many patients in these two countries might decide against buying these drugs, even if they have the money to do so.

In the final stage of AIDS, the immune system is so weak that a variety of infections spread throughout the body, leading to death. At this point, morphine to assuage extreme pain and the sensation of suffoca-

Table 4.1 Annual Cost per Patient of Palliative Care and Treatment of Opportunistic Illnesses, Sub-Saharan Afric and Thailand

(1996 dollars)

	Diagnosed episodes per 100 patient-years		*Cost per episode*[a]		*Average cost per patient-year*	
Symptom or illness	*Sub-Saharan Africa*	*Thailand*[b]	*Sub-Saharan Africa*	*Thailand*	*Sub-Saharan Africa*	*Thailand*
Palliative care[c,e]						
Diarrhea	63		13.00		8.19	
Scaling skin rash	15		1.50		0.23	
Itching skin rash	52		2.00		1.04	
Cough	120		1.40		1.68	
Fever	105		0.60		0.63	
Headache	52		0.25		0.13	
Pain, mild	52		1.12		0.58	
Pain, severe	17		14.00		2.38	
Nausea	75		1.75		1.31	
Shortness of breath	43		6.50		2.80	
Subtotal	*594*	*594*			*18.96*	*18.96*
Treatment of inexpensive OIs						
Tuberculosis[d]	47.5	40	37.00	261.88	17.58	104.75
P. carinii pneumonia	3	20	8.00	207.76	0.24	41.55
Toxoplasmosis	0	2	8.00	207.76	—	4.16
Oral thrush	77	77	2.00	2.48	1.54	1.91
Esophageal thrush	14	14	10.00	4.96	1.40	0.69
Pneumonia/septicemia	20	20	60.00	25.38	12.00	5.08
Subtotal	*161.5*	*173*			*32.76*	*158.14*
Treatment of expensive OIs						
Cryptococcosis	5	25	870.70	1,741.40	43.54	435.35
Herpes simplex virus	5	18	140.00	46.80	7.00	8.42
Penicilliosis	0	9	1,852.50	697.40	—	62.77
Other OIs including:						
Cytomegalo virus						
Mycobacterium avium/complex	19.5	19	717.88	717.88	139.99	136.40
Subtotal	*29.5*	*71*			*190.52*	*642.94*
Inpatient days[f]	3,000	3,000	7.25	22.44	217.50	673.34
Outpatient visits[f]	1,200	1,200	2.50	13.60	30.00	163.20
Grand totals per case						
Palliative plus inexpensive OIs					*299.22*	*1,013.65*
Palliative plus all OIs					*489.74*	*1,656.59*

a. Costs per episode are estimated in Perriëns (*background paper,* 1996).

b. Frequency of various symptoms and OIs for Thailand are from Perriëns (*background paper,* 1996), or Kaplan and others (1996) or, where both give a value, an average of the two.

c. The frequency and treatment costs of symptoms listed under palliative care are assumed to be the same in Sub-Saharan Africa and Thailand.

d. In Zambia, experience suggests that preventing tuberculosis in a group of HIV-infected patients costs approximately the same as treating those in the group who get the disease (Foster, Godfrey-Faussett, and Porter 1997).

e. Since palliative care involves generic drugs, these costs should be similar in all countries able to buy essential drugs in bulk through international tenders.

f. Patients in Thailand pay about 30 percent of these costs for drugs, inpatient days, and outpatient visits. The cost per patient-day in Sub-Saharan Africa is taken from Chela and others (1994).

tion provides relief to the dying patient, and this in turn helps to ease the distress of the patient's family. If purchased in bulk at international generic prices, enough morphine to ease the last two weeks of life would cost less than $4. But because of international controls on morphine distribution, this essential drug is rarely legally available in poor countries at any price.

The foregoing discussion has shown that many of the symptoms and opportunistic illnesses that occur in the early stages of AIDS can be effectively treated at low cost. Unfortunately, the low-cost generic forms of the needed drugs are often unavailable; even when they are available, people often lack information about their efficacy. Thus, many people pay much more than the $10 to $20 cited in the table for palliative treatments, while achieving no additional benefit. Governments can address these problems by facilitating the availability of generic drugs needed for palliative care and common opportunistic illnesses. For example, countries with a concentrated or generalized epidemic could add these medications to their list of "essential drugs," which are widely distributed. Governments can also help patients to make informed decisions by ensuring access to reliable information about the efficacy of various treatment options, both pharmaceuticals and traditional remedies. The degree of government subsidy for treatment will depend on the country's overall health financing policy. We discuss this issue later in the chapter.

Antiretroviral Therapy Is Expensive, Uncertain

The treatments discussed above ease suffering and prolong life but ultimately fail to save the patient's life because none attacks the underlying cause of illness—the continued spread of HIV within the body and the consequent decline of the immune system's ability to recognize and repel biological threats. A few drugs have reduced the levels of HIV in the patient's blood below the ability of laboratory tests to detect it. Unfortunately, these drugs are expensive and complex to administer, their long-term benefits are uncertain, and their efficacy varies greatly from one individual to another.

The first drug that showed evidence of inhibiting the spread of the virus in an infected patient was Zidovidine (AZT, or ZDV). When AZT was introduced in the late 1980s, the cost of a year's dosage was about $10,000 in industrial countries. By 1997 the cost of a year's dose had fallen to about $2,738 in industrial countries, while Thailand and a few other developing countries had negotiated bulk purchases for as little as $657 per patient per year. However, except for prevention of mother-to-child transmission, AZT rarely provided dramatic benefits, adding perhaps six months of healthy life for the average patient (Prescott 1997; Perriëns and others 1997)

A more effective therapy involving the use of three antiretrovirals was announced in June 1996. A year later, the U.S. government issued draft guidelines recommending early, aggressive treatment of HIV-infected individuals with triple-drug therapy (Brown 1997). However, it was clear that more time would be needed before the new therapies could be fully assessed. Some individuals taking the medicines in clinical trials have dramatically improved their health and no longer have detectable levels of viral RNA activity. Yet even among these patients the virus may only be hiding and could re-emerge. And other patients show little or no reduction in viral levels, while still others cannot tolerate the drugs. As of mid-1997 no studies had yet been completed estimating the average percentage of patients who could benefit from triple-drug therapy or the characteristics of patients most likely to respond favorably—or to relapse.

Does triple-drug therapy offer reasonable hope for treating the disease in developing countries? Even if the therapy is shown to be generally effective, three substantial problems will remain: the cost of the drugs themselves, the costs and difficulty of the monitoring needed for the therapy to be effective, and problems with patient compliance. Although all of these problems also exist in industrial countries, they are likely to be especially severe in developing country medical settings.

Table 4.2 shows the cost of the drugs and necessary monitoring in Thailand, one of the few developing countries where the therapy is available, and the United Kingdom or United States, and hints as well at the great complexity of regimen. Because most of the drug costs and all of the monitoring costs are lower in Thailand than in the two industrial countries, overall costs are a minimum of about $8,000 per year in Thailand, compared with a minimum of about $12,000 per year in the United Kingdom and United States. These costs are likely to decline over time, perhaps substantially. But even if costs fell to *one-hundredth* of current costs, or about $80 dollars per person per year, they would still be several times the total annual per capita expenditure on health in many low-income countries. Moreover, effective antiretroviral therapy requires a highly trained, specialized physician working in a well-equipped clinic with experience performing a wide range of sophisti-

Table 4.2 Annual Cost of Antiretroviral Therapy, Thailand, and the United Kingdom or the United States
(dollars)

Inputs	Daily dose	Daily or unit cost		Annual cost	
Drugs	(mg)	Thailand	U.K. or U.S.	Thailand	U.K. or U.S.
Nucleoside RT inhibitors					
Zidovudine (AZT)	500	1.80	7.50	657	2,738
Didanosine (ddI)	400	5.80	5.75	2,117	2,099
Zalcitabine (ddC)	2.25	5.40	6.81	1,971	2,486
Stavudine (d4T)	80	—	7.95	—	2,900
Lamivudine (3TC)	300	—	7.37	—	2,690
Protease inhibitors					
Saquinavir (SQV)	1,800	19.08		6,870	
Ritonavir (RTV)	1,200	21.95		8,010	
Indinavir (IDV)	2,400	11.84		4,320	
Monitoring	*Times per year*				
Blood count	12.00	2.00	21.00	24	252
Blood chemistry	4.00	12.00	35.00	48	140
CD4 count	4.00	30.00	157.00	120	628
RNA viral load	3.50	50.00	100.00	175	350
Additional outpatient visits	12.00	13.60	100.00	163	1,200
Total for triple-drug therapy[a]					
AZT, ddI, and IDV				9,595	19,803
AZT, ddI, and RTV				13,285	23,493

— Data not available or not applicable.

a. Triple-drug therapy consists of two of first group of drugs plus one of second group plus monitoring. Drugs are given daily. Which three drugs should be combined is a matter of current research and probably varies by patient.

Source: Background paper, Perriëns 1996; Prescott and others 1997; and Moore and Bartlett 1996.

cated tests and procedures, all of which are in critically short supply in most developing countries.

In the event that cost and infrastructure problems could somehow be overcome, patient compliance would continue to pose serious difficulties. Patients undertaking triple-drug therapy must swallow up to 20 pills a day according to a complex schedule related to sleep and meal times. Failure to follow the schedule increases the chance that the virus will become resistant or that the patient will be too sickened by the drugs to continue treatment. Even well-educated patients with good clinical support have difficulty adhering to this demanding regimen; moreover, patients in the early stages of HIV infection are sometimes not willing to take drugs that make them nauseous when they otherwise feel healthy. In clinical trials in industrial countries, for example, as few as 26 percent of patients complied with the instructions (Stewart 1997). Problems with patient compliance are likely to be worse in low-income countries due to lower education levels and the many other problems that poor people in developing countries face.

Even with all these difficulties and uncertainties, many patients in developing countries will ask their physicians for triple-drug therapy, just as patients have attempted to obtain AZT. Governments will in turn face pressure to buy these drugs and to subsidize the necessary clinical services. When very few people have AIDS, total costs will also be small relative to other government expenditures. But as the epidemic progresses, the number of AIDS cases and the cost of the subsidy will escalate rapidly, drawing resources from other pressing social needs. At some point it will become evident that such a subsidy is unaffordable and also unfair to the many people who for a variety of reasons want government help but do not have HIV.

Individual Treatment Costs for AIDS Are High, Even in Poor Countries

We have seen that medical responses to HIV/AIDS range from a few pennies to thousands of dollars. How much a country actually spends to treat a case of AIDS depends on many factors besides the differing cost of health care inputs. The most important of these is the amount of treatment that the HIV-infected person, his or her family, and any third party payers such as insurance companies or the government are willing and able to buy, and how much the government subsidizes health care and AIDS treatment. Figure 1-8 showed that across countries this amount is strongly correlated with per capita income. An in-depth study of AIDS expenditure in four countries and São Paulo State, Brazil, confirms this general pattern; the average total (public and private) AIDS expenditure varies from 0.6 times per capita GDP in Tanzania to 3.0 times per capita GDP in São Paulo; the average is a ratio of about 1.5 (*background paper,* Shepard and others 1996).

Alternatives to Expensive Inpatient Care

Where the AIDS epidemic is severe, health policymakers inside and outside government have sought ways to provide compassionate care at low cost. Three alternatives to expensive inpatient care are outpatient

AIDS clinics, hospice care (residential low-technology care for the terminally ill), and home-based care.

One innovative program to deliver high-quality treatment of symptoms and opportunistic illnesses without the expense of hospitalization was an outpatient clinic started in 1989 in São Paulo, Brazil. Such clinics are especially well suited to serve urban HIV-positive and AIDS patients who are able to leave their homes. Later in the course of the disease, when the patient is less mobile, the hospice or nursing home provides a lower-cost substitute for inpatient care in a sophisticated referral hospital. However, since such facilities are rarely available in developing countries, the main alternative to the hospital is care at home.

What sort of home-based care is most effective? An analysis of the cost of eight home-based care programs in Zambia found that community-initiated programs were more effective and much less expensive than hospital-initiated programs (Chela and others 1994; Martin, Van Praag, and Msiska 1996). Assuming that the average patient with AIDS would survive six months with either type of care, the benefits of the care must be measured in reductions of hospitalization cost; reduced travel time to the hospital for the patient and the patient's caretakers; increased patient satisfaction and comfort; and ancillary benefits to the community, such as improved understanding of the ways to prevent AIDS and decreased stigma toward HIV-positive people. Since the study found that patients who received home-based care reduced their hospitalization before death by only two days, the expenditure on the hospital-initiated home-based care programs of about $312 (6 months x 2 visits per month x $26 per visit) was much more than the $14.50 saving in hospital charges (2 days x $7.25 per day). On the other hand, the costs for six months of community-initiated home-based care averaged just $26, less than one-tenth the cost of the hospital-initiated program, and could almost be justified on the basis of reduced hospital use alone.

The tenfold cost difference between hospital- and community-initiated home care programs was due to the much larger expenditure on transport and staff time for the hospital-based programs. For example, on a typical day a team of trained hospital-based nurses could visit only four to eight patients, about a quarter of whom were away from home when the team arrived. As a result the hospital-initiated teams spent on average about two hours on the road in order to spend only fifteen minutes with the patient. In contrast, the community-initiated teams walked only a few minutes and spent an average of two hours with the patient.

If the low cost of the community-initiated home-based care program in Zambia can be generalized to other settings, it is possible that such care would be financed by the patients, their families, and their communities. Indeed, the community-initiated Zambian programs function well because of strong volunteer support from the local communities. Since the benefits of the program include the public ones of improved knowledge about HIV prevention and reduced stigma, there may be a government role in financing such programs, at least until their private benefits to patients' families are sufficiently well understood for these families and communities to support such programs on their own. Where policies exist to facilitate access to health care for the poor, they should be extended to include community-based home care programs using the same eligibility criteria.

Difficult Health Policy Choices in a Severe AIDS Epidemic

THE PREVIOUS SECTION DESCRIBED THE IMPACT OF AIDS ON the individual HIV-infected person and demonstrated that limited treatment of symptoms and opportunistic illnesses, especially when performed partly by community-initiated home care programs, can provide compassionate care at relatively low cost. In this section the need to keep costs low becomes more apparent as we widen the focus from the individual HIV-infected person to the health care needs of all people in a country. To better understand the difficult tradeoffs involved, we first estimate the magnitude of the impact of AIDS on the health sector, and then discuss how government policies can mitigate this impact.

How HIV/AIDS Will Affect the Health Sector

AIDS will affect the health sector in two ways: by increasing demand and by reducing the supply of a given quality of care at a given price. As a result, some HIV-negative people who would have obtained treatment had there been no epidemic will be unable to do so, and total national expenditure on health care will rise, both in absolute terms and as a proportion of national product.[2]

Increased demand for care. Most people who develop AIDS are prime-age adults. Without AIDS, this 15-to-50 age group accounts for only 10 to 20 percent of all deaths in a developing country, but these deaths typically generate a disproportionate share of total health care demand (Over, Ellis, Huber, and Solon 1992; Sauerborn, Berman, and Nougtara 1996). Moreover, since several studies suggest that adults with AIDS use more health care prior to death than those who die of other causes, or even of other prolonged illnesses, the percentage increase in the demand for care by adults is likely to exceed the percentage increase in their mortality due to AIDS. As a result of these two factors, in a country where prime-age adults utilized one-quarter of all health care before AIDS, a given percentage increase in their demand for health care will increase *total* demand by *at least* one-quarter of that percentage. For example, a 40 percent increase in the mortality rate of prime-age adults will increase total demand by at least 10 percent, even though total mortality has increased by only 4 percent to 8 percent.[3] If AIDS patients use expensive antiretroviral therapies, the increase in demand will be much greater.

How much the demand for care increases in the aggregate depends on the increase in the prime-age adult death rate, which in turn depends on the level of HIV prevalence and the median time from infection to death (table 4.3). A stable prevalence rate of 5 percent among prime-age adults eventually increases their annual mortality by about five deaths per 1,000 adults if the median time from infection to death is ten years, or by about ten deaths if the median time is only five years.[4] A prevalence rate of 30 percent, such as is observed in Lusaka, Zambia, will increase the number of deaths per 1,000 adults by 30 to 60, depending on the median time to death. In Sub-Saharan Africa, where mortality rates in this age group were as high as five per 1,000 before the epidemic, even a 5 percent infection rate will double or triple the adult death rate. In a middle-income developing country with adult mortality of one per 1,000, the same endemic level of HIV infection will increase prime-age adult mortality five- or tenfold.

Given these parameters, how much will the epidemic increase the demand for care? *In a country where adults consume one-quarter of health care prior to the AIDS epidemic, HIV prevalence is constant at 5 percent of adults, the median time to death is ten years, and the baseline mortality rate among prime-age adults is 5 per 1,000, the epidemic will cause a 26 percent increase in the demand for health care at every price.*[5] If the prevalence rate is higher, the median time to death shorter, or the baseline adult mortality rate smaller, the percentage increase in demand will be correspondingly greater.

A final important factor that may increase demand is insurance. This may take the form of private insurance, a government-run insurance program, or, more typically, health care financed through general taxation. Because a portion of health care costs is often covered by one or more of these types of insurance, the price paid by the patient is usually a fraction of the cost of providing the care. Since insurance enables patients to purchase more care than they would otherwise, it increases the demand for care arising from any given level of illness, thus magnifying the price shock of an AIDS epidemic. For example, if the proportion of cost of providing care paid by patients (i.e., the coinsurance rate) is 25 percent, patients will reduce their utilization in response to increased cost by only a quarter as much as they would if they had to pay the full increase.

Reduced supply of health care. In addition to increasing the demand for care, the AIDS epidemic will reduce the supply available at a given price, in three ways. The magnitude of these effects, discussed below, will generally be larger in the poorest countries with the largest epidemics.

The first and largest effect is the increased cost of maintaining a given level of safety for medical procedures. Even without HIV, hospitals and clinics in poor countries may pose a risk to health. Needles and other instruments are not always sterilized, rooms are often overcrowded and poorly ventilated, and care providers may lack rubber gloves and sometimes even soap. Without modern blood banks, a transfusion might infect the recipient with hepatitis B. In such situations, infections of all types spread rapidly; some, including such common illnesses as pneumonia, may kill. Before HIV, however, infections picked up in a clinic or hospital were rarely fatal to persons not already in a seriously weakened state.[6]

Because the AIDS epidemic has greatly increased the risk to patients of existing medical procedures, simply maintaining the level of safety that existed before HIV requires additional hygiene and blood screening, both of which increase the cost of care. In middle- to high-income countries, where blood screening and sterilization of injecting equipment are already the norm, the impact of AIDS is confined to the incremental costs of adding an HIV test to existing tests and using rubber gloves and face masks in situations where they were previously not used. In poor

le 4.3 Deaths per Thousand lts Caused by a Constant Rate IIV Infection

HIV prevalence rate (percent)	*Median time from infection to death*	
	10 years	*5 years*
0	0	0
5	5.3	11.1
10	10.5	22.2
15	15.8	33.3
20	21.1	44.4
30	31.6	66.7
50	52.6	111.1
100	105.3	222.2

Note: The death rates in columns 2 and 3 are calculated by multiplying the prevalence rate from column 1 by $2\delta/(2M-1)$, where M is the median time from infection to death. This formula assumes a steady-state epidemic in which incidence is constant and a proportion $1/(2M)$ of those infected in a given year die in each of $2M$ subsequent years. In the absence of HIV, the baseline mortality rate per thousand adults age 15 to 50 ranges from 0.8 in industrial countries to as high as 5 in some parts of Sub-Saharan Africa.

countries, where blood screening and needle sterilization were lacking before the epidemic, the resources needed to maintain the quality of care in the face of the AIDS epidemic can be substantial. For example, the annual recurrent budget of the Ugandan Blood Transfusion Service, which was established in response to the epidemic and meets the demands of the entire Ugandan national health care system for clean blood, is estimated to be about $1.2 million, including capital and recurrent costs. This amounts to about 2 percent of national public health expenditures or about 1 percent of total national health expenditures (European Commission 1995a). Despite the potentially high costs of blood screening, HIV has greatly increased the justification for a government role in ensuring a safe blood supply. However, there is no convincing rationale for government to subsidize the entire cost of running such a service indefinitely (see box 4.1). Blood screening and improved collection procedures will protect blood donors and recipients. However, since average donors and recipients do not engage in unprotected sex with a large number of partners, a person infected while giving or receiving blood is not likely to pass the infection to many others. Thus, in developing countries where the cost of establishing a safe blood supply is high, blood screening will not be among the more cost-effective approaches to preventing an epidemic based on sexual transmission (see box 4.2).

To be sure, blood screening and better hygiene will help to prevent the spread of other infectious diseases besides AIDS. Such measures will also reduce the occupational risk of AIDS and other diseases that health care workers face, and therefore reduce the amount of additional compensation needed to offset their occupational risk—an issue we discuss below. A careful accounting of the net cost of protecting patients from HIV by screening blood would need to take into consideration these additional benefits, for which data are lacking. However, it seems likely that even if these benefits are taken into account, the remaining cost of screening blood and improving hygiene to protect patients from HIV/AIDS would substantially increase the unit cost of medical care.

The second factor reducing the supply of medical care at a given price is the increased attrition of health care workers who become infected with HIV. Like all adults, health care workers may become infected with HIV as a result of sexual contact or use of unsterile injecting equipment. They also face an additional risk of becoming infected in the course of their work; however, this risk is generally much smaller than the risk from sexual contact. Thus whether the AIDS mortality rate among health care

Box 4.1 The Government Role in Ensuring Clean Blood

THE HIV/AIDS EPIDEMIC HAS DRAMATICALLY increased the importance of clean blood. Where the most serious common infection that a transfusion recipient previously had to fear from unscreened blood was hepatitis B, which is rarely fatal and communicated in only about 2.5 percent of unscreened transfusions, recipients in some countries now face a one-fourth chance of HIV infection (Emmanuel, WHO, as cited in Fransen, personal communication). As a result of the HIV/AIDS epidemic, the transfusion required for a surgical procedure or childbirth that might have been relatively routine in a developing country ten years ago now requires the guarantee of clean blood to be equally safe.

What should be the government's role in the provision of safe blood? Setting aside poverty, which is addressed in the text, five justifications can be identified for the public to subsidize or otherwise play a role in the provision of blood: (1) to prevent HIV infections in blood recipients; (2) to prevent infections in the sexual partners of blood recipients; (3) to avoid the sudden onset within a community of the health risk from unscreened blood; (4) to provide the economies of scale that apply to a blood bank service; and (5) to avoid the difficulty that a citizen would have in judging the quality of a blood bank.

While a high-quality blood bank will obviously be quite effective in preventing the transfusion of infected blood, and thereby in preventing the hospital from infecting transfusion recipients, this fact does not, by itself, imply that the government should play a role in supplying the clean blood. Setting aside for the moment considerations (2) through (5), the provision of clean blood is comparable in importance to the provision of clean needles, clean bandages, and clean hands of the nurses who change those bandages. Any arguments for government financing of decent quality of care, including basic cleanliness in the hospital, also apply to clean blood. If one accepts the argument that hospital care is a basic need, which should be heavily subsidized by the government, then the same argument would apply to clean blood. If, however, one believes that there is no obvious reason to favor curative health care over other necessities, such as clothes, housing, and clean water, then clean blood should receive as little subsidy from the government as other curative health care services.

Yet even those who believe that most curative care deserves little subsidy admit that the treatment of infectious diseases confers positive externalities and thus should be subsidized. This brings us to an evaluation of the second consideration. Assuming that transfusion recipients recover from the medical procedure and then become sexually active, preventing their infection may prevent them from infecting others. How large are these positive externalities? For one country, Uganda, box 4.2 shows that a highly effective program prevented 517 secondary infections in 1994 at a cost of $1,684 each. While this cost is much less than the lifetime treatment cost of an HIV-infected person in an industrial country, it is more than any reasonable estimate of the cost of preventing secondary infections in Uganda. Thus, the prevention of secondary infections does not appear to be sufficient to justify government subsidy of the entire cost of the program although it could justify a partial subsidy.

Considerations (3) and (4) appeal to the same economic arguments often used to justify government infrastructure investments. The sudden increase in risk from blood transfusion is a shock to the health care system, too rapid for individuals and private institutions to make new blood-screening arrangements quickly. As the insurer of last resort against catastrophic changes in the environment, the government has a role in assisting society in adjusting to the new higher cost and complexity of health care in the presence of AIDS. Furthermore, as demonstrated by box figure 4.1, a blood transfusion service entails substantial economies of scale. Since

(Box continues on the following page.

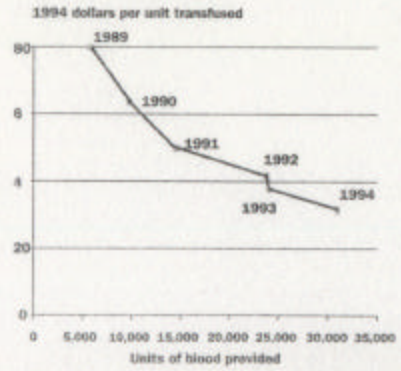
Box 4.1 *(continued)*

single transfusion service can serve all local needs without exhausting its economies of scale, it would be a natural monopoly without the fear of competition to ensure quality service at the best price. It would be forced to charge prices above marginal cost in order to cover its costs and might charge prices well above average costs in order to maximize its profits. Just as for electric utilities and other natural monopolies, there is a well-established justification for government intervention to regulate, if not own and operate, them in such circumstances. However, they do not justify a 100 percent subsidy for blood.

Consideration (5) involves the inability of the public to judge the quality of a blood bank. This argument is not particular to blood transfusion services, since patients have an equally difficult time judging the quality of their physicians.[1] Yet patients can choose among many different physicians, but, because of the economies of scale, are unlikely to have a choice of blood banks. The government and the public should not assume that any monopoly, whether it produces electricity or blood bank services, and whether it is "for-profit" or "nonprofit," will indefinitely perform in the public's best interest. In this situation there is an argument for the establishment of a regulatory board to whom the blood transfusion service is responsible.[2] The board should consist of representatives of the medical establishment, government, and patients and should produce an annual report on the quality of the blood bank service, which should then be widely disseminated in the press.

In sum, the appropriate role of government in financing blood supplies depends first on one's view of the degree of financing the government should provide to curative health services. The argument for curative services extends directly to the provision of blood. The number of secondary infections averted through blood screening is unlikely to be a powerful argument for government subsidies. Even so, there is a strong argument for the government to launch and nurture a blood bank service as a subsidized "infant industry," before subjecting it to the rigors of the financing arrangements provided for the rest of the health care system. Finally, because economies of scale will tend to make the blood bank a monopoly in most communities, blood bank services should be subject to strict regulatory review.

Box Figure 4.1 The Cost per Unit of Blood Transfused in Uganda



Source: European Commission 1995a, p. 94. Nominal amounts converted to current dollars at 1.2 dollars per ECU and then to 1994 dollars using the U.S. consumer price index.

[1] Information is asymmetrically distributed between the firm producing and selling blood and the hospitals, physicians, or patients who consume it.

[2] While patients should be charged the same percentage of the marginal cost of a unit of blood that they are charged for other curative care of noninfectious diseases, it does not follow that donors should be paid for blood. The observations by Richard Titmuss (1972) regarding the benefits of recruiting voluntary donors have been found to apply in many different national settings.

Box 4.2 Cost of Preventing Secondary HIV Infections through Blood Screening in Uganda

HOW COST-EFFECTIVE IS BLOOD SCREENING IN preventing secondary HIV infections? One answer to this question can be seen in the results of the Uganda Blood Transfusion Service (UBTS) for 1993. Having established its ability to supply Kampala with clean blood in 1991, by 1993 the UBTS was reaching out to cover the entire country. That year the service transfused 20,156 patients throughout the country at an average cost of approximately $38 per unit of blood, and an average of 1.2 units per patient, for a total budget of approximately $929,900. Box table 4.2 breaks out the HIV prevention benefits of the service, showing that its use averted HIV infection in an estimated 1,863 surviving transfusion recipients.

But to measure the positive externalities of the program, and thus the rationale for government subsidies, we need to look beyond these primary infections to consider secondary infections. Children who are infected by transfusion are unlikely to live long enough to infect others, but some of the adults may be sufficiently young and sexually active to engage in risky sexual behavior later in their lives. Since many of these people are quite sick, the evaluation stud estimated that each of these adults would have only 50 percent chance of infecting one other person wit HIV (European Commission 1995a). Thus the tot number of secondary infections averted would b 415.[1] If the entire justification of the blood suppl service is prevention of these secondary infection the cost-effectiveness of the service is $929,900 di vided by 415, or $2,240 per such infection averte If Uganda had had a sustainable blood supply sy tem, the cost of preventing these 415 infection would have been only $319,894, or $771 each. Thi much smaller amount is still substantially larger tha the cost of preventing secondary infections in othe ways (see Appendix B).

[1] The authors point out that the counseling provided to bloo donors may have averted additional primary infections (Europea Commission 1995a). Any secondary infections averted throug this route should be added to the 415 to compute the total pos tive externalities of the program.

Box Table 4.2 Effectiveness of Blood Transfusion at Averting HIV Infection, Uganda, 1993

	Benefits		
Effects of blood transfusions	*Children*	*Adults*	*Total*
Patients transfused	11,515	8,641	20,15
Patients expected to die without transfusion	5,758	3,898	9,65
Patients who died despite transfusion	3,801	2,592	6,39
Number of deaths prevented	1,957	1,296	3,25
Number of primary HIV infections prevented	1,033	830	1,86
Number of secondary HIV infections prevented	0	415	41

Source: Based on the results achieved by the Ugandan Blood Transfusion Service as reported in Beal, Bontinck, and Fransen (1992 European Commission (1995a); and Fransen (1997, personal communication).

workers is higher or lower than among the general population depends mostly on the effects of income, education, and social status on sexual behavior. Two studies of HIV prevalence among health care workers from Africa suggest that doctors and nurses are at least as likely to become infected as other people (Mann and others 1986, Buvé and others 1994). If this is true elsewhere, a country with stable 5 percent HIV prevalence can expect that each year between .5 and 1 percent of its health care providers will die from AIDS; a country with 30 percent prevalence would lose 3 to 7 percent of its health care workers to the epidemic. This attrition from AIDS deaths may substantially increase the cost of health care. For example, if labor costs are half of total health care costs, and training or recruiting a replacement worker requires a one-time expenditure equal to the worker's annual salary, then a 7 percent increase in attrition will increase total costs in the health sector by 3.5 percent.

The third way in which AIDS reduces the supply of health care is through the additional risk it imposes on health care workers. Even though most HIV-infected health care workers acquire their infection through sexual contact, in a society with a large proportion of HIV-positive patients, health care work will be more dangerous than if there were no HIV. Some students who would have become doctors and nurses will therefore choose alternative occupations, unless they are compensated with higher pay for the increased risk. A recent survey of medical and nursing students in the United States found that AIDS had indeed reduced the attractiveness of specialties in which contact with HIV-positive patients was more likely (Bernstein, Rabkin, and Wolland 1990; Mazzullo and others 1990).This problem is likely to be most severe in hard-hit developing countries, where HIV prevalence is much higher and rubber gloves and other protective equipment are often in short supply. In Zambia, for example, some nurses have demanded special payments to compensate for increased occupational risk due to HIV (Buvé and others 1994).

The magnitude of increased costs of medical staff has not been estimated. As noted above, improved precautions in hospitals and clinics may reduce these costs. But because people respond to perceived risk rather than actual risk, such improvements may have little impact on the demand for increased compensation. Thus, it seems clear that health care workers' perception of risk will increase the cost of care.

The total impact of these three effects—increased cost of preventing infection in medical facilities, attrition of health care workers due to HIV, and additional pay that health care workers demand to compensate them for increased risk—will depend most importantly on HIV prevalence and whether modern blood banks and hygiene were already in place. *In a country that has 5 percent HIV prevalence among prime-age adults and lacked blood banks and blood screening before the epidemic, a conservative guess is that the cost of providing care of a given quantity and quality will rise by about 10 percent.*

Scarce care, higher expenditures. Taken together, increased demand and reduced supply have two related impacts: first, health care becomes scarcer and thus more expensive; second, national health care expenditure rises. The size of the increases in health care prices and national health care expenditure depends partly on the price-responsiveness, or "elasticity," of the demand for and supply of care. For most goods, higher prices reduce demand, as consumers switch to substitutes or forgo an intended purchase altogether. This same principle holds true for health care, but the price-responsiveness or elasticity of demand for adult health care is usually small, since there are no close substitutes, and people who are sick and who have the ability to pay will often pay whatever is needed to get well. For the purposes of our simulation, we assume that a price increase of 10 percent would decrease utilization by only about 8 percent, for an elasticity of 0.8.[7]

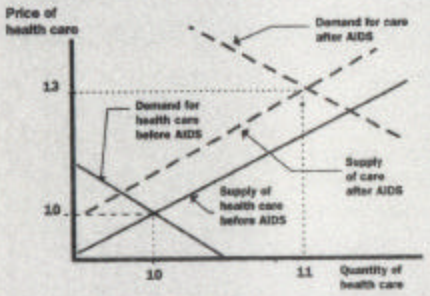
Higher prices also generally increase supply. Here, too, however, the nature of the health sector affects the supply response. In the very short run, perhaps a month, the supply of care is unlikely to change much. Over the long run, the supply of physicians and inputs to health care can expand as much as necessary. Over the medium run, five years or so, we would expect the supply of care to respond somewhat to increased demand and the resulting higher price. One response observed in Canada, Egypt, India, Indonesia, and the Philippines is that physicians who work in the public sector rearrange their schedules to offer more health care privately, after their obligations to the government have been met. The elasticity of this response has been estimated at about 0.5, meaning that every 10 percent increase in the price of care elicits a 5 percent increase in supply (Chawla 1993, 1997; Bolduc, Fortin, and Fournier 1996).

We have argued in the previous two subsections that a constant 5 percent seroprevalence rate would eventually increase the demand for care by about one-quarter and the cost of care of a given quality by 10 percent. Drawing on the assumptions in this subsection about the elasticities of the demand and supply responses, and assuming that patients pay half the cost of health care, box 4.3 shows that total national health expenditure, and also the government's share of expenditure, would both increase by about 43 percent. The increase would be less in a country like India,

Box 4.3 Estimating the Impact of AIDS on the Health Sector

HOW MUCH WILL THE EFFECTIVE PRICE OF CARE increase as a result of AIDS? Box figure 4.3 demonstrates how the approximate size of these increases can be estimated for a hypothetical country with elasticities of demand and supply for health care of 0.8 and 0.5 and a government policy to subsidize half of the cost of care. The two solid lines show the amount of health care that is demanded and supplied at each price prior to an HIV epidemic. (The demand curve is drawn with an elasticity of only 0.4 in order to incorporate the effect of the government subsidy on consumers.) The figure is constructed so that the market equilibrium occurs at a price of 10 currency units per unit of health care, at which a total of 10 units of care are delivered. Total health care expenditure in this hypothetical country is thus 10 times 10 or 100 currency units in the absence of the AIDS epidemic.

Box Figure 4.3 The Impact of a 5 Percent Infection Rate on the Quantity and Price of Health Care



Note: The demand and supply curves are constructed so that the price elasticities at the point (10, 10) are 0.8 and 0.5, respectively. The impact of AIDS is illustrated by shifting the demand curve to the right by 25 percent at every price and the supply curve up by 10 percent at every quantity. See the box text for an explanation of these assumptions.

Now assume there is an HIV/AIDS epidemic that levels off at a constant seroprevalence of 5 percent of the adult population. The arguments in the chapter suggest that the amount of health care demanded at every price is likely to increase by 25 percent, while the cost of purchasing any given amount of care of a given quality will increase by 10 percent. These two impacts of the AIDS epidemic are illustrated by a rightward shift of the demand curve by 25 percent (to the dashed, downward-sloping line) and an upward shift of the supply curve by 10 percent (to the dashed, upward-sloping line). The impacts on the equilibrium price and quantity can be read from the figure. The price of a unit of health care will increase about 30 percent, and the amount of care provided will increase about 10 percent. Total national expenditure, the price per unit of care times the number of units, will increase 43 percent to 143 currency units (since 13 x 11 = 143).

We have seen that a third-party payment, such as insurance or a government subsidy for treatment, makes people less sensitive to changes in cost of health care. By reducing the price elasticity of demand, such third-party payments make the demand curve steeper, both before and after the introduction of AIDS.

where only about one-fifth of the cost of care is paid by the government, and substantially more in countries like those of Latin America and Eastern Europe, where three-quarters or more of the cost are subsidized.

Does the available empirical evidence support these conclusions? Although there are significant data problems, the short answer is yes.

Measuring the scarcity of medical care through changes in the price of care of given quality is problematical because of the difficulties in measuring quality. This is especially true in developing countries, where a general lack of data is compounded in the health sector by government subsidies and nonprice forms of rationing. In such cases, the *effective* price of care may rise even though nominal prices remain constant (see box 4.4). Furthermore, because of the lag between infection and death, the time between the attainment of a given HIV prevalence rate and the full impact of that rate on the demand and supply of health care can be ten to 20 years. For these reasons, we cannot accurately assess changes in scarcity of health care in developing countries by observing changes in nominal price. Nonetheless, we can get some sense of the extent to which HIV/AIDS increases the effective price of health care by considering whether the epidemic makes it more difficult to obtain care. Studies of hospital admissions data strongly suggest that this is the case.

Table 4.4 shows the percentage of beds occupied by HIV-positive patients in six referral hospitals in developing countries with large epidemics. The hospitals are the top health care institutions in each country, providing the best care available outside of a few expensive private clinics. Because these hospitals are at the apex of their health care pyramids, we would expect that AIDS patients account for a significant proportion of their patients. Even so, the percentage of beds occupied by HIV-positive patients is striking, ranging from 39 percent in Nairobi, Kenya, to 70 percent in Bujumbura, Burundi.

Box 4.4 The Effective Price of Care

SOME READERS MAY OBJECT THAT THE PRICE PAID BY patients need not increase in countries where the government guarantees free care. However, as we have seen, even with HIV prevalence rates of 5 percent or less, the demand for medical care is likely to increase faster than the government's ability to supply it. When this happens, means of rationing medical care other than price come into play. People in countries where health care is officially "free" are familiar with these mechanisms. Some systems rely on waiting time. In others, a patient dissatisfied with inferior care in a public facility can pay for better care during a doctor's private office hours. In still other cases, side payments to a nurse or other gatekeeper are necessary in order to get access to "free" care. The effective price of health care to the consumer is the value of all of the consumer's sacrifices, in time and in money, needed to obtain care of a given quality. The AIDS epidemic increases the effective price, even if care is supposedly "free."

Table 4.4 Evidence of Possible Crowding Out of HIV-Negative by HIV-Positive Patients, Six Countries, circa 1995

City	*Hospital*	*Percentage of beds occupied by HIV-positive patients*
Chiang Mai, Thailand	Provincial	50
Kinshasa, Congo DR[a]	Mama Yemo	50
Kigali, Rwanda	Central	60
Bujumbura, Burundi	Prince Regent	70
Nairobi, Kenya	Kenyatta National Hospital	39[b]
Kampala, Uganda	Rubaga Hospital	56

a. Formerly Zaire.

b. Since Floyd and Gilks found the average length of stay to be identical across HIV-positive and -negative patients, the ratio of HIV-positive to total admissions is a useful estimate of the proportion of beds occupied by HIV-positive patients. Thus this entry is calculated from figure 4.2 as 9.6/24.9.

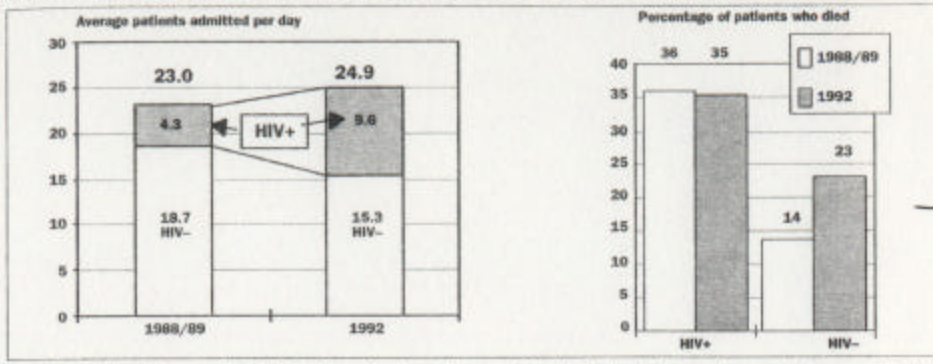
Sources: First four hospitals, van Praag 1996; Kenyatta Hospital, Floyd and Gilks 1996; Rubaga Hospital, Tembo and others 1994.

If the hospitals were operating well below capacity before the epidemic, they might have accommodated the HIV-positive patients without reducing care for HIV-negative clients. Although no data on occupancy prior to the epidemic are available for these specific hospitals, bed occupancy rates in such hospitals typically were well above 50 percent even before AIDS.[8]

The best evidence that AIDS is making it more difficult for people not infected with the virus to get medical treatment comes from an in-depth study of Kenyatta National Hospital (KNH), the premier teaching hospital in Nairobi, Kenya. The KNH study compared all patients admitted during a sample 22 days in 1988 and 1989 with all patients admitted during a sample 15 days in 1992 (Floyd and Gilks 1996). Panel A of figure 4.2 shows that while the average number of patients admitted per day increased from 23 to 25, the number of HIV-positive patients more than doubled, while the number of HIV-negative admissions shrank by 18 percent. Since the number of HIV-negative people in the hospital's "catchment area" could not have shrunk by this much, this evidence suggests that the AIDS epidemic did in fact result in some HIV-negative patients being dissuaded or barred from admission to the hospital.

There are no data on what happened to the HIV-negative patients who were not admitted. But hospital records show that the mortality rates for those who were admitted increased between the two periods,

Figure 4.2 Impact of AIDS on Utilization of and Mortality at Kenyatta National Hospital, Nairobi, 1988/89 and 199



Panel A. Utilization increased for HIV-positive patients but fell for HIV-negative patients between 1988 and 1992.

Source: Floyd and Gilks 1996

Panel B. In-hospital mortality remained constant for HI positive patients, but rose by 66 percent for HIV-negative patie between 1988 and 1992.

from 14 to 23 percent (panel B of figure 4.2). The mortality rate for the HIV-positive patients did not increase, and other indicators of the quality of care remained constant. Thus, the most likely explanation for the increased mortality rate among the HIV-negative patients is that the rationing scheme used to allocate increasingly scarce beds had the effect of changing the mix of HIV-negative patients toward those with more severe illnesses. Whether the rationing was imposed by hospital staff or was a response by prospective patients to their perception of a higher effective price of care (box 4.4), it is likely to have excluded some patients whose lives the hospital could have saved.

Since the HIV-infected make up an increasingly large fraction of the sick people in a severely affected country, it is appropriate that they occupy an increasing share of hospital beds and consume an increasing share of health care resources. The pressure of this increased demand for care will naturally be felt by all citizens, whether or not they are HIV-infected. However, the extent of the shift in health care resources away from the HIV-negative can be exaggerated, as indeed it may have been in Kenyatta National Hospital, if the government provides special subsidies for people with HIV.[9] We discuss this issue, and the broader issue of how the level of government health care subsidies affects the demand for care and health care expenditure, in the next section.

Data from Kenyatta National Hospita on admissions and mortality suggest that the increased need to care for people with HIV has squeezed out some HIV-negative people who woul otherwise have received care.

Policies To Mitigate the Impact on the Health Sector

Scarcer and more expensive care and increased total health expenditure present society with difficult choices. Because a large share of the increased expenditure is typically financed through tax revenues, governments and their constituencies will confront tradeoffs along at least three dimensions:

- treating AIDS versus preventing HIV infection
- treating AIDS versus treating other illnesses
- spending for health versus spending for other objectives.

The need to confront these difficult choices can be reduced somewhat if a government is willing and able to increase tax revenues. But few countries will be able to avoid the choices entirely, especially developing countries facing a severe epidemic. Unable to pay for everything, most governments will subsidize some goods and services more than others, thereby disproportionately benefiting certain groups of citizens.

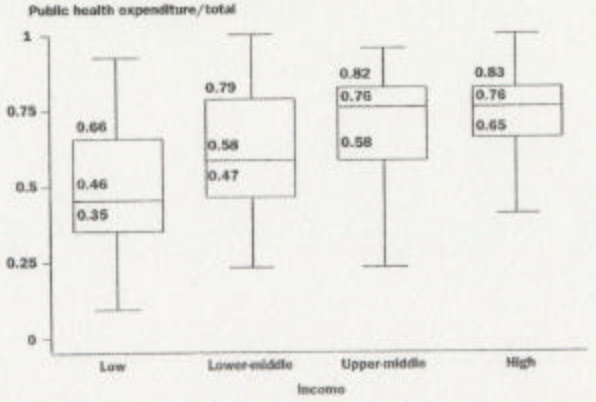
As the number of AIDS cases increases, governments are likely to face mounting pressure for two responses that on first consideration seem rational and humane. One is to pay a larger share of health care costs; the other is to provide special subsidies for the treatment of HIV/AIDS. Unfortunately, these responses can have unintended consequences. For reasons discussed below, governments that wish to minimize the impact of HIV on the health sector should try to avoid both courses of action. However, this does not mean that governments should do nothing to help alleviate the suffering caused by HIV/AIDS. The section concludes with a list of compassionate and affordable measures that governments can and should undertake to mitigate the health sector impact of an HIV/AIDS epidemic.

No increase in the overall subsidy to health care. One obvious and politically appealing response to the HIV/AIDS epidemic is to increase the government share of health care costs and thus the overall subsidy for health care. Such a course of action may be especially attractive early in the epidemic, when few people are sick with AIDS. There is an argument for it on economic grounds as well: it would fill the gap created by the failure of the private market to offer health care insurance in poor countries. However, increasing the subsidy to curative care increases the demand for a limited supply. As a result, both effective price and total expenditure will rise by a greater proportion than the increased subsidy alone, or the increased demand arising from the epidemic alone, or even the sum of the two, would suggest. As more and more people become sick with AIDS, this effect becomes evident in escalating health care expenditures; in a severe epidemic, the burden on the government budget is likely to become unsustainable.

To understand how changes in the level of government subsidies affect the impact of the epidemic on the health care sector, we first look at the extent to which governments already subsidize care. Then, taking India as an example, we project the impact of an expanding epidemic at the current subsidy level and an increased subsidy level. As we shall see, increasing the overall subsidy to care can greatly exacerbate the impact of the epidemic on the health sector.

Most governments subsidize a large share of health care expenditures. The balance includes payments by private insurers and all "out-of-pocket" payments at private or government-subsidized facilities, whether traditional or modern. The average overall subsidy to health care varies widely but generally rises with GDP. As can be seen in figure 4.3, the poorest countries, with average per capita income of about $600, typi-

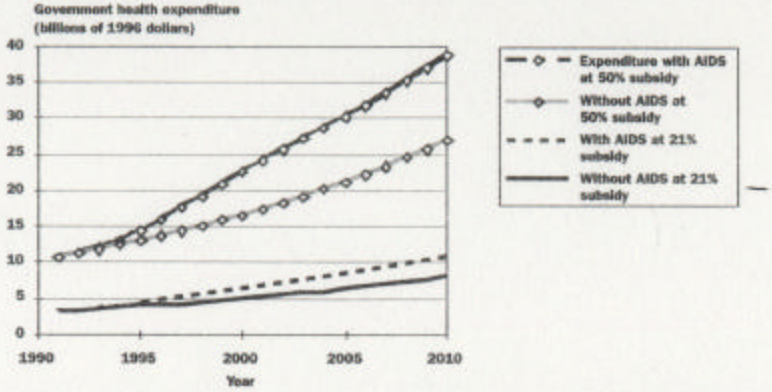
Figure 4.3 Public Share of Health Expenditure in Selected Countries, by Income Group, Various Years, 1990–97



Note: The middle line in each box shows the median proportion subsidized; the top and bottom of the boxes are the 75th and 25th percentiles, and the "whiskers" give the minimum and maximum subsidy rates observed.
Source: World Bank data.

The public share of health care expenditures tends to be higher in countries with higher incomes.

Figure 4.4 Simulated Impact of a Severe AIDS Epidemic on Health Expenditure, India, 1990–2010



Note: The projections follow box 4.3 in assuming that the elasticity of demand for healthcare is 0.8 and of supply 0.5. If the demand elasticity in India were smaller or the supply elasticity greater than these assumptions, all the expenditure impacts would be correspondingly smaller.
Source: Ellis, Alam, and Gupta 1997; authors' calculations.

If India maintains its current level of health care subsidies, a severe AIDS epidemic would increase government health care expenditure by about $2 billion per year by 2010. If subsidies are increased to the 50% level, the same size epidemic would increase annual government health expenditure by an additional $30 billion.

cally subsidize less than half of the cost of health care, while upper-income countries subsidize about three-quarters of the cost.

In India in 1990 the government subsidized about 21 percent of total health care expenditures, a small share even compared with other low-income countries. The bottom line of figure 4.4 projects government health expenditure if India were to have no AIDS epidemic and continued to spend 6 percent of a constantly growing GDP on health care, of which the government continued to finance 21 percent. In this baseline scenario, India's government health expenditures grow from $3.2 billion in 1991 to $8 billion in 2010. The second line from the bottom shows the increase in government health spending if India's current steep rise in HIV prevalence continues until 2000, then levels off at a stable 5 percent. This is about the growth in prevalence seen in countries such as Zambia and Botswana, where focused prevention was not implemented early in the epidemic. The result in India would be to increase the government's expenditure on health in the year 2010 by about one-third, from $8 billion to $10.5 billion.

What if India in 1990 had increased health care subsidies to about 50 percent, the level seen in many Latin American countries? The top pair of projections in figure 4.4 shows the impact of the higher subsidy on expenditure. Even without an AIDS epidemic, government expenditure more than triples to $11 billion in 1991 due to the more than doubling of the government's share of existing expenditure combined with the demand stimulus caused by the greater subsidy. Subsequent growth of health expenditure proportional to GDP brings health expenditure to $27 billion in 2010 (third line from the bottom). Now again suppose a serious AIDS epidemic that reaches a stable 5 percent HIV prevalence rate in 2000. The fourth line from the bottom of figure 4.4 gives the projected result: health expenditures in 2010 would reach $39 billion. Thus, not only has the increased subsidy tripled health care spending, as might have been expected, but it has also increased the vulnerability of the budget to the AIDS epidemic, adding $12 billion (43 percent of $27 billion) rather than just $2.5 billion (31 percent of $8 billion) to government health care expenditures.

The large expenditure shocks that will result from the AIDS epidemic will create new pressures on health budgets, especially in countries that enter the AIDS epidemic with higher subsidy rates. For example, although Mexico's infection rate was estimated to be only 0.4 percent in 1994 and it subsidized only 49 percent of the cost of AIDS treatment, compared with 76 percent for other sicknesses, AIDS was already consuming 1.2 percent of its health budget. In contrast, Tanzania has kept the subsidy rate for AIDS treatment down to 28 percent in line with the subsidy it provides to other illness categories. As a result, despite a prevalence rate of 5 percent, more than ten times higher than Mexico's, the AIDS share of total government health care expenditure is only 3.5 percent, just three times larger in Tanzania than in Mexico.[10]

Although a discussion of the design of health financing systems is beyond the scope of this book, the evidence suggests that countries in the nascent or concentrated stages of the epidemic, like India, should carefully consider not only the immediate budgetary consequences of any expanded commitment to fund curative care, but also the multiplication of these consequences that would occur if the AIDS epidemic spreads. A prudent course would be to consider any expansion of government-financed health care subsidies or insurance only in conjunction with vigorous prevention programs that enable people most likely to contract and spread HIV to protect themselves and others.

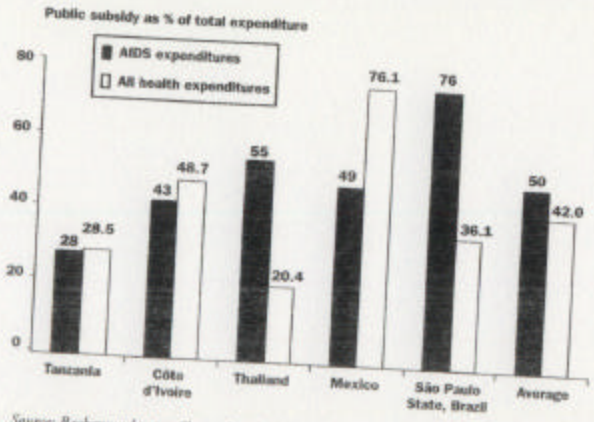
Equal subsidy rates regardless of HIV status. A second common health sector response to the HIV/AIDS epidemic is to offer a different subsidy rate depending on whether or not the person receiving care is infected with HIV. Especially in the countries in the nascent stage of the epidemic, HIV-infected people all too frequently experience discrimi-

nation, including restricted access to or higher effective prices for health care. As the epidemic advances, however, governments are often pressed to provide special subsidies for the treatment of HIV/AIDS. This section points out the government's role in limiting discrimination against the HIV-infected in health care settings and then considers the consequences of preferential subsidies for HIV treatment.

AIDS treatment subsidies vary greatly from country to country. Figure 4.5 presents data on the percentage of AIDS-related and total 1994 health care expenditure funded by the government. In three of the five countries, the subsidy rates for AIDS treatment are significantly different from that for total health care expenditure. For example, although Mexico subsidized a generous 49 percent of the cost of AIDS treatment, this was much less than the 76 percent share of total health care expenditure. Brazil and Thailand subsidized AIDS care at a *higher* rate than all types of care, while Tanzania and Côte d'Ivoire subsidized AIDS treatment and total health care expenditure at roughly the same rate.

A bias against those with HIV/AIDS can take many forms, ranging from a singling out of AIDS-specific drug therapies for exclusion from public funding, to outright refusal of service. There are many anecdotes

Figure 4.5 Percentage of AIDS-Related and Total Treatment Expenditures Financed by the National Government, Four Selected Countries and São Paulo State, Brazil, 1994



Source: Background paper, Shepard and others 1996.

nments often provide different of health care subsidies ding on whether or not the t is infected with HIV.

about discrimination against the HIV-infected in health care settings. In some hospitals, the HIV-infected were placed in special AIDS wards, which were subsequently shunned by fearful health care workers. In others, the HIV-infected were required to pay extra costs for rubber gloves or a private room. In still other cases, the HIV-infected have been denied treatment for common illnesses, perhaps because doctors and nurses mistakenly believed that nothing could be done to help a person with HIV/AIDS. Such discrimination is unfair, unprofessional, and unethical. Moreover, it displays ignorance of the many ways, discussed above, in which inexpensive treatments for symptoms and opportunistic illnesses can prolong and improve the lives of people with HIV/AIDS. Government has an important role to play in training medical personnel in order to eradicate all vestiges of discrimination against HIV-infected patients.

Yet it is equally unfair, and also inefficient, for government to subsidize a higher proportion of the costs of care for patients with HIV than for other patients. Aside from the issue of poverty, to be addressed in the next section of this chapter, there are three ways to justify government subsidies for curative health care: (1) as an incentive for those with an infectious disease to seek a cure and avoid infecting others, (2) as health care insurance with universal coverage and mandatory participation through general taxes, or (3) as government support for a "merit good" or "basic need." No treatment has yet been shown to reduce the infectivity of sexual contact with an HIV-infected person (see box 4.5). AZT treatment of HIV-infected pregnant women has been shown to reduce transmission at birth, but is still too costly an approach to preventing secondary infections in the poorest countries (see box 4.6). With the prominent exception of TB, the treatment of which should be subsidized in all countries, most opportunistic illnesses that afflict the HIV-infected are infectious only to other equally sick HIV-infected people. Thus the argument for treating the diseases on the grounds that they are infectious is weak. If government subsidy is considered as an insurance payment, efficiency criteria argue for a higher coinsurance (i.e., lower subsidy) rate for any condition in which the patient is likely to be highly price-responsive.[11] The first section of this chapter established that the drugs and medical services to treat AIDS can amount to a great deal of money, although some of the most expensive of these treatments purchase the patient little additional life span and decrease, rather than improve, the quality of life. Thus on efficiency grounds, where the objective is to limit the responsiveness of expenditure to insurance, AIDS

Box 4.5 Is Antiretroviral Therapy an Effective Way To Prevent Sexual Transmission?

UNTIL RECENTLY, ANTIRETROVIRAL (ARV) THERAPY could not be considered as a possible way to prevent sexual transmission because the available drugs for treating HIV/AIDS had little impact on infectivity. The 1997 discovery that protease inhibitors and triple-drug therapy suppress HIV below the level of the most sensitive blood tests to detect it has raised hopes that these drugs might prevent the spread of HIV, in addition to greatly extending the life of the patient. Even if this proves true, however, policymakers deciding whether to provide public subsidies will need to consider that the $10,000 to $20,000 cost of treating a single patient would prevent many more cases if spent on focused prevention in high-risk groups. Furthermore, we saw in chapter 1 that even without the expense of antiretroviral therapy, current expenditure for treating an AIDS patient would buy a year of primary school for ten students in most developing countries. In the poorest countries, the much higher cost of antiretroviral therapy would buy a year of primary school for 400 students. For this reason, even if the cost of antiretroviral therapy is shown to reduce the infectivity of sexual contacts, and even if the cost falls substantially, decisionmakers will still want to consider very carefully before initiating such subsidies.

patients should face somewhat lower subsidies, not higher ones. The final possibility, that AIDS treatment is a basic need, is difficult to justify in poor countries where the opportunity cost of treating one adult for AIDS may be measles vaccines for 100 to 200 children or, as shown in figure 1.8, ten student-years of primary school. Thus none of these economic arguments justifies higher subsidy rates for AIDS.

What policy recommendations can be drawn from these two observations? The prudent, efficient, and equitable course is to place the financing of health care for HIV/AIDS on the same footing as other diseases. The treatment of particularly infectious illnesses striking HIV-infected people, including TB and STDs, should be subsidized relatively generously because of the secondary infections treatment will prevent. Other health care problems of the HIV-infected should be subsidized at the same rate that applies to other adult health problems that are equally infectious. Assuming that Brazil subsidizes about one-third of other health care costs (as figure 4.5 indicates it does in São Paulo) and that the infectious proportion of illness episodes is similar among the HIV-infected and uninfected populations, this policy would lead Brazil to reduce its subsidy to antiretroviral therapy from 100 percent to one-third. Similarly Thailand would reduce its subsidy of antiretroviral therapy from 100 percent to about 20 percent. Mexico, on the other hand, would increase its subsidy to AIDS patients to approximately the same rate it offers other patients.

In mid-1997, none of these countries appeared to be following this recommendation precisely. Brazil and Mexico were continuing their former policies, with a tilt of subsidies toward AIDS treatment in Brazil and away from it in Mexico. Having spent $108 million on antiretroviral medication in 1996, Brazil was projecting an expenditure four times that large for 1997 (Chequar 1997). Thailand had recently embarked on an experiment that held out the possibility of an equal percentage subsidy for the treatment of AIDS and other diseases, on average, if not for the individual patient. In 1996, the Thai Ministry of Public Health found that, given the rising patient load, its policy of a 100 percent subsidy for antiretrovirals and drugs for the opportunistic illnesses would soon consume considerably more than the entire budget allocated to the National AIDS Program (Prescott and others 1996). As a result, the government revised its policy to provide free antiretroviral therapy only to HIV-positive pregnant women, where it might prevent mother-to-child transmission, and to participants in nationally approved clinical trials, where patients receive the support they need to maximize compliance (Kunanusont 1997). This policy makes sense for antiretroviral therapy, on the assumption that low levels of compliance outside clinical trials would have little therapeutic effect on patients and might cause negative externalities in the form of drug-resistant strains of HIV. Furthermore, participants in clinical trials produce a positive externality in the form of the knowledge that can be used to benefit many other patients, and therefore should receive a higher subsidy than other patients. Thailand's decision to subsidize AZT for prevention of mother-to-child transmission can be justified as a "merit good," which might be affordable in a middle-income country (see box 4.6).

Affordable, humane responses to the epidemic. We have argued that governments should avoid two types of health care responses to the epidemic: increasing the overall subsidy to all types of treatment, and providing disproportionately large subsidies to treatment of HIV/AIDS. There are nonetheless several ways in which governments can intervene to mitigate the health impact of HIV/AIDS on infected individuals and their families and on the overall health sector. Each of these interventions is justified on public economic grounds, either because it has large positive externalities, or because it improves the efficiency or the equity of the health care market in other ways.

Box 4.6 Preventing Mother-to-Child Transmission

OF THE MANY TRAGEDIES CAUSED BY THE HIV/AIDS epidemic, perhaps none is more disturbing than that of children who contract the virus from their mothers at birth or through breastfeeding. Methods exist for preventing mother-to-child transmission; sadly, most of the methods so far developed are difficult to implement in the very poor countries where most mother-to-child transmission occurs.

About one-half to two-thirds of mother-to-infant transmission is believed to occur at the time of birth (Reggy, Simonds, and Rogers 1997). The risk of HIV transmission from mother to newborns can be reduced by two-thirds, from 25 percent to about 8 percent, by administering zidovudine (AZT) to the mother before and during birth, and to the non-breastfed newborn for six weeks after birth (Connor and others 1994). The total drug and related medical costs for the AZT regimen currently recommended by the U.S. Centers for Disease Control and Prevention (CDC) for reducing mother-to-child transmission amounts to $1,045 per case treated in the United States (Mauskopf and others 1996). In Thailand, where some inputs are less costly, the total cost is about half as great (Prescott and others 1996). Even so, this is roughly 50 times the average per capita health expenditure of low-income countries in Sub-Saharan Africa, where about two-thirds of mother-to-child transmissions take place. And at roughly $3,000 per HIV infection averted, this approach to prevention does not compare favorably with other approaches discussed in chapter 3 and would be affordable only in middle- or upper-income countries.

Several research efforts are under way to find a lower-cost means of reducing mother-to-child transmission. One involves trying to identify the most efficacious part of the AZT regime, in order to reduce the total amount of AZT needed. Trials are also under way in industrial and developing countries to investigate various other medical approaches to reducing transmission (Biggar and others 1996, DeMuylder and Amy 1993). However, it is unclear whether any of these strategies, if found effective, would be affordable or technically feasible in many developing country settings.

Newborns of HIV-positive mothers who escape infection at birth may nonetheless be infected later through breastfeeding. As a result, public health officials have had to weigh the advantages of breastfeeding for child health against the possibility of HIV transmission. In areas where the primary causes of infant deaths are malnutrition and infectious diseases, UNAIDS recommends that women continue to breastfeed their children. If a woman is known to be HIV-positive, she should be provided with the means to make an informed choice about infant feeding methods. In areas where there are safe alternatives for infant feeding, however, children will be at less risk of illness and death if not breastfed (UNAIDS 1996a). While it may be possible to simply reduce the duration of breastfeeding, it is not known what impact this might have on reducing transmission, since there is no consensus on when the risk of transmission is highest within the breastfeeding period (*background paper*, Saba and Perriëns 1996).

- *Provide information about the efficacy of treatments.* Because people with HIV/AIDS are often desperate for treatment and cannot easily research what works, they are especially vulnerable to quackery. Governments can serve the interests of everyone by promptly investigating unproven treatments and providing credible information about their validity. So long as this is done through existing media channels—for example by issuing press releases and arranging media interviews with credible experts—it can be done quite inexpensively.
- *Subsidize the treatment of infectious opportunistic illnesses and STDs.* Subsidized treatment is especially appropriate for tuberculosis, one of the most common opportunistic illnesses to infect AIDS patients, since curing a single case can avert many secondary infections. Treatment of gonorrhea, syphilis, and the other classic STDs should be subsidized, not only because they are highly contagious, but also because they exacerbate HIV transmission, as discussed in chapter 3. Because few people are susceptible to them, treating toxoplasmosis, cryptococcosis, or one of the other infectious opportunistic illnesses that develop only in people with severely disabled immune systems prevents few secondary cases and thus should be subsidized at a lower rate, closer to the subsidy rate for chronic, noninfectious disease. Whether a subsidy to antiretroviral treatment of HIV itself is justifiable as a way to prevent secondary HIV infections will depend on the efficacy of the treatment and on its cost relative to the cost of other HIV prevention measures. In mid-1997, such treatments were far too expensive and uncertain to warrant subsidies on these grounds (see box 4.5).
- *Subsidize the start-up costs for blood safety and AIDS care.* The AIDS epidemic has increased the willingness of individuals to pay for certain types of services, such as screening of blood for transfusions and care for the terminally ill. Where these services are lacking, government help with the start-up costs is justified, just as governments subsidize other large indivisible investments, such as an electric utility or a water system, so long as the users then pay for the services they receive. Thus, governments in poor countries should establish blood banks but should not indefinitely provide free blood. Similarly, government should help establish AIDS treatment facilities, especially community-based home care programs, but should not permanently subsidize the care they provide.
- *Provide special assistance to the poor.* Most countries already make special provision for medical care to the poor. As the AIDS epidemic increases the demand for care, governments may wish to focus such assistance even more on those who can least afford it. Sliding fee scales and other measures to make care available to the

poor should apply to people with HIV/AIDS just as they do to people with other illnesses. This principle of providing assistance to those who need it most, regardless of their HIV/AIDS status, is discussed more fully in the next section on ways to mitigate the impact of HIV on poverty.

AIDS and Poverty: Who Needs Help?

IN ADDITION TO ITS DEVASTATING IMPACT ON INFECTED INDIviduals, HIV hurts all those who are linked to them by bonds of kinship, economic dependence, or affection. The grief suffered by survivors, and the possible lasting psychological damage, especially to young children who lose a parent, are potentially the most damaging consequences of the epidemic. They are, however, difficult to measure, probably unreachable by public policy, and therefore beyond the scope of this book. In addition, survivors often suffer economically. This harm from a prime-age adult death constitutes the most important economic impact of an HIV/AIDS epidemic and is the topic of the remainder of this chapter. It can be measured by the impact of adult death on such social indicators as orphanhood, child nutrition, schooling, and poverty. By worsening these measures and widening the gap between the poor and others, HIV can exacerbate poverty in poor countries and delay attainment of national economic development goals. We look first at how HIV/AIDS affects poverty, then at the implications of these findings for poverty policy in a severe AIDS epidemic.

How HIV/AIDS Affects Poverty

It is sometimes said that "AIDS is a disease of poverty." In what sense might this be true—or false? First, are the poor more likely to become infected with HIV than others? Second, what proportion of people infected with HIV are poor? Answers to these questions are important, for they will influence both the focusing of prevention measures and attempts to mitigate the impact of the AIDS infections that do occur. In considering the impact of AIDS on poverty, we first examine the available evidence to answer these two basic questions; then we ask how the impact of an AIDS death compares with other shocks that households suffer, and how households of different income levels cope.

HIV infects the rich and the poor. In developing countries, the relationship between income and HIV infection rates has been best documented in eastern and central Africa.[12] Whether the patterns observed in this part of Africa will also emerge elsewhere remains to be seen. Several factors have exacerbated the epidemic in hard-hit areas of Africa: most people who had HIV at the time of the studies had become infected years earlier, when little was known about HIV prevention; moreover, the area is traversed by major transport routes and has suffered from war. Yet each of these factors is also evident in other developing regions to varying degrees: knowledge about HIV prevention is still often scant, and other regions also have major transport routes and wars. Thus, until other data are available, the experience in eastern and central Africa may offer worthwhile clues about how infection rates in other regions are likely to differ across income groups as the epidemic progresses.

As we learned in chapter 3, early in the epidemic in Sub-Saharan Africa men and women who travel more, and men who had higher incomes, were more likely than others to contract the virus. There are reasons to believe that this may hold true elsewhere. Studies show that sex is similar to other pleasurable pastimes: the number of partners per year rises with income. Also, a person with a higher income is likely to attract more prospective partners, and will have more money than a person with lower income to compensate sexual partners or to support any offspring. These factors, combined with the fact that HIV, unlike other STDs, cannot be readily cured, has made HIV unique among widely prevalent infectious diseases in striking rich people in the same proportion, or larger proportions, than it strikes the poor. That HIV infects the rich as well as the poor is important to keep in mind when considering which households need help the most.

Of course, we would expect that more-educated people with higher incomes would be in a better position to learn about the epidemic and alter their behavior to avoid infection. Chapter 3 presents evidence that this is already occurring: in some countries, highly educated people have higher frequencies of condom use than the less well educated. Also, recent studies in developed countries have shown AIDS incidence to be highest among the very poor. If these trends are replicated worldwide, AIDS will become like other infectious diseases, in that the poor will be more likely to become infected than the nonpoor. Ultimately, AIDS may become most prevalent in the poorest urban slums of developing countries.

Already, most people with HIV/AIDS are poor. Although lack of data makes it impossible to calculate the precise proportions of poor and non-

poor who are infected, knowledge of income levels and infection rates across countries suggests that many more poor people are infected than nonpoor people. For example, according to an internationally adjusted standard of absolute poverty, Sub-Saharan Africa has about four times as many poor people as nonpoor people. Thus, even if poor people were infected at *just slightly more than one-quarter the rate* of the nonpoor, poor people would account for the majority of HIV infections in Africa. Since poor people in many parts of Sub-Saharan Africa have infection rates that are well above one-quarter the rates of the nonpoor, we know that, in Africa, at least, there are many more poor people than rich people with HIV. Although magnitudes are less striking, the same general principle will tend to apply in other developing regions.[13]

We have seen that AIDS is already a disease of poverty in the sense that it affects *more* poor people than nonpoor, and it may eventually become a disease of poverty in the sense of infecting a *higher proportion* of poor than nonpoor. If we assume that one of government's main responsibilities is to make it possible for people to escape from poverty, these findings lead us to new questions. What is the impact on a poor household when the mother, father, or another prime-age adult who is a member of the household dies from AIDS? How do poor households cope with AIDS deaths? We examine these questions in the next two subsections. Box 4.7 describes three sets of characteristics that determine the initial impact of an adult death and how well an afflicted household copes.

What is the direct impact of an AIDS death? The death of a prime-age adult is obviously a tragedy for any household. Survivors must contend not only with profound emotional loss, but also with medical and funeral expenses, plus the loss of income and services that a prime-age adult typically provides. How serious is the shock of an AIDS death to the economic welfare of the survivors? The direct impact of a death consists of the medical costs prior to death and the costs of the funeral. To assess the direct cost of a death from AIDS, we compare the medical and funeral costs of an AIDS death with those of a prime-age adult death from other causes. Finding that the difference is not large, we then consider how the death of a prime-age adult, regardless of cause, affects household consumption patterns.

Our analysis is based on findings from several household surveys described in box 4.8. In particular, we rely on the most extensive of these, a study done in Kagera, Tanzania, since detailed data from that study provide a basis for our subsequent analysis of how households cope with AIDS deaths. Although the data are very limited, based on the available information, it is reasonable to expect that the impacts and coping responses described in this chapter will prove to be broadly consistent with future findings.

Box 4.7 Three Factors Determine the Household Impact of a Death

THE OVERALL ECONOMIC IMPACT OF AN ADULT DEATH ON THE surviving household members varies according to three sets of characteristics:

- those of the deceased individual, such as age, sex, income, and cause of death
- those of the household, such as composition and assets
- those of the community, such as attitudes toward helping needy households and the availability of resources.

The first set of characteristics determines the basic impact of the death on the surviving household members; the second and third influence how well the afflicted household copes. Although disentangling the three is very difficult, it is nonetheless important when attempting to assess the household impact of an adult death to consider all three sets of factors.

In the Kagera study, people dying from AIDS were somewhat more likely to seek medical care than people dying from other causes, and they were more likely to incur out-of-pocket medical expenses.[14] Moreover, household medical expenditures tended to be much higher for AIDS than for other causes of death, as shown in figure 4.6. Strikingly, for all groups except men with AIDS, medical expenses were overshadowed by funeral expenses. On average, households spent nearly 50 percent more on funerals than they did for medical care. Moreover, funeral expenditures for AIDS deaths and non-AIDS deaths differed less than did medical expenditures. Thus, even though a significant proportion of funeral costs were covered by gifts from other households (about 45 percent on average), the difference in the household impact of an AIDS death and a non-AIDS death is smaller than the differences in medical costs alone would lead us to expect.[15]

Box 4.8 Studies of the Household Impact of Adult Death from AIDS and Other Causes

WITHIN THE PAST FEW YEARS, FOUR IN-DEPTH studies have examined the impact of adult death from AIDS on surviving household members. Compared with other studies, these four studies used more detailed survey instruments; applied these to larger, more representative samples of households; and followed the households over longer periods. The four studies were carried out in the following locations (the number of households surveyed is shown in parentheses):

- Chiang Mai, Thailand (300)
- Abidjan, Côte d'Ivoire (107)
- Rakai, Uganda (1,677)
- Kagera, Tanzania (759)

The studies used many similar parameters. All but the Thai study visited the sample households several times. All but the Côte d'Ivoire study included households that did not experience an AIDS sickness as well as those that did.[1] All but the Rakai study were done expressly to study social and economic impact and thus had extensive questionnaires about consumption and other social and economic measures of well-being.[2] All but the Côte d'Ivoire study included deaths from causes other than AIDS as well as those from AIDS.

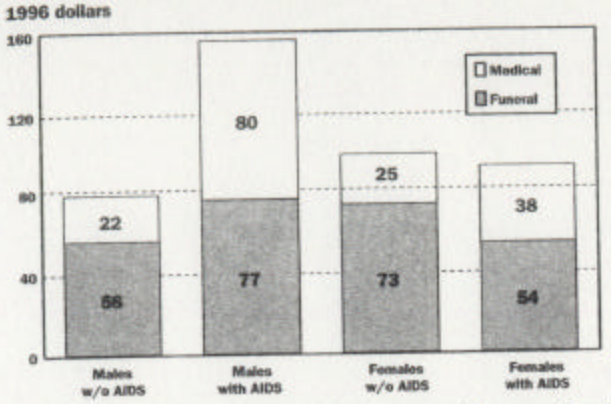
Two broad findings emerged from these studies and are discussed in the text. First, households use a variety of informal mechanisms to cope with misfortunes like an adult death in the household. Second, although these coping mechanisms cushion the impact of the shock, households are not entirely successful in protecting their well-being. In general, the poorer the household, the greater and more persistent the impact of a prime-age adult death from AIDS and similar shocks.

1. Although the Côte d'Ivoire study did not include an explicit control group, Béchu (*background paper*, 1996) is able to use differences across households in the severity of the AIDS cases combined with the sequence of six observations on each household to estimate the impact of fatal adult illness on consumption.

2. The Rakai study is part of a study of the effect of mass STD treatment on the incidence of AIDS. The household questionnaire focused on epidemiological issues and only asked a few questions related to economic well-being.

Sources: For Thailand, Pitayanon, Kongsin, and Janjaroen (1997) and Janjaroen (*background paper*, 1996); for Côte d'Ivoire, Béchu (*background paper*, 1996); for Uganda, Menon and others (*background paper*, 1996a); and for Tanzania, Over and others (forthcoming).

Figure 4.6 Average Medical and Funeral Expenditures, by Gender and Cause of Death, Kagera, Tanzania, 1991–93



Note: Throughout this report currency amounts have been converted from current Tanzanian shillings to 1996 U.S. dollars. The conversion procedure involves three steps: (1) convert current shillings to 1991 shillings using the project's price deflator; (2) convert 1991 shillings to 1991 dollar amounts at 289 shillings per dollar; and (3) inflate to 1996 dollars by multiplying by 1.15. Sample: deaths of 264 adult household members ages 15 to 50.

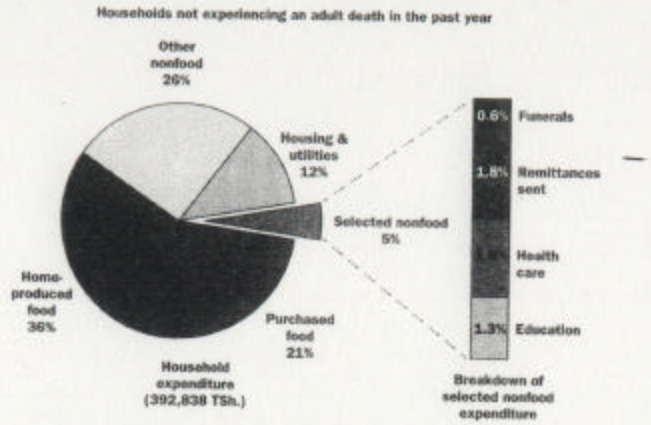
Source: Over and others, forthcoming.

Medical expenditures were higher for people who died of AIDS than people who died of other causes. But because funeral expenses are large, the overall difference in expenditure for AIDS deaths and deaths from other causes is smaller than the difference in medical expenditure alone would suggest.

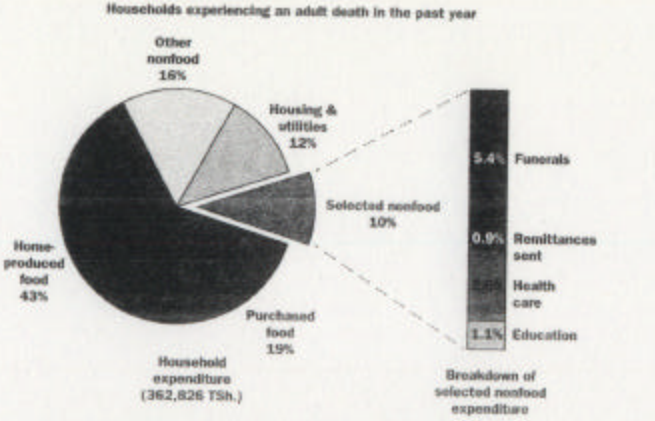
In Thailand, where per capita income is 10 times that in Tanzania, households in Chiang Mai province spent more than ten times as much on medical care prior to death as did the Tanzanian households (Pitayonon, Kongsin, and Janjaroen 1997). The households with an AIDS death spent $973 on average, which in contrast to Tanzania was only about 10 percent more than the $883 spent by the non-AIDS households. But, just as in Tanzania, the households spent much more on funerals than on medical care.[16]

The relative amounts spent for medical care and funerals will, of course, vary from country to country and even across communities within a district. Nevertheless, two broad observations are likely to apply in most situations: first, medical costs are only a portion of the cost of a prime-age adult death; and second, nonmedical costs are likely to be similar, regardless of the cause of death. Where these observations hold true, the direct impact of an AIDS death will not be much different from that of a non-AIDS death, despite higher medical expenditures for AIDS. Thus, the high cost to households from AIDS will usually be due to the large number of deaths caused by the epidemic rather than by the fact that they are caused by AIDS. Given that the impact of a prime-age adult death is likely to be similar, regardless of cause, how does a prime-age adult death affect household consumption? Figure 4.7 shows household consumption during the previous twelve months for two groups of households in the first wave of the Kagera survey: those who had experienced a death during this period and those who had not. Households that suffered a death had lower overall expenditures and, as we would expect, devoted a larger share of the expenditure to medical and funeral costs. Also, these households spent one-third less on the "other nonfood" category (e.g., clothing, soap, and batteries). Finally, in households that suffered a death, food produced by the household was a larger share of

Figure 4.7 Consumption in Kagera, Tanzania, Households by Whether the Household Experienced a Death in the Past Year (Results from Wave 1 of Kagera Study)



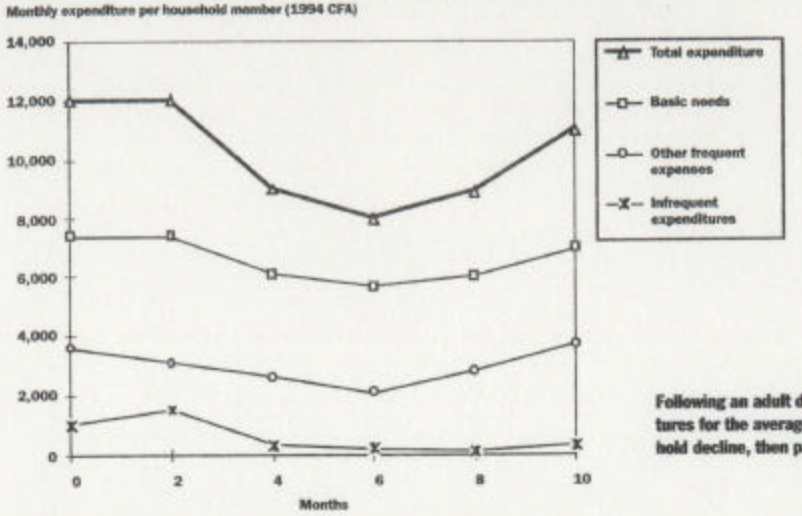
Note: Of the 6,395 TSh. spent on health care in the average sample household, TSh. 748, or 11%, was spent on the care of nonadult household members who had died.



Note: Of the 9,453 TSh. spent on health care in the average sample household, TSh. 6,069, or 64%, was spent on the care of household members who had died.
Source: Over and others, forthcoming.

chased food accounted for a aller share of total consumption ouseholds that suffered a death ttom panel) than in households t did not (top panel). Households t suffered a death increased their sumption of home-produced food, this only partially offset reduced sumption of purchased food.

Figure 4.8 The Time Pattern of the Impact of Adult Illness on Per Capita Household Expenditure, Côte d'Ivoire St



Following an adult death, expendi tures for the average bereaved ho hold decline, then partly recover.

Source: Background paper, Béchu 1996.

consumption than in households without a death, while purchased food was a smaller share of consumption.[17] These differences reflect the fact that the members of households that experienced a death cut back on the number of hours they worked for wages and thus had lower incomes with which to purchase food (Beegle 1996). They were only partially able to replace this lost income with additional production of food at home.

In the two studies that followed, detailed household consumption over time, the Kagera study and the one from Côte d'Ivoire, the time pattern of consumption demonstrates the resiliency of the average household to the impact of the death. Figure 4.8, drawn from the Côte d'Ivoire study, shows changes in expenditure per household member for three components of expenditure and total expenditure over the ten months during which the households lost someone to AIDS.[18] Two patterns are immediately evident. First, total consumption dips and then partially recovers, still trending upward at the end of the survey. Second, basic needs, which include food, dip less than other categories of expenditure, then almost fully recover as families reduce other categories of

spending to minimize the impact on necessities (*background paper,* Béchu 1996). The household surveys from Chiang Mai and Rakai also suggest a partial recovery in per capita consumption but do not have sufficient data to confirm this pattern.

How households cope with the impact of adult death. The economic shock of a prime-age adult death, described above, would have been larger and more persistent, except that households use a variety of strategies to cope. Before the AIDS epidemic, prime-age adult deaths were much less common, so these mechanisms were used mostly to cope with other shocks. As a result, early assessments of the household impact of AIDS tended to overlook household coping and assume that AIDS would be catastrophic not only for the infected individual but also for the entire household. Press accounts that presented devastated households as typical contributed to the widespread belief that most AIDS-affected households in developing countries would collapse. To be sure, some households *are* destroyed by AIDS; this is especially true if both parents become ill or die while their children are still very young. However, such instances may be less typical than is generally assumed because of the typically long lag between HIV infection and death. Moreover, while premature death of a loved one is always tragic, leading to emotional pain and sometimes lasting psychological damage in survivors, survey data suggest that when it comes to coping with the *economic* impact of such a loss, households in general are surprisingly resilient.

The degree of household resilience to the economic impact of a prime-age adult death has important implications for society's response to a generalized epidemic. On the one hand, if nearly all AIDS-affected households collapsed, resources for mitigating the household impact of the epidemic would be stretched so thinly that governments and social welfare organizations would be overwhelmed. In such a situation, policymakers might easily conclude that those currently affected were beyond help and that the only reasonable response for the government would be to redouble prevention efforts. On the other hand, if many households were able to cope, governments and NGOs could focus the limited resources available for mitigating the impact of the epidemic on the households that needed help the most.

Understanding the variety of household coping mechanisms and how these will affect different groups of households is important. The mix of responses attempted by a specific household in response to a prime-age adult death depends on countless factors, some of which will vary across countries and communities. Since the available data on household impact comes mostly from Sub-Saharan Africa, the following discussion unavoidably reflects this bias. Policymakers in all countries faced with the possibility of a generalized epidemic will want to assess the extent to which these responses are evident in their own country. To varying degrees, however, three coping mechanisms observed in Africa—altering household composition, drawing down savings or selling assets, and utilizing assistance from other households—are all likely to be attempted whenever households confront the tragedy of a prime-age adult death. This section discusses each of these informal mechanisms in turn and then discusses formal assistance, such as that provided by governments and NGOs.

Before this analysis, it would be useful to consider whether income that had been devoted to health care and funeral expenses could be diverted after the death to other expenses. Some household coping certainly involves such responses. However, the potential should not be overestimated, since much of the cost of medical care and an even larger proportion of the cost of funerals is financed by transfers from outside the household. Since these transfers typically cease after the funeral, households must draw on additional coping strategies, described below.

Altering household composition. Households everywhere fulfill economic as well as social functions. In rural areas of developing countries, households are often the main production unit for subsistence farming and, in some instances, for cash crop farming as well. In such a situation, the economic shock of the death of a prime-age adult can be cushioned to some degree by altering household composition. Examples of such changes could include sending one or more dependent children to live with relatives, or inviting an unmarried aunt or uncle to join the household in exchange for assistance with farming and household tasks. Results from three of the four available household surveys—two from Africa and one from Chiang Mai, Thailand—show that the degree to which household composition is used to cushion the shock of the death varies according to the size and flexibility of local household structure.

Among the 759 households in the Kagera study interviewed once every six months for two years, 130 household members of all ages died, but roughly nine times as many people left the households alive over the same period and seven times as many joined the households. In addition, about 200 children were born to household members. As a result, the average size of all the households declined only slightly, from about 6.0 to 5.7 members.

During the six months between any two interviews, economically active adults left or joined about one-fifth of the households that did not have an adult death and about 40 percent of the households that did suffer a death. Since most households that suffered a death added at least one member, the average size of these households declined by less than one, from 6.4 to 5.7 members—so that the average household size after a death was the same as in households that did not suffer a death. Similarly, the dependency ratio rose only slightly in households with an adult death, from 1.2 to 1.4, slightly *less* than the 1.5 dependency ratio in households without an adult death.

A striking fact is that household size and dependency ratios changed very little, even though Kagera has high adult mortality from AIDS. The same phenomenon was observed in the survey in Rakai, Uganda, which, like Kagera, has a severe AIDS epidemic: 15 percent or more of adults in roadside communities are infected with HIV. This suggests that, even in a generalized AIDS epidemic, most African households that suffer an AIDS death will be able to adjust household size and dependency ratios in ways that make them similar to households that did not suffer a death.

The Chiang Mai survey reveals that, at least in this area of Asia, households are much smaller and less mutable than in Africa. The 108 households in the sample that had not experienced a death had 432 members, or exactly four per household. In contrast to the no-death households in Kagera, the Chiang Mai households experienced almost no change in membership, receiving among all of them only one new member and losing only 6 members over the reference period. The 216 households that experienced a death had an average of 4.1 members, of which they lost one each because of the death. Unlike the Kagera households, these Chiang Mai households remained a full person smaller (that is, with 3.1 persons per household) at the time of the interview, which was up to two years after the death (*background paper,* Janjaroen 1996).

There are two points of similarity between the household composition responses to death in the Kagera and Chiang Mai studies. First, the Chiang Mai households with deaths, like their Kagera counterparts, suffered an increased dependency ratio due to the deaths. Because of the smaller number of adults in the Thai households, the dependency ratio there almost doubled after the death. Second, in both countries households with a death were twice as likely to experience membership change as the households without deaths. However, the proportion of households that experienced a membership change and the rates of turnover were only about one-quarter as large in Chiang Mai as in Kagera.

When we later discuss possible policy responses to adult mortality, the possibility will be raised that households may respond opportunistically by moving people into a household that is benefiting from an assistance program. The evidence here suggests that, even if this turns out to be a problem in Africa, it is much less likely to be an issue in places like Chiang Mai where households are much smaller and apparently less able or willing to adjust their membership in response to outside stimuli.

Dissavings and the sale of assets. Drawing down savings and selling assets is an obvious potential mechanism for coping with prime-age adult death. Because assets may have been accumulated as part of a strategy to cushion unanticipated shocks, drawing upon them is one of the least painful ways of coping, much less painful than reducing food consumption, for example. Evidence from Kagera, Rakai, and Chiang Mai suggests that households do draw down savings or liquidate assets in response to a prime-age adult death.

The surveys in Kagera and Rakai both asked respondents about their ownership of three types of durable goods: a car or truck, a bicycle, and a radio. Less than 2 percent of the households owned a car or lorry, and changes in ownership did not show any clear pattern in relation to whether households suffered an adult death. However, ownership of bicycles and radios, which is much more widespread, did reveal a pattern. Table 4.5 shows how ownership of these assets changed over the course

Table 4.5 Asset Ownership in Households with and without an Adult Death
(percentage of total households)

	Rakai District, Uganda		*Kagera Region, Tanzania*	
Asset	*Households w/o adult death*	*Households with adult death*	*Households w/o adult death*	*Households with adult death*
Bicycle				
First visit	34	39	27	26
Last visit	41	35	29	28
Radio				
First visit	30	40	31	36
Last visit	37	36	35	35

Source: Authors' calculations; *background paper,* Menon and others 1996.

of the surveys, depending on whether or not the household suffered an adult death. In both surveys, radio ownership increased among households that had no death and decreased among households that had a death.[19] A similar pattern can be seen for bicycle ownership in Rakai, although not in Kagera. Thus the evidence from Rakai, partially supported by the Kagera data, suggests that some households that suffer an adult death may be selling durable goods as part of their coping strategy. The alternative is that these goods may have belonged to the deceased and been willed to someone outside the household. Even in this instance, however, the loss of the asset may help with coping efforts, if the recipient feels an increased obligation to assist the bereaved.

Additional evidence of households drawing down savings to cope with an adult death can be seen in Kagera data on membership in traditional rotating savings and credit associations (ROSCAs). In wave 1 of the survey, 51 percent of the 80 households that would experience an adult death during the eighteen-month survey period were members of a ROSCA; by the end of the survey, participation had dropped to 36 percent. Among households that did not experience a death during the survey period, ROSCA participation varied less, from 41 percent in wave 1 to 36 percent in wave 4.

Although the Chiang Mai survey does not permit comparisons of financial variables over time between households that experienced a death and those that did not, fully 41 percent of households with a death report having sold land, 57 percent report some dissavings, and 24 percent report borrowing from a cooperative or revolving fund (i.e., a ROSCA) to finance the adjustment to the death. Perhaps it is the greater wealth of the Thai households that permitted them to cushion the shock in these ways, rather than through readjustment of household composition.[20]

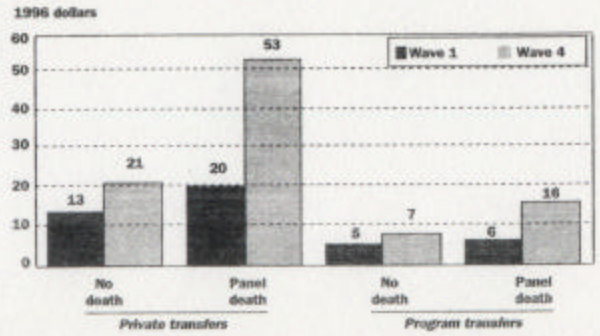
Assistance from other households. For all households confronted with an adult death, help from relatives and neighbors is a potentially important supplement to the household's own efforts. Policymakers considering how to best use the limited resources for mitigating the household impact will want to avoid displacing such private transfers. To do so, they will need information about assistance from households in the specific communities concerned. The discussion that follows is not intended to substitute for this information, but only to suggest the types and possible relative magnitude of such responses.

An important feature of the social organization of Kagera households, and indeed of most African communities, is interdependence in time of need. In Kagera, both bereaved and nonbereaved households were very likely to receive cash or in-kind assistance from other households. (About three-quarters of the nonbereaved households received such assistance, compared with 80 to 90 percent of the households that suffered a death.) But among households that received private transfers after a death, the median amount received during the half-year of the death ($53) was more than twice that received during the year before the death, as well as twice that received by households that did not suffer a death.[21]

New organizations established to help cope with the costs of AIDS death may be one explanation for this large difference. Focus group interviews in 20 of the sample villages found that besides traditional savings and mutual assistance associations, such as ROSCAs, residents of many villages had launched associations specifically to help families affected by an AIDS death. Most of these associations were launched and operated by women; many have regular meetings at which members make contributions in cash or in kind (Lwihula 1994).

Figure 4.9 shows the amounts of private transfers received by households according to whether or not they suffered an adult death. Note the dramatic response of private transfers between wave 1 and wave 4 for the households that experienced a death in that interval (i.e., during the "panel"). The figure also shows the much smaller amount of program transfers, an issue we turn to below.

Figure 4.9 Median Value of Assistance Received among Sample Households Receiving Transfers, by Source, Wave, and Occurrence of Adult Death, 1991–94



Source: Over and others, forthcoming.

Households that suffered a death between the first and fourth "wav data collection received larger pri and program transfers than house holds that did not suffer a death ing this period. For these bereave families, private transfers were m larger than program transfers.

Assistance from government and NGOs. Regarding assistance from government and NGOs, two types of questions must be asked. First, which families receive such assistance and how much do they receive? Second, how much does it cost to provide this assistance? Cost considerations did not figure in our discussion of private assistance, since only private resources are involved. But governments and NGOs use public resources, whether generated by taxes or by voluntary contributions. Accordingly, we should ask whether these funds are used in the most effective way possible. In this discussion, assistance from government and NGOs is referred to as program transfers or formal assistance, to distinguish it from the private and informal assistance provided by households and village associations.

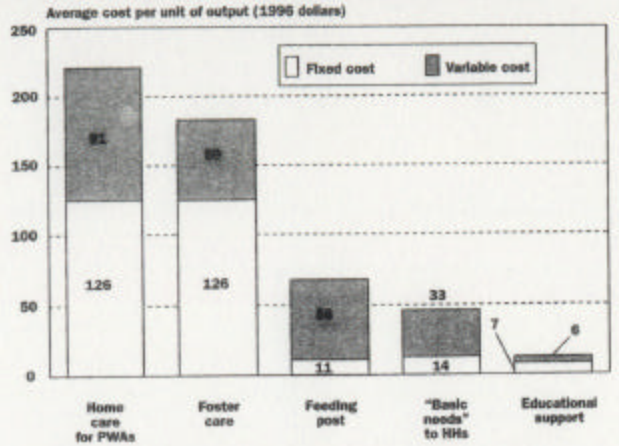
According to the Kagera survey, program transfers reached fewer households and provided a smaller amount of assistance than private transfers. In the last wave of the survey, one-fifth of the households that had not had an adult death in the past eighteen months had received assistance from an organization in the past six months; almost two-fifths of the households that had experienced a death received such assistance. The median value of program assistance received was small relative to total household expenditure, and to the amounts of private assistance received.

But while, on average, households that had experienced a death received larger amounts of assistance, as shown in figure 4.9, this was not always the case. Nor were program transfers always small relative to annual income. In one village, 50 percent of the households, including some that had never reported a death, received more than $110 in program transfers during the six months before wave 4.

To analyze the relative costs of various types of programs for assisting households affected by AIDS and other causes of adult death, the survey collected data from one governmental and eleven nongovernmental organizations operating in the Kagera Region. Figure 4.10 presents the average cost per year of operating each of the programs where cost data were available from at least two agencies. In considering the implied cost comparisons, it is important to remember that the services provided may be very different; for example, home care focuses on the sick household member, while educational support helps dependent children, who may not be sick, to attend school. Furthermore, even the programs averaged in a single category often contain disparate program elements and vary in quality.

Despite these caveats, the figure reveals that there can be very large differences in the cost per beneficiary of different types of programs. A

Figure 4.10 Average Cost per Year of Survivor Assistance in 1992 by Government and Nongovernmental Organizations, Kagera, Tanzania



Note: PWA = person with AIDS, HH = household. Other costs are per child per year.
Source: Over and Koda, forthcoming.

particularly telling comparison is between the cost of supporting a child in a foster home, estimated at $185 per year, and the cost of supporting a child in an orphanage, which averages $1,063, or ten times larger (not shown on the figure). For children who cannot be placed in a foster home, it may be necessary to consider the alternative of an orphanage. However, policymakers and NGO providers should keep in mind that every child sent to an orphanage will consume the resources that could have been used to support ten children in foster homes.

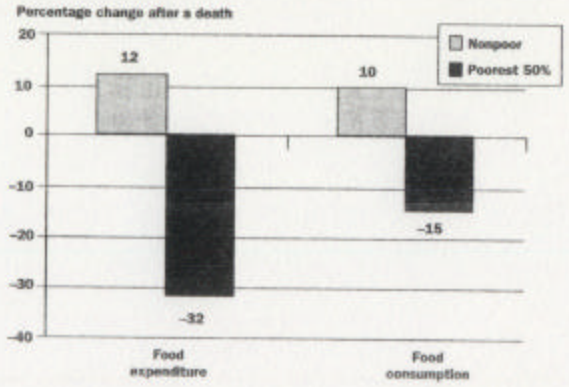
The economic impact of AIDS is larger in poor households. We have seen that households that experience an adult death draw on their assets to cushion the shock of this catastrophe. It follows that households with lower levels of assets can be expected to have more difficulty coping with the death than households with more assets. In this section we examine the effect of a household's initial assets on its ability to cope with adult death. First we show how a household's assets affect the short-term impact of an adult death on per capita food consumption; then we consider the long-term harm to children, through worsening malnutrition and reduced school enrollments.

Some types of assistance for ho holds affected by AIDS consume more resources than others.

In examining this evidence, it is useful to keep in mind the key question that policymakers are likely to face in deciding how society in general and governments in particular, can mitigate the impact of a generalized epidemic: who needs help?

The impact on food consumption. The greater impact of a prime-age adult death on poorer households appears most starkly in changes in food expenditure and food consumption. Figure 4.11 shows the changes in per capita food expenditure and consumption (which includes both purchased food and home-produced food) for the poorer half of the Kagera households and the less-poor half of the Kagera households during the six months when the death occurred. For the better-off households, both measures of food intake increased. The picture is quite different for the poorest 50 percent of the households: food expenditure, which was already lower in these households than in the others, dropped by nearly a third. The resulting drop in per capita food consumption was cushioned by an increase in the consumption of home-produced food (not shown). Even so, per capita consumption in the poorer households fell by 15 percent. Even if these households eventually return almost to the predeath level of per capita food consumption, as did the Ivoirian households, lack of adequate nutrition for a year or more can have a profound effect on the development of children. We turn to this topic.

Figure 4.11 Short-Term Impact of the Death of an Adult Household Member on Food Expenditure and Consumption per Adult Equivalent Member, Kagera, Tanzania, 1991–93



ong households in Kagera, nzania, that suffered a prime-age ult death, food expenditure and nsumption declined for the poorer lf of households but increased for others.

Note: The poorest 50 percent of households are those with less than the median value of assets per member in wave 1 of the survey, which was about $415 per adult equivalent member in 1996 dollars. The sample is 64 households that experienced an adult death between the first and last waves of the Kagera survey.

Source: Over and others, forthcoming.

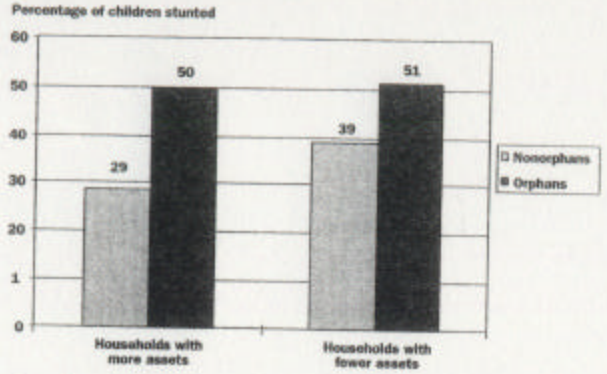
The impact on child nutrition. Childhood malnutrition is potentially one of the most severe and lasting consequences of a prime-age adult death. The death of a parent or other adult may lower the nutritional status of surviving children by reducing household income and food expenditure, and by reducing adult attention to childrearing. Because childhood malnutrition can impede intellectual development and thus reduce a person's long-run productivity, improving childhood nutrition has long been an important development goal. Policymakers seeking to mitigate the impact of the AIDS epidemic will therefore be particularly concerned about minimizing the impact of the increasing number of prime-age adult deaths on childhood nutrition.

The impact of adult death on childhood nutrition is likely to vary according to many factors, not least of which is the nutritional status of children in the overall population. Little information is available on how adult death affects child nutrition. Moreover, the impact is likely to differ across countries and communities. The following discussion of the findings in Kagera illustrates some of the issues that policymakers will want to consider in attempting to mitigate the impact of the epidemic. In this discussion, the term "orphan" is used to indicate a child who has lost one or both parents.

We would expect that the drop in food consumption among the poorer bereaved families described above would result in an increase in malnutrition among children in these households, since these children are likely to be malnourished or at risk of malnutrition before the adult death. As figure 4.12 shows, among the poorer households in Kagera, stunting (very low height for age) among children under 5 is indeed substantially higher for orphans (51 percent) than for children whose parents are both alive (39 percent). What is surprising, however, is that the difference between orphans and nonorphans in the better-off households is even larger; indeed, orphans in the better-off households are stunted at almost the same rate as orphans in the poorer households.

This unexpected result raises difficult operational issues. If orphans in the poorer households were much more likely to be stunted than orphans in the less-poor households, as we might have expected, the policy prescription would be straightforward: to minimize childhood malnutri-

Figure 4.12 Stunting among Orphaned and Nonorphaned Children under 5, by Household Assets, Kagera, Tanzania



Source: Kagera data, authors' calculations.

Kagera, Tanzania, half the children ho had lost one or both parents were unted, regardless of the level of ousehold assets.

tion, focus nutritional assistance on the poor households that suffer a prime-age adult death. Instead we find that, at least in Kagera, half of the children who have lost one or both parents are stunted, *regardless of whether they live in a poorer household or a less-poor household.*

There are several possible explanations for this surprising observation. One is that stunting among both groups of orphans is due in part to pediatric AIDS and to other illnesses that a child may contract from an HIV-infected adult, such as tuberculosis, which would not necessarily be closely linked to household asset levels. Another possible explanation is that some stunted orphans in the households with more assets originally resided in poorer households, and their stunting is a legacy of that earlier poverty. Finally, the fact that stunting is about equal among both groups of orphans suggests that, for this population, stunting of 50 percent may be approaching an upward limit beyond which any additional deterioration in childhood nutrition results in increased child mortality rather then increased stunting. In all three cases, child nutrition could indeed be worse in the poorer bereaved families than in the less-poor bereaved families.

It may also be the case, however, that childhood nutrition does deteriorate sharply after a prime-age adult death, even in households with comparatively high levels of assets. This could happen, for example, if grief and psychological depression in the surviving parent interferes with child-rearing, including obtaining food and providing meals. If this is true, young orphans stand a high probability of being malnourished, irrespective of the economic status of the household in which they are living.

One policy approach that could be appropriate in either case would be to focus nutritional assistance on young children who show evidence of being malnourished or who are likely to be at risk of becoming malnourished (by virtue of losing one or more parents).

There are several advantages to such an approach. First, because the percentage of children under 5 who have lost a parent will be small, even in a generalized epidemic, such a response is likely to be much less costly, and therefore more feasible, than the alternative of providing assistance to all households that suffer a prime-age adult death from AIDS.

Furthermore, because of the long illness that often precedes death from AIDS, it will often be possible to identify young children who will soon be orphans before the mother or father dies and to enroll them in programs to minimize the nutritional impact. In cases where the mother is HIV-positive, this supplemental feeding could perhaps simultaneously reduce the risk of mother-to-child transmission through breast milk.

In addition, programs that provide food directly to malnourished children and to orphans, rather than to households that include orphans, may avoid the problem of households fostering children primarily to obtain benefits intended for the orphans. While creating an incentive for households to foster children may be desirable in a severe AIDS epidemic, too large an incentive can increase the number of children shifted between households, to the detriment of their welfare. A better approach may be to include children in households where a death is anticipated in community-based nutrition monitoring and feeding programs on the model of the UNICEF-sponsored "village feeding posts."

Finally, including orphans in a program designed to address malnutrition more broadly is more equitable than focusing assistance on AIDS orphans alone. This is particularly true in very poor countries, where an alarmingly high proportion of all children are malnourished. In Kagera, for example, even in households that are less poor and have both parents alive, nearly one-third of children are stunted. In such a situation, providing assistance only to AIDS orphans would neglect a large number of children who are also very needy.

The impact on child schooling. Besides increasing childhood malnutrition, a prime-age adult death in a household is likely to reduce school enrollment. This lack of schooling, perhaps exacerbated by inadequate nutrition, will make it particularly difficult for child survivors of a prime-