

Part III

The Impact of AIDS on the Health Sector

Levels and determinants of expenditures on HIV/AIDS in five developing countries

A. Overview

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Section One: Introduction and method

The AIDS epidemic poses enormous challenges to the health systems of developing countries. The magnitude of the epidemic requires medical care and social support for those infected. Yet, the threat of future infections demands an effective preventive programme. And AIDS must compete for resources with acute infectious diseases and the growing burden of chronic diseases.

To inform these decisions, policymakers need data about resource flows for AIDS in their own countries, as well as comparative data and insights from other countries. This study sought to answer the following questions in selected countries:

- What is the level of health sector expenditures related to AIDS, and how are they divided by use of funds (prevention, treatment, and mitigation) and by source of financing (public, private, and donor)?
- How do AIDS expenditures relate to overall health expenditures by use and source of funds?
- What are some of the major determinants of the level and pattern of expenditures and financing?

This study is based on case studies from five developing countries with moderate to severe AIDS epidemics and a range of economic conditions: Brazil (Iunes et al 1998, this volume), Côte d'Ivoire (Koné et al 1998, this volume), Mexico (Izazola et al 1998, this volume), Tanzania (Tibandebage et al 1998, this volume), and Thailand (Kongsin et al 1998, this volume). A common methodology was used across all five case studies. This chapter begins with an overview of the methodology and a comparison of the results across countries and is followed by the detailed case studies themselves.

1.1 Sources of expenditure data

Each case study relied on a combination of objective and subjective information. The study used five sources of expenditure data:

- financial reports of public expenditures or budgets

- country workshops to estimate treatment costs by type of patient
- special health sector analyses (Tanzania only)
- a detailed database of public hospital claims (Brazil only)
- household surveys (Thailand only).

Detailed estimates of expenditures were obtained according to the use of funds (prevention, treatment, and mitigation of the impact of AIDS) and by the source of finance. Where objective information was missing, incomplete, inconsistent, out-of-date, or of questionable accuracy, we consulted informed experts. Except for countries where public sector health expenditure data were available from special studies, public budgets were used to estimate public expenditures.

Total health expenditures and the breakdown among public, private, and donor financing were based on Murray, Govindaraj, and Musgrove (1994), using data for 1990. We extrapolated overall health expenditures to the target year by assuming the same ratio of health expenditure to GDP and the same distribution of expenditure among funders (public, private, and donors) as in 1990. The specific sources of data are described in each case study.

In the time available for this study, Brazilian data on AIDS expenditures could be obtained only for the state of São Paulo, with a population of about 33 million and 54 per cent of Brazil's reported AIDS cases. While data on AIDS cases were available for the state, other economic and expenditure data had to be inferred from national information. According to the United Nations Development Programme, the state's 1991 income per capita was 72 per cent higher than income per capita in Brazil as a whole. We assumed that the same ratio applied to per capita GNP and GDP. We also assumed that the national share of GDP spent on health reported in Murray et al (1994) also applied to the state. These assumptions provided the basis for estimating private health expenditures in São Paulo state.

1.2 Expenditure by use and source of finance

Preventive expenditures were expenditures primarily intended to prevent new HIV infections. They include information, education, and communication about HIV; promotion, purchase, and social marketing of condoms through AIDS control programmes; testing and screening for HIV of persons without HIV symptoms; and screening of blood for transfusions. Expenditures undertaken for another purpose were not counted as HIV prevention, even though they may contribute indirectly to preventing HIV transmission. For example, condom promotion for purposes of family planning, or treatment of sexually transmitted diseases (other than HIV) for the purpose of treating and controlling those conditions, or programmes to empower women generally to resist unwanted sex were not counted in HIV prevention. Treatment expenditures are designed to care for persons with HIV. They include expenditures not only on Western medical care but also, insofar as possible, expenditures on traditional medicine.

Mitigation efforts, such as aid to orphans whose parents died of AIDS, proved hard to measure systematically in this study. Most assistance was provided by small NGOs that did not report to any government entity. Some of these efforts are detailed in the individual case studies. For the purposes of this overview, we focus on expenditure for prevention and treatment.

1.3 Delphi estimates

The study consulted groups of experts in each country to estimate the treatment costs for AIDS patients. In Côte d'Ivoire, Mexico, and Tanzania, the estimates were obtained in a workshop of care providers (doctors, nurses, and traditional practitioners) from both urban and rural areas. In Brazil and Thailand, experts were interviewed individually. Interviewees estimated the number of visits, prescriptions, hospital use, and costs for AIDS for each of several categories of public and private patients. Where possible, the estimates were checked against independent objective sources (e.g., against public sector expenditures for hospital care).

Costs were estimated for patients attending public and private health care in rural and in urban areas. Where clinical experts did not have reliable information on unit costs of services, information on quantities of services were merged with information on unit costs from other sources to estimate expenditures. To illustrate this process, table 1 shows an excerpt of the questions used and results obtained in Côte d'Ivoire.

To estimate treatment costs, we multiplied a lifetime cost per patient times the number of patients of each type. The number of patients were estimated from a three-step process:

- 1 The number of officially reported AIDS cases was obtained.
- 2 These figures were adjusted by an expansion factor to correct for under-reporting. The expansion factor is often derived from analysis of deaths during a historical period. Increases in deaths from conditions

Table 1. Workshop estimate of lifetime treatment per 'other (non-insured) Abidjan patient'

Component of treatment	Unit	Workshop participant				Average
		A	B	C	D	
Consultations with generalist physician	Visits	10	10	10	5	8.8
Consultations with specialist physician	Visits	2	1	1	0	1.0
Days with ambulatory care	Days	20	5	5	5	8.8
Nights in a hospital	Nights	15	15	20	15	16.3
Nights in other health facilities	Nights	5	3	2	3	3.3

that may be complications of AIDS represent true numbers, while declared cases are the reported numbers.

3 The estimated totals were allocated among types of patients using expert opinion and information about how underreporting varies by location.

In Côte d'Ivoire and Thailand, for example, the number of reported cases was only about a seventh of the epidemiologically estimated total. Demographic projections also provided a basis for estimating AIDS cases. It can be assumed, on average, that each patient who died of AIDS would have met the diagnostic criteria a year earlier.

As AIDS surveillance largely comes from public sector hospitals, reported cases likely received medical care. Cases may go unreported because their data were not recorded by busy providers, were lost, or invalid or, more commonly, because they were treated outside of the public health care sector or not treated at all. Workshop participants and other informants were asked to extrapolate for missing data. Data were assembled for the single most complete year – 1994 or 1995.

1.4 Validation of estimates

Since the number of AIDS cases is a sensitive issue, this study attempted to validate and adjust estimates derived from one source with information from another independent source whenever possible – a process termed 'triangulation.'

For example, in estimating public sector hospital expenditures on AIDS treatment in Côte d'Ivoire, we estimated the total number of days of hospital care received by AIDS patients based on the country workshop. We then compared this with the total number of occupied hospital bed days, obtained from the country's health information system. From this we calculated that 21 per cent of occupied hospital beds were filled with HIV or AIDS patients. Given a national seroprevalence rate of about 5 per cent, this share seemed reasonable to national officials. Similarly, providers' estimates about the cost of a service can be verified from the expenditures of that service. In Tanzania, for example, donors corroborated providers' estimates of the costs of protecting the blood supply.

1.5 Adjustment for purchasing power parity

Most international economic comparisons seek to standardise for differences among countries by converting all amounts into a single, convertible currency, often US dollars. The conversion is usually based on the average midyear market exchange rate for the year of the conversion. The market exchange rate is governed only by traded goods and services – generally a small share of economic output.

To adjust for international differences in purchasing power, economists have created the concept of gross national product (GNP) per capita in 'international dollars' – that is, adjusted for purchasing power parity (PPP). An

international dollar buys the same amount of GNP in another country as one US dollar buys in the United States. The World Bank (1996) has computed GNP per capita for all five countries used in these case studies in both international dollars and US dollars (at market exchange rates).

Because wage rates are generally lower in developing countries than in industrialised countries, many domestic prices tend to be lower than those in the United States. PPP-adjusted GNP per capita is therefore substantially higher than in US dollars. Generally, the poorer the country, the greater the discrepancy between the two measures of GNP. Thus, among the five countries in this study, the difference is most dramatic for Tanzania: its 1994 GNP per capita in international dollars (\$620) is 4.42 times the amount in US dollars (\$140).

To improve international comparability in this Overview, we expressed all of our salient measures – expenditures on AIDS, all health expenditures, GNP, and GDP – in international dollars. The conversion was based on a four-step process:

- We summarized the most recent AIDS expenditures for each country into a 3 x 3 matrix of sources by uses expressed in the currency in which the data were compiled. Côte d'Ivoire, Tanzania, and Thailand used local currency (CFA francs [FCFA], Tanzania shillings, and Thai baht, respectively), while Brazil and Mexico used US dollars at market exchange rates because of high inflation rates.
- Local currencies were converted to US dollars at the current market exchange rates for the year for which the data were compiled.
- Amounts were converted from US to international dollars by multiplying by the country's purchasing power parity ratio for 1994 – the ratio of its per capita GNP in international dollars to its GNP in US dollars – based on World Bank (1996) data. As the 1994 entries were the latest data and were generally based on regression estimates, it was plausible that these ratios would apply to 1993 or 1995 as well.
- Amounts per capita in international dollars were calculated by dividing each country's total by its estimated population, generally for 1994 (World Bank 1996). They were extrapolated to the needed year based on the compound annual growth rate.

Section Two: Results

2.1 Total AIDS expenditure

Table 2 shows AIDS and health expenditures per capita by source and use of funds, in international dollars. Countries are ordered from lowest to highest PPP-adjusted per capita GNP.¹ Total public and private expenditure per capita ranges from \$1.48 to \$8.69, with an unweighted average of \$4.36. Levels of spending are determined by several factors.

- A country's public and private ability to pay for curative and preventive care and the sophistication and costliness of its health system. This can be proxied by GNP per capita. The state of São Paulo, Brazil, with the

highest per capita GNP, also has the highest AIDS expenditures per capita. With the exception of Mexico (where the incidence of AIDS is lowest), public funding per capita rises steadily with per capita GNP.

- The incidence of AIDS, which affects the costs of curative care. Since a person with AIDS lives for about a year in many developing countries, the number of new AIDS cases per year (incidence) approximates the number of people alive with AIDS. Variations in incidence explain why Tanzania, with the highest incidence rate (14.3 per 100,000), has moderately high expenditures despite having the lowest GNP per capita, while Mexico, with the lowest incidence, also has the lowest expenditures despite the second highest GNP per capita.
- Political factors within the country and the donor community. Tanzania's egalitarian ideals and relatively honest administration have long earned respect from the international donor community and helped the country gain donor funding for its AIDS control programme. Thailand's openness in addressing AIDS through its National AIDS Task Force, chaired by the prime minister, has also generated relatively high donor support.

Table 2. AIDS and health expenditure for five countries^a

	Tanzania	Côte d'Ivoire	Thailand	Mexico	São Paulo state, Brazil	Average
	\$ (%)	\$ (%)	\$ (%)	\$ (%)	\$ (%)	\$ (%)
Total AIDS expenditure per capita	3.73 (100)	3.18 (100)	4.76 (100)	1.48 (100)	8.69 (100)	4.37 (100)
<i>By source of funds</i>						
Public	0.20 (5)	1.34 (42)	3.45 (72)	0.76 (52)	5.78 (67)	2.31 (48)
Private	0.40 (11)	1.69 (53)	0.76 (16)	0.70 (47)	2.65 (31)	1.24 (31)
Donor	3.12 (84)	0.16 (5)	0.56 (12)	0.02 (1)	0.26 (3)	0.82 (21)
<i>By use of funds</i>						
Preventive	3.13 (85)	0.23 (7)	3.07 (64)	0.55 (37)	1.32 (15)	1.66 (42)
Treatment	0.54 (15)	2.94 (92)	1.69 (36)	0.92 (62)	7.37 (85)	2.70 (58)
Public AIDS expenditure per capita						
<i>By use of funds</i>						
Prevention	0.05 (25)	0.08 (6)	2.51 (73)	0.31 (41)	0.18 (3)	0.63 (30)
Treatment	0.15 (75)	1.25 (94)	0.94 (27)	0.45 (59)	5.60 (97)	1.68 (70)

	Tanzania	Côte d'Ivoire	Thailand	Mexico	São Paulo state, Brazil	Average
Total health expenditure per capita (\$)	28	48	310	157	417	155.31
AIDS as % of health expenditure						
Public expenditure	3.1	5.7	5.4	1.9	2.6	3.8
Total expenditure	13.3	6.7	1.5	1.8	2.1	5.1
Health expenditure as % of GNP	4.50	3.49	4.45	2.17	4.50	3.82
Other data						
GNP/capita	620	1,370	6,970	7,040	9,310	5,062
Population (millions)	28	14	58	90	33	45
Adult HIV prevalence (%)	6.40	6.80	2.10	0.40	0.75	3.29
AIDS incidence						
<i>Number of cases</i>	40,000	18,000	39,000	6,000	8,802	22,360
<i>Rate per 100,000</i>	143	126	67	6.7	27	50

Note: Sums may not total due to rounding.

a. All expenditures and GNP/capita are in 1993–95 international dollars.

Source: AIDS and health expenditure estimates, authors' calculations (see text); GNP/capita in international dollars and population, World Bank (1996); adult HIV prevalence, World Bank (1997); AIDS incidence, country case studies (number of cases) and authors' calculations (rate per 100,000).

2.2 Total AIDS expenditure by source of funding

Donor funding is by far the largest share of resources in Tanzania (84 per cent); in the other countries, international donors fund no more than 12 per cent of total AIDS expenditures. On average, donors finance (counting each of the five countries equally) 21 per cent of AIDS expenditures, or \$0.82 per capita.

The importance of donor funding outstrips its monetary value. It is insulated from domestic political pressures by patients and providers to spend more on curative care. Further, it can play a catalytic role, showing the effectiveness of prevention and sparking contributions from other sources of funding.

2.3 Total AIDS expenditure by use of funds

The highest share of total (public and private) expenditure on prevention is in Tanzania (85 per cent), followed by Thailand (64 per cent). In contrast, prevention is only 15 per cent of total AIDS expenditure in São Paulo state and 7 per cent in Côte d'Ivoire. One reason for these large differences is the contribution of private expenditure: governments control public expenditures directly, whereas governments influence private expenditures only indirectly. In Côte d'Ivoire, Mexico, and São Paulo state, where the share of total AIDS expenditure for prevention is lowest, private expenditure on AIDS is highest.

2.4 Public AIDS expenditure by use of funds

Both the public goods aspect of AIDS prevention and the high cost-effectiveness of prevention, compared with AIDS treatment, suggest that the priority for government expenditure is prevention. When the share of *public* funding devoted to prevention is analyzed separately, Thailand stands out, with nearly three-quarters of public funds devoted to prevention, or \$2.31 per capita. Mexico spends 41 per cent of public AIDS funds on prevention, but overall expenditure is very low. Further, in Thailand most prevention expenditure is from domestic sources, indicating a high political commitment to prevention. In contrast, in Tanzania most funding of prevention in Tanzania is from donors.

Broomberg (1996) estimated the worldwide cost in all developing countries of a comprehensive programme of AIDS prevention. Although some private or donor funding could be used (particularly for blood supply and STD treatment), public funding would be needed as the primary source of finance. The need for public or donor funding arises because many preventive services are public goods (e.g., information, education, and communication) or have positive externalities (e.g., social marketing of condoms). As continued donor funding depends on the salience of AIDS in relation to other development problems and on the priority of a specific country to the donors' worldwide interests, public funding is often more stable than donor funding.

The estimated cost of worldwide prevention, according to Broomberg, would range from US\$1.48 billion to US\$2.17 billion (at market exchange rates), or \$0.63 to \$0.93 in international dollars per person when spread over the worldwide population of 4.689 billion people. By this standard, only Thailand has adequate public spending on prevention, and only Tanzania, Thailand, and São Paulo state have adequate total spending on prevention. The composition of prevention expenditure (not shown here) is also important. For example, the level of spending on prevention in Mexico – total and public – falls below Broomberg's estimated needs, and almost all preventive expenditures in that country were spent on blood safety and worker testing, which will not prevent as many cases of HIV as would other preventive programmes, like condom distribution.

2.5 The cost per case for AIDS treatment

Treatment expenditure per capita is the product of AIDS incidence times the lifetime cost per case. In table 3, we calculate the cost of treatment per case and express it as a multiple of per capita GNP (both in international dollars). The cost per case ranged from 0.4 (in Thailand) to 3.0 (in São Paulo state) times per capita GNP, with a mean of 1.5. The low estimate from Thailand occurs because many AIDS patients were thought not to receive treatment, whereas the high estimate in São Paulo state is due to a system of universal curative health insurance that provides good financial access to publicly financed care in both public and private health facilities.

Table 3. Cost of treatment per AIDS case

	Tanzania	Côte d'Ivoire	Thailand	Mexico	São Paulo state, Brazil	Average
Cost per case in international \$	414	2,335	2,516	13,868	27,639	9,354
As a multiple of GNP per capita	0.7	1.7	0.4	2.0	3.0	1.5

Source: Authors' calculations, converted to international dollars and multiples of GNP per capita using World Bank (1996) data.

Because control of infectious diseases is usually regarded as a public good, AIDS treatment has received public subsidies. At least two of the countries – Côte d'Ivoire and Thailand – provide special subsidies for AIDS treatment. On more careful scrutiny, however, the rationale for public subsidy fails. The infectious disease rationale would argue for treatment of curable STDs, which eliminates the possibility of transmission among those who are most sexually active. AIDS, on the other hand, cannot be cured. Further, by the time an AIDS patient needs hospital care, he/she may have very few sexual partners due to declining health and the impact of prevention messages. Thus, treatment for AIDS is likely to have a negligible effect on HIV transmission in the population.

2.6 AIDS as a share of total health expenditures

The share of total health expenditures consumed by AIDS is highest in Tanzania (13 per cent) and Côte d'Ivoire (7 per cent), due to their high incidence of AIDS and relatively low health expenditures. Thailand, which had the second highest AIDS expenditures per capita and per case, also has the lowest share of health expenditures devoted to AIDS (1.5 per cent). AIDS expenditures are estimated to be about 2 per cent of health expenditure in São Paulo state, Brazil, where per capita expenditures are highest. Note, however, that these data date from the

period before the Brazilian government undertook to finance triple-drug antiretroviral therapy for AIDS patients, and the share has most probably increased (see the discussion below). On average, 5 per cent of total health expenditures are devoted to AIDS in the five countries.

The share of *public* health expenditures devoted to AIDS averages 3.8 per cent. The shares of public and total expenditures devoted to AIDS differ by more than 1 percentage point only for Tanzania and Thailand. In Tanzania, the share of public expenditures on AIDS is much lower because of substantial donor funding for AIDS prevention. In Thailand, the share of prevention in public funds is larger because Thailand's extensive prevention programme is predominantly funded from public sources.

Section Three: Public policies for subsidies of AIDS treatment

The World Bank (1997) argues that 'the prudent, efficient, and equitable course' is to subsidise treatment of AIDS to the same extent as curative health services generally. This policy would avoid discrimination against persons with AIDS and also against people with other diseases. In fact, subsidy rates vary substantially across countries.

Figure 1 compares the share of AIDS treatment expenditures that are publicly financed to the share of overall curative health expenditures that were publicly financed as of 1987. For example, in Tanzania, only 26 per cent of AIDS treatment is publicly financed, compared to 31 per cent of all treatment expenditures.²

The extent of public subsidies for AIDS treatment in these five countries generally increases with per capita GDP. In three of the countries (Côte d'Ivoire, Mexico, and Tanzania), AIDS treatment receives less public subsidy than curative health care overall. On the other hand, São Paulo state and Thailand provide a greater public subsidy for AIDS treatment than for other curative care. The variation in subsidies reflects the interaction of AIDS policies, the country's health financing strategy, and the stage of the epidemic.

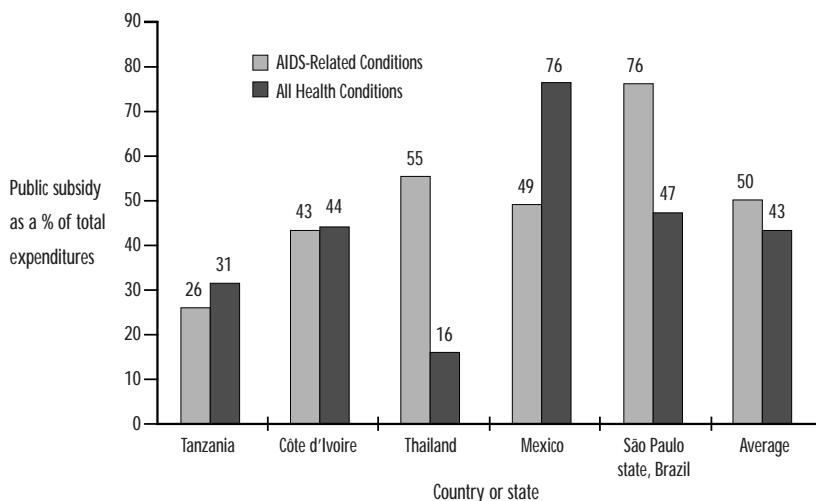
Tanzania

With a high adult HIV prevalence rate (6.4 per cent), Tanzania offers no special treatment programmes for AIDS patients. Moreover, as the country has only two major teaching hospitals, opportunities for sophisticated treatment are extremely limited.

Côte d'Ivoire

Two opposing forces operate. A factor favoring greater public subsidy is the fact that the Ministry of Health extended the special public health status of infectious diseases to AIDS treatment. Although most patients must pay fees at teaching hospitals amounting to about a quarter of their costs, AIDS patients are admitted to the national infectious diseases unit free of charge. Located in

Figure 1. The per cent of AIDS treatment and all curative health expenditure that is publicly financed



the largest of the teaching hospitals in the country's capital, it provides the most sophisticated hospital treatment available free of charge. On the other hand, active private financing tends to reduce the public share in Côte d'Ivoire. Several nongovernmental organisations (NGOs), the private sector, and traditional medicine all treat significant numbers of AIDS patients.

Thailand

The government's policy of financing antiretroviral therapy and the admission of AIDS patients to heavily subsidised infectious disease hospitals substantially raised public expenditures on AIDS relative to other conditions. More recent data, not reflected in this study, shows that public expenditures for antiretroviral drugs have continued to rise through 1996. In 1997, the Ministry of Health reviewed its policies toward payment for this therapy. AZT is being made available to pregnant women, where a recent trial confirmed that even a very limited dose can reduce perinatal HIV transmission by 51 per cent (Bhatiasevi 1998). Subsidised antiretroviral drugs will also be made available under appropriate clinical protocols to poor patients. The AIDS programme had found that the costs of unmonitored distribution of AZT and other antiretroviral drugs was rising rapidly as more and more patients initiated treatment. As the drug was being administered, it appeared to confer little benefit on the patients involved. As patients traveled between their homes and rural areas and sometimes sought to avoid being identified as AIDS patients, their treatment was often too sporadic to be effective. While the new policy is expected to reduce these losses, antiretroviral treatment for populations other than pregnant women remains expensive and problematic.

Mexico

The majority of curative expenditures are made by the largely publicly funded social security system. As many employers screen for HIV and try to avoid hiring or to terminate persons with AIDS, infected workers are reluctant to disclose their status through employer-sponsored treatment. Proximity to the United States has fueled demand for the latest antiretroviral drugs. As public sources cannot provide these drugs, patients must rely on donations and private purchases, thereby reducing the public share. These potentially discriminatory factors tend to lower public subsidy for AIDS care compared to that for curative care overall.

São Paulo state

Brazil has a universal health insurance system that facilitates access to curative services for all types of hospital care. Thus, São Paulo state's share of publicly financed treatment expenditures is higher than the five-country average and higher than for health care generally. Private insurers try to deny coverage of AIDS care, and private hospitals do not feel adequately paid for admitting AIDS patients, so most are treated at public hospitals, where the government subsidises antiretroviral drugs.

These expenditure patterns demonstrate some of the consequences of public provision of antiretroviral therapy. Among the five countries, both Brazil's São Paulo state and Thailand have policies that offer substantially higher subsidies for AIDS treatment than for health services overall. And public subsidies for AIDS treatment are likely to be even higher in the future in both countries. Brazil expanded the public provision of antiretroviral drugs in 1997 in response to political pressures. Actual expenditure surpassed the original estimates midway through the year, requiring supplemental funds. In 1998, antiretroviral therapy will represent a striking 4 per cent of the budget of the Ministry of Health. On the other hand, Thailand also has the highest share of the public AIDS expenditure devoted to prevention. While its policy on antiretroviral drugs should promote more rational use, the growing number of AIDS patients will inevitably raise costs.

Notes

- 1 The countries would also rank in the same order in GNP per capita in US dollars.
- 2 Because of a number of refinements, the results in figure 1 differ somewhat from earlier data used to generate figure 4.5 in World Bank (1997). However, the main pattern of subsidies across AIDS treatment and other curative care remains the same.

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