Resource needs for an expanded response to AIDS in low- and middle-income countries

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JOINT UNITED NATIONS PROGRAMME ON HIV/AIDS
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August 2005

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Table of Contents

Acknowledgements

The UNAIDS Secretariat would like to thank all members of the Resource Needs Steering Committee—and especially one of its Co-Chairs, Rob Moodie from the Victorian Health Promotion Foundation—as well as of the Resource Needs Technical Working Group for their invaluable contributions and dedication during this short process. In particular, we would like to recognize the Futures Group International, the National Institute of Public Health in Mexico, the United Nations Children's Fund and the World Health Organization for their critical contributions to different elements of these new resource needs estimates for AIDS. For the resources available section, Kaiser Family Foundation and the UNAIDS Global Resource Tracking Consortium provided significant input. Finally, we express our special gratitude to Phil Compernolle of the Royal Tropical Institute (KIT) for her leading role in integrating the data and drafting key portions of the narrative for this document. While acknowledging these contributions, UNAIDS assumes final responsibility for these analyses.

1. Executive summary

In the four months since the High-Level Meeting on "The Global Response to AIDS: Making the Money Work – The Three Ones in Action" on March 9th 2005, the estimates for the AIDS resource needs have been refined and updated. The revisions are based on newly available information and invaluable input from the recently formed Resource Needs Steering Committee and the Resource Needs Technical Working Group[1]. UNAIDS appreciates the support from these experts, but assumes responsibility for the final draft of the report. Acknowledging that the estimation process has intrinsic limitations, at present these estimates constitute the best available assessment of global needs for AIDS and a rational basis for further discussion about AIDS funding in the international arena[2]. The coverage levels for services presented in the analysis should not be considered as agreed targets, but rather the outcomes that could be expected if these resources were spent as described.

The revised estimates indicate global resource requirements amount to US$ 15 billion in 2006, US$ 18 billion in 2007 and US$ 22 billion in 2008 for prevention, treatment and care, support for orphans and vulnerable children (OVC)[3], as well as programme and human resource costs. The financial requirements for human resources and programme costs are preliminary, and will form the basis for future refinement and improvement of the estimates[4].

Table 1. AIDS Resource needs

US$ billion	2006	2007	2008	Total for 2006–2008 *
Prevention	8.4	10.0	11.4	29.8
Treatment and care	3.0	4.0	5.3	12.3
OVC	1.6	2.1	2.7	6.4
Programme costs	1.5	1.4	1.8	4.6
Human resources	0.4	0.6	0.9	1.9
Total	**14.9**	**18.1**	**22.1**	**55.1**

* The totals for 2006–2008 have been rounded to the first decimal place with the result that there may be small differences with the figures for subtotals in the text because of rounding.

These resource needs estimates are only for the period 2006 to 2008, but the calculations are part of more extended projections of scale up to reach a comprehensive response for prevention, full coverage of support for orphans and vulnerable children (OVC) and universal access to treatment globally by 2010. Although previous AIDS resource requirements included selected longer term

[1] These advisory groups were formed subsequent to March 9 and are composed of international economists and AIDS experts from donor and developing countries, civil society, United Nations agencies and other international organizations.

[2] The coverage levels presented in the analysis should not be considered as agreed targets, but as outcomes that could be expected if these resources were effectively spent. Moreover, it must be emphasised that decisions about resource allocations by donors, national governments and any other private or public AIDS programme, cannot be based on global figures, such as the ones presented here.

[3] Support for orphans and vulnerable children includes education, health care support, family/home support, community support and administrative costs.

[4] Please note that while prevention, treatment and care, OVC support services are costed for all low- and middle-income countries, human resource requirements are currently limited to low income countries, South Africa and Botswana only. This will be improved upon by March 2006, with the release of the World Health Report.

investments to improve country capacity in the health and social sectors through training of existing staff and recruiting and paying new staff, the methodology for estimating these has been refined. This is the first time that significant capital investments for building necessary infrastructure have been included. It is also important to place this AIDS resource needs estimation in the broader context of required resources for the achievement of the Millennium Development Goals (MDGs).

With regards to the funding of resource requirements, it is estimated that US$ 6.1 billion was available for AIDS activities from all sources in 2004. For 2005, 2006, and 2007, projections have been made, based on past trends and currently known pledges and commitments, that amount to US$ 8.3 billion, US$ 8.9 billion and US$ 10 billion respectively. It appears that there is a funding gap between resources available and those needed of at least US$ 18 billion from 2005 to 2007. However, this is likely to be a significant underestimate.

The resource requirements for 2006–2008 would result in the following achievements.

- Based on the current coverage of prevention services and the most recent evidence on actual rates of scaling up interventions, it appears to be realistic and achievable to arrive at a comprehensive prevention response by 2010, as is required to turn around the AIDS epidemic. Especially so because the AIDS resource needs estimate also incorporates the resources required to enhance capacity for scaling up (human resources and programme costs). Prevention interventions include programmes to reduce risk behaviours by vulnerable groups, decreasing infections in infants, and improving safety in health facilities. Expected coverage rates for prevention are different for the three defined types of epidemics: low prevalence, concentrated, and generalized in order to achieve the most impact.
- For treatment and care, current coverage rates and rates of growth in coverage maintained at 2004 levels, lead to antiretroviral treatment (ART) coverage of 75% of people in the most urgent need globally by 2008 (about 6.6 million people in 2008 compared to 3 million by the end of 2006). [5] By 2010, coverage of 80% could be reached, which corresponds closely with expectations of what can be reached under global "universal access", acknowledging that even in countries where there is universal access to treatment (currently in high- and some middle-income countries) coverage remains less than 80% of those eligible for antiretroviral treatment. When eligibility is defined more broadly to include people as they become symptomatic (about two years before death), as defined in the "3 by 5" Initiative, then achievable coverage rates are 63% by 2008 and 68% by 2010.
- The support for orphans and vulnerable children is assumed to scale up from current low levels to full coverage by 2010[6]. This includes support for all orphans and vulnerable children in need of support in sub-Saharan Africa, and the AIDS share of orphan support in other low- and middle-income countries.

[5] "Most urgent need" defined as those persons who would die within one year without access to treatment

[6] Full coverage is defined within Sub-Saharan Africa as children living below the poverty line who are double orphans, children who will soon lose one parent, and half of all children who have lost one parent.

- This expansion of services requires a significant investment in human resources. Therefore, the resource needs estimation includes the costs of training medical students and nurses in low-income countries, and in two middle-income countries—South Africa and Botswana. The first graduates will be available in 2009 for nurses and in 2012 for medical doctors. Wage benefits for nurses and doctors are incorporated as a way of attracting and retaining human resources for health. Strengthening the cadres of community health workers is covered as well. An expanded and improved estimation of human resource requirements will be developed in the future. This will include an analysis of the costs for additional tiers of health workers, especially nurse practitioners, clinical officers, and laboratory technicians.
- Programme costs are also included in these estimates and are defined as costs that are incurred at administrative levels outside the point of health care delivery. Programme costs cover services such as management of AIDS programmes, monitoring and evaluation (M&E), advocacy, and facility upgrading through purchases of laboratory equipment and telecommunications. With regards to investment in upgrading and constructing health centres, just over 2700 new health centres are forecasted to be available by 2010, based on the investments made during 2006–2008. About 19 000 health centres and 800 hospitals are to be upgraded to handle the scaling-up of treatment and care. It is important to note that this is not the total number of new health centres and upgrading of current centres required, but rather the equivalent of what is needed for the provision of AIDS treatment and care.

It is crucial to recognize the fact that any estimate has its limitations, due to the inherent uncertainty about the future and limited data availability. For example, resource needs estimates are based on hypotheses about future behaviour of donors, governments and various agents (companies, households, individuals), as well as about the way in which increased coverage will affect unit costs. Moreover, estimations necessarily use proxies and generalizations to fill in incomplete empirical data. Even when validated by expert opinion, such assumptions remain uncertain. Therefore, resource needs estimations must be continuously improved, in close cooperation with programme implementers in country, as additional data become available to inform the assumptions about unit costs, numbers of people in need and activities to be included.

Given the considerable efforts made to solicit the latest available information, UNAIDS is confident that the current resource estimations will remain constant for the next year. However, to continue to improve these estimates, UNAIDS proposes to undertake the following actions.

- Establish a longer term systematic and inclusive process that would utilize existing reference groups, such as the UNAIDS Global Resource Tracking Consortium, the UNAIDS Reference Group on Economics and the UNAIDS Reference Group on Estimates, Modelling and Projections.
- Create additional structures that would be comprised of a supervisory Steering Committee and defined technical working groups. The Steering Committee would facilitate the data exchange between countries and the UN system, and between UN agencies. The technical working groups would focus on the

interpretation of new data, new approaches to modelling and a better understanding of the synergies of comprehensive intervention packages.

- Enlarge the above-mentioned groups to involve an increased number of developing country representatives and a pluralistic body of experts in the process of AIDS resource needs estimation.
- Work with WHO and other partners to link disease-specific resource estimations with estimates of the resources required to strengthen the overall health sector in order to scale-up services for all diseases.
- Organize a new round of regional workshops for national experts to gather more information on in-country resource requirements, and build country capacity in this area.
- Build on existing tools and develop new approaches to facilitate countries undertaking their own resource needs estimates.
- Release an annual report on current resources available from all sources and a biannual report on resource needs estimates through 2010.
- Continue to improve the level of detail and accuracy of donor reporting on resources committed and disbursed.

2. Introduction

Understanding the flow of financial resources—from funding source to actual expenditure—is an essential part of monitoring and evaluating the response to the AIDS pandemic. Identifying the source of funds, be they from a range of international sources or available domestically, allows us to assess the shared responsibility for funding across stakeholders, partners, and affected persons. Expenditure can give an indication of efficiency, equity and sustainability of programmes.

Estimating resource requirements to achieve specified outcomes provides an additional dimension. At a global level, these numbers are often used for advocacy, resource mobilization, and strategic planning of funding. Knowledge about resources needed, based on the costs of comprehensive packages of programmes for prevention, treatment and mitigation, can help us understand the additional needs for funding. This data has increasingly become strategic information for negotiations among donor countries and agencies and between donors and recipient countries.

However, it is important to note that this analysis should not be considered a strategic plan of action. This document presents what it would likely cost for a set of interventions to achieve defined outcomes over a specific period of time. The coverage levels for services should therefore not be considered targets, but outcomes that could be expected if the required resources were expended. The report is presented so that the underlying assumptions, the expected outcomes and the costs are as clear and as transparent as possible[7]. Thus, the reader can easily discern what specific interventions would cost and should be able to modify these resource numbers based on the use of different assumptions or expected coverage levels.

The coverage levels that are presented for the next three years are based on four factors: data on current coverage levels, data on current scale up rates, where this was available; the minimum coverage level required to achieve impact on the epidemic, and an attempt to reach the concepts of “universal access” for antiretroviral treatment and implementation of a “comprehensive package” of prevention programming by the end of the decade.

Are the coverage levels and rates of scaling-up presented here feasible? The answer depends on whether the necessary investments are made to develop the capacity to deliver quality services and on whether, at the same time, increased resources are available for the actual delivery of these services. The resource needs estimates also include the funds required for increasing the rate of scaling-up, such as investments in human resources, and, for the first time, for building additional infrastructure, e.g. capital investments in facility construction and refurbishment. If the resource requirements are met, the coverage levels could even surpass what is possible given current scale up rates, and coverage would more closely approximate desired goals for the future. Over the next several years, it will be critical to monitor the impact of investments in capacity strengthening and determine the effect on the expansion and impact of prevention, treatment and mitigation programmes.

[7] A more detailed report will be available by September 2005.

UNAIDS has been involved in resource needs estimates since 2001. Since that time there has been increased access to relevant data, a continuous improvement in methodologies and new thinking about what comprises a comprehensive package of interventions.

- The first of these estimates in April 2001 was inspired by the Secretary General's call in Abuja for a 'war chest' of US$ 7 billion to US$ 10 billion to fight AIDS, tuberculosis and malaria.
- Following discussion of these estimates at the Barcelona conference in 2002, an updated calculation of resource needs with a refined methodology was conducted for the UNAIDS Programme Coordinating Board in November 2002.
- The third set of estimates was published in July 2004 in the UNAIDS 2004 *Report on the Global AIDS Epidemic*. This *Report* benefited from an extensive consultation through nine regional/subregional workshops with over 155 experts drawn from 78 affected countries[8].

Work on a fourth set of estimates, initiated by a working group of the UNAIDS Reference Group on Economics (URGE), was started early in 2005. Before finalizing these estimates, an agreement was reached at a high-level meeting in London on 9th March 2005, "The Global Response to AIDS: Making the Money Work – The Three Ones in Action", to form "*a Working Group, to be facilitated by UNAIDS, and representing donors, national governments, civil society, the private sector, and technical partners, which will continue preliminary work and provide technical justification of financial resources needed within 60 days, taking into account appropriate assumptions and methodologies and considering resources required for the development of adequate health sector and related human and institutional resources"* [9]. Following this meeting, a Resource Needs Steering Committee and a Resource Needs Technical Working Group, representing a wide range of stakeholders, were established. These groups discussed and guided the estimation of the resources required for the AIDS response between 2006–2008, and suggested improvements for estimations of future resource needs[10]. However, UNAIDS is the final author of the report and assumes responsibility for its contents.

Based on the invaluable input provided by these groups, the AIDS resource needs estimation has been improved and refined. This report first discusses the estimations of resources available, followed by the resource requirements for prevention, treatment and care, orphans and vulnerable children, and programme costs and human resources. The methodology for arriving at these estimates is presented in the annexes of this report.

[8] Juan Pablo Gutierrez, Benjamin Johns et al "Achieving the WHO/UNAIDS antiretroviral treatment 3 by 5 goal: what will it cost?" Lancet. 2004 Jul 3;364(9428):63-4

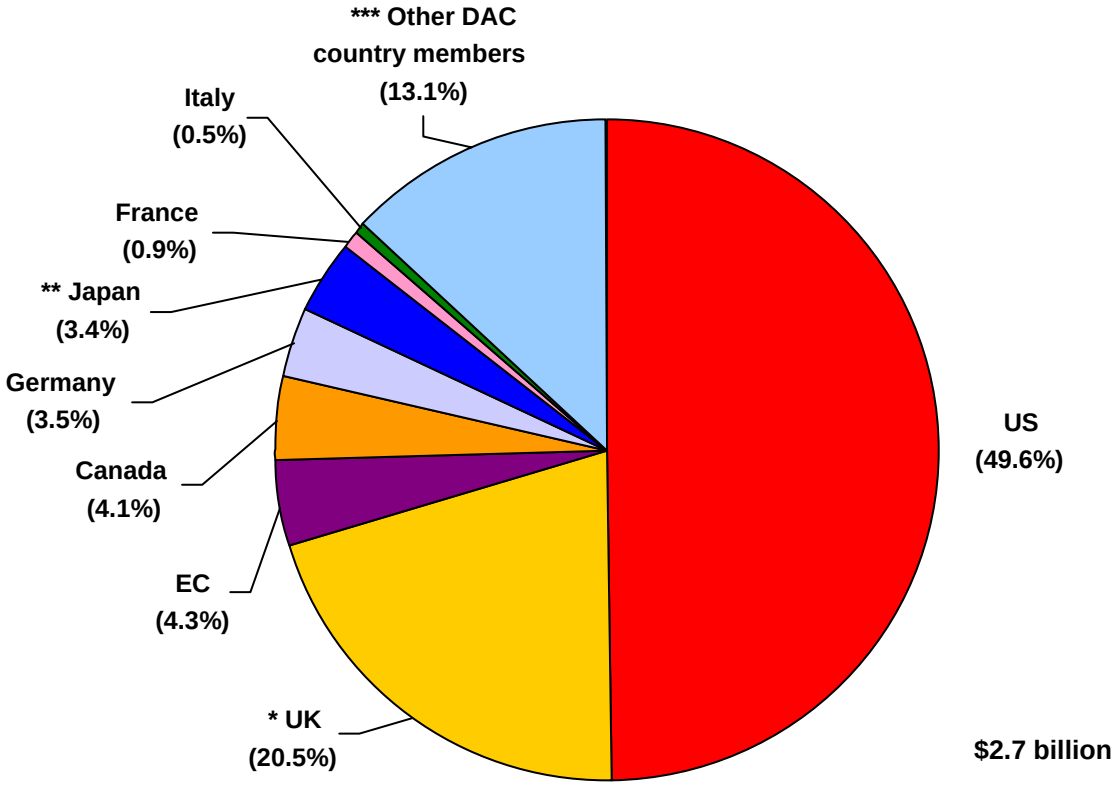
[9] The report of this meeting is available on http://www.unaids.org/Unaids/EN/Media/Recent+News+from+UNAIDS/Leaders+call+for+coordinated+and+comprehensive+response+to+the+global+AIDS+crisis.asp

[10] Reports of these meetings and participant lists are available on http://www.unaids.org/Unaids/EN/About+UNAIDS/What+is+UNAIDS/UNAIDS+at+country+level/The+Three+Ones/Follow+up+to+Making+the+Money+Work+meeting.asp

3. Resources available[11]

According to most recent reports, it appears that a total of US$ 6.1 billion was available for AIDS activities in 2004. The commitments of DAC[12] country-members amounted to US$ 2.7 billion, with the majority of the funds provided by the G7 countries and the European Commission. The following figure shows the 2004 commitments for direct bilateral assistance for AIDS-programmes from DAC countries, excluding the contributions to the Global Fund to Fight Tuberculosis, AIDS and Malaria (Global Fund) and funding of international research.

Figure 1. 2004 Direct bilateral donor commitments to recipient countries for HIV and AIDS (Global Fund and international research was not included)

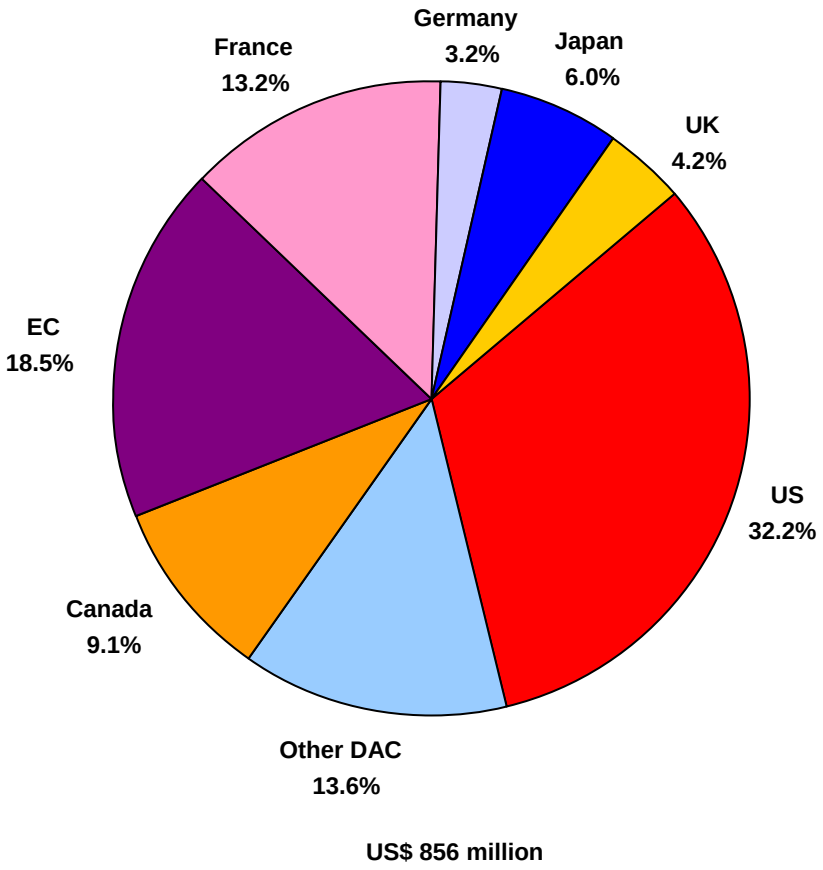


******Others**: includes direct reports Australia, Finland, Ireland, Sweden and Switzerland, and estimates for Austria, Belgium, Denmark, Greece, Luxembourg, Netherlands, New Zealand, Norway, Portugal and Spain.*
*****Japan:** 2004 information on commitments was still incomplete, thus these are UNAIDS estimates.*
****UK**: Preliminary estimates. The United Kingdom (DFID) holds a policy not to separate the commitments for AIDS and sexual and reproductive health. Reproductive health activities were reviewed and included if there was a substantial portion focused on AIDS.*
***France:** These are preliminary estimates and might be revised later.*

[11] The methodology for the estimation of the direct bilateral 2004 donor's commitments, Global Fund contributions and projections of resource availability 2005–2007 is presented in Annex VI.
[12] Development Assistance Committee.

Selected donor countries primarily channel their AIDS assistance through multilaterals. This funding included contributions to the Global Fund for a total of US$ 1.36 billion in 2004, 60% of which is the estimated share for AIDS. Of this amount, US$ 402 million was disbursed by the Global Fund in 2004. Contributions to international research (excluding development of microbicides or vaccines) in 2004 by the United States totalled US$ 328.2 million; Canada provided CAN$ 1.3 million; France provided € 25[13] million and the European Commission € 44.5 million (these figures are not included in the estimated bilateral commitments shown in the previous graph).

Figure 2. Donor contributions to AIDS through the Global Fund to Fight AIDS, Tuberculosis, and Malaria, based on the donor's 2004 fiscal year

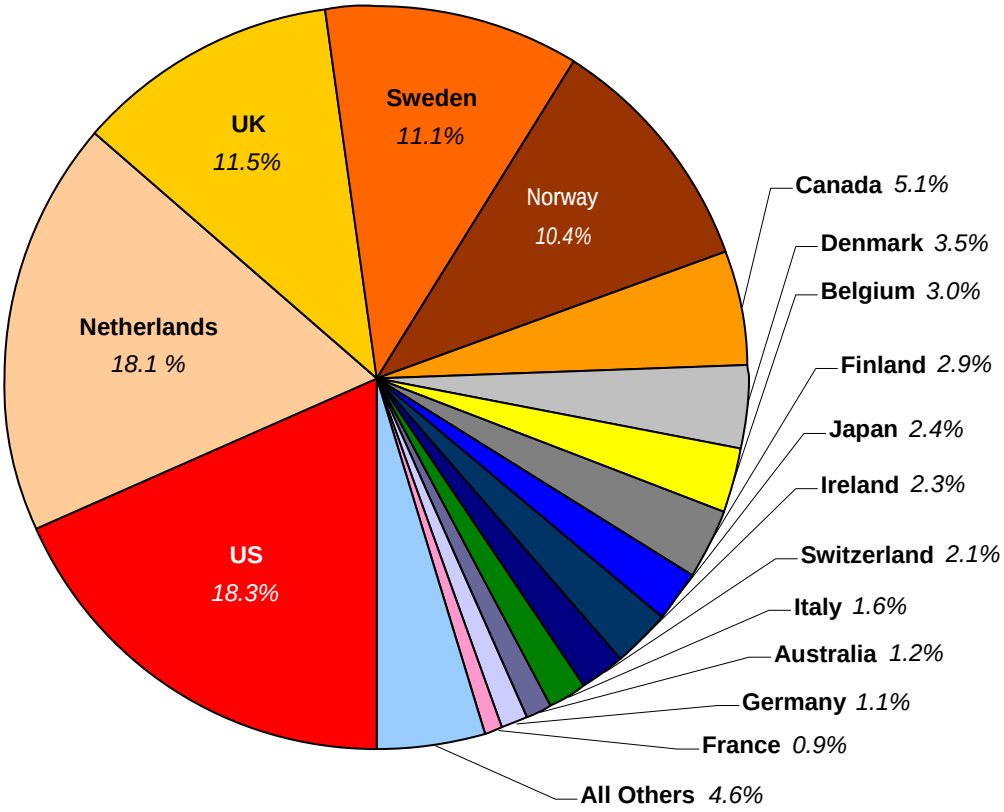


"Other DAC includes Australia, Austria, Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, and Switzerland.
Canada's contribution for their 2004 fiscal year includes a payment to the Global Fund in 2005.
FRANCE: These are preliminary estimates and might be revised later.

[13] Preliminary estimates.

Figure 3 presents the donor contributions to UNAIDS in 2004 for which donor contributions can be tracked. It includes the Unified Budget and Workplan (UBW) core funding for 2004 of US$ 145.8 million; as well as supplemental (US$ 15 million) and extra-budgetary contributions of US$ 4.5 million. Additional global/regional and country-level resources from UNAIDS cosponsoring organizations for HIV and AIDS activities total an estimated US$ 562.1 million in 2004. These resources derive from each agency's general budget. However, these are not included in the graph because the source could not be tracked to donor countries at this time.

Figure 3. Donor contributions to UNAIDS for the Unified Budget and Work plan—2004 estimate. (Total = US$ 167.3 million)



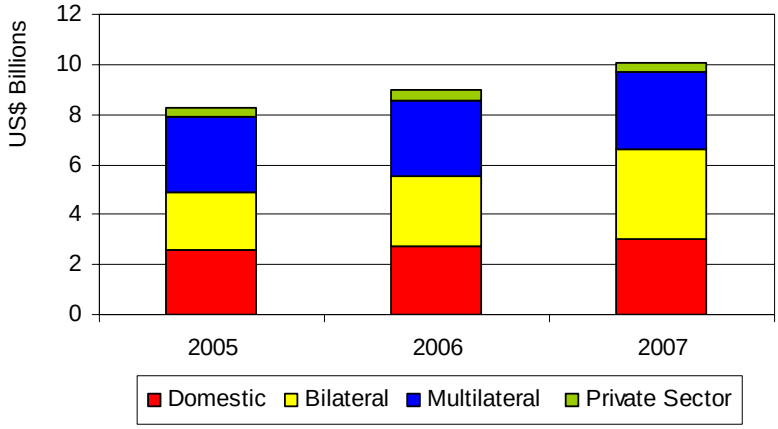
In total, resources from all donors and financial channels, including the Global Fund and domestic public and out-of-pocket expenditures, amount to US$ 6.1 billion for AIDS activities in 2004. However, these figures are preliminary and need to be revised on the basis of the donor country reports to the Organisation for Economic Cooperation and Development (OECD) and cross checked with donor countries' accounts, as well as with National Spending Assessments in recipient countries.

The UNAIDS Global Resource Tracking Consortium projected the amount of resources that might be available in 2005, 2006 and 2007[14]. These estimations are based on trends in past disbursements, adjusted for known pledges and commitments made up to 2007 by domestic, bilateral, multilateral and private sector sources, according to organization-specific disbursement schedules. A total of US$ 8.3 billion

[14] UNAIDS. Financing the expanded response to AIDS, Bangkok, July 2004.

is projected to be available from all sources in 2005, and about US$ 8.9 billion and US$ 10 billion in 2006 and 2007 respectively.

Figure 4. Projection of available resources for AIDS from all sources between 2005 and 2007 (in US$ billions)



Domestic spending (public and out-of-pocket expenditures by affected individuals and families), in the 135 middle- and low-income countries included in the estimation exercise, is projected to be US$ 2.6 billion for 2005, US$ 2.8 billion for 2006 and US$ 3 billion for 2007. This amount is unlikely to increase significantly, although some countries are in a position to contribute more government resources to AIDS. There is, however, an expectation that domestic public expenditure and international funding will substitute for the out-of-pocket expenditures that poor families are incurring for care and treatment services. There is also an assumption that the non-poor households, particularly in middle-income countries, will continue to spend their own resources for prevention activities (mainly purchase of condoms). Private sector spending by foundations and international nongovernmental organizations is estimated to remain around US$ 400 million from 2005 to 2007. The remainder of the available resources is expected to come from bilateral and multilateral sources. Based on current trends in expenditure, adjusted by known pledges and commitments, the internationally funded component amounts to US$ 5.7 billion in 2005, US$ 6.2 billion in 2006 and US$ 7 billion in 2007.

Gap analysis

It appears that there is a funding gap between resources available and those needed of US $ 4 billion in 2005 (previous analyses estimated that the resources needed for 2005 were US $12 billion), US$ 6 billion in 2006, and US$ 8 billion in 2007—a total of US $18 billion across those three years. However, this is likely to be a significant underestimate. Determining the gap between resources available and resources needed is not a matter of simple subtraction, as they are based on different methodologies. The projections of available resources are estimations of the funding of AIDS programmes, based on commitments and pledges, which can differ substantially from what is actually disbursed and spent in country. Moreover, the estimations of resource requirements are based on the costs of a package of interventions at country-level that does not necessarily match the interventions included in the estimations of available resources.

For example, not all countries target vulnerable groups, such as men who have sex with men or sex workers for which resource requirements have been estimated in these calculations. As such, the estimation of available resources will not necessarily cover what countries are expected to provide according to the package included in the resource needs assessment. In that case, the needs for the most vulnerable groups could remain unmet and the projected resources available will underestimate the need for international funding for these specific interventions unless the resources available are reallocated to address the needs of these groups.

Moreover, the commitments included in the projections of available resources from some donors, may be funding a wider set of activities than those covered in the estimates of the resource requirements, e.g. funding for sexual and reproductive health services that are not AIDS related or which are not included within the package interventions described in this analysis. Finally, the estimates of resource needs focus on what is required to be spent in-country only, whereas the projections of available resources may include resources that do not necessarily reach the country, such as management, overhead and technical assistance at international levels. While the level of detail of donor reporting of resources for AIDS has dramatically improved over the past five years, there is a continued need to increase the accuracy of these numbers, the definitions of AIDS activities, and the distinctions between commitments and disbursements.

Therefore the difference between the projected *available resources* and the *resources needed* can only be used to describe a lower bound estimate of the financial gap.

4. Prevention

The overall resource needs for prevention are based on country-specific estimations, grouped per epidemic type. The methodology is presented in Annex 1. Using the most recent evidence of scale-up rates[15], it seems a comprehensive response, required to turn around the epidemic, can be achieved by 2010. This implies that by 2010 all countries are assumed to have reached the target coverage rates for a package of interventions, depending on the type of epidemic that prevails. The target coverage rates for each type of epidemic are presented in the table below.

[15] POLICY Project. Coverage of selected services for HIV/AIDS prevention, care and support in low and middle-income countries in 2003. June 2004.

Table 2. Coverage by type of epidemic

	Low level	Concentrated	Generalized
Vulnerable populations			
AIDS education for primary and secondary students	30%	45%	100%
Programmes focused on out-of-school youth (6–15)[16]	10%	20%	50%
Programmes focused on sex workers and clients	80%	80%	80%
Programmes focused on MSM[17]	80%	80%	80%
Harm reduction programmes for IDUs[18]	80%	80%	80%
Prevention for people living with HIV	80%	80%	80%
Workplace prevention	0%	3%	50%
General populations			
Percentage of adults reached through community mobilization	0%	0%	70%
Number of mass media campaigns per year	2	4	5
Percent of adult population accessing VCT each year[19]	0.1%	1%	5%
% of casual sex acts covered with condoms	80%	80%	80%
% of married people with casual partners using condoms in marital sex	30%	30%	30%
Medical services			
% of need for post-exposure prophylaxis that is met	100%	100%	100%
Safe blood (proportion of units screened for HIV)	100%	100%	100%
Safe medical injections	77%	92%	99%
Universal precautions	77%	92%	99%
STI treatment[20]	60%	75%	100%
PMTCT (coverage among women attending ANC)[21]	80%	80%	80%

Scaling up to comprehensive prevention coverage would require US$ 8 billion in 2006, US$ 10 billion in 2007, US$ 11 billion in 2008, or US$ 30 billion overall between 2006–2008. The following table shows the breakdown per activity.

[16] The target for out-of-school youth is limited to 50%, because the resources required for peer outreach activities to this group (outreach worker serving 20–40 youths) beyond such levels would not be justified given the need to preferentially devote resources to provide schooling for this group.
[17] Men having Sex with Men (MSM).
[18] Injecting Drug Users (IDUs).
[19] Client-initiated confidential voluntary counselling and testing (VCT) resource needs were calculated based on anticipated demand which varied according to prevalence. Testing to identify persons needing treatment is included in the Treatment and Care section.
[20] Sexually Transmitted Infections (STIs)
[21] Prevention of Mother-to-Child Transmission

Table 3. Global prevention[22]

Prevention-related activities (US$ million)	**2006**	**2007**	**2008**	**2006-08**
Mass media	91	100	109	299
Community mobilization	449	608	772	1830
Voluntary counselling and testing	451	569	690	1710
Youth in school	101	104	108	313
Youth out of school	768	945	1126	2838
Programmes focused on sex workers and their clients	429	552	682	1663
Programmes focused on MSM[23]	312	407	499	1218
Harm reduction programmes for IDUs[24]	114	149	180	443
Workplace	421	523	628	1573
Prevention programmes for people living with HIV	22	33	48	103
Special populations	151	252	252	654
Condom social marketing	159	175	190	525
Public and commercial sector condom provision	1381	1501	1625	4506
Improving management of STIs[25]	672	718	764	2154
Prevention of mother-to-child transmission	206	264	324	794
Blood safety	226	228	231	685
Post-exposure prophylaxis (health care setting, rape)	1	2	2	5
Safe medical injections	897	897	897	2690
Universal precautions[26]	1590	1944	2303	5838
TOTAL FOR PREVENTION	**8441**	**9969**	**11 430**	**29 840**

It is important to note that a global figure masks the differences between countries based on the type of epidemic, their population sizes and local costs. For example, as table 4 shows, the relative costs for universal precautions are much lower in the low-income countries than for all the low and middle-income countries together. This is because the largest share of these costs occurs in larger, middle-income countries such as China, Russia and Brazil. In Sub-Saharan Africa, however, a higher proportion of resources are required for out-of-school youth and community mobilisation[27].

[22] These activities are clustered around programmatic themes: general public and youth, most at risk populations; and health services.
[23] Men who have Sex with Men (MSM)
[24] Injecting Drug Users (IDUs)
[25] Sexually Transmitted Infections (STIs)
[26] Universal precautions are shared across the health system and are not AIDS-specific. Therefore only 96% of the full costs of universal precautions and safe medical injections have been included, based on an analysis of the burden of blood-borne communicable diseases (Hepatitis and HIV).
[27] It is also important to note that the absolute amount of resources does not necessarily indicate the priority of interventions. Some programmes are relatively cheap but effective and therefore prioritized (e.g. PMTCT).

Table 4. Prevention for low-income countries only

Prevention-related activities (US$ million)	2006	2007	2008	2006–08
Mass media	45	49	54	147
Community mobilization	388	528	673	1589
Voluntary counselling and testing	229	287	347	863
Youth in school	49	53	57	160
Youth out of school	555	689	829	2074
Programmes focused on sex workers and their clients	104	129	156	389
Programmes focused on MSM	151	192	231	575
Harm reduction programmes for IDU	49	63	76	188
Workplace	218	273	331	822
Prevention programmes for people living with HIV	15	23	33	70
Special populations	49	67	67	184
Condom social marketing	99	111	124	335
Public and commercial sector condom provision	433	485	539	1457
Improving STI management	98	140	191	429
Prevention of mother-to-child transmission	99	131	164	393
Blood safety	45	46	47	139
Post-exposure prophylaxis (health care setting, rape)	1	1	1	2
Safe medical injections	595	595	595	1785
Universal precautions	250	308	368	926
Total for prevention in low-income countries	**3471**	**4170**	**4884**	**12 526**

5. Treatment

The coverage and annual increase in people being treated is based on country-specific evidence of current coverage and rates of scaling up (see Annex II)[28]. In addition, there was an attempt to acknowledge the positive impact from increased investments in capacity for delivering these services. Based on this information, it is projected that approximately 80% of people in the most urgent need (about 9.8 million people who would die within one year without treatment) could be receiving antiretroviral therapy by 2010. This corresponds closely with expectations of what can be reached under global "universal access" to treatment, acknowledging that even in countries where there is universal access (currently in high and some middle-income countries) coverage remains less than 80% of those eligible for antiretroviral therapy. By the end of 2008, it is estimated that about 6.6 million people could be receiving treatment, a significant increase from the estimated 3 million reached by the end of 2006.

An alternative interpretation of the number in need of antiretroviral therapy would include all those who have begun to develop AIDS-related symptoms, usually estimated to be two years before they would die without treatment. If this description of need is used, which is consistent with the "3 by 5" Initiative definition, then the number of people in need is greater, and the corresponding projection of coverage is lower—reaching 68% in 2010, as shown in Table 5 below.

[28] The starting coverage rates (2006) for antiretroviral therapy (ART) in each country were taken from long-term projections prepared by WHO/UNAIDS, which were based on the 2004 ART data from the recently released "3 by 5" report. WHO/UNAIDS "3 by 5" Progress Report. December 2004. Released January 26, 2005.

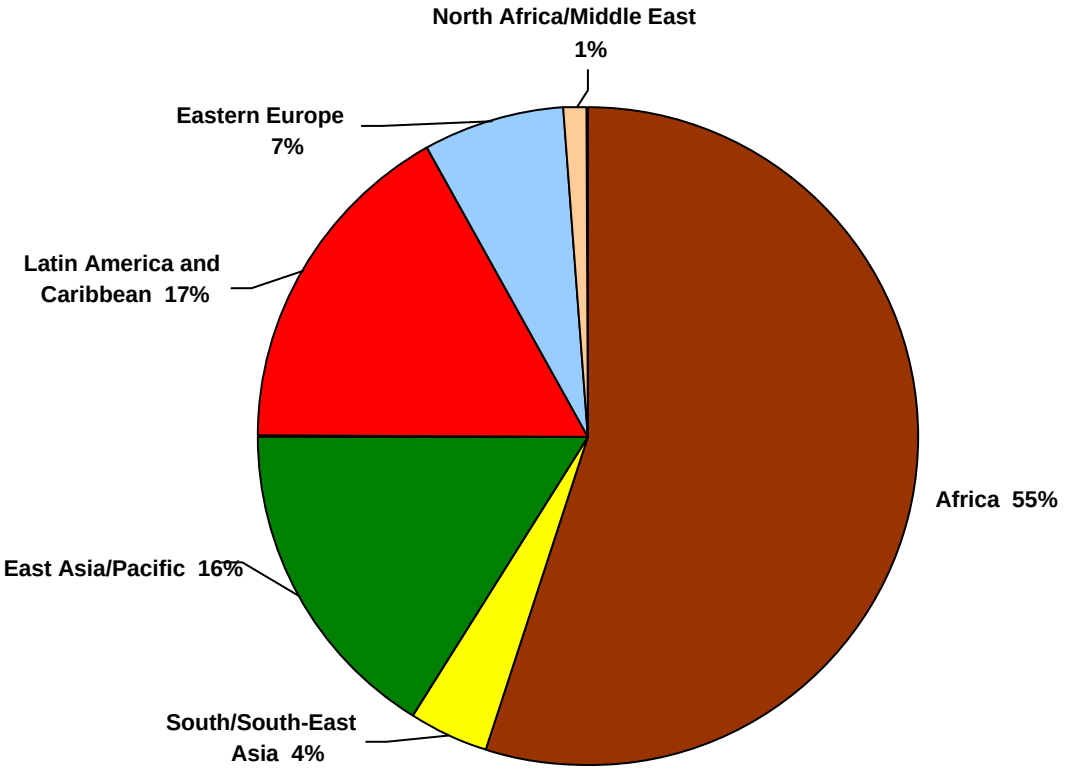
The total resource requirements are approximately US$ 3 billion in 2006, US$ 4 billion in 2007, and US$ 5 billion in 2008. The following table shows the total resources required and the coverage levels. The figure illustrates the distribution of resource needs per geographical region.

Table 5. Total treatment and care resource needs and antiretroviral therapy (ART) coverage

Year	People on ART (millions)	Coverage ART 1 yr need[a]	Coverage ART 2 yr need[b]	Total Resources (US$ millions)
2006	3.0	55%	41%	**2986**
2007	4.8	67%	54%	**4029**
2008	6.6	75%	63%	**5250**
2009	8.3	79%	67%	–
2010	9.8	80%	68%	–

[a] Coverage estimated assuming that people in need are identified only one year before death. [b] Coverage estimated assuming that people in need are identified when they become symptomatic, i.e. two years before death

Figure 5. Treatment and care per region



The resource needs for treatment and care cover more than antiretroviral treatment and include:

- provider initiated testing (diagnostic and routine offer of testing)[29]
- treatment and prophylaxis for opportunistic infections (OI),
- antiretroviral therapy (ART), including nutritional support,
- laboratory testing,
- palliative care.

Annex II, Table 13, presents the average costs per year per patient for these components. The average costs for antiretroviral drugs were calculated at US$ 519 in low-income countries and US$ 2 389 in middle-income countries. Table 6 shows the costs per component based on these costs and coverage rates.

Table 6. Treatment and care components

US$ million	**2006**	**2007**	**2008**
Palliative care	308	302	295
Provider initiated testing[30]	66	79	109
OI Treatment	686	703	707
OI Prophylaxis	287	403	510
ART, including nutritional support	1642	2482	3624
Laboratory testing	54	79	104
Total	**3043**	**4048**	**5349**

The resources required to provide social services, such as adherence support or treatment preparedness, are currently not costed explicitly. However, these and other human resources required to provide treatment and care are covered to some extent in the unit costs of these interventions, in the programme costs (e.g. community health workers) and the human resource component (training and salaries for additional nurses and doctors).

6. Orphans and vulnerable children

The updated methodology for the estimation of the resource requirements for orphans and vulnerable children (OVC) is based on recent estimates for sub-Saharan Africa used by UNICEF (see Annex III)[31]. However, the resource requirements reported here include the needs for most children orphaned from AIDS and all other causes in sub-Saharan Africa, as well as the needs for children orphaned by AIDS in other low- and middle-income countries[32]. Those included in the AIDS resource estimation are

[29] The cost of provider-initiated testing is distinct from client-initiated testing that takes place through voluntary counselling and testing (VCT) services. The former testing includes an initial test, followed by a confirmatory test if reactive. Post-test counselling is included in the care budget but more focused prevention with positive people programming costs is included in the prevention estimates. See UNAIDS/ WHO Statement on HIV Testing Policy. Available at: http://www.unaids.org/en/other/functionalities/ViewDocument.asp?href=http://gva-doc-owl/WEBcontent/Documents/pub/UNA-docs/HIVTestingPolicy_01Jun04.pdf (June 2004).

[30] The methods for estimating the coverage needs for provider initiated testing are still in an early stage. These cost numbers are likely to be an underestimate.

[31] Stover J, Bollinger L, Walker N, and Monasch R. Resources Required to Support Orphans and Vulnerable Children in Sub-Saharan Africa. UNICEF: New York, January 2005.

[32] From a programmatic standpoint it is difficult and inappropriate to identify only children orphaned by AIDS for services. Thus in sub-Saharan Africa, it was decided that services would be provided to all orphans living below the poverty level. Outside of Sub-Saharan Africa the resource estimates represent the AIDS contribution to general orphan programming See Annex III.

children living below the poverty line who are double orphans (children who have lost both parents), near orphans (children who will be orphaned in the following year) and half of single orphans (children who have lost one parent) living below the national poverty line. Table 7 shows how the total costs for OVC support of US$ 1.6 billion in 2006, US$ 2 billion in 2007 and US$ 2.7 billion in 2008 are distributed between regions. These estimates have recently been endorsed at the Inter-Agency Task Team on Children (IATT)[33].

Table 7. Resource needs for support for orphans and vulnerable children by region

US$ million	**2006**	**2007**	**2008**	**2006–08**
Sub-Saharan Africa	1490	1952	2558	6000
S and SE Asia	52	66	84	202
E Asia and Pacific	4	7	12	24
Latin America and Caribbean	14	18	22	54
E Europe	8	11	15	35
N Africa and Middle East	1	1	2	5
Total	**1569**	**2055**	**2694**	**6319**

The following activities have been included, assuming all OVC services scale up from today's low levels to full coverage (100%) by 2010 in all countries:

1. Education
   - Primary school/Secondary school (school fees, uniforms, books and supplies, special fees/assessments)
   - Skills training (out-of-school youth).
2. Health-care support (immunization, nutrition and routine health care, sexual and reproductive health services for older children).
3. Family/home support (bed nets, clothes and shoes, blankets and bedding, food, income generation or support).
4. Community support (identification of OVC in the community, outreach for street children, training and supporting full-time community workers, child care)
5. Administrative costs (e.g. birth certificates and other administrative and institutional arrangements necessary for implementing OVC care).

Table 8. Resource needs for support for OVC by activity

US$ million	**2006**	**2007**	**2008**	**2006–08**
Education	193	287	443	923
Health care support	145	174	200	519
Family/home support	971	1255	1604	3830
Community support	14	18	25	57
Organization costs	246	322	422	990
Total	**1569**	**2055**	**2694**	**6319**

The services included in the resource needs estimation for OVC support cover different sectors and needs, but it is important to note that the support for OVC still

[33] June 15 and 16, New York. The IATT also recommended additional work in the coming year to include several new approaches to OVC support currently being tested and better unit cost information on OVC support outside of Africa.

necessitates a larger, concerted effort beyond what can be supported by AIDS-related resources, even in sub-Saharan Africa.

7. Programme costs, including infrastructure investments

Programme costs are defined as costs that are incurred at administrative levels *outside* the point of health care delivery, in all low- and middle-income countries[34]. Programme costs cover services such as management of AIDS programmes, M&E and advocacy, providers' transportation costs, facility upgrading, including purchases such as laboratory equipment and telecommunications. This section also includes longer term investments such as health facility construction, which benefit the health sector as a whole[35]. It is important to note that the programme costs are incremental, i.e. that they cover what is required to scale up services over and above what is currently available. Annex IV presents the methodology.

Table 9. AIDS programme costs by activity

US$ million	2006	2007	2008
Management[36]	485	376	390
Advocacy and communications	118	111	111
Monitoring and Evaluation	148	138	146
Operations Research	11	7	7
Training[37]	72	136	231
Logistics and supply, including transportation	305	259	304
Supervision of personnel and patient tracking	97	68	92
Drug resistance surveillance	69	68	68
Construction of new health centres	60	23	167
Laboratory and other infrastructure upgrading	121	185	236
Programme costs	**1486**	**1371**	**1753**

The way in which investments in new health facilities are anticipated to occur over the three years leads to a rise and fall in costs is caused by the way in which new health facilities are invested in over the three years: health facility site planning and design, buying land and the bidding process for construction take place in 2006 and 2007, actual investment in the construction itself takes place in 2008, for readiness by 2009 Moreover, the programme costs assume high fixed start-up costs (buying computers, e-mail connectivity, etc) in the first year. However, overall, variable costs are rising between 2006 and 2008.

[34] As such, the resource requirements for human resources under programme costs are distinct from the estimations of human resources for treatment and prevention as reported in the next section 8, because those are offered as part of health care delivery.

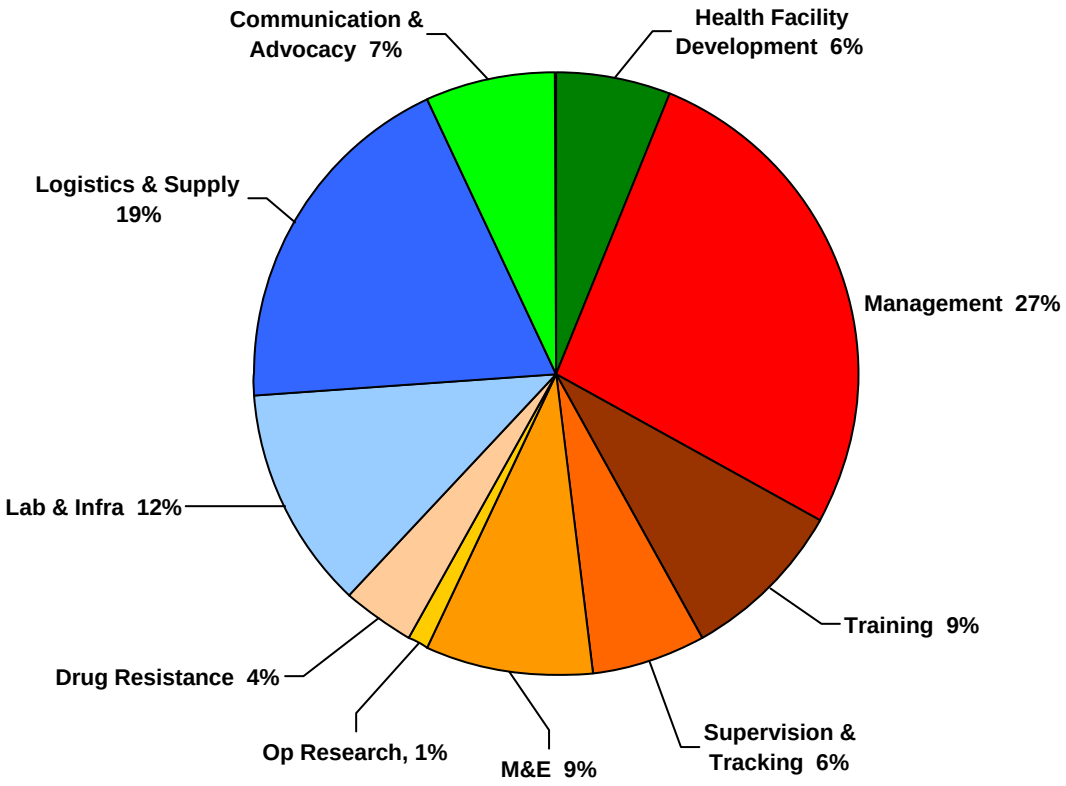
[35] It is important to note that by linking the estimation of programme costs to people's access to treatment and prevention, the resource estimates represent only the share of costs that are attributable to AIDS and that are required to provide services over and above those currently already provided.

[36] For treatment and prevention activities, including local and international technical assistance required in-country for specific programme functions (e.g. drafting guidelines, training).

[37] Training needs for all the appropriate cadre of health professionals and para-professionals

The next figure shows the distribution of programme costs per category.

Figure 6. AIDS programme costs by activity



With regards to investment in upgrading and constructing health centres in low- and middle-income countries, about 2700 new health centres are forecasted to be available by 2010, based on the investments made during 2006–2008. About 19 000 health centres and 800 hospitals are to be upgraded to handle the scaling-up of treatment and care. It is important to note that this is not the *total* number of new health centres and the upgrading of existing centres required, but rather the equivalent of what is needed for the provision of AIDS interventions.

8. Human resources for AIDS

Given the crucial importance of human resources for scaling up the response to AIDS, additional human resource need requirements for health care delivery have been estimated for low-income countries, and two middle-income countries: South Africa and Botswana[38]. These are the resource requirements to ensure the availability of human resources over and above what is currently available in the health sector[39]. However, this estimate of the human resource requirements serves to identify an order

[38] Assuming that other middle-income countries benefit from a higher availability of existing health personnel and a lower burden of AIDS on health services. However, more expanded and improved estimations of human resource requirements will be developed in the future.

[39] Human resources are also covered in the unit costs of prevention and treatment interventions and, where it concerns human resources required outside the point of care delivery, they are included in the programme costs as well.

of magnitude. Considerably more work is needed to refine this assessment and incorporate more human resource cost components.

The resource requirements currently include those for:

- providing of education for additional nurses and physicians who will be needed in the future;
- recruiting additional staff and reducing the wage differential with middle-income countries by providing wage benefits five times higher[40] to retain and attract people to the health sector by reducing the wage differential with middle-income countries.

The following table shows the resource needs for these two components of human resource requirements. It is important to recognize that these are not the only requirements for human resources in the AIDS needs estimate. Human resource needs are also addressed under the programme cost component (e.g. treatment management, community health workers linked to prevention activities, technical assistance). Moreover, the treatment and prevention costs also cover human resources to some extent as they include the costs of health facility utilization (outpatient visits and hospitalization).

Table 10. Resource needs for components of human resources for AIDS

US$ million	Total HR	Education	Wage benefit
2006	355	50	305
2007	608	89	520
2008	859	123	736
2006–2008	**1822**	**262**	**1561**

These resources will cover the costs of an additional 3070 medical students and 5700 student nurses every year in low-income countries, and South Africa and Botswana, between 2006 and 2008. The first graduates will be available in 2009 for nurses and in 2012 for medical doctors. Moreover, the additional doctors and nurses that are required for the AIDS response, and are working between 2006 and 2008, receive a wage that is five times higher than the current average wage for low-income countries, which currently is equivalent to US$ 5300 per year for a doctor and US$ 3200 for a nurse.

Table 11. Human resources receiving wage benefits

	2006	2007	2008
Total doctors	6271	10 298	14 355
wage bill for doctors (US$ mill)	*152*	*258*	*366*
Total Nurses	10 501	17 245	24 039
wage bill for nurses (US$ mill)	*153*	*261*	*370*

An expanded and improved estimation of human resource requirements will be developed in the future. The multiplying of the wage bill is only one possible way of attracting and retaining health personnel, and future estimations should assess the

[40] This level wage adjustment was considered because it brings the wages to a median between the United Kingdom and low-income country salaries.

impact of alternative policies such as task shifting. Furthermore, the current estimate for human resource requirements only covers nurses and doctors, whereas a broader public health approach to treatment and care would also include counsellors, clinical officers, adherence supporters and laboratory staff. However, resource requirements for other kinds of care providers, such as counsellors for palliative care or community workers for prevention, are covered through the unit costs for prevention and treatment programmes. Moreover, the programme costs also cover community workers. For example, community coordinators are considered for each of the preventive interventions targeting special populations, and community outreach workers are made available in health centres. In total, programme costs provide for the training and honoraria of more than 316 000 community health workers between 2006 and 2008.

9. Discussion of results

The revised estimates indicate resource requirements of US$ 15 billion in 2006, US$ 18 billion in 2007 and US$ 22 billion in 2008 for prevention, treatment and care, support for orphans and vulnerable children, and accompanying programme and human resource costs[41].

Table 12. AIDS Resource needs

US$ billion	2006	2007	2008	Total for 2006–2008 *
Prevention	8.4	10.0	11.4	29.8
Treatment and care	3.0	4.0	5.3	12.3
OVC	1.6	2.1	2.7	6.4
Programme costs	1.5	1.4	1.8	4.6
Human resources	0.4	0.6	0.9	1.9
Total	**14.9**	**18.1**	**22.1**	**55.1**

* The totals for 2006–2008 have been rounded to the first decimal place with the result that there may be small differences with the figures for sub-totals in the text because of rounding.

Compared to previous estimates, prevention costs have increased somewhat because of changes in the resource requirements for specific prevention activities differentiated by type of epidemic and related differences in target coverage rates. Treatment and care requirements seem lower than in the most recent estimates, however, some of the resource requirements in this component have been transferred to the programme costs and human resources components (training and hiring of additional nurses and physicians). Moreover, the resources required for second-line treatment are lower because of lower estimated failure rate of first line treatment. TB-antiretroviral therapy costs are also reduced after consultation with the Office of Tuberculosis in the WHO. Support for orphans and vulnerable children is higher than previously estimated because of the inclusion of resources required for children orphaned by AIDS outside of sub-Saharan Africa.

This most recent resource estimation also follows a different approach, which affects the overall results. Firstly, it is important to note that the resource needs estimates are

[41] Please note that the resource estimations for the human resources are preliminary and expected to be further refined and expanded.

for 2006 to 2008, though these calculations are based on longer projections of scaling-up to reach universal access to treatment and a comprehensive package of necessary prevention activities by 2010 globally. Secondly, the previous estimations reported different scenarios with varying assumptions about the growth in coverage (resource constrained, capacity constrained and capacity enabled). The latest estimates assume that current rates of growth in coverage of services are maintained, but they also incorporate resources required to enhance capacity for scaling up (covered under human resources and programme costs). The coverage levels and rates of scaling-up used for these resource estimates are only feasible if such additional investments in enhancing capacity are indeed made.

Based on the current coverage of prevention services and the most recent evidence on rates of scaling up interventions, and assuming resource needs are fulfilled, it appears to be realistic and achievable to arrive at a comprehensive prevention response by 2010, as is required to turn around the AIDS epidemic. Support for orphans and vulnerable children is also expected to scale up from current low levels to full coverage by 2010. For treatment and care, current coverage rates and rates of growth in coverage maintained at 2004 levels could lead to coverage of 80% of people in need by 2010 (about 9.8 million people) if programmatic constraints are addressed[42]. The 80% coverage corresponds to an accepted interpretation of the "universal access" target, acknowledging that even in countries where there is universal access to treatment (currently in high and some middle income countries) coverage remains less than 80% of those eligible for antiretroviral therapy.

However, it is important to note that the coverage levels presented in the analysis should not be considered as agreed targets, but rather as outcomes that could be expected if these resources were spent. Moreover, it must be emphasized that decisions about resource allocations by donors, national governments and any other private or public AIDS programme, cannot be based on global figures, such as those presented here. In particular, the proportions of estimated resource requirements per component of the AIDS programme (55% for prevention, 22% for care and 12% for OVC) should not be used as a practical guide for resource allocation for the three-year period. These proportions are influenced by the different methodologies used for each component of the AIDS resource needs estimation. Moreover, resource allocation should be country-specific and based on other factors such as epidemic type, resource availability; overall financing of the AIDS response; cost-effectiveness of interventions; and equity of access to services.

With regards to the funding of AIDS resource requirements, it is estimated that US$ 6.1 billion was available for AIDS activities from all sources in 2004. Projections, based on past trends and currently known pledges and commitments, suggest US$ 8.3 billion, US$ 8.9 billion and US$ 10 billion might be available in 2005, 2006 and 2007 respectively. On first sight, it appears that there are funding gaps between resources available and those needed of US $4 billion in 2005, US $6 billion in 2006, and US $ 8 billion in 2007—a total of US $18 billion across those three years. However, the projections of available resources cannot be compared directly with the estimates of resource needed. They are based on commitments and pledges, which do not necessarily lead to expenditure at country level. The estimations of resource requirements are based on a pre-determined comprehensive package of interventions

[42] Those in "urgent need" as defined by persons who would die within one year without treatment.

at country-level, that does not necessarily match the programmes covered in the projections of available resources. Therefore, the difference between the projected available resources and the estimated resource needs will be an underestimation of the true funding gap for AIDS.

It is important to note that in the real world the AIDS response cannot and should not be isolated into a single vertical programme. This estimation of resource needs includes activities that extend beyond the AIDS response and serve the general health sector (e.g. universal precautions and blood safety) or broader development agenda (e.g. support to orphans from other causes than AIDS in sub-Saharan Africa). Ultimately the goal is to estimate the overall requirements for health system strengthening, particularly health facility and human resource development. Disease-specific resource requirements, such as those for AIDS, TB and malaria, should be embedded within that broader envelope. The resources required for the response to AIDS will also depend on the progress made towards achieving other Millennium Development Goals, such as primary education and poverty reduction. Though the current exercise take this into account to some extent (e.g. close linkages with resource estimations for Global TB programme), most of these dynamic interactions are not incorporated in the AIDS resource estimation due to limited data availability concerning potential investments in these other health and social sectors.

Is US$ 22 billion dollars too much to spend on combating the epidemic in 2008—or too little? Will we see the desired impact on reducing incidence of new infections and prolonging and improving the lives of those already infected? Will the general health and other social sectors be advanced or damaged by this flow of resources? How could the macroeconomic impact of increased aid flows for AIDS best be managed? It is critical that such questions be answered in as timely a way as possible. The analyses in this report are only a first step to that ultimate goal.

Finally, it is important to recognize that any estimate will have its limitations, due to inherent uncertainty about the future and limited data availability. For example, the resource needs estimates are based on hypotheses about future behaviour of donors, governments and various agents (companies, households, individuals), as well as about the way in which increased coverage will affect unit costs. Moreover, estimations necessarily use proxies and generalizations to fill in incomplete empirical data. Even when validated by expert opinion, such assumptions remain uncertain. Therefore, resource needs estimations must be continuously improved, in close cooperation with programme implementers in country, as additional data become available to inform the assumptions about unit costs, number of people in need and activities to be included. Over the next five years, improved information is greatly needed on actual costs of services and on the ways in which constraints in the delivery of these services will be resolved.

10. Way forward

Given the considerable efforts made to solicit the latest available information, but acknowledging that the estimation process has its limitations, UNAIDS is confident that the current resource estimations constitute the best available assessment of global needs for AIDS and a rational basis for further discussion about AIDS funding in the international area over the coming year. During this time, UNAIDS proposes to undertake the following actions.

- Establish a longer term systematic and inclusive process that would utilize existing reference groups, such as the UNAIDS Global Resource Tracking Consortium, the UNAIDS Reference Group on Economics and the UNAIDS Reference Group on Estimates, Modelling and Projections.
- Create additional structures that would be comprised of a supervisory Steering Committee and defined technical working groups. The Steering Committee would facilitate the data exchange between countries and the UN system, and between UN agencies. The technical working groups would focus on the interpretation of new data, new approaches to modelling and a better understanding of the synergies of comprehensive intervention packages.
- Enlarge the above-mentioned groups to involve a larger number of developing country representatives and a pluralistic body of experts in the process of AIDS resource needs estimation.
- Work with WHO and other partners to link disease-specific resource estimations with estimations of the resources required to strengthen the overall health sector in order to scale-up services for all diseases.
- Organize a new round of regional workshops for national experts to gather more information to estimate in-country resource requirements, and build country capacity in this area.
- Develop new tools to facilitate countries in conducting their own resource needs estimates.
- Release an annual report on current resources available from all sources and a biannual report on resource needs estimates through 2010.
- Continue to improve the level of detail and accuracy of donor reporting on resources projected to be available, resources committed and resources disbursed.

ANNEX I Prevention Methodology

Regardless of whether a country faces a low level, concentrated or generalized epidemic, resource requirements are the product of multiplying the population in need of the service by the coverage (the percentage of the population in need that receives the services), and by the unit cost of providing the service. The key assumptions in this equation are as follows.

a) Population in need

The population in need differs among prevention interventions. For some prevention components it is a segment of the general population, such as school children or pregnant women or populations at high risk of HIV exposure, while others are targeted to the general population, such as mass media.

b) Coverage

Target coverage rates for each intervention are set at realistic and necessary levels to turn the epidemic around, where possible using existing targets. Based on current coverage and most recent evidence of scale-up rates, the progress towards the targets is modelled for each intervention, in each country separately[43]. At these rates, the target coverage rate for all countries and all interventions is achieved by 2010.

For interventions such as school education, prevention of mother-to-child transmission and the treatment of sexually transmitted infections, the current levels of understaffing of skilled personnel and lack of facilities are recognized by including services only for those persons who currently have access to education, antenatal care and basic health care respectively. Given the short time frame of the estimation (three years), the access to services is assumed to be constant. In the longer term, however, increased access would enable more people to be covered by the prevention programmes.

c) Prevention programming mix and coverage levels by epidemic state

Target coverage levels differ for each of the three types of epidemics: low (48 countries), concentrated (29 countries) and generalized (53 countries). This reflects the fact that different programmatic mixes are required to address the AIDS epidemic, depending on the type of epidemic. For example, work place prevention will have a lower priority in a country with a low level epidemic compared to a country with a generalized, high epidemic. Community mobilization, on the other hand, is most important in generalized epidemics. See Table 3 for coverage rates for each intervention by type of epidemic.

d) Unit costs

Unit costs for most prevention components were derived from country specialist information and published pilot project descriptions, with regional averages used for countries with no data. Unit costs remain constant to 2008 as information on economies of scale (lowering unit costs) or diseconomies from extension to populations that are more difficult to reach (raising unit costs) remains too limited to incorporate.

[43] POLICY Project. Coverage of selected services for HIV/AIDS prevention, care and support in low and middle-income countries in 2003. June 2004

ANNEX II Treatment and care methodology

For the different components of care and treatment, the methodology is again based on multiplying the estimated number of people in need by the coverage rate and by the unit costs of each treatment and care service. The key assumptions in this area are as follows.

a) The population in need

The number of people newly needing antiretroviral therapy is derived from the annual incidence of AIDS, based on UNAIDS/WHO country-specific projections of AIDS mortality. There multiple interpretations of how to estimate the number of people in need. The "3 by 5" definition estimates those in need as the number of people who will die within two years in the absence of antiretroviral therapy. This is a proxy for the number of adults who are not yet on treatment, but who are developing advanced HIV disease.

However, in line with experience to date, many people will actually start treatment on average one year after they begin to experience symptoms of HIV-related disease. This might be regarded as the population most urgently in need of treatment. The model has been run to include both definitions of people in need.

The additional years lived with antiretroviral therapy are assumed to be four-to-six and six-to-nine years respectively in low- and middle-income countries[44]. Without treatment, it is assumed that people would die within a year. The model assumes that the population requiring palliative care, diagnostic testing, treatment and prophylaxis for opportunistic infections are all people with AIDS, whether or not they are receiving antiretroviral therapy[45]. Considerable effort has been made to ensure consistency between the resource estimation for tuberculosis and that for AIDS, given the overlap of interventions and patients. Given the short time frame of the estimation (2006–2008) and the time span from infection to overt disease, the model also assumes that prevention efforts do not noticeably affect the numbers of people in need of antiretroviral therapy during this period.

b) Components of treatment and care

Palliative care is a package of services provided to those people nearing death. Treatment of opportunistic infections (OI) refers to a package of medication and care used for treatment of HIV-related diseases, while prophylaxis for prevention of OI includes the cost of isoniazid to prevent TB and cotrimoxazole to protect against pathogens responsible for pneumonia, diarrhoea and their complications. Children born to positive mothers also receive 18 months of cotrimoxazole, as prophylaxis. The cost of diagnostic testing (provider-initiated testing including post-test counselling) is included as an initial test, followed by a confirmatory test if reactive[46].

Within antiretroviral therapy, several options are included. Different first line antiretroviral drug regimens are considered for tuberculosis patients, pregnant women

[44]This includes assumptions about adherence failure and dropout of treatment programmes. Children are assumed to have the same survival benefit.

[45]These services, with the exception of OI prophylaxis, are costed as life time costs. The costs are attributed two years before death in the absence of antiretroviral therapy, but in reality some of the costs are incurred earlier and others later.

[46]Client-initiated voluntary counselling and testing (VCT) services are part of the prevention component.

and children. An alternative "first-line" regimen is included for patients who experience toxicity. After clinical failure of first-line therapy, patients are placed on second-line therapy. The treatment and care component includes a comprehensive package of recommended services for antiretroviral therapy delivery, including nutritional support and the cost of drug supply logistics. The costs for CD4 testing to monitor the response to antiretroviral therapy and disease progression are also included for middle-income countries.

c) The growth of coverage rates

The starting coverage rates (January 2006) for antiretroviral therapy in each country were taken from long term projections prepared by WHO/UNAIDS, which were based on the 2004 antiretroviral therapy data from the recently released "3 by 5" report[47]. Coverage rates of prophylaxis for opportunistic infections and testing for HIV were taken from 2003 coverage data (the most recent survey)[48]. It is assumed that the coverage of palliative care is highest, followed by OI treatment and OI prophylaxis and finally antiretroviral therapy having the lowest coverage rates, so that even if people are not yet covered by antiretroviral therapy, they can receive other forms of care.

The coverage rates after 2006 were increased at a constant rate, maintaining the rates reported during 2004 and the first half of 2005 in the "3 by 5" progress reports[49]. Given the lack of information on which to base projections of future growth rates of coverage, it is assumed that the last reported rates are maintained. The AIDS resource estimates also include resources for investments (e.g. human resources, programme costs) required to maintain such rates of growth in coverage. At this rate of growth, 80% of people in need globally are reached by 2010, which is more than that currently experienced in high and those middle income countries with universal access to treatment.

d) Unit costs and prices

The costs of palliative care, treatment of opportunistic infections, and testing are all expressed as lifetime costs for a general package of services and drugs. Therefore, though the costs are attributed two years prior to death in absence of antiretroviral therapy, the services could have been provided earlier or later. Prophylaxis of opportunistic infections is costed per year on prophylactic therapy, with the assumption that 40% of patients initiating antiretroviral therapy will be able to discontinue prophylaxis after six months; the remainder continue till death. Treatment for children is costed as 100% of adult costs, although the few studies on the cost of care for young children suggest the average cost is currently lower, because new child-specific treatment methods are expected to be more costly as well as more appropriate[50].

[47] WHO/UNAIDS "3 by 5" Progress Report. December 2004. Released January 26, 2005.

[48] POLICY Project. Coverage of selected services for HIV/AIDS prevention, care and support in low and middle-income countries in 2003. June 2004. Regional averages adjusted by gross national income (GNI) per capita were used for 70 countries for which no data are available.

[49] Note that the growth rate is calculated as the annual percent reduction in the unmet need for people newly needing care. With a constant rate of reduction in unmet need, the absolute increase in coverage decreases as the unmet need approaches zero. This accounts for the fact that as coverage rises, it becomes harder to cover the next person who has not previously had access (e.g. more remote, less demand, less access).

[50] The estimation methodology for all these services followed the previous approach (see Bertozzi S, Gutierrez JP, Opuni M, Walker N, and Schwartländer B Estimating resource needs for HIV/AIDS health care services in low-income and middle-income countries. *Health Policy* 2004; 69: 189-200).

Per-patient costs for treatment and care were taken from new prices negotiated with providers of drugs and diagnostics, in particular for antiretroviral drugs and laboratory monitoring. The Global Fund to fight AIDS, Tuberculosis and Malaria website dataset on prices agreed for antiretroviral drug purchases was used to inform antiretroviral drug costs for lower-middle-income countries, using originator company drugs. For low-income countries, prices for generic company drugs were used. The price of second-line drugs is based on recent estimates by Médecins Sans Frontières (MSF). Within each income range, these prices were adjusted for individual countries based on the country's purchasing power parity (PPP) adjusted gross national income per capita (GNI/capita[51]) and were assumed to prevail to 2008. The other unit cost data were validated through regional workshops, organized by UNAIDS, with over 155 experts drawn from 78 affected countries.

Table 13. Annual costs for AIDS treatment and care

Annual cost per person per year (constant prices)	Low-income countries	Middle-income countries
Provider-initiated HIV testing	8	8
Palliative care	267	580
OI treatment	618	1300
OI prophylaxis	103	312
Average drugs costs ART	519	2389
Average costs ART Tuberculosis	883	2753
Average cost second line ART	2245	4115
Laboratory monitoring for ART	3	117
Nutritional support ART	113	225

e) Programme and human resource costs

The additional programme and human resource costs are reported as separate cost components to reflect the overarching nature of such resource needs (see sections 6 and 7[52]). However, the costs of treatment and care, including human resources, are probably still an underestimation because activities such as psychosocial care and community support are not included given the limited data available on coverage and costs of these services. As data becomes available, future resource estimations will also cover the financial and human resources required for such interventions.

[51] World Bank, World Development Indicators 2004. Washington DC: World Bank, April 2004. Available at www.worldbank.org

[52] Programme costs are the cost occurred outside the point of health care delivery. The human resource costs are the measures taken to ensure the availability of additional human resources, such as education and wage benefits.

ANNEX III Orphans and vulnerable children methodology

An orphan is defined as a child under the age of 18 who has lost one or both parents. Those included in the AIDS resource estimation are children living below the poverty line who are double orphans (children who have lost both parents), near orphans (children who will be orphaned in the following year) and half of single orphans (children who have lost one parent).

The AIDS resource needs estimates include children who were orphaned from all causes in sub-Saharan Africa given that AIDS is responsible for more than two thirds of all double orphans in that region. Moreover, as a result of AIDS, sub-Saharan Africa is the only region where overall, adult capacity generally to provide care and support to orphans is overstretched.

Outside of sub-Saharan Africa, AIDS also leaves an increasing number of children orphaned. However, because of differences in the severity of the epidemic and in the overall proportion of children orphaned, the burden of AIDS is less than in sub-Saharan Africa. UNICEF has not yet completed detailed analyses of the resources needs for orphans outside of sub-Saharan Africa. Therefore, the estimates of resource needs in other regions assume similar costs for orphan support as in sub-Saharan Africa, but have been restricted to the needs of children orphaned by AIDS. As such, the AIDS resource needs estimation will include all orphans in sub-Saharan Africa given the high burden of AIDS in this region, but only children orphaned by AIDS in other regions in order to reflect the proportion of orphan care that should be funded through AIDS resources.

More on the methodology for estimating the resources required to provide support to orphans and vulnerable children can be found in Stover J et al 2005[53].

[53] Stover J, Bollinger L, Walker N, and Monasch R. Resources Required to Support Orphans and Vulnerable Children in Sub-Saharan Africa. UNICEF: New York, January 2005.

ANNEX IV Programme costs methodology

These costs are estimated using the approach developed in the WHO-CHOICE cost-effectiveness work programme, which entails quantifying resource inputs and resource prices for different levels of population coverage[54]. The costs are estimated based on interviews with programme experts within WHO. The interviews were structured around activities that were listed in successful Global Fund Applications for AIDS. The total programme costs include estimates for the following activities at the country level.

1. Programme Management for Preventive Activities, including:
    - New staffing needs based on coverage levels, by intervention (including management at provincial and district levels, support staff and community coordinators)
    - Technical assistance at country level, both national and international
    - Vehicles and motorcycles in districts
    - Quality control.
2. Programme Management for Treatment and Care Activities, including amongst others:
    - New staffing needs based on coverage levels. Crossing coverage levels of 10% (moving from start-up to urban roll out), 25% (to rural roll out), 50% (to nationwide access), and 80% (universal access) are all assumed to need additional staffing
    - Partnerships and linkages (e.g. meetings, referral system)
    - Human resource planning (e.g. district level).
3. Advocacy and communications, including staffing needs and development of communication strategy.
4. Monitoring and Evaluation, including staffing, training and development of system
5. Operations Research, with number of studies depending on the numbers of people on antiretroviral therapy.
6. Training for treatment and care with number of trainees based on coverage levels.
7. Increasing the capacity of logistics and drug supply systems, including staffing, development of administrative systems and upgrading of transportation infrastructure.
8. Supervision of programmes and programme support for patient tracking.
9. HIV drug resistance surveillance including a national level drug resistance committee and two new sentinel sites in all countries
10. Upgrading laboratory infrastructure to accommodate the delivery of antiretroviral therapy and the purchase of new equipment (including training on new equipment).
11. Development and building of new health facilities, including situational analysis, site assessment and selection, contracting and construction with completion within four years.

[54] Johns B, Baltussen R, and Hutubessy R. Programme costs in the economic evaluation of health interventions. Making choices in health: WHO guide to cost-effectiveness analysis. Geneva: World Health Organization, 2003.

The programme costs also include longer term capital investments to develop health facilities (health centres, clinics and laboratories). Based on the assumption that one health centre will, on average, provide antiretroviral therapy services to no more than 400 patients, the number of patients that can not be served by the current or estimated current level of health facilities in a country are calculated. It was further assumed that it would take four years for a new health centre to be completed. The first year is dedicated to situational analysis and preparation of a national framework for health centre expansion. The first and second years also involve actual site assessment and selection, architectural design and contracting. From there, it is assumed that a health centre will be built in 1.5 years, on average. Therefore, by 2009 the new health facilities will be available as a result of investments made between 2006–2008.

It is important to note that the programme costs are incremental, i.e. that they cover what is required to scale up services over and above what is currently available. It is hoped that for future resource estimations more information on total programme costs will be available. In the meanwhile, this remains an underestimation of true programme costs.

ANNEX V Human resources methodology

a) Estimation of supplementary physicians and nurses

The human resource requirements are based on an "average care delivery model" for all countries, which determines the numbers of staff needed per patient on antiretroviral therapy. The staff complements included in the resource needs estimation are nurses and physicians, although this is insufficient to provide a complete package of care for people living with HIV according to the public health approach to treatment and care. Clearly, this leads to an underestimation of the true human resource requirements for the response to AIDS. These do not include the human resources necessary for an expansion of prevention activities, such as community workers. Moreover, a public health approach would also include counsellors, clinical officers, adherence supporters and laboratory staff. Furthermore, this estimation assumes that the currently existing human resources are able to handle other, non-antiretroviral therapy, health needs of the population. A further implicit assumption is that the Human Resources management and planning results in very efficient health professionals and an optimal allocation of patients to carers.

b) Estimation of education costs

The consultation time of the nurses and doctors is included in the unit costs of treatment and care, but additional resources required to ensure that sufficient health personnel available are included in this component. The education costs are based on the training costs observed in the few low-income countries for which data are available, which are then applied to all countries[55]. This amounts to US$ 6000 per doctor per year (six years) and US$ 4000 per nurse per year (three years). It is assumed that the education sector has sufficient capacity to increase the number of nurses (5700 extra per year) and physicians (3070 extra per year) to be educated trained, so additional investments in the education sector, e.g. the building of medical schools and recruitment of teachers, will not be required between 2006–2008. However, education costs are increased by 20% to cover expansion of teaching capacity in current facilities.

c) Estimation of costs of recruitment and retention policies

In the future a more detailed costing of recruitment and retention policies should be included in the AIDS resource estimation. The current resource needs estimation uses the assumption that wage rates need to be five times higher than what currently prevails, as a specific policy to attract and retain the needed health professionals in the short term. This augmentation reduces the wage differential between low-income countries and middle- and high-income countries (five fold leads to a salary that is a median between the average salary in low-income countries and the average salary in high-income countries). However, the multiplying of the wage bill is only one possible way of attracting and retaining health personnel, and future estimations should assess the impact of alternative policies such as task shifting.

It is also important to point out that these resource estimations do not take into account the labour market consequences of the hiring, staffing and wage increases for health professionals working in AIDS, for example the impact on the price of labour (wages). In reality there will be labour market (both within and outside the health sector), fiscal and macroeconomic effects that need to be considered by national governments when planning and managing the human resources for health, both public and private.

[55] See Matsiko WC and Kiwanuka J (2003). A Review of health human resources in Uganda. Health Policy and Development, 1, 1, 15-20.

ANNEX VI Methodology for the estimation of the direct bilateral 2004 donor's commitments, Global Fund contributions and projections of resource availability 2005–2007

The definition of HIV and AIDS activities by OECD originally focused on the Health Sector—'population/reproductive health': ***'all activities related to sexually transmitted diseases and HIV/AIDS control e.g. information, education and communication; testing; prevention; treatment, care'***.
The definition has been expanded to include:

- Sexually Transmitted Infection activities—which encompass prevention and care services, diagnosis and treatment and promotion of voluntary abstinence, from the education sector as well as the health sector.
- Prevention—client-initiated voluntary counselling and testing, prevention of mother-to-child transmission, information and education materials about AIDS prevention, blood safety and prevention strategies from the education sector as well as the health sector.
- Treatment and care—palliative care for people living with AIDS, treatment of opportunistic infections, access to essential AIDS-care programmes including drugs, prophylaxis for opportunistic infections.
- Social mitigation and support—promotion and protection of human rights, legal support and humanitarian assistance, from the social development sector.

Multiple-purpose Development Assistance Projects, whose main objective is not HIV or AIDS are not currently being reported as "HIV and AIDS", however the part or parts of the project that include any or several of the above mentioned activities is considered as "AIDS" activity.

Data provided as the 2004 commitments from donor countries in this report were obtained from multiple sources. UNAIDS and the Kaiser Family Foundation conducted primary data collection from the governments of Canada, France, Germany, Italy, Japan, the United Kingdom, the United States, and the European Commission during the first half of 2005. For other donor countries previous UNAIDS estimates or estimates from the OECD Creditor Reporting System (CRS) were used. Data were also obtained from the Global Fund to Fight AIDS, Tuberculosis and Malaria.

For the United States, final Congressional appropriations were considered to be commitments. Disbursements, which often lag commitments, are the actual expenditure of obligated funds.

Contributions made by donors to the Global Fund were considered to be disbursed by donors in full, even if the Global Fund did not disburse them in that same year. Both bilateral funding and Global Fund contributions were collected and analyzed. All Global Fund contributions were adjusted to represent 60% of the total, reflecting the Global Fund's grant distribution through 2004 for HIV/AIDS.

Data were collected for fiscal year 2004, as defined by the donor: the United States. FY, October 1 to September 30; the fiscal years for Canada, Japan, and the United Kingdom are April 1 to March 31. The EC, France, Germany, and Italy use the calendar year. The Global Fund's fiscal year is the calendar year. In some cases, therefore, data obtained directly from donors on their fiscal year 2004 contributions to

the Global Fund may differ from amounts reported on the Global Fund's website by calendar year.

Other than contributions provided by donor governments to the Global Fund, UNAIDS, or to a UN agency for an AIDS-specific purpose (e.g., the "3 by 5" Initiative), general contributions to UN entities (e.g., the World Bank's IDA or UN country membership fees), are not counted as part of a donor government's AIDS assistance even if the multilateral organization in turn directs some of these funds to AIDS. Rather, they would be counted as AIDS funding provided by the multilateral organization. Funding for international HIV and AIDS research was not included in the total donor's contributions.

Where data could not be obtained directly from donors, data from 2003 were used as a preliminary estimate. Data were obtained from all G7 and EC governments except Japan; data from Japan are from 2003 and are considered to be a preliminary estimate only, mainly because of incomplete reporting of their 2004 bilateral contributions. Totals from the United Kingdom, while obtained directly, are also considered preliminary; United Kingdom policy is not to separate the resources for AIDS from sexual and reproductive health. Totals from the United Kingdom may include selected sexual and reproductive health activities but every attempt was made to review these to establish the proportionality focused on AIDS. Further analysis of these data must be conducted. For other members of the DAC, data were reported directly to UNAIDS by Australia, Finland, Ireland, Sweden and Switzerland; for Austria, Belgium, Denmark, Greece, Luxembourg, Netherlands, New Zealand, Norway, Portugal and Spain estimates were based on 2003 data provided either to UNAIDS[i] or to the OECD.

Final figures reported to the Development Assistance Committee (DAC) of the OECD for 2004 will be available by the end of 2005; OECD/DAC statistics might not match the reports by donor countries because in DAC statistics, "aid to HIV/AIDS control" is currently classified under the "population/reproductive health" sector under code 13040, exclusively, and as described above, potentially underestimating the multipurpose and multisector projects that include one part for HIV and AIDS but whose main purpose is not HIV/AIDS, as well as the non-health projects.

All 2004 figures were adjusted by average exchange rates in 2004 to obtain US$ equivalent for 2004, based on foreign exchange rate historical data available from the U.S. Federal Reserve[ii].

Methodology of the projection of resource availability for HIV and AIDS 2004–2007

Data on HIV/AIDS funding for 1996–2002 were used to estimate resources available 2004–2007 with the information available on pledges and commitments as of June 2004. This dataset included information on bilateral, nongovernmental organization, foundations and domestic sources of funding devoted to HIV/AIDS programming by country (donor and receiver), and year. Data were aggregated by region and subsequent estimates of the total resources available by region and year were calculated.

Additional data related to current expenditures and future commitments were collected from the Kaiser Family Foundation, the Global Fund, and the Regional AIDS Initiative for Latin America and the Caribbean (SIDALAC). For regions receiving funding from the U.S. President's Emergency Plan for AIDS, it was assumed that this would represent the majority of bilateral funding. For the other

regions, based on data from previous years, a 33% yearly increase in bilateral funding was assumed on the assumption that other donors would concentrate their new funding on countries not supported by the U.S. Emergency Plan and the Global Fund.. Global Fund resources were estimated using their data on approved grants and expected disbursements by region. Multilateral funds (primarily the World Bank with additional funds made available through the UNAIDS joint fundraising with its cosponsors) were assumed to remain constant. Nongovernmental organization and private foundation resources were also assumed to remain constant per region through 2007. This assumption was based on the fact that most of the new money that has already been committed will be managed through the other mechanisms (e.g. the Gates Foundation support to the Global Fund). Limited data exists for low- and middle-income countries (with the exception of Latin America). The under-reporting revealed by the Latin American country case studies was applied worldwide, as was the growth rate in domestic spending (conservative estimate as the epidemic is growing more slowly in Latin America than in other regions). It is estimated that the largest share of sources of funding will come from bilateral donors mostly driven by the U.S. Emergency Plan (75% of total bilateral funds for 2007). The share of domestic resources would decrease as bilateral funding grows, but the absolute amount would be 46% greater in 2007 than in 2003. Overall, a 100% increase in total resource availability is estimated from 2003 to 2007.

Based on these projections, resources available would increase from approximately US$ 8.2 billion in 2005 to US$ 10 billion in 2007, with an estimated US$ 7 billion from bilateral and multilateral sources expected in 2007.

[i] UNAIDS/PCB(14)/03, Table3/figure 5, page 8.
[ii] U.S. Federal Reserve, H. 10 Release (release date of June 6, 2005; http://www.federalreserve.gov/releases/h10/Hist/dat00_eu.htm)

UNAIDS, the Joint United Nations Programme on HIV/AIDS, brings together the efforts and resources of ten UN system organizations to the global AIDS response. Cosponsors include UNHCR, UNICEF, WFP, UNDP, UNFPA, UNODC, ILO, UNESCO, WHO and the World Bank. Based in Geneva, the UNAIDS secretariat works on the ground in more than 75 countries worldwide.

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