

Country response to HIV/AIDS: National Health Accounts on HIV/AIDS in Brazil, Guatemala, Honduras, Mexico and Uruguay

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National expenditures on HIV/AIDS were estimated as summary indicators to assess the country's response to HIV/AIDS. The methodology is based on a matrix system describing the level and flow of health expenditures on HIV/AIDS: an adaptation of the National Health Accounts methods. The expenditures were classified by source (public, private, international), by the use of funds (prevention, care), by object, and by type of provider institution. The results are reported in US\$ using the official exchange rate for the year of estimation. For international comparisons monetary units were adjusted by the purchasing power parity (US\$PPP). National HIV/AIDS total expenditures were: Guatemala US\$PPP29.5 million, Uruguay US\$PPP32.5 million, Mexico US\$PPP257 million, and Brazil US\$PPP587.4 million during 1998, and Honduras US\$PPP33.9 million for 1999. The total HIV/AIDS expenditures per capita for 1998 were: Brazil US\$2.69, Mexico US\$1.25, Guatemala US\$1.08, Uruguay US\$6.63, and Honduras US\$3.6 for 1999. The 1998 distribution of the total HIV/AIDS expenditures in prevention and care were, respectively, Brazil 10 and 80%, Guatemala 15 and 70%, Mexico 29 and 66%, Uruguay 36 and 51%, and Honduras 28 and 65% for 1999. The share of total expenditures on antiretroviral drugs ranged from 52% in Guatemala to 75% in Brazil, even when the estimated coverage of antiretroviral therapy was close to 10% in Guatemala and universal in Brazil. The estimated flow from international sources per capita in 1998 was Uruguay US\$0.03, Brazil US\$0.24, Guatemala US\$0.11, Mexico US\$0.01, and Honduras US\$1.04 in 1999. The data allow international comparisons and provide critical information to improve equity and efficiency in the allocation of scarce resources. The National HIV/AIDS Accounts also constitute a powerful tool to describe the country's response to HIV/AIDS.

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Introduction

A common response to HIV/AIDS is the struggle to obtain economic resources that are sufficient, opportune, properly directed to the most efficacious interventions, and provide an adequate response to peoples' needs for prevention and care. The Joint United Nations Programme on AIDS, following its particular mandate to increase the flow of resources from international donors and domestic expenditures in the fight against AIDS, devoted efforts to describe the flow of resources between international donors to recipient countries [1]. Other studies have also attempted to estimate the economic impact of AIDS from a social perspective, by measuring the losses of lifetime earnings among the population mostly affected by AIDS [2,3]; and a few others have focused on evaluations of the cost-effectiveness and benefits of specific programme interventions [4–10].

A recently published modelling exercise estimated the basic amount of resources needed to confront the HIV/AIDS epidemic efficiently in the developing world. The authors projected US\$9250 million annually as the minimum global fund needed immediately to curb the HIV/AIDS epidemic by 2005; for Latin American and Caribbean (LAC) countries US\$590 million was needed annually for prevention and US\$550 million for care [11].

As part of several technical assistance projects conducted worldwide, developing countries have been urged to draft strategic plans to confront HIV/AIDS. These plans naturally require an initial assessment of the current response to the epidemic and a continuous evaluation of the implementation process, results and achievements [12]. On the other hand, and mainly as a result of initiatives for reforming healthcare systems worldwide, several tools for helping decision-makers have been developed, for example, the National Health Accounts (NHA), which systematically measure the resources and flows from the original sources of funds, the economic agents and providers of services, for care and prevention [13–17]. The use of this tool can be adapted to the in-depth study of expenditure on specific diseases [18], such as HIV/AIDS and other catastrophic diseases because of their economic impact on the households of the non-insured ill.

Therefore, the purpose of the National HIV/AIDS Accounts is to quantify all expenditures on HIV/AIDS using NHA methodology. This accounting system provides information aimed at decision-making and more efficient resource allocation; it quantifies the sector economic impact of the HIV/AIDS epidemic on the health system and constitutes an adequate assessment of countries' financial responses to confront HIV/AIDS [19]. The objective of this report is to

describe the levels and flows of expenditures on HIV/AIDS in five Latin American countries in 1997–1999.

Methods

The National HIV/AIDS Accounts consist of a systematic, periodic and exhaustive accounting of health expenditures and financing flows related to activities on HIV/AIDS, using the already validated NHA methodology [20–24]. The sources of financing are the economic institutions or agents that provide the resources to prevent HIV infection and care for those affected by HIV or AIDS. The expenditure level is measured on annual bases and is grouped in three levels: from resources of financing, through the funds or financing agents, to the institutions managing the resources.

The level of expenditures is estimated utilizing secondary sources of information, official reports, and by conducting specific surveys. Information available usually allows an estimate to be made of public expenditure, whereas private expenditure estimation is usually complemented with surveys. Private expenditure includes institutional contributions and household expenditures on drugs, the expenditure of additional companies on social security in health services for its employees, private health insurance and out-of-pocket expenses.

There are five matrices to concentrate the estimation of financial flows and expenditures. The same approach is used for HIV/AIDS as when estimating health accounts: (i) from the source of financing to the funds; (ii) from the funds or financing agents to the provider institutions; (iii) from the provider institutions by the type of service; (iv) by the category of expenditure and provider institution; and (v) by the category of expenditure and type of service.

The source of financing (government, social security, households, external cooperation) refers to those entities that contribute with financial resources to the prevention, diagnosis, and management of HIV/AIDS. The financing agents (government, households) are entities that concentrate and arrange the resources, and the provider institutions use the resources in generating services to the population. The funds from external sources are classified according to their status as reimbursable or non-reimbursable resources, i.e. reimbursable funds, such as loans, are considered domestic resources, whereas donations or contracts are considered external resources.

Flow from sources to financing agents

This matrix registers the origin and amount of the

contribution of each source of financing as well as the destination of these resources towards the financing agents. The sources of financing of the sector identified are households, companies, government agencies, domestic and international non-governmental organizations (NGO). In order to fill in the matrix, the expenditures are disaggregated according to the source of financing in private (households and companies) and public (governmental or public social security).

Resources from agents to provider institutions

This matrix registers the flow of resources of each of the financial agents towards the institution that delivers the service. Service providers and financing agents constitute the dimension of this matrix, financing agents include the social security system and public and private agents. Each transfer should be quantified in order to establish the profile of the public-private, public-public or private-private mix of each institution.

Institutional expenditures according to type of service

The matrix presents the breakdown of expenditures performed by each service provider institution in each programme. Similar to estimating NHA, the first step is to identify all the programmes and institutions that carry out health activities on HIV/AIDS. The dimension of the matrix is that each institution must share a generic name: public services for insured individuals (social security services); public services for uninsured individuals (public services); and private healthcare services.

Provider institution by type of expenditure

The dimension of the matrix is formed by the same service provider institutions described above as well as by the classification as an objective of expenditure, such as personal services, materials and supplies, general services, etc.

Expenditure by programme according to type of expenditure

The total expenditure must be consistent throughout all the matrices, and the distribution of total expenditure will change in each matrix. Frequently, the services that have registries lack data on expenditure; the principal effort consists of carrying out the collection of existing data. HIV/AIDS expenditures may or may not be classified as health expenditures according to their nature, but are included in the total [25].

Monetary units

For comparative purposes the financial flows and the expenditures were analysed in current US dollars, as well as their adjusted value as a result of purchasing power parity (PPP) according to standard methods set by the World Bank Development Reports. The adjust-

ment caused by PPP provides monetary units of international US dollars, i.e. adjusting for differentials in inflation and exchange rates; in other words, adjusting for the cost of living in each country. The results for the estimations for Brazil, Guatemala and Mexico are for 1997 and 1998; the results for Uruguay are for 1998 and those for Honduras are for 1999. Emphasis was placed on the comparison across countries; more in-depth results of each country project might be found in the published final reports for each country and year [26-30].

Data analysis

The data analysis is descriptive, allowing the identification of flows of resources as well as of the major actors of the national response towards HIV/AIDS, by means of the identification of the major providers of services, for example social security institutions. To analyse the financial response to HIV/AIDS and evaluate the patterns of expenditures critically, we combined the final figures with other economic, demographic, and epidemiological data, in order to build useful and complex indicators for decision making.

Results

Total national HIV/AIDS expenditures estimated for the year 1998 were US\$PPP29.5 million in Guatemala, US\$PPP32.5 million in Uruguay, US\$PPP257 million in Mexico, and US\$PPP587.4 million in Brazil, and for the year 1999 US\$PPP33.9 million in Honduras. All the results were interpreted in the context of the demographic and epidemiological situation in the country. Table 1 shows that the health investment varies widely across the five countries under study, and presents demographic, epidemiological and economic data, per capita expenditure on HIV/AIDS crude and adjusted by PPP, and the relative distribution of the health expenditure allocated to HIV/AIDS [31-33].

Expenditure on care and prevention

The expenditures allocated to personal healthcare services represented the majority of the expenditures in each country, as opposed to prevention; averaging 66% in the estimations of the five countries across the period of study (Table 2). Conversely, expenditures on preventative services averaged less than 40% (Table 3). Other expenditures were devoted, for example, to institutional development, advocacy or mitigation. Administration costs were divided into their share attributable to institutional expenditures, or were included within the prevention and care estimates.

Uruguay had the highest unadjusted per capita expenditure, but after adjusting for PPP it ranked second to Honduras. The largest share of Uruguay's expenditures

Table 1. Background demographic, economic and epidemiological information and national expenditure on HIV/AIDS in Brazil, Guatemala, Honduras, Mexico and Uruguay.

	Brazil		Guatemala		Mexico		Uruguay	Honduras
	1997 ^a	1998	1997	1998	1997	1998	1998	1999
Population (million)	160	162	11	11	95	96	3	6
GNP (billion US\$)	807.8 ^b	787.5 ^b	16.8	17.7	348.6	380.9	20.3	4.4
GNP (billion US\$PPP) ^c	1019.9	1021.4	43.1	44	770.3	785.8	31.2	13.0
GNP per capita (US\$)	4720	4570	1500	1640	3680	3970	6180	760
GNP per capita (US\$PPP)	6240	6160	3840	4070	8120	8190	9480	2254
Cumulative AIDS cases by end of year ^d	153 570 ^e	177 200	2168	2510	19 398	22 358	1014	10 626
Total health expenditure per capita (US\$) ^f	–	309	–	78	–	202	621	74
Total health expenditure per capita (US\$PPP) ^f	–	453	–	155	–	371	823	210
Total health expenditure as percentage of GDP (%)	6.6%	6.3%	–	4.4%	–	4.7%	9.1%	8.6%
Public health expenditure as percentage of GDP (%)	2.9%	2.7%	–	2.1%	–	2.8%	1.9%	3.9%
Total expenditure on HIV/AIDS (million US\$)	339.6 ^a	435.8	5.9	11.9	89.7	124.6	21.2	22.1
Total expenditure on HIV/AIDS (million US\$PPP)	448.9 ^a	587.4	15.1	29.5	197.9	257.0	32.5	33.9
HIV/AIDS expenditure/health expenditure (%)	–	0.87%	–	1.38%	–	0.62%	1.06%	4.86 %
HIV/AIDS expenditure per capita (US\$)	2.07 ^a	2.69	0.53	1.08	0.94	1.25	6.63	3.6
HIV/AIDS expenditure per capita (US\$PPP)	2.73 ^a	3.62	1.35	2.68	2.07	2.57	10.17	11.29
Percentage of HIV/AIDS expenditures in care	73%	81%	63%	70%	55%	66%	51%	69%
Percentage of HIV/AIDS expenditures in prevention	13%	10%	25%	15%	38%	29%	36%	29%
HIV/AIDS funds from external sources (US\$000s)	Not estimated ^g	Not estimated ^g	543	1226	1700	1900	96	6913
Percentage of HIV/AIDS funds from external sources	1.5% ^g	1.1% ^g	9.1%	10.3%	1.9%	1.5%	0.5%	28.4%

GDP, Gross domestic profit; GNP, gross national profit.

^aEstimated expenditures for Brazil are only of direct government expenditures.

^bInstituto de Pesquisa Economica (IPEA) [31].

^cPurchasing power parity (PPP) based on the World Bank development reports for each year.

^dBoletín de Vigilancia del SIDA en las Américas [32].

^eMinisterio da Saude [33].

^fHealth expenditures are for 1998 or the closest estimate. World development indicators; Health expenditure and use; Health nutrition and population. http://www.worldbank.org/data/wdi2001/pdfs/tab2_15.pdf. Accessed 29 November 2001.

^gThe Brazilian team did not estimate the external non-reimbursable funds for Brazil in 1997 and 1998. Another study by J Rojas, unpublished, estimated an average of US\$24 million non-reimbursable flow from bilateral and multilateral sources per year, or approximately 7 and 5.5% per year in 1997 and 1998, respectively. The World Bank loan was considered as a domestic fund because it was reimbursable.

(62%) was devoted to care, which is not surprising as a result of their policy of universal access to antiretroviral drugs (ARV). Uruguay's expenditure was executed mainly by private health providers (56%) and by direct government (43%), which is consistent with the operations mechanism of its health system and the overall investment in health. The change in ranking after adjusting by PPP to the second position is consistent with the high prices Uruguay pays for technological inputs and in general with a higher cost of living.

Honduras had the highest per capita expenditure after adjusting by PPP, partly explained by a larger number

of AIDS cases and significant international financial cooperation. In contrast to Uruguay and Brazil, where AIDS patients have universal access to ARV, in Honduras the access to ARV was minimal. Most of the provision of care was palliative, including hospitalization and ambulatory care mainly by private health providers (63%), and to a minor extent by public providers (27%) and NGO (10%). In Honduras, ARV were not provided using public resources; the provision of ARV through private sector agents represented 7% of the out-of-pocket expenditures used obtaining services from private for-profit providers; the provision of ARV accounted for the totality of NGO expenditures in care.

Table 2. HIV/AIDS care estimated expenditures by type of service and provider institution in Brazil, Guatemala, Honduras, Mexico and Uruguay (in US\$000s).

Curative services	Provided by public sector				Provided by private sector ^a			
	Social security		Direct government		For profit		NGO	
Brazil	1997	1998	1997	1998	1997	1998	1997	1998
Hospitalization	n/a	n/a	17 251	17 275	2597	2347	0	0
Ambulatory care	n/a	n/a	0	0	0	0	0	0
Antiretroviral drugs	n/a	n/a	167 837	260 339	0	0	0	0
Other expenditures	n/a	n/a	11 481	13 935	0	0	0	0
Total (US\$)	n/a	n/a	196 569	291 549	2597	2347	0	0
Total (US\$PPP)	n/a	n/a	259 871	392 985	3433	3163	0	0
Guatemala	1997	1998	1997	1998	1997	1998	1997	1998
Hospitalization	1491	2619	860	974	58	131	0	0
Ambulatory care	24	32	12	30	0	0	53	65
Antiretroviral drugs	29	2916	175	248	292	583	758	758
Other expenditures	147	179	297	1066	0	0	226	360
Total (US\$)	1682	5746	1345	2318	350	714	1037	1183
Total (US\$PPP)	4305	14 259	3443	5752	896	1772	2655	2936
Mexico	1997	1998	1997	1998	1997	1998	1997	1998
Hospitalization	5900	7000	400	300	800	500	200	200
Ambulatory care	7000	7400	2000	2400	400	1000	600	200
Antiretroviral drugs	8200	38 300	5200	5400	2800	3000	100	400
Other expenditures	8600	9000	1200	1200	300	300	0	0
Total (US\$)	29 700	61 700	8800	9300	4300	4800	900	800
Total (US\$PPP)	65 534	127 285	19 417	19 186	9488	9902	1986	1650
Uruguay		1998		1998		1998		1998
Hospitalization		65		4708		6028		0
Ambulatory care		11		969		1239		0
Antiretroviral drugs (included above)		n/a		n/a		n/a		n/a
Other expenditures		0		20		0		9
Total (US\$)		76		5697		7267		9
Total (US\$PPP)		117		8739		11 147		14
Honduras		1999		1999		1999		1999
Hospitalization		110.4		2837		3467.5		0
Ambulatory care		73.4		277.6		2285.9		0
Antiretroviral drugs		0		0		1608		1220
Other expenditures		50.6		0		563.4		0
Total (US\$)		234		3115		7925		1220
Total (US\$PPP)		695		9237		23 503		3619

PPP, Purchasing power parity; n/a, not available.

^aThese expenditures are paid for by out-of-pocket expenditures, pre-paid health plans or private insurance when using for-profit private providers (i.e. physicians office, hospitals, etc.), and when using non-governmental organization (NGO) services they usually are paid as out-of-pocket expenditures or subsidized by the NGO.

As might be expected, the largest bulk of the expenditures by far was for ARV. The category labelled 'other' included research, infrastructure and managerial expenditures.

In the three countries with estimates for two consecutive years, their expenditure was increased. The largest increase in the total HIV/AIDS expenditure was observed in Guatemala, which was doubled from US\$5.9 million in 1997 to US\$11.9 million in 1998. This increment in expenditures is mainly explained by an increase in hospitalizations and antiretroviral therapy by the social security system (from US\$1.7 million in 1997 to US\$5.7 million in 1998). A much-limited increase was observed in preventative expenditures. A similar but more moderate increase in expenditures for HIV/AIDS was observed in Mexico from the first to the second year of the estimation, also attributed mainly to a mild increase in ARV coverage.

In Brazil, the increased expenditures in 1998 compared with 1997 were attributable to condoms, which was an item missing in the 1997 estimation. Condom expenditures reached US\$100 million in 1998 as out-of-pocket expenditure through for-profit private providers (e.g. pharmacies). The rest of the figures remained relatively stable in Brazil, but the expenditure on ARV increased from US\$167 million in 1997 to US\$260 million in 1998, showing only a small decrease in expenditures caused by hospital admissions in the same period (Table 2).

Prevention activities rely mainly on services or products provided by the private sector in Brazil, Guatemala and Uruguay, such as the purchase of condoms in pharmacies, which are paid as out-of-pocket expenditures. In Mexico, these activities are still a significant portion of the expenditures on prevention, but they are surpassed by blood bank screening in public institutions, mainly by the social security institutions. In Honduras, an

Table 3. HIV/AIDS prevention expenditures by type of service and provider institution in Brazil, Guatemala, Honduras, Mexico and Uruguay (in US\$000s).

Prevention	Provided by public sector				Provided by private sector ^a			
	Social security		Direct government		For profit		NGO	
Brazil	1997	1998	1997	1998	1997	1998	1997	1998
IEC	n/a	n/a	21 381	16 997	n/e ^b	34 576	652.2	1084
HIV/testing	n/a	n/a	41 431	50 943	7161	7439	0	0
Blood banks	n/a	n/a	14 393	14 868	8289	7999	0	0
Condoms	n/a	n/a	3645	1913	n/e ^c	100 000	152.1	47.7
Other expenditures	n/a	n/a	44 777	43 087	0	0	0	0
Total (US\$)	n/a	n/a	125 627	127 808	15 450	150 014	804	1131
Total (US\$PPP)	n/a	n/a	166 083	172 275	20 425	202 207	1063	1525
Guatemala	1997	1998	1997	1998	1997	1998	1997	1998
IEC	0	8.7	204.3	252.2	0	0	29.6	541.3
HIV/testing	4.4	4	25.8	20.4	71.3	50.5	4.7	3.7
Blood banks	2.7	2.2	4.1	3.3	0	0	0	0
Condoms	33.1	49.4	24.1	26.9	662.2	678.8	30.9	70.4
Other expenditures	0	0	16.5	24.9	0	0	0	0
Total (US\$)	40	64	275	328	734	729	65	615
Total (US\$PPP)	103	160	703	813	1878	1810	167	1527
Mexico	1997	1998	1997	1998	1997	1998	1997	1998
IEC	200	200	1700	1700	0	0	1800	1900
HIV/testing	16 947	17 899	1616	1643	1896	2003	14	15
Blood banks	16 900	17 900	1600	1600	1900	2000	0	0
Condoms	100	100	2300	2400	7600	8000	40	40
Other expenditures	19	20	0	0	0	0	0	0
Total (US\$)	34 166	36 119	7216	7343	11 396	12 003	1854	1955
Total (US\$PPP)	75 388	74 512	15 922	15 148	25 146	24 762	4091	4033
Uruguay		1998		1998		1998		1998
IEC		0		216		0		35
HIV/testing		3		157		189		0
Blood banks		0		0		0		0
Condoms		0		622		6885		101
Other expenditures		0		0		0		0
Total (US\$)		3		995		7074		136
Total (US\$PPP)		5		1526		10 851		209
Honduras		1999		1999		1999		1999
IEC		11.1		568.3		0		382.7
HIV/testing		28.3		174.1		94.5		0
Blood banks		92.2		192		0		0
Condoms		93.5		391.6		1069.7		453
Other expenditures		0		0		0		0
Total (US\$)		225		1326		1164		836
Total (US\$PPP)		668		3634		3453		2476

PPP, Purchasing power parity.

^aPreventative activities are paid for as out-of-pocket expenditures when using for-profit providers (i.e. pharmacies or private laboratories for HIV testing and counselling), whereas using non-governmental organization (NGO) services, they could be subsidized by the NGO or paid completely or partly from out-of-pocket expenditures.

^bThe Brazil study did not estimate the private expenditures of information, education and communication (IEC) for 1997.

^cThe Brazil study did not estimate the private expenditures of condoms for 1997.

important proportion of the expenditures on prevention are services provided by the public sector and are allocated for information, education and communication (IEC) activities and the purchase of condoms, followed closely by condoms paid out of pocket.

The subsidy for the health sector (public expenditure divided by the total expenditure on health) varies widely between countries, and ranges from a low 21% subsidy in Uruguay (1.9% of the gross domestic product from public sources) to a high 60% in Mexico (2.8% of the gross domestic produce from public sources, Table 1). The subsidy for HIV/AIDS (or the public share of the total expenditure) was 68% for Brazil in 1998; 60%

in 1997 and 72% in 1998 for Guatemala; 77% in 1997 and 84% in 1998 for Mexico; 34% for Honduras in 1999; and 30% for Uruguay in 1998. The high public expenditure shares are associated with the provision of ARV, except in Honduras where no ARV are provided, and in Uruguay where there is a high expenditure on condoms from out-of-pocket sources.

Most of the public HIV/AIDS expenditure remains centralized and is managed at the national or federal level. In Brazil, only 31% in 1997 and 29% in 1998 of the total HIV/AIDS public expenditure was exercised at the states and municipalities. The decentralized expenditures in Brazil included drugs for treating

opportunistic infections, HIV screening in blood banks, testing and counselling, IEC activities, and to a small extent the purchasing of ARV as a counterpart of the federal provision. Federal expenditure was executed mainly through the Brazilian unified health system (Sistema Unico de Saude, SUS).

In Mexico, only 19% in 1997 and 14% in 1998 of the total HIV/AIDS public expenditure was decentralized, covering mainly the costs of care through social security institutions, HIV screening in blood banks and a limited number of IEC activities. In Guatemala, Honduras and Uruguay there is no information available for the years under study.

The relative distribution of HIV/AIDS expenditures might reflect the pattern of a national response in a given country (see Table 2 and Table 3). Brazil in 1998 allocated the largest amount of expenditures paid from public sources to ARV (56%), followed by private expenditures on condoms (22%) and blood banks, which accounted for almost US\$23 m or 4.9% of the total expenditures.

In Mexico, during 1997 most of the expenditures were allocated to HIV/testing (30.5%) and blood bank testing (30.4%), followed by expenditures on ARV (19.7%), the treatment of opportunistic infections (14.4%), and private expenditures on condoms (11.2%). In 1998, the largest item was ARV (43.1% from public sources and 3.4% out of pocket), blood banks accounted for US\$21.5 million (21.2%) and private expenditures on condoms accounted for US\$8 million (7.9% of the total expenditures).

In 1997, Guatemala allocated half of the HIV/AIDS expenditure (50.5%) to hospital admissions (without ARV) paid from public sources, 23% was spent on ARV from private sources (or US\$1.05 million) and US\$693 100 was spent on condoms from out-of-pocket sources. In 1998, 37% was spent on hospitalization using public sources; expenditures on ARV accounted for 32.1% from public sources (US\$3.16 million) and 13.6% from private sources (US\$1.3 million). Only 16% of the public and private expenditures were spent on IEC and condoms (or US\$1.6 million).

In 1998, Uruguay spent 59% out of the total on care (e.g. hospitalization, ARV, treatment of opportunistic infections and ambulatory care); most of these expenditures were for services provided by private agents (33% of the total) compared with the proportion provided by the public sector (26%). Almost US\$7.3 million was paid out of pocket in condoms (37% of the total), and only US\$600 000 of condoms were purchased through public services.

In 1999, Honduras spent 72% on care; 24% of these

expenditures on hospital admissions to public services (US\$2.9 million) and 28% on hospital services through private providers (US\$3.5 million). Twenty-three per cent of the total was spent out of pocket on ARV (US\$2.8 million). Blood bank testing through public services represented 2.3% of the total. Expenditures on condoms totalled US\$485 100 through public services and US\$1.5 million from private sources.

Discussion

The results of these case studies document the levels and flow of resources for HIV/AIDS in five Latin American countries. Very few attempts have been focused on the level of monetary resources being mobilized and used within countries in the fight against AIDS. An early World Bank and European Commission publication focused on the public policies to cope with HIV/AIDS in developing countries. That report analysed the levels and determinants of the expenditure on HIV/AIDS in Tanzania, Ivory Coast, Thailand, Brazil and Mexico [34,35].

Information on the economic funding of countries' responses to the epidemic is sparse or incomplete at best. Several approaches have been taken to estimate the resources needed to confront the epidemic, and have been focused on costing specific preventative interventions and more frequently estimating the cost of providing care in developed and developing countries [10,36].

The estimated funds needed for LAC were US\$1,140 million annually to curb the HIV/AIDS epidemic by 2005 (US\$590 million prevention, US\$550 million care); our report on five countries shows expenditures of US\$755.8 million in 2000 (US\$350 million prevention, US\$406 million care). Although insufficient, these levels of resources clearly represent the national countries responses towards HIV/AIDS, and thus the willingness of governments and the ability of households to subsidize and pay for prevention and care. The estimates for 2005 might show a decrease in care costs, mainly caused by the price of ARV or an underestimation of the resources needed.

The lowest share of public expenditures in the five countries was in prevention, ranging from 20% in Brazil to 49% in Uruguay. The steady domestic increase in private expenditures on prevention (e.g. condoms) more likely constitutes an important achievement of the National AIDS Programmes (NAP), whereas the large portion of care expenditures from private sources demonstrates governments' inability to provide services for this catastrophic disease that has devastating effects on households.

Most of the actions to prevent HIV infections in these countries are specifically executed by the NAP, whereas most care actions occur within the existing healthcare system. It is of vital importance to quantify the public and private funds these programmes manage in order to optimize their allocation and to estimate the balance of the public-private mix of funding and the provision of these activities. Unfortunately, only a tenth of the countries affiliated to the World Health Organization (WHO) have a recurrent flow of financial data for health, as was reported for the NHA system for 191 countries published by WHO.

Our observations are descriptive and are not intended for prescriptive purposes; in fact, the data say nothing about the right level of expenditures. However, they allow international comparisons and are useful as a reference, because they are based on a standard methodology. The economic development of these countries is contrasting, and ranges from a per capita gross national product (GNP) of US\$760 in Honduras to US\$9480 in Uruguay. The participating countries have different health system organizations and responses to the epidemic: such as Brazil whose governmental programme is considered to be very successful; Guatemala whose response to HIV/AIDS is weak with varying degrees of leadership; or Honduras with a highly dependent programme on external cooperation.

To analyse the financial response to HIV/AIDS, the expenditures were combined with other economic, demographic and epidemiological data to build useful indicators to identify policy decisions. We found that the relative distribution of the health expenditure allocated to HIV/AIDS ranged from 0.6% in Mexico to 4.9% in Honduras. Despite the formidable amount of resources spent in Honduras, the access to ARV is minimal and most of the provision of care is palliative, paid for by individuals. Interestingly, the per capita expenditure on HIV/AIDS is apparently unrelated to the contextual indicators of GNP. The unadjusted per capita expenditure on HIV/AIDS ranged from US\$0.53 (1997) in Guatemala to US\$6.63 in Uruguay. The adjustment as a result of PPP indicates that countries with relatively similar economic levels decrease their differences when measured in per capita US\$PPP. In 1998, Brazil, Guatemala and Mexico spent US\$PPP3.62, 2.68 and 2.57, respectively; but the expenditures of Uruguay and Honduras, the richest and the poorest countries, appear to be much further apart from the other countries than was observed on the unadjusted estimates (US\$PPP10.17 and 11.29, respectively).

Many developing countries with very limited domestic resources for health finance their activities against HIV/AIDS with external sources; World Bank loans have become a major source of funds for middle-

income countries in the region. External cooperation is another important source of funding, such as in Guatemala, Honduras, and many others in the region. The Joint United Nations Programme on HIV/AIDS (UNAIDS) reported that the HIV/AIDS funding that official organization agencies channelled through multi-lateral organizations dropped from over 70% in 1987 to 22% in 1997 [1]. The estimated flow from international sources per capita ranged from US\$0.01 in Mexico to US\$1.04 in Honduras in 1998. The World Bank (IBRD) loan to Brazil provided US\$44.6 million and US\$41.6 million for 1997 and 1998, but such funds are considered domestic because they are reimbursable. Brazil has an average non-reimbursable flow of US\$5 million from external bilateral and multilateral sources per year.

The quality of the financial information on HIV/AIDS services depends on the availability of information and the quality of the sources of information or estimations. In practically all cases we use different formats of presentation. Until now the estimation of expenditures for a specific programme was relatively easy when the value of an average service is estimated or known and is then multiplied by the total volume.

The household registry of expenditures, frequently used for private expenditure estimation, has the problem of lacking specificity, e.g. income and expenditure surveys do not have information on every disease, just for health expenditures. In this case it is advisable to seek specific indicators to disaggregate the expenditure. Such indicators can be obtained from ad hoc studies on the market prices of products and services that households consume when they have patients with a specific disease, according to their socioeconomic characteristics.

The estimates presented here are based on the approach developed by the Harvard School of Public Health for NHA. However, other recently developed methodologies might facilitate data abstraction and the interpretation of the results by NAP managers and other HIV/AIDS stakeholders. For example the Organization for Economic Cooperation and Development (OECD) approach provides information about health expenditures in a comparable way across countries. At the beginning of 2000, the OECD published a version of the NHA system that seeks to generate a set of comparable categories, therefore providing an integrated, consistent and flexible system of accounts. It establishes a conceptual basis of statistical reporting rules, and proposes an innovative international classification of health accounts covering three dimensions: healthcare by health functions, healthcare providers, and sources of financing. Our results are estimates of the first five countries of a large-scale ongoing project that includes 21 LAC countries, which in a second

phase are incorporating the methods proposed by the OECD, thus offering a more comparable presentation of country results with a fixed and exhaustive classification system. This method also allows the accounting of non-health expenditures, such as advocacy and lobbying, educational programmes in schools, food supply, hospices and shelters, etc.

An additional advantage of this accounting method of expenditures is that the reporting categories are better suited for policy analysis. The Latin American countries are characterized by having social security systems that cover an important proportion of salaried workers and civil servants. Despite a coverage lower than 50% of the population in most countries, these systems provide antiretroviral therapy for a substantial number of people with AIDS in the region. In fact, the major component of public expenditure in the five countries was allocated to care services, ranging from 51% in Mexico to 80% in Brazil. Antiretroviral therapy, far from universal, accounted for 63% of the expenditures on curative services, and its coverage for AIDS patients ranged from 10% in Guatemala to universal in Brazil. The major sources of these funds were households and enterprises, as they supply the resources for the social security system (flows from sources to agents or providers). However, the decision to provide ARV resided within the social security system as the health provider, without participation or knowledge of the sources of the funds, such as households' and companies' fees directed to these institutions.

One of the strengths of the data is the application of the same methodology in the different countries, thus allowing international comparisons. However, we have to acknowledge that our estimation method is not free of limitations. Information available in most countries usually allows a more accurate estimation of public expenditure, whereas private expenditure estimation is usually complemented with surveys, for the most part outside the health sector. The major area of uncertainty about the precision of our estimates comes from private expenditure, mainly in estimating household and out-of-pocket expenses.

In conclusion, our results are relevant for the planning process in the health sector, both at the institutional and national level and document governmental decisions. Also, identifying the level of expenditures will establish the need to generate alternative sources of financing. These results also provide a series of financial indicators describing the country's response to HIV/AIDS, including governmental, non-governmental and international cooperation activities. As the data allow international comparison, the National HIV/AIDS Accounts accurately portray the current situation of the national response towards HIV/AIDS, and can therefore easily be adopted as a measure for benchmarking

and as a tool for implementing national AIDS strategic plans.

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Appendix of additional study sites and participants

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