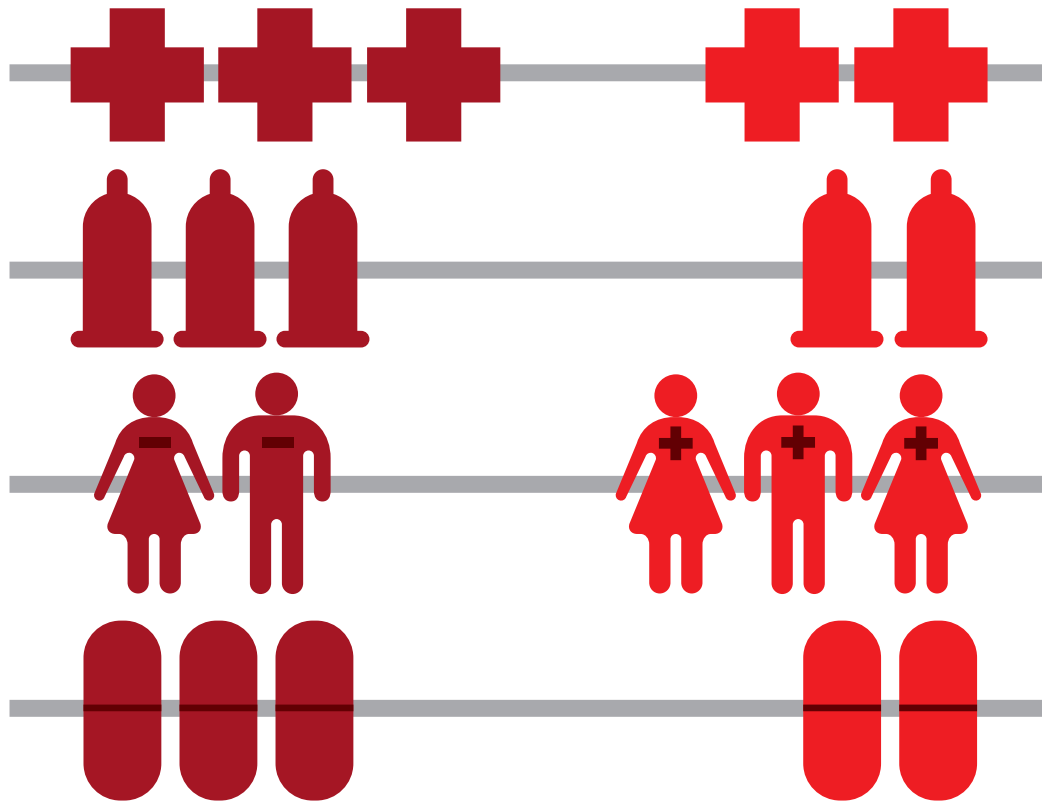


RESULTS FOR DEVELOPMENT INSTITUTE



COSTS AND CHOICES

FINANCING THE LONG-TERM FIGHT AGAINST AIDS

An aids2031 Project | Edited by Robert Hecht

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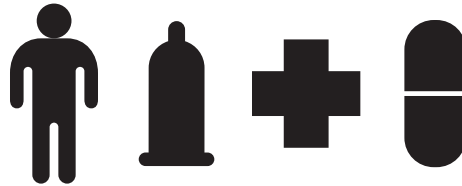
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Edited by Robert Hecht

COSTS & CHOICES

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Costs and Choices

Financing the Global Fight Against AIDS

EXECUTIVE SUMMARY

Today, in 2010, more than 35 million people around the world are living with HIV or AIDS-related diseases. Roughly a million people are being added each year to the treatment rolls. Yet the world is losing ground at an alarming pace. More than 2.5 million every year are estimated to become newly infected with the virus, for which there is no vaccine or cure. Despite huge efforts to expand treatment, infections continue to outstrip those put on AIDS drugs by a more than 2 to 1 margin. At the same time, spending on AIDS in low and middle income countries has increased almost fifty-fold over the past decade, from \$300 million a year in 1998 to about \$13 billion in 2008. Yet the need for additional funds continues to grow, to help the millions requiring treatment and orphan care, and to expand hitherto inadequate prevention efforts.

This report comes as low and middle income country governments, donor agencies, and non-governmental organizations stand at a major crossroads in the history of the response to AIDS. Costs are rising fast at a time when funding is leveling off. Policymakers and experts are examining both the efforts to date in fighting the spread of the virus as well as the challenges and options ahead. Complicating these step-back assessments is the prolonged global economic crisis in which nearly all countries, rich and poor, are experiencing shrinking budgets and scaled-back ambitions. Funding choices, never easy, now are excruciatingly difficult. The particular choices in how to fight AIDS in the future are coming under serious pressure for financial reasons, especially as it becomes increasingly clear that spending on AIDS could spiral steeply upward in the future with relatively modest impact on the arc of the HIV virus – unless smarter choices are made by AIDS program managers and their international partners.

The Costs and Financing Working Group of the aids2031 project – an initiative named for the year marking a half-century after the discovery of HIV – has rigorously looked at the tough questions now facing policymakers about the future costs of AIDS. What we've found is that the decisions made today and in the coming years will have major financial impact and health consequences for decades ahead. At stake are millions of HIV infections and human lives, and billions of dollars. It is imperative that wise choices be made now, and actions to carry them out are taken right away.

2 Executive Summary

Our Major Findings Include:

- Future spending on HIV will be well above current spending levels, ranging from \$19 billion to \$35 billion a year in 2031. Last year, the world spent roughly \$13 billion. The majority of this expenditure – from one-half to two-thirds – will occur in African countries hit hardest by the epidemic, and treatment alone will consume over 70 percent of the total cost of fighting AIDS in countries with the highest rates of infection, such as Botswana and South Africa.
- Even if AIDS costs are almost certain to rise between now and 2031, we can significantly influence the cost trajectory with our actions today. Policy choices have different price tags – ranging from \$397 billion to \$722 billion over the 22-year period. This will demand stronger political will and AIDS financing capacity, but the potential payoff in making the right choices is great, leading to fewer infections and more lives saved.¹
- Governments and development partners could be much more effective in the AIDS activities they back, and more financially efficient, if they focused resources on prevention programs that are more closely aligned with specific epidemics. In most cases, these reconfigured investments will save large amounts of funding because countries will discard ill-fitting and often costly interventions. For instance, in areas where the epidemic is mostly concentrated among men having sex with men, female commercial sex workers, and injecting drug users, proven prevention initiatives for these groups should be expanded, while other prevention activities aimed at the general population are scaled back. In the large generalized epidemics in Eastern and Southern Africa fueled mainly by heterosexual sex among low- and medium-risk individuals, major expansion of male circumcision and of efforts to block transmission of HIV from infected mothers to their babies would help slow the pace of new infections. Innovative programs to change sexual behavior so that people have fewer concurrent partners and use condoms regularly – something that has proven elusive until now – also need to be launched and evaluated, and then pursued vigorously when new approaches are shown to work.²
- Middle income countries with low rates of HIV infection, such as Brazil, China, India, and Russia should move as quickly as possible in the direction of paying a larger share of the costs of their AIDS programs, eventually covering all costs and thereby freeing more donor funds for the poorest countries that have high HIV prevalence. In that latter group of countries, donors should be prepared to sustain their financial and technical support for decades to

1 Hecht R, Bollinger L, Stover J, McGreevey W, Muhib F, Madavo CE, de Ferranti D. Critical Choices In Financing: The Response to the Global HIV/AIDS Pandemic. *Health Affairs*. 2009; 28(6): 1591-1605.

2 Wirtz V, Forsythe S, Valencia-Mendoza A, Bautista-Arrendondo S, Ana-Tellez YS. The cost of antiretrovirals: maximizing value for money [Internet]. Working paper. Cuernavaca (Mexico): National Institute of Public Health; 2009 Mar [cited 2009 Nov 5]. Available from: http://www.aids2031.org/pdfs/the%20cost%20of%20antiretrovirals_28.pdf.

come, since the burden of AIDS disease will only decline slowly and economic growth and expanding domestic health spending will be too gradual to allow the countries to pay the full cost of AIDS programs over the next two decades and even longer.

- Resources should continue to be invested in the search for an AIDS vaccine as well as new technologies that prevent infections, including microbicides and pre-exposure prophylaxis (or PrEP, the use of oral AIDS medicines as a preventive measure). The bottom line is that such “game-changers” are needed in order to lower the number of adult infections below the 1.2 million mark annually by 2031 – the best case we foresee using existing prevention tools.

The Scope of Our Work

Results for Development Institute, a nonprofit organization based in Washington, D.C., led the Working Group, which consisted of 17 experts from around the world with strong backgrounds in AIDS, public health, and economics, representing government, donor agencies, academia, and civil society. The Costs and Financing Working Group was co-chaired by David de Ferranti and Robert Hecht from Results for Development, and Callisto Madavo from Georgetown University.³

The Working Group authorized the secretariat at Results for Development to develop a variety of models to estimate future costs and probable impacts from various interventions. In order to figure out the future price tags, we needed to understand whether countries were deploying the right set of interventions to match the varied AIDS epidemics within their borders. We also needed to gauge each nation’s knowledge of its epidemic and of the costs and financing of its national response. What were its sets of data? Did it have accurate information that spanned several years? Could it estimate incidence of HIV infections among certain populations? Did it even have a national AIDS plan for which the costs had been carefully calculated?

What we learned about the state of AIDS financing knowledge, data, capacities, and strategies in low and middle income countries was sobering. Despite the enormous progress that has been made over the past decade, there are still huge gaps and deficiencies in national plans, budgets, and expenditure tracking systems. Few countries have developed detailed cost estimates of their national strategic plans. All too often, they do not specify how limited resources will be allocated, nor how priorities will be set if they are unable to do all that might be desirable. In the face of unclear

3 aids2031 Costs and Financing Working Group [Internet]. Washington (DC): Results for Development Institute; c2009 [cited 2009 Jul 8]. Our Projects/aids2031; [2 screens]. Available from: <http://main.resultsfordevelopment.org/projects/aids2031-costs-and-financing-working-group>

4 Executive Summary

priorities, the plans often call for channeling funds to what is politically popular, or dispersing them across the board to all prevention, treatment, and orphan programs, rather than focusing money on what is most effective.

In the end, we found dozens of key countries – in terms of HIV prevalence or levels of domestic and international donor funding – that did not possess or were not reporting critical data. Some countries had limited human resources to get the job done. Some faced too many demands from donors who wanted regular updates related to their programs, or who imposed their own “pet” interests in specific prevention or treatment activities, rather than following a consistent and coherent national approach. It was troubling to find that after 28 years of the epidemic, countries and the global community lack an accurate picture how funds are being spent or where they should be spent for maximum impact.

Over the past decade, as AIDS programs have been launched in an emergency mode, countries and donors have paid only modest attention to getting the best value for their money. The focus has been, rightly, on saving as many lives as quickly as possible. But the situation now has to change. AIDS pioneers have built life-saving programs; the next generation needs to extend those programs while at the same time cutting wasteful aspects of all programs, on both the prevention and treatment side. Over the next two decades and more, as we recognize increasingly that AIDS is a long-term phenomenon with significant financial resource implications, we need to put greater emphasis on achieving efficiency gains.

We found large general areas for greater efficiency in preventing infections, which would in turn result in major cost savings. One important way to raise efficiency is to focus and expand spending on prevention programs that are known to work. In countries with the highest prevalence of HIV and AIDS, governments should focus efforts on successful interventions, including mother-to-child transmission, male circumcision, and community mobilization programs that encourage counseling and testing. In these high prevalence countries, however, new prevention approaches are desperately needed to slow sexual transmission of HIV in the general population, which, among other things, will require political leaders to encourage a radical change in behavior, especially in reducing the numbers of regular and overlapping sexual partnerships.

Meanwhile, in countries with epidemics more concentrated among the so called “most at risk populations” – commercial sex workers, injecting drug users, and men who have sex with men – prevention efforts should be targeted to effectively slow the transmission of HIV within these groups. These populations account for a large fraction of new infections in countries with concentrated AIDS epidemics, including most countries in Latin America, East Asia, Eastern Europe,

and Central Asia. In Asia, three out of four HIV infections can be linked directly to these most at risk population groups. At present, Asian countries spend only a tiny fraction of their AIDS budgets – uniformly less than 10 percent – on prevention services for these groups, and coverage of these populations is also low, with prevention packages only reaching a fifth to a third of those in need. For instance, spending on prevention programs for men who have sex with men in Vietnam and Cambodia was less than three percent of the total prevention expenditures in 2004, the last year this spending was reported.⁴

The Future Choices of Fighting AIDS

Part of our work involved showing how decisions made today would have great impact on future AIDS costs and on the magnitude of the epidemic and its negative health consequences. Financial needs were projected under four scenarios driven by a range of assumptions about future political will, available resources, and strategic approaches, agreed upon after consultations with the Working Group and other aids2031 task forces and the overall project steering committee. The four scenarios highlight a combination of feasible policy options, but are only a subset of the wide range of possible scenarios, including more pessimistic and optimistic ones (see Figure ES.1, pp.6).

For each scenario, we estimated the impact of intervention scale-up on HIV incidence and prevalence, AIDS deaths, and numbers of persons on treatment. We also calculated the costs of each scenario, based on the coverage and unit cost of each intervention. Further details of our methodology have been reported elsewhere and are available on our website.⁵

The results from these projections are sobering (see Figure ES.2, pp.7). Overall, resource needs for AIDS in low and middle income countries are projected to increase to between \$18.5 and \$35.3 billion annually by 2031, in the absence of a vaccine or cure. The high end of this range would mean nearly tripling the current level of expenditures for AIDS. Over the 22-year period, total outlays are estimated to be \$397 billion to \$722 billion. Two thirds of this would be required in Africa.

The results of the global analysis show that policy choices made in the next few years can have a large impact on AIDS spending and related health benefits over the long term – actions today can

4 McGreevey W, Menser N, Sakar S. Cost-effective interventions that focus on most-at-risk populations. Working paper. New York (NY): aids2031 Costs and Financing Working Group; 2009 Jul [cited 2009 Nov 5]. Available from: http://www.aids2031.org/pdfs/cost-effective%20interventions%20that%20focus%20on%20most-at-risk%20populations_16.pdf.

5 Bollinger L, Stover J, Forsythe S. Estimating the Long-Term Global Resource Needs for AIDS through 2031 [Internet]. Working paper. New York (NY): aids2031 Costs and Finance Working Group; 2009 May [cited 2009 Nov 5]. Available from: <http://www.aids2031.org/pdfs/estimating-long-term-global-resource-needs-for-aids-through-2031.pdf>.

Figure ES.1 | aids2031 Costs and Financing Scenarios for Prevention Strategy and Policy Options

Current Trends:

Coverage of key interventions continues to expand to 2015 as it has in the past few years. As a result some countries achieve universal access for some services but not others and some countries do not achieve universal access by 2015. Across all interventions coverage reaches about two-thirds of universal access targets by 2015 and then remains at those levels after 2015.

Rapid Scale-Up:

Political will to achieve universal access is strong and resource availability continues to grow rapidly. The focus is on scaling-up direct approaches to preventing HIV transmission and providing care and support. All countries achieve universal access to key prevention, care and treatment, and OVC support services by 2015 and continue at that level to 2031. Universal access is defined as 80 percent coverage for most interventions, with the exception of school programs, blood safety and safe medical injections, where universal access is defined as 100

Hard Choices for Prevention:

Resources for HIV/AIDS programs are limited, so there is a focus on scaling-up only the most cost-effective approaches for prevention in order to achieve maximum impact with the resources available. For prevention this implies greater emphasis on programs for most-at-risk-populations such as sex workers, MSM, and injecting drug users, and less emphasis on general population interventions such as workplace programs and community mobilization, particularly in low-level and concentrated epidemics.

Structural Change:

In recognition that AIDS is a long-term problem, there is a greater focus on structural change that can reduce vulnerability to AIDS and produce a more sustainable response. This might include, for example, programs to reduce violence against women, modify employment practices that lead to the separation of workers and their families, removal of legal and other stigma-related barriers, and strengthening of health systems.

make a big difference to the future course of the epidemic. With a broad-reaching effort to achieve universal access to prevention and treatment services by 2015 under the Rapid Scale-Up scenario, about seven million additional lives can be saved and an extra 14.2 million infections averted, as compared to simply following Current Trends in prevention and treatment scale-up. To achieve these major impacts on AIDS deaths and HIV infections averted, an extra \$232 billion will need to be invested.

Alternatively, if prevention efforts are focused on a smaller number of activities that are known to be most cost-effective and are targeted at high-risk populations (the Hard Choices scenario), total costs over the 22-year period could be \$325 billion lower than under Rapid Scale-Up and \$92 billion less than under Current Trends. The estimated number of cumulative AIDS deaths would be slightly higher (by 2.6 percent) than with Rapid-Scale up, but would be far lower (six million fewer AIDS

Figure ES.2 | Results of the Global Modeling Key Output and Outcome indicators, 2009-2031

Scenario	Current Trends	Rapid Scale-up	Hard Choices for Prevention	Structural Change
Cumulative Resources Required, US\$ Billions (2009-2031)	490	722	397	579
Cumulative Life Years Gained, Millions (2009-2031)	148	235	232	99
Cumulative Adult AIDS Deaths, Millions (2009-2031)	45.1	38.8	39.6	44.6
Cumulative Adult HIV Infections, Millions (2009-2031)	47.7	33.4	38.7	36.5
Annual Resources Required, US\$ Billions (2031)	23.7	35.3	18.8	31.9
Number of People on ART, Millions (2015)	8.8	11.6	11.3	5.7
Number of People on ART, Millions (2031)	10.1	13.1	13.2	8.6
Number of New HIV Infections, Millions (2031)	2.1	1.3	1.7	1.2

deaths) than with a continuation of Current Trends. Hard Choices is the approach that achieves the best results in terms of cost-effectiveness in prevention.

While Hard Choices represents the most economical option for curbing the epidemic, investing in Structural Change activities has the greatest impact in reducing future spread of the infection. However, even under this best-case scenario in which countries tackle the underlying social drivers of AIDS (including gender-based violence, stigma, and discrimination), the modeling suggests that the numbers of adults newly-infected in 2031 will still be around 1.2 million, or just over half the 2.3 million who were infected in 2009. While this decline would be important progress, it means that in 2031 – 50 years in – there would still be a persisting epidemic. Under the Current Trends scenario, the projected number of new HIV infections in 2031 only dips slightly to 2.1 million – little changed from the situation we face today.

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Structural Change represents an intermediate option with regard to its cumulative financial resource requirements, with a total cost (\$579 billion) that is higher than for Hard Choices but lower than for Rapid Scale-up – but it is important to recognize that many of the structural interventions (e.g., gender violence prevention) have benefits that go far beyond AIDS, so it could be justifiably argued that some of these costs should be seen as “shared” and not counted entirely against AIDS program expenditures.

Using the old WHO guidelines for treatment eligibility, the numbers of persons on ART rises rapidly between now and 2015, and continues to grow modestly after that, reaching 8.6-13.2 million by 2031 – two to three times the numbers of patients on treatment today. The new eligibility guidelines will cause these numbers to expand further.⁶

In our global modeling, we also explored the impact of possible breakthroughs in new biomedical prevention technologies. In particular, we looked at microbicides and pre-exposure prophylaxis (PrEP), which may become available between now and 2015; an AIDS vaccine, which is not anticipated to be available until later, if it materializes; and treatment leading to a cure, with unknown feasibility. Our results suggest that current implementation strategies for microbicides and PrEP could drive a further decline in new infections of between 5 and 25 percent, depending on the type of epidemic, but that more significant reductions (50 percent or more) would only occur with the introduction of other more uncertain “game-changing” technologies – such as vaccines or a cure.

Who Pays for the AIDS Fight in the Future?

The other big tasks for the Working Group were to forecast the availability of funding to fight AIDS, and to identify ways in which potential funding gaps could be filled. In 2008, the largest sources of funding for AIDS were domestic expenditures in affected countries (52 percent), bilateral contributions (31 percent), multilateral institutions (12 percent) and the philanthropic sector (5 percent).⁷ This finding reminds us that the external agencies supporting the AIDS response, while certainly important, are not in fact the predominant source of AIDS funding overall. The largest share of spending comes from domestic sources, primarily the governments in middle income countries like Brazil and Thailand. Despite these positive developments, AIDS programs remain

6 WHO. Rapid Advice: Antiretroviral therapy for HIV infection in adults and adolescents [Internet]. Geneva (Switzerland): World Health Organization; 2009 Nov [cited 2009 Dec 14]. Available from: http://www.who.int/hiv/pub/arv/rapid_advice_art.pdf.

7 Joint United Nations Programme on HIV/AIDS. What countries need: investments needed for 2010 targets. Geneva: UNAIDS; 2009 Feb.

heavily reliant on outside funding, especially in low income countries. In Cambodia, Tanzania, and Zambia, for example, more than 90 percent of AIDS spending today comes from outside agencies, with the government's contribution at less than 10 percent.⁸

Overall, our analysis suggests that it will be extremely challenging to mobilize the hundreds of billions of dollars required for AIDS in developing countries between now and 2031, unless a positive game-changer such as a vaccine dramatically alters the situation by cutting the number of new infections and thus the future price tag for treatment. The financial outlook for a number of the countries with the heaviest AIDS disease burden, especially the poorest ones in Southern Africa such as Malawi and Zambia, is bleak. External financing for AIDS from donor nations is being re-evaluated as they emerge from the current global recession and as the donors face stronger competing demands to use foreign aid for other areas such as climate change. At the same time, future funding contributions from philanthropies and innovative sources such as global solidarity taxes on airline tickets are uncertain.⁹

In these circumstances, several important policy actions are needed. Funding for AIDS from low and middle income governments needs to grow in line with their ability to pay, something that has not happened over the past decade.

As part of our work, we compared expected AIDS spending with the projected overall national wealth and total health spending for a selected set of countries that represent a cross section of all low and middle income countries. The table and bubble chart (Figures ES.3 and ES.4, pp. 11-12) show results under one of the scenarios, Rapid Scale-Up. For several of the sizeable middle income countries that are expected to be among the largest spenders for AIDS in 2031 in absolute terms, including Brazil, China and India, we project that AIDS resource needs will amount to a tiny fraction of national wealth (0.1 to 0.2 percent of GDP) and less than 5 percent of health expenditures by 2031. Such countries will be able to absorb the costs of AIDS relatively easily. They should gradually move to pay fully for their epidemics and also join donors in helping low income countries.

On the other hand, in a significant number of low income countries in Africa, AIDS spending needs are projected to be equivalent to 1.2 to 3.6 percent of GDP and a sizeable share of all health

8 Schneider, K and L Garrett. The evolution and future of donor assistance for HIV/AIDS [Internet]. Working paper. New York (NY): aids2031 Costs and Financing Working Group; 2009 Jul [cited 2009 Nov 5]. Available from: http://www.aids2031.org/pdfs/the%20evolution%20and%20future%20of%20donor%20assistance%20for%20hiv%20-%20aids_19.pdf.

9 UNITAID. Innovative financing for health: the air-tax – a journey to access [Internet]. Geneva: WHO; c2006 [updated 2008 Dec; cited 2009 Jul 7]. Available from: <http://www.unitaid.eu/en/Facts.html>.

Figure ES.3 | Projected AIDS Prevalence And Expenditure in 2008, 2015, and 2030, Selected Countries by Adult Prevalence

COUNTRY	2008					2015					2030				
	Prevalence	GDP Per Capita (US\$) ^a	AIDS Exp Per Capita (US\$)	AIDS Exp as % of THE ^b	AIDS Exp as % of GDP	Prevalence	GDP Per Capita (US\$) ^a	AIDS Exp Per Capita (US\$)	AIDS Exp as % of THE ^b	AIDS Exp as % of GDP	Prevalence	GDP Per Capita (US\$) ^a	AIDS Exp Per Capita (US\$)	AIDS Exp as % of THE ^b	AIDS Exp as % of GDP
South Africa	18.3	3946	32	9.8	0.8	19.3	5194	58	13.4	1.1	17.9	8992	64	8.4	0.7
Zambia	15.2	401	24	111.5	6.0	13.1	530	34	118.9	6.4	7.9	915	33	64.5	3.6
Mozambique	12.6	336	12	86.3	3.5	12.2	493	30	145.1	6.0	8.0	1198	30	57.8	2.5
Kenya	7.0	513	11	52.0	2.2	5.7	627	23	84.6	3.6	3.2	921	23	57.3	2.5
Uganda	5.5	294	8	42.3	2.8	3.8	353	14	59.7	4.0	1.6	550	12	31.8	2.2
Cameroon	5.0	782	6	15.8	0.8	3.8	898	17	36	1.9	1.9	1234	15	22.6	1.2
Nigeria	3.1	522	4	19.0	0.7	2.6	674	11	44	1.6	1.5	1137	11	25.3	1.0
Ukraine	1.6	1172	2	2.2	0.1	1.6	1817	6	4.8	0.3	1.8	4332	6	1.9	0.1
Thailand	1.4	2779	4	4.0	0.1	1.1	3489	4	3.2	0.1	0.6	5179	3	1.6	0.1
Cambodia	0.9	512	3	11.0	0.6	0.6	814	5	10.7	0.6	0.2	1903	5	4.2	0.3
Brazil	0.6	4010	4	1.1	0.1	0.6	4566	4	1.1	0.1	0.5	5650	4	0.9	0.1
Vietnam	0.5	661	1	2.3	0.1	0.5	963	3	5.7	0.3	0.6	1822	3	3.0	0.2
India	0.3	727	1	1.7	0.1	0.2	1090	2	4.2	0.2	0.1	2388	2	1.8	0.1
Mexico	0.3	6320	7	1.8	0.1	0.3	7009	9	2.1	0.1	0.3	8018	8	1.6	0.1
China	0.4	1930	0	0.5	0.02	0.2	3277	3	2.4	0.1	0.2	9002	3	0.8	0.04

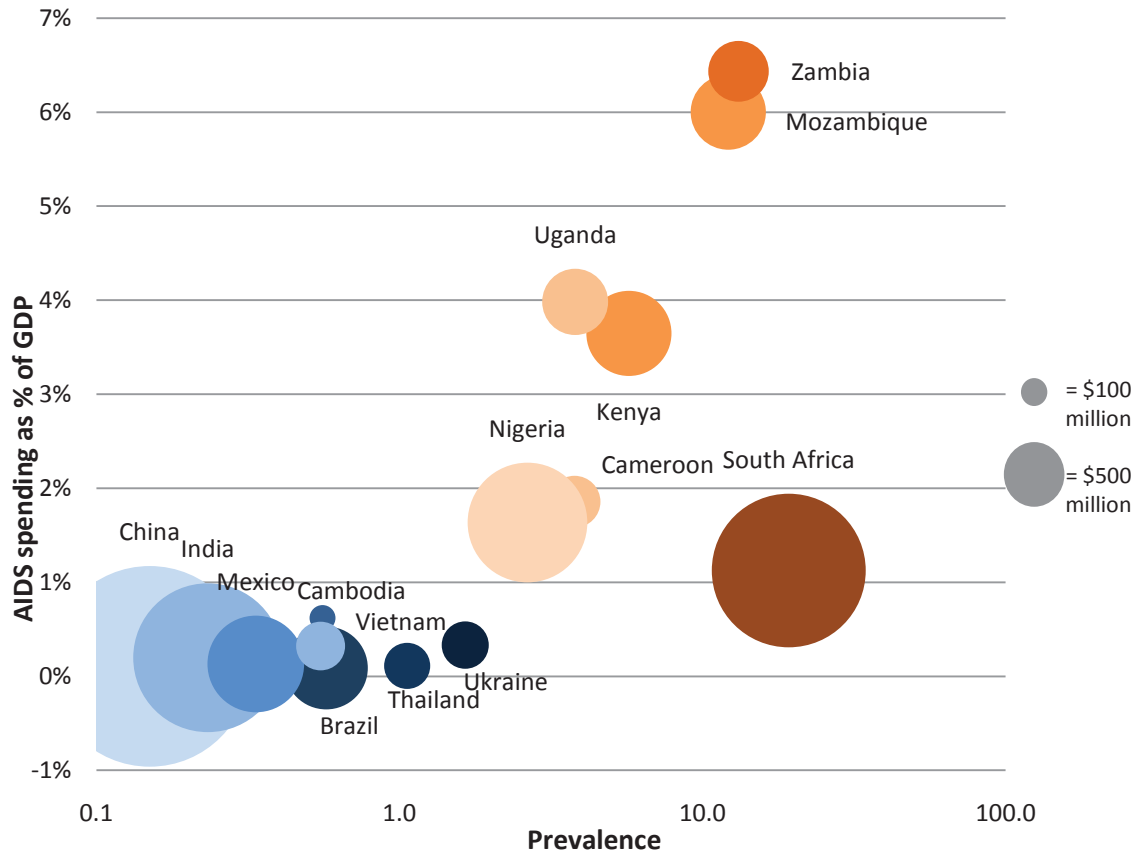
Sources: Unless otherwise indicated, all numbers are the authors' own calculations. Complete results can be found online in the full working paper, Estimating Long-Term Global Resource Needs for AIDS through 2031, available at: www.resultsfordevelopment.org

^a Based on World Bank GDP estimates. ^b THE stands for total health expenditure.

expenditures in 2031, ranging from 23 percent in Cameroon to 64 percent in Zambia under one of our scale-up scenarios. This financial burden will be even higher in 2015 – absorbing as much as 6.4 percent of GDP in Zambia – as AIDS spending escalates rapidly over the next few years while overall economic growth progresses slowly.¹⁰ It is unlikely that these countries will be able to pay for an adequate response to their AIDS epidemics with their own domestic funds, without crowding out other important areas of spending for health and other services. These countries

10 Bollinger L, Stover J, Forsythe S. Estimating the Long-Term Global Resource Needs for AIDS through 2031 [Internet]. Working paper. New York (NY): aids2031 Costs and Finance Working Group; 2009 May [cited 2009 Nov 5]. Available from: <http://www.aids2031.org/pdfs/estimating-long-term-global-resource-needs-for-aids-through-2031.pdf>.

Figure ES.4 | AIDS Spending Requirements as a Share of GDP and Adult HIV Prevalence, 2015, Selected Low and Middle Income Countries



Bubble size is proportional to each country's total projected AIDS spending needs in 2015.

face the prospect of dependence on outside financial support for two decades and longer.

External sources (donor governments and philanthropic organizations) should help to fill the gaps which remain in countries that cannot afford to pay all AIDS costs. But how much funding can be expected from these outside sources over the next two decades? Our analysis suggests that if the share of rich countries' wealth devoted to overall development assistance and to AIDS remains as it is today, outside support for AIDS will reach just \$8 billion in 2015 and \$11 billion by 2031, covering less than 30 percent of what will be needed, as compared to 43 percent today. The poorest, most affected countries could face large funding shortfalls. On the other hand, if

wealthy nations expand their overall development assistance to 0.7 percent of GDP, in line with the announced target of the European Union, external resources for AIDS could grow to \$30 billion by 2031, covering a much larger share of future requirements and going a long way to support the poorest countries with the most severe epidemics.

At the same time, external financing should not produce perverse incentives for developing countries – for example, quasi-guaranteed support for treatment should not lead governments to become complacent about prevention, because they assume that outside funding will always be available to ensure a robust treatment response. Donors should increasingly combine their technical and financial support for AIDS with intensified policy discussions with low and middle income recipients, encouraging these countries to commit to the actions – stronger and smarter prevention, more efficient delivery of treatment, faster and deeper social changes – that will ultimately stop the epidemic and reduce the long-term costs of the struggle to control AIDS.

Policy Choices and Recommendations

In our report we make a number of policy recommendations. The top ones include:

1. To reduce and contain long-term AIDS spending, the number of new infections over the next two decades must be brought down well below the 1.2-2.1 million a year figure that we project in our scenarios for 2031. Dramatically lowered infections will result in fewer persons requiring treatment in the future, thus moderating spending on anti-retroviral therapy and related treatment of other opportunistic infections such as tuberculosis, certain cancers, and severe pneumonia.
2. HIV prevention efforts, still neglected in many countries, must be greatly intensified, including the greater focus of resources on prevention programs for most at-risk population groups, especially men having sex with men, female commercial sex workers, and injecting drug users. In countries where the epidemic is spread widely among sexually active adults, expansion of male circumcision services would help to slow the pace of new infections. Public sector donors, foundations, academic institutions, and pharmaceutical companies should invest more in research and product development for new HIV prevention tools. Public sector and civil society institutions in all countries should mobilize on a large scale, with high level political leadership, to put in place a series of structural changes such as repeal of anti-sodomy laws, legalization of needle exchange programs, and measures to reduce violence against women.

3. In each low and middle income country, the government and its main external partners should identify and commit to a series of actions which can substantially raise the efficiency of national AIDS spending over the short and medium term. Areas worth considering: improving procurement of anti-retroviral drugs and test kits; expanding prevention services at individual sites, such as counseling and testing, so that economies of scale can be achieved; training and employing better program managers focused on raising service quality and lowering costs; and shifting tasks (e.g., in AIDS treatment) to lower cost health workers and community based facilities.
4. Given the likelihood that financial needs for AIDS will continue to grow in most developing countries, the many middle income nations with low levels of infection should strive for financial self-sufficiency in the coming years. They should agree with their current external funders (especially the largest ones including the Global Fund and PEPFAR) on exit strategies for these outside agencies, based on a carefully planned and executed transition process in which the national government takes over funding AIDS activities as the donor winds down.
5. Available donor funding should be focused on high prevalence countries – on those in the low income category over the next two decades and possibly even longer, since they are unlikely to be able to achieve self-sufficiency, and on a small number of severely affected middle income countries like Botswana, Namibia, and South Africa over the medium term (5 to 10 years).
6. Donors should be using their financial and technical strengths to stimulate greater policy dialogue with low and middle income countries, discussing and supporting the key policy changes that are needed to improve the use of scarce AIDS funds. This means getting governments with concentrated epidemics to acknowledge the importance of reaching at-risk population groups with prevention services, and act swiftly to reach those groups. And it means persuading governments with widespread epidemics (especially in Southern Africa) to expand proven approaches such as preventing mother-to-child transmission and male circumcision, while also boldly building social movements and searching for creative ways to lower heterosexual transmission in the general population by reducing the number of sexual partners that each person has, and by increasing condom use.
7. Governments and AIDS advocates should expand their current efforts to capture a share of the new philanthropy that will emerge in the coming years, including from very wealthy individuals in the emerging economies of Brazil, China, India, and the Middle East. There is scope for considerably greater creativity in this area, something that governments and public sector donors have been slow to capitalize upon.

8. Governments, bilateral aid agencies, multilateral institutions, foundations, and policy research organizations should continue to invest in better data, tools, models, and assessments of the impact, costs, and effectiveness of AIDS prevention and treatment programs. While much has been learned in this area to date, there are still large gaps in our knowledge of what works, and at what cost; what are the most cost-effective ways to prevent HIV infections and treat AIDS patients in different settings; and where the greatest efficiency gains can be achieved in the design and management of critical prevention and treatment services.

The Way Ahead

As we explain in this report, the future of AIDS funding is troubling and should be a cause for major concern for everyone, low and middle income country governments and their international partners included. But the situation is far from hopeless. There is much that we can and must do to get AIDS prevention, treatment, and mitigation programs onto a better path, leading to faster and deeper drops in infections, cuts in the average cost of providing treatment to all those who need it, and placing the spending by governments, donors, and others onto a lower, more affordable trajectory. Showing that money for AIDS can be used more efficiently and to achieve greater benefits will also help to maintain political support and enthusiasm for the large-scale efforts that will need to be sustained for decades to come. These steps will require global creativity, national and international leadership, and improved policies and programs. Given the impressive progress that has been made in the fight against AIDS over the past decade, that if we use our collective resources and political will to our best advantage, we can solve the AIDS financing challenges of the coming decades to 2031.



Chapter 1: Introduction

THE IMPETUS FOR aids2031

AIDS has been with us now for nearly three decades, taking individual lives, weakening families and communities, and undermining economic and social progress. The first AIDS cases were reported in 1981, and the HIV virus was characterized shortly thereafter. Since that time, an estimated 60 million people have become infected worldwide, and about 33 million are living with the virus today. About 2.7 million new infections occurred in 2007, and over 2 million persons died from AIDS that year.

After a slow global response in the early years of the pandemic, countries have initiated a major effort to scale up efforts against the virus. In 2008, officials estimated that more than \$13 billion was spent on AIDS prevention, treatment, and related social mitigation activities in developing countries, up from a several hundred million dollars annually a decade earlier. About \$7 billion of this spending came from external donors, representing about 7 percent of all overseas development assistance. About 4 million HIV positive persons in low and middle income countries were receiving highly active antiretroviral treatment by mid-2009, up from just 50,000 people in sub-Saharan Africa, home to two thirds of all infections, receiving treatment in 2002.

In short, AIDS has become a major public health effort with many successes. But there remains a large gap in actions and funding, whether to achieve the Millennium Development Goal #6 of “halting and reversing” the epidemic, or in pursuit of other ambitious long-term objectives such as providing treatment to all in need and moving rapidly toward a world in which the number of new HIV infections each year might fall to near zero. While the recent leveling off of new infections globally is encouraging, there is no indication so far that we are about to see AIDS decline and disappear, nor are there signals to suggest that the costs of stronger prevention or of treating the growing numbers of people who require AIDS drug therapy will stop increasing in the coming years.

In the face of these worrying short- and medium-term trends, the aids2031 project was launched in 2008 to develop fresh insights into where the global AIDS epidemic may be heading over the next two decades. Its focus has been on what can be done in the next few years to decisively shift the trajectory of AIDS so that in the year 2031 – 50 years after the discovery of the disease – a much more positive situation might arise, in which (1) the number of new HIV infections would be minimal, (2) the number of persons dying from AIDS would also be close to zero, and (3) the negative social and economic impacts of the disease would be fully mitigated.

THE LONG-TERM COSTS AND FINANCING OF AIDS

As part of the aids2031 effort, our Working Group was asked to consider the long-term costs and financing of AIDS, including the implications of various major policy options. More specifically, our charge was to provide analytical insights and policy recommendations in three areas:

- Estimating the long-term costs of AIDS, using a range of distinct scenarios, grounded in different future possibilities for the main cost drivers which can be influenced by countries' economic and political choices. Where are financial needs trending for low and middle income countries over the next 22 years? How much funding will each of the scenarios require over the full period, and what will be the annual cost in 2031? What factors are likely to be most important in driving future costs upwards? Are there some "game-changing" actions that could dramatically lower future resource needs?
- Making recommendations for setting priorities for resource allocation, based on evidence of intervention and program cost-effectiveness, and for managing financial resources in an effective and efficient manner. While detailed recommendations for making AIDS spending more efficient were seen as beyond the scope of our work, we were still asked to point to some of the broad areas that could yield more "value for money." How can governments, donors, and other key actors in national AIDS programs use their scarce resources to prevent more infections, keep more people alive on treatment, and protect and nurture AIDS orphans? Where can they obtain the greatest gains by allocating funds to the highest impact areas, and by managing those funds more efficiently? And how can such improved allocations and management approaches be encouraged and realized in practice?
- Constructing and evaluating long-term financing scenarios that are adequate, equitable, predictable, and sustainable. How affordable are the estimated AIDS program "price tags," annually and over the next 22 years, for individual countries and their external partners? How should the future financial burden be shared among the various sources of financing, internal and external, public (including health insurance) and private (including philanthropic organizations, industry, NGOs, and out of pocket payments)? Over the next two decades, will there be new important new sources, mechanisms, and channels for financing?

HOW WE DID OUR WORK

In order to address these questions, the Results for Development Institute (R4D) agreed to set up an international Working Group (WG) composed of 17 eminent persons from government, donor agencies, academia, and civil society (Figure 1.1, pp. 20). The WG was co-chaired by David de Ferranti and Robert Hecht from R4D, and Callisto Madavo from Georgetown University.

Starting in May 2008, the WG commissioned a series of technical background papers covering the three broad topics in AIDS costs and financing mentioned above. The background papers, written by teams of leading health economists and finance experts, were presented in draft at a review workshop in February 2009 and subsequently revised and published in May-July 2009. The papers are listed in Figure 1.2 (pp. 21).

In connection with several of these background papers, new models were developed, tested and validated, and then used to estimate long-term AIDS funding requirements and project the capacity of developing country governments and the donor community to finance these AIDS costs. These models are available for review and use by others who might wish to apply them at global or country levels. The WG convened a number of technical consultations to deepen specific aspects of its work, including a consultation on AIDS resource mobilization and on estimating the unit costs of AIDS prevention and treatment interventions as national programs expand their scale of implementation.

The Costs and Financing Working Group, through its secretariat at R4D, also organized two country-based applications of the long-term AIDS costs and financing tools in Cambodia and South Africa. Cambodia was selected because it is representative of a low income developing country facing a serious but concentrated epidemic, in which most new infections are occurring in vulnerable population groups including commercial sex workers, injecting drug users, and men having sex with men. While the estimated financial resources needed to continue fighting AIDS are modest, Cambodia is a relatively poor country which is currently depending heavily on outside donors to fund its AIDS activities. South Africa was chosen because it represents a distinctly different situation – a middle income developing country with relatively more internal resources, but coping with a widespread epidemic in which nearly a fifth of all adults are infected with HIV, largely through heterosexual transmission.

Figure 1.1 | Working Group Members**Dr. David Apuuli,**

Director General,
Uganda AIDS Commission

Dr. Jarbas Barbosa da Silva,

Area Manager,
Health Surveillance
and Disease Management, PAHO

Mr. Paul Bekkers,

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Mr. Christoph Benn,

Director of External Relations,
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Tuberculosis, and Malaria

Dr. Alvaro Bermejo,

Executive Director,
International AIDS Alliance

Dr. Mark Blecher,

Director of Social Services,
National Treasury,
Cape Town, South Africa

Dr. David Bloom,

Chair, Department of Population
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Mr. Dai Ellis,

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Dr. Dean Jamison,

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Dr. A.K. Nandakumar,

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Dr. Agnes Soucat,

Senior Health Economist,
World Bank

Mr. Louis-Charles Viossat,

Inspector General for Social Affairs,
IGAS

Dr. Alan Whiteside,

Professor, University of KwaZulu-Natal,
South Africa

The Cambodian and South African authorities have embraced this work and are carrying it out using local teams of experts guided by a national steering committee, as both countries see the aids2031 work as an opportunity to obtain answers to critical questions about the future financial burden of AIDS and how to contain it, make wise spending choices, and adopt fair and sustainable financing strategies. The Cambodia and South Africa studies will be completed in the second quarter of 2010, and broad publications, dissemination, and policy dialogue activities are being planned for both countries.

THE ORGANIZATION OF THIS REPORT

The report is organized in five chapters. In Chapter 2, we present the principal results from the long-term cost scenarios, and look at some of the “game-changers” that could significantly increase, or lower, the long-run financing needs of national AIDS programs.

In Chapter 3, we consider ways to improve the efficiency of AIDS spending, by allocating limited resources to the prevention, treatment, and mitigation activities where they can have the largest

Figure 1.2 | aids2031 Costs & Financing Working Group – Background Papers

I. Resource Needs (costs)

1. Global Resource Needs Estimates 2009-2031
2. Projecting Changes in Unit Costs of Key Interventions as National Programs Scale-up

II. Resource Allocation (efficiency)

3. The Cost of Antiretrovirals - Maximizing Value for Money
4. Assessing Costing and Prioritization in National HIV/AIDS Strategic Plans
5. AIDS Strategic Planning in Honduras: A Case Study
6. The Past, Present and Future of AIDS Resource Allocation
7. What Works to Prevent, Treat, and Mitigate - Review of Cost-Effectiveness Literature
8. Cost-Effective Interventions for Most-at-Risk Populations
9. HIV and AIDS Programs: How they Support Health System Strengthening

III. Resource Mobilization (financing)

10. Prospects for Public Sector Donor Assistance to 2031
11. The Future Role of Philanthropy in Fighting AIDS
12. Fiscal Space and Political Space: Implications for aids2031

impact; raising technical efficiency through a series of measures such as stronger and more effective program management; opting for low cost, high quality models to deliver prevention and treatment services; and pursuing procurement strategies that lead to low cost purchases of drugs and other important commodities. In this chapter, we also look at how improved national AIDS planning processes can contribute to making more efficient spending decisions.

In Chapter 4, we examine the long-term prospects for financing the global AIDS response in developing countries between now and 2031. As part of this analysis, we project the capacity of developing country governments to pay for their national AIDS efforts, taking into account expected economic growth and population increases. We further consider the potential of OECD donors to continue paying for a portion of these national AIDS programs, and look at possibilities for important financial contributions from other sources, including non-traditional public sector donors, philanthropic institutions and individuals, and corporations.

Finally, in Chapter 5 we summarize our main findings and policy recommendations, and point to some areas where future analysis might be fruitful.



Chapter 2: How Much Will the Global AIDS Response Cost Over the Period 2009-31?

THE MAIN COST SCENARIOS

The primary question to be answered is: How large are the resources required for HIV/AIDS programs in low and middle income countries through 2031? This information can illustrate how policy decisions taken in the next few years might dramatically affect the financial resources required to fight AIDS over the next 22 years.

The estimates presented here build upon the methods used for the UNAIDS Global Resource Needs Estimates (GRNE), which include resources required for 19 prevention interventions, seven care and treatment interventions, orphans and vulnerable children (OVC) support, and 15 program support functions for the period 2007-2015 (Annex A).¹ The resources required for each of the prevention, care and treatment, and OVC support interventions are determined by multiplying the population in need of the service by the coverage (the percentage of the population in need actually receiving the service) and multiplying this result by the unit cost. The number of people in need of each service is determined from epidemiological and demographic projections. Unit costs are based on current country-specific costs, with possible changes as programs expand to reflect economies of scale. For coverage, information is available for most countries on the current coverage of key services, while future coverage targets vary by scenario.

The initial GRNE were calculated in 2001 to support the first UN General Assembly Special Session on HIV/AIDS.² Over time, the GRNE have evolved to include more interventions, such as post-exposure prophylaxis kits and interventions to prevent violence against women.

In general, however, the basic components of a comprehensive package to address the HIV/AIDS epidemic remain the same: prevention, care and treatment, support for orphans and vulnerable children, national program costs, and international support costs. The aids2031 projections take into

1 Joint United Nations Programme on HIV/AIDS. Financial resources required to achieve universal access to HIV prevention, treatment, care and support. Geneva (Switzerland): UNAIDS; 2007 Sep 26.

2 Joint United Nations Programme on HIV/AIDS. Financial resources required to achieve universal access to HIV prevention, treatment, care and support. Geneva (Switzerland): UNAIDS; 2007 Sep 26.

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Figure 2.1 | List of Interventions by Component

PREVENTION PROGRAMS

Vulnerable Populations	Behavior Change	Medical Services	New Technologies
Sex Workers	Community Mobilization	Blood Safety	Pre-Exposure Prophylaxis
MSM	Mass Media	STI Treatment	Microbicides
IDU	Social Marketing	Male Circumcision	Vaccines
Prisoners	VCT	PMTCT	Cures
Other Special Populations	Condoms	Safe Medical Injections	
Youth: In-School		Universal Precautions	
Youth: Out-Of-School			
Formal Sector Employees			

CARE AND TREATMENT PROGRAMS

ART	Non-ART
Drug Costs	Opportunistic Infections Treatment
Laboratory Costs	Provider-Initiated Counseling/Testing
Service Delivery (including HR)	

NATIONAL PROGRAM COSTS*

Health Facilities
Program Management
IEC & Advocacy
M&E Including Ops Research
Training
Logistics and Supply
Lab Upgrading
Supervision & Patient Tracking
Drug Resistance Surveillance
Human Resources

INTERNATIONAL PROGRAM COSTS*

Civil Society Strengthening
Technical Assistance
Global Advocacy & Coordination
Policy, Human Rights, Stigma

SUPPORT TYPES FOR OVC*

Education
Health Care Support
Family/Home Support
Community Support
Organization Costs

*Interpolated directly from the UNAIDS Global Resource Needs Estimates

account target population sizes, unit costs and coverage through 2031 for the same interventions used in the GRNE and also look at new interventions (technologies) that may become available in this time frame, such as pre-exposure prophylaxis (PrEP), microbicides, vaccines or cures. (See Figure 2.1, pp. 24).

The basic estimation methodology has also remained the same: First, the target population in need of a particular intervention is identified. Second, the number of people actually served by the intervention is calculated by multiplying the identified target population by a target coverage rate. Finally, the number of people served is multiplied by the appropriate unit cost to calculate the resources required: $\text{Population in need} * \text{Coverage} * \text{Unit Cost} = \text{Resources Required}$. The data sources and general description of each part of this equation are described in turn below.

Population in Need

Data sources for population in need vary by intervention; a detailed list of the data sources used by intervention can be seen in Annex B (pp. 110). For prevention programs, the basic demographic estimates and projections are from the UN Population Division 2006 World Population Prospects. These are supplemented by national estimates for special population groups. When national-level estimates for special population groups are not available, regional averages are used. Socio-economic variables are derived from the World Development Indicators database, while data regarding the need for medical services are supplied by the World Health Organization. The number of people needing care and treatment was estimated in collaboration with the aids2031 Modeling Working Group. Because of the long-term nature of the projections, prevention efforts in earlier years will have an impact on the number of new HIV infections, and hence the number of people needing treatment, in later years. After extensive consultation, the Modeling Group decided to estimate the impact of the different scenarios on new HIV infections using the Goals model.³ This model estimates the effects of prevention interventions on behavior change and then simulates the effects of behavior change on the number of new infections.

The Goals model has been used in numerous national and global applications. It links coverage of prevention and care and treatment interventions to behavior change and reduction in infectiousness. The impact of exposure to prevention interventions on behavior change is estimated on the basis of an impact matrix that summarizes the findings from all the impact studies of good quality

³ Stover J, Bertozzi S, Gutierrez JP, Walker N, Stanecki K et al. The Global Impact of Scaling-Up HIV/AIDS Prevention Programs in Low- and Middle-Income Countries. *Science* 10 March 2006; Vol 311.no.5766, pp. 1474-1476; Bollinger L, Cooper-Arnold KA, Stover J. Where are the Gaps? The Effects of HIV-prevention Interventions on Behavioral Change in Developing Countries *Studies in Family Planning* 2004; 35[1]27-38.

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that have been conducted in the developing world. This matrix describes how coverage of various prevention activities (such as Voluntary Counseling and Testing (VCT), school-based programs and community mobilization) affects four key behaviors: condom use, number of partners, age at first sex, and needle-sharing behavior. In addition, increasing ART coverage reduces the infectiousness of people living with HIV, and the impact of Prevention of Mother to Child Transmission (PMTCT) programs is also included. An HIV transmission model with five risk groups (high, medium, low, men who have sex with men (MSM), and injecting drug users (IDU)) calculates how changes in behavior reduce the number of new HIV infections and thus the future need for ART.

The Modeling Group also used the Goals model to estimate the impact of both pre-exposure prophylaxis (PrEP) and microbicides on the number of new infections and AIDS deaths through 2031. The incremental impacts of these new technologies were calculated as further additions to the Rapid Scale-up scenario (see below for scenario description).

Unit Costs

For prevention interventions, most unit costs are based on data from published sources and then applied to all countries with appropriate adjustments for purchasing power parity (Annex C). A special analysis of the relationship between unit costs and scale is used to project changing unit costs over time for six prevention interventions: (PMTCT); counseling and testing; STI treatment; and programs for sex workers, MSM, and injecting drug users.⁴ A two-step process was followed: first, the average cost curve was calculated based on published studies that reported both fixed and variable costs; and second, the number of persons served by an intervention was distributed across cities within a country using Zipf's Law, which predicts the size of a city based on its rank.⁵ The appropriate average unit cost for the estimated population reached in a particular city was then applied based on the estimated average cost curve, and an average unit cost was calculated by country using weighted averages for all cities with more than 5,000 inhabitants.

For care and treatment interventions, the unit costs are calculated following the same methodology used in the UNAIDS GRNE, the details of which can be seen in Annex D (pp. 118). One of the key drivers of care and treatment costs is the price of antiretroviral drugs (ARVs); since there is a great

4 Full details of the calculations and results can be seen in L Bollinger and J Stover, Projecting changes in unit costs of key interventions as national programs scale-up coverage, *aids2031 Costs and Financing Working Group*, August 2009. Available from: <http://www.resultsfordevelopment.org/products/search/81>.

5 Gabaix X. Zipf's Law for Cities: An Explanation. *Q J Econ.* 1999 April; 114(3):739–67.

deal of uncertainty surrounding the unit costs, we have performed sensitivity analyses for both first- and second-line ARV prices, varying the equilibrium price reached in 2015 by 25 percent in both directions.

Coverage: Drivers and Scenarios

Future levels of coverage will depend on a variety of factors including funding availability, political will, health system strength, and household and individual demand (which, in turn, is affected by information, social mobilization, and cost). Assumptions about possible rates of scale-up in program coverage, introduction and uptake of new technologies, and underlying global and national approaches or strategies cut across the domains of many of the aids2031 working groups. The Costs and Financing Working Group developed a set of draft scenarios to address this need for a unified approach. The scenarios were discussed at a meeting of the Steering Committee and reviewed in detail with the Modeling Working Group and the Social Drivers Working Group.

Scenarios can be used to address the uncertainty associated with long-term projections such as those required for aids2031. The use of multiple scenarios allows for the examination of resource requirements under a range of possible futures. Scenarios are usually constructed around a series of 'drivers' which are the most important influences on the actions of interest. There are a large number of possible drivers for the aids2031 scenarios. The scenarios we present below are constructed around three key factors:

- **Resource Availability:** Will the resources available for HIV/AIDS programs continue to grow rapidly, as they have in the past few years, or will they become more constrained as the costs mount, other global concerns take some attention away from AIDS, and the global economy experiences slower or less stable growth?
- **Political Will:** Will national politicians, governments, and their constituencies make stronger commitments to achieve universal access and to address politically sensitive issues regarding marginalized populations? Or will they be content with more modest or selective efforts, or shy away from issues like stigma and discrimination, or even express declining commitments as other issues come to the forefront of the political debate?
- **Approach:** Will the global approach continue to treat AIDS as an emergency and focus on short-term solutions, or will it take the longer-term view and give more emphasis to addressing structural changes that could lead to less vulnerability and a more sustainable response in the long run?

Figure 2.2 | Taxonomy of Scenario Possibilities

APPROACH	POLITICAL WILL	RESOURCE AVAILABILITY		
		Low	Medium	High
Address Immediate Needs	Mixed		Current Trends	
	Strong	Hard Choices for Prevention		Rapid Scale-up
Focus on Long-Term Structural Change	Mixed			
	Strong		Structural Change	

Different levels of these three drivers will produce very different futures for the AIDS response. From the range of possible combinations, we selected four scenarios that encompass the range of uncertainty (Figure 2.2, pp. 28).

The scenarios we investigate here in greater detail are:

1. **Rapid Scale-Up:** Political will to achieve universal access is strong and resource availability continues to expand rapidly. The focus is on scaling-up direct approaches to preventing HIV transmission and providing care and support. All countries achieve universal access (based on targets for coverage set by each country, often less than 100%) to key prevention, care and treatment, and OVC support services by 2015, and continue at that level to 2031.
2. **Current Trends:** Coverage of key interventions continues to expand as it has in the past few years. Some countries achieve universal access for some services but not others, and some countries do not achieve universal access until well past 2015.
3. **Hard Choices for Prevention:** Resources for AIDS programs are limited, so there is a focus on scaling-up only the most cost-effective approaches in order to achieve maximum impact with the resources available. For prevention, this entails greater emphasis on programs for most-at-risk-populations and less emphasis on general population interventions, particularly in low prevalence and concentrated epidemics⁶. In generalized epidemics, lower scale-up rates occur for interventions such as mass media, safe medical injections, and community mobilization.

6 Low-level epidemics are where HIV is not widespread (5% or greater) in any population sub-group, while concentrated epidemics are where HIV is widespread in at least one population sub-group.

4. **Structural Change:** In recognition that AIDS is a long-term problem, there is a greater focus on structural change that can reduce vulnerability to AIDS and produce a more sustainable response. This might include, for example, programs to reduce violence against women, modify employment practices that lead to the separation of workers and their families, and strengthen health systems.⁷

The targets for Rapid Scale-up assume that funding is available to scale up all interventions as rapidly as possible. Maximum coverage levels for most behavioral interventions are set at 60 percent, under the assumption that structural and societal factors (e.g., norms that inhibit the delivery of services for sex workers and IDU and the empowerment of women) will make it difficult to reach more than this share of the most vulnerable populations at national level. Targets for the Current Trends scenario were chosen to reflect current trends in program scale-up, based on several rounds of the Coverage Survey.⁸ Targets for the Hard Choices scenario are similar to Rapid Scale-up for those prevention interventions that have proven impact. These include condom promotion, outreach to sex workers, MSM, and IDU, male circumcision, PMTCT, blood safety, and ART. Other prevention interventions are not scaled up. Targets for the Structural Change scenario assume that societal change will facilitate greater acceptance of prevention interventions among marginalized populations allowing coverage to reach higher levels (80 percent), as well as the adoption of microbicides by 20 percent of women in the low-risk group. In addition, some prevention interventions assumed to be important in achieving structural change are scaled up to match the target coverage rates in the Rapid Scale-up scenario (community mobilization, mass media, and youth programs). Financial resources available, however, are similar to those in the Current Trends scenario, resulting in similar coverage rates for care and treatment interventions (about two-thirds of universal access targets by 2015, remaining at that level through 2031). We also assume that the societal changes allow increased effectiveness of all prevention activities.⁹ The maximum levels of coverage are achieved by 2015 in all countries under the Rapid Scale-up, Current Trends, and Hard Choices scenarios. Working in close collaboration with the Social Drivers Working Group, we assume that structural change takes longer to achieve full effects, thus the targets for the Structural Change scenario are not reached until 2025. Coverage remains constant once these target levels are achieved.

7 See Rao Gupta G, Parkhurst JO, Ogden JA, Aggleton P, Mahal AS, Structural Approaches to HIV Prevention, *The Lancet* (372:9640) pp 764-775 for a complete explanation of interventions identified as structural change interventions.

8 Coverage of Selected Services for HIV/AIDS Prevention, Care and Support in Low and Middle Income Countries, various years, available at: www.policyproject.com.

9 The model estimates of the impact of interventions on behavior change rely on a synthesis of over 200 impact studies. For most projections the average impact from all available studies is used for each intervention. For the Structural Change scenario the upper quartile of the effectiveness is used. See Bollinger LA, How can we calculate the "E" in "CEA"? *AIDS* 2008 Jul; 22 Suppl 1:S51-7.

Figure 2.3 | Coverage of Prevention, Treatment and Mitigation Interventions in Different Types of Epidemics by Scenario

INTERVENTION	2007	2015			2025
		Current Trends	Rapid Scale-Up	Hard Choices	Structural Change
Community Mobilization		H/G=30%, L/C=0%	H/G=70%, L/C=0%	Constant (2007 values)	H/G=70%, L/C=0%
Mass Media		50%	80%	Constant (2007 values)	H/G=80%, C=60%, L=50%
Counseling & Testing	10%	H/G=30%, L/C=4%	H/G=80%, L/C=10%	H/G=30%, L/C=4%	H/G=30%, L/C=4%
Condom Promotion (medium risk pop)		50%	60%	50%	70%
Youth: In-School	40%	H/G=75%, L/C=15%	H/G=100%, L/C=30%	H=50%, G=30%, L=5%, C=0%	H/G=100%, L/C=30%
Youth: Out-of-School		H/G=25%, L/C=5%	H/G=50%, L/C=10%	Constant (2007 values)	H/G=50%, L/C=10%
Workplace		H/G=35%, L/C=0%	H/G=50%, L/C=0%	Constant (2007 values)	H/G=35%, L/C=0%
Sex Work	20%	50%	60%	60%	80%
MSM	15%	35%	60%	60%	80%
IDU: Outreach	20%	35%	60%	60%	80%
IDU: Needle Exchange	10%	35%	40%	40%	60%
IDU: Drug Substitution		10%	20%	5%	40%
Blood Safety	98%	100%	100%	100%	100%
STI Treatment		100%	100%	Constant (2007 values)	100%
Male Circumcision		NA	H/G=60%, L/C=0%	H/G=60%, L/C=0%	H/G=80%, L/C=0%
PMTCT	33%	50%	80%	80%	50%
Safe Medical Injections	60%	100%	100%	0%	100%
ART	31%	64%	80%	80%	64%
Structural Change Interventions		0%	0%	0%	100%

Note that the results for orphan and vulnerable children (OVC) support costs, national program costs, and international support costs are all derived from the UNAIDS Global Resource Needs Estimates. The support costs for OVC include a combination of targeted subsidies in areas such as education, food and health care costs, and cash grants to households for all vulnerable and orphaned children in sub-Saharan Africa, and children made vulnerable or orphaned because of HIV/AIDS in the rest of the world. National program costs are based on the average percentage of the health system strengthening costs calculated by World Health Organization for the GRNE. International support costs are absolute amounts that are taken directly from the GRNE.

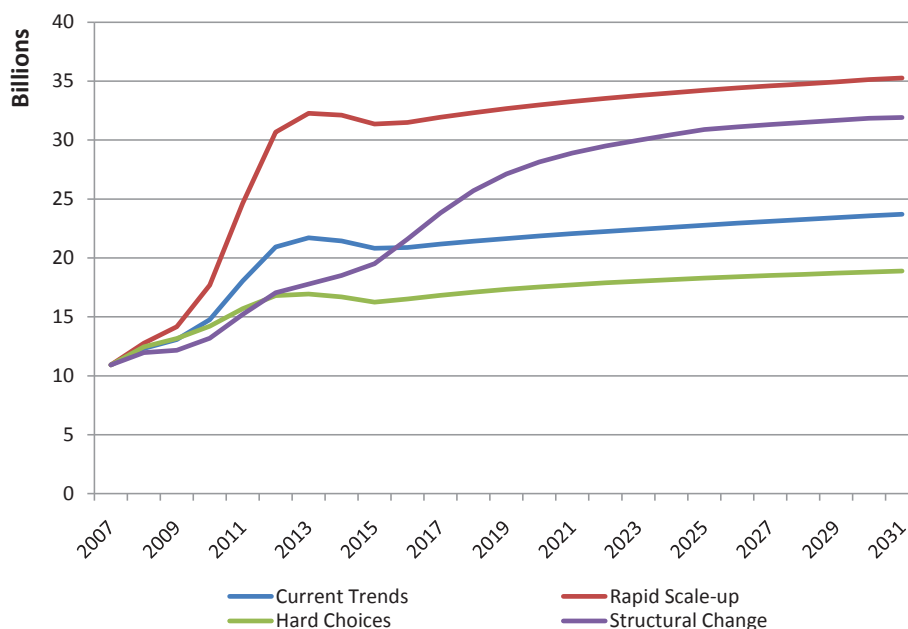
THE MAIN RESULTS FROM THE SCENARIOS

The epidemiological results shown on Figure 2.3 (pp. 30) rely on the top 22 countries only, since detailed results on the impact of prevention programs on the epidemic are available only from those countries where the Goals model was applied. The resource requirements presented below are calculated for 139 low and middle income countries; the global results for care and treatment expenditures are calculated by scaling up the number of people on ART by multiplying by the proportion accounted for by the top 22 countries at the end of 2007. The resources required to achieve these results for each of the different scenarios can be seen in Figure 2.4, (pp. 32).

Overall, the most expensive scenario is Rapid Scale-up, which reaches high coverage rates in 2015 and maintains these rates through 2031, resulting in resource needs of over US\$35 billion by the end of the time period. Note that there is a rapid increase in the resources required at the beginning of the time period, and then the rate of growth levels off after the maximum coverage rates are reached. In contrast, although the Current Trends and Hard Choices scenarios exhibit the same patterns of initial rapid increase and leveling off after the maximum coverage rate occurs, the final level of expenditures required are substantially lower than in the Rapid Scale-up scenario: about US\$24 billion in 2031 in the Current Trends scenario, and a bit less than US\$19 billion in Hard Choices. The number of new adult infections is substantially lower in the Hard Choices scenario than in Current Trends, and at the same time the level of expenditures is shown here to be 20 percent lower, due to lower prevention expenditures. Finally, by the end of the time period, the resources required by the Structural Changes scenario falls between Current Trends and Rapid Scale-up, reaching about US\$32 billion by 2031. By 2031 the number of new adult infections is actually the lowest in the Structural Change scenario, lower than the Rapid Scale-up scenario, even though the resources required are lower by that time as well. This is because the improved

environment for prevention created by the structural changes allows prevention services to reach a larger proportion of the most-at-risk populations.

Figure 2.4 | Total Resource Requirements in Low and Middle Income Countries by Scenario (Billions of US\$)

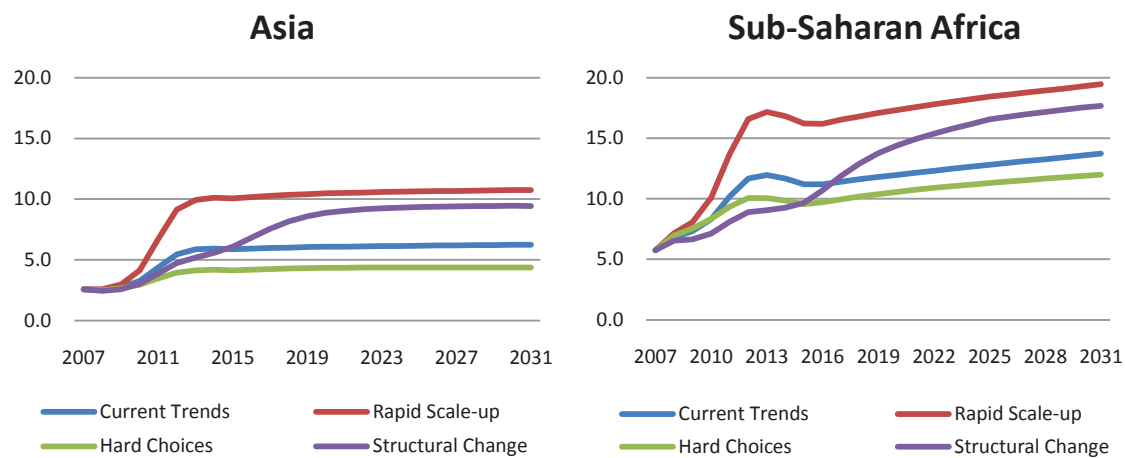


Results by Countries and Regions. The two regions with the largest resource requirements are Asia (because of the large populations) and sub-Saharan Africa (because of large disease burden), displayed in Figure 2.5, (pp. 33) on the same scale. There is a rapid increase in the amount of resources required over the short-term in both Asia and sub-Saharan Africa until the maximum coverage levels have been reached; for the first three scenarios, this occurs in 2015, while for Structural Change, this occurs in 2025.

In Asia, the Rapid Scale-up scenario reaches about US\$10.7 billion annually, the Current Trends scenario about US\$6.2 billion, and the Hard Choices scenario US\$4.4 billion a year by 2015. In the Structural Change scenario in Asia, the resource requirements peak at about US\$9.4 billion annually by the year 2025.

In sub-Saharan Africa, there is a bump in the amount of resources required as maximum coverage is attained, reaching about US\$16.8 billion annually in the Rapid Scale-up scenario, about US\$11.7 billion in the Current Trends scenario, and almost US\$10 billion a year in the Hard Choices scenario around 2014. After a pause in the growth of expenditures required when the initial maximum

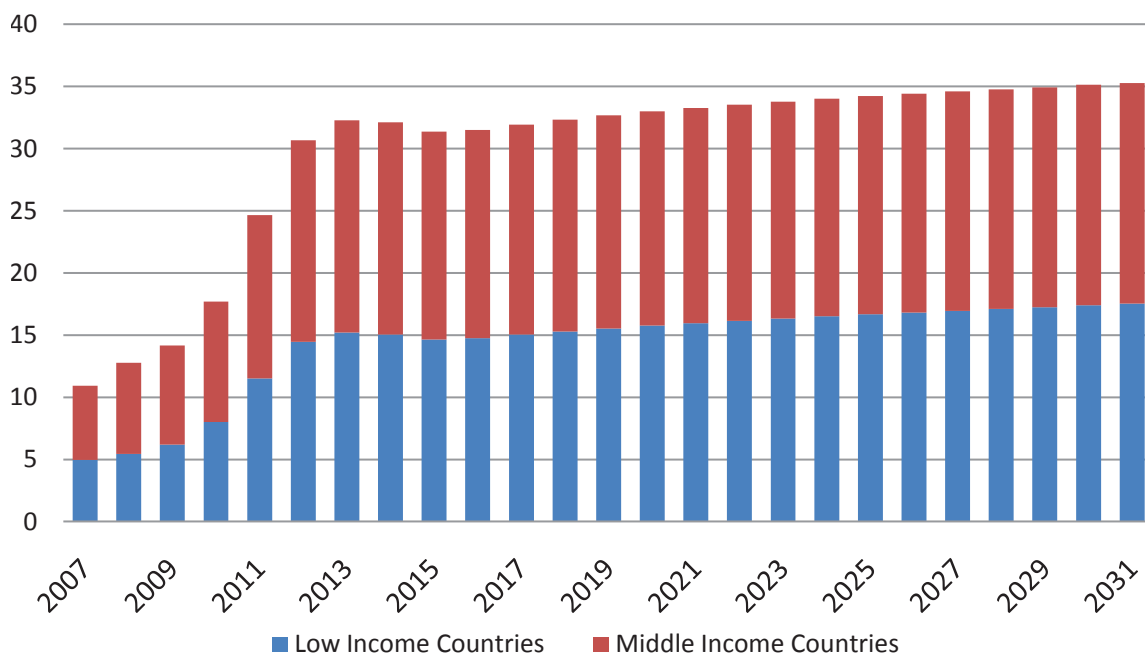
Figure 2.5 | Asia and Sub-Saharan Africa Resource Requirements by Scenario



coverage has been reached for these first three scenarios, required resources increase through 2031 in sub-Saharan Africa, as the number of new infections continues to grow. By 2031, the resource requirements in sub-Saharan Africa for the Rapid Scale-up scenario approach US\$20 billion annually, while the Current Trends scenario requires US\$13.7 billion and Hard Choices requires US\$12 billion. The path of the Structural Change scenario has a fairly consistent growth pattern over the entire time period for sub-Saharan Africa, reaching about US\$17.8 billion annually by 2031. Figure 2.6 (pp. 34) displays the total resource requirements according to low and middle income status for the Rapid Scale-up scenario.

The resources required for low income countries, defined by the World Bank as those countries with GNI per capita of US\$975 or less in 2009, accounts for slightly less than half of the total resources required between 2009 and 2031. In 2009, the low income countries require 45 percent of the total resources required, or US\$6 billion; by 2031, that percentage will increase to around 50 percent of the total resources required, or US\$17.5 billion. The implicit assumption is that over time middle income countries will probably be able to self-finance their HIV/AIDS expenditures, unless the disease burden is very high as in South Africa. At the same time, a number of low income countries may see their GNI per capita increase to the point where they also qualify as middle income countries and may be able to assume a larger share of their AIDS financing (see Chapter 4). Figure 2.7 (pp. 35) shows the resources required in the Rapid Scale-up scenario for the top 22 countries; note that the sum of these requirements in 2031 is about US\$22 billion annually, which accounts for about two thirds of overall expenditures required for low and middle income countries. This chart illustrates that the highest requirements are experienced by a few of the countries

Figure 2.6 | Low and Middle Income Countries Resource Requirements for the Rapid Scale-up Scenario (2009-2031)



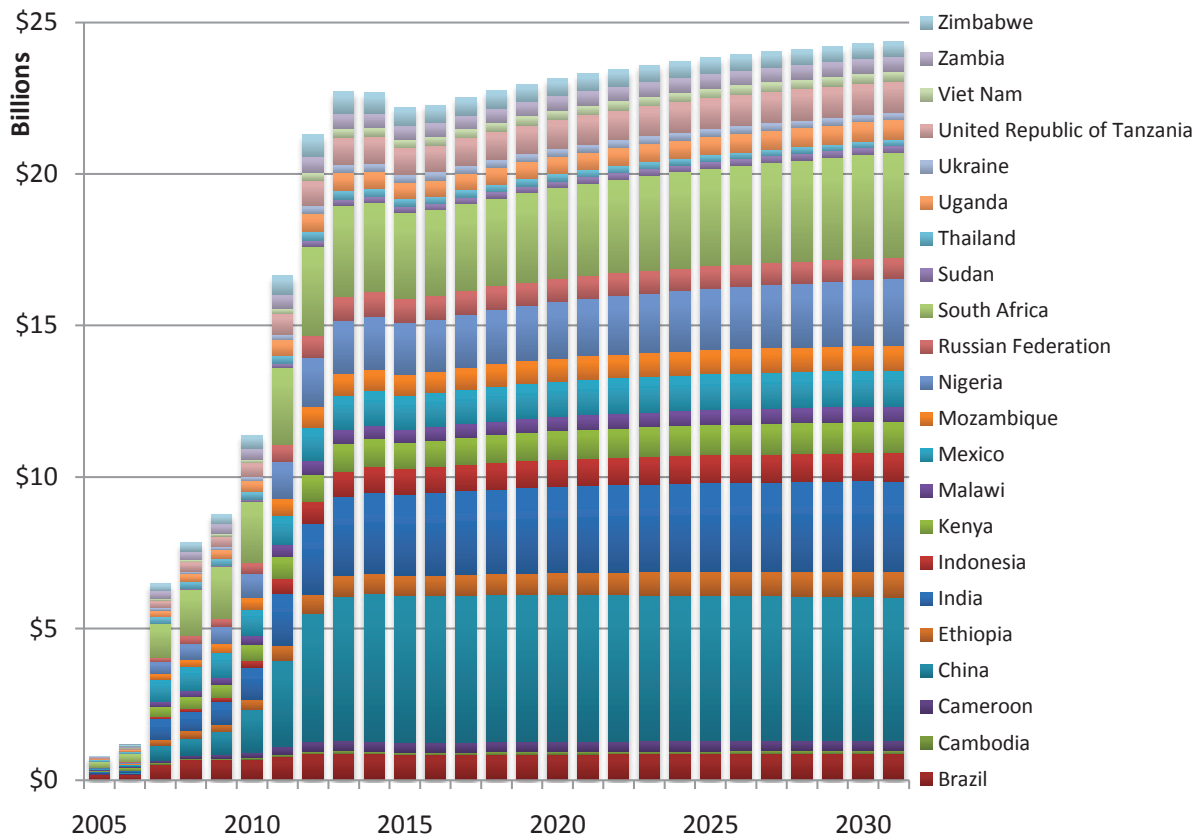
with the largest populations (China, India, and Indonesia) and a combination of large populations and high HIV disease burden (South Africa, Nigeria). By 2031 in the Rapid Scale-up scenario, the largest amount of resources is required by South Africa (US\$3.5 billion),¹⁰ followed by China (US\$3.4 billion), India (US\$2.4 billion), and Nigeria (US\$2.0 billion). In total, these four countries account for 32 percent of the total for all 139 low and middle income countries in the Rapid Scale-up scenario in 2031.

RESULTS BY COST COMPONENT

Future AIDS costs can also be examined according to the amounts required by each intervention. Figure 2.8 (pp. 36) displays the various prevention, care and treatment, OVC support, and national and international support interventions described in Figure 2.2 (pp. 28) for the Rapid Scale-up scenario.

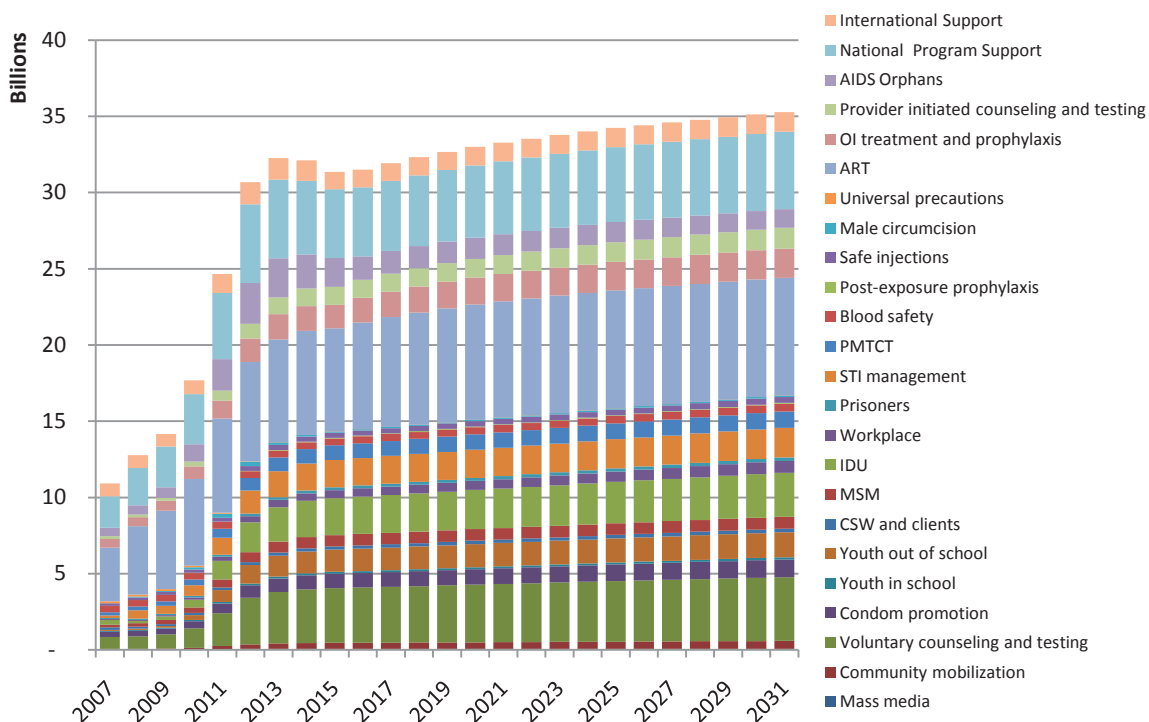
¹⁰ This estimate for South Africa is lower than the future funding requirements shown in the aids2031 country case study, which used a different, more customized set of assumptions concerning scenario definition, target coverage levels, and unit costs for the country. See “The Long-Run Costs and Financing of HIV/AIDS in South Africa,” April 2010.

Figure 2.7 | Resource Needs by Country for the Rapid Scale-Up Scenario



At the beginning of the time period, the three largest components of total resources required are ART (US\$3.5 billion), national program support (US\$2.1 billion), and VCT (US\$0.8 billion). Together, these three interventions account for 59 percent of the total expenditures in 2007 of US\$10.9 billion. In order to reach high coverage levels by 2015 spending would have to triple in just five years, growing from almost US\$13 billion in 2008 to over US\$32 billion in 2013. By 2031, the largest component is still ART, totaling US\$7.7 billion in 2031. This is followed by VCT at US\$4.2 billion in 2031. Requirements for VCT are large because it is relatively expensive per person (the average cost is \$15-\$30) and is applied to a large proportion of the adult population (12% per year in the Rapid Scale-Up scenario). The third highest level of expenditure in 2031 is National Program Support at US\$5.1 billion. In 2031, these three components account for US\$17 billion, or 48 percent of total expenditures, lower than the previous share of 58 percent in 2007.

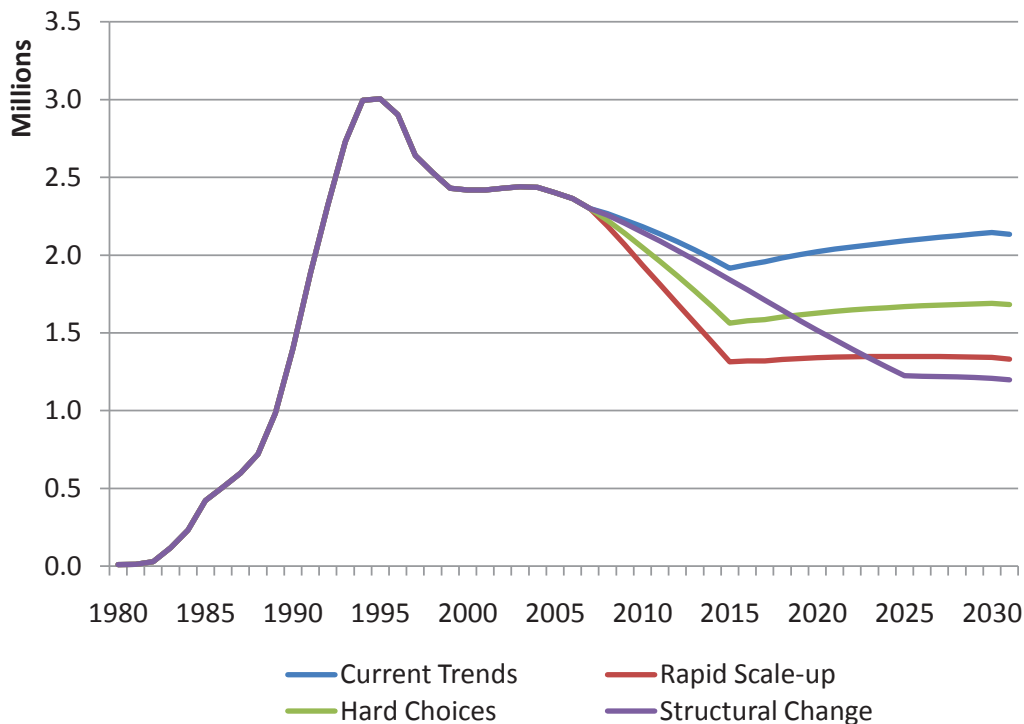
Figure 2.8 | Resource Needs for each Intervention for Low and Middle Income Countries in the Rapid Scale-up Scenario



EPIDEMIOLOGICAL IMPACT OF THE DIFFERENT SCENARIOS

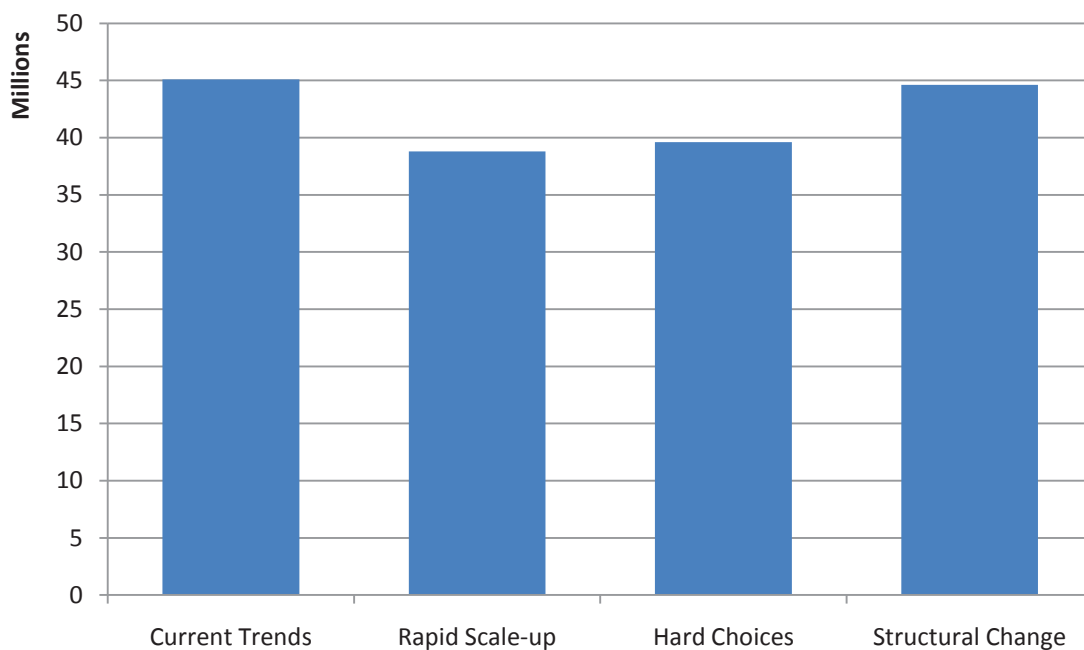
The epidemiological impact and the resources required are presented below for 139 low and middle income countries. The number of new infections associated with each scenario is displayed in Figure 2.9 (pp. 37). Historically, the number of new adult infections increased rapidly from the start of the epidemic in the early 1980s, peaking at about 3 million in the mid-1990s. Since then, the number of new adult infections has decreased by about 25 percent, reaching about 2.3 million in 2007. If Current Trends of coverage for prevention and treatment interventions continue, there will be a further decline in the number of new adult infections to about 1.9 million in 2015, when coverage reaches maximum rates, and then a gradual increase over the next 16 years to 2.1 million in 2031, as coverage remains constant but population growth occurs. In the Rapid Scale-up scenario, where the maximum coverage rates are significantly higher in 2015 than in the Current Trends scenario, the number of new adult infections declines much further, reaching a low of about 1.3 million in 2015 and remaining at about that level over the rest of the time period. If Hard Choices in Prevention are

Figure 2.9 | New Infections Among Adults Aged 15-49 by Scenario for 139 Countries



enacted, and the same high coverage is achieved in 2015 for a subset of the interventions for which there is high coverage in the Rapid Scale-up scenario, the number of new infections by 2015 falls between the first two scenarios, reaching a low of about 1.6 million before experiencing a gradual increase. Finally, if structural interventions are implemented, resulting in even higher coverage rates for certain interventions, the final number of new adult infections reaches its lowest level of about 1.2 million annually. This low level is not reached until 2025, the year that the coverage target rates reach their maximum in the Structural Change scenario. Performing a sensitivity analysis on the results for Structural Change by extending the timeframe of the scenario 10 years to 2041 for one country, South Africa, confirms that the reduction in the number of new infections reaches its minimum around 2025, and remains at about the same rate of incidence through 2041 as is experienced in 2025. Note that, although substantial progress is made against the epidemic in the Figure 2.9 (pp. 37), even scaling-up interventions to the maximum possible only cuts the number of new adult infections by half; new “game-changing” strategies will be necessary to have any further impact on reducing the number of new adult infections.

Figure 2.10 | Cumulative Number of Adult AIDS Deaths, 2009-2031, by Scenario



PROJECTED AIDS DEATHS

Another key indicator used to measure relative success of programs is the number of AIDS deaths for each of the scenarios (Figure 2.10, pp. 38). Over the time period 2009 to 2031, the number of AIDS deaths in low and middle income countries varies between 39 million and 45 million. The lowest number of cumulative AIDS deaths is experienced in the Rapid Scale-up scenario, where ART is scaled up to 80 percent by 2015 and prevention interventions are also expanded to reach their maximum by 2015. The Hard Choices scenario is similar to Rapid Scale-up, driven by similar ART and prevention coverage targets. The Current Trends scenario has the highest number of adult AIDS deaths through 2031, over 45 million; continuing on the current growth path results in the greatest number of AIDS deaths. The Structural Change scenario contains almost as many cumulative adult AIDS deaths as the Current Trends scenario, as the scale-up rates of both ART and prevention interventions are slower, reaching the maximum by 2025 rather than 2015. However, by 2031 the annual number of AIDS deaths is 10 percent lower than in the Current Trends scenario. The full benefits of the Structural Change scenario will occur after 2031 whereas AIDS deaths will continue to increase each year under the Current Trends scenario.

ESTIMATED YEARS OF LIFE GAINED

Another way of evaluating the impact of the different scenarios is to examine the number of years of life gained relative to a baseline scenario, which maintains current levels of key behaviors and interventions through 2031 (Figure 2.11, pp. 40).

Each of the four scenarios contributes years of life relative to the baseline projection of no change in treatment levels or behavior between 2009 and 2031. The impact ranges from a low of 97 million years of life gained in the Structural Change scenario to a high of 234 million years of life gained in the Rapid Scale-up scenario. As was true with projected AIDS deaths, Structural Change provides the fewest additional years of life because the full scale-up does not occur until 2025. The Hard Choices for Prevention scenario has similar results to the Rapid Scale-up scenario, as they both have 80 percent coverage rates for ART beginning in 2015.

COMPARING COSTS AND BENEFITS IN THE SCENARIOS

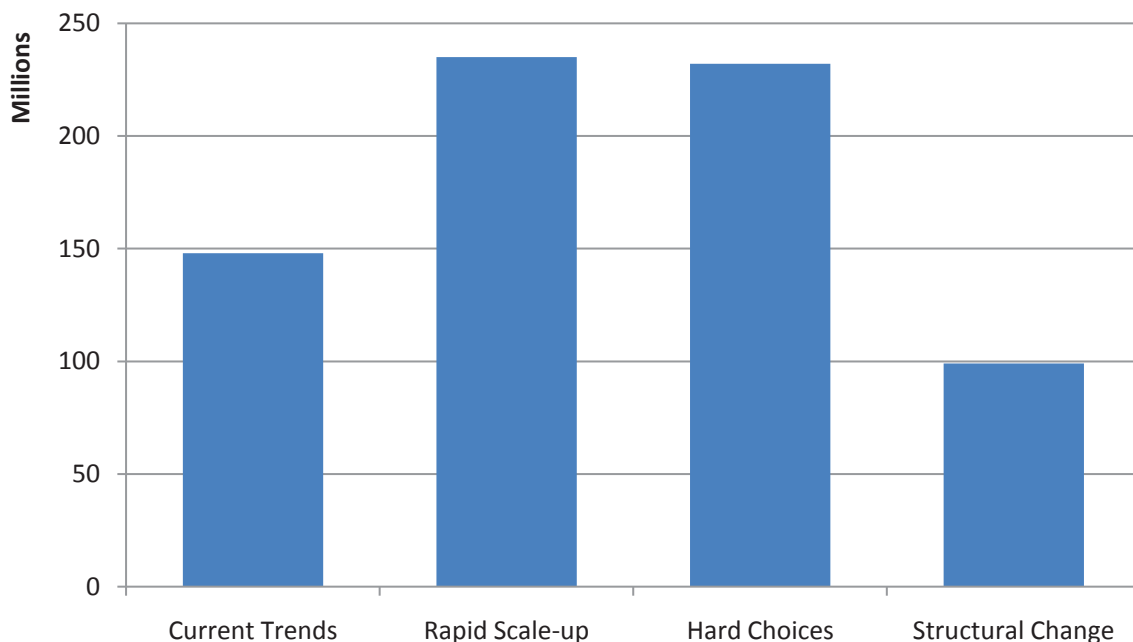
Figure 2.12 (pp. 41) summarizes the costs and epidemiological impacts of the four scenarios. If resources are constrained, Hard Choices is 20 percent less costly than pursuing Current Trends and it leads to 17 percent fewer new infections over the two decade period, and puts more than a third more patients on ART by 2031. Rapid Scale-up brings the largest benefits, in terms of lower numbers of infections – 30 percent fewer than in Current Trends – but it costs \$232 billion (or 47 percent) more than by following Current Trends.

Simple cost-effectiveness analysis can be performed for prevention interventions by calculating the incremental prevention expenditure per HIV infection averted fixing prevention expenditures at 2008 levels for the base scenario and discounting appropriately (Figure 2.13, pp. 42).¹¹

The Current Trends scenario is more cost-effective for prevention expenditures relative to both Rapid Scale-up and Structural Change, with an incremental cost-effectiveness ratio of US\$7,600 per HIV infection averted for the Rapid Scale-up scenario and US\$6,800 per HIV infection averted for the Structural Change scenario, compared to US\$6,200 for Current Trends. The Hard Choices scenario, however, is considerably more cost-effective than the Current Trends, with an incremental ratio of US\$1,400 per HIV infection averted. In other words, Hard Choices averts even more infections at a lower cost.

11 It was not possible to calculate the ICER for treatment per AIDS deaths averted for the Structural Change scenario as both total number of deaths and total expenditures are less than the Current Trends scenario.

Figure 2.11 | Cumulative Number of Life Years Gained, 2009-2031, by Scenario



GAME-CHANGERS

Factors that Could Drive Costs Higher

Are there some key factors or important events which might occur in the coming years which would have a dramatic impact on the shape of the AIDS epidemic and the related financial costs that would be incurred? In our *aids2031* project, we attempted to look at several of these factors.

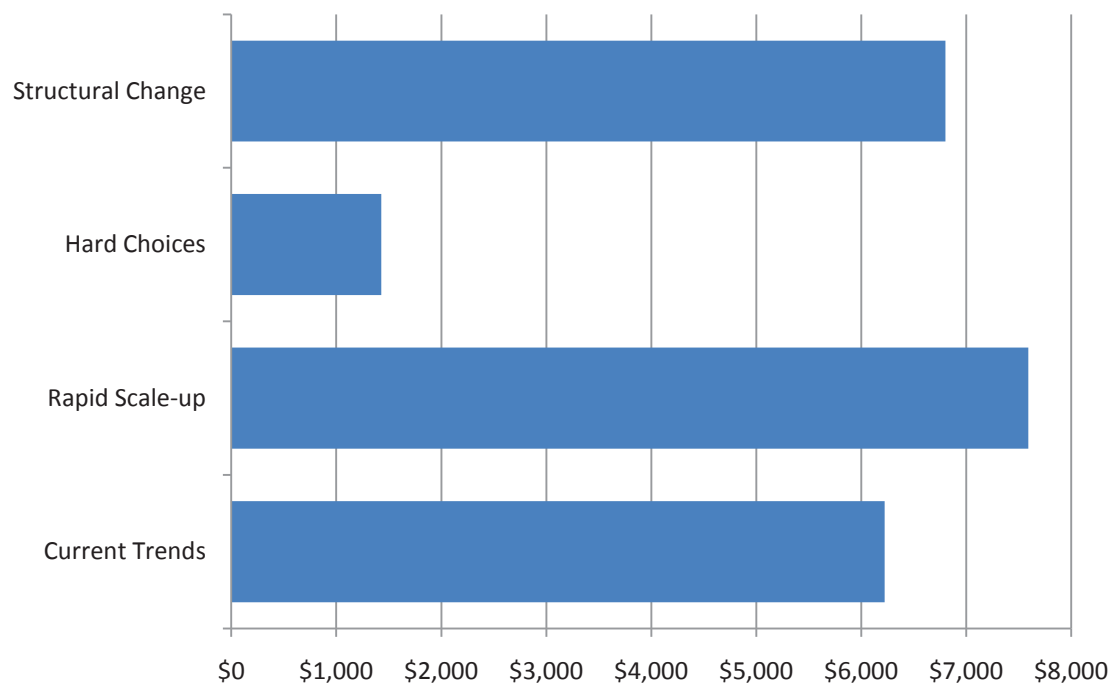
ART Prices. Due to the uncertainty surrounding the costs of ARV drugs in the future, a sensitivity analysis was performed by varying those costs. In the four scenarios, the initial price of ARV drugs is an average of drug costs for four different first-line regimens and two different second-line regimens, weighted by the proportion of patients on each regimen (see Annex B, pp. 110).¹² Separate prices are available for low income and middle income countries, and drug costs for children are assumed to be

12 WHO, UNAIDS, UNICEF. *Towards universal access: Scaling up priority HIV/AIDS interventions in the health sector.* 2007 Apr.

Figure 2.12 | Key Impact Indicators for Each Scenario (2009-2031)

	Cumulative Resources Required (Billions US\$)	Cumulative Number of New HIV Infections (Millions)	Cumulative Number of Adult AIDS Deaths (Millions)	Number of ART patients in 2031 (Millions)
Current Trends	489.9	47.7	45.1	10.1
Rapid Scale-up	722.3	33.4	38.8	13.1
Hard Choices	397.1	38.7	39.6	13.2
Structural Change	578.9	36.5	44.6	8.6

Figure 2.13 | Incremental Prevention Expenditure Per Infection Averted



42 Chapter 2: How Much Will the Global AIDS Response Cost over the Period 2009-31?

equal to those for adults.¹³ The cost of first line drugs for low income countries is assumed to increase to US\$210 by 2015, and the cost of second line drugs for low income countries to decrease to US\$590 by 2015, based on the new ARV prices announced by the Clinton Foundation.¹⁴ The cost of both first and second line drugs for middle income countries is assumed to change at the same rate as the cost for low income countries. Increasing the prices of ARV drugs by 25 percent raises overall AIDS expenditures by 3 percent, from US\$35 billion in 2031 to US\$36.5 billion, with a similar but reverse impact when the prices of ARV drugs are decreased by 25 percent. While this is an important effect, it does not dramatically change the overall AIDS program costs for developing countries.

Although most technology changes are assumed to improve the outlook of the epidemic, the possibility of increased drug resistance as a side effect could have a negative impact. Increased resistance to ARVs would likely raise the overall cost of treatment because the least expensive and most used drugs would have to be replaced with more expensive drugs from different classes. This could potentially double ARV costs in the short term. The long-term impact would be dependent on the availability of alternative drugs and price negotiations.

Factors that Could Drive Future Costs Lower

As discussed above in relation to Figure 2.4 (pp. 32), scaling up current prevention and treatment interventions to the maximum coverage level possible still will not reduce the number of new adult HIV infections by more than 50 percent by 2031. In order to achieve a more significant reduction, new technologies will have to be developed, or major behavioral transformations will have to occur in high incidence settings, for instance a dramatic reduction in numbers of sexual partners, through social movements backed by strong national leadership.

A new technology with implementation plans currently under way is male circumcision. Other possibilities are pre-exposure prophylaxis (PrEP) and microbicides, which may become available over the coming decade. There are also some even higher impact technologies which may or may not be realized over the next 20 years: an AIDS vaccine, which at this point in time is not anticipated to be available until at least 2020; and treatment leading to a cure, with unknown scientific feasibility.

The impact of the first two of these four new technologies on new adult HIV infections and adult AIDS deaths was modeled for the 22 highest-burden countries using the Rapid Scale-up scenario

13 F Renaud-Thery, BD Nguimfack. Current use of ARVs in selected Resource-Limited Countries. HIV/AIDS Programme/WHO: presented at 15-16 February 2007 - Global Resource Needs Estimates Technical Working Group Meeting.

14 See www.clintonfoundation.org for further details.

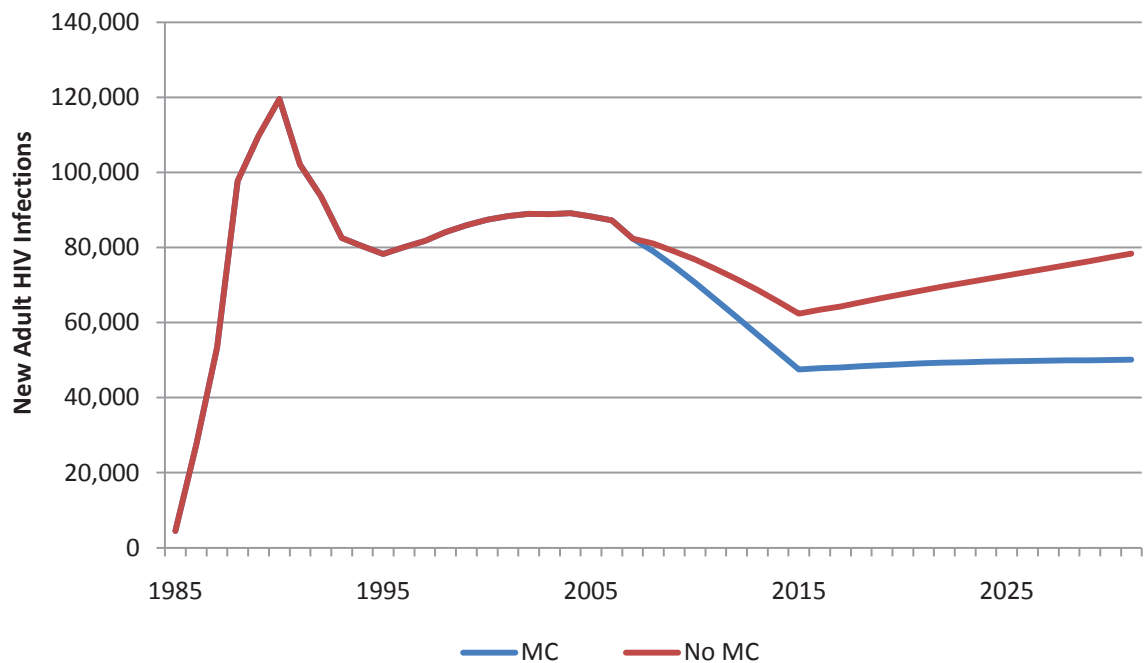
as a base scenario. For microbicides we assume an effectiveness of 80 percent and maximum coverage of 20 percent in all population groups. Since the Rapid Scale-up scenario already factors in condom promotion efforts that increase their use to high levels, microbicide coverage of 20 percent brings the combined coverage to very high levels. Also, since microbicides act in a similar fashion to condoms, we assume that their effectiveness would have to be nearly as good as condoms before they would be introduced, or there would be no incentive to adopt the new technology. For PrEP, we assume effectiveness of 60 percent and maximum coverage of 50 percent in the medium and high risk groups but no use by low risk couples, as it is less likely low risk couples will use PrEP on a regular basis. For vaccines, three different scenarios were developed and compared to the base scenario of Rapid Scale-up, varying assumptions about population coverage and reductions in infectiousness, susceptibility, and progression to needing treatment; further details are provided below. The vaccine analysis was conducted only for Brazil, China, India, Mexico, Nigeria, Russia, and South Africa and scaled up to represent the rest of the developing world.¹⁵ Finally, the impact of treatment leading to a cure was estimated for South Africa as a case study. Impact was modeled by assuming that 80 percent of those eligible for treatment could be cured of HIV infection in one year, after which they would again be susceptible to re-infection.

Male Circumcision. The potential impact of introducing male circumcision to reach 80 percent of adult and newborn males by 2015 can be seen in Figure 2.14 (pp. 44), using Zambia as a case example and comparing it to the Rapid Scale-up scenario. The impact is significant; by 2031, the number of new HIV infections is reduced from over 78,000 to 50,000; the cumulative number of new HIV infections from 2009 to 2031 is reduced by one-quarter, from about 1.6 million to 1.2 million.

Pre-Exposure Prophylaxis. Overall, the projected impact of PrEP globally is modest (Figure 2.15, pp. 45). This is partly due to the assumption underlying the new scenario, namely that PrEP would be provided to high and medium risk people only. Because the scenario involves scaling up all of the other existing prevention interventions reaching high risk populations, most of the new infections in this scenario come from the low risk population. Although a large percentage of new infections have historically occurred in the higher risk groups, especially in the 1990s, once the prevention interventions are scaled up fully by 2015, the number of new infections in those risk groups will drop, and by 2031 infections in the low-risk group will account for almost two thirds of all new infections (Figure 2.16, pp. 46).

15 Stover J, Bollinger L, Hecht R, Williams C, Roca E. The impact of an AIDS vaccine in developing countries: a new model and initial results. *Health Aff (Millwood)*. 2007 Jul-Aug;26(4):1147-

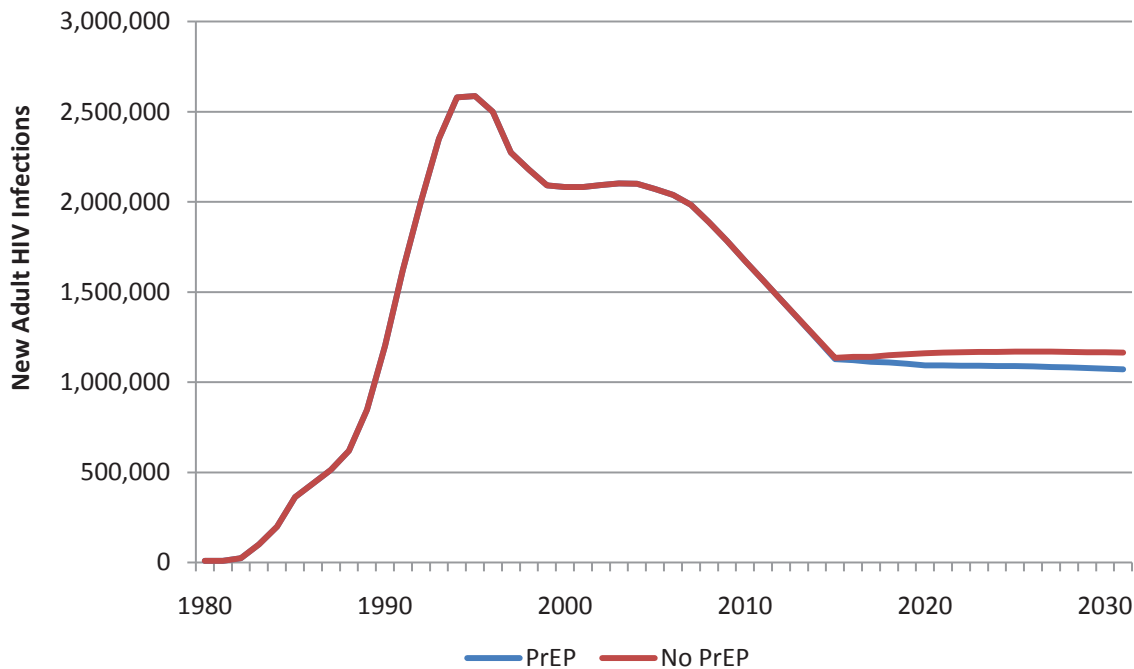
Figure 2.14 | The Effect of Male Circumcision on New HIV Infections in Zambia Relative to the Rapid Scale-up Scenario



In a country like Mexico, however, where most of the new adult HIV infections are occurring in the MSM population, providing PrEP to that group would have a more significant impact (Figure 2.17, pp. 47). Adding PrEP coverage to the Rapid Scale-up scenario, which contains 60 percent coverage of MSM outreach interventions, would result in a reduction from about 15,000 new infections in 2031 to less than 10,000.

Microbicides. The projected overall impact of microbicides is also small, due to our assumption that microbicide coverage would be additive to condom use (Figure 2.18, pp. 48). Microbicide use might substitute for condom use, as couples discontinued using condoms in favor of a microbicide. That would increase the number of infections averted due to microbicides, but not the overall impact of condoms and microbicides. We further assume that microbicide use among low risk couples would not exceed 20 percent for the same reasons that condom use is low among married couples: low perceived risk and reluctance to imply that the partner is unfaithful. The impact of both PrEP and microbicides would be higher if extensive testing to identify discordant couples led to high levels of use by those couples.

Figure 2.15 | Effect of PrEP on New Infections Assuming Full Coverage of Other Interventions

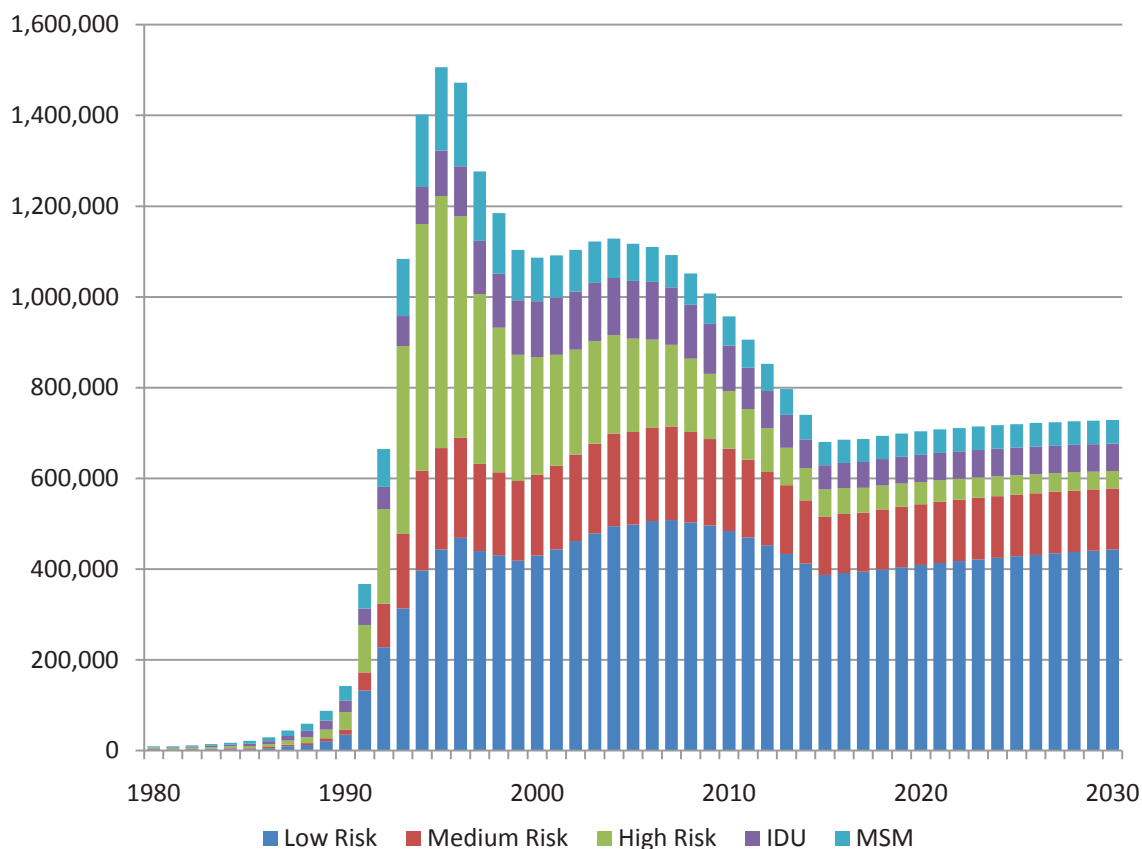


Vaccines. An AIDS vaccine would be one of the best tools to end the epidemic, if such a vaccine could be produced.¹⁶ However, questions surrounding potential AIDS vaccines remain. The most fundamental one is whether such a vaccine is scientifically possible, and if so, how difficult, costly, and time-consuming it will be to design, test, and license for widespread use in humans. Beyond this, other questions would be: How effective would such a vaccine be? Would it still be needed if existing prevention programs and antiretroviral treatments (ARTs) are significantly expanded while a vaccine is being developed? What would the impact be of first generation vaccines if they only provide partial protection against HIV?

Here, we explore three different vaccine scenarios, comparing the outcomes with the Rapid Scale-up scenario. These scenarios - Low, Medium, and High – combine changes across three different parameters: the coverage of those receiving the vaccine in the general population (20/30/40 percent); the reduction in the probability of becoming infected after being vaccinated, or “susceptibility” (30/50/70 percent); and the reduction in the probability of a vaccinated person infecting a partner,

¹⁶ The recently reported results from the phase III trial in Thailand, which showed 31 percent efficacy, offers some hope that correlates of protection can be identified and a more efficacious vaccine can eventually be developed.

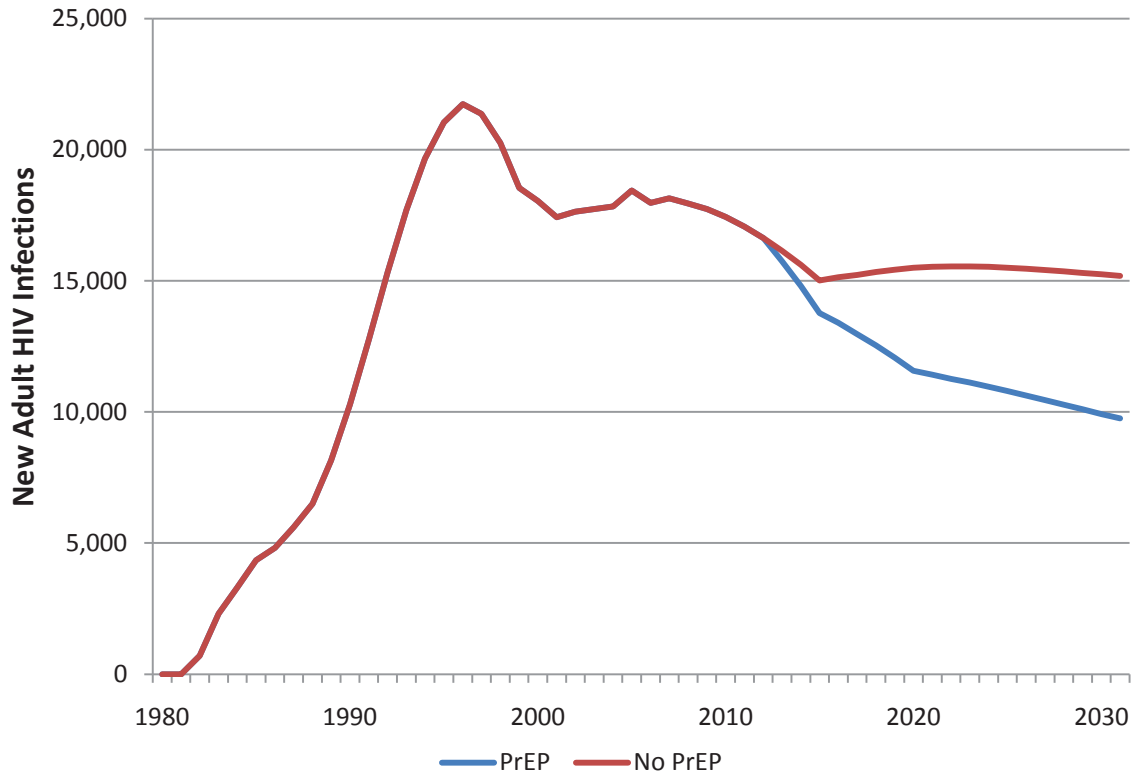
Figure 2.16 | Number of New Adult Infections by Risk Group in the Rapid Scale-up Scenario, Nigeria, South Africa, Brazil, Mexico, Russia, India and China



known as “infectiousness” (30/50/70 percent). Each of the scenarios also assumes that there is an increase in the average survival time following infection for everyone vaccinated.

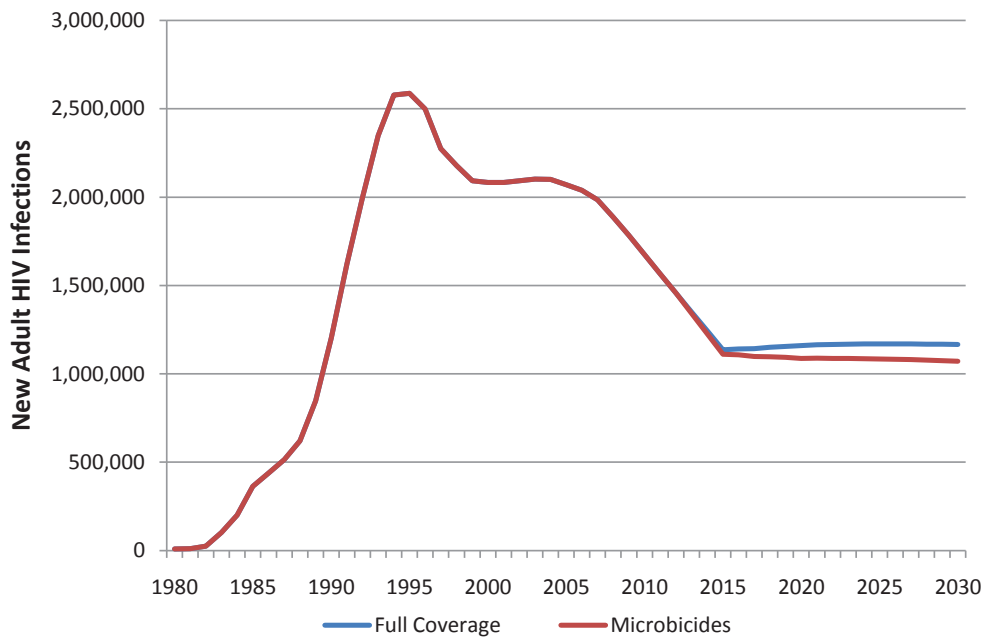
The impact differs across the various scenarios, but all are significant improvements over the base scenario (Figure 2.19, pp. 49). By 2031, the introduction of an AIDS vaccine reduces the number of new adult HIV infections from approximately 1.5 million in the Base scenario to 0.6 million in the High scenario, a reduction of 60 percent. The other scenarios fall between the Base and High scenarios, in terms of impact.

Figure 2.17 | Effect of PrEP in Mexico using Rapid Scale-up as the Base Scenario



A final technology that may become available is treatment leading to a cure for HIV. For modeling purposes, we assume that this would become available in 2015, and would cure 80 percent of those the first year they are on treatment, after which they rejoin the pool of susceptible people, subject to becoming infected again. Results for South Africa show that this would have a significant impact on the HIV/AIDS epidemic; the number of adult AIDS deaths declines dramatically, by more than 75 percent, as does the number currently infected with HIV (almost 50 percent) and the number of adults receiving ART (more than 75 percent). Note that there would also be significant financial savings if the number of adults receiving ART declines so dramatically. Once the number of cured people reaches a critical mass, HIV incidence drops dramatically due to the herd effect.

Figure 2.18 | Impact of Microbicides in the Rapid Scale-up Scenario

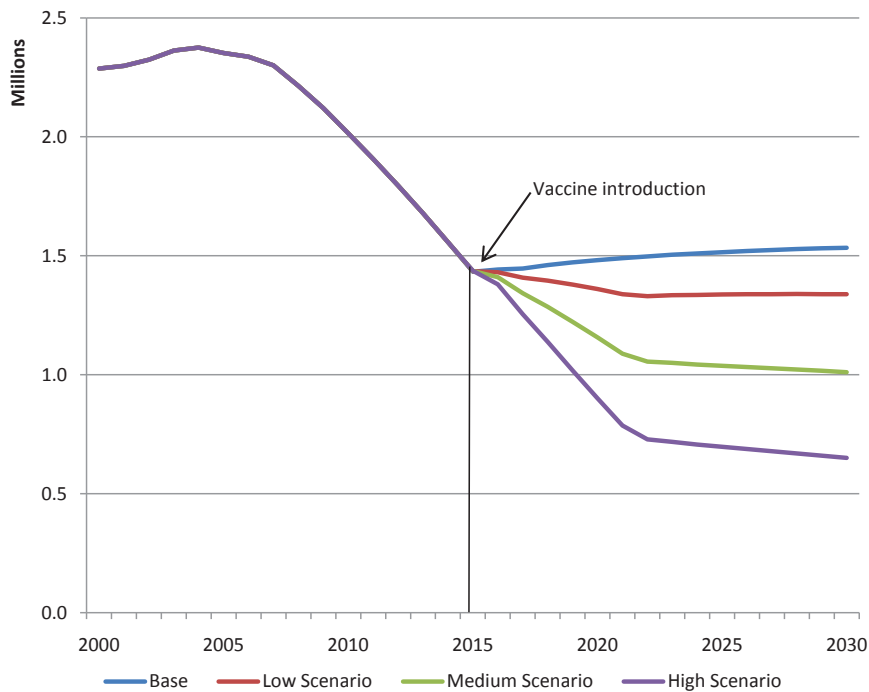


Potential Policy Options to Reduce Costs and Reduce Incidence of HIV

The four scenarios presented in this chapter represent four trajectories that the epidemic may take if AIDS programs are designed accordingly. All four scenarios call for increased spending on HIV well above current spending levels, with estimates ranging from \$19 to \$35 billion a year in 2031. The majority of this expenditure will occur in Africa in countries hit the hardest by the epidemic. Due to both increased survival of AIDS patients on ART and increased numbers of HIV infected people, AIDS treatment spending will increase as the number of patients eligible for ART increases. Policy choices made now can help reduce the ultimate price tag significantly. Some of these choices are outlined below:

1. The most ambitious scenarios do not necessarily have the highest return on investment. By focusing on the most effective prevention methods, the Hard Choices scenario averts more infections per dollar spent.
2. Prevention needs to be strengthened by the following actions:
 - Governments and development partners should focus resources on programs for “most-

Figure 2.19 | Impact of three Different Vaccine Scenarios on the Number of New Adult HIV Infections



at-risk populations” (MARPs), especially men having sex with men, female commercial sex workers, and injecting drug users. This is particularly the case in many countries where the epidemic is currently concentrated in these groups, but could also have important benefits in countries where HIV infections are more widespread.

- In generalized epidemics, especially in East and Southern Africa, expansion of male circumcision and PMTCT services would help to slow the pace of new infections. In addition, efforts to encourage significant changes in sexual behavior, concentrating on reducing the numbers of sexual partners (including concurrent, overlapping relationships) and encouraging greater condom use in such relationships, are vital.
- Resources should also be devoted to developing new technologies that prevent infections; these tools, which include microbicides, PrEP, AIDS vaccines, and treatment leading to a cure are among the game-changers needed to lower number of infections below the one million mark in 2031.

3. Changing the environment in which interventions take place is an important part of increasing coverage of both treatment and prevention interventions. Public sector and civil society institutions need to put in place a series of structural interventions for the long term that will address the underlying social drivers of AIDS, including stigma and discrimination, criminalization of behaviors such as men having sex with men and intravenous drug injection, and women's low social and economic status. These measures will reduce the levels of vulnerability and risk and allow interventions to achieve higher rates of coverage, thereby cutting the number of new infections.

With major breakthroughs in prevention still several years away – at best – it is all the more vital for national and local leaders in low and middle income countries to back important social movements that can create a favorable environment for behavior change (sexual behavior, injecting drug behavior) that reduces HIV infections. Experience from Uganda and other countries shows that high level leadership and use of the media and other forms of communication can result in significant shifts in sexual patterns. This is urgently needed in the high prevalence countries of East and Southern Africa where new HIV infections are widespread through the general population. Experience from various Asian and Latin American countries and from high income countries also shows that laws and prevailing societal attitudes toward marginalized populations can change in a short period of time, with positive effects on support for HIV prevention and treatment programs for these groups. Such successes could be replicated in other countries where the epidemic is concentrated in marginalized populations. Greater investment in such “social movements” needs to be encouraged.



Chapter 3: Getting More Value for Money – Spending AIDS Resources Efficiently

From the previous chapter, it should be clear that under almost all conceivable scenarios, the trajectory of future spending for AIDS in developing countries over the next two decades is going steadily upward – in some scenarios, dramatically so. Some “negative” factors like a new epidemic outbreak in a populous country or a major increase in ART prices could cause the expenditure curve to turn upward even more steeply, exceeding the Rapid Scale-up estimates of \$35 billion a year in 2031. On the other side, certain “positive” factors such as rapid roll-out of male circumcision in East and Southern Africa, or the discovery and licensing of an effective AIDS vaccine, could cause the cost curve to turn downward, as infections are avoided, lives saved, and treatment costs reduced. Our Working Group did not rule out any of these “game-changing” possibilities, but nevertheless felt that the most likely future for AIDS over the next 22 years would be along the lines of the four scenarios that we have costed, which do not reflect the effects of the major game-changers.

Under these circumstances, how can low and middle income countries and their external partners efficiently spend the hundreds of billions of dollars needed over the next two decades? How can they get the most value for money, in terms of infections averted, lives saved, and orphans supported? What procurement, program design, and management action can increase efficiencies? And if funds are tightly constrained, how should countries and their partners allocate resources in order to maximize the impact?

At the macro level, one illustration of the substantial inefficiencies in current AIDS resource use can be seen when one compares overall spending in developing countries with what is being achieved in terms of critical program targets. The 2006 progress report by UNAIDS concluded that of six targets evaluated, only one was achieved: \$9.2 billion was spent on AIDS in developing countries, which was within the target range of \$7-\$10 billion.¹⁷ These resource requirements assumed that 6 billion condoms would be distributed annually; by 2005, however, 5 billion condoms were actually distributed, 83 percent of the target.¹⁸ Reaching vulnerable populations proved to be even more difficult: for sex workers, only 61 percent of the estimated number targeted was actually reached, while for injecting drug users (IDU) only 37 percent of the target was reached. In the area of AIDS

17 Report on the Global AIDS Epidemic: A UNAIDS 10th Anniversary Special Edition. 2006, UNAIDS: Geneva, Switzerland.

18 Stover, J. and M. Fahnstock, Coverage of selected services for HIV/AIDS prevention, care and treatment in low and middle income countries in 2005. 2006, Constella Futures: Washington, DC.

care, only 31 percent of HIV positive persons that countries aimed to cover with antiretroviral therapy (ART) were reached, and only 28 percent of the prevention of mother to child transmission (PMTCT) goal was achieved.

In other words, despite generating and spending 90 percent of the estimated required financial resources, key services did not reach the levels commensurate with these funding amounts. Unless the cost estimates were miscalculated, the billions of dollars deployed to fight AIDS were either spent on something other than the monitored services (misallocation) or were spent in an inefficient or wasteful manner (technical inefficiency).

In this chapter, we consider ways to improve the efficiency of AIDS spending, either by allocating limited resources to the prevention, treatment, and mitigation activities where they can have the largest impact; or by raising technical efficiency through stronger and more effective program management; opting for low cost, high quality models to deliver prevention and treatment services; pursuing procurement strategies that lead to low cost purchases of drugs and other important commodities; and other efficiency enhancing measures. We also look at how improved national AIDS planning processes can contribute to making these more efficient spending decisions.

IMPROVING ALLOCATIVE EFFICIENCY – SPENDING MORE ON HIGH IMPACT ACTIVITIES

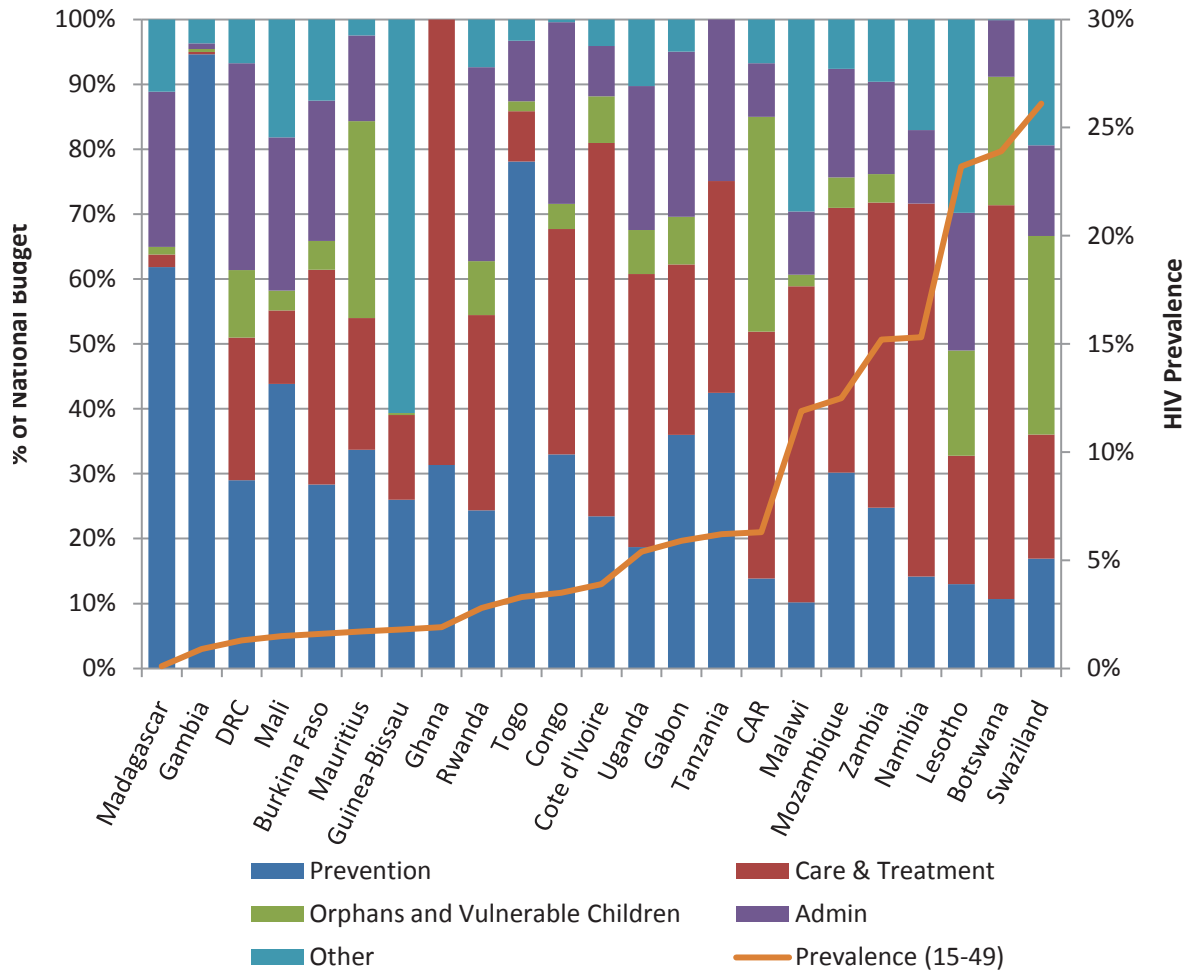
There is widespread inefficiency in resource allocation... While the evidence on what works in AIDS prevention and treatment is far from perfect, and more research in this area is needed, we do have a great deal of information on what works, and on cost-effectiveness, that is, how much benefit (in terms of infections avoided, AIDS deaths averted, health life-years gained, etc.) can be obtained for every dollar spent. Yet we also have abundant evidence to suggest that in many national AIDS programs, funds are not being programmed or allocated to interventions that produce good value for the money, while large sums are being spent on interventions that generate limited or questionable benefits.

Here are a few examples, drawing on previous work.¹⁹ Figure 3.1 (pp.55) shows the reported expenditure of AIDS funds in Sub-Saharan Africa.²⁰ The list of countries is ordered from the lowest prevalence

19 Forsythe, S., J. Stover and L. Bollinger. The Past, Present and Future of AIDS Resource Allocation. Draft Working Paper. 2009, Futures Institute: Washington, DC.

20 Note that Figure 3.1, Figure 3.2 and Figure 3.3 were developed to show the proportions of all resources spent on different interventions. The graphs don't show the absolute amount of spending, which may influence how countries allocate their funds.

Figure 3.1 | Allocation of HIV/AIDS Resources in Sub-Saharan Africa



Source: Report on the Global AIDS Epidemic, UNAIDS, 2008.

country (Madagascar, with an adult prevalence of 0.1 percent) to the highest prevalence country (Swaziland, at 26.1 percent). On average, these 23 countries spend 40 percent of their resources on care and treatment, 25 percent on prevention, 18 percent on administration and management, 9 percent on other items, and 8 percent on orphans and vulnerable children.²¹

21 "Other HIV expenditures" in Figure 3.1 and Figure 3.2 include human resources, social protection and social services, an enabling environment and research.

As Figure 3.1 (pp. 55) indicates, lower prevalence countries allocate a higher proportion of their resources to prevention, while higher prevalence countries spend a larger percentage on care and treatment. For example, the eight countries with prevalence below 2 percent spend 38 percent of their resources on prevention, and only 23 percent on care and treatment. The five countries with a prevalence of more than 15 percent spend only 17 percent of their resources on prevention and 48 percent on care and treatment. This allocation is consistent with what one might expect; low prevalence countries have a lower burden of treatment and therefore allocate a greater share of their resources to prevention. High burden countries should be spending heavily on prevention but will have much greater need for treatment.

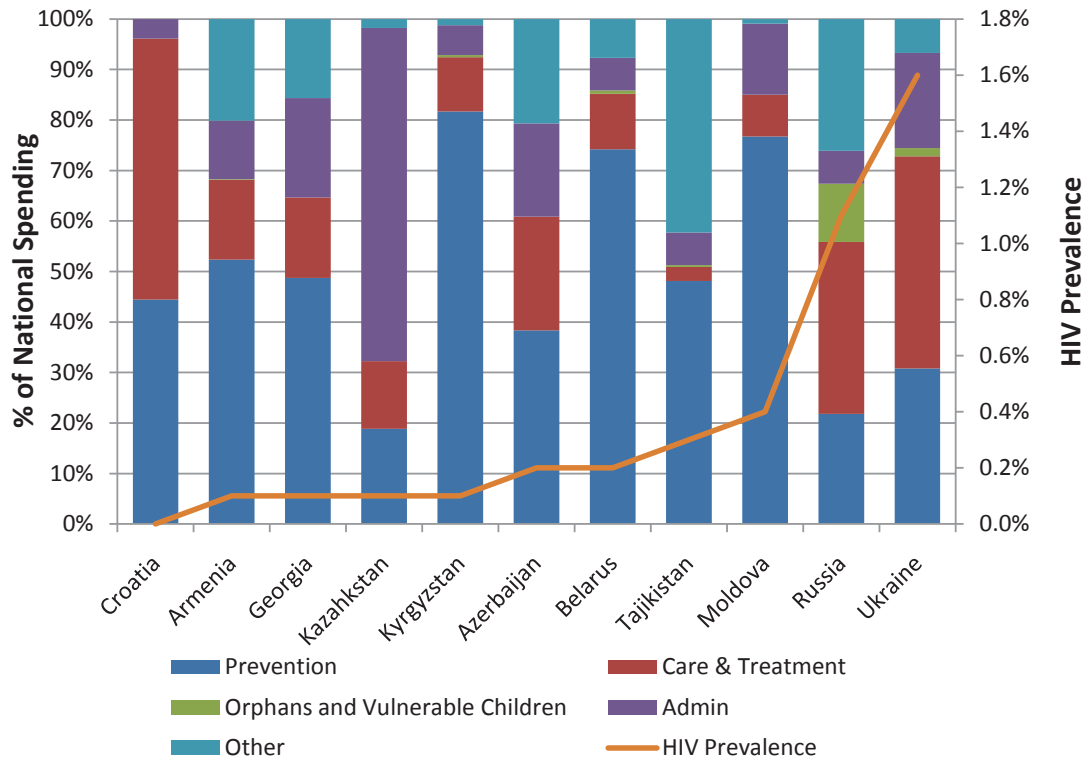
However, it is also worth noting that there are some significant outliers. For example, Congo reports spending 32 percent of its resources on administration, almost twice as much as the average for the 23 countries. Ghana, with a prevalence of only 1.9 percent, reports spending the highest proportion of any country on care and treatment (69 percent). Even when comparing two high prevalence countries, such as Botswana (adult prevalence of 24 percent) and Swaziland (26 percent), the resource allocation patterns differ significantly. Botswana spends the largest proportion of its resources on care and treatment, while Swaziland devotes most of its resources on orphans and vulnerable children. As a result, Botswana had 76 percent ART coverage in 2006, while Swaziland had only 35 percent.²²

The allocation of resources appears to be even more inconsistent across countries in Eastern Europe and Central Asia, as shown in Figure 3.2 (pp. 57). The lowest prevalence country, Croatia, spends the largest proportion of its funds on care and treatment, contrary to what would be expected. Moving from the lowest prevalence countries on the left to the highest prevalence countries in the region on the right, there appears to be little pattern in the way resources are spent. Even neighboring countries with a similar prevalence of HIV, such as Kazakhstan and Kyrgyzstan, spend their HIV and AIDS resources in radically different ways – Kazakhstan mostly on program support, Kyrgyzstan mostly on prevention.

The analysis becomes more revealing when we assess the allocation of resources within prevention programs. In Figure 3.3 (pp. 58), sub-Saharan Africa countries are arranged by prevalence from the lowest on the left to the highest on the right. Looking at the two highest prevalence countries, Botswana and Swaziland, the approach to allocating prevention resources appears to be markedly different. In the case of Botswana, most prevention resources are spent on PMTCT, whereas Swaziland spends only a small proportion of its resources on this intervention. On the other hand, Swaziland devotes most of its funds to behavior change communications and VCT, two interventions which are allocated a much smaller proportion of resources in Botswana.

22 2008 Report on the Global AIDS Epidemic. 2008, UNAIDS: Geneva, Switzerland.

Figure 3.2 | Distribution of HIV Expenditures in Eastern Europe/Central Asia

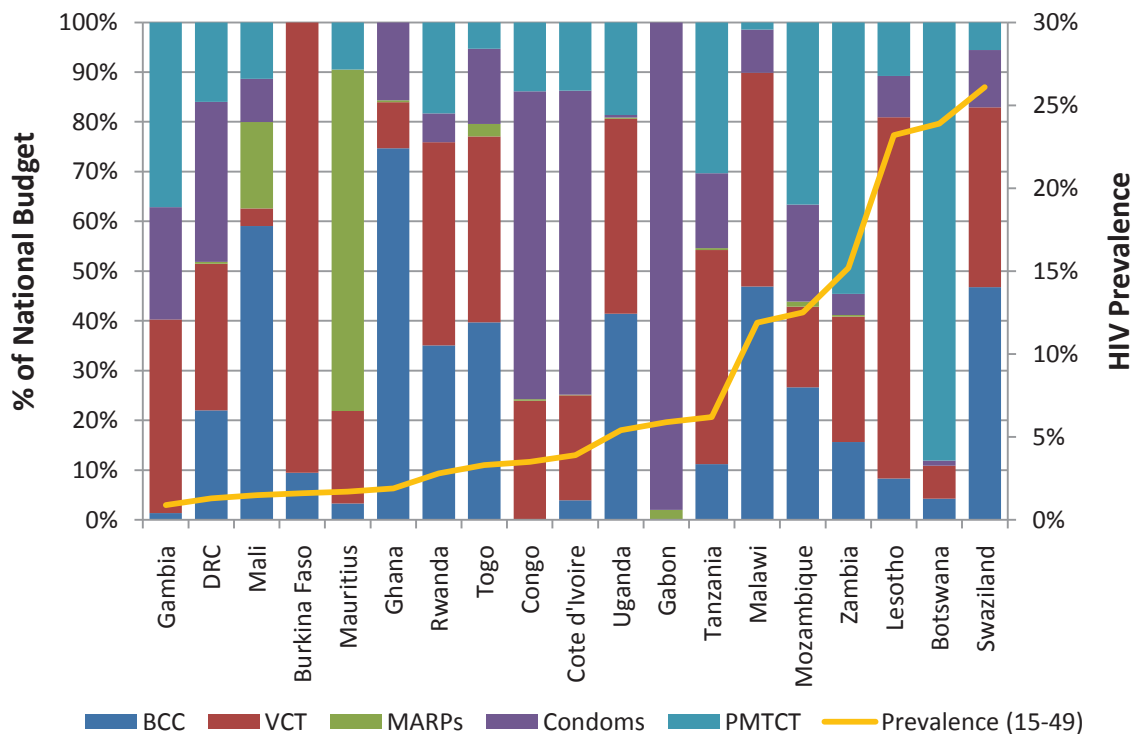


Source: Report on the Global AIDS Epidemic, UNAIDS, 2008.

There are also numerous examples of possible misallocation of funds in Asia.²³ For example, in China 90 percent of HIV transmission is attributable to MSM or IDU, yet 54 percent of donors’ prevention funding is allocated to the “general population.” Another example of misallocation can be seen in Latin America. In many countries in the region the epidemic pattern suggests that the top priority population group should be men who have sex with men (MSM). However, in much of Latin America there is little support for spending resources on MSM, and thus policymakers often decide to focus their prevention resources on services for the general population. Figure 3.4 (pp. 59) confirms

23 Pisani, E. *The Wisdom of Whores: Bureaucrats, Brothels and the Business of AIDS*. 2008, New York City, NY: W.W. Norton & Company.

Figure 3.3 | Allocation of Prevention Resources in Sub-Saharan Africa

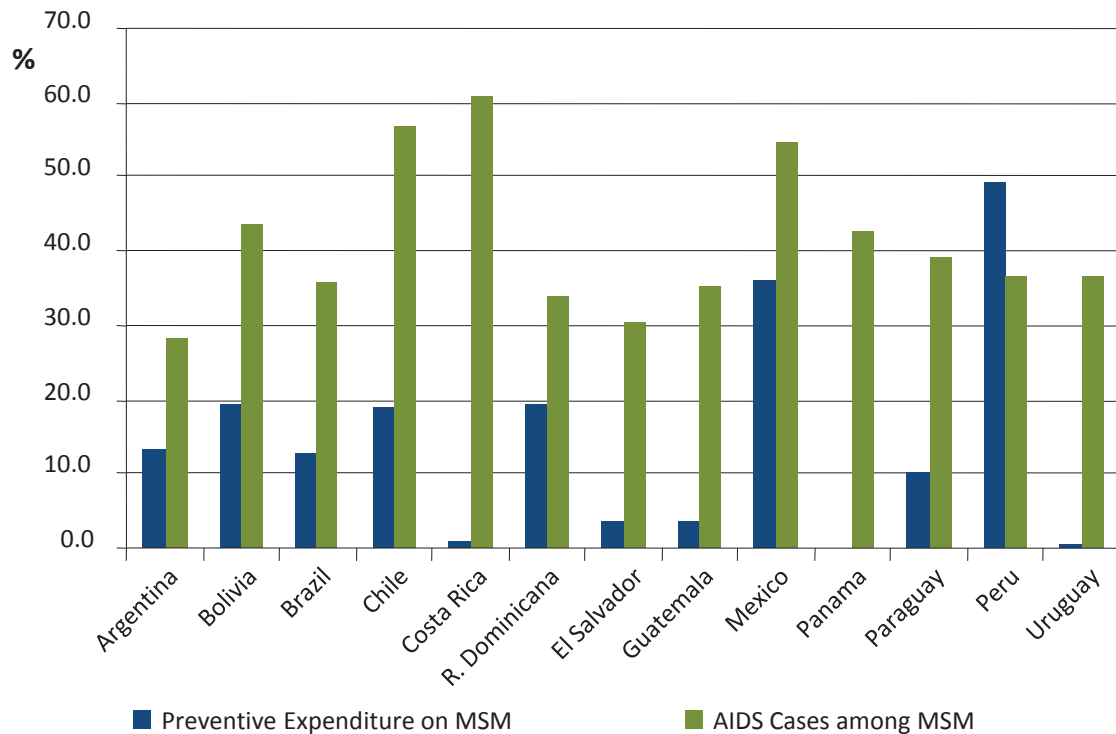


Source: Report on the Global AIDS Epidemic, UNAIDS, 2008.

that MSM represent a large proportion of all AIDS cases in most of Latin America (in Costa Rica, for example, they account for more than 60 percent of all AIDS cases). However, most prevention resources are not focused on MSM. In fact, in every country except Peru, the analysis suggests that resources are disproportionately small in relation to the number of AIDS cases involving MSM.

...even though our knowledge of what works is good... As mentioned earlier, resources are misallocated even though we have extensive knowledge of what works well at low cost. As part of aids2031, our Working Group commissioned an update of earlier reviews of the evidence on cost-effectiveness of AIDS interventions. The update showed that over the past three years, there is considerably more evidence on some areas of prevention, such as male circumcision. The number of studies focusing on the cost-effectiveness of ARV provision in resource limited settings has also grown significantly, from two studies identified in 2006 to 14 today. Among prevention interventions for low-income countries, the majority of biomedical, behavioral,

Figure 3.4 | AIDS Spending on MSM Relative to MSM Cases



Sources: SIDALAC. <http://www.sidalac.org.mx>; PAHO report of AIDS cases.

and structural interventions are below the range of \$200 per disability-adjusted life year (DALY), and a few more are \$200-\$600 per DALY, which is still very cost-effective. For middle-income countries, we find that a number of interventions can be implemented at \$500 per DALY, and a few others between \$1,000 and \$2,000, which is again within the parameters of what is considered cost-effective.

In order to determine which interventions offer the best value for the investment, we analyzed the evidence available both along epidemic profile and country income level. A ranking of the evidence for effectiveness and cost-effectiveness can be found in the background paper for our report.²⁴ Notably, circumcision is a new addition among the list of interventions. New evidence further strengthens the qualification of voluntary counseling and testing as cost-effective. However, these studies remain

24 De Maria, L., S. Bautista-Arredondo and O. Galarraga. What Works to Prevent and Treat AIDS. Draft Working Paper. 2009, aids2031: Costs and Financing Working Group: Washington, DC.

concentrated in sub-Saharan Africa settings. More studies are needed from other regions. For care interventions in low-income countries, co-trimoxazole prophylaxis, first-line ARV treatment, and using CD4 counts to determine initiation of ARVs are cost-effective. Provision of second-line ARV regimes is also cost-effective, although with higher cost-effectiveness ratios than first-line therapy.

Why is Such Misallocation Occurring? If countries are not pursuing an “evidence-based allocation strategy,” why not? A number of explanations are possible:

- **Lack of Access to Key Data:** Some countries do not have access to the information required to make rational decisions regarding the allocation of AIDS funds. Or the data may not be relevant for them. For example, about two thirds of the costing studies were conducted in Sub-Saharan Africa. However, applying such estimates outside of Sub-Saharan Africa has proven to be problematic. In Honduras, for example, policymakers were hesitant to accept unit cost estimates from studies conducted outside of the region.
- **Contradictory Results:** Apparently contradictory results can be confusing and off-putting for policy makers. For example, early economic analysis suggested that PMTCT interventions would not be affordable in South Africa.²⁵ Subsequent analyses concluded that PMTCT would not only be affordable, but it would also be cost-effective and potentially cost-saving.^{26,27,28} Similarly, data about the effectiveness of STI treatment have demonstrated mixed results. An early randomized control trial suggested that STI treatment would have a significant impact on the prevalence of HIV.²⁹ However, subsequent studies suggested that this impact was much less than anticipated.³⁰

25 Wilkinson, D., K. Floyd and C.F. Gilks. Antiretroviral drugs as a public health intervention for pregnant HIV-infected women in rural South Africa: an issue of cost-effectiveness and capacity. *AIDS*, 1998. 12(13): p.1675-82.

26 Soderlund, N., et al., Prevention of vertical transmission of HIV: analysis of cost effectiveness of options available in South Africa. *BMJ*, 1999. 318(7199): p. 1650-6.

27 Wilkinson, D., S.S. Karim and H.M. Coovadia, Short course antiretroviral regimens to reduce maternal transmission of HIV. *BMJ*, 1999. 318(7182): p. 479-80.

28 Wood, E., et al., Extent to which low-level use of antiretroviral treatment could curb the AIDS epidemic in sub-Saharan Africa. *Lancet*, 2000. 355(9221): p. 2095-100.

29 Gilson, L. et al., Cost-effectiveness of improved treatment services for sexually transmitted diseases in preventing HIV-1 infection in Mwanza Region, Tanzania. *Lancet*, 1997. 350(9094): p. 1805-9.

30 Wawer, M.J., et al., Control of sexually transmitted diseases for AIDS prevention in Uganda: a randomised community trial. Rakai Project Study Group. *Lancet*, 1999. 353(9152): p. 525-35.

- **Interpretation of the “Multi-sectoral” Response:** A third possible explanation is that AIDS is viewed as an epidemic requiring a multi-sectoral response, which is interpreted to mean that the country should spread resources across all interventions. The danger is that this can lead to little or no priority given to those interventions which produce the greatest possible impact. And over time, as many different government departments and other agencies obtain a share of the national AIDS budget as part of a multi-sectoral approach, it is hard to cut back or refocus those resources in a smaller number of high impact areas.
- **Political Will to Deal With Sensitive Issues and Stigmatized Populations:** Perhaps the most important reason why governments do not allocate resources based on evidence of cost-effectiveness is that they lack the political will or fear political backlash from supporters if they give prominence to addressing the prevention needs of stigmatized risk groups such as commercial sex workers (CSW), injecting drug users (IDU), and men having sex with men (MSM).²³
- **Poor Planning Methods:** In some cases, poor allocation occurs as a result of weak or politically-influenced planning approaches. Countries such as Tanzania have avoided explicitly prioritizing interventions in their strategic plan. As a result, program managers have been given responsibility for managing a plan that lacks guidance about which interventions and target populations should be prioritized.³¹ Other countries such as Nicaragua identify so many priority populations in their strategic plan that the prioritization essentially becomes meaningless (Nicaragua identifies 11 groups including young people, children exploited by violence, children exploited by sex, MSM, sex workers, mobile populations, prisoners, uniformed services, pregnant women, indigenous populations, and orphans).³²

Lack of national control over financial resources. Another possible reason why resources may not be allocated to produce the greatest possible impact is that the country itself cannot control how resources are being spent. Some international donors have their own agenda to fulfill in regard to allocating resources. In this case, recipient countries are likely to be hesitant to turn down resources, even if those resources will skew the national response towards interventions which planners do not believe will be successful.

31 National Multi-Sector Strategic Framework on HIV/AIDS (NMSF). 2003, Republic of Tanzania, TACAIDS: Dar es Salaam.

32 Plan Estrategico Nacional de ITS/VIH/SIDA, Nicaragua 2006-2010. 2006, CONISIDA Nacional.

The next section examines some of the key actions that could be taken in the coming years to address these causes for poor allocation of resources, especially for HIV prevention, so that in the longer run to 2031 countries can better use funds for high impact interventions to reduce the number of new infections.

WAYS TO IMPROVE ALLOCATIVE EFFICIENCY

Focusing on MARPs, with Donor Support. One important way to raise allocative efficiency is to focus and expand spending on prevention programs aimed at the so called “most-at-risk populations” (MARPs) discussed earlier – CSW, IDU, and MSM. These populations account for a large fraction of new infections in countries with concentrated AIDS epidemics, including most countries in Latin America, East Asia, and Eastern Europe, and Central Asia. The MARPs are also important in the high prevalence countries of Africa, though they account for a smaller share of new infections in these hyperendemic settings.

In Asia, three out of four HIV infections can be linked directly to the three MARPs. The AIDS Epidemic Model developed for the International Commission on AIDS in Asia (ICAA) projects that on current trends, half of all new infections will be among MARPs by 2020.³³ In much of Latin America and the Caribbean, MARPs are also the predominant groups affected by AIDS.

The general public’s sensitivity in many countries to the links between the HIV epidemic and the behaviors associated with sex workers, men who have sex with men, and intravenous drug users leads to stigma and discrimination against those groups. One result is that government officials who wish to foster programs directed toward these groups cannot depend on public and community support. To the contrary, governments may be actively blocked from taking steps to promote effective programs among these groups by hostile public opinion and law enforcement authorities. In Cambodia, where same-sex relations are legal, MSM have suffered harassment by the police. In other countries, criminalization of drug use and increased police activity has promoted the switch from smoking to injecting drug use. Stigmatization of HIV positive people by health care professionals is a major stumbling block to adequate care and treatment in many Asian countries.³⁴

Turning back the AIDS pandemic will require greater attention to prevention for these most-at-risk populations. One analysis of a hypothetical country program in Asia with a concentrated epidemic

33 Redefining AIDS in Asia, ICAA. 2008, Jakarta, Indonesia: p. 57.

34 ICAA. 2008, p. 111.

suggests that 42 percent of all AIDS intervention spending should be allocated to programs for MSM, sex workers and their clients, and injecting drug users, based on data showing which interventions yield the most positive results in terms of infections averted.³⁵ At present, Asian countries spend only a small fraction of their AIDS budgets – uniformly less than 10 percent – on prevention services for these groups. This also applies to other regions experiencing concentrated epidemics, especially in Latin America and the Caribbean and in Eastern Europe and Central Asia.

In Asia, the cost per life year gained may be as low as US\$3 for interventions focused on sex workers and their clients, US\$40 for harm reduction among IDUs, and US\$75 to reduce transmission among MSM.³⁶ Such spending is a very ‘good buy.’ Even in Eastern and Southern Africa with their generalized epidemics, interventions among the MARPs would yield a positive benefit-to-cost ratio.

The Independent Commission on AIDS in Asia (ICAA) report estimates that interventions for MARPs cost US\$100 per person per annum. Applied to the total number of persons in these groups in Asia, prevention programs with extensive coverage of IDUs, CSW, and MSM in the region would cost about \$1 billion a year over the next few years, less than 15 percent of the total estimated annual requirement for all dimensions of a strong response to the epidemic. The cost per infection averted would be US\$1,800, an extremely favorable cost by global standards.

One approach to overcoming the political barriers to government financing of programs for MARPs would be to have external donor agencies fund these programs, at least in the short run, while the government pays for other parts of the AIDS response, including areas that contribute to health system strengthening as well as the fight against AIDS. Specialization and division of financial responsibility between governments and donors could help to ensure that all essential services are financed. With that specialization in mind, governments could finance AIDS program management, PMTCT, antiretroviral therapy, care for orphans and vulnerable children, and other less politically sensitive activities. At the same time, donors could finance prevention for the MARPs and other cost-effective programs that governments may find politically difficult.¹⁹

Promoting the use of Priority Setting and Trade Off Analysis and Dialogue.¹⁹ Another important way to raise allocative efficiency would be to encourage senior government policy makers to use tools that can enable them to more easily see and weigh the relative benefits and costs of different AIDS spending policies. Over the past decade, several of these tools have been developed and validated on the ground, yet they are still not widely employed. More could be done to persuade country officials

35 Report of the Commission on AIDS in Asia. *Redefining AIDS in Asia: crafting an effective response*. New Delhi (India): Oxford UP; 2008.

36 Prevention Interventions: Cost per DALY Saved. ICAA. 2008, Jakarta, Indonesia: p. 90, Figure 3.10.

to adopt them, through a combination of information sharing, training, dialogue, and incentives from donors that link their external financial support to thorough analysis of various spending options and appropriate follow up actions.

When national AIDS strategic plans are costed, there is usually little or no effort to assess what would happen if the levels of resources being sought do not materialize, even though the estimated costs typically exceed what is eventually made available. A costed strategic plan should ideally consider alternative scenarios, aligning priorities with different levels of funding and estimating the impact (on incidence, prevalence, persons on treatment, AIDS mortality avoided) of distinctly different patterns of spending for the same total budget.

A country, for example, might cost its strategic plan at \$2 billion over 5 years, but then realize that the level of funding for the program is unlikely to exceed \$1 billion. Should the country cut all of its targets in half? Are there ways to reallocate funds to ensure that the targets can still be achieved despite the limited funds? Which budgetary items are the most critical and therefore should be fully funded, as opposed to those items which are important but not critical? If the country has to manage with a limited budget, should it spend more on say, PMTCT and prevention programs for sex workers and their clients and less on VCT and sex education, or vice versa?

One of the costing and resource allocation tools – the Goals model – allows users to test alternative patterns of resource allocation and observe how these decisions are likely to affect the overall achievement of specific targets.³⁷ Goals has been used to try to improve the resource allocation process in 17 countries since 2002, including twelve in Africa, three in Asia, and two in Latin America.³⁸ All 17 applications were conducted between 2002 and 2008, with two countries (Ethiopia and Kenya) utilizing the model twice.

The experience with Goals at the country level has been mixed in terms of the interest and willingness of the government to consider allocating resources in line with the cost-effectiveness of different interventions. Some of the most successful cases point to the potential of this approach, when the Goals' tool is used in an environment where senior policy makers are eager to consider ways to improve allocative efficiency. And the more disappointing country experiences also help to highlight the circumstances that work against the effective translation of the analytical findings into actual policies. Several examples follow below.

37 GOALS was used extensively by our Working Group to create the costing scenarios shown in Chapter 1.

38 Uganda, Lesotho, Kenya, South Africa, Ghana, Ethiopia, Namibia, Zambia, Mozambique, Rwanda, Malawi, Mali, Honduras, Mexico, China, Cambodia, Ukraine.

Shifting Prevention Funding in South Africa. The Goals model application in South Africa was conducted in 2003, halfway through the country's 2000-2005 National Strategic Plan.³⁹ The analysis identified several areas where additional funds could be devoted to high impact prevention activities that had not been included in the Plan, including interventions with sex workers, MSM, and IDU. The analysis showed that funding for condoms was insufficient and that the government should allocate additional resources in this area. The Goals model was also used to estimate the cost of a national PMTCT program, confirming previous estimates. Finally, the model suggested that the general provision of ART would be affordable for the government, even if the total cost was likely to escalate rapidly.

There were numerous positive outcomes from this work. The government expanded its support for sex worker interventions, condom distribution, PMTCT programs, and general ARV access. However, while the government agreed to research the needs of MSM and IDU in South Africa, they did not allocate more resources to reach these populations.

UGANDA'S PATH TOWARD REFINING ITS PREVENTION STRATEGY

In 2006 the Uganda AIDS Commission decided to use Goals in preparing its new HIV/AIDS Strategic Plan for the 2007/8 – 2011/12.⁴⁰ The costing and resource allocation work started early in the process with an assessment of current spending and estimates of future resource requirements. The assessment found that AIDS spending had grown from \$39 million in 2003/4 to \$170 million in 2006/7. Future funding scenarios, developed based on a detailed analysis of donor plans and government budgets, suggested that available resources might further expand to \$350-\$500 million per year by 2012.

The Ugandan team used the Goals model to estimate the future funding required to scale up coverage of all key prevention, treatment, and mitigation interventions to reach full coverage by the end of the plan.⁴¹ They estimated that about \$620 million would be needed in 2011-12, implying a large gap between resources needed and resources expected to be available amounting to \$120-\$270 million in that year. This begged the obvious question, "Which activities were most important to fully fund, and which ones would only be partially funded?"

39 Moving Towards Universal Access: National HIV and AIDS Strategic Plan 2007/8 – 2001/12. 2007, Uganda AIDS Commission: Kampala, Uganda.

40 Ibid.

41 Stover, J., Mukobe, J., Muwonge, J. Resources Required to Achieve the Goals of the National Strategic Plan (NSP) 2007-8 – 2011/12. 2007, Futures Institute: Glastonbury, CT.

The national team then used Goals to estimate the impact of different allocation scenarios. Impact was measured by several indicators including two for prevention (the number of new infections, the reduction in annual incidence), two for treatment (ART coverage and the number of AIDS deaths), and one for mitigation (coverage of support services for orphans and vulnerable children). Several different allocation schemes were analyzed including: (1) Cost-effective prevention first: fully fund the most cost-effective prevention interventions, keep other prevention constant, allocate the remaining funds to treatment and mitigation; (2) Treatment first: achieve universal access to treatment, allocate the remaining funds to prevention and mitigation; and (3) Mitigation first: increase funding for OVC programs by six-fold, allocate the remaining resource to prevention and treatment.

Allocation scenarios that prioritized prevention averted many new infections but did not have as much impact on reducing deaths or mitigating the effects on children. Allocating funding to treatment first averted the most deaths and achieved high ART coverage, but did not prevent as many new infections.

This information was presented in meetings with the Uganda AIDS Commission, civil society, donors, government departments, and parliamentary committees. At these meetings participants discussed the benefits of each allocation strategy and voiced their opinions about priorities for the new plan. This had happened before, but what was different this time was that these discussions were informed by data on the impact of their decisions. After much discussion it was decided to give top priority to fully funding the most cost-effective prevention strategies, with significant but more modest efforts in treatment and OVC services.

Identifying the Value of AIDS Spending in Ukraine. Ukraine has the most severe AIDS epidemic in Europe, with adult prevalence estimated at 1.6 percent.⁴² Epi modeling suggests that a third of male mortality and more than half of female mortality among those between the ages of 15 and 49 in Ukraine will be attributable to AIDS within the next five years.

In 2008, Ukraine was preparing for their next AIDS strategic plan, to run from 2009 to 2013. As part of that preparation a team applied the Goals model to evaluate a set of distinct nationally-defined scenarios, including several that were highly resource constrained and others defined by certain levels of coverage. These included (1) Constant expenditures: Funding remains unchanged from 2008 to 2013; (2) Universal access: Funding increases to achieve universal access; (3) Prevention focus: Universal access is achieved for prevention, treatment spending increases by 50 percent; (4) Treatment focus: Universal access is achieved for treatment, prevention spending increases 50

42 Bollinger, L., Resource Allocation with the Goals Model in Ukraine: Estimating the Amount of Resources Required and the Contribution Toward Achieving Goals in 2009-2013. 2008, Futures Institute: Glastonbury, CT.

Figure 3.5 | Ukraine – Scenarios for Resource Allocation

Scenario	Cost in 2013	ART Coverage	IDU Coverage	Prevalence
1. Constant Funding	\$118 million	16%	0%	2.24%
2. Universal Access	\$307 million	80%	60%	2.26%
3. Prevention Focus	\$242 million	44%	60%	2.18%
4. Treatment Focus	\$270 million	80%	30%	2.32%
5. Limited Funding	\$244 million	80%	38%	2.26%

percent; and (5) Limited incremental funding: Budget based on the commitment of the Ministry of Finance and the Global Fund.

Each of these five scenarios was evaluated in terms of cost, impact on incidence and prevalence, and levels of coverage for care and treatment services. The results are shown in Figure 3.5. (pp. 67) Scenario 1 is the least expensive, but also achieves the lowest level of coverage for ART and for prevention coverage (IDU drug substitution coverage is used as an indicator of prevention success). Scenario 2 has the greatest impact in terms of both ART and prevention coverage, but this scenario is the most expensive. Scenario 3 would have the greatest impact on HIV prevalence, but only achieves 44 percent coverage for ART. Scenario 4 achieves high level of treatment coverage, but results in the highest prevalence of HIV. Finally, Scenario 5 also reaches high levels of treatment coverage, but only reaches 38 percent of IDUs with drug substitution programs.

While the Ministry of Finance had originally proposed that the country pursue Scenario 5, there was a recognition following the exercise that this level of funding was insufficient to achieve the country's AIDS control objectives. As a result, the Ministry agreed to higher levels of government funding, even though these were well below the amount needed for Universal Access. As a side benefit of the Goals modeling exercise, the Ministry of Health realized that it was paying too much for ARVs, and decided to conduct further negotiations with ARV manufacturers. This is an example of ways to improve the “technical” efficiency of AIDS spending, as discussed below.

IMPROVING TECHNICAL EFFICIENCY – MANAGING RESOURCES BETTER

Evidence of Low Technical Efficiency

Over the long term, as AIDS programs in developing countries scale up and spending mounts, it will be vital to put in place policies and practices that raise the level of technical efficiency of resource use, i.e. that deliver a specific AIDS prevention or treatment service of a defined quality at the lowest possible cost. Over the past decade, as AIDS efforts have accelerated in an emergency mode, there has been only modest attention paid to these issues of technical efficiency. Over the next two decades and more, however, as we recognize increasingly that AIDS is a long wave phenomenon with significant financial resource implications, we need to put greater emphasis on achieving technical efficiency gains.

There is growing evidence of the substantial degree of inefficiency in existing AIDS programs. In the Prevent AIDS Network for Cost-Effectiveness Analysis (PANCEA) project, for example, researchers collected data on expenditures and outputs for six prevention services (VCT; a package for commercial sex workers; STI treatment; PMTCT; information, education, and communications for the general population; and risk reduction activities for IDUs) at 206 service delivery sites across five countries (India, Mexico, Russia, South Africa, and Uganda). One of the striking findings from the study was the degree of variation in unit costs of delivering these prevention services across facilities, which were operating at the same scale within and across countries. If all providers could improve their resource use and reach the lowest unit cost level of their peers, literally tens of millions dollars could be saved.⁴³

Another area of technical inefficiency is in the purchase of antiretroviral drugs for AIDS treatment programs. A background paper commissioned for aids2031 assessed this efficiency problem by examining data on recent procurement of ARVs by low and middle-income countries, drawing upon an international database covering a large share of all ARV purchases during 2005-08.⁴⁴

Antiretroviral medicines (ARVs) are the single most costly component of an AIDS treatment program. Although substantial price reductions of ARVs have occurred, especially between 2002 and 2008, achieving sustainable access for the next 25 years remains a major challenge for most low and middle income countries. The incidence of HIV remains high in many countries and people on therapy are living longer, requiring second- and third-line therapies, which are

43 Marseille et al, HIV prevention costs and program scale: data from the PANCEA project in five low and middle-income countries. *BMC Health Services Research* 2007, 7:108

44 Wirtz, V., et al. The Cost of Antiretrovirals. Draft Working Paper. 2009, aids2031: Costs and Financing Working Group: Washington, DC.

significantly more costly than first-line therapy. An analysis of ARV price variation was carried out using the Global Price Reporting Mechanism (GPRM) from the World Health Organization. A selection of 12 ARVs was identified and price reductions were evaluated for both innovator and generic products.

The study showed that there is wide ARV price variation across countries, even for countries with similar socioeconomic status. Several factors were found to have an influence on a country's ARV prices, including whether the product is generic or not, the socioeconomic status of the country, and HIV prevalence. In addition, price reductions between 2005 and 2008 were greatest for those ARVs which had more manufacturers.

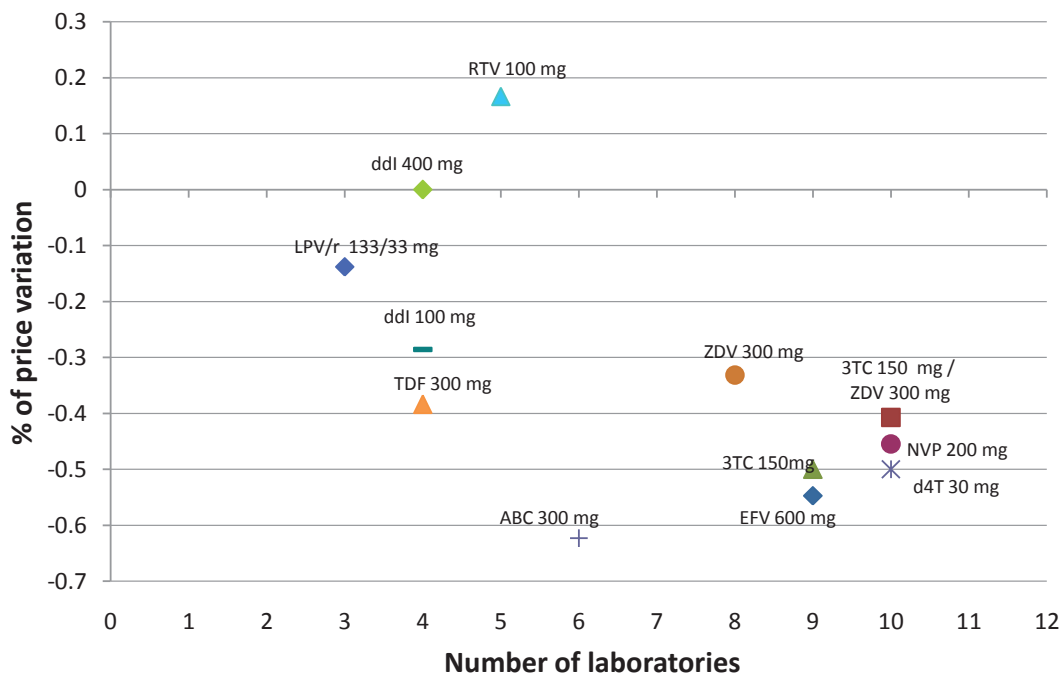
Between 2005 and 2008, the average first-line therapy ARV prices declined by 46 percent while second line therapy on average decreased by 21 percent. Overall, generic prices fell more than those of innovators, with the exception of the generic version of lopinavir/ritonavir, which increased in price, and tenofovir, lamivudine/zidovudine, and stavudine 30mg, which decreased less in price than the innovator version.

Apart from marketing time, the number of manufacturers that reported providing each ARV between 2005 and 2008 appears to influence price declines (Figures 3.6, pp. 70). Whereas first-line ARVs were procured between eight to 11 different manufacturers with a price reduction of 30 to 55 percent; second-line ARV three were procured from three to six different manufacturers with a price reduction between 12 and 38 percent level and HIV prevalence were paying dramatically different amounts for the same ARVs. Many countries were purchasing the drugs at well above the highest direct manufacturing costs for the most costly producer. According to one exercise in which it was assumed that all countries obtained ARVs at either the lowest direct manufacturing cost or at the highest direct manufacturing cost, an additional 24 to 68 percent of patients could be treated with a basic first line drug such as stavudine 30mg – this represents an extra 12,874 to 30,507 persons on treatment for the same amount of money. For a second line therapy such as didanosine 400mg, an additional 18,835 to 41,135 patients could be treated at the high/low direct manufacturing cost, or 213 to 466 percent of the number of patients actually treated with the drug.

WAYS TO RAISE TECHNICAL EFFICIENCY

What are the key actions to be taken to raise technical efficiency? Unfortunately, even 29 years after AIDS was discovered, the answer to this question remains unclear. This is an area of AIDS research which has been largely neglected and deserves much greater attention as we shift from the emergency to long-term response mode.

Figure 3.6 | Number of Manufacturers Versus Price Reduction



Legend: EFV= efavirenz; 3TC: lamivudine; ZDV: zidovudine; NVP; nevirapine; d4T: stavudine; ABC= abacavir; ddl= didanosine; LPV/r= lopinavir/ritonavir; RTV= ritonavir; TDV=tenofovir.

However, based on what we currently know, some of the more promising areas where efficiencies can be achieved include the following:

Lowering the Cost of ARV Drugs. Three principal mechanisms which can help to lower prices for ARVs over the next decades are:

- Increasing procurement efficiency. By using existing pricing data for benchmarking; optimizing third party negotiations; overcoming quality concerns of buyers and slow registration processes for generic ARV, factors which have been identified by PEPFAR as obstacles to the use of generics; and strengthening negotiation skills of low income country procurement officials.

- Encouraging competition among manufacturers. To encourage competition among manufacturers, countries may also be able to take greater advantage of the flexibilities allowed under the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), including parallel importation and compulsory licensing.⁴⁵ The WHO initiative to strengthen the countries' ability to use TRIPS flexibilities is important.⁴⁶
- Emphasizing the need for improved production efficiency. This depends largely on the ability of generic companies to invest in research and scale up to improve their production processes. Some authors suggest that there is substantial scope for increasing efficiencies the synthesis of the active pharmaceutical ingredients in the ARVs, which would result in reduced production costs.⁴⁷

Adopting Low Cost, High Quality Treatment Delivery Models. There is growing evidence from South Africa and other countries of wide variations in the unit cost of treating AIDS patients with ARVs, even after adjusting for quality by factoring in rates of drop-out due to patients discontinuing treatment or dying while on treatment. A recent study by Rosen et al. showed significant variation in overall cost per patient for four treatment delivery models. While drug costs made up the majority of these costs (ranging from 41 to 56 percent), other factors including number of doctor visits, lab tests per patient, as well as infrastructure costs, seem to drive the variation in costs across these sites. However, when outcome was linked to cost, the average costs to produce a patient who was successfully responding to treatment was similar across sites, indicating that efficiency in utilization of resources and quality of care provided by the more expensive treatment models produced better outcomes. Additional treatment delivery models need to be studied to determine what other variables (size of the patient cohort being treated, the quality of program management, the strength of counseling, communication, and outreach, etc.) may explain these variations in unit costs.⁴⁸ As treatment programs expand in Africa and elsewhere, governments and their donors can also be expected to learn more about the most efficient treatment models.

45 Scherer and Watal. Post-TRIPS options for access to patented medicines in developing nations. *Journal of International Economic Law* 5(4); 913-939.

46 World Health Organization. WHO medicines prequalification: progress in 2008. *WHO Drug Information* 2009; 23(1): 3-7

47 Pinheiro E.S., O.A. Antunes and J.M. Fortunak. A survey of the syntheses of active pharmaceutical ingredients for antiretroviral drug combinations critical to access in emerging nations. *Antiviral Res.* 2008 Sep; 79(3):143-65. Epub 2008 Jun 2. Review.

48 Rosen, S. L. Long and I. Sane. The outcomes and outpatient costs of different models of antiretroviral treatment delivery in South Africa. *Trop. Med.* 13(8): 1005-15.

This information needs to be acted upon quickly by officials in setting guidelines and policies, so that these models can be widely adopted as a way to maximize the benefits from the budgets being devoted to treatment services.

Professionalizing the Management of Service Delivery. There is emerging evidence that large AIDS prevention efforts can be operated more efficiently, delivering a high volume of high impact services, when the programs are run by professional managers with private sector experience in fields which need not be limited to AIDS or health. This is the case with The Bill & Melinda Gates Foundation-funded Avahan project in India, which supports large numbers of local NGOs in six states to deliver prevention services to most-at-risk populations (CSW, IDU, MSM). The Avahan project emphasizes the qualities of a successful business, collecting and analyzing data at each level of their organization from program managers to peer leaders. This information is used in regular evaluations of the project and drives the reallocation of resources in response to the data collected. Flexibility in project funding facilitates the implementation of more efficient use of funds.

An example of this approach is a long distance trucker intervention – initially 36 intervention sites were set up by Avahan partner Transport Corporation of India Foundation. But after two years, data showed that there were critical gaps remaining. In response to this, the program closed 17 locations and re-allocated funding to the largest impact locations. Flexible project funding led to changes in the intervention design, including an increase in the number of service touch points in a site and making truckers the face of the program by engaging them as peer outreach workers. These changes in design and resource allocation resulted in the doubling of monthly communication reach and monthly clinic uptake, as well as a 50 percent increase in monthly condom sales.

An emphasis on timely data analysis, flexibility in program design and funding, as well as a hands-on approach by managers and program staff resulted in a program that has been able to scale up quickly and show impact with key prevention indicators. Although the Avahan project costs are approximately 14 to 19 percent higher than similar programs run by the Indian government, the success of the program has prompted the government to increase its allocation to similar state run programs.

By using managers with private sector experience, prevention programs can marry some of the key tenets of business success with program implementation knowledge to result in the successful execution of large scale interventions. Additional studies on increasing the use of private sector management techniques and their subsequent impact on program performance are needed.⁴⁹

49 BMGF website link for the program: <<http://www.gatesfoundation.org/avahan/Pages/overview.aspx>>

ASSISTING COUNTRIES TO CARRY OUT BETTER COSTING AND BUDGETING

Underlying many of the problems detailed in this chapter surrounding efficient use of AIDS financial resources is another fundamental challenge: the lack of data and analytical capacity, and the lack of incentives to generate such data and use the results in the most affected countries. As part of *aids2031*, we conducted a review of the current situation in developing countries regarding the development of costed national strategic plans, annual budgets, and information on past AIDS spending, as well as the generation of related data on unit costs and cost-effectiveness ratios for prevention and treatment services.

The findings from this review were striking.⁵⁰ Despite the enormous progress that has been made over the past decade, there are still large gaps and deficiencies in knowledge, capacity, and products in the area of national plans, budgets, and expenditure tracking systems. Few countries have developed detailed costs for their national strategic plans. They do not specify how limited resources will be allocated nor how priorities will be set in the event that they are unable to do all that might be desirable. In the face of unclear priorities, the plans permit applying funds to what is most popular but not what is most effective. Recent efforts by UNAIDS and the World Bank AIDS Strategic Action Plan (ASAP) seek to correct these gaps in knowledge and practice.

An earlier review showed that only a minority of countries costed their first generation NSPs (1998-2004).⁵¹ Significant variation existed from country to country in content, structure, costing bases, resource allocation percentages, and targets. These shortcomings have received increased attention in subsequent years, yet the quality of the second generation NSPs is still weak. The Resource Needs Estimates (RNE) discussed in Chapter 2 of this report currently cover 139 countries. Of these 139 GRNE countries, 65 have national strategic plans. Of the 65 with national strategic plans, 42 of them include annual spending requirements. 17 of the 42 plans with annual spending requirements are presented in sufficient detail to allow comparison between the country RNE and its national strategic plan. Of the 17 plans with NSPs comparable to RNE, only 7 report expenditures for one or more years of the NSP period.

50 Hester, V., C. Avila and E. Gaillard, *Assessing Costing and Prioritization in National AIDS Strategic Plans*. 2009, *aids2031: Costs and Financing Working Group*: Washington, D.C.

51 R. Bonnel, M. Temin and F. Tempest, 2004. *Poverty Reduction Strategy Papers: Do they matter for children and young people made vulnerable by HIV/AIDS? Results of a joint UNICEF and World Bank Review*. UNICEF and World Bank, Geneva and Washington DC.

The seven costed NSPs were subsequently assessed as part of the aids2031 background analysis, using the guidelines developed by the AIDS Strategy and Action Plan (ASAP 2008). On the quality and breadth of the costing in the plans, only one of the seven countries (Botswana) was evaluated as having a strong NSP (with a score of 9 out of a total of 16 possible points). The other six countries scored 3 or less. On the ability of the country to set priorities and allocate resources in the plan according to epidemiological and cost-effectiveness criteria, the results were somewhat better, with Botswana again scoring highly and Cameroon, Peru, and the Philippines obtaining just over half of the 28 possible points.

Two standards became clear through this analysis. First, full data availability (Resource Needs Estimates, a costed NSP which could be compared with the RNE, and National AIDS Spending Assessment (NASA) data) is extremely rare. There are dozens of important countries, in terms of HIV prevalence and levels of domestic and international donor funding, not reporting full data. Myriad reasons for this exist, including difficulties orchestrating multi-sectoral responses, limited human resources and physical capacity to implement and track these programs, and failure of parallel donor systems to strengthen public systems and data collection processes. Nevertheless, it is troubling to realize that after 28 years of the epidemic, countries and the global community lack an accurate picture how funds are being spent or where they should be spent for maximum impact.

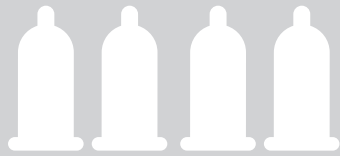
The ideal source for costing NSPs is robust local unit cost information. An active, stable, and comprehensive financial system that is integrated with development partners is also necessary to monitor spending. Tracked expenditures and complete NASA data serve to inform progress under a national response across the years.

Governments and donors need to do more to support the development of country-specific unit cost and cost-effectiveness data, as well as continued development of tools and resources to facilitate costing and resource allocation scenarios exercises. For better costing, some measures that could speed this process include: (a) requests for and uptake of ASAP technical assistance; (b) periodic mid-term reviews of the NSPs; (c) supplementary country-level impact studies; and (d) adequate funding and personnel to perform robust M&E.

For prioritization and resource allocation among interventions, accurate recent epidemiological data about the sources of the latest infections in a country will help point to the key drivers of each country's epidemic and the corresponding areas of prevention to emphasize. Modeling expected costs and resource allocation scenarios, using tools such as the Goals model, can then strengthen the decisions made as part of the strategic planning and budgeting processes.

In order to improve their ability to set spending priorities and carry out AIDS expenditures in a way that improves allocation and technical efficiency, it is important that countries develop functional and transparent national financial systems; track, report, and share full cost and financing data; conduct AIDS financing self-assessments; create an integrated system for linking actual AIDS spending with national plans; and set and monitor targets for improved NSP processes.

To put national AIDS programs on a sounder financial footing for the long run, one urgent short-term action could be to mount an effort in which the top 10 or 20 countries, as defined by HIV prevalence and by national AIDS resource needs estimates, would work intensively over the next three to five years to achieve the ASAP guidelines for costing, cost-effectiveness analysis, and priority setting. Each country would report its progress to a neutral body such as UNAIDS and would agree to participate in independent assessments of their achievements and shortcomings.



Chapter 4: Mobilizing Funds for AIDS over the Long Term

OVERVIEW OF THE ISSUES

As highlighted in Chapter 2, the long-run costs of AIDS in developing countries to 2031 and beyond will be very large, amounting to as much as \$35 billion annually, with little prospect of outlays declining over the coming years in the absence of biomedical or behavioral “game-changers.” But the funds devoted to AIDS prevention, treatment, and mitigation can certainly be used in a more efficient way, as discussed in Chapter 3. This should be done for many reasons, including the responsible stewardship of public monies (both from developing country and donor governments) and the fact that sustained political support for spending on AIDS will be stronger if program managers can demonstrate that they are finding ways to realize greater benefits with limited resources.

Given the financial outlook for AIDS, it will be very challenging for governments, donors, and civil society groups to mobilize adequate resources in a fair, predictable, and timely manner. In this chapter, we address the key questions around resource mobilization: Where will the money come from? How much effort can and should developing country governments make to pay for their own AIDS programs? What can be expected of public sector donors from affluent countries? Will the size and composition of the donor community and the modalities for external assistance change over the next two decades? What about the contributions of the private sector, including philanthropy, corporations, NGOs, and individual households? Are there other innovative schemes for raising financial resources for AIDS that could be launched over the coming years?

In general, we believe that in the short run (i.e., the next two to three years), the climate for financing AIDS programs in developing countries will come under severe pressure because of the current global economic crisis which will continue to negatively affect both domestic sources of funding for AIDS (governments, businesses, and household out of pocket spending) and external donor sources. This pressure will be compounded by the growing demand for AIDS treatment, especially in countries with large numbers of HIV positive people needing therapy but not yet enrolled in ART programs. Some signs of this financial stress are already visible.⁵²

52 The Global Economic Crisis and HIV Prevention and Treatment Programmes: Vulnerabilities and Impact. Jul 2009, World Bank and UNAIDS: Geneva, Switzerland.

Over the longer run, a number of positive factors may come into play. Economic growth will resume in both developed and developing countries, providing an expanding base that governments and private sources could use to pay for AIDS prevention, treatment, and mitigation programs out to 2031 and beyond – if the political will is there to do so. Also on the positive side, there is already widespread awareness of AIDS and a general recognition that spending produces positive results, especially in treatment where the impact is immediate and visible. Strong and active support from civil society groups will exert a positive pressure on governments. In addition to governments, there could also be prospects for increased financial contributions from philanthropic individuals and institutions, and “innovative financing” mechanisms hold some promise for expanding the resource envelope for AIDS over the long run.

On the negative side of the ledger, there are significant threats to increased and sustained financing of the hundreds of billions of dollars in AIDS programs that we project will be needed between now and 2031. Developing country and donor governments may become “fatigued” with large outlays for AIDS, especially if they feel that prevention efforts are not working, or are proceeding too slowly, or if there are negative repercussions from any large-scale misuses of funds. The perception that AIDS programs are getting a disproportionate share of domestic spending and of donor assistance, to the detriment of other health and social development programs – and such a perception is growing today – could lead to a backlash.⁵³ We should also not rule out the possibility that in the aftermath of the global financial crisis and economic recession of 2008-2010, donor assistance will not recover to its earlier levels, but instead will be discounted or become discredited as a form of welfare transfer from affluent to poor countries.⁵⁴

The actual spending trajectory for AIDS over the period 2009-2031 will be the result of the interplay between these positive and negative forces. Which ones will predominate? It is difficult for us to predict from the current point in time. In this chapter, we consider several scenarios, based on the following principles:

- Developing country governments have a responsibility to finance their national AIDS programs according to their ability to do so. Poorer countries which are growing slowly and have a large disease burden should pay a smaller share of the costs; middle income countries that are growing more rapidly and have a smaller burden of AIDS costs should pay more. External sources (donor governments and philanthropic organizations) should help to fill the gaps which remain after domestic resources are deployed. This approach is grounded

53 England, R. Are we spending too much on HIV? *BMJ* 2007; 334:344 (17 February).

54 Schneider, K. and L. Garrett. The Evolution and Future of Donor Assistance for AIDS. Working Paper. 2009, aids2031: Costs and Financing Working Group: Washington, DC.

in principles of equity, international solidarity, and the idea that there are important social and economic externalities associated with an effective AIDS response that merit the use of public funds. At the same time, external financing should not produce perverse incentives for developing countries – for example, quasi-guaranteed support for treatment should not lead governments to become complacent about prevention, because they assume that outside funding will always be available to ensure a robust treatment response. There are also legitimate concerns that large amounts of external financing for AIDS and other health programs lead domestic governments to spend less of their own funds.⁵⁵

- There is an important role for NGOs and for-profit companies to contribute financially to the national AIDS effort. NGO funding can help to increase the sense of community and local ownership of the national AIDS response, whether in reaching marginalized populations with prevention services, expanding home-based care to remote communities, or helping AIDS orphans with a range of health and psycho-social services. Companies can be motivated by the opportunity to support AIDS services that protect the health of their workforce and their employees' families, and by the positive image they create by contributing to the national AIDS effort. The public sector should adopt policies which facilitate NGO/private involvement and resource contributions, in cash and in other forms.
- Funding for AIDS should be channeled in ways that increase national ownership and accountability, consistent with the principle of maximizing efficiency and thus impact on the epidemic and its social consequences. This means coordinating donor funds with domestic resources, while minimizing “off budget” programs; minimizing transaction costs in getting the funds into the hands of implementing organizations, public, NGO, and private; and exploring ways to combine AIDS funding streams (e.g. for treatment) with the health insurance schemes that are already emerging in many developing countries and can be expected to become an increasingly important component of health finance in these countries over the next two decades.

THE LONG-RUN PROSPECTS FOR DOMESTIC FINANCING OF AIDS

The starting point for analysis of future AIDS financing is to answer the question, “Over the longer term, how much will governments be able to pay, in relation to the expected financial burden?” This, in turn, leads to the assessment of the country’s “fiscal space” – the amount of budgetary

55 Lu, Chunling, Matthew Schneider, et al, Public financing of health in developing countries: a cross national systematic analysis, *The Lancet* 375:0732, 17 April 2010.

Figure 4.1 | Projected Average Annual Health Expenditures Per Capita for Low and Middle Income Countries In 2006, 2015, and 2030, US\$

Country Groups	2006	2015	2030
Low income countries	19	26	43
Middle income countries	105	170	353
All developing countries	85	134	269

Notes and sources: Calculations based on World Bank Global Economic Prospects projections. Data on health expenditures by country from WHO as included in World Bank WDI 2008.

resources from taxation that will be available, and whether a portion of those resources, for which there will always be many claimants and thus intense competition, can be directed toward AIDS prevention, treatment, and mitigation.

One way to approach this issue is to compare the projected future national AIDS spending (as presented in Chapter 2) with projected future government revenues – or the portion of those revenues which might go to health services – in order to see whether the government might reasonably be expected to cover its AIDS costs. A related comparison is to estimate future AIDS spending as a share of national wealth (GDP), and to pose the question, “Can the country afford to mobilize such a share of its GDP to pay for its national AIDS response?” In this chapter, we carry out both kinds of analysis.

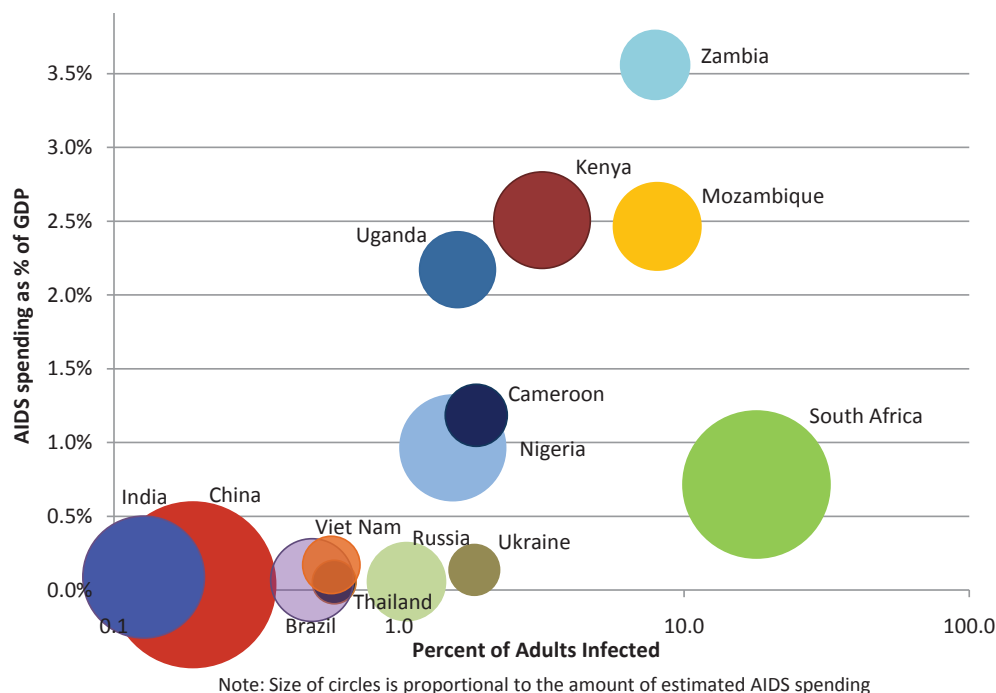
The World Bank and IMF prepare updated projections of GDP per capita and population for their member countries.⁵⁶ These projections can be combined with cross-sectional data from national health accounts to estimate future public revenues and total health spending (public and private). While both low and middle income developing countries are expected to grow by 5 to 6 percent a year between now and 2031, because population growth in the poorest countries (1.7 percent annually) will be more than twice the level in middle income countries (0.8 percent a year), health spending will increase more slowly (an average of 3.5 percent a year) in low income countries than in the middle income group (5.2 percent). As a result, we project that for low income countries, average per capita health spending will little more than double over a quarter century, from \$19 to \$43 per capita (Figure 4.1, pp. 80). By 2015, estimated spending of \$26 per person will still be lower than the target of \$34 per capita for a basic package of health services set nearly a decade ago by the WHO Commission on Macroeconomics and Health. For countries heavily burdened by AIDS,

56 World Development Indicators Online. The World Bank and IMF: Washington, DC. Available at: <<http://go.worldbank.org/UoFSM7AQ40>>.

Figure 4.2 | Projected Population, Health Spending Per Capita, and AIDS Resources Needs for 2030 (Rapid Scale-up), Selected Countries

Country	Population (Millions)	Total Health Spending Per Capita	AIDS Resource Needs Per Capita	AIDS Resource Needs/Health Spending
Zambia	14.9	\$51	\$33	64%
Mozambique	27.7	\$51	\$30	58%
Kenya	44.4	\$40	\$23	57%
Malawi	19.0	\$47	\$27	57%
Tanzania	54.6	\$51	\$19	37%
Ethiopia	117.8	\$21	\$7	34%
Uganda	54.2	\$38	\$12	32%
Nigeria	197.5	\$43	\$11	25%
Cameroon	23.6	\$65	\$15	23%
South Africa	53.1	\$769	\$64	8%
Indonesia	285.4	\$44	\$3	7%
Cambodia	19.1	\$113	\$5	4%
Viet Nam	106.2	\$105	\$3	3%
Ukraine	40.8	\$307	\$6	2%
India	1416.1	\$115	\$2	2%
Mexico	145.5	\$508	\$8	2%
Thailand	70.5	\$178	\$3	2%
Russia	125.3	\$502	\$6	1%
Brazil	231.1	\$442	\$4	1%
China	1489.2	\$405	\$3	1%

Figure 4.3 | AIDS Spending Requirements as a Share of GDP and Adult HIV Prevalence, 2015, Selected Low and Middle Income Countries



where resource needs will be \$10 per capita or greater according to our scale-up scenarios, these levels of health spending will not be adequate to support a robust national AIDS effort unless backed by large injections of donor funding. By contrast, middle income countries are expected to fare better over the next two decades, more than tripling per capita yearly health spending, from an average of \$105 in 2006 to \$353 in 2030. This suggests that many middle income countries, especially those with concentrated epidemics and thus more moderate AIDS financing needs, may be able to generate the resources required for AIDS from domestic sources without having to turn to outside sources of funding.

This heterogeneous – and diverging – picture of the future capacity of different countries to pay for their national AIDS programs is reinforced by our projections of future government revenues and total health spending for 20 individual countries (Figure 4.2, pp. 81), which together account for about two thirds of all AIDS spending over the next 22 years. To the extent these countries can finance most of the long-run costs of their programs for prevention, treatment, and mitigation, the overall calls for donor assistance will be more limited and manageable.

For several of the sizeable middle income countries expected to be among the largest spenders for AIDS in 2031 (in absolute terms), including Brazil, China, and India, projected AIDS resource needs will only amount to 1 to 2 percent of future health expenditures. Such countries may thus be able to absorb the costs of AIDS relatively easily, without recourse to external support. On the other hand, in a significant number of low income countries in Africa, AIDS spending needs are projected to be equivalent to one quarter or more of all health expenditures in 2031, ranging from 23 percent in Cameroon to 64 percent in Zambia under the Rapid Scale-up scenario. It seems doubtful that these countries will be able to pay for an adequate response to their AIDS epidemics with their own domestic funds, without crowding out other important areas of spending for health and other services. These countries face the prospect of dependence on outside financial support for two decades and longer.

What about AIDS spending as a share of GDP? Figure 4.3 (pp. 82) shows projected HIV prevalence and AIDS resource needs (in the Rapid Scale-up scenario) for 2030 for selected countries. What emerges is the same pattern of considerable heterogeneity across low and middle income countries, with four distinct groupings:

- Middle income countries with expected low adult prevalence in 2030 (generally less than 1 percent), which will have to devote a small fraction – less than 0.2 percent – of GDP to their national AIDS programs. These countries (Brazil, China, India, Indonesia, Mexico, Russia, Thailand, Ukraine, and Vietnam) should be able to achieve financial self-sufficiency.
- A small cluster of high prevalence middle income countries in Southern Africa (South Africa, Namibia, Botswana, Swaziland) where 15 to 20 percent of adults are estimated to be infected with HIV in 2031, but where economic growth will be strong enough to keep expected AIDS spending at around 1 percent of GDP. These countries should be able to make a large contribution to their AIDS spending, though it may be difficult for them to meet their full financial needs without relying on some external support, especially over the next five to ten years, when AIDS expenditures as a share of GDP are expected to peak at 1 to 2 percent of GDP as treatment costs rise rapidly to match unmet demand. In South Africa, for example, recent modeling suggests that to fully satisfy the need for AIDS treatment, over \$2 billion will be required annually by 2012.
- A set of low income countries, mostly in Africa (illustrated by Burkina Faso, Cameroon, Ethiopia, and Nigeria), where there will be a serious but more modest epidemic (1 to 5 percent of adults infected) and where GDP per capita growth will be slower, resulting in AIDS spending needs equal to about 1 percent of GDP. These countries should be able to

make an important contribution to their national AIDS spending, but external sources may be required to cover the balance of future AIDS costs.

- A group of low income countries located in the severely affected zone of Eastern and Southern Africa (including Kenya, Malawi, Mozambique, Uganda, and Zambia), which will have high adult HIV prevalence in 2031 (5 to 15 percent). For these countries, AIDS spending needs are likely to be 2 to 6 percent of GDP over the coming two decades – a very heavy burden. Their dependence on donor financing will remain high, creating serious risks for these countries.

THE OUTLOOK FOR DONOR FINANCING

What are the prospects for future donor flows for AIDS in low and middle income countries? How will the current economic slowdown affect donor readiness to maintain past levels of support?

As a consequence of overall increases in donor flows for development since the G8 meetings in Gleneagles, Scotland in 2005, the high income countries have expanded their support for health and AIDS. In 2007 approximately \$14.5 billion funds were allocated to health, about \$5.1 billion of that supporting AIDS programs.⁵⁷

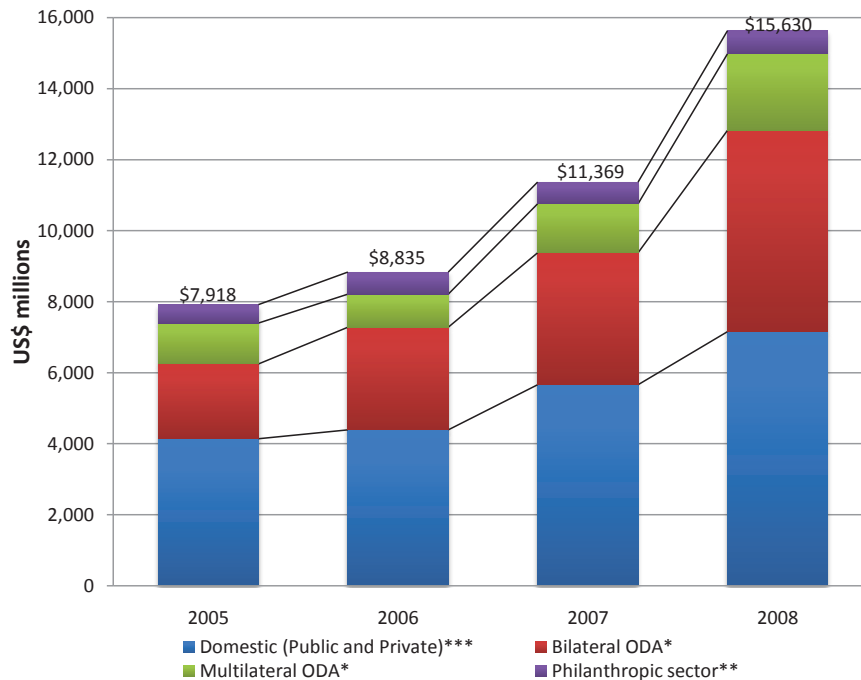
Prior to the creation of bilateral and multilateral programs to fight AIDS, foreign aid for health had historically been used to fund public health initiatives, such as clean water and sanitation systems, building of clinics, the purchase of medical supplies and family planning commodities, and vaccination campaigns. It was rarely used for medical care, and never before used to fund chronic disease management, as is the case with AIDS treatment.

In 2008, the largest sources of funding for AIDS were domestic expenditures in affected countries (52 percent), bilateral contributions (31 percent), multilateral institutions (12 percent) and the philanthropic sector (5 percent).⁵⁸ The largest area of growth for AIDS funding has been from domestic funding sources, primarily from middle income countries. Despite these positive developments, AIDS programs remain heavily reliant on outside funding, especially in low income countries. In Cambodia, Tanzania, and Zambia, for example, more than 90 percent of AIDS spending today comes from outside agencies, with the government's contribution at less than 10 percent.

57 Ravashankar et al. Financing of Global Health: tracking development assistance for health from 1990 to 2007. *Lancet* 2009;373:2113-24

58 What Countries Need: Investments Needed for 2010 Targets. February 2009, UNAIDS: Geneva, Switzerland.

Figure 4.4 | Resource Availability for AIDS in Developing Countries, 2005-2008



Source: UNAIDS, 2009

How much funding can be expected from donors over the next two decades? Here we provide a quantitative look at the range of possibilities (Figure 4.4, pp. 85), using projections built upon GDP data from the World Bank and assumptions about the share of donors' GDP devoted to donor assistance and to AIDS. Using the Bank's estimate of 2 percent for average annual economic growth over the next two decades in the most affluent countries – lower than projected growth rates for the developing world – GDP for the high income countries will be just under \$42 trillion in 2030. We then consider two scenarios for the share of GDP devoted to donor aid: (a) a pessimistic one in which this share remains at its current 0.25 percent overall, despite recent pledges from many European countries to expand their donor support budgets, and (b) and optimistic one in which aid grows to 0.7 percent of GDP, in line with the announced EU target for 2015.⁵⁹ We further assume that the share of aid going to AIDS remains at its current historically high level of 7 percent, an assumption that might be considered optimistic.

59 UK Keeps Aid Promises to the World's Poor. October 2008, UK in the USA: Foreign and Commonwealth Office. <<http://ukinusa.fco.gov.uk/en/newsroom/?view=News&id=6831836>>.

Figure 4.5 | Pessimistic and Optimistic Scenarios for Overseas Development Assistance and Share of ODA for AIDS programs, 2006-31 (US\$ Billions)

	2006	2015	2031
Pessimistic – No Change in ODA as Share of GDP (0.25%)			
Total ODA*	92	113	155
Donor Assistance for HIV/AIDS	6	8	11
Optimistic – Donors Increase ODA to 0.7% of GDP			
Total ODA*	92	315	433
Donor Assistance for HIV/AIDS	6	22	30
Global Resource Needs for AIDS (Rapid Scale-up)	10	27	35

*ODA calculated using GDP provided by OECD. June 2009, Principaux Indicateurs Économiques: ISSN 0474-5523.

As Figure 4.5 (pp. 86) shows, under the pessimistic scenario, development assistance for AIDS reaches \$8 billion in 2015 and \$11 billion in 2031, covering less than 30 percent of the funds needed in those years, as compared with 43 percent in recent years. In this scenario, low income countries would be pressed to come up with additional funds to meet their AIDS spending requirements. Under the optimistic scenario, external financing for AIDS programs rises to \$22 billion in 2015 and \$30 billion by 2031, covering a large share of future requirements.

It is difficult to predict the overall size of donor aid and the share of that aid that will go to AIDS over the next two decades. Two important trends are worth considering. First, analysts predict that growth in Brazil, China, India, and Russia will lead to their generating a large share of global wealth by 2040.⁶⁰ These new economic powers will play an influential role in dictating the terms and guiding the flow of development assistance. Their approaches to aid overall and to HIV/AIDS in particular have been varied so far, with some positive signs including Brazil's participation in UNITAID, China's support for prevention efforts for injecting drug users, and India's rapid scale-up of targeted HIV prevention for sex workers and MSM.

Second, there is an ongoing debate regarding the merits of improving health systems and services across the board, as opposed to supporting disease-specific initiatives.⁶¹ Over the next few years,

60 Global Trends 2025: A Transformed World. November 2008, National Intelligence Council: Washington, DC.

61 An assessment of interactions between global health initiatives and country health systems. WHO Maximizing Positive Synergies Collaborative Group. Lancet 373(9681):2137-69, 20 June 2009.

there may be a shift towards funding programs to ensure access to universal health coverage. Where this discussion around “horizontal” and “vertical” programs leads, and how AIDS advocates position themselves, will have an important impact on the level of political support and funding from donors.

Donor-Government Financing Dialogue with the Long Run in Mind

As the response to the global pandemic matures, it is crucial for the key policy discussions between national governments and external funding organizations to take a long-term view of how HIV incidence, numbers of infected persons, and the number of those on treatment are evolving and what this means for financing. The nature and duration of funding commitments, and how these commitments should be related to AIDS program performance, also need to change in line with a longer-term view.

In low income settings where the epidemic is severe, financial commitments from all parties including external partners need to be long-term. Funding requirements will be large for many decades to come, and domestic public financing alone will not be adequate. But external support should be linked to a reasonable level of matched funding from the government, and to a concerted effort to strengthen HIV prevention programs and achieve measurable results in prevention. This is important for many reasons, including the obvious fact that fewer infections over the next two decades will mean fewer people going on costly treatment in the future. More innovation and experimentation with this kind of policy dialogue between governments and donors, where funding, program efficiency, and more effective prevention are tightly connected, are urgently needed.

Similarly, in middle income settings and especially in countries with concentrated epidemics, the time has come for governments and donors to broach the subject of a measured and rational “transition” or “exit” strategy. Countries in this category should be able to afford to pay for their national AIDS efforts over the coming decade, assuming that they focus on the most cost-effective prevention activities and manage their treatment programs efficiently. Donor funding should be used as a catalyst for these countries to develop well designed and managed AIDS programs, and not as a long-term substitute for national resources. As discussed in Chapter 3, in a number of countries it is key that external funders expand their policy dialogue with national authorities on the importance of cost-effective AIDS services for marginalized populations.

HARNESSING PHILANTHROPIC FUNDING

Philanthropy – charitable giving by individual donors, foundations, companies, and other private organizations – has historically been an important, if not dominant, source of financing for AIDS in developing countries. Philanthropy has been especially useful in catalyzing early actions and innovative approaches, and in supporting AIDS-related biomedical research. What might be its role over the long run to 2031?

Total funding from the philanthropic sector for AIDS is estimated at \$1 billion annually, with \$500 million from U.S.-based foundations and corporations, \$115 million from European-based foundations and companies, and another \$300 million to \$400 million from private individuals, charities, churches, and service organizations.⁶² The three leading non-corporate foundations are The Bill & Melinda Gates Foundation, the Ford Foundation, and The Henry J. Kaiser Family Foundation, which together provided \$340 million in 2007.⁶³

Over the next two decades, private philanthropists could continue to play an important role in AIDS in low and middle income countries, exploiting their areas of comparative strengths: speed and flexibility, ability to move funding directly to local communities, and supporting small scale experimental projects that may be promising for future scale-up but are also risky. On the other hand, it should be expected that philanthropists will move in and out of an issue like AIDS over a few years, so there could be less long-run financial stability or predictability from them, as compared to public sector institutions.

Several emerging trends in philanthropy may be important for long-term funding for AIDS. First, the next generation of extraordinarily wealthy individuals will come from a wide range of countries, including the new economic powers such as China and India. Second, more nations are currently altering their tax structures to encourage private philanthropy, including the United Kingdom, Ireland, and France. Third, the use of the internet to drive online giving will also help to broaden the base for philanthropy, encouraging millions of people with modest incomes to make small donations which can be aggregated for specific causes.

What is currently unclear is whether these trends will ultimately lead to more funding for AIDS. Mitigating factors include competing priorities for philanthropists, such as climate change and global warming, access to clean water, and a host of issues “at home;” negative perceptions about

62 Funders Concerned About AIDS. US Philanthropic Support to Address HIV/AIDS in 2007, pg 8-11. Available from: <http://www.fcaids.org/publications/documents/FCAT12_rtg07_vF.pdf>.

63 Funders Concerned About AIDS, pg 14.

corruption and accountability in some developing countries; and lack of clear and convincing information on the effectiveness of past philanthropic investments in AIDS and health in low income settings.

In this environment, it will be important for AIDS organizations to take a series of actions that together can make an effective case for support for prevention, treatment, and mitigation programs in low income countries. These actions include documenting the severity and the consequences of the AIDS pandemic and communicating this information to philanthropic organizations, articulating and disseminating success stories and cataloguing examples of future funding opportunities, and ensuring that developing country leaders are seen highlighting AIDS as a national priority.

To develop a more favorable global climate for philanthropic contributions to AIDS, another short-term action could be to support intermediary organizations such as UNAIDS, the UN Foundation, and the Global Fund, which have stimulated AIDS philanthropy in recent years.

INNOVATIVE FINANCING SOURCES AND MECHANISMS

AIDS programs have been on the cutting edge in the design and testing of innovative approaches to financing for development over the past decade. Can they continue to do this in the future, and how much potential is there in this area?

- Much of the recent innovation has been pioneered by the Global Fund: Voluntary contributions through the Product (RED) campaign, launched in 2006, have generated several hundred million dollars for the Fund.⁶⁴ A percentage of revenues from the sale of certain products marketed by internationally known brands are contributed to the Fund for its AIDS programs in Africa.⁶⁵
- Debt swaps are being used to channel extra funding to the Fund's AIDS, TB, and malaria activities. Under the swaps, the holder of the debt of a developing country government agrees to forgive the debt, provided that the government donates a negotiated portion of its value to a local Global Fund project.⁶⁶ So far, Indonesia and Pakistan have participated in

64 Mid-Term Review of the Second Voluntary Replenishment 2008-2010. March 2009, Global Fund: Cáceres, Spain.

65 Progress Report on Resource Mobilization Efforts. Available from: <http://www.theglobalfund.org/documents/replenishment/caceres/ProgressReport_ResourceMobilization.pdf>.

66 Overview of Innovative Financing. Global Fund: Cáceres, Spain. Available from: <<http://www.theglobalfund.org/en/innovativefinancing/debt2health/overview.html>>.

this debt swap scheme, with Germany agreeing to forgive about \$300 million in debts by the two countries. Australia has recently agreed to join the debt swap scheme.

- The airline solidarity tax, proposed by France and launched in 2006, has generated \$718 million over a little more than two years for UNITAID, the conduit which was established to channel these funds for expanded treatments for AIDS, TB, and malaria. In the case of AIDS, the focus has been on pediatric AIDS treatment, second line ARVs, and PMTCT programs. UNITAID revenues come from taxes on airline tickets issued in nine countries, and are augmented by voluntary contributions from 22 other governments. In 2008, the UNITAID board approved \$450 million in new commitments, of which about \$210 million was for AIDS-related projects.⁶⁷

The positive track record in designing and accessing innovative forms of financing mechanisms could favor AIDS organizations in the coming years, as work on innovative approaches intensifies. The recent Task Force on Innovative Financing for Health Systems, led by the United Kingdom and the World Bank, has proposed that other forms of global taxation be considered, including expansion of the International Financing Facility and of the airline levy, and other possible new forms of global taxes.⁶⁸ Other new ideas, such as using government guaranteed bonds to finance global health research and development, could also be appropriate for financing work on an AIDS vaccine, cure, or other “game-changer” as discussed in Chapter 2 of this report.⁶⁹

67 UNITAID. Innovative financing for health: the air-tax – a journey to access. Geneva: WHO; c2006 [updated 2008 Dec; cited 2009 Jul 7]. Available from: <<http://www.unitaid.eu/en/Facts.html>>.

68 Taskforce on Innovative International Financing for Health Systems. More money for health, and more health for the money. Main report. Washington (DC): International Health Partnership; c2007 [cited 2009 Jul 8]. Available from: <<http://www.internationalhealthpartnership.net/taskforce.html>>.

69 Spurring Innovation in AIDS Vaccine R&D: What will it take? April 2009, International AIDS Vaccine Initiative (IAVI): New York City, NY. Available from: <<http://www.iavi.org/publications-resources/Pages/publications.aspx>>.



Chapter 5: Summary of Main Findings and Recommendations

TOP LINE RECOMMENDATIONS

1. Over the next 22 years, the global AIDS costs and financing outlook should be a cause for major concern for the heavily affected developing countries and their external partners. Global AIDS funding needs will continue to grow rapidly over the next two decades. Under all four of the scenarios that we modeled, costs spike dramatically between now and 2015-20, and continue to rise gradually thereafter, reaching \$19 billion to \$35 billion a year in 2031. A decline in yearly AIDS spending is not in sight over the next two decades under any of the scenarios.
2. Among the world's regions, Africa will be most affected, requiring half to two-thirds of all financial resources for AIDS. Across the spectrum of interventions to address the epidemic, AIDS treatment can be expected to absorb the largest share of future spending, at around a quarter of the total (as much as two thirds to three quarters of spending in the most affected countries of Southern Africa). AIDS treatment spending rises inexorably as the number of persons requiring such care also increases, since successful treatment means that people remain alive by continuing to take their medications, while people infected in the recent past also enter into and swell the ranks of those who will benefit from such care.
3. Even if AIDS costs are almost certain to rise between now and 2031, we can significantly influence the cost trajectory with our actions today. Policy choices have different price tags – ranging from \$397 billion to \$722 billion over the 22-year period. Backed by stronger political will and AIDS financing capacity, more infections can be averted and lives saved, at a higher total cost. In the low cost scenario where available funds are concentrated on prevention activities that have the largest impact, the projected reduction in new infections is nearly as large as in the most expensive approach.
4. By taking a long-term view and addressing the underlying social drivers of AIDS – such as stigma and discrimination, criminalization of behaviors such as men having sex with men and intravenous drug injection, and women's low social and economic status – with “structural interventions,” countries can reduce the number of expected new infections further, by an extra 10% or more, as compared to the result if they focus exclusively on direct, short-run actions.

5. While these different scenarios show that by expanding use of our current HIV prevention toolkit, and by investing in structural changes, we can significantly attenuate the epidemic – lowering the number of new infections from 2.6 million to 1.2 million a year over two decades – such efforts will not extinguish AIDS. Even under the most optimistic scenario, the world will see more than a million adults and children infected each year in 2031 – still a very serious infectious disease epidemic.
6. To bring down the number of new infections even further, new biomedical or behavioral breakthroughs in HIV prevention are needed. On the biomedical front, technologies which may be approved in the next few years – vaginal microbicides and the use of antiretroviral drugs as a preventive measure (pre-exposure prophylaxis, PrEP) – could help to lower infections, but are unlikely to have a major impact globally. An AIDS vaccine or a drug leading to a cure, while of more uncertain scientific feasibility and further out on the horizon than either a microbicide or PrEP, could have significant added benefit in terms of lowering the rate of HIV infections.
7. Within the national AIDS programs of low and middle income countries, there is considerable scope for spending financial resources better, thus making existing funds go further in preventing infections and treating HIV positive individuals. One avenue for greater efficiency would be by directing available funds to the prevention services that have the highest impact. Our Hard Choices scenario suggests that by doing this, countries could spend 45 percent less and achieve nearly the same impact in terms of cutting the number of new infections, as compared to a less targeted approach. A second broad avenue for efficiency gains would be by better managing prevention and treatment programs, improving coordination, purchasing drugs and other commodities more cheaply, and relying more on less expensive nurses and other paramedical workers in facilities close to patients, in favor of more expensive doctors and specialists in more costly hospitals located further away. More work is required to quantify the gains resulting from better program design and management.
8. Sustained long-term financing for AIDS in low and middle income countries is in serious jeopardy. In the short run, the global economic slowdown of 2008-10 is lowering government revenues and household spending for AIDS in a number of countries, and blunting earlier efforts by donors to expand their financial support for AIDS programs. Over the longer run to 2031, financing the AIDS response will be challenging because projected funding needs will continue to outstrip the capacity of many of the most affected countries, and because donor budgets may only grow slowly and will be subject to pressures from groups seeking funding for other priorities such as global warming, education, clean water, and other infectious diseases.

9. The long-term financial prospects are especially bleak for several poor countries with high levels of HIV infection such as Malawi, Mozambique, and Zambia, but also for some better off middle income countries with high prevalence, such as South Africa. In both types of situations, there will likely not be adequate domestic financial resources to address the epidemic, during both the “crunch” period of the next 5-10 years as treatment efforts expand rapidly, and over the longer term. AIDS spending needs in Zambia, for example, could exceed 6 percent of gross national income in the next few years, and is projected to remain at around 3 percent of GNI even in 2031 as the rate of new infections falls.
10. External donor assistance for AIDS, from both bilateral programs and from multilateral organizations such as the Global Fund for AIDS, Tuberculosis, and Malaria and the United Nations agencies, has grown rapidly in recent years, from a few hundred million dollars a decade ago to more than \$7 billion last year. The share of all official development assistance devoted to AIDS has increased to a remarkable 7 percent of total aid. But even if this share is maintained – something that will be hard to achieve in the future, given competing demands on donor agencies – unless the percentage of rich countries’ GNI allocated to development aid expands beyond its current level of 0.27 percent, donor assistance for AIDS will fail to keep pace with the rising needs of the low and middle income countries, as per our projections of \$397-733 billion over the next two decades to 2031.
11. Beyond the low and middle income country governments and the traditional rich country public sector donors, there are at least three promising new sources of financing for AIDS programs that could be tapped in the coming years: new philanthropists, new public sector donors, and innovative financing mechanisms. Regarding the first, there are indications that philanthropy will increase rapidly over the next 20 years, once the world recovers from the current global economic crisis – including growing philanthropy by wealthy individuals in the emerging economies such as China and India. The challenge for AIDS advocates will be to find ways to make a compelling case that this new philanthropy should flow to AIDS, given intense competition with other causes. Concerning the second new source of funding, there is potential additional external funding available for AIDS from countries that have recently become wealthy enough to join the donor community, including a number of Middle Eastern nations and non-OECD members of the Group of 20 (G-20). In the area of innovative financing, recent experiences with mechanisms such as the International Financing Facility, debt-for-health swaps, solidarity levies, and voluntary contributions tied to purchase of certain commercial products have demonstrated the possible financial benefits of these schemes and their potential for further expansion.

MAIN POLICY RECOMMENDATIONS

1. To reduce and contain long-term AIDS spending, the number of new infections over the next two decades must be brought down well below the 1.2-2.1 million a year figure that we project in our scenarios for 2031. Dramatically lowered infections will result in fewer persons requiring treatment in the future, thus moderating antiretroviral therapy spending and related expenditures for treatment of other opportunistic infections. What this means is that HIV prevention efforts, which are still neglected in many countries, must be greatly intensified.
2. In order to strengthen prevention, key actions include the following:
 - a. Developing country governments and their external partners should focus resources more on prevention programs for “most-at-risk population” groups (MARPs), especially men having sex with men, female commercial sex workers, and injecting drug users. This is particularly the case in many countries where the epidemic is currently concentrated in these groups, but could also have important benefits in countries where HIV infections are more widespread. This change will require that countries overcome stigma and discrimination and their reluctance to help these marginalized groups, who have not been a popular political cause in most Asian, Latin American, and Eastern European countries.
 - b. In countries where the epidemic is generalized in the population of sexually active adults, especially in East and Southern Africa, expansion of male circumcision as well as programs to prevent transmission of HIV from pregnant mothers to their babies would help to slow the pace of new infections. Governments and donors should back such programs. In addition, efforts to encourage significant changes in sexual behavior, concentrating on reducing the numbers of sexual partners (including concurrent, overlapping relationships) and encouraging greater condom use in such relationships, are vital.
 - c. Public sector donors, foundations, academic institutions, and biotechnology companies should invest more in research and product development for new HIV prevention tools, including the testing, licensure, and roll out of microbicides and PrEP, plus the discovery and subsequent efficacy trials for an AIDS vaccine and possibly a drug that could permanently eliminate the HIV virus from the body.

- d. Public sector and civil society institutions in all countries should mobilize on a large scale, with high level political leadership, to put in place a series of structural changes (repeal of anti-sodomy laws, legalization of needle exchange programs, measures to reduce violence against women, etc.) that will reduce levels of vulnerability and risk and allow prevention programs to achieve higher levels of effective coverage.
3. In each low and middle income country, the government and its main external partners should identify and commit to a series of actions which can substantially raise the efficiency of national AIDS spending over the short and medium term. There exists a wide range of opportunities for efficiency gains in every country. Areas worth considering in virtually all countries include: improving procurement of antiretroviral drugs and test kits; expanding prevention services at individual sites, such as counseling and testing, so that economies of scale can be achieved; training and employing better program managers focused on raising service quality and lowering costs; and shifting tasks (e.g., in AIDS treatment) to lower cost health workers.
4. Given the likelihood that financial needs for AIDS will continue to grow in most developing countries, the many middle income nations with low levels of infection concentrated in MARPs should strive for financial self-sufficiency in the coming years. Some of these countries, such as Brazil, Mexico, and Thailand, are already paying for most of their AIDS services. Others, such as China and Indonesia, should move as rapidly as possible in this direction. External funders such as the Global Fund should design short to medium term exit strategies for these countries.
5. Available donor funding should be focused on high prevalence countries – on those in the low income category over the longer run, since they are unlikely to be able to achieve self-sufficiency, and on severely affected middle income countries like Botswana, Namibia, and South Africa over the medium term (5 to 10 years). In light of the mounting costs of AIDS treatment in these countries because of the continuing high rates of new infections, and the inherent risks that external funding may not be sustained over a period of several decades as required for those on treatment, donors such as the Global Fund and PEPFAR should enter into more vigorous dialogue with the high prevalence countries to discuss ways to improve prevention, including explicit government commitments to achieve certain prevention targets.

6. Governments and AIDS advocates should expand their current efforts to capture a share of the new philanthropy that will emerge in the coming years. There is scope for considerably greater creativity in this area, something that governments and public sector donors have been slow to capitalize upon. In the case of innovative financing approaches involving the use of public funds as prizes, guarantees, and collateral; solidarity levies; debt conversion; and tax-favored voluntary contributions, AIDS programs including the Global Fund and UNITAID have been on the cutting edge of thinking and experimentation in this area. They should retain this advantage as innovators.
7. Governments, bilateral aid agencies, multilateral institutions, foundations, and policy research organizations should continue to invest in better data, tools, models, and assessments of the impact and effectiveness of AIDS prevention and treatment programs. While much has been learned in this area to date, there are still large gaps in our knowledge of what works and at what cost; what are the most cost-effective ways to prevent HIV infections and treat AIDS patients in different settings; and where can the greatest efficiency gains be achieved in the design and management of critical prevention and treatment services. Donors, ministries of finance in developing countries, and watchdog civil society organizations have an important role to play in encouraging national AIDS program managers to allocate and manage financial resources in a more efficient way, based on improving knowledge of what works and what is most cost-effective.

Renewed Effort and Investments in “Social Movements” and Social Change

With major technological breakthroughs still several years away – at best – it is all the more vital for national and local leaders in low and middle income countries to drive important social changes that can create a favorable environment for behavior change (sexual behavior, injecting drug behavior) that reduces HIV infections. Experience from Uganda and other countries shows that high level leadership and use of the media and other forms of communication can result in significant changes in sexual patterns. This is urgently needed in the high prevalence countries of East and Southern Africa where new HIV infections are widely spread through the general population. Experience from various Asian and Latin American countries and from high income countries also shows that laws and prevailing societal attitudes toward marginalized populations can change in a short period of time, with positive effects on support for HIV prevention and treatment programs for these groups. Such successes should be replicated in other countries where the epidemic is concentrated in marginalized populations. Greater investment in and political backing of such “social movements” need to be encouraged.

CONDUCTING ADDITIONAL ANALYSIS

Financial studies. Even though our knowledge of the economics of AIDS has improved considerably over the past decade, there are still many serious gaps in information, and in some respects this type of analysis has not kept pace with the rapid increase in spending on AIDS in low and middle income countries. An expanded program of studies on intervention and program cost-effectiveness and better tracking of AIDS spending and calculations of unit costs are badly needed. As different approaches to service delivery in prevention and treatment are implemented across and even within the same country (via government and NGO providers, in central and peripheral facilities, with professional and paraprofessional personnel), it is imperative that the relative costs and efficiency of these different approaches be assessed. Billions of dollars are at stake – the results of these studies could guide spending decisions that dramatically increase the impact of large investments, on which millions of lives hang in the balance.

Further refinement and application of the tools presented in this report. As part of aids2031, we are applying the tools and perspectives presented in this global report in two quite different country settings – Cambodia and South Africa. When combined with a political process led by a national steering committee composed of senior officials from government, academia, NGOs, and the private sector, we believe that an “aids2031” approach can lead to important positive changes in thinking, investment, and action at the country level. We will soon be publishing the results of the Cambodia and South Africa country studies. We expect that additional applications of the aids2031 tool kit in other low and middle income countries can also contribute to better short-term decisions that will drive the long-term national response toward better outcomes – fewer infections, fewer persons on treatment, fewer AIDS deaths, and fewer orphans and other social consequences resulting from the epidemic.

Finally, we would welcome further refinement and use by others of the tools we have created and deployed for aids2031 – the long-term scenarios and the models for estimating resource needs, epidemiological impacts, fiscal space, and financing options. We intend to make all of these tools and our datasets “open source,” and encourage others to pick up these tools, test and improve them, and use them as part of a larger effort to end AIDS by 2031, if not before that date.



ANNEXES

Annex A:

**Description of Interventions and Services Included
in the Estimates of Future Resource Needs for HIV/
AIDS Prevention, Care, Treatment, and Mitigation**

Annex B:

Data Sources for Target Population Groups

Annex C:

Unit Cost Data for Prevention

Annex D:

Care and Treatment Methodology

Annex A: Description of Interventions and Services Included in the Estimates of Future Resource Needs for HIV/AIDS Prevention, Care, Treatment, and Mitigation

PREVENTION PROGRAMS

Priority Populations

1. **Female Sex Workers**
2. **Male Sex Workers**
3. **MSM**

Behavior change interventions for female and male sex workers and MSM are based on a peer outreach model. These interventions combine one-on-one or small group awareness and counseling services, group education (IEC), and access to commodities and services. Unit costs may include costs for training of peer educators, stipends or transportation allowances for peer educators, paid outreach workers, operation of drop-in centers, condoms, lubricants, STI treatment, IEC activities and special events, program management, and M&E.

Costing Guidelines for HIV/AIDS Intervention Strategies, UNAIDS/ADB, February 2004
Guinness Let al. Does scale matter? The cost of HIV-prevention interventions for commercial sex workers in India. Bull WHO October 2005. 83; 10: 747-754.

4. **Injecting Drug Users**

Comprehensive programs for harm reduction among injecting drug users include:

- o Risk reduction information, education, and counseling through professional educators or peer outreach. Costs of outreach programs include training of peer educators and may include a stipend or transportation allowance.
- o Access to sterile injection equipment through needle and syringe exchange, distribution or vending, and/ or decontamination programs. Costs include the operation of drop-in centers, commodities (syringes, needles, condoms), outreach workers, and IEC.

- o Drug substitution treatment. Costs include the operation of drop-in centers, commodities (methadone, buprenorphine or other opioid agonists, condoms), outreach workers, and IEC.

5. **Workplace**

Workplace programs generally refer to health education provided through peer educators. For larger employers, programs may also include the provision of condoms, VCT, and STI treatment services either provided on-site or through a nearby health clinic.

6. **School-Based Education**

The costs of school-based AIDS education are mainly teacher training. The basic model assumes one third of primary school teachers and one eighth of secondary school teachers are trained every two years. Some countries aim to train all existing teachers and make AIDS education a part of the teacher training curriculum. Teacher salaries or school operation costs are not included. Costs may also include preparation and printing of brochures, posters, and other material.

7. **Out-of-School Youth**

Behavior change interventions for out-of-school youth are based on a peer outreach model. These interventions combine one-on-one or small group awareness and counseling services and group education (IEC). Programs may be targeted to youth not attending schools or to all youth. Unit costs may include costs for training of peer educators, stipends or transportation allowances for peer educators, paid outreach workers, IEC activities and special events, program management, and M&E.

Terris-Prestholt F et al. From Trial Intervention to Scale-Up: Costs of an Adolescent Sexual Health Program in Mwanza, Tanzania. *Sexually Transmitted Diseases* 2006 [October Supplement] 33; 10: S133-139.

General Population

8. **Mass Media**

Mass media programs generally include print and radio channels and may also include television, hot lines, theater, and special events. Print activities might include regular columns in newspapers, special inserts, brochures and billboards. Radio often includes public service health announcements and may include call-in shows or dramas. Television may include public service spots for which the airtime is free but the costs of production may be high, or serial dramas which may be quite costly.

9. Community Mobilization

Community mobilization programs may include a wide variety of activities such as: paid or volunteer community mobilizers who may go door-to-door or organize special community events, church-based programs that include AIDS messages in sermons, church events and youth programs, and efforts to build support for HIV prevention among chiefs, elders, and other community leaders. There may be overlap with IEC if video shows or dramas are used in community events. Costs may include operational costs such as personnel, supplies, rent, equipment maintenance, and program management and might also include some capital costs for equipment, vehicles, and start-up activities.

Kinsman et al. Quantitative process evaluation of a community-based HIV/AIDS behavioural intervention in rural Uganda. *Health Educ Res* 2002; 17:253-265.

Terris-Prestholt et al. The Role of Community Acceptance over Time for Costs of HIV and STI Prevention Interventions: Analysis of the Masaka Intervention Trial, Uganda 1996-1999.

Sexually Transmitted Diseases 2006 [October Supplement]; 33: S111-116.

10. Social Marketing

Social marketing generally refers to social marketing of condoms although some countries use social marketing approaches to support behavior change for youth and/or MSM and others use social marketing approaches for VCT. Social marketing costs consist of salaries for local staff including sales people, production of advertising and promotional materials, condom packaging, market research, free samples, commodities and other operational costs such as transportation, office rent, and office equipment. Where social marketing programs are linked to international social marketing organizations, the costs of head office support are usually not included.

Stover J. The Costs of Contraceptive Social Marketing Programs in the Developing World, Futures Group International, 1997.

Stallworthy G, Meekers D. An analysis of unit costs in selected condom social marketing programs 1990-96. *Soc Mar Q* 1996;6:9-16.

11. Voluntary Counseling and Testing (VCT)

Voluntary counseling and testing refers to services providing pre-test counseling, testing for HIV infection, and post-test counseling for anyone seeking to know their HIV status. In some cases it may also include post-test clubs that provide ongoing group counseling. Counseling and testing may be conducted in stand-alone centers, by mobile vans, or in health clinics and hospitals.

Sweat M et al. Cost-effectiveness of voluntary HIV-1 counseling and testing in reducing sexual transmission of HIV-1 in Kenya and Tanzania. *The Lancet* July 2000; 356: 113-121.

12. Condom Promotion and Distribution

Condom distribution refers to the provision of male and female condoms for protection against transmission of HIV and other sexually transmitted infections and protection against pregnancy. Program costs include commodities, testing, transportation, warehousing and distribution, and may also include packaging and promotion.

Health Care

13. STI Management

STI management programs should include not only treatment but also prevention programs such as risk counseling and condom distribution. However, most unit costs reported are for STI treatment alone. These costs are generally derived from special studies since the integration of STI treatment into other health services means that separate costs for STI treatment are not readily available. Costs include operational costs for personnel salaries, drugs, other supplies, and laboratory testing as well as an overhead charge for an allocated share of the overall facility costs. The target population is those people with symptomatic STIs.

Terris-Prestholt F et al. The Costs of Treating Curable Sexually Transmitted Infections in Low- and Middle-Income Countries: A Systematic Review. *Sexually Transmitted Diseases* 2006 [October Supplement] 33; 10: S153-166.

Gilson L et al. Cost-effectiveness of improved treatment services for sexually transmitted diseases in preventing HIV-1 infection in Mwanza region, Tanzania. *Lancet* 1997; 250: 1805-9.

14. Prevention of Mother-to-Child Transmission (PMTCT)

Comprehensive PMTCT programs for pregnant women include pre-test counseling, HIV testing, post-test counseling, drug prophylaxis, and counseling on infant feeding options. Drug prophylaxis may be a single drug regimen (single dose Nevirapine [SD NVP] or AZT), a combination prophylactic regimen (AZT+SD NVP with or without 7-day postpartum AZT/3TC, AZT+3TC, or AZT+3TC+SD NVP), or a highly active triple drug regimen (AZT + 3TC + NRTI/NNRTI or PI). Programs may provide infant formula for a period of six months or longer.

Desmond C et al. The Prevention of Mother-to-Child Transmission: Costing the Service in Four Sites in South Africa. Health Systems Trust; 2004.

15. Male Circumcision

The major cost of programs to provide male circumcision will be those associated with the operation itself. These will include personnel time (counselor, surgeon, nurse, anesthetist), drugs and supplies (antibiotics, sutures, needles, bandages, gloves, antiseptic), and laboratory tests. Costs per procedure should also include an overhead charge for allocation of a share of facility costs. Management of adverse events associated with the procedure should also be included. Programs may also include promotional and training costs.

Kahn J et al. Cost-Effectiveness of Male Circumcision for HIV Prevention in a South African Setting. PLOS Medicine December 2006; 3: 2349-2358.

16. Blood Safety

Blood safety consists of screening donated blood for HIV. It does not include the costs of running the blood collection and transfusion service, rather only the incremental costs of the HIV test.

17. Injection Safety

- o The costs of injection safety generally consider only the incremental costs to procure auto-destruct syringes as opposed to re-usable syringes. However, a full injection safety program should include:
 - o Behavior change to achieve safe injection practices and to reduce injection overuse.
 - o Provision of equipment and supplies to ensure sufficient access to injection devices and safety boxes in each health care facilities.
 - o Sharp waste management within a broader health care waste management plan.

WHO. Managing and injection safety policy. WHO/BCT//03.0X.

WHO. Estimating the investments needed for interventions for the safe and appropriate use of injections. A practical guide. Draft 1. May 30 2003.

Dziekan G, Chisholm D, Johns B, Rovira J, Hutin YF. The cost-effectiveness of policies for the safe and appropriate use of infection in health care settings. Bull WHO 2003 81; 4:277-285.

18. Post-Exposure Prophylaxis (PEP)

The costs of post-exposure prophylaxis generally include just the drug costs, which are equivalent to a one-month supply of a triple drug combination of antiretroviral therapy.

19. Universal Precautions

Costs for universal precautions are generally just supplies (gloves, masks, and gowns) although health worker training may also be included in some programs.

SUPPORT FOR ORPHANS AND VULNERABLE CHILDREN

Support for orphans and other vulnerable children may be provided in several ways. Here we consider two approaches: provision of a full range of essential services through NGOs and community groups, and cash grants to families.

Stover J et al. Resource needs to support orphans and vulnerable children in sub-Saharan Africa Health Policy and Planning 2007; 22: 21-17

20. Education Support

This includes school fees where they exist, funds required for uniforms, books and other supplies, and special fees. Many countries have eliminated school fees and additional advocacy efforts could help to eliminate them in other countries as well, but the extra costs of uniforms, supplies, and special assessments can still be substantial.

21. Health Care Support

The need for health care includes childhood immunizations and vitamin supplements for children under five, routine health care for all, and reproductive health services for older children 10-17 years of age. In some countries health care is free for all children or for the youngest children. However, patients often have to pay for drugs and supplies. Some have argued that orphan-related programs should advocate for free health care for all children rather than focus on providing funding to pay for care for children. However, in that case additional resources would need to be made available to governments to provide free care to families.

22. Family and Home Support

Food and clean water are the most basic needs for all children. Food supplied from external sources could actually reduce food security in the long run if it disrupts the local market, but food procured locally or produced through community gardens can contribute to local food security. Food may be provided as either bulk grain needing preparation or as cooked meals.

This category also includes clothes, shoes, bed nets, and economic self-sufficiency programs. The need for bed nets will vary depending on local climate and other conditions. In many cases donated clothes and shoes are available at no cost, but reliance on donated goods may not be sustainable as programs scale up considerably. Economic self-sufficiency refers to programs to provide older children and/or their families with economic support such as microfinance loans, skills training, financial grants or seeds.

23. Community Support

This includes identification of vulnerable children and funding for community workers who can assess needs, organize support, and provide some counseling and individual support. Many community workers will be volunteers but significant funds may still be required for training and transportation.

24. Organizational Costs

The overhead costs of administering support programs include fund raising, planning, research, and management. This category applies to the organizational costs of NGOs providing direct support or central administrative costs for government run programs. It is usually specified as a percentage of other costs.

25. Support to Families Caring for Orphans

Support to families caring for orphans is defined as cash grants given to families to spend as they see fit. The grants are intended to defray some of the costs of caring for orphans. Some grants may be conditioned upon the family meeting certain criteria such as ensuring the child attends school or receives a complete course of immunizations.

PROGRAM SUPPORT

26. Policy

Policy costs are primarily personnel costs for preparing analyses and presentations, conducting awareness-raising, and policy dialogue with opinion leaders, policy makers and stakeholders. Additional costs include office support costs (rent, support personnel, supplied, communications) and any transportation and materials production associated with stakeholder, policy drafting, and policy dissemination workshops.

27. Program Management

Program management costs refer to the operation of the national HIV/AIDS coordinating body, usually a National AIDS Control Council. This item includes all the costs of running the Council (personnel salaries, supplies, communications, transport, rent, meetings) but not pass-through funds that go directly to other organizations for the implementation of programs.

28. Research

Research costs include support for programs that collect primary data (such as national surveys, cohort studies, operations research, clinical trials), as well as data analysis, report writing and dissemination.

29. Monitoring and Evaluation

Costs for M&E include the salaries of M&E officers, equipment for data processing, communications, and transportation as well as the costs of data collection. Data collection costs include HIV and behavior surveillance as well as the collection and processing of service statistics.

30. Advocacy

Advocacy costs are similar to those for policy. They include personnel salaries, office support costs, and the preparation and dissemination of advocacy messages.

31. Procurement and Stores

Logistics system costs include the costs of procurement, transportation, storage, testing and distribution of commodities such as ARV drugs, other essential drugs, test kits, gowns, gloves and masks. The costs of the materials themselves are not included here but in the unit costs of providing those services.

32. Program-Level Human Resources

Human resource costs refer to the training costs for personnel involved in the HIV/AIDS program. Training may include both pre-service and in-service training for health care workers as well as special training for program staff in areas such as strategic planning, M&E, advocacy, and financial reporting systems.

Annex B: Data Sources for Target Population Groups

Data for the different target population groups come from a wide variety of sources. The main sources used, along with the variables that were derived from those sources are listed below.

1. UN Population 2008: medium variants used; these are the demographic data underlying all of the Spectrum projections.
2. UNAIDS: Most-At-Risk Populations (MARPs) from the workbook epidemiological projections.
3. Spectrum/Goals: number of people infected with HIV and the number of AIDS deaths is calculated for 22 countries using the Goals module in Spectrum.
4. International Labour Organization (ILO) Key Indicators of the Labour Market, 4th edition (where available, otherwise 3rd edition): Sectoral employment and labor force participation rates for men and women.
5. World Bank World Development Indicators: Gross Domestic Product (GDP) adjusted for Purchasing Power Parity and Gross National Income (GNI).
6. UNESCO: Male/female gross enrollment rates and pupil-teacher ratios.
7. UNICEF web site www.childinfo.org: Antenatal care utilization.
8. World Health Organization: number of hospital beds (except sub-Saharan Africa, which are from an older version of the World Bank World Development Indicators database), blood units required, annual incidence of sexually transmitted infections.

9. United Nations Survey of Crime Trends and Criminal Justice Systems, 2000: rape statistics.
10. United National Office on Drugs and Crime (UNODC): number of prisoners and percent of prisoners who are male, prevalence of opiate use.
11. Various Demographic and Health Surveys: number of immunizations, sexually active adults, adults in regular and non-regular sexual partnerships, number of sex acts per regular partner.
12. Williams BG, Lloyd-Smith JO, Gouws E, Hankins C, Getz WM, Hargrove J, de Zoysa I, Dye C, Auvert B. The potential impact of male circumcision on HIV in Sub-Saharan Africa. *PLoS Med* Jul 2006; 3(7):e262: adult male circumcision rate.

Annex C: Unit Cost Data for Prevention

The table below contains regional average unit costs for the various prevention interventions included in the calculation of global resources required. The unit cost information for care and treatment interventions is described in Annex D: Care and Treatment Methodology.

Figure C.1 | Regional Averages of Unit Costs by Intervention

REGIONAL AVERAGES	Blood Safety	Counseling and Testing	CSW Outreach		Community Mobilization	Condom Distribution
	2009	2009	2009	2015	2009	2009
Sub-Saharan Africa	10.09	14.46	20.67	18.21	1.74	0.15
East Asia and the Pacific	5.95	26.71	53.69	46.97	1.63	0.12
South and Southeast Asia	5.65	17.50	29.92	25.40	0.00	0.42
Eastern Europe	12.92	15.58	80.82	66.22	1.63	0.23
North Africa and Near East	17.70	20.92	89.18	68.05	1.63	0.25
Latin America and the Caribbean	15.46	14.99	58.10	51.53	1.64	0.19
GLOBAL AVERAGE	11.90	16.54	50.73	42.38	1.48	0.22

REGIONAL AVERAGES	IDU Outreach and NSEP		IDU Drug Substitution	Mass Media	Male Circumcision	PEP
	2009	2015	2009	2009	2009	2009
Sub-Saharan Africa	19.70	11.06	1008.00	0.02	55.31	19.97
East Asia and the Pacific	54.33	28.48	1008.00	0.00	n/a	313.00
South and Southeast Asia	20.61	15.43	1008.00	0.01	n/a	86.75
Eastern Europe	62.04	40.08	1008.00	0.02	n/a	95.56
North Africa and Near East	83.27	41.25	1008.00	0.00	n/a	125.00
Latin America and the Caribbean	57.72	31.30	1008.00	0.04	n/a	103.83
GLOBAL AVERAGE	44.93	25.70	1008.00	0.02	n/a	86.23

Note that for a subset of prevention interventions, economies of scale are included as programs scale up (C&T, SW/MSM outreach, STI treatment, IDU outreach, PMTCT for those testing positive). For these interventions, regional average unit costs are presented in the table below for 2009 and 2015, the year when maximum coverage is reached. In addition, in order to illustrate how unit costs change as coverage scales up, the pattern for the reference country for each of the interventions is presented individually in charts below the table.

REGIONAL AVERAGES	MSM Outreach		Primary Teachers	PMTCT Screening	PMTCT Treatment of HIV+ Woman		Prisoners
	2009	2015	2009	2009	2009	2015	2009
Sub-Saharan Africa	24.59	18.23	195.24	7.50	39.13	39.13	50.00
East Asia and the Pacific	65.56	46.97	63.39	5.88	61.53	61.53	35.00
South and Southeast Asia	34.63	25.48	45.54	4.99	11.87	11.87	50.00
Eastern Europe	87.85	66.21	48.30	9.83	191.30	191.30	22.56
North Africa and Near East	99.28	68.05	49.65	24.44	1007.41	1007.41	30.00
Latin America and the Caribbean	65.89	51.64	59.66	17.19	791.64	791.64	15.83
GLOBAL AVERAGE	57.25	42.42	98.68	11.54	331.27	331.27	34.83

REGIONAL AVERAGES	Safe Injection	Secondary Teachers	STI Treatment		Universal Precautions	Workplace	Youth (out-of-school)
	2009	2009	2009	2015	2009	2009	2009
Sub-Saharan Africa	0.23	192.66	41.34	20.10	79.11	8.60	8.48
East Asia and the Pacific	0.21	63.39	109.22	51.64	312.64	17.29	14.51
South and Southeast Asia	0.11	47.41	41.99	27.97	319.88	13.31	5.90
Eastern Europe	0.22	56.58	99.36	72.81	172.36	4.46	7.24
North Africa and Near East	0.03	63.82	262.87	74.99	172.80	4.19	8.61
Latin America and the Caribbean	0.08	56.58	69.62	56.78	167.34	4.36	5.40
GLOBAL AVERAGE	0.16	100.81	88.69	46.67	165.30	7.41	7.66

Annex D: Care and Treatment Methodology

The care and treatment resources required consist of three categories of care and treatment interventions: antiretroviral therapy (ART), treatment and care of opportunistic infections (OI), and provider-initiated testing and counselling (PITC). The resources required for each category is the product of three variables: target population, unit cost, and coverage. Coverage targets are based on two different sets of scale-up rates. In the first set of scale-up rates, which is utilized in both the Current Trends and Structural Change scenarios, coverage of ART continues growing at current growth rates and reaches a maximum of 64 percent coverage by 2015 for ART and OI treatment (60 percent for PITC), remaining there through 2031. In the second set of scale-up rates, which is utilized in the Rapid Scale-up and Hard Choices scenarios, coverage of ART scales up to reach 80 percent coverage by 2015 for all three interventions, remaining at 80 percent through 2031. Further details of the target populations and unit costs are described below.

Antiretroviral Therapy (ART)

Target population: Estimates of those in need of ART are based on the methodology recommended by the UNAIDS Reference Group on Estimates, Modelling, and Projections which are incorporated into the Spectrum model. This approach assumes that the median time from infection to need for treatment for adults is 8 years (7.5 for males and 8.5 for females). The median time from need for treatment to AIDS death in the absence of treatment is 3 years. For those on ART, survival for both first and second line therapy is estimated as 95 percent per year.

UNIT COSTS

(1) Drugs: The initial values for ARV costs are a weighted average of drug costs for four different first-line regimens and two different second-line regimens used, weighted by the proportion of patients on each regimen.⁷⁰ Separate prices are available for low income and middle income countries. Drug costs for children are assumed to be equal to those for adults.

The cost of 1st line drugs for low income countries is assumed to increase to \$210 by 2015 and the

70 World Health Organization. Towards Universal Access: Scaling up priority HIV/AIDS interventions in the health sector, Progress report, 2008. Geneva: WHO, UNAIDS, UNICEF, 2008.

Figure D.1 | Antiretroviral Drug Unit Cost (Weighted Average-US\$) – 2007

ANTIRETROVIRAL DRUG UNIT COST (WEIGHTED AVERAGE-US\$) - 2007

	Low Income	Middle Income
1st line	\$167.65	\$189.56
2nd line	\$1,016.48	\$2,730.61

cost of 2nd line drugs for low income countries is assumed to decrease to \$590 by 2015, both based on the cost negotiated recently by the Clinton Foundation, remaining at that level through 2031.⁷¹ The cost of both 1st and 2nd line drugs for middle income countries is assumed to increase/decrease at the same rate as the cost for low income countries, reaching \$315.44 for 1st line and \$1,419.92 for 2nd line ARVs in 2015 and remaining there through 2031. Further details of the calculations are available from the authors.

(2) Lab Costs: Calculated as the annual median cost for lab tests across recent literature. Recent studies in various countries (Cote d’Ivoire, Ethiopia, Mexico, Nigeria, Rwanda, South Africa, Thailand, Zambia) are used as the basis.⁷² The median cost is \$190.94 per patient per year.

(3) Service Delivery Costs: Service delivery costs are based on a standard number of inpatient days and outpatient visits per patient per year and country specific costs for inpatient days and outpatient visits. The same studies referenced above for laboratory costs (with the exception of Cote d’Ivoire and the addition of another South Africa study) are used to calculate the median

71 www.clintonfoundation.org.

72 Goldie SJ, Yazdanpanah Y, Losina E, et al., “Cost-Effectiveness of HIV Treatment in Resource-Poor Settings - The Case of Cote d’Ivoire.” *NEJM* 355; 11(1141-1153); G Kombe, D Galaty, R Gadhia, C Decker. The Human and Financial Resource Requirements for Scaling Up HIV/AIDS Services in Ethiopia. *PHRPlus*, Feb 2005 ; Bautista SA, Dmytraczenko T, Kombe G, Bertozzi SM. “Costing of HIV/AIDS Treatment in Mexico.” *PHRPlus* report, June 2003; *PHRPlus*. Nigeria: Rapid Assessment of HIV/AIDS Care in the Public and Private Sectors. August 2004; Cleary SM, McIntyre D, Boulle AM. “The cost-effectiveness of Antiretroviral Treatment in Khayelitsha, South Africa - a primary data analysis.” *Cost Eff Resource Alloc* 2006, 4:20; Katajima T, Kobayashi, Y, Chaipah W, Sato H, Chadbunchachai W, Thuennadee R. “Costs of medical services for patients with HIV/AIDS in Khon Kaen, Thailand.” *AIDS* 2003 Nov 7; 17(16):2375-81; Chandler R, Decker C, Nziyige B. “Estimating the Cost of Providing Home-based Care for HIV/AIDS in Rwanda.” *PHRPlus* paper June 2004; Kombe G, Smith O. “The Costs of Anti-Retroviral Treatment in Zambia.” *PHRPlus* October 2003. Huddart J, Furth R, Lyons JV. “The Zambia Workforce Study: Preparing for Scale-up.” April 2004; available at www.qaproject.org; Badri M, Maartens G, Mandalia S, Bekker LG, Penrod JR, et al. (2006) Cost-Effectiveness of Highly Active Antiretroviral Therapy in South Africa. *PLoS Med* 3(1): e4 doi:10.1371/journal.pmed.0030004.

Figure D.2 | Regional Service Delivery Costs for ART Patients

Regional Service Delivery Costs for ART Patients	Annual Cost of Inpatient Days (ART Patient)	Annual Cost of Outpatient Visits (ART Patient)	Total Annual Service Delivery Cost (ART Patient)
Sub-Saharan Africa	\$18.43	\$53.62	\$72.05
East Asia	\$36.48	\$64.36	\$100.84
Oceania	\$56.33	\$77.62	\$133.94
South and Southeast Asia	\$29.20	\$64.77	\$93.98
Eastern Europe and Central Asia	\$52.07	\$71.82	\$123.89
Western and Central Europe	\$106.23	\$239.38	\$345.61
North Africa and Middle East	\$63.44	\$73.68	\$137.12
Caribbean	\$58.92	\$70.52	\$129.45
Latin America	\$59.34	\$72.91	\$132.25

number of outpatient visits per year as 9.5.⁷³ Only three of these studies also had data on the number of inpatient days for ART patients (Mexico and the two South Africa studies); these are used to calculate the median number of inpatient days for ART patients per year as 1.56. The country-specific costs per inpatient day are the costs of one bed day at a primary-level hospital as reported in the WHO-CHOICE database of service delivery costs.⁷⁴ The cost of an outpatient visit is for a 20-minute outpatient visit at a health centre, from the same WHO database. Representative regional costs are shown below.

73 Badri M, Maartens G, Mandalia S, Bekker LG, Penrod JR, et al. (2006) Cost-Effectiveness of Highly Active Antiretroviral Therapy in South Africa. *PLoS Med* 3(1): e4 doi:10.1371/journal.pmed.0030004.

74 Available at: <http://www.who.int/choice/costs/en/>.

Figure D.3 | Regional Service Delivery Costs for OI Patients

Regional Service Delivery Costs for OI Patients	Annual Cost of Inpatient Days (OI Patient)	Annual Cost of Outpatient Visits (OI Patient)	Total Annual Service Delivery Cost (OI Patient)
Sub-Saharan Africa	\$114.57	\$30.90	\$145.48
East Asia	\$226.83	\$37.09	\$263.92
Oceania	\$350.23	\$44.73	\$394.96
South and Southeast Asia	\$181.59	\$37.33	\$218.92
Eastern Europe and Central Asia	\$323.74	\$41.39	\$365.13
Western and Central Europe	\$660.51	\$137.96	\$798.47
North Africa and Middle East	\$394.44	\$42.46	\$436.91
Caribbean	\$366.39	\$40.64	\$407.03
Latin America	\$368.98	\$42.02	\$411.00

Treatment and Care of Opportunistic Infections

Target population: We assume that treatment and care of opportunistic infections is required the year leading up to dying from AIDS (either without ever having ART or after stopping ART), as well as for another year before beginning ART. Thus the target population is calculated from the Spectrum model outputs: number of AIDS deaths and number of those newly-needing ART.

(1) Drug/lab Costs: Drug/lab costs: \$48.67 - Calculated as the annual median cost for drugs and lab tests across recent literature, based on several recent studies.⁷⁵

75 Goldie SJ, Yazdanpanah Y, Losina E, et al., “Cost-Effectiveness of HIV Treatment in Resource-Poor Settings - The Case of Cote d’Ivoire.” NEJM 355; 11(1141-1153); Bautista SA, Dmytraczenko T, Kombe G, Bertozzi SM. “Costing of HIV/AIDS Treatment in Mexico.” PHRPlus report, June 2003; P Vinard, B Nziyige, S Rugabirwa. Etude sur le cout de la prise en charge des PVVIH. Prejet Int/107 - Initiative ESTHER en collaboration avec la CNLS. Dec 04-Mar 05; Chandler R, Decker C, Nziyige B. “Estimating the Cost of Providing Home-based Care for HIV/AIDS in Rwanda.” PHRPlus paper June 2004; Kombe G, Smith O. “The Costs of Anti-Retroviral Treatment in Zambia.” PHRPlus October 2003. Huddart J, Furth R, Lyons JV. “The Zambia Workforce Study: Preparing for Scale-up.” April 2004; available at www.qaproject.org.

(2) Service Delivery Costs: The product of the annual median number of inpatient days for OI patients (9.7) across recent literature and country-specific costs for one bed day at a primary-level hospital (WHO CHOICE database), and the annual median number of outpatient visits for OI patients (5.5) from recent literature and country-specific costs for one 20-minute outpatient visit at a health center (WHO CHOICE database).^{76,77} Representative regional costs are shown in Figure D.2 (pp. 116).

Provider Initiated Testing and Counselling (PITC)

Target population: Sex workers, MSM, and IDU reached by outreach programs are targeted as well as those with treatable, symptomatic STIs (same target group as STI treatment).

Unit cost: Identical to the country-level unit costs used for the VCT intervention in calculating costs for prevention.

76 Bautista SA, Dmytraczenko T, Kombe G, Bertozzi SM. "Costing of HIV/AIDS Treatment in Mexico." PHRPlus report, June 2003; P Vinard, B Nzigiyi, S Rugabirwa. Etude sur le cout de la prise en charge des PVVIH. Prejet Int/107 - Initiative ESTHER en collaboration avec la CNLS. Dec 04-Mar 05; Cleary SM, McIntyre D, Boulle AM. "The cost-effectiveness of Antiretroviral Treatment in Khayelitsha, South Africa - a primary data analysis." *Cost Eff Resource Alloc* 2006, 4:20, available at <http://www.resource-allocation.com/content/4/1/20>; Badri M, Maartens G, Mandalia S, Bekker LG, Penrod JR, et al. (2006) Cost-Effectiveness of Highly Active Antiretroviral Therapy in South Africa. *PLoS Med* 3(1): e4 doi:10.1371/journal.pmed.0030004; Kitajima T, Kobayashi, Y, Chaipah W, Sato H, Chadbunchachai W, Thuennadee R. "Costs of medical services for patients with HIV/AIDS in Khon Kaen, Thailand." *AIDS* 2003 Nov 7;17(16):2375-81.

77 Bautista SA, Dmytraczenko T, Kombe G, Bertozzi SM. "Costing of HIV/AIDS Treatment in Mexico." PHRPlus report, June 2003; P Vinard, B Nzigiyi, S Rugabirwa. Etude sur le cout de la prise en charge des PVVIH. Prejet Int/107 - Initiative ESTHER en collaboration avec la CNLS. Dec 04-Mar 05; Cleary SM, McIntyre D, Boulle AM. "The cost-effectiveness of Antiretroviral Treatment in Khayelitsha, South Africa - a primary data analysis." *Cost Eff Resource Alloc* 2006, 4:20, available at <http://www.resource-allocation.com/content/4/1/20>; Badri M, Maartens G, Mandalia S, Bekker LG, Penrod JR, et al. (2006) Cost-Effectiveness of Highly Active Antiretroviral Therapy in South Africa. *PLoS Med* 3(1): e4 doi:10.1371/journal.pmed.0030004; Chandler R, Musau, S. "Estimating Resource Requirements for Scaling up Antiretroviral Therapy in Uganda." PHRPlus paper October 2005.



The Results for Development Institute (R4D) is a nonprofit organization committed to accelerating social and economic progress in low and middle income countries. We provide policy analysis, key information, decision-making tools, and policy advice to governments, civil society organizations, and international funders in order to stimulate positive change. With expertise in areas including economics and finance, health policy, education, and governance, R4D works with leaders, globally and at country level, to design and test solutions to some of the world's biggest development challenges.

aids2031 is a consortium of independent individuals and organizations dedicated to answering critical questions about how global and national responses to AIDS must be adapted and transformed in order to best address the epidemic over the next two decades to the year 2031, the 50th anniversary of the discovery of AIDS.

The aids2031 Costs and Financing Working Group is composed of senior officials from government, civil society, the private sector, and academic institutions from Africa, Asia, and Latin America, and developed countries. The Working Group focuses on modeling and analyzing the long-term costs and financing of the AIDS epidemic, examining policy choices that could help to manage future spending, improve efficiency, and mobilize adequate, fair, and sustainable resources.

35 MILLION PEOPLE LIVING WITH HIV/AIDS WORLDWIDE.

OVER 2.5 MILLION BECOME INFECTED EVERY YEAR.

**\$13 BILLION TO FUND THE AIDS RESPONSE IN
LOW AND MIDDLE INCOME COUNTRIES IN 2008**

**WHERE ARE WE HEADING, AND HOW WILL
THE EPIDEMIC LOOK TWO DECADES FROM NOW?**

In 2031 the AIDS pandemic will enter its 50th year. This report comes at a major crossroads in the history of the response to AIDS, as costs are rising rapidly at a time of economic uncertainty and tightening funds. This is the moment when wise policy decisions are needed, in order to contain spending, improve the efficiency of resource use, and ensure fair and sustainable financing for the global AIDS effort.

“Costs and Choices” shows that governments in the countries most affected by AIDS, their international partners, civil society organizations, and others on the front lines of the fight against the pandemic face a series of critical choices on how to approach HIV prevention, AIDS treatment, and orphan care, that have dramatically different financial and health consequences. This book recommends a series of actions that can move the world toward a better future in dealing with AIDS, while using financial resources in a more efficient and affordable manner.



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