

Resource requirements to fight HIV/AIDS in Latin America and the Caribbean

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Objectives: Economists and epidemiologists from 10 countries in Latin America and the Caribbean (LAC) reviewed the methods used to develop estimates for resource requirements to address HIV/AIDS prevention and care in low- and middle-income countries.

Methods: They applied their country-specific knowledge to re-estimate the costs, coverage, and capacity of their health and education systems to expand HIV/AIDS interventions by 2005. A discrepancy of US\$173 million exists between the model estimates and those of country specialists.

Results: The most important difference between the model estimates and those of country specialists was in the estimated future price of highly active antiretroviral therapy. To a large extent, the estimates of the model reflect the efficiency gains that could result from purchasing arrangements that lead LAC countries to lower prices for antiretroviral drugs.

Conclusion: This preliminary exercise with 10 LAC countries confirmed the validity of the use of these estimates as tools at the international level, given current data limitations, both to guide the allocation of resources across diseases and countries, and for advocacy and resource mobilization. In addition, with the country revisions, these estimates have also been shown to be key tools for country-level strategic planning.

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AIDS 2002, 16 (suppl 3):S58–S65

Keywords: AIDS, economics, financing, HIV, Latin America, Caribbean

Introduction

Policy makers need information on the scale of resources required to prevent the further spread of HIV and to provide adequate care for people living with HIV/AIDS. At the international level, estimates of resource needs for HIV/AIDS prevention and care can provide guidance on how to allocate resources across diseases and countries. At the national level, knowledge of the funding levels required to achieve coverage

targets for different interventions is key to national HIV/AIDS strategic planning. Finally, both nationally and internationally, such studies are key tools for advocacy and resource mobilization.

Two major studies estimating resource requirements for HIV/AIDS were published during 2001 [1,2]. The first, carried out in preparation for the UN General Assembly Special Session (UNGASS), modelled the cost of HIV/AIDS prevention and care needs in 135

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low- and middle-income countries in 2005 [1]. The second, undertaken for the Commission on Macroeconomics and Health (CMH), modelled resources needed to scale up a package of core interventions to address HIV/AIDS and other priority illnesses in 83 low- and middle-income countries by 2007 and 2015 [2].

The UNGASS study [1] called for the annual expenditure of US\$9.2 billion on HIV/AIDS prevention and care in low- and middle-income countries by the year 2005. This compares with an estimated level of expenditure of US\$1.8 billion in the year 2000. The CMH study [2] concluded that between US\$13.6 billion and 15.4 billion should be spent annually on HIV/AIDS prevention and care in selected low- and middle-income countries by the year 2007 in addition to what is already being spent, and this should increase to between US\$20.6 billion and 24.9 billion by 2015.

Since their publication, these studies have been important advocacy and resource mobilization tools at the international level. In his testimony before the Committee on Foreign Relations of the United States Senate, for example, the Executive Director of UNAIDS referred to the results of the UNGASS study [3]. Similarly, these study results have been used to inform key global resource allocation decisions, such as those taken by the Global Fund to Fight AIDS, Tuberculosis and Malaria [4].

To date, however, these estimates have played only a limited role in informing resource mobilization and resource allocation decisions within low- and middle-income countries. Although costs for selected HIV/AIDS prevention and care interventions were modelled on a country-specific basis in both studies, data limitations on intervention costs, the current coverage of interventions and the capacity of countries to scale up HIV/AIDS interventions meant that many assumptions were made regionally or sub-regionally in order to build the models. Both study teams recognized that it would be inappropriate to use these studies as tools in country-level strategic planning without additional country-level work to improve the estimates.

This process began with individual country explorations of the UNGASS estimates for Latin America and the Caribbean (LAC) sponsored by the Inter-American Development Bank. Country experts from 10 countries in the region were invited to a workshop during which they reviewed the methods used to develop the UNGASS estimates, and applied their country-specific knowledge to re-estimate the costs, coverage, and capacity of their health and education systems to expand HIV/AIDS interventions by 2005. Economists and epidemiologists from Brazil, Chile, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, and Trinidad and Tobago participated

in the workshop held in Cuernavaca, Mexico on 25–26 January 2002.

This paper presents the results of this first workshop. They are presented as a composite for the 10 countries and are made available as a work in progress, as country team members continue to review and refine their estimates. Moreover, two additional groups of LAC countries will come together to conduct similar exercises in the coming months.

Methods

For the UNGASS model, as described previously [1], cost estimates for selected HIV/AIDS prevention and care interventions were based on country-specific estimates of the size of the populations in need of each of the interventions included. These estimates were based on epidemiological and demographic data from UNAIDS, WHO and the UN Population Division for the general population and orphans; and surveys and special studies in the literature for key populations such as sex workers and injecting drug users. Because not everybody has equal access to services, a composite access indicator was developed for facility-based interventions using the median of percentage of the population with access to tuberculosis treatment, essential immunizations, attended births and prenatal care services. Finally, for both prevention and care interventions, the model included unit cost estimates, drawing on published and unpublished studies of pilot programmes and area-specific interventions. Given the paucity of unit cost data, these costs were standardized with non-tradable components adjusted for purchasing power parity. Moreover, all costs included annualized capital components.

Beyond these common features, slightly different methodologies were used for prevention and care. The methodology used to estimate resource requirements for the 12 HIV prevention interventions (Table 1) and for support to orphans in each country is detailed elsewhere [5]. For each country, separate calculations were made for specific population target groups (e.g. the general population, sex workers and injecting drug users) for rural and urban populations. Target coverage rates were calculated using current HIV prevalences [6] and levels of economic development as measured by the World Bank. Finally, unit costs were estimated for each intervention [7]. The product of numbers of individuals in need of the service, the target coverage rate, and the unit cost yielded estimates for each intervention. The sum of these products generated the estimates of resources needed for prevention in each country.

Table 1. Prevention and care interventions included in the UNGASS model.

Prevention interventions
Public condom distribution
Management of sexually transmitted infections
Interventions with youth
Interventions with men who have sex with men
Workplace communications and promotion of safe behaviours
Information, education and communication
Interventions with sex workers
Social marketing of condoms
Blood safety programmes
Prevention of mother-to-child transmission of HIV infection
Interventions with injecting drug users
Voluntary counselling and testing
Care interventions
Palliative care
Diagnostic HIV testing
Treatment of opportunistic infections
Opportunistic infection prophylaxis
Highly active antiretroviral therapy
Support to children orphaned by AIDS

A somewhat different methodology was used to estimate the resources needed for care interventions (Table 1). This is because the limited capacity of country healthcare systems to expand the delivery of services is a more important constraint to what could be achieved by 2005.

Data from UNAIDS on expected HIV-related deaths estimated year by year, 2000–2006, were used to estimate the number of individuals needing care in each country and for each of the services or interventions to be provided to those individuals. Current levels of service delivery were estimated using the composite indicator mentioned above. Yearly country-specific growth rates for each of the interventions were then applied to the estimates of current access to derive estimates of feasible coverage levels for 2005. The assumed growth rates were adjusted on the basis of national incomes and on the previous success in scaling up coverage for Expanded Programme on Immunization vaccination.

Separate estimations were made for labour costs and the costs of pharmaceuticals. Labour costs in the health sector delivery system were generally taken to be wage costs in the public health service. Private sector wages in the health sector were recognized as being much higher, but the modelling was done with the perspective of increasing publicly funded care. Because drug and pharmaceutical prices have been so volatile during the past 2 years, estimating these prices in the future was particularly problematical. International pharmaceutical companies have indicated a willingness to bargain down the prices of selected drugs, and several governments have made some favourable arrangements on pricing. Cipla in India and some Brazilian producers

have produced generic equivalents at drastically reduced prices [8,9]. More recently, the Thai government has developed tablets made up of three antiretroviral drugs costing US\$0.46 per day or US\$ 200 per annum [10]. The prices included in the UNGASS model were estimated taking into account differential pricing agreements, with the poorest countries paying the least.

Finally, as with the prevention interventions, for each country the multiplied product of estimated individuals needing services with access to health services in 2005, the country's capacity to expand current care services and unit cost yielded estimates for each intervention, and the sum of these products generated the estimates of resources needed for care in each country.

Before the workshop, country specialists were sent a description of the model. In addition, they were sent a list of all of the parameters used by the model. During the workshop, the teams from each country reviewed the model for their country using computer-based data adjustment programmes that permitted real-time data changes and an analysis of their implications. Country teams were given free reign to adjust all of the inputs into the model. Moreover, if they had information on target populations or growth rates for the expansion of prevention and care interventions, for example, they inputted those data directly rather than using the model to produce those estimates. The result of the workshop is a set of revised estimates for HIV/AIDS programme costs for the year 2005 for these 10 countries.

Results

Prevention

The net effect of the changes by the country specialists to the 12 prevention intervention cost estimates for the 10 countries for 2005 was an increase of 15% in the total prevention budget from US\$327 million to US\$375 million. Figure 1 presents the comparison between the two sets of estimates for the 12 prevention interventions.

A number of important changes in the expected unit cost of selected interventions were identified. These included the average cost of training a primary school teacher in the skills necessary to inform youth about HIV/AIDS and motivate behavioural change, which increased from US\$69 to US\$82; the average cost for training a secondary school teacher, which changed from US\$38 to US\$60; the cost of treating sexually transmitted infections, which increased by one third, from US\$9 to US\$12 per case; and the average cost of testing a unit of blood, which almost doubled, increasing from US\$15 to US\$28. The estimated cost per

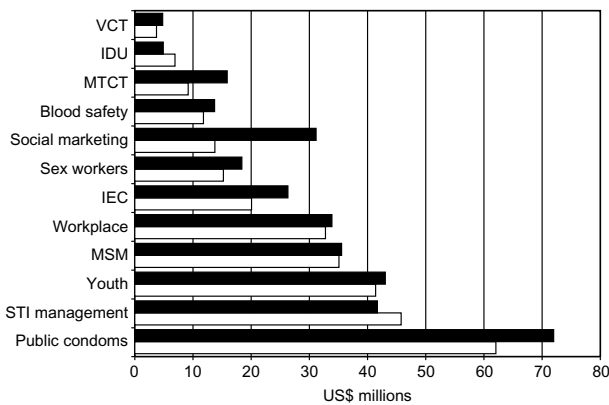


Fig. 1. Comparison of prevention interventions, UN General Assembly Special Session (UNGASS) versus country-revised estimates.

□ UNGASS estimates; ■ country estimates.

IDU, Injecting drug users; IEC, information, education and communication; MSM, men who have sex with men; MTCT, mother-to-child transmission; STI, sexually transmitted infection; VCT, voluntary counselling and testing.

mass media campaign also increased from US\$489 000 to US\$565 000. This last average masks large differences, only partly explained by differences in country size, as the lowest country-specific estimated cost was US\$3000 per campaign, whereas the largest was approximately US\$1.7 million per campaign.

The discrepancies between UNGASS estimates and revised country estimates across these 12 interventions were not large, with two exceptions. First, the resources needed for the social marketing of condoms more than doubled in estimated cost from US\$14 million to US\$31 million, because the estimated average price per condom, including distribution costs, doubled from US\$0.10 per condom to US\$0.21 per condom.

Second, the resources needed to prevent mother-to-child transmission increased from US\$9.2 million to US\$15.9 million. The estimated cost of mother-to-child transmission interventions was much higher among the group of LAC region countries than was the UNGASS estimate, at US\$61 per case treated rather than only US\$5 in the UNGASS estimates. Most of this increase was caused by the presumption by one large country that the treatment protocol (ACTG 076) would be substantially more costly than that envisioned in the UNGASS estimating procedure.

Care and support

The care cost estimates generated by the country teams varied from the UNGASS estimates by a larger percentage than did the prevention estimates. The 10 countries taken together raised their care and support estimate for 2005 from US\$437 million to US\$562

million. This change is an increase of approximately 29%, nearly double the percentage change for prevention services.

Much of the observed increase in the estimated cost of care and support can be attributed to increases the country specialists made in their expected costs of highly active antiretroviral therapy (HAART). Their projected spending on HAART in 2005 was US\$440 million, far higher than the US\$304 million called for in the UNGASS estimates for these 10 countries (Fig. 2).

Part of this increase was as a result of increased patient load, as the numbers of HAART patients increased in the country specialists' estimation by only 24 000 patients from a total of 196 000. The bulk of the increase was attributable to higher estimates of pharmaceutical costs associated with the delivery of HAART in 2005. In contrast to the UNGASS model assumptions, several country teams assumed that they would face the same pharmaceutical costs in 2005 as they do now, despite evidence of dramatic price reductions from mid-2001, when the UNGASS estimates were prepared, to early 2002, when the workshop was held. This pessimistic view held by a number of smaller countries probably reflects their relative lack of bargaining power, and is an argument for cooperative purchasing mechanisms.

The revisions also led to some small but significant changes in costs for opportunistic illnesses and support for orphans. The cost of year 2005 prophylaxis associated with opportunistic illnesses increased from US\$27 million to US\$31 million. The expected costs of support for orphans rose in percentage terms by much more, from approximately US\$5 million to US\$15 million. Much of the variation in the cost of orphan support will depend, of course, on the degree to which families and communities find ways to care for orphans without costly institutionalized care.

The country specialists cut the estimated 2005 cost of lifetime palliative care, lifetime opportunistic illness treatment, and annual laboratory testing costs associated with HAART. These amounts changed, respectively, from US\$12 million to US\$9 million, from US\$44 million to US\$32 million, and from US\$43 million to US\$36 million. All of these decreases were attributable to the country specialists' view that the estimated unit cost of the above-mentioned services would be lower than the UNGASS team anticipated.

The country experts were somewhat more optimistic than the UNGASS team in projecting care and support coverage to the year 2005 (see Fig. 3). For four out of the five services described there, the country specialists expected to achieve higher rates of coverage. The increased coverage with HAART, which would in

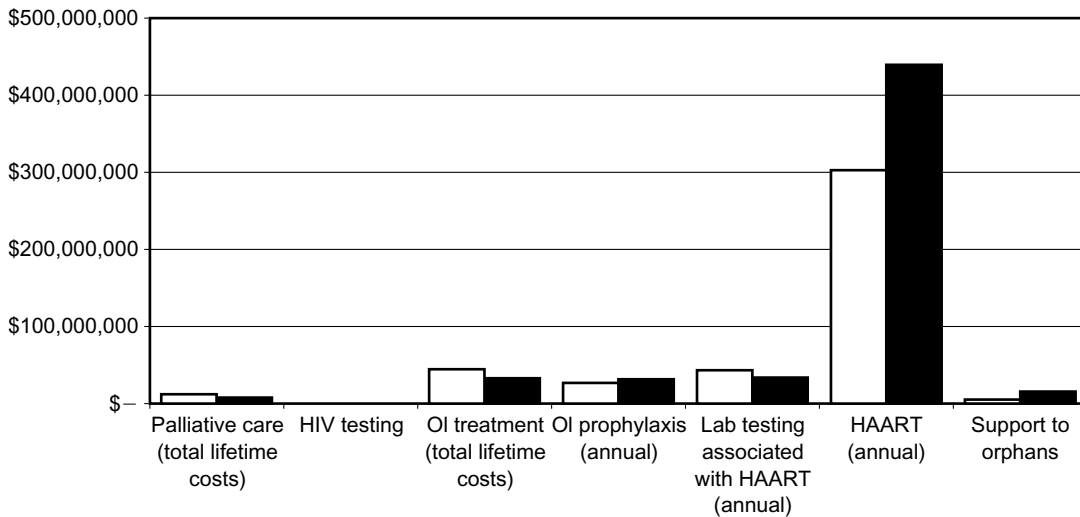


Fig. 2. Total HIV/AIDS care costs for selected Latin America and Caribbean countries, 2005. □ UNGASS estimates; ■ country estimates. HAART, Highly active antiretroviral therapy; OI, opportunistic infection; UNGASS, UN General Assembly Special Session.

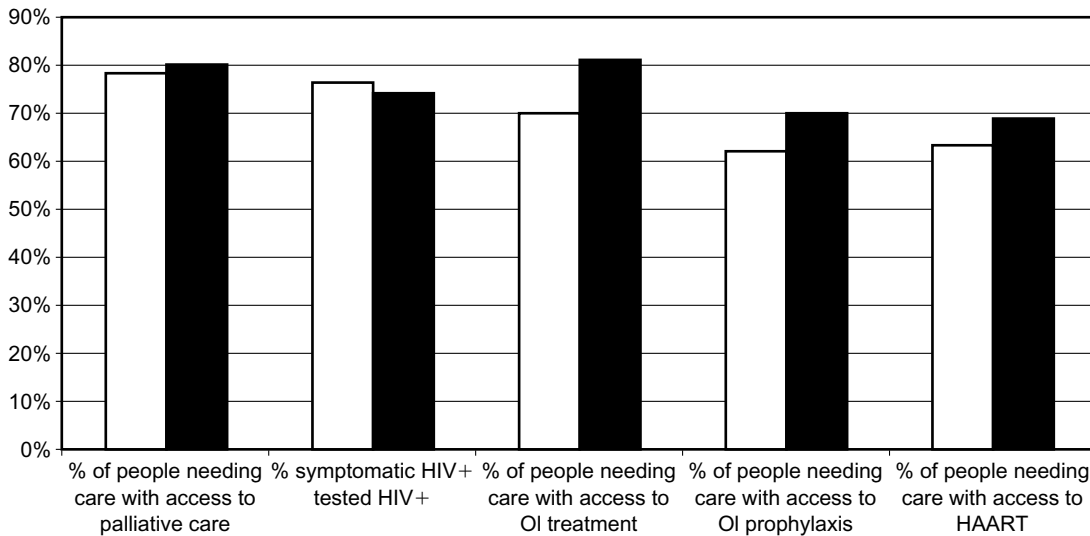


Fig. 3. Total HIV/AIDS care coverage rate for selected Latin America and Caribbean countries, 2005. □ UNGASS estimates; ■ country estimates. HAART, Highly active antiretroviral therapy; OI, opportunistic infection; UNGASS, UN General Assembly Special Session.

these specialists' view be close to 70%, rather than to the 60% anticipated in the UNGASS estimates, would represent a substantial challenge for all these countries. That component of coverage would also be the most expensive of the five presented in the graph.

As noted earlier, the largest change in shares between the UNGASS and the country team estimates occurred in the projected cost of HAART in the year 2005. That share, in the country specialists' view, would be 77%, rather than the 70% derived from the earlier estimates. Support to orphans increased in this new

projection from an expected 1% of all care and support for HIV/AIDS to 3% in the country-revised estimates. As these shares increased, others declined. The proportions attributable to lifetime costs for palliative care, lifetime costs for opportunistic illness treatment, and annual laboratory testing associated with HAART, thus each declined by from one to four percentage points.

Prevention, care and support: a summary

In the UNGASS model, the estimated resource requirements for HIV/AIDS in the 10 LAC countries was US\$764 million for prevention and care. After the

preliminary parameter adjustments by the country experts, estimated resource requirements totalled US\$937 million.

Figure 4 shows how this expected expenditure for 2005 is divided between prevention and care, and then between the specific service interventions that each encompasses as estimated in the UNGASS model and in country revisions. Resource needs for the different interventions are rather equally distributed in both estimates, with HAART consuming over half of all resources for care and support, increasing from 45% in the UNGASS estimates to 51% in the country-revised estimates.

Figure 5 shows how expected 2005 coverage levels changed with revisions by the country experts. The most notable differences are the dramatic increase in the number of individuals tested, the increase in individuals receiving opportunistic infection prophylaxis, the marked decrease in men who have sex with men (MSM) reached, and the decrease in the number of individuals reached with harm reduction programmes.

Discussion

Country specialists from 10 LAC countries predict that by 2005, these countries will require a total of US\$937 million to provide HIV/AIDS prevention and care interventions to those populations with access to healthcare services, given current country infrastructure and human resource capacity.

This total of US\$937 million represents a discrepancy of US\$173 million between the UNGASS estimates and those of the country specialists. The most important difference between the two estimates was in the estimated future price of HAART. In essence, the estimates of the UNGASS model reflect the efficiency gains that could result from purchasing arrangements that lead LAC countries to lower prices for antiretroviral drugs. The difference is perhaps even a conservative estimate because price reductions have already been achieved in some countries beyond the best-case scenario assumed for the UNGASS estimates.

This preliminary exercise with 10 LAC countries confirmed the validity of the use of these estimates as tools at the international level, both to guide the allocation of resources across diseases and countries, and for advocacy and resource mobilization. Even if the global estimates produced by the UNGASS and CMH studies do not provide the exact quantity of resources needed to address the epidemic in low- and middle-income countries, they provide good information on the scale of the resources required.

With the country revisions, similar estimates have also been shown to be key tools at national level. The revised country estimates produced by these 10 LAC countries have already been reported as useful in preparing country proposals for the Global Fund to Fight AIDS, Tuberculosis and Malaria.

There are of course limitations with using country experts to refine estimates of a model that is as complex as the UNGASS resources needs estimates model. It

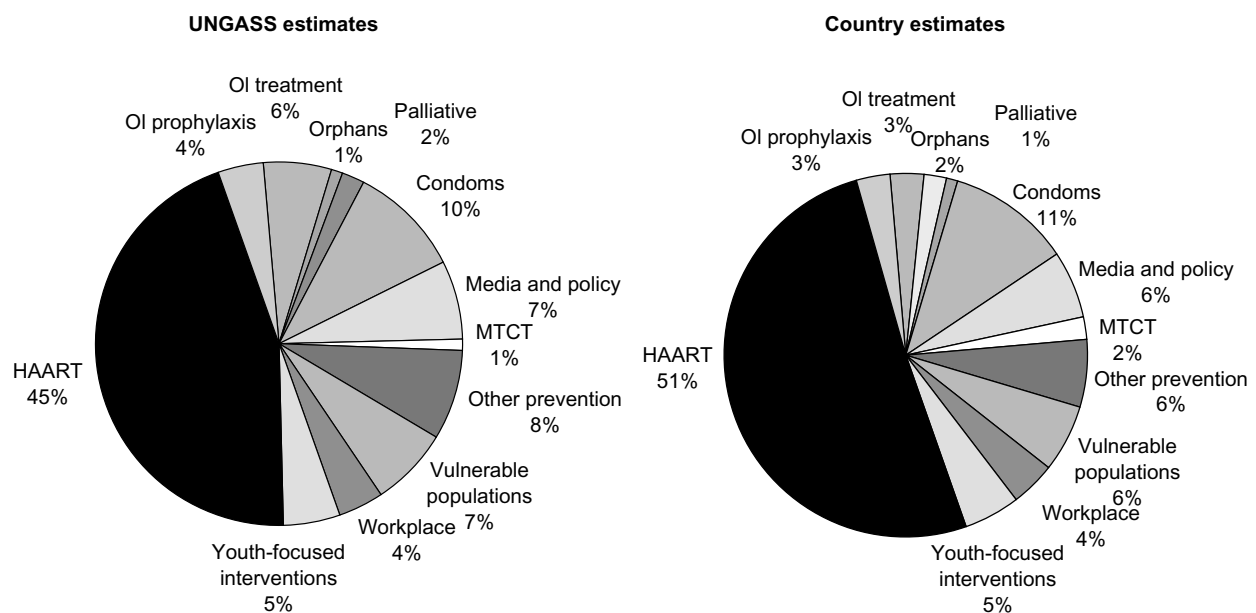


Fig. 4. Distribution of HIV/AIDS prevention and care resource needs for selected Latin America and Caribbean countries, 2005. HAART, Highly active antiretroviral therapy; MTCT, mother-to-child transmission; OI, opportunistic infection; UNGASS, UN General Assembly Special Session.

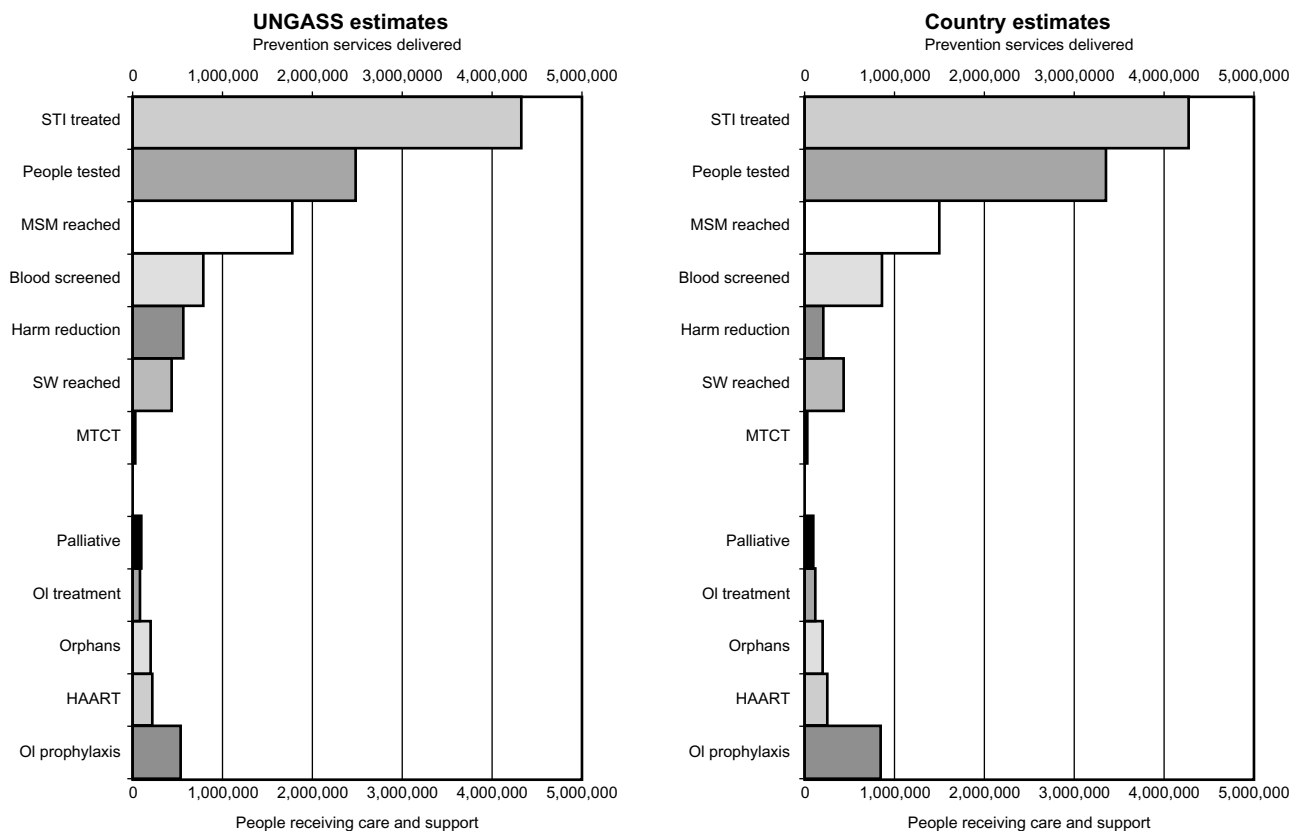


Fig. 5. HIV/AIDS prevention and care services delivered and number of individuals receiving care for selected Latin America and Caribbean countries, 2005.

HAART, Highly active antiretroviral therapy; MSM, men who have sex with men; MTCT, mother-to-child transmission; OI, opportunistic infection; STI, sexually transmitted infection; SW, sex workers; UNGASS, UN General Assembly Special Session.

can be difficult to identify the face validity of the numbers they produce. However, the significance of data limitations in many low- and middle-income countries means that, in many cases, country experts are indeed the best sources of data estimates available.

Although there are shortcomings associated with virtually all of the parameters used in the models, and there is a real need to strengthen all data management systems in low- and middle-income countries, the weakest parameters are the unit costs of prevention and care services. Not only are there few studies that have been crudely extrapolated to other countries and regions, virtually no information is available on how those unit costs change as interventions are scaled up. Such information could and should be collected as efforts to scale up begin.

To strengthen the quality of HIV/AIDS resource needs estimates further, the necessary next steps include the compilation of estimates of country-level resource needs for all low- and middle-income countries. Workshops are planned for the rest of the LAC region. Similar initiatives should be undertaken in sub-Saharan Africa, Asia and Eastern Europe.

Acknowledgements

The authors are grateful to the Inter-American Development Bank and the UNAIDS Secretariat for the technical and financial support they provided to make this work possible.

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