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Scaling up priority HIV/AIDS interventions in the health sector

Progress Report 2008

World Health Organization

UNAIDS
JOINT UNITED NATIONS PROGRAMME ON HIV/AIDS
UNHCR UNICEF WFP UNDP UNFPA UNODC ILO UNESCO WHO WORLD BANI

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TABLE OF CONTENTS

FOREWORD

Two years ago at the United Nations General Assembly High-Level Meeting on AIDS, countries committed to reaching as close as possible to the goal of universal access to HIV prevention, treatment, care and support by 2010. In this report, as we approach 2010, we assess how far we have come. Progress in the health sector is a key measure of progress towards universal access. This second annual report on the global health-sector response to HIV reveals impressive achievements as well as ongoing challenges in meeting our goals.

Increased political commitment and allocation of resources are having an effect in the most severely burdened countries. By the end of 2007, nearly 1 million more people were receiving antiretroviral therapy than in 2006, and the world had met the "3 by 5" target of providing antiretroviral therapy to 3 million people in low- and middle-income countries – a target many people predicted was unachievable when the initiative was launched in 2003. With the unprecedented scale-up of treatment, people living with HIV are living longer and have a better quality of life.

The report also documents encouraging trends in providing health services targeting women and children. More mothers have access to interventions to prevent transmission to their infants, and more children living with HIV are benefiting from treatment and care programmes.

Despite this progress, much remains to be done. As we look ahead, it is clear that – even at the increased pace of scale-up – most countries will not meet the goal of universal access by 2010. Most people living with HIV remain unaware of their HIV status. As many as 6800 people are newly infected with HIV every day because of poor access to affordable, proven interventions to prevent HIV transmission, yet only about 2700 additional people receive antiretroviral therapy per day. The HIV/TB co-epidemic, one of the most serious consequences of the spread of HIV, has been further complicated by the emergence of multidrug-resistant and extensively drug-resistant TB. Despite the substantial progress in access to treatment, more than two thirds of people in need are being left behind, while still others are being lost to follow-up after initiating treatment.

Three challenges require urgent and concrete action: ensuring the sustainability of the response; building stronger health systems; and generating high-quality strategic information. To sustain our efforts, we need more financial and technical resources over the long term to maintain people on treatment and prevent new HIV infections. Countries require strong health systems and skilled human resources to deliver services. Expanding HIV programmes represents an opportunity to promote innovative models of integrating HIV interventions into the primary health care system and to strengthen the health system as a whole, including its infrastructure and laboratory capacity. Finally, countries need information to monitor their achievements and improve outcomes. "What gets measured gets done."

By committing to universal access, the international community has embarked on an ambitious, long-term commitment to reducing new infections, disease and mortality. The challenges ahead are daunting, but our collective efforts are showing positive results. Together, we have an opportunity to turn one of the greatest public health initiatives in history into a lasting public health success.

Margaret Chan
Director-General
World Health Organization

Peter Piot
Executive Director
UNAIDS

Ann M. Veneman
Executive Director
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EXECUTIVE SUMMARY

The main messages of this report are the following.

- The combined efforts of countries and international partners have resulted in substantial, ongoing progress towards providing HIV interventions in low- and middle-income countries.

- Access to antiretroviral therapy for advanced HIV infection is increasing at an accelerating pace in low- and middle-income countries. About 3 million people [2 700 000–3 280 000 people] were receiving antiretroviral therapy at the end of 2007, nearly 950 000 more compared with the end of 2006 and a 7.5-fold increase during the past four years.

- Despite progress, antiretroviral therapy coverage remains low: only 31% [27–34%] of people in need were receiving antiretroviral therapy in 2007. That same year, an estimated 2.5 million people were newly infected with HIV.

- Estimates of need and coverage are derived from statistical models. The parameters used for estimating need and coverage in 2007 differ from those used in previous years due to improvements in methods. For this reason, comparing the estimates of need and coverage published in this report with those published in previous progress reports is inappropriate.

- The decreases in mortality and morbidity rates among people receiving antiretroviral therapy in low- and middle-income countries are comparable to those in high-income countries. However, many countries still face significant challenges. These include higher mortality in the six months following the initiation of treatment, and insufficient retention rates.

- Tuberculosis continues to be the leading cause of death among people living with HIV. Access to interventions for people living with HIV/TB is falling short because many people with TB do not know their HIV status. Rates of coinfection with hepatitis B and C viruses are high, especially among injecting drug users. The prevalence of hepatitis C virus among injecting drug users living with HIV has been estimated to range between 72% and 95% in some countries.

- Countries are increasingly relying on diverse client- and provider-initiated strategies to expand knowledge of HIV status. The availability of HIV testing and counselling in health facilities increased substantailly between 2006 and 2007 in countries with comparable data, accompanied by an increase in the number of people who received HIV testing and counselling. However, a large majority of the people living with HIV remain undiagnosed and are lacking opportunities to access adequate prevention, treatment, care and support services.

- Successful examples of HIV prevention among high-risk populations such as sex workers and their clients, injecting drug users, men who have sex with men and prisoners, have been implemented in multiple settings. Further efforts are needed to scale up access to prevention interventions, to strengthen surveillance and monitoring and to ensure that policies and legislation create an environment that encourages the effective delivery of health services.

- Research has now unequivocally demonstrated that male circumcision is an important additional health sector intervention that reduces the risk of heterosexually acquired HIV infection among men by 60%. Many countries in sub-Saharan Africa with high rates of HIV transmission and low rates of male circumcision are exploring whether, and how, to scale up male circumcision. However research exploring alternative prevention technologies has yielded mixed results. Trials of female microbicides, preventive vaccines and suppression of herpes simplex virus genital infections have failed to show efficacy.

- There has been substantial progress in scaling up access to services for the prevention of mother-to-child transmission. A growing number of pregnant women living with HIV have access to HIV testing and counselling services and are receiving antiretroviral drugs to prevent transmission to their children. In 2007, 33% of pregnant women living with HIV in low- and middle-income countries received antiretroviral drugs to prevent transmission to their children versus 10% in 2004. However, only 12% of pregnant women living with HIV identified during antenatal care were assessed for their eligibility to receive antiretroviral therapy for their own health.

- Today, more children are accessing care and treatment services than in previous years. In 2007, nearly 200 000 children with HIV in low- and middle-income countries received antiretroviral therapy versus 127 000 in 2006. However, the difficulty of diagnosing HIV early among infants remains an obstacle to further gains.

- Despite substantial progress in 2007, most low- and middle-income countries are still far from achieving universal access goals. Obstacles include weak health care systems, a critical shortage of human resources and a lack of sustainable, long-term funding. Countries also require monitoring systems to track progress and increase the effectiveness and impact of HIV programmes.

1. INTRODUCTION

Tracking progress in the health sector towards achieving universal access

The objective of this report is to monitor global progress in the health sector as it scales up HIV prevention, treatment and care interventions towards universal access *(1,2)*.

The current report is the second in a series of annual progress reports developed by the World Health Organization (WHO), the Joint United Nations Programme on HIV/AIDS (UNAIDS) and the United Nations Children's Fund (UNICEF) in partnership with other international monitoring and reporting mechanisms to monitor the response of the health sector to HIV. It follows the 2007 progress report *(3)* and previous "3 by 5" reports that charted the scaling up of antiretroviral therapy *(4–7)*.

This report includes a focus on women and children. It incorporates data collected by UNICEF and WHO on behalf of the Expanded Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children *(8)*.

Although all sectors of society have important contributions to make in achieving universal access targets, the health sector plays a key role in the response to the epidemic. The health sector is wide-ranging and includes: organized public and private health services (including those for health promotion, disease prevention, diagnosis, treatment and care); health ministries; nongovernmental organizations; community groups; professional associations; as well as institutions that directly input into the health care system, such as the pharmaceutical industry and teaching institutions *(9)*. Recent estimates indicate that the health sector alone represents at least 55% of the resources required for the global response to HIV/AIDS *(10)*.

The report reviews progress in the following areas:

- treatment and care for people living with HIV: antiretroviral therapy, care and management of HIV/TB coinfection and other comorbidity;
- HIV testing and counselling;
- health sector interventions to prevent sexual transmission, transmission through injecting drug use, mother-to-child transmission and transmission in health care settings; and
- health systems and HIV: human resources, drug procurement and supply management and health information.

Each of these health-sector interventions represents a key area in which countries must invest to achieve universal access to HIV prevention, treatment, care and support.

1.1 Background

By the end of 2007, an estimated 33.2 million [30.6 million–36.1 million] people were living with HIV, of whom 2.1 million [1.9 million–2.4 million] were children. An estimated 2.5 million [1.8 million–4.1 million] people were newly infected in 2007, and 2.1 million [1.9 million–2.4 million] died from AIDS. About two thirds of all people with HIV live in sub-Saharan Africa *(11)*.[1]

The international community has intensified its commitment and efforts to address the HIV epidemic in recent years. In 2001, the United Nations convened a special session on HIV/AIDS and, for the first time in history, agreed to a set of global targets in response to a rapidly escalating global public health crisis *(12)*. In 2006, at the second United Nations General Assembly High Level Meeting on HIV/AIDS, countries agreed to work towards the goal of "universal access to comprehensive prevention programmes, treatment, care and support" by 2010 *(2)*. These global commitments complement the health-related United Nations Millennium Development Goals *(13)*, which established targets to reduce child mortality, improve maternal health and combat HIV/AIDS, malaria and other major diseases by 2015.

Although recent epidemiological estimates remain a daunting obstacle to progress, increased global political commitment and financial investment are having a positive impact. Increasing numbers of people have access to HIV prevention, treatment, care and other interventions. Expanded access to antiretroviral therapy has reduced morbidity and mortality to an extent discernible at a population level, and evidence is mounting that prevention programmes are resulting in behaviour change and declining HIV prevalence in several high-burden countries *(11)*.

However, although significant resources have been allocated to the HIV response in recent years (Box 1.1), evidence indicates that many countries are far from achieving universal access goals. Countries continue to face a number of challenges in expanding and sustaining the response to HIV. These include weak health systems, a critical shortage of human resources and lack of long-term sustained financing.

At the end of 2007, the annual gap between the required and available financial resources necessary to achieve universal access goals was estimated to be US$ 8.1 billion. To meet targets, available financial resources must more than quadruple by 2010 from the 2007 level – up to about US$ 35 billion. Projections reveal that funding would need to increase to US$ 41 billion by 2015 *(10)*.[2]

1 Updated estimates will be published in mid-2008.

2 The figures presented in this report have been adjusted to take into account the revised global estimates in the HIV epidemic after September 2007.

Box 1.1. Global AIDS funding architecture

Political commitment to scale up the response to HIV has been accompanied by increased allocation of financial resources made available through an evolving global funding architecture.

Domestic funding

Domestic resources cover a significant proportion of the cost of scaling up towards universal access. National heath care funding could supply roughly one third of the amount necessary to close the gap between the required and available resources. External sources will be required to cover the remaining two thirds (10).

Multilateral funding

Multilateral organizations have increased their HIV investment during the past several years. The Global Fund to Fight AIDS, Tuberculosis and Malaria currently provides 20% of all funding for the response to HIV/AIDS *(14)*. It has continued to expand grants allocated for HIV prevention, treatment and care programmes and succeeded in securing commitments for increased investment from donor countries in 2007.

The World Bank has committed about US$ 2 billion through grants, loans and credits for programmes for the response to HIV/AIDS since 2001. The Bank's Multi-Country HIV/AIDS Program for Africa *(15)*, launched in September 2000, has committed US$ 1.2 billion to 29 countries for the response to HIV/AIDS.

UNITAID, an international drug purchasing facility launched in 2006, provides sustainable, long-term funding for HIV/AIDS, tuberculosis (TB) and malaria drugs and diagnostics. UNITAID is financed primarily from the proceeds of a tax on airline tickets. The budget of UNITAID exceeded US$ 320 million in 2007 and included funding for the purchase of antiretroviral medicine for children, second-line antiretroviral medicines and drugs and diagnostics to prevent transmission from mother-to-child *(16)*.

Bilateral funding

Funding commitments from bilateral donors have also increased significantly. Members of the Development Action Committee of the Organization for Economic Cooperation and Development (OECD)[3] more than tripled their funding for HIV/AIDS programmes between 2000 and 2006, increasing at an average annual rate of 24% *(17)*. In 2005–2006, annual aid commitments to HIV control by the Development Action Committee members totalled US$ 4.7 billion versus US$ 3 billion in 2003–2004.

The United States is the largest donor, contributing more than half of total bilateral aid to HIV in 2006 primarily via the United States President's Emergency Plan for AIDS Relief. The Plan, the world's largest bilateral AIDS programme, has been submitted to the United States Congress for reauthorization along with a request to more than double funding – to between US$ 37 billion and US$ 41 billion – over the next five years. Other major bilateral funding sources include the United Kingdom, whose share in the total represents 12%; and Canada, France, Germany, the Netherlands and Sweden, whose contributions together represent another 20% of the total contribution from members of the Development Action Committee.

Sub-Saharan Africa accounted for 57% of total bilateral aid flows for controlling HIV/AIDS in 2004–2005. The top 10 aid recipients were the United Republic of Tanzania, South Africa, Uganda, India, Kenya, Zambia, Ethiopia, Mozambique, the Democratic Republic of the Congo and Nigeria.

Private-sector funding

Private foundations such as the Bill & Melinda Gates Foundation and the William J. Clinton Foundation have also contributed significantly to the response to HIV/AIDS over the past several years.

3 The members of the Development Action Committee are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Ireland, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States and the Commission of European Communities.

1.2 Data sources and methods

This report has several sources of information. The first is the framework developed by WHO to monitor progress in the health sector as it scales up towards universal access *(18)*. The framework includes 39 indicators designed to measure the availability, coverage and impact of high-priority HIV interventions delivered by the health sector. The framework is also used to monitor key health system components required to support scale-up, including procurement, supply management and human resources. WHO collected data from countries through a questionnaire based on the framework (Box 1.2).

The second source of information is the Report Card on Prevention of Mother-To-Child Transmission of HIV and Paediatric HIV Care and Treatment in Low- and Middle-income Countries, issued jointly by UNICEF and WHO on behalf of the Expanded Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children. The Report Card includes a set of indicators for monitoring the progress of national programmes to prevent HIV infection among infants and young children *(8)*.

Both reporting tools have shared indicators that were developed in coordination with the reporting process for the United Nations General Assembly Special Session on HIV/AIDS to harmonize data collection at the country level. UNAIDS, UNICEF, WHO and other partners work with national governments to include these indicators in national monitoring systems.

At the country level, health ministries administer data collection in collaboration with the country offices of WHO, UNICEF and other implementing partners. Aggregate data at the global level are cross-validated and reconciled with data collected by international partners, including bilateral and multilateral organizations (see explanatory notes to statistical annexes).

Data collected through UNAIDS, UNICEF and WHO are supplemented by data from other surveys (such as on drug pricing and utilization and surveillance of drug resistance), more detailed population-based surveys *(21)*, special studies and grey literature. The report also presents relevant evidence from recent scientific literature.

Box 1.2. Monitoring progress towards universal access

In defining "universal access", WHO, UNAIDS and their partners recognize that even high-income countries with well-developed infrastructure have difficulty in reaching 100% of the people who need interventions. As recently as 2005, only 55% of the people who needed antiretroviral therapy in the United States received it *(19)*.

"Access" is a broad concept that measures three dimensions of key health sector interventions: availability, coverage and outcome and impact.

- Availability is defined in terms of the reachability (physical access), affordability (economic access) and acceptability (sociocultural access) of services that meet a minimum standard of quality.[4] Making services available, affordable and acceptable is an essential precondition for universal access.
- Coverage is defined as the proportion of the people needing an intervention who receive it. Coverage is influenced by supply (provision of services) and by the demand from those who need services.
- Outcome and impact are defined in terms of behavioural change, lower infection rates or higher survival rates. Outcome and impact are the result of coverage, modulated by the efficiency and effectiveness of interventions.

In addition to the availability, coverage and outcome and impact of interventions, other aspects also determine the attainment of universal access, including whether the services are provided in an equitable manner and their quality, acceptability and effectiveness.

The data on the coverage of antiretroviral therapy and services for preventing mother-to-child transmission presented in this report cannot be compared with the data published in previous reports *(3–7)* owing to a change in the methods used to estimate the need. Sections 2 (Box 2.1) and 5 (Box 5.6) provide more details.

4 "Access", "utilization", "availability" and "coverage" are often used interchangeably to indicate whether people who need something for their health are actually getting it *(20)*.

1.3 Structure of the report

The report is structured as follows.

Section 1 outlines the objectives of the report and the methods and definitions used to track progress towards universal access.

Section 2 presents global progress towards scaling up access to treatment and care for people living with HIV.

Section 3 presents global progress towards scaling up HIV testing and counselling.

Section 4 presents global progress towards scaling up health sector interventions for HIV prevention.

Section 5 presents global progress towards scaling up HIV services for women and children, including those aimed at preventing mother-to-child transmission.

Section 6 summarizes available information on strengthening health systems and investing in strategic information aimed at guiding the response.

Section 7 identifies the main challenges and the way forward.

The statistical annexes contain detailed tables outlining the global coverage of antiretroviral therapy and prevention of mother-to-child transmission.

References

1. *HIV/AIDS. WHO's contribution to universal access to HIV/AIDS prevention, treatment and care: report by the Secretariat*. Geneva, World Health Organization, 2006 (World Health Assembly document A59/39; http://www.who.int/gb/e/e_wha59.html, accessed 5 May 2008).
2. United Nations General Assembly. *Political Declaration on HIV/AIDS*. New York, United Nations, 2006 (United Nations General Assembly document 60/262; http://www.unaids.org/en/AboutUNAIDS/Goals/UNGASS, accessed 5 May 2008).
3. WHO, UNAIDS and UNICEF. *Towards universal access: scaling up priority HIV/AIDS interventions in the health sector. Progress report, April 2007*. Geneva, World Health Organization, 2007 (http://www.who.int/mediacentre/news/releases/2007/pr16/en/index.html, accessed 5 May 2008).
4. WHO and UNAIDS. *Progress on global access to HIV antiretroviral therapy: a report on "3 by 5" and beyond. March 2006*. Geneva, World Health Organization, 2006 (http://www.who.int/mediacentre/news/releases/2006/pr13/en/index.html, accessed 5 May 2008).
5. WHO and UNAIDS. *Progress on global access to HIV antiretroviral therapy: an update on "3 by 5" – June 2005*. Geneva, World Health Organization, 2005 (http://www.who.int/3by5/publications/progressreport/en, accessed 5 May 2008).
6. WHO and UNAIDS. *"3 by 5" progress report: December 2004*. Geneva, World Health Organization, 2005 (http://www.who.int/3by5/publications/progressreport/en, accessed 5 May 2008).
7. WHO and UNAIDS. *3 by 5 progress report: December 2003 through June 2004*. Geneva, World Health Organization, 2004 (http://www.who.int/3by5/publications/progressreport/en, accessed 5 May 2008).
8. *A report card on prevention of mother-to-child transmission of HIV and paediatric HIV care and treatment in low- and middle-income countries: scaling up progress from 2004 to 2005*. New York, Expanded Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children, 2007 (http://www.unicef.org/aids/index_documents.html, accessed 5 May 2008).
9. *Towards universal access by 2010: how WHO is working with countries to scale-up HIV prevention, treatment, care and support*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/advocacy/universalaccess/en/index.html, accessed 5 May 2008).
10. *Financial resources required to achieve universal access to HIV prevention, treatment, care and support*. Geneva, UNAIDS, 2007 (http://www.unaids.org/en/KnowledgeCentre/Resources/FeatureStories/archive/2007/20070925_Resources_needs.asp, accessed 5 May 2008).
11. *2007 AIDS epidemic update*. Geneva, UNAIDS/WHO, 2007 (http://www.unaids.org/en/KnowledgeCentre/HIVData/EpiUpdate/EpiUpdArchive/2007, accessed 5 May 2008).
12. United Nations General Assembly. *Declaration of Commitment on HIV/AIDS*. New York, United Nations, 2001 (http://www.unaids.org/en/AboutUNAIDS/Goals/UNGASS, accessed 5 May 2008).
13. *United Nations Millennium Development Goals*. New York, United Nations, 2001 (http://www.un.org/millenniumgoals, accessed 5 May 2008).
14. *Communiqué: the Global Fund's Second Replenishment (2008–2010)*. Geneva, Global Fund to Fight AIDS, Tuberculosis and Malaria, 2007 (http://theglobalfund.org/en/about/replenishment/berlin, accessed 5 May 2008).
15. *Multi-Country HIV/AIDS Program*. Washington, DC, World Bank, 2008 (http://go.worldbank.org/I3A0B15ZN0, accessed 5 May 2008).
16. UNITAID budget [web site]. Geneva, UNITAID, 2008 (http://www.unitaid.eu/en/UNITAID-budget.html, accessed 5 May 2008).
17. *Creditor reporting system: aid activities in support of HIV/AIDS control 2000–2007*. Paris, Organisation for Economic Co-operation and Development, 2007.
18. *Monitoring and reporting on the health sector's response towards universal access to HIV/AIDS treatment, prevention, care and support, 2007–2010*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/universalaccess2010/UAframework_Final%202Nov.pdf, accessed 5 May 2008).
19. The global HIV/AIDS pandemic. *MMWR Morbidity and Mortality Weekly Report*, 2006, 55:841–844.
20. Tanahashi T. Health services coverage and its evaluation. *Bulletin of the World Health Organization*, 1978, 56:295–303.
21. Demographic and health surveys [web site]. Calverton, MD, MEASURE DHS, 2008 (http://www.measuredhs.com, accessed 5 May 2008).

2. TREATMENT AND CARE FOR PEOPLE LIVING WITH HIV

Key findings

- About 950 000 more people were receiving antiretroviral therapy at the end of 2007 compared with the end of 2006, reaching nearly 3 million people living with HIV receiving antiretroviral therapy.
- The greatest increase in the number of people receiving treatment was in sub-Saharan Africa.
- Despite these unprecedented gains, global coverage of antiretroviral therapy in low- and middle-income countries remains low (31% of the need).
- Treatment programmes are facing challenges related to high mortality in the early months of treatment and low rates of retention.
- Access to antiretroviral therapy among women is higher than or equal to access among men.
- About 97% of adults and children on therapy in low- and middle-income countries are receiving first-line antiretroviral drug regimens.
- The average price of second-line regimens remains high in low- and middle-income countries.
- Access to co-trimoxazole prophylaxis and antiretroviral therapy for people living with HIV/TB is falling short because many people with TB do not know their HIV status.

2.1 Antiretroviral therapy

Recent years have seen an unprecedented momentum to expand access to antiretroviral therapy in low- and middle-income countries and to reduce morbidity and mortality among people living with HIV. Countries are using simplified and standardized approaches to initiate, deliver and monitor treatment and are able to purchase antiretroviral drugs at increasingly lower prices. However, the number of people receiving antiretroviral therapy continues to fall short of the need, and new challenges are emerging as treatment is scaled up.

2.1.1 Global coverage of antiretroviral therapy

Access to antiretroviral therapy in low- and middle-income countries has continued to expand in recent years (Table 2.1). When the "3 by 5" initiative was launched in 2003, an estimated 400 000 people in low- and middle-income countries were receiving antiretroviral therapy *(1)*. Since then, increasing political commitments, resource mobilization and efforts by multiple stakeholders have resulted in a massive increase in the number of people receiving antiretroviral therapy.

Table 2.1. Estimated number of people receiving antiretroviral therapy, people needing antiretroviral therapy and percentage coverage in low- and middle-income countries according to region, December 2003 to December 2007[a]

Geographical region	Estimated number of people receiving antiretroviral therapy, December 2007 (range)[b]	Estimated number of people needing antiretroviral therapy, 2007 (range)[a]	Antiretroviral therapy coverage, December 2007 (range)[c]	Estimated number of people receiving antiretroviral therapy, December 2006 (range)[b]	Estimated number of people needing antiretroviral therapy, 2006 (range)[a]	Antiretroviral therapy coverage, December 2006 (range)[c]	Estimated number of people receiving antiretroviral therapy, December 2003 (range)[b]
Sub-Saharan Africa	2 120 000 [1 925 000–2 315 000]	7 000 000 [6 250 000–7 900 000]	30% [27%–34%]	1 375 000 [1 280 000–1 470 000]	6 700 000 [5 900 000–7 600 000]	21% [18%–23%]	100 000 [75 000–125 000]
Eastern and southern Africa	1 690 000 [1 560 000–1 820 000]	5 300 000 [4 700 000–6 000 000]	32% [28%–36%]	1 115 000 [1 050 000–1 180 000]	5 100 000 [4 400 000–5 700 000]	22% [20%–25%]	75 000 [56 000–94 000]
Western and central Africa	430 000 [370 000–490 000]	1 700 000 [1 400 000–2 100 000]	25% [20%–31%]	260 000 [230 000–290 000]	1 600 000 [1 400 000–2 100 000]	16% [12%–19%]	25 000 [19 000–31 000]
Latin America and the Caribbean	390 000 [350 000–430 000]	630 000 [550 000–770 000]	62% [51%–70%]	345 000 [305 000–385 000]	600 000 [510 000–740 000]	58% [47%–68%]	210 000 [160 000–260 000]
Latin America	360 000 [320 000–400 000]	560 000 [490 000–700 000]	64% [51%–73%]	325 000 [290 000–360 000]	530 000 [450 000–670 000]	61% [49%–72%]	206 000 [156 000–255 000]
The Caribbean	30 000 [25 000–35 000]	70 000 [60 000–80 000]	43% [38%–50%]	20 000 [15 000–25 000]	65 000 [50 000–75 000]	31% [27%–40%]	4 000 [3 000–5 000]
East, South and South-East Asia	420 000 [375 000–465 000]	1 700 000 [1 300 000–2 100 000]	25% [20%–32%]	280 000 [225 000–335 000]	1 600 000 [1 220 000–2 060 000]	18% [14%–23%]	70 000 [52 000–88 000]
Europe and Central Asia	54 000 [51 000–57 000]	320 000 [240 000–440 000]	17% [12%–22%]	35 000 [33 000–37 000]	260 000 [180 000–380 000]	13% [9%–19%]	15 000 [11 000–19 000]
North Africa and the Middle East	7 000 [6 000–8 000]	100 000 [70 000–135 000]	7% [5%–10%]	5 000 [4 000–6 000]	97 000 [66 000–130 000]	5% [4%–8%]	1 000 [750–1 250]
Total	2 990 000 [2 700 000–3 280 000]	9 700 000 [8 700 000–11 000 000]	31% [27%–34%]	2 040 000 [1 850 000–2 230 000]	9 300 000 [8 200 000–10 600 000]	22% [19%–25%]	400 000 [300 000–500 000]

Note: some numbers do not add up due to rounding.
a For an explanation of the methods used, see explanatory notes to Annex 1.
b Data on children – when available – are included.
c The coverage estimate is based on the estimated numbers of people receiving and needing antiretroviral therapy.

Close to 3 million people [2 990 000 people; range 2 700 000 – 3 280 000] were receiving antiretroviral therapy at the end of 2007. This represents a 7.5-fold increase in four years.

The year 2007 also saw an unprecedented annual increase in the number of people receiving antiretroviral therapy. About 950 000 more people were receiving antiretroviral therapy at the end of 2007 compared with the end of 2006, versus a corresponding increase of 750 000 in 2006 *(2)*. This represents an average monthly increase of 79 000 more people receiving antiretroviral therapy in 2007.

However, global coverage of antiretroviral therapy is still limited, reaching 31% [27–34%] of the 9.7 million [8.7 million–11.0 million] people in need at the end of 2007. In comparison, these percentages were 5% [4–6%] in 2003, 8% [7–10%] in 2004, 15% [13–17%] in 2005 and 22% [19–25%] in 2006. Box 2.1 explains recent revisions in estimates of treatment need.

Box 2.1. Estimating antiretroviral therapy need and coverage

Antiretroviral therapy coverage measures the proportion of people who need antiretroviral therapy that have access to it. The numerator (the number of people receiving antiretroviral therapy) is derived from national programme reporting systems, aggregated from health facilities or other service delivery sites. The denominator (the total number of people who need antiretroviral therapy) is generated using a standardized statistical modelling approach *(3)*. Estimating the number of people who need antiretroviral therapy raises some definition and measurement issues, which in turn influence estimates of coverage.

To estimate the number of people who need antiretroviral therapy in a country, WHO and UNAIDS use statistical modelling methods that include all people who meet treatment initiation criteria, whether or not these people know their HIV status and their eligibility for antiretroviral therapy. Hence the number of people who need antiretroviral therapy in a country includes:

- the people currently receiving antiretroviral therapy;
- the people who know they are HIV-positive and are eligible for antiretroviral therapy but do not have access to it;
- the people who do not know their HIV status but meet criteria for initiating treatment.

A comprehensive estimate of the number of people who need treatment should include all three categories of people mentioned above.

Estimation methods

Based on the recommendations of the UNAIDS Reference Group on Estimates, Modelling and Projections, UNAIDS and WHO have developed modelling methods and tools to generate country estimates of the magnitude of the epidemic and key impact indicators, including mortality *(3)*. Treatment needs are estimated using a statistical software package called Spectrum *(4)*. The tool takes into consideration epidemiological surveillance data and key assumptions (including adult prevalence over time, average survival of people living with HIV with and without antiretroviral therapy and average time between seroconversion and eligibility for antiretroviral therapy) to generate estimates of treatment need. The estimation methods are regularly updated using new epidemiological and research data and improved methods.

Some countries have developed their own method for estimating treatment need, which could differ from the estimates derived using UNAIDS/WHO methods. For example, some countries do not include the third category of people mentioned above (the people who do not know their HIV status but meet criteria for initiating treatment) in their estimates of treatment need, which incompletely represents the progress that needs to be made to achieve universal access.

To analyse and compare antiretroviral therapy coverage across countries, this report uses standardized estimates of treatment need derived using UNAIDS/WHO methods. The software is used to generate ranges around estimates for antiretroviral therapy need. Depending on the quality of surveillance data, the ranges can be very large in some countries. The point estimate is used to calculate coverage.

Annex 1 reports alternative estimates of needs based on individual country methods.

New parameters in estimation methods in 2007

The global, regional and country estimates of treatment need published in this report cannot be compared with the 2006 estimates published in 2007 due to new parameters in the estimation model. In 2006, the UNAIDS Reference Group on Estimates, Modelling and Projections recommended changes in various parameters in the estimation method based on new evidence. Specifically, the Reference Group recommended that the net survival time from seroconversion to death in the absence of antiretroviral therapy be increased from 9 years to 11 years, with the time from seroconversion to antiretroviral therapy eligibility revised to 8 (instead of 7) years and the time from antiretroviral therapy eligibility to death revised to 3 (instead of 2) years. These revised parameters,

together with an increasing number of people receiving antiretroviral therapy, has resulted in a substantial increase in the estimates of the total number of people who need antiretroviral therapy. In 2007, 9.7 million [8.7 million–11.0 million] people are estimated to need antiretroviral therapy. When the revised parameters are applied retrospectively to the previous year, 9.3 million [8.2 million–10.6 million] people are estimated to have needed antiretroviral therapy in 2006, instead of 7.1 million as published last year. Based on these new estimates, global coverage in 2006 was 22% [19–25%] instead of 28% [24–34%] as previously published.

In the years to come, the estimation of treatment need will continue to evolve due to changes in treatment guidelines, estimation methods and trends in the epidemic, rendering comparisons of coverage difficult.

Changes in treatment guidelines
WHO guidelines currently recommend: prescribing antiretroviral therapy to everyone with a clinical condition indicative of WHO clinical stage 4 irrespective of CD4 cell count; prescribing antiretroviral therapy to everyone with a CD4 cell count under 200 cells per mm3 irrespective of the clinical stage; and considering prescribing antiretroviral therapy when the CD4 cell count is below 350 cells per mm^3 and the person has clinical stage 3 disease *(5)*. Future changes in such recommendations would influence the estimates of treatment need.

The expanding epidemic
Despite prevention efforts, 2.5 million [1.8 million–4.1 million] people were infected in 2007, and this number was above 3.0 million in the late 1990s and early 2000s. With an average period of eight years between HIV infection and treatment eligibility, between 2.5 million and 3.0 million additional people will therefore newly need treatment each year in the coming years. This total must be added to the increasing number of people who are currently receiving treatment or are eligible based on WHO guidelines.

The greatest increase in the number of people receiving treatment in 2007 was in sub-Saharan Africa (Fig. 2.1 and 2.2). About 2 120 000 [1 925 000–2 315 000] people were receiving antiretroviral therapy at the end of 2007 in sub-Saharan Africa versus 1 375 000 [1 280 000–1 470 000] people in 2006. This represents an increase of 54% in one year in this region. Regional antiretroviral therapy coverage was 30% [27–34%] in 2007 versus 21% [18–23%] in 2006 and just 2% in 2003. Coverage is higher in eastern and southern Africa (32% [28–36%]) than in western and central Africa (25% [20–31%]). Sub-Saharan Africa represents 71% of the estimated total treatment need in low- and middle-income countries and 72% of the total number of people receiving treatment at the end of 2007.

In East, South and South-East Asia, an estimated 420 000 [375 000–465 000] people were receiving antiretroviral therapy at the end of 2007. Regional antiretroviral therapy coverage was 25% [20–32%] in 2007 versus 18% [14–23%] in 2006. This represents an increase of 51% in the number of people receiving antiretroviral therapy in one year in this region and a 6-fold increase over the 70 000 [52 000–88 000] people receiving treatment at the end of 2003. East, South and South-East Asia represents around 18% of the estimated total treatment need in low- and middle-income countries and 14% of the total number of people receiving treatment at the end of 2007.

About 390 000 [350 000–430 000] people were receiving antiretroviral therapy in Latin America and the Caribbean in December 2007, representing coverage of around 62% [51–70%] in this region versus 58% [47–68%] in 2006. The number of people receiving treatment in this region increased slightly in one year (13%). However, many countries in the region have already reached a high level of coverage, which limits their capacity to generate a large increase within one year. Latin America and the Caribbean represents only 6.5% of the estimated total treatment need in low- and middle-income countries but 13% of the total number of people receiving treatment at the end of 2007.

In Europe and Central Asia, 54 000 people [51 000–57 000] people were receiving antiretroviral therapy at the end of 2007 versus only 15 000 people at the end of 2003. Between 2006 and 2007, about 54% more people received antiretroviral therapy. Regional antiretroviral therapy coverage was 17% [12–22%] at the end of 2007. Europe and Central Asia represent 3% of the estimated total treatment need in low- and middle-income countries and about 2% of those reported to be receiving treatment.

North Africa and the Middle East has the lowest regional coverage: 7% [5–10%] versus 5% [4–8%] in 2006. An estimated 7000 [6000–8000] people were receiving treatment at the end of 2007, while 100 000 [70 000–135 000] people were in need. Progress in this region depends largely on scale-up in Sudan, which accounts for 87% of treatment need but has only 1% coverage.

Fig. 2.1. Antiretroviral therapy coverage in sub-Saharan Africa, 2003–2007

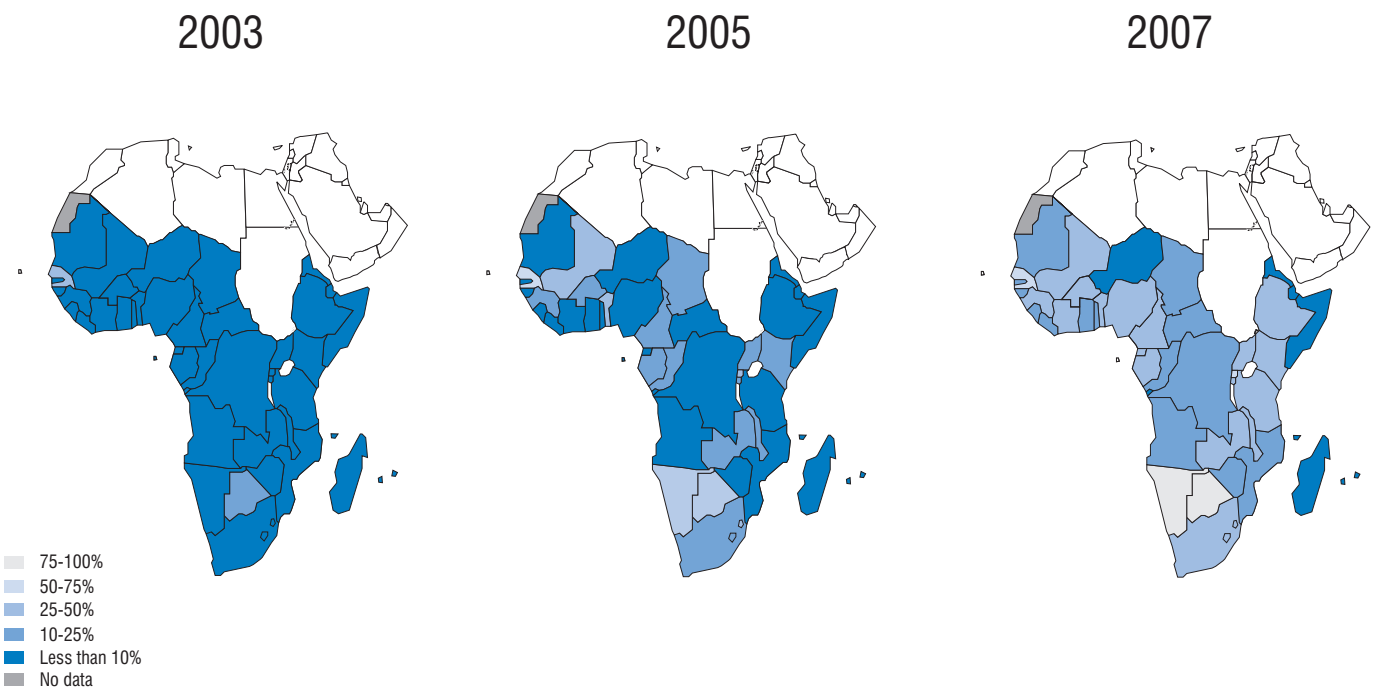
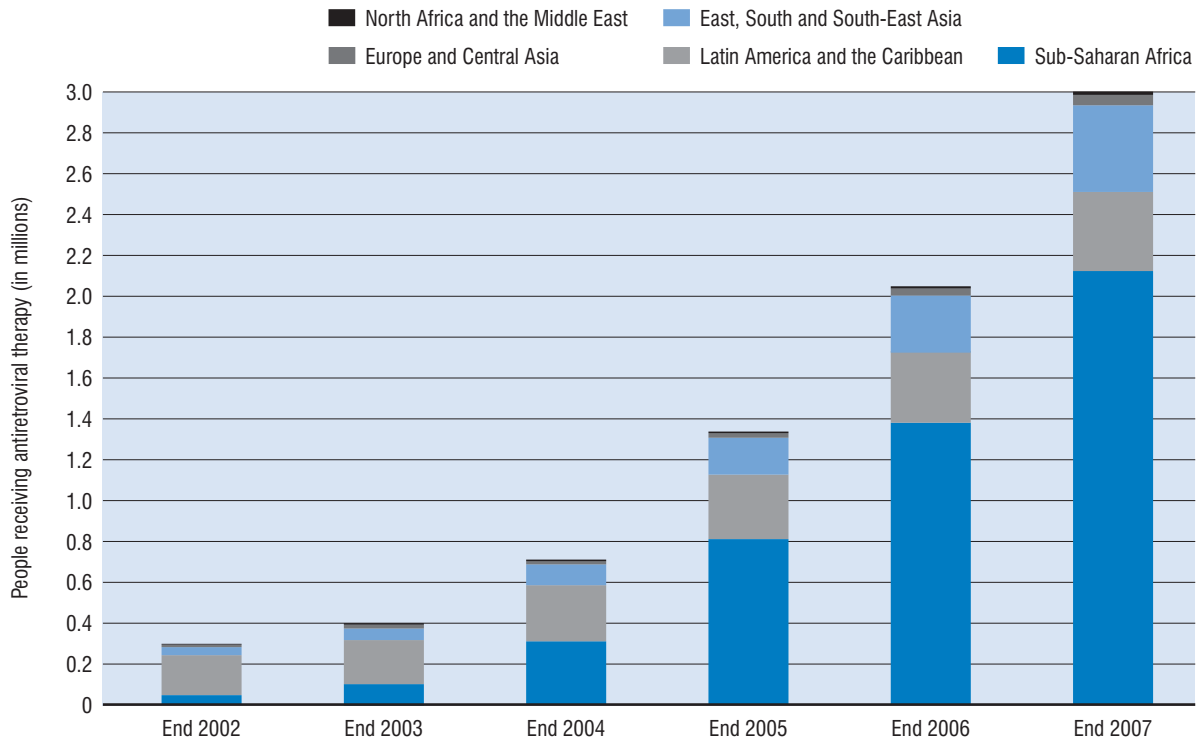


Fig. 2.2. Number of people receiving antiretroviral therapy in low- and middle-income countries, 2002–2007



At the end of 2007, 47 low- and middle-income countries were providing antiretroviral therapy to at least 31% of the people in need (the global average for low- and middle-income countries, including adults and children). Eleven countries achieved coverage of 50–75% of the people in need and nine countries achieved a coverage level of at least 75% of the people in need (Table 2.2).

Fifteen countries accounted for 75% of the 3 million people receiving treatment in low- and middle-income countries in 2007 (Fig. 2.3). Some of these countries substantially increased the number of people receiving treatment in 2007 as compared with 2006, with rates of increase exceeding 100% in three countries (Mozambique, Nigeria and the United Republic of Tanzania). Despite this progress, treatment in many of these countries remains well below the estimated need. Coverage exceeded 50% in 4 of these 15 countries (Botswana, Brazil, Namibia and Thailand), while in Ethiopia, Mozambique, Nigeria, South Africa and Zimbabwe, coverage was below the global average for low- and middle-income countries (below 31%, including adults and children).

In addition to the 3 million people receiving antiretroviral therapy in low- and middle-income countries at the end of 2007, an estimated minimum of 600 000 people were receiving antiretroviral therapy in high-income countries. However, obtaining an accurate estimate of this figure is difficult as many high-income countries do not collect and report this information systematically.

The Global Fund to Fight AIDS, Tuberculosis and Malaria and the United States President's Emergency Plan for AIDS Relief are major sources of funding for antiretroviral therapy programmes in low- and middle-income countries. The Global Fund estimates that its funding supported the provision of treatment to 1 448 000 people at the end of 2007. Programmes financed by the United States President's Emergency Plan for AIDS Relief are estimated to have supported the provision of treatment to 1 445 500 people. As about 910 000 people were receiving treatment through programmes jointly financed by the two initiatives, they were together supporting the provision of treatment to almost 2 million people at the end of 2007.

2.1.2 Expanding the availability of antiretroviral therapy

The number of sites delivering antiretroviral therapy is an important variable in assessing progress in scale-up and indicates the volume of people receiving antiretroviral therapy per site across regions. In 2007, globally, about 10 000 sites provided antiretroviral therapy in 119 reporting countries.[1] This is more than twice the 4000 sites providing antiretroviral therapy in 2005. Of the 10 000 sites, about 4200 were in sub-Saharan Africa. The global average number of people who received antiretroviral therapy per site was about 300, but the number of people per site was higher in sub-Saharan Africa, with approximately 455 people per site. Although these figures are based on aggregate data and do not represent

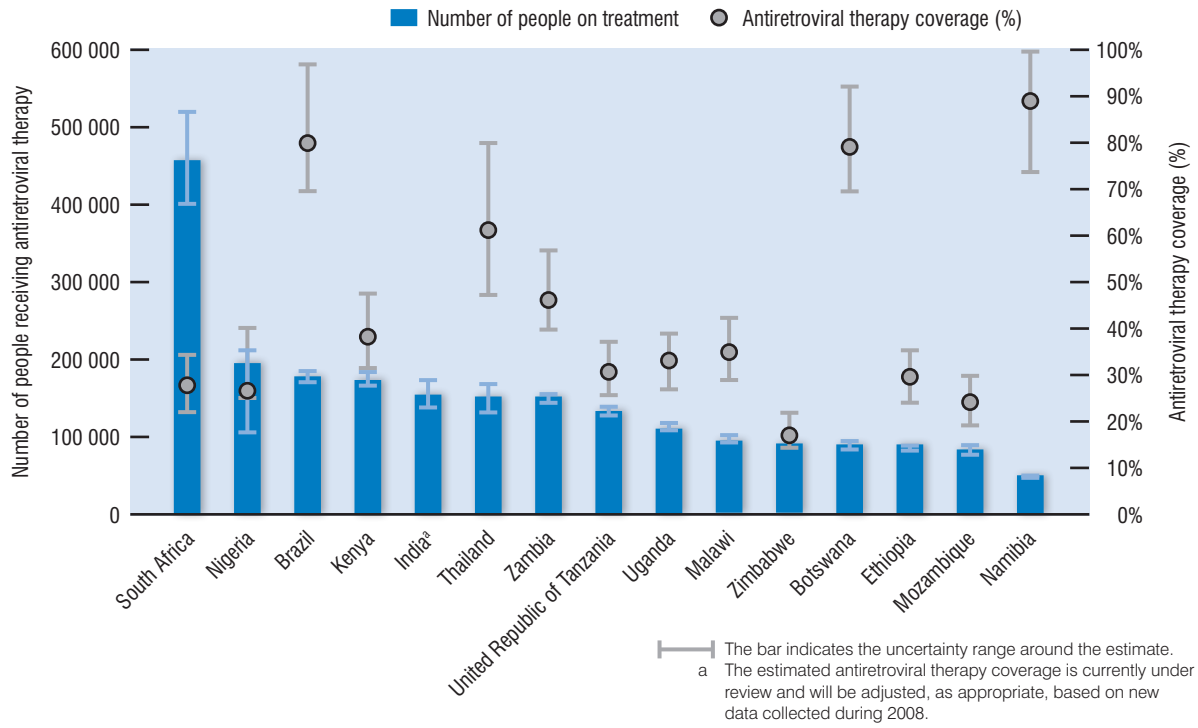
Table 2.2. Estimated antiretroviral therapy coverage of at least 31% in low- and middle-income countries, December 2007[a]

Countries with 31–50% antiretroviral therapy coverage (n = 27)		Countries with 50–75% antiretroviral therapy coverage (n = 11)	Countries with 75% or more antiretroviral therapy coverage (n = 9)
Belize	Malawi	Argentina	Bhutan[b]
Benin	Malaysia	Cambodia	Botswana
Burkina Faso	Mali	El Salvador	Brazil
Colombia	Morocco	Mexico	Chile
Dominican Republic	Papua New Guinea	Moldova[b]	Costa Rica
Ecuador	Peru	Panama	Cuba
Equatorial Guinea	Philippines	Romania	Georgia[b]
Gabon	Poland	Rwanda	Lao People's Democratic Republic[b]
Guatemala	Suriname	Senegal	Namibia
Guyana	Swaziland	Thailand	
Haiti	Uganda	Uruguay	
Honduras	United Republic of Tanzania		
Jamaica	Zambia		
Kenya			

a The overall antiretroviral therapy coverage for low- and middle-income countries is 31%.
b Countries with an estimated antiretroviral therapy need of less than 1000 people. The data for these countries should be interpreted cautiously.

1 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

Fig. 2.3. Antiretroviral therapy coverage in the 15 countries accounting for 75% of the 3 million people receiving treatment in low- and middle-income countries in 2007



the diversity of the sites delivering antiretroviral therapy in Africa, they do underscore ongoing challenges to both the health care workforce and health systems in delivering adequate care and treatment.

Efforts to scale up access to antiretroviral therapy have reinforced the need for a comprehensive public health approach at the district, national and international levels (Box 2.2).

Access to antiretroviral therapy for rural populations has been of rising concern, especially in low-income countries with generalized epidemics. Many rural populations live at great distances from the urban tertiary care sites that have been the focus of most antiretroviral therapy rollout to date.

Box 2.2. The public health approach to scaling up antiretroviral therapy

The public health approach addresses the health needs of a population based on the principles of simplification, standardization, decentralization, equity and participation by the people receiving antiretroviral therapy and the community *(6)*.

The main components of the public health approach to scaling up antiretroviral therapy are:
- standardizing regimens and simplifying formularies
- simplifying clinical decision-making and standardizing treatment monitoring
- standardizing management of toxicity and drug–drug interaction
- monitoring HIV drug resistance at the population level.

Implementing a public health approach to scaling up antiretroviral therapy requires:
- decentralized, integrated delivery of care
- task-shifting and specialized support
- antiretroviral therapy free of charge at the point of service delivery
- strengthened procurement and supply management
- tracking progress.

Increasing evidence indicates that decentralizing the delivery of HIV services and providing community support can facilitate the scaling up of antiretroviral therapy, even in the most resource-limited settings (Box 2.3). In South Africa, a programme delivering antiretroviral drugs through community health clinics in a rural area of KwaZulu-Natal resulted in meeting the needs of more than 60% of the people who need antiretroviral therapy after 24 months of programme initiation in a geographically dispersed rural population *(7)*. In another rural area of South Africa, delivering antiretroviral therapy through primary health care sites, using adherence counsellors to provide a broad range of services and integrating HIV services into other components of clinical care resulted in faster enrolment of individuals, better retention of individuals on treatment and 95% treatment coverage *(8)*.

In Ethiopia, the Ministry of Health began decentralizing the delivery of antiretroviral therapy to health centres in 2006, when hospital enrolment was insufficient to keep pace with treatment need.[2] Clinical teams in health centres were trained using the WHO Integrated Management of Adolescent and Adult Illness (IMAI) training tools for service delivery *(9)*. Currently, 210 health centres provide HIV care and antiretroviral therapy to 16 572 individuals, comprising 18% of the national total of 90 212 currently receiving antiretroviral therapy in Ethiopia *(10)*.

2.1.3 Equity in access to antiretroviral therapy

Equity in treatment access for women living with HIV has been a concern, given the social and economic inequity between women and men globally as well as the greater biological risk of HIV infection that women face relative to men *(12)*.

Available data from 57 low- and middle-income countries, representing 87% of the people receiving antiretroviral therapy and 88% of those in need, suggests that, overall, women are not disadvantaged in access to antiretroviral therapy. At the end of 2007, 56% of people receiving antiretroviral therapy were women, while they represented 52% of people in need.

In sub-Saharan Africa, data from 32 countries (representing 98% of the people receiving antiretroviral therapy in the region and 97% of regional need) reveal that 61% of the people receiving antiretroviral therapy in this region were female, while they represent 57% of the people in need. In other regions, the respective values for countries with available data were 36% and 32% in Latin America and the Caribbean, 39% and 34% in East, South and South-East Asia and 41% and 36% in Eastern Europe and Central Asia.

Box 2.3. Providing antiretroviral therapy in a conflict setting: the example of Uganda

The Acholi, Lango and Karamoja subregions of Uganda have been facing civil conflict for the past 20 years, resulting in a breakdown of health infrastructure and a large internally displaced population living in camps. The HIV prevalence in these regions is high; the results of recent surveys have indicated that the HIV prevalence in Acholi and Lango is 8.3% versus the national average of 6.3% *(11)*.

Since 2004, the Ministry of Health, local government institutions, international donors, United Nations agencies and nongovernmental organizations have implemented a joint programme for scaling up the delivery of health services among internally displaced populations in affected areas. The programme includes increasing access to HIV testing and counselling, condoms, HIV care and treatment and social support to vulnerable populations in camps for internally displaced people. As a result of these efforts, the coverage of antiretroviral therapy in Acholi and Lango increased from 1228 people receiving treatment in 5 sites in 2004 to 9994 people in 35 sites at the end of 2007. In Karamoja, the number of people receiving antiretroviral therapy increased from 33 in 2004 to 456 in 2007. However, national estimates indicate that the total number of people currently receiving antiretroviral therapy represents only 39% of the people in need in these two subregions.

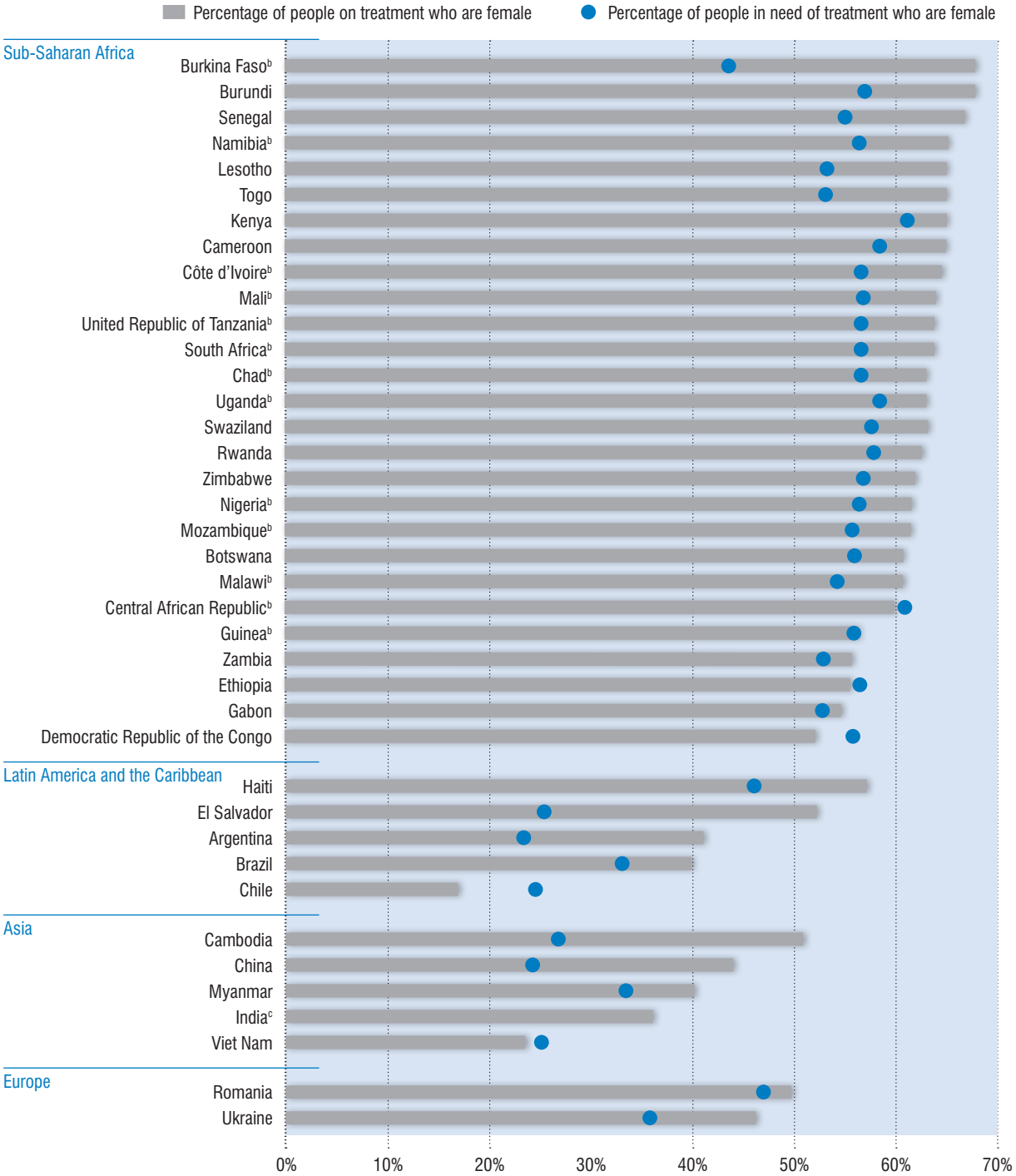
Strong collaboration among implementing partners, involvement of local representatives and regular supervision and monitoring have been key factors in scaling up services in the affected areas. The shortage of health workers was addressed by using the IMAI approach with support from WHO to train clinical teams, facilitate task-shifting towards health workers with less training and involve people living with HIV as "expert patients" to provide adherence counselling and support.

However, service delivery in these subregions continues to face several challenges, including inadequate infrastructure, high rates of attrition among health workers, frequent stock-outs of drugs and commodities and the difficulty of sustaining access to treatment for internally displaced populations as they begin returning to their original homes as peace negotiations conclude.

2 Ethiopia's health network model consists of primary community health posts, health centres and district or zonal hospitals.

Fig. 2.4 presents the pattern in selected countries with at least 5000 people receiving antiretroviral therapy. In most countries, women comprise a higher proportion of the people receiving treatment than would be expected based on the percentage of people needing antiretroviral therapy who are women. Annex 2 provides country-level disaggregated data.

Fig. 2.4. Women as a percentage of all people receiving antiretroviral therapy versus women as a percentage of all people needing treatment, selected low- and middle-income countries, 2007[a]



a Based on the antiretroviral therapy needs among women as a proportion of the total needs among both sexes in 2007. The values are sorted in descending order of the percentage of people receiving antiretroviral therapy who are women within each region. This figure includes only countries with treatment data available by sex for at least 5000 people. Annex 2 provides more country-specific data.
b Treatment data by sex are based on partial data sets and/or are not based on the most recent national-level data. See Annex 2 for further details.
c The estimated need for antiretroviral therapy is currently under review and will be adjusted, as appropriate, based on new data collected during 2008.

The ART-LINC Collaboration[3] recently conducted a comprehensive, multi-site analysis to compare the number of women on antiretroviral therapy with the HIV prevalence among women in low- and middle-income countries in Africa, Asia and Latin America. This study also found that women were not disadvantaged in access to antiretroviral therapy compared with men. The study, which included 33 164 individuals (19 989 women and 13 175 men) participating in 29 centres in 13 countries, suggested that more attention be paid to ensuring that men living with HIV start treatment earlier in the course of the disease *(13)*.

Although the overall ratio of women to men receiving antiretroviral therapy is in accordance with the distribution of HIV infection by sex, in some countries pregnant women living with HIV have poor access to antiretroviral therapy for their own health (for more details, see subsection 5.4.2).

Recent data also reveal that an increasing number of children are benefiting from treatment programmes. Section 5 presents detailed information on equity in access to treatment for pregnant women and children.

Concerns have also been raised regarding equity in access to antiretroviral therapy for populations at high risk of HIV infection, including injecting drug users, men who have sex with men, sex workers and prisoners. Data on the coverage of antiretroviral therapy among these populations are extremely limited. The most comprehensive data on the coverage of antiretroviral therapy among population groups most at risk are available for injecting drug users in the WHO European Region (Box 2.4). The data suggest that, despite recent efforts, the coverage of antiretroviral therapy among these populations remains low.

In addition, socioeconomic status can play an important role in determining access to priority care and treatment interventions and overall health outcomes (Box 2.5). Conclusive evidence indicates that abolishing user fees at the point of service delivery leads to increased uptake of and adherence to antiretroviral therapy *(16)*.

In 2007, of 76 reporting low- and middle-income countries, 72 had a policy for providing antiretroviral therapy free of charge in the public sector.[4] However, data on the implementation of these policies at the country level are limited. Seventy countries also reported having policies for providing co-trimoxazole free of charge in the public sector. A smaller number of countries reported having a policy for providing laboratory monitoring free of charge. As the cost of laboratory monitoring is relatively high, this could represent a barrier for accessing antiretroviral therapy services in low-income settings. Countries in eastern Europe provide a good example, as both HIV treatment and laboratory monitoring are provided free of charge in the public sector.

Box 2.4. Antiretroviral therapy coverage among injecting drug users in Europe

Injecting drug use accounts for the overwhelming majority of HIV cases in Eastern Europe and Central Asia and contributes significantly to older HIV epidemics in many countries in western Europe *(14)*.

Access to antiretroviral therapy for injecting drug users in Europe is increasing. In 2002, among 27 countries reporting in the WHO European Region, injecting drug users accounted for 46% of reported HIV cases, yet only 10% of those receiving antiretroviral therapy were injecting drug users. By 2006, among 38 reporting countries, injecting drug users represented 59% of reported HIV cases and 30% of all people receiving antiretroviral therapy *(15)*.

However, regional variation within Europe is considerable. Antiretroviral therapy coverage is high in western Europe, where injecting drug users represented 29% of reported HIV cases and 30% of people receiving antiretroviral therapy in 2006. In eastern Europe, countries such as Ukraine have made substantial progress in scaling up the provision of antiretroviral therapy among injecting drug users in recent years. However overall, coverage of antiretroviral therapy is inequitable. In 2006, more than 70% of reported HIV cases were among injecting drug users, but they represented 39% of people receiving antiretroviral therapy.

3 The Antiretroviral Therapy in Low-Income Countries (ART-LINC) Collaboration is a network of clinics in Africa, South America and Asia. It was established to examine outcomes for people living with HIV treated in resource-limited settings and to compare experiences across settings. It is supported by the French Agence Nationale de Recherches sur le SIDA et les Hépatites Virales, the European and Developing Countries Clinical Trials Partnership, the United States National Institutes of Health and the United States Agency for International Development.

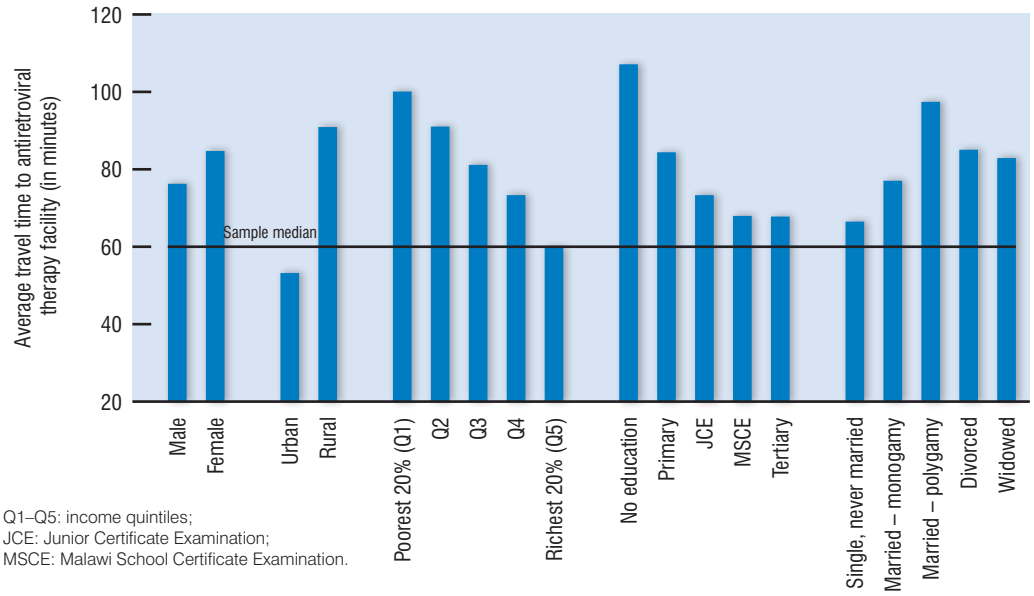
4 Both these studies were based mostly on clinic-based cohorts. Hence they may classify people who have been formally or informally transferred to another clinic as lost to follow-up and may underestimate retention.

Box 2.5. Socioeconomic determinants of access to antiretroviral therapy in Malawi

A WHO study of the socioeconomic determinants of access to antiretroviral therapy in Malawi *(17)* found that, nationally, 66% of the people accessing antiretroviral therapy services did this at the secondary level of care (in district hospitals) versus only 8.5% at the primary level (in community clinics and health centres). This means that accessing treatment requires incurring not only direct costs such as transport and food but also opportunity costs in terms of time spent on travel and waiting in queues. Exit interviews conducted in a sample of 947 people being treated at facilities in the Lilongwe and Rumphi districts found that the median travel time to the treatment facility was 60 minutes for the entire sample. Travel time to treatment facilities varied across income levels. The poorest 20% travel a longer distance and incur higher transport costs to reach a treatment facility. Fig. 2.5 shows the average time taken to reach an antiretroviral therapy facility according to socioeconomic group.

The study also found that the average waiting time at the treatment facility for men and women was similar (mean waiting time of 126 minutes for men and 128 minutes for women). People visiting mission hospitals and government health centres had shorter waiting times than people visiting private not-for-profit facilities.

Fig. 2.5. Determinants of travel time to an antiretroviral therapy facility in Malawi, 2007



Q1–Q5: income quintiles;
JCE: Junior Certificate Examination;
MSCE: Malawi School Certificate Examination.

2.1.4 Impact and outcomes of scaling up antiretroviral therapy

Since 2002, the expanded provision of antiretroviral therapy in low- and middle-income countries has resulted in an estimated gain of 3.2 million [2.9 million to 3.6 million] life-years, including 2 million [1.9 million to 2.3 million] in sub-Saharan Africa.

Survival and improved clinical outcomes

Improvements in survival time and clinical outcomes have been demonstrated in a growing number of cohorts in low- and middle-income countries *(18–21)*. A recent meta-analysis of data from the ART-LINC Collaboration *(22)* tracked CD4 cell counts among adolescents and adults in low- and middle-income countries up to five years (beginning with treatment initiation). The study found that the median CD4 count rose from 108 cells per μl at the time of treatment initiation to 442 cells per μl at five years following initiation among those remaining on antiretroviral therapy for five years. The cohort of almost 20 000 individuals, of whom 60% were women, demonstrates that strong and sustained CD4 cell recovery can be achieved over extended periods of time in resource-limited settings. The effect of antiretroviral therapy on reducing mortality and morbidity in low- and middle-income countries is even more significant when supplemented by co-trimoxazole prophylaxis. A recent study demonstrated a 95% reduction in mortality among people receiving both antiretroviral therapy and co-trimoxazole prophylaxis compared with untreated people *(23)*.

Levels of adherence, a key variable in determining clinical efficacy, appear to be comparable among population groups being treated in both high-income and low- and middle-income settings. A meta-analysis of studies from sub-Saharan Africa found that adherence rates were similar to or exceeded those from North American and European population groups. This is consistent with findings from Brazil, one of the first countries outside the Organisation for Economic Co-operation and Development to implement a universal access programme for antiretroviral therapy *(24,25)*. However, these findings should be interpreted with caution because the results of studies conducted as part of research projects and in well-resourced settings may not be able to be replicated outside such settings. Many people continue to face difficulty in adhering to treatment. This is related to both structural factors (such as the cost of treatment, distance to health facilities or stigma) as well as individual factors (such as the side effects of drugs and comorbidity).

Although the evidence indicates substantial improvements in clinical outcomes and their impact at the population level, some trends raise concern. Recent evidence *(26)* indicates that many people die after an HIV-positive diagnosis and before they can access antiretroviral therapy. Further, despite significant gains in survival time since treatment began to be scaled up, people in low- and middle-income countries still have higher mortality in the first six months of treatment than people in high-income countries *(27)*. This suggests that late diagnosis, late initiation of therapy, undiagnosed comorbidity and differential access to health care contribute to unequal treatment outcomes.[5]

Retention is also emerging as a critical issue in antiretroviral therapy programmes. A recent study from the ART-LINC Collaboration *(28)* reviewed retention data for 5491 people being treated in 15 programmes in Africa, Asia and Latin America. Researchers found that early loss to follow-up in antiretroviral therapy programmes was becoming increasingly common in the context of treatment scale-up and was associated with fee-for-service programmes and more advanced immunodeficiency at baseline. The study suggests that the infrastructure and number of staff required to document and trace the people lost to follow-up are becoming increasingly inadequate due to the pressure on public health programmes to start the maximum number of new people on antiretroviral therapy as part of efforts to scale up treatment. Another recent review of treatment programmes in sub-Saharan Africa *(29)* found that retention averaged 75% after one year and 62% after two years, although the retention rates varied widely among programmes. The issue of retention will be a significant challenge as the pace of scale-up increases.[6]

Impact of treatment on prevention

In addition to clinical outcomes, evidence indicates that antiretroviral therapy programmes can be implemented in a way that emphasizes HIV prevention. Studies *(30,31)* have found that sexually active people receiving antiretroviral therapy may be more likely to practice protected sex and use contraceptives. Mounting evidence, including several studies of serodiscordant couples, also shows that effective viral suppression combined with appropriate behavioural prevention support (such as the use of condoms) reduces HIV transmission *(32,33)*. Although additional evidence is required on the extent to which scaling up antiretroviral therapy affects the incidence and prevalence of HIV at the population level, scientific studies to date indicate that antiretroviral therapy should be considered part of a comprehensive and integrated approach to HIV prevention and that cost-effectiveness analysis of prevention programmes in low- and middle-income countries should include antiretroviral therapy.

5 Based on available evidence, the UNAIDS Reference Group on Estimates, Modelling and Projections assumes that the death rate among people receiving antiretroviral therapy in low- and middle-income countries is 15% in the first year of treatment and 5% in the following years.

6 Both these studies were based mostly on clinic-based cohorts. Hence they may classify people who have been formally or informally transferred to another clinic as lost to follow-up and may underestimate retention.

Socioeconomic benefits

Socioeconomic determinants are known to play a part in both access to antiretroviral therapy and in the effects of scaling up antiretroviral therapy at the population level. Recent studies confirming increases in labour force participation among individuals receiving antiretroviral therapy *(34)* have demonstrated that investing in HIV prevention and treatment can have broader social and economic effects in high-burden countries. A recent study of tea plantation workers in Kenya *(35)* found that those living with HIV who were receiving antiretroviral therapy worked at least twice as many days in a month as they would have in the absence of treatment.

2.1.5 Prevention and assessment of HIV drug resistance

As larger numbers of people receive treatment, preventing and assessing HIV drug resistance become increasingly important.

The WHO HIVResNet is a global network of individuals, institutions and countries working in HIV drug resistance that supports WHO in developing and implementing a public health approach to preventing and assessing HIV drug resistance. With the support of HIVResNet, WHO has developed a comprehensive strategy for minimizing the emergence and transmission of HIV drug resistance at the population level (Box 2.6). The purpose of the strategy is to prolong and maximize the quality of life of people living with HIV by supporting optimal antiretroviral therapy programme functioning, maintaining the effectiveness of standard first- and second-line antiretroviral regimens used in low- and middle-income countries and potentially reducing HIV transmission.

In 2006, the Bill & Melinda Gates Foundation provided a five-year grant of US$ 15.2 million to WHO to implement the HIV drug resistance strategy in the countries most affected by the epidemic.[7]

During 2006–2007, 25 countries received technical assistance from WHO and its HIVResNet partners for developing and implementing national HIV drug resistance plans. All 25 countries implemented one or more elements of their national HIV drug resistance strategies.

Box 2.6. Strategy for prevention and assessment of HIV drug resistance

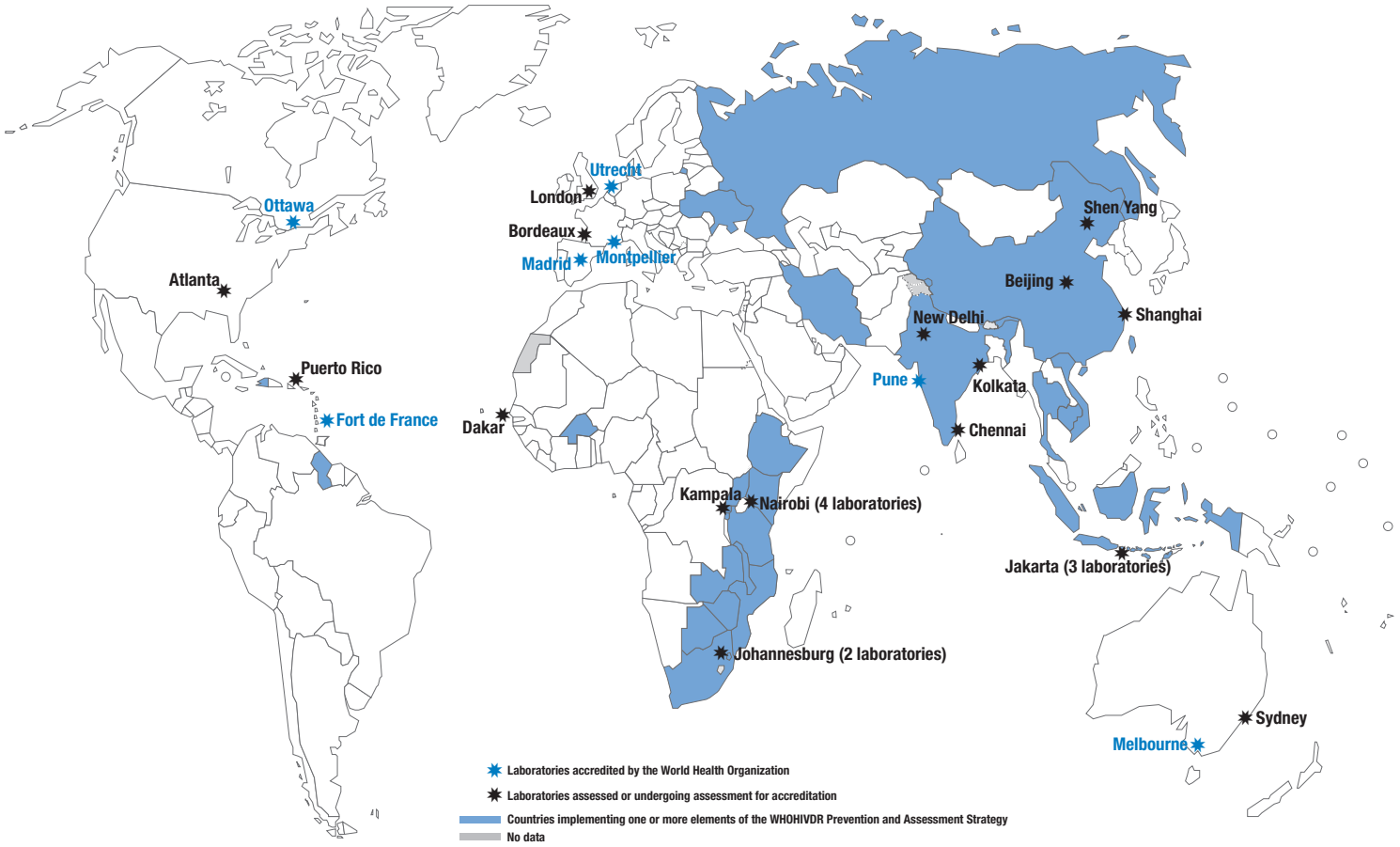
The HIV drug resistance strategy provides country-level guidance for the following activities:

- formation of a national HIV drug resistance working group to develop and implement a national plan for preventing and assessing HIV drug resistance in coordination with the national strategy for HIV prevention and care;
- monitoring the extent to which antiretroviral therapy sites are functioning to prevent HIV drug resistance through site-level early warning indicators for HIV drug resistance;
- conducting surveys to assess the prevention and emergence of HIV drug resistance during antiretroviral therapy and the transmission of HIV drug resistance;
- accrediting laboratories for HIV drug resistance genotypic testing at the national, regional and global levels to form the WHO HIVResNet laboratory network;
- implementing the WHO HIV drug resistance database; and
- producing an annual report with evidence-based recommendations for public health action to prevent HIV drug resistance at the antiretroviral therapy site level and the national antiretroviral therapy programme level.

Source: Bennett et al. *(36)*.

7 In 2007, the WHO Global Strategy for Prevention and Assessment of HIV Drug Resistance also received support from national governments including Canada, Italy, Spain and the United States of America as well as additional support to specific countries from other partners.

Fig. 2.6. Countries implementing one or more elements of the WHO Global Strategy for Prevention and Assessment of HIV Drug Resistance and the HIVResNet laboratory network (as of December 2007)



The WHO Global HIV Drug Resistance Laboratory Network was formed to provide quality-assured laboratory results for HIV drug resistance surveillance and monitoring. As of August 2007, 28 laboratories were assessed for accreditation and 7 were accredited. Two additional laboratories were in the process of being assessed (Fig. 2.6).

Seven countries have reported results *(37–44)* from the surveillance of transmitted HIV drug resistance in geographical areas where antiretroviral therapy was first used within the country (Table 2.3). All reported less than 5% transmitted resistance to all antiretroviral drugs and drug classes.

2.1.6 Antiretroviral drug regimens

WHO treatment guidelines reflect the principles of the public health approach. They focus on maximizing survival at the population level through standardized treatment regimens and simplified formularies, delivered to individuals though simplified clinical decision-making and standardized treatment monitoring *(5)*. Guidelines issued by WHO evolve based on scientific evidence and clinical management experience in resource-limited settings.

As treatment continues to be scaled up, establishing the principles and criteria by which priorities among antiretroviral drug options are set is becoming increasingly urgent, especially for the growing number of individuals who require second-line therapy (Box 2.7).

Distribution and use of antiretroviral drug regimens

In 2007, WHO conducted the second annual survey on the distribution and composition of first- and second-line antiretroviral therapy regimens used in low- and middle-income countries *(46,47)*. Surveys were sent to national AIDS programmes in 41 countries in March 2007. The selected countries include the 40 countries with the highest number of people receiving antiretroviral therapy as of December 2006 as well as Guyana (to include all 15 focus countries of the United States President's Emergency Plan for AIDS Relief). Thirty countries responded, representing 63% of the estimated 2 million people receiving antiretroviral therapy in resource-limited countries as of December 2006. Ninety-three per cent of the people receiving antiretroviral therapy in the 30 responding countries were adults and 7% were children.

The vast majority of adults (97%) were receiving first-line regimens. Information on specific regimens was available

Table 2.3. Surveys of transmitted HIV drug resistance in seven countries: characteristics and summary results

Country	Area and time period	Site type	Percentage participation (of the people eligible)	Predominant HIV-1 subtype(s)	Transmitted resistance classification
Ethiopia *(37)*	Addis Ababa, April–August 2005	Antenatal care	100%	C	<5% (all classes)
Malawi *(38)*	Lilongwe, October–December 2006	Prevention of mother-to-child transmission	100%	C	<5% (all classes)
South Africa *(39)*	Gauteng Province, October 2002	Antenatal care	100%	C	<5% (all classes)
South Africa *(39)*	Gauteng Province, October 2004	Antenatal care	100%	C	<5% (all classes)
Swaziland *(40)*	Manzini-Mbani corridor, July–August 2006	Antenatal care	100%	C	<5% (all classes)
Thailand *(41)*	Bangkok, July 2005 –April 2006	Blood donation site	100%	CRF01-AE	<5% (all classes)
Thailand *(41)*	Bangkok, July–December 2005	Voluntary counselling and testing sites	100%	CRF01-AE	<5% (all classes)
United Republic of Tanzania *(42)*	Dar Es Salaam, November 2005 – February 2006	Antenatal care	100%	A1, C	<5% (all classes)
Viet Nam *(43)*	Hanoi, February–June 2006	Voluntary counselling and testing sites	99%	CRF01-AE	<5% (all classes)

HIV drug resistance threshold surveys to assess transmitted HIV drug resistance are performed in one or more cities or health planning areas of a country where antiretroviral therapy has been available for the longest period of time – that is, where transmission of drug resistant strains would be most likely to be seen initially. Separate surveys may be performed in different subgroups of interest in each area. The transmitted resistance to relevant drug classes and drugs is classified as <5%, 5–15% or >15% based on a small number of specimens collected from eligible individuals who are consecutively diagnosed with HIV *(44)*.

Box 2.7. Simplifying current options for second-line antiretroviral therapy

As low-income countries rapidly expand their HIV treatment programmes, they are increasingly faced with the need to make second-line regimens available. In response to requests from national programme managers and regulatory agencies for additional operational guidance in this area, WHO convened a working group of experts and implementing partners in 2007 to advise on selecting, setting priorities for and planning for second-line antiretroviral medicines recommended in the current WHO treatment guidelines *(5)*.

The meeting developed guidance *(45)* on simplified options for second-line regimens for low- and middle-income countries based on the limited options of most formularies. Six major domains were considered while developing recommendations regarding second-line regimens: efficacy, simplicity, toxicity, population coverage, low potential cost and compatibility for children.

The following second-line regimens were ranked as the highest priorities among the second-line options WHO recommended in its 2006 guidelines *(5)*.

1. For people who initiated antiretroviral therapy with thymidine-based analogues (first-line regimens containing zidovudine or stavudine), the second-line regimens should preferably comprise tenofovir + lamivudine, tenofovir + emtricitabine or abacavir + didanosine as the nucleoside background component associated with either of the following ritonavir-boosted protease inhibitor options: lopinavir + ritonavir or atazanavir + ritonavir.

2. For people who initiated antiretroviral therapy with non-thymidine-based analogues (first-line regimens containing tenofovir or abacavir), the second-line regimens should preferably comprise zidovudine + lamivudine associated with either of the following ritonavir-boosted protease inhibitor options: lopinavir + ritonavir or atazanavir + ritonavir.

This priority-setting is not a revision of the WHO treatment guidelines published in 2006 *(5)*. The other antiretroviral drug options presented in the WHO treatment guidelines are still valid for clinical use.

for 91% of these people. Almost 90% were receiving first-line regimens in accordance with WHO 2006 treatment guidelines *(5)*. Fig. 2.7 presents the composition of the most common adult first-line regimens.

Three percent of adults among the study population were on second-line regimens. Information on specific regimens used was available for 72% of this population. The most common adult second-line regimens included abacavir + didanosine + ritonavir-boosted lopinavir (15%), zidovudine + didanosine + ritonavir-boosted lopinavir (14%), zidovudine + lamivudine + ritonavir-boosted lopinavir (7%), tenofovir + lamivudine + ritonavir-boosted lopinavir (7%), tenofovir + emtricitabine + ritonavir-boosted lopinavir (4%) and stavudine + lamivudine + ritonavir-boosted lopinavir (3%). About 60% of adults on second-line regimens were on regimens that were in accordance with the 2006 WHO treatment guidelines *(5)*, a substantially lower percentage compared with first-line regimens.

The vast majority of children (97%) from responding countries were on first-line regimens, with information on specific regimens available for 94% of children. About 91% of children were receiving first-line regimens in accordance with 2006 WHO treatment guidelines *(5)*. Fig. 2.8 presents the distribution and composition of first-line regimens among children.

Three percent of children among the study population were receiving a second-line regimen. Only 21 countries provided information on specific regimens. Data reporting is somewhat fragmented, with greater diversity among second-line regimens than among first-line regimens. The most common second-line regimens included zidovudine + lamivudine + ritonavir-boosted lopinavir (24%), didanosine + abacavir + ritonavir-boosted lopinavir (12%), stavudine + didanosine + ritonavir-boosted lopinavir (8%) and stavudine + lamivudine + ritonavir-boosted lopinavir (7%).

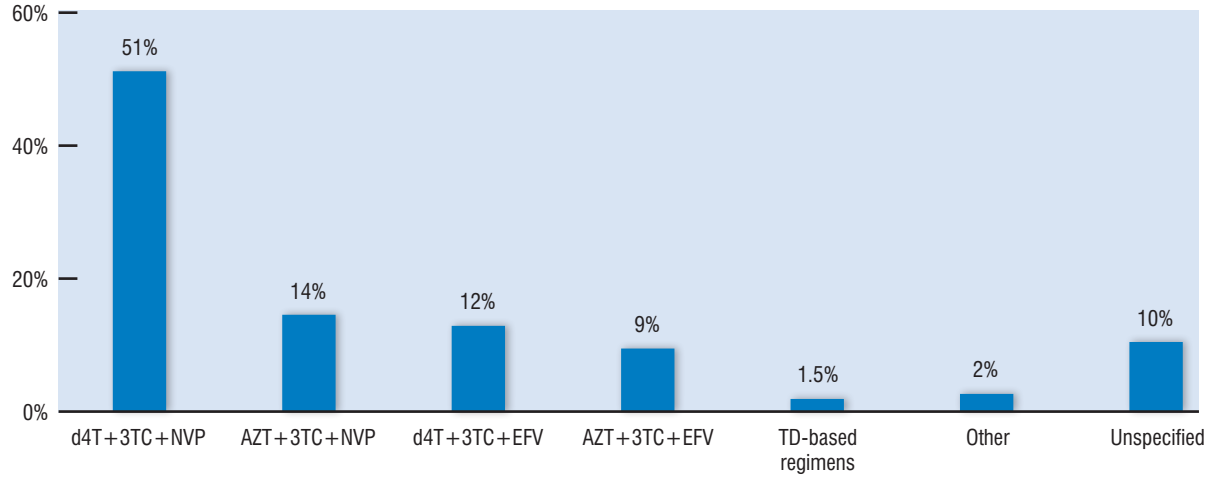
A subset of the data was analysed from the 21 countries that completed both 2006 and 2007 surveys to compare the distribution in the 2007 survey with the data collected in 2006. The results for this subset showed that the proportion of adults receiving antiretroviral therapy who are treated with second-line regimens continues to be low and is not increasing. Four per cent of adults receiving antiretroviral therapy were on second-line regimens in 2006 versus 3% in 2007. This is slightly lower than the original forecasts, which anticipated an annual switch rate of 5%. This result cannot be clearly interpreted. Possible interpretations include demand-driven factors (such as a limited need for second-line regimens because many people have recently initiated antiretroviral therapy) or supply-driven factors (such as a lack of available options to construct a viable second-line regimen).

Pharmacovigilance

Although about 3 million people are currently estimated to be receiving antiretroviral therapy in low- and middle-income countries globally, the scaling up of treatment has not been matched by a proportionate development in pharmacovigilance practice in low- and middle-income countries. Drug toxicity can severely affect people's health and safety and undermine their adherence to antiretroviral therapy, not only increasing morbidity and mortality but also leading to the emergence of secondary drug resistance.

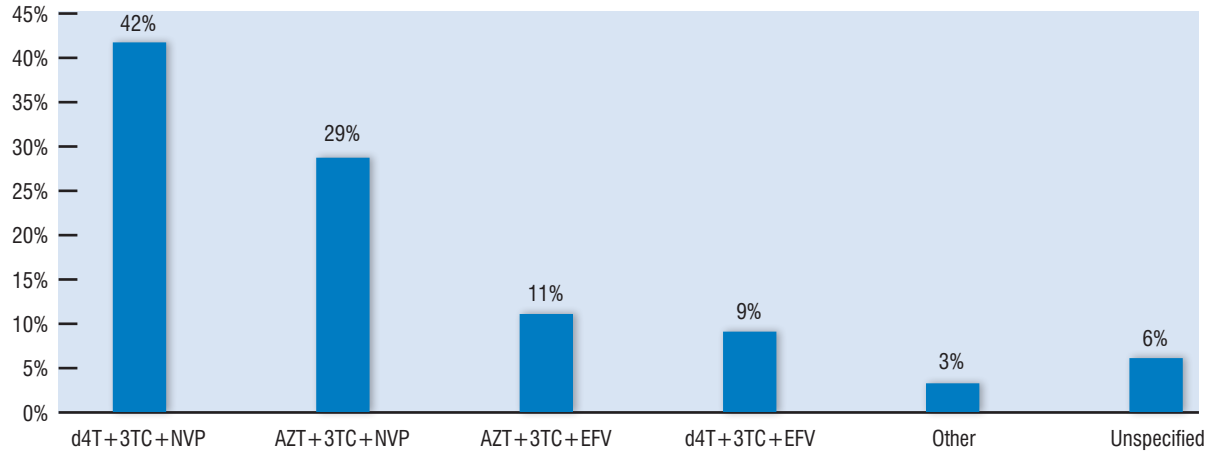
The current knowledge of the side effects and adverse events of antiretroviral therapy is based on data collected primarily in high-income countries from populations whose demographics, genetic background, nutritional status and comorbidity may vary substantially from those of the populations in low- and middle-income countries. Of the 80 000 reports of adverse reactions to antiretroviral medicines included in the WHO global Individual Case Safety Reports (ICSR) database at the WHO Collaborating Centre for International Drug Monitoring Programme in Uppsala, Sweden, only 6000 came from low- and middle-income countries, substantially compromising the identification and optimal management of drug adverse events *(48)*.

Fig. 2.7. First-line antiretroviral drug regimens used among adults in 30 low- and middle-income countries, 2007



d4T: stavudine; 3TC: lamivudine; NVP: nevirapine; AZT: zidovudine; EFV: efavirenz; TDF: tenofovir.

Fig. 2.8. First-line antiretroviral drug regimens used among children in 30 low- and middle-income countries, 2007



d4T: stavudine; 3TC: lamivudine; NVP: nevirapine; AZT: zidovudine; EFV: efavirenz.

WHO has developed a strategy to improve the mapping of adverse events, ensure consistent reporting and ultimately improve patient safety and clinical management (Box 2.8).

Prequalification and quality assurance of antiretroviral products

WHO's Prequalification Programme conducts evaluation and inspection activities and builds national capacity for manufacturing and monitoring high-quality medicines. WHO began reviewing HIV antiretroviral medicines for this programme in 2001. At present, the list of prequalified medicinal products includes 178 formulations of antiretroviral medicines, of which 56 originate from innovator companies and 122 from generic companies. In 2007, WHO prequalified 13 new formulations of antiretroviral medicines, received 23 dossier submissions and began delivering technical assistance (such as on formulations of antiretroviral medicines for children) at the country level.

In 2005–2006, WHO conducted a quality assurance survey of antiretroviral medicines in Cameroon, the Democratic Republic of the Congo, Kenya, Nigeria, Uganda, United Republic of Tanzania and Zambia *(49)*. Of the 395 samples tested, none had quality deficiencies that would pose a risk to the people taking them. The results of this and future surveys on drug quality are key to ensuring that the pace of scaling up treatment does not compromise the quality of the medicines available.

Box 2.8. WHO strategy for strengthening pharmacovigilance

To respond to the need to strengthen pharmacovigilance and improve treatment monitoring in resource-limited settings, WHO has developed a plan for:

- coordinating and standardizing approaches to pharmacovigilance for antiretroviral medicines;
- supporting national authorities in investing in identifying and managing pharmacogivilance for antiretroviral medicines;
- conducting, coordinating and supporting focused studies on adverse event and drug–drug interactions linked to antiretroviral medicines;
- supporting regional and global data collection through improved spontaneous and active reporting of adverse events linked to antiretroviral medicines; and
- analysing data and disseminating information on pharmacovigilance.

2.1.7 Antiretroviral drug prices

The Global Price Reporting Mechanism (GPRM) for antiretroviral drugs, established in 2004, provides information on the transaction prices of antiretroviral drugs purchased in low- and middle-income countries *(50)*.

In low- and middle-income countries, the prices of most first-line medicines decreased by 30–64% from 2004 to 2007 and by 10–40% from 2006 to 2007. This has contributed greatly to the wider availability of treatment. However, prices remain high in most countries in eastern Europe and Latin America.

The average prices paid for second-line regimens remain high in both low- and middle-income countries (with some exceptions in certain low-income countries), where few or no prequalified generic alternatives are available.

Prices of first-line regimens in low-income countries

The median price paid for first-line treatment (prequalified by WHO) in low-income countries in 2007 ranged from US$ 92 per person per year for the fixed-dose combination of stavudine + lamivudine + nevirapine (the most widely used combination) to US$ 294 for the fixed-dose combination zidovudine + lamivudine plus efavirenz (Fig. 2.9). The weighted average median price of the four combinations most widely used in first-line treatment (representing 86% of the prescribed first-line treatments in low-income countries) was US$ 170 per person per year in 2007.[8]

The decline in drug prices between 2004 and 2007 can be attributed to the scaling up of treatment programmes, increased competition between a growing number of products prequalified by WHO, new pricing policies by pharmaceutical companies and successful negotiations between the William J. Clinton Foundation and major generic manufacturers.[9]

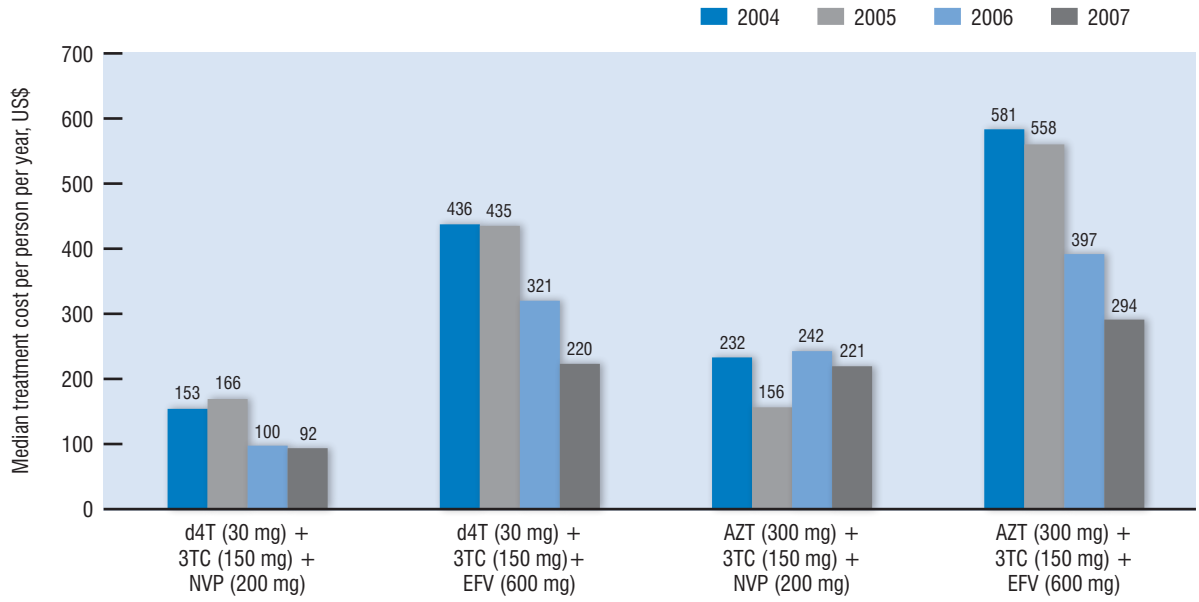
8 The weighted average price is calculated by assigning to the price of each combination a weight that equals the proportion that the combination represents in the global volume of first-line regimens in low-income (and, respectively, middle-income) countries.

9 In 2007, WHO published an addendum *(51)* to the 2006 guidelines on antiretroviral therapy in adults and adolescents *(5)*, indicating that lowering the stavudine dosage to 30 mg twice daily for all adults and adolescents, regardless of body weight, resulted in less toxicity and clinical outcomes comparable to the higher dosage. Previously, dosing for people >60 kg was recommended at 40 mg twice daily; and dosing for people <60 kg was recommended at 30 mg twice daily. The reduced dosage has also contributed to the reduction in the cost of first-line regimens that include stavudine.

Prices of first-line regimens in middle-income countries

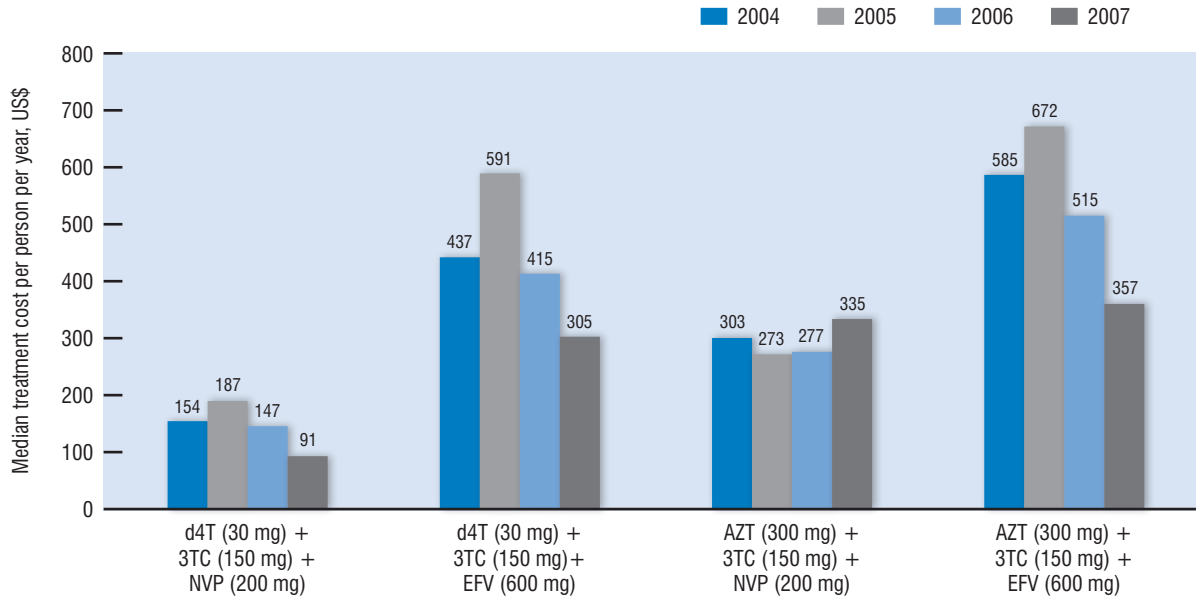
The average prices paid for first-line regimens have declined significantly in middle-income countries and are now closer to those paid in low-income countries (Fig. 2.10). The median prices in 2007 ranged from US$ 91 per person per year for the least expensive regimen of stavudine + lamivudine + nevirapine to US$ 357 per person per year for the most expensive regimen of zidovudine + lamivudine + efavirenz. In the same year, the weighted median price of the four most widely used combinations in first-line treatment was US$ 188 per person per year.

Fig. 2.9. Median price (United States dollars) of first-line antiretroviral drug regimens in low-income countries, 2004–2007



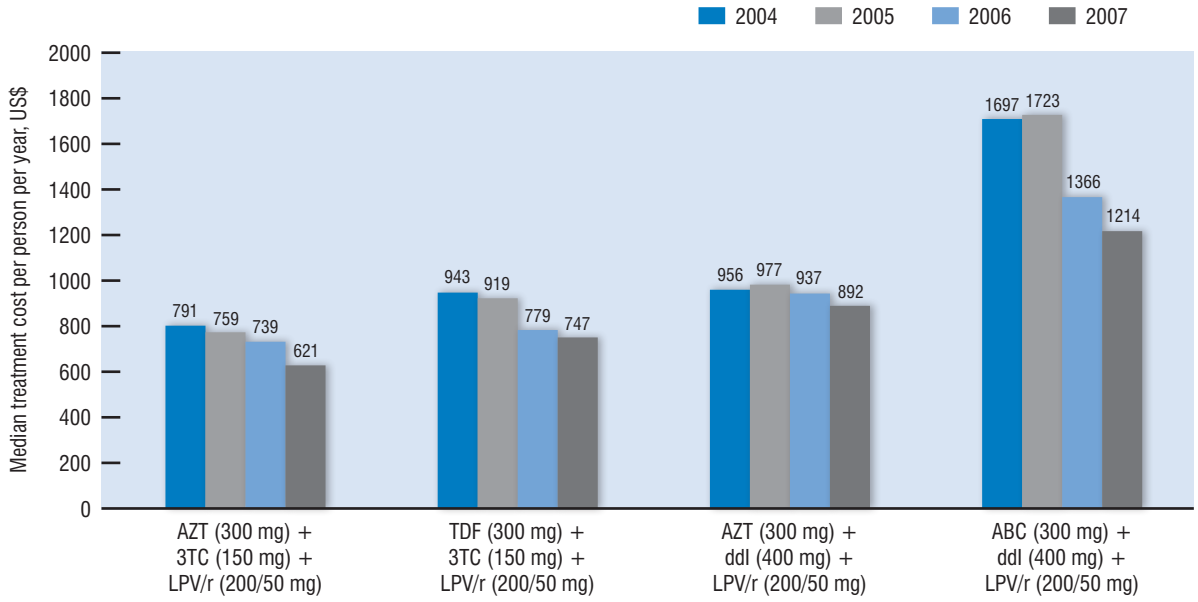
d4T: stavudine; 3TC: lamivudine; NVP: nevirapine; EFV: efavirenz; AZT: zidovudine.

Fig. 2.10. Median price (United States dollars) of first-line antiretroviral drug regimens in middle-income countries, 2004–2007



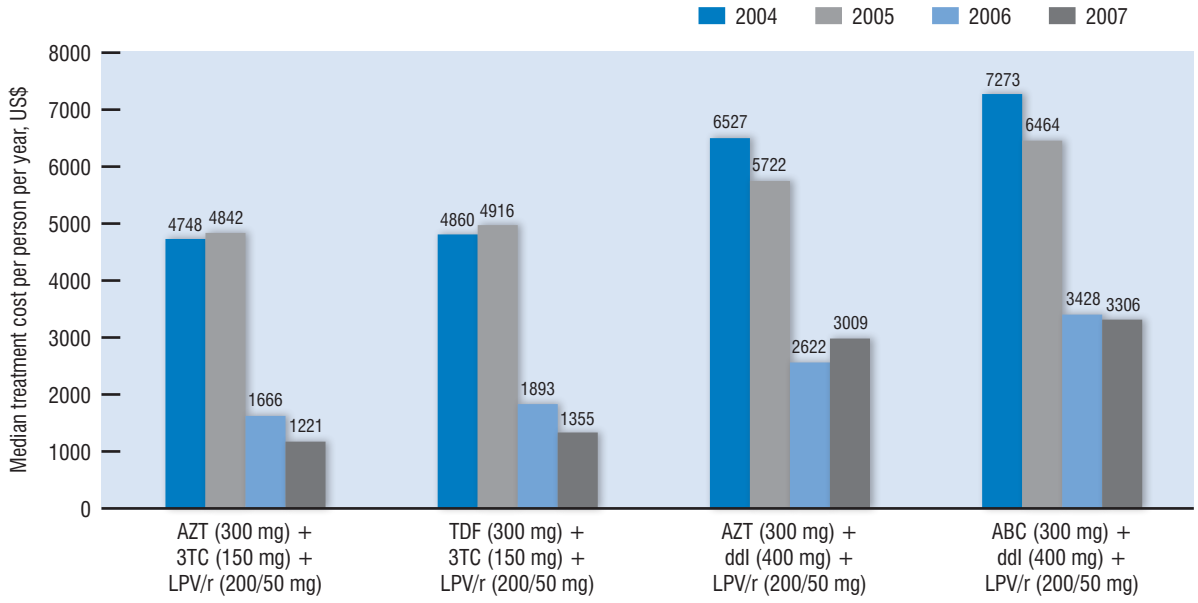
d4T: stavudine; 3TC: lamivudine; NVP: nevirapine; EFV: efavirenz; AZT: zidovudine.

Fig. 2.11. Median price (United States dollars) of second-line antiretroviral drug regimens in low-income countries, 2004–2007



AZT: zidovudine; 3TC: lamivudine; LPV/r: ritonavir-boosted lopinavir; TDF: tenofovir; ddI: didanosine; ABC: abacavir.

Fig. 2.12. Median price (United States dollars) of second-line antiretroviral drug regimens in middle-income countries, 2004–2007



AZT: zidovudine; 3TC: lamivudine; LPV/r: ritonavir-boosted lopinavir; TDF: tenofovir; ddI: didanosine; ABC: abacavir.

Second-line regimens in low- and middle-income countries

Second-line regimens are still significantly more expensive than first-line regimens in low- and middle-income countries. In 2007, the median cost of a regimen of didanosine + abacavir + ritonavir-boosted lopinavir, the most commonly used second-line regimen (Fig. 2.11 and 2.12), was US$ 1214 in low-income countries and US$ 3306 in middle-income countries. The median cost of tenofovir + lamivudine + ritonavir-boosted lopinavir is US$ 747 per person per year in low-income countries and US$ 1355 per person per year in middle-income countries. The actual prices paid for second-line regimens vary significantly between countries. For example, South Africa pays an average price of US$ 1600 per person per year for didanosine + abacavir + ritonavir-boosted lopinavir, whereas El Salvador paid US$ 3448 per person per year for the same regimen in 2007.

As the absolute numbers of people who need access to second-line regimens continue to grow, addressing the high cost of second-line regimens will become increasingly important to ensure the most cost-effective use of available resources (Box 2.9).

2.1.8 Laboratory services

The public health approach to scaling up access to antiretroviral therapy recommends that antiretroviral therapy can be initiated with the use of WHO clinical staging in the absence of laboratory capacity to measure CD4 cell count *(52)* and that people receiving antiretroviral therapy can be monitored clinically in terms of toxicity (so that antiretroviral drugs can be substituted) and treatment failure (so that second-line antiretroviral therapy can be initiated).

A recent modelling study *(53)* provides support for these simple recommendations, which will enable the decentralized management of antiretroviral therapy. The study predicted that, at five years, the survival for people in Africa started on a standard antiretroviral therapy regimen (stavudine + lamivudine + nevirapine) would be 83% for people monitored for viral load, 82% for people monitored for CD4 count and 82% for clinical monitoring using WHO staging alone. The corresponding figures over a 20-year period were 67%, 64% and 64%, respectively. The study also indicated that using viral load monitoring is not a cost-effective strategy for resource-limited settings.

Box 2.9. Using market information to lower drug prices: the example of Morocco

Morocco, a middle-income country with a concentrated HIV epidemic, has been paying high prices for antiretroviral drugs compared with other middle-income countries. Since antiretroviral drugs were introduced to the country in 1998, Morocco has introduced a number of measures to bring down their cost, including negotiating prices with pharmaceutical companies; reducing import tariffs and introducing generic combinations. In 2005, Morocco signed an agreement with the Clinton Foundation HIV/AIDS Initiative to obtain lower prices for antiretroviral drugs. With these efforts, the average price for first-line treatment fell from US$ 1300 per person per month in 1998 to US$ 48 per person per month in 2007. However, this price was still relatively high compared with other middle-income countries that have a comparable number of people who need treatment.

During 2007, the Ministry of Health worked with national stakeholders and international organizations, including WHO and UNAIDS, to review current antiretroviral drug prices, determine additional options for price reductions and develop an action plan on drug pricing.

Data from the WHO Global Price Reporting Mechanism were used to compare the antiretroviral drug prices in Morocco between 2003 and 2007 with the prices in other middle-income countries. In many cases, even 2007 prices in Morocco were more than 30% higher than the median prices paid in middle-income countries.

The group also undertook a review of patent status, recommended measures to facilitate the registration of generic products and held discussions with suppliers based on a comparison of prices in comparable countries. National treatment experts reviewed the list of individual and fixed-dose combinations being used in the country and selected a smaller number of cost-effective products that could be procured in large quantities while maintaining optimal treatment outcomes.

As a result of these efforts, the price per person per year for first-line antiretroviral drugs decreased by 23–57% from 2004 to 2007.

Efforts to strengthen laboratory capacity remain important for measuring CD4 counts (especially to guide when antiretroviral therapy can optimally be initiated) and for viral load to assess adherence and to review initial responses to antiretroviral therapy. However, access to laboratory services, as part of general strengthening of the health system or as a specific focus of antiretroviral therapy programmes, must not be scaled up at the expense of continuing to expand access to antiretroviral therapy.

In 2007, of the 74 low- and middle-income countries that reported data on the use of CD4 monitoring for providing antiretroviral therapy,[10] most reported using CD4 monitoring in all or some of their treatment facilities, either on site or through referral. Only two countries reported that they were providing antiretroviral therapy without any CD4 monitoring. Of the 5856 facilities providing antiretroviral therapy in these 74 countries, 4850 facilities (78%) were using CD4 monitoring on site or through referral. Countries in the WHO Region of the Americas reported a higher proportion of facilities using CD4 monitoring (95%) than other WHO regions, where the proportion was 69–80%. However, even where CD4 monitoring is available, countries may face challenges such as difficulty in servicing and maintaining the equipment, insufficient capacity to meet the demand for testing and delays in returning results in time to the clinician and the person being monitored to immediately inform treatment decisions. Countries in eastern Europe report using both CD4 and viral load monitoring to initiate antiretroviral therapy and monitor outcomes.

2.2 Care and management of HIV/TB coinfection and other types of comorbidity

Managing the broad range of opportunistic infections and comorbidity related to HIV requires an integrated health sector response. Appropriate prevention and treatment of opportunistic infections and comorbidity can substantially reduce morbidity and mortality among people living with HIV. The health sector also needs to ensure that people living with HIV have access to appropriate nutritional and psychosocial support, palliative care and end-of-life care.

TB remains among the leading causes of HIV-related morbidity and mortality. Whether a person with HIV is receiving antiretroviral therapy or not, HIV-associated TB is both preventable and curable.

2.2.1 Responding to the dual epidemic of HIV and TB[11]

About one third of the world's population is infected with *Mycobacterium tuberculosis*, the bacterium that causes TB. Although the bacterium usually remains latent, people with intact immune systems have a lifetime risk of developing active disease of about 5–10%. This risk of developing TB increases dramatically among people living with HIV to around 10% per year.

Recent reports continue to highlight the major public health threat posed by the dual epidemics of HIV and TB. TB is now the most frequent life-threatening opportunistic disease among people living with HIV, including those receiving antiretroviral therapy, and is a leading cause of death *(55)*, posing a significant threat to the gains made in scaling up prevention, care and treatment programmes for people living with HIV. The emergence of ever more dangerous strains of multidrug-resistant TB strains, including extensively drug-resistant TB, represents a critical threat to global health and security.

Since 1990, TB incidence has increased dramatically in HIV-endemic regions. In sub-Saharan Africa, TB cases have increased between two-fold and six-fold, resulting in enormous demands on health services and increased mortality.

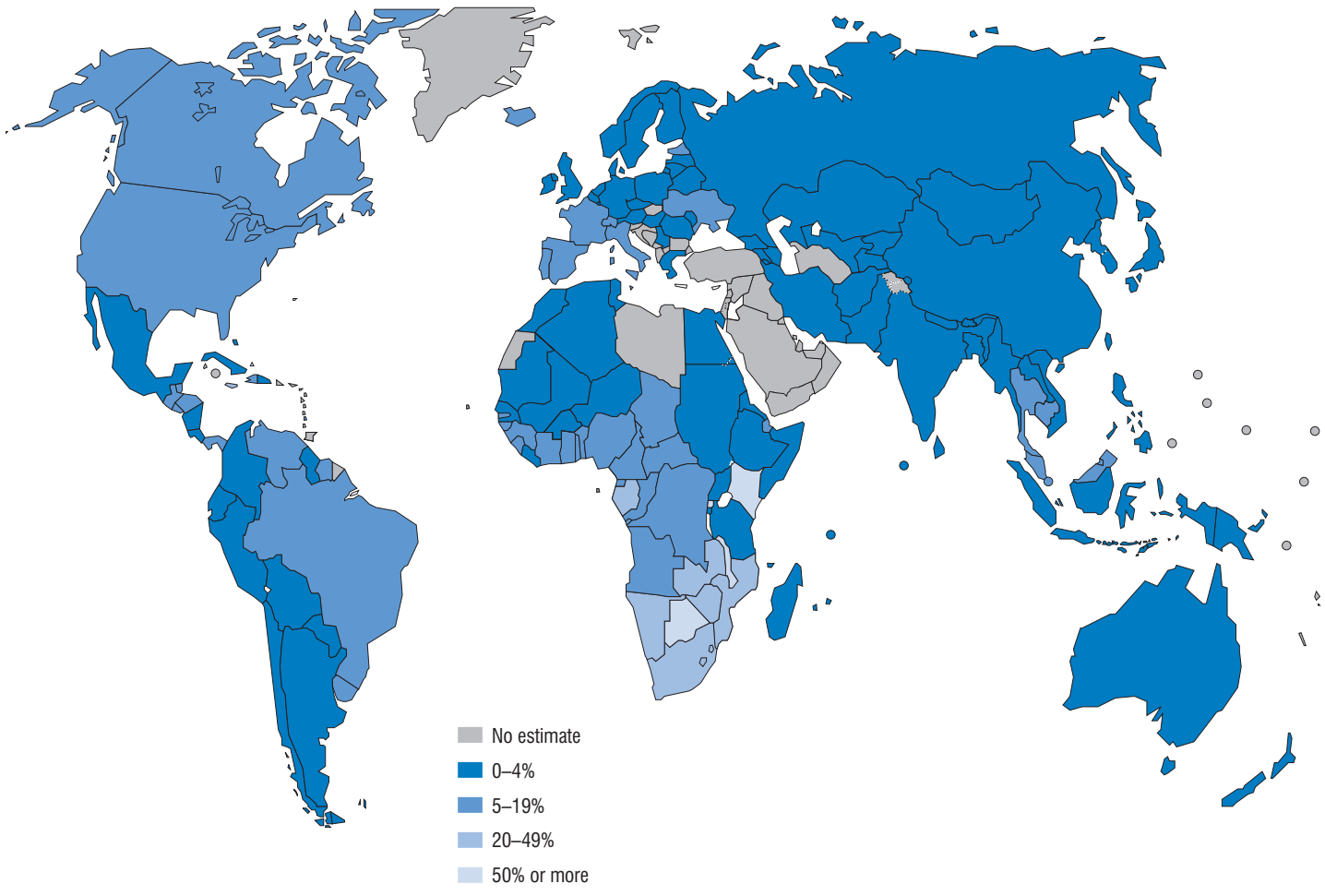
10 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

11 Section 2.2.1 draws largely from *Global tuberculosis control 2008 – surveillance, planning, financing (54)*. Addition relevant references are cited in this section.

Globally, 700 000 people living with HIV had TB in 2006. About 12% of deaths among people living with HIV globally are due to TB. Sub-Saharan Africa accounts for 85% of the people with both TB and HIV, with a disproportionately heavy burden in some countries (Fig. 2.13). South Africa, for example, has 0.7% of the world's population but accounts for 28% of the world's people with both HIV and TB and 33% of the cases in sub-Saharan Africa. Cohorts of people receiving antiretroviral therapy reveal high rates of TB among people initiating treatment, particularly in the first 6 months.

The dual epidemic of HIV and TB has considerable effects outside sub-Saharan Africa. TB incidence rates are high in many countries in Europe. Factors such as the high incidence of TB in many countries; the high level of multidrug-resistant TB; the appearance of extensive drug-resistant TB; the TB outbreaks in the growing pool of people living with HIV and the large population in prisons; and increasing population mobility make TB a regional emergency and call for effective region-wide control. Injecting drug use is a major driver of the HIV epidemic in many countries in Europe, and the concomitant risk of developing TB presents further complexity for HIV and TB case detection and management (including avoiding services and poor treatment adherence).

Fig. 2.13. Estimated HIV prevalence (%) among people newly infected with TB, 2006



Emergence of drug-resistant TB

Most cases of TB can be cured with a drug regimen of 6–8 months. However, the recent emergence of multidrug-resistant TB and extensively drug-resistant TB poses a significant public health threat, especially for countries with high HIV prevalence (Box 2.10).[12]

WHO-recommended interventions to prevent and address HIV/TB

Collaborative HIV/TB activities are essential to decrease the burden of TB among people living with HIV and the burden of HIV among people with TB and should be priorities for both HIV and TB control programmes. WHO has identified key HIV/TB collaborative activities (Box 2.11) for TB and HIV programmes to define and set priorities for implementing a joint response to the dual epidemic.

The number of countries with mechanisms and policies to address HIV/TB increased among the 63 HIV/TB priority countries WHO identified and surveyed in 2005–2006, representing more than 90% of the global HIV/TB burden (Fig. 2.14). However, some countries still lack some key public health interventions for preventing and treating TB (Box 2.12).

TB is a leading cause of mortality among injecting drug users living with HIV. TB-associated mortality rates are several-fold higher among drug users living with HIV than in the general population living with HIV *(58)*. WHO will issue new guidelines on providing comprehensive TB and HIV prevention, treatment and care services for drug users in late 2008.

Box 2.10. Increasing rates of multidrug-resistant TB and extensively drug-resistant TB

In February 2008, WHO released a report indicating that multidrug-resistant TB had reached the highest rates ever recorded *(56)*. The report was based on information collected on 90 000 people with TB in 81 countries between 2002 and 2006.

Almost half a million of the total of 9 million new cases of TB are multidrug-resistant TB. The highest prevalence rates of multidrug-resistant TB were reported in Azerbaijan, Moldova, the Russian Federation, Ukraine and Uzbekistan. Ukraine, for example, reported that the level of multidrug-resistant TB among people living with HIV was almost twice that of people with TB but without HIV. In sub-Saharan Africa, the region with both the highest rates of TB and HIV in the world, data were available for only six countries. This creates difficulty in assessing the true burden of coinfection.

The report also indicated that extensively drug-resistant TB, which is virtually untreatable, has been recorded in 45 countries and that HIV infection is strongly linked to multidrug-resistant TB. Recent data on extensively drug-resistant TB among people living with HIV in sub-Saharan Africa suggest a mortality rate of over 95%. Urgent action is needed to control extensively drug-resistant TB, including an increased focus on new approaches to preventing, diagnosing and treating TB. These include, but are not limited to, increased implementation of the "three Is" for people living with HIV: intensified case-finding for TB, isoniazid preventive therapy to prevent TB and infection control for TB. These interventions are intimately linked with screening for TB, a necessary part of the decision-making process for TB infection control, preventive therapy and diagnosis.

An estimated US$ 4.8 billion is needed for overall TB control in low- and middle-income countries in 2008, with US$ 1 billion required for multidrug-resistant TB and extensively drug-resistant TB alone.

12 Multidrug-resistant TB occurs when the TB bacteria are resistant to at least isoniazid and rifampicin, the two most powerful anti-TB drugs. Extensively drug-resistant TB is TB that is resistant to any fluoroquinolone and at least one of three injectable second-line drugs (capreomycin, kanamycin and amikacin) in addition to isoniazid and rifampicin.

Box 2.11. Recommended HIV/TB collaborative activities

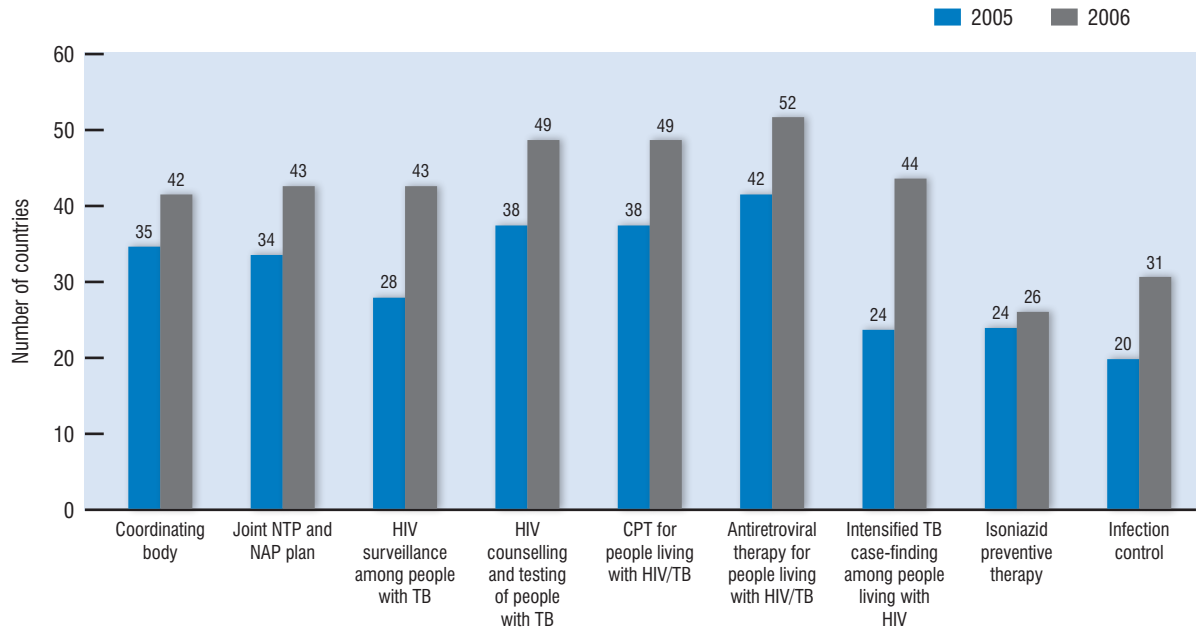
WHO recommends the following collaborative HIV/TB activities for national HIV and TB programmes *(57)*.

Establish mechanisms for collaboration
- Set up a coordinating body for HIV/TB activities effective at all levels
- Conduct surveillance of HIV prevalence among people with TB
- Carry out joint HIV/TB planning
- Conduct monitoring and evaluation

Decrease the burden of TB among people living with HIV
- Establish intensified TB case-finding
- Introduce isoniazid preventive therapy
- Ensure TB infection control in health care and congregate settings

Decrease the burden of HIV among people with TB
- Provide HIV testing and counselling
- Introduce HIV prevention methods
- Introduce co-trimoxazole preventive therapy
- Ensure HIV care and support
- Introduce antiretroviral therapy

Fig. 2.14. Mechanisms for collaboration and policies for collaborative HIV/TB activities among 63 priority countries, 2005–2006



NTP: national TB programme. NAP: national AIDS programme. CPT: co-trimoxazole preventive therapy.

Box 2.12. Scaling up co-trimoxazole prophylaxis and isoniazid preventive therapy

In 2007, WHO conducted a global survey to assess progress in developing and implementing policy recommendations on providing co-trimoxazole prophylaxis and isoniazid preventive therapy. The survey collected data on national policies on co-trimoxazole prophylaxis and isoniazid preventive therapy in HIV infection, their current level of implementation at various facilities and barriers to developing or implementing these policies. A self-administered questionnaire was addressed to WHO offices in 69 countries representing 98% of the global HIV/TB burden and 97% of the global HIV burden. Forty-one countries responded to the survey. The 41 responding countries represented 85% of the global HIV/TB burden and 82% of the global HIV burden.

Co-trimoxazole prophylaxis

Of the 41 respondent countries, 38 (93%) had developed national policy on providing co-trimoxazole prophylaxis to people living with HIV. However, only 25 countries (61%) had implemented the policy at the national scale (Fig. 2.16). In 24 of these 25 countries (96%), more than 80% of facilities providing antiretroviral therapy were also providing co-trimoxazole prophylaxis. However, TB care services provided little co-trimoxazole prophylaxis. Further, facilities providing services to children living with HIV and HIV-exposed infants provided little co-trimoxazole prophylaxis.

Overall, most countries included in the survey had made progress with developing policy on co-trimoxazole prophylaxis. However, many countries faced challenges in scaling up implementation. Erratic supply and stock-outs of co-trimoxazole at health care facilities were reported to be the major obstacle to scaling up co-trimoxazole prophylaxis policy at the national level in 70% of the countries that provided this information. Other barriers to national scaling up of the co-trimoxazole prophylaxis policy included insufficient training and supervision of health care workers, lack of human resources, lack of systems to monitor the provision of co-trimoxazole prophylaxis, insufficient advocacy on the benefits of co-trimoxazole prophylaxis, lack of integration of HIV/TB services and fear of stigma.

Greater advocacy on the benefits of co-trimoxazole prophylaxis and assistance to the countries to improve their drug management system can help countries in scaling up this intervention. The Global Fund to Fight AIDS, Tuberculosis and Malaria and other international funding agencies should consider including instructions on the importance of co-trimoxazole procurement and monitoring the scaling up of co-trimoxazole prophylaxis in their guidance for funding proposals.

Isoniazid preventive therapy

Of the 41 respondent countries, 21 (51%) had developed a national policy on providing isoniazid preventive therapy to people living with HIV. However only 15% (6 of 41 countries) had implemented the policy at the national scale (Fig. 2.16). Even in countries that had developed national policy on isoniazid preventive therapy, little isoniazid preventive therapy was provided in all facilities providing HIV and TB care.

Similarly, the development and implementation of isoniazid preventive therapy at the national level remains suboptimal in most of these countries. Difficulty in ruling out active TB, poor intensified TB case-finding, difficulty in diagnosing latent TB and concerns regarding adherence and the development of monoresistance to isoniazid were the main reasons provided for not developing and implementing a national policy on isoniazid preventive therapy. Other reasons included a lack of consensus among policy-makers and experts and uncertainty regarding the long-term benefits of isoniazid preventive therapy. Countries that had developed policy on isoniazid preventive therapy faced similar challenges to achieve national scale-up.

Strong advocacy, dissemination of the strong evidence-based information regarding the benefits and feasibility of isoniazid preventive therapy and issuing updated normative guidelines for the implementation of isoniazid preventive therapy as an essential component of HIV care can assist countries in adopting and implementing isoniazid preventive therapy guidelines on a large scale. A recent WHO expert consultation on the “three Is” recommended the urgent development of co-packaged and/or co-formulated co-trimoxazole and isoniazid to address issues regarding logistics, adherence and integration of services.

Global coverage of collaborative HIV/TB activities

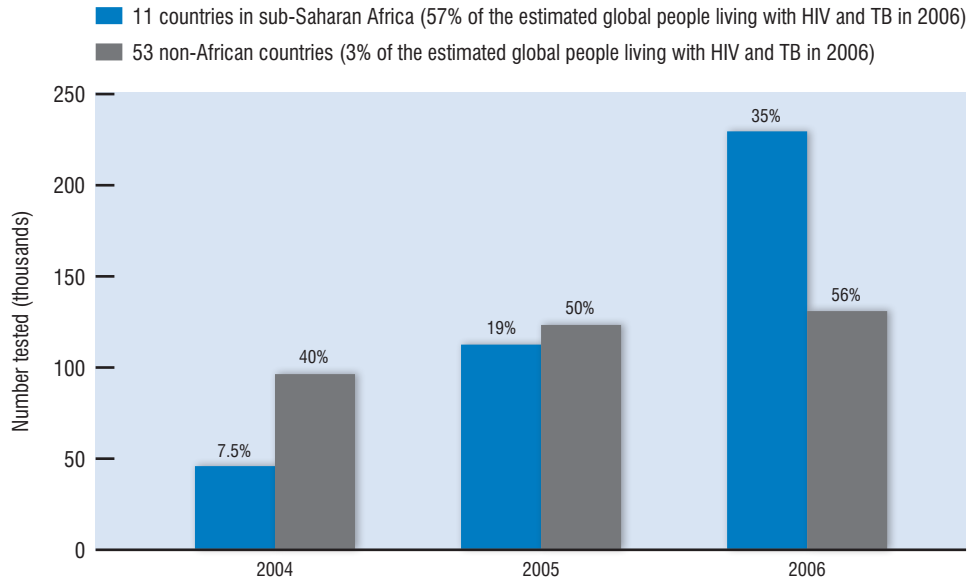
Decreasing the burden of HIV among people with TB

Countries have made progress in both HIV and TB prevention programmes in recent years. Remarkable progress has been made in implementing interventions designed for people living with TB, particularly HIV testing, the provision of co-trimoxazole and access to antiretroviral therapy.

However, despite the expansion in HIV testing and counselling of people with TB in recent years, overall coverage still remains insufficient *(54)*. Almost 700 000 people with TB were tested for HIV in 2006 in 112 reporting countries, up from 470 000 in 2005 and 22 000 in 2002. The total number of people with TB tested for HIV in 2006 represents 12% of notified TB cases globally and 22% of notified TB cases in sub-Saharan Africa. On average, half the people with TB who are tested for HIV are found to be HIV-positive. Not testing the remaining 78% of people with TB in sub-Saharan Africa therefore represents a potentially huge missed opportunity for prevention, care and treatment for people living with TB and HIV.

Noteworthy increases in HIV testing and counselling of people with TB have been reported in some countries in sub-Saharan Africa with a high HIV/TB burden (Fig. 2.15). The percentage of notified TB cases that were tested for HIV quadrupled from 7.5% to 35% among 11 countries in sub-Saharan Africa that reported data for all years 2002–2006 and accounted for more than 50% of the world's HIV-positive people with TB. The highest testing rates were achieved in Rwanda (76%), Malawi (64%) and Kenya (60%). Progress in HIV testing and counselling of people with TB has also been significant in some countries is Asia. In Malaysia, 69% of people with TB had an HIV test recorded in the TB registers between January and September 2007.[13]

Fig. 2.15. Number and percentage of notified TB cases who were tested for HIV in the 64 countries that reported data for each year from 2004 to 2006



The numbers above the bars are the percentage of people with notified TB who were tested for HIV.

13 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

In addition to scaling up HIV testing and counselling as a routine activity, countries also need to implement comprehensive and effective prevention approaches for people living with HIV and TB to address difficult issues such as partner testing, family planning, discordant couple counselling and HIV and TB case-finding among family members. Several countries have initiated these activities, and activities such as partner testing for people living with HIV and TB are expected to become the standard of care in areas with higher HIV prevalence.

There has also been considerable progress in providing co-trimoxazole prophylaxis and antiretroviral therapy to people living with HIV and TB. The number of people living with HIV and TB treated with co-trimoxazole prophylaxis reached 147 000 in 2006, which represents 78% of the people living with HIV and TB that were identified through testing and 2.5 times higher than the 58 000 people treated with co-trimoxazole prophylaxis in 2005. A larger number of people living with HIV and TB could receive co-trimoxazole prophylaxis if more countries were to emulate the high rates of HIV testing in such countries as Kenya, Malawi and Rwanda.

Globally, about 67 000 people living with HIV and TB began antiretroviral therapy in 2006. This is more than twice the 29 000 people living with HIV and TB reported to have enrolled in antiretroviral therapy programmes in 2005 and seven times the number reported in 2004 (9800 people living with HIV and TB). Overall, 41% of diagnosed people living with HIV and TB were enrolled in antiretroviral therapy programmes. As with co-trimoxazole prophylaxis, one reason why numbers fall short is that HIV testing rates are not yet high enough (Box 2.12).

Decreasing the burden of TB among people living with HIV

Expanding the prevention and treatment of TB among people living with HIV is an urgent priority for both HIV and TB programmes. There are several key public health interventions for preventing and treating TB including the "three Is": isoniazid preventive treatment, intensified case-finding for active TB and TB infection control (Box 2.13).

Despite the significant progress made in targeting people living with TB, the implementation of interventions to reduce the impact of TB among people living with HIV is far below the targets set in 2006 in the Global Plan to Stop TB 2006–2015 *(62)*.

Intensified case-finding or screening for TB among people living with HIV remains low. Only about 314 200 people living with HIV were reported to be screened for TB in 2006, which represents a tiny fraction of the global target of screening 11 million people living with HIV by 2015.

The recent outbreak of extensively drug-resistant TB in Tugela Ferry, South Africa, with nearly 100% mortality among people living with HIV, has re-emphasized the serious need for improved TB infection control, especially in settings providing services to people living with HIV. Although some countries have recognized the need to scale up TB infection control, progress in implementing infection control interventions has been very slow. WHO will update its current guidelines on preventing TB infection in health care facilities in resource-limited settings *(59,60)* in the second half of 2008.

Box 2.13. The "three Is": priority and linked public health interventions for people living with HIV

Intensified case-finding

HIV services are using several screening approaches to intensify their TB case-finding efforts. Screening people living with HIV for TB is a vital first step in TB infection control and in deciding whether to place someone on isoniazid preventive therapy or TB treatment.

Infection control for TB

TB infection control measures are essential to prevent the spread of *Mycobacterium tuberculosis* to vulnerable people, health care workers and the community. WHO issued TB infection control guidelines for resource-limited settings in 1999 *(59)* including an addendum in 2006 *(60)*. Appropriate infection control measures (for example, developing a TB infection control plan, "fast-tracking" coughing patients, assuring rapid TB diagnosis, improving ventilation, etc.) should be implemented and reviewed periodically to minimize the transmission risk.

Isoniazid preventive therapy

TB preventive therapy is safe and effective for people living with HIV in a setting with high TB prevalence. It reduces the risk of developing active TB in the short term by 60% of what it would have been without such treatment *(61)*. Although antiretroviral therapy for the people who are eligible significantly reduces the risk of developing TB, isoniazid preventive therapy has significant added value for people living with HIV in areas with high TB prevalence. Integrating isoniazid preventive therapy into routinely provided HIV care services is therefore a high priority and should contribute to other efforts to reduce the impact of TB on people living with HIV.

Provision of isoniazid preventive therapy to people living with HIV also remains extremely low. About 27 000 people living with HIV but without active TB were started on isoniazid preventive therapy in 2006. This represents only 0.1% of the 33 million people estimated to be infected with HIV worldwide. Seventy per cent of those started on isoniazid preventive therapy in 2006 were in Botswana.

Although guidelines do exist, national programmes need additional operational guidance on how to scale up comprehensive TB prevention activities within HIV clinical settings. WHO convened an expert consultation on the "three Is" in April 2008 with key stakeholders including government, expert, donor, and civil society representatives. The participants discussed key challenges to implementation and developed recommendations regarding specific actions to increase implementation. WHO will continue to work with countries to develop guidance for national programmes to scale up access to these vital interventions for people living with HIV.

2.2.2 HIV and viral hepatitis

Of the more than 30 million people living with HIV worldwide, about 3 million people are estimated to be chronically infected with hepatitis B virus and around 4–5 million people are estimated to be coinfected with hepatitis C virus *(63)*.

Rates of hepatitis B virus infection are high in the endemic countries of Asia and Africa, where infection occurs perinatally or early in life. The prevalence of hepatitis B virus infection is also high among men who have sex with men in high-income countries as a result of sexual transmission of hepatitis B virus. More than half the men who have sex with men in these countries have evidence of past hepatitis B virus infection, and 5–10% have chronic hepatitis B virus infection.

The prevalence of chronic hepatitis C virus infection among people living with HIV in western Europe and the United States is estimated to be 25–30%. Coinfection rates average over 40% in eastern Europe, with rates as high as 70–95% estimated for Estonia, the Russian Federation and Ukraine. Hepatitis C virus transmission is ongoing among men who have sex with men in the United States of America *(64)*.

Because both hepatitis B virus and hepatitis C virus are efficiently transmitted by sharing contaminated needles and other injecting equipment (such as water and solution), HIV, hepatitis B virus and hepatitis C virus coinfection are common among injecting drug users. The prevalence of hepatitis C virus among injecting drug users living with HIV has been estimated at 72–95% in some countries *(63)*.

An effective vaccine exists for hepatitis B virus. It needs to be used more widely to protect the people at risk of hepatitis B virus, including injecting drug users, infants, men who have sex with men, sex workers and health care workers who risk nosocomial infection from needle-stick injuries. There is no vaccine for hepatitis C virus, but harm reduction measures effectively protect against HIV, hepatitis B virus and hepatitis C virus.

Several antiretroviral drugs, including lamivudine and tenofovir, are highly effective against chronic hepatitis B virus infection. Operational research studies are being undertaken to identify the best way to manage HIV and hepatitis B virus co-therapy and to avoid the emergence of drug resistance to hepatitis B virus.

Access to treatment for hepatitis B virus and hepatitis C virus is limited in most countries, especially among injecting drug users and people in drug treatment programmes, in part due to the high cost of treatment. Recent evidence *(65)* indicates that treatment adherence among current and former injecting drug users is comparable to that of non-users. However, in many countries, injecting drug users continue to be explicitly excluded from treatment due to fears of drug–drug interactions and the possibility of reinfection regardless of their clinical indication, their willingness to receive treatment and the proven efficacy of treating hepatitis B virus and hepatitis C virus infection in this population.

As antiretroviral therapy becomes more widely available and individuals live longer, the patterns of comorbidity and mortality among people living with HIV are changing. Chronic liver disease, a major complication of chronic infection with hepatitis B virus and hepatitis C virus, now causes significant morbidity and mortality among people living with HIV *(66,67)*. HIV accelerates the disease progression of both hepatitis B virus and hepatitis C virus, and reactivating both infections can complicate immune reconstitution inflammatory syndrome. There is therefore a pressing need to better assess the magnitude of disease associated with hepatitis B virus and hepatitis C virus among people living with HIV and to ensure that appropriate treatment is available for coinfected individuals. Underlying chronic liver disease can also increase significantly the toxicity of some antiretroviral drugs.

2.2.3 HIV and other comorbidity

The global scaling up of antiretroviral therapy has increased the survival rates of people living with HIV in resource-limited settings. However, it has also been associated with the emergence of other types of comorbidity apparently associated with the persistence of HIV infection among them.

Several clinical studies have examined changes in mortality patterns among people living with HIV in the era of highly active antiretroviral therapy. Studies from both high-income and low- and middle-income countries *(68,69)* are finding that non-AIDS-defining comorbidity diseases – such as diabetes mellitus, cancer, cardiovascular disease, liver disease and other non AIDS-defining comorbidity – are rapidly replacing AIDS-defining illnesses as more likely causes of death among people living with HIV than in the general population.

The incidence of HIV-associated malignancies continues to increase in resource-limited settings where antiretroviral therapy is not yet widely available. Kaposi's sarcoma is now the most frequently reported malignancy in many countries in sub-Saharan Africa. In some areas, Kaposi's sarcoma is more common among men than all other types of cancer combined. In contrast, in the United States, Europe and Australia, the incidence of Kaposi's sarcoma among people living with HIV has declined by at least 70% since 1997, when highly active antiretroviral therapy became widely available *(70)*. The long-term risk of AIDS- and non-AIDS-defining cancer among people on antiretroviral therapy is uncertain. However an increased risk of AIDS- and non-AIDS-defining cancer has been identified in some observational cohorts in Europe, particularly among people with prolonged immunosuppression *(71,72)*.

WHO will work with partners in coming years to address these emerging issues. Planned actions include establishing a global database linked with international cancer registry and research protocols, simplified treatment protocols and links with prevention and palliative care for people living with HIV who have cancer.

References

1. *Treating 3 million by 2005: making it happen. The WHO strategy*. Geneva, World Health Organization and UNAIDS, 2003 (http://www.who.int/3by5/publications/documents/isbn9241591129/en, accessed 5 May 2008).
2. WHO and UNAIDS. *Progress on global access to HIV antiretroviral therapy: a report on "3 by 5" and beyond. March 2006*. Geneva, World Health Organization, 2006 (http://www.who.int/mediacentre/news/releases/2006/pr13/en/index.html, accessed 5 May 2008).
3. Publications: Reference Group reports [web site]. UNAIDS Reference Group on Estimates, Modelling and Projections (http://www.epidem.org/publications.htm, accessed 5 May 2008).
4. Stover J et al. Projecting the demographic impact of AIDS and the number of people in need of treatment: updates to the Spectrum projection package. *Sexually Transmitted Infections*, 2006, 82(Suppl 3):iii45–iii50. An update will be published in *Sexually Transmitted Infections* (in press).
5. *Antiretroviral therapy for HIV infection in adults and adolescents: recommendations for a public health approach. 2006 revision*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/guidelines/adult/en/index.html, accessed 5 May 2008).
6. Gilks C et al. The WHO public-health approach to antiretroviral treatment against HIV in resource-limited settings. *Lancet*, 2006, 368:505–510.
7. Fredlund VG, Nash J. How far should they walk? Increasing antiretroviral therapy access in a rural community in northern KwaZulu-Natal, South Africa. *Journal of Infectious Diseases*, 2007, 196(Suppl 3):496–473.
8. Bedelu M et al. Implementing antiretroviral therapy in rural communities: the Lusikikisi model of decentralized HIV/AIDS care. *Journal of Infectious Diseases*, 2007, 196(Suppl 3):464–468.
9. IMAI/IMCI guideline modules [web site]. Geneva, World Health Organization, 2008 (http://www.who.int/hiv/capacity/modules/en/index.html, accessed 5 May 2008).
10. *Monthly HIV care and antiretroviral therapy update*. Addis Ababa, AIDS resource Center, Ethiopian National HIV/AIDS Prevention and Control Office, 10 January 2008 (http://www.etharc.org/arvinfo/artupdate/ARTTah2000Jan2008.pdf, accessed 5 May 2008).
11. Uganda Ministry of Health, ORC Macro and MEASURE DHS. *2004-05 Uganda HIV/AIDS sero-behavioural survey. Uganda: prevalence of HIV and other sexually transmitted infections*. Calverton, MD, ORC Macro and MEASURE DHS, 2006 (http://www.phishare.org/documents/MEASUREDHS/4188, accessed 5 May 2008).
12. Ojikutu BO, Stone VE. Women, inequality, and the burden of HIV. *New England Journal of Medicine*, 2005;352:649.
13. Braitstein P et al. Gender and the use of antiretroviral treatment in resource-constrained settings: findings from a multicenter collaboration. *Journal of Women's Health*, 2008, 17:47–55.
14. Donoghoe M et al. Access to highly active antiretroviral therapy for injecting drug users in the WHO European Region 2002–2004. *International Journal of Drug Policy*, 2007, 18:271–280.
15. UNAIDS and WHO Regional Office for Europe. *Monitoring progress on the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia*. Copenhagen, WHO Regional Office for Europe, 2008.
16. Souteyrand Y et al. Free care at the point of service delivery: a key component for reaching universal access to HIV/AIDS treatment in developing countries. *AIDS* (in press).
17. REACH Trust (Malawi), Ministry of Health (Malawi) and World Health Organization. *The impact of socioeconomic status on patients' access to antiretroviral therapy in Malawi – preliminary report*. Unpublished, 2008.
18. Hogan DR, Salomon JA. Prevention and treatment of human immunodeficiency virus/acquired immunodeficiency syndrome in resource-limited settings. *Bulletin of the World Health Organization*, 2005, 83:135–143.
19. Braitstein P et al. Mortality of HIV-1-infected patients in the first year of antiretroviral therapy: comparison between low-income and high-income countries. *Lancet*, 2006, 367:817–824.
20. Hacker MA. The first ten years: achievements and challenges of the Brazilian program of universal access to HIV/AIDS comprehensive management and care, 1996–2006. *Cadernos de Saúde Pública*, 2007, 23(Suppl 3):S345–S359.
21. Boulle A, Ford N. Scaling up antiretroviral therapy in developing countries: what are the benefits and challenges? *Sexually Transmitted Infections*, 2007, 83:503–505.
22. Nash D et al. Long-term CD4 response to potent ART among ART-naïve patients in several low-income countries. *15th Conference on Retroviruses and Opportunistic Infections, Boston, USA, 3–6 February 2008* (Abstract 126; http://www.retroconference.org/2008/Abstracts/31581.htm, accessed 5 May 2008).
23. Mermin J et al. Mortality in HIV-infected Ugandan adults receiving antiretroviral treatment and survival of their HIV-uninfected children: a prospective cohort study. *Lancet*, 2008, 371:752–759.
24. Hacker MA. The first ten years: achievements and challenges of the Brazilian program of universal access to HIV/AIDS comprehensive management and care, 1996–2006. *Cadernos de Saúde Pública*, 2007, 23(Suppl 3):S345–S359.

25. Mills EJ et al. Adherence to antiretroviral therapy in sub-Saharan Africa and North America: a meta-analysis. *Journal of the American Medical Association*, 2006, 296:679–690.
26. Maartens G. ART in Africa: beyond the rollout. *15th Conference on Retroviruses and Opportunistic Infections, Boston, USA, 3–6 February 2008* (http://www.retroconference.org/2008/Abstracts/33418.htm).
27. Johannessen A et al. Predictors of mortality in HIV-infected patients starting antiretroviral therapy in a rural hospital in Tanzania. *BMC Infectious Diseases*, 2008, 8:52.
28. Brinkhof M et al. Early loss to program in HIV-infected patients starting potent antiretroviral therapy in lower-income countries. *Bulletin of the World Health Organization* (in press).
29. Rosen S, Fox M, Gill C. Patient retention in antiretroviral therapy programs in sub-Saharan Africa: a systematic review. *PLoS Medicine*, 2007, 10:e29.
30. Kennedy C et al. The impact of HIV treatment on risk behaviour in developing countries: a systematic review. *AIDS Care*, 2007, 19:707–720.
31. Kaida A et al. The relationship between HAART use and sexual activity among HIV-positive women of reproductive age in Brazil, South Africa, and Uganda. *AIDS Care*, 2008, 20:21–25.
32. Montaner J et al. The case for expanding access to highly active antiretroviral therapy to curb the growth of the epidemic. *Lancet*, 2006, 368:53–56.
33. Bunnell R et al. 3-year follow-up of sexual behavior and HIV transmission risk of persons taking ART in rural Uganda. *15th Conference on Retroviruses and Opportunistic Infections, Boston, USA, 3–6 February 2008* (Abstract 29; http://www.retroconference.org/2008/Abstracts/31270.htm, accessed 5 May 2008).
34. Kazatchkine M. Stopping the plagues: investing in health can create stronger economies. In: *The Economist: the world in 2008*. London, The Economist, 2007.
35. Larson BA et al. Early effects of antiretroviral therapy on work performance: preliminary results from a cohort study of Kenyan agricultural workers. *AIDS*, 2008, 30:22: 421–425.
36. Bennett DE et al. The World Health Organization's global strategy for prevention and assessment of HIV drug resistance. *Antiviral Therapy*, 2008, 13(Suppl 2):1–13.
37. Abegaz WE et al. Threshold survey evaluating transmitted HIV drug resistance among public antenatal clinic clients in Addis Ababa, Ethiopia. *Antiviral Therapy*, 2008, 13(Suppl 2):89–94.
38. Kamoto K, Aberle-Grasse J on behalf of Members of the Malawi HIV Drug Resistance Task Force. Surveillance of transmitted HIV drug resistance with the World Health Organization threshold survey method in Lilongwe, Malawi. *Antiviral Therapy*, 2008, 13(Suppl 2):69–75.
39. Pillay V et al. Antiretroviral drug resistance surveillance among drug-naive HIV-1-infected individuals in Gauteng Province, South Africa in 2002 and 2004. *Antiviral Therapy*, 2008, 13(Suppl 2):101–107.
40. Maphalala G et al. Surveillance of transmitted HIV drug resistance in the Manzini-Mbabane corridor, Swaziland, in 2006. *Antiviral Therapy*, 2008, 13(Suppl 2):95–100.
41. Sirivichayakul S et al. HIV drug resistance transmission threshold survey in Bangkok, Thailand. *Antiviral Therapy*, 2008, 13(Suppl 2):109–113.
42. Somi GR et al. Surveillance of transmitted HIV drug resistance among women attending antenatal clinics in Dar es Salaam, Tanzania. *Antiviral Therapy*, 2008, 13(Suppl 2):77–82.
43. Nguyen HT et al. HIV drug resistance threshold survey using specimens from voluntary counselling and testing sites in Hanoi, Vietnam. *Antiviral Therapy*, 2008, 13(Suppl 2):115–121.
44. Bennett DE et al. Recommendations for surveillance of transmitted HIV drug resistance in countries scaling up antiretroviral treatment. *Antiviral Therapy*, 2008, 13(Suppl 2):25–36.
45. *Prioritizing second-line antiretroviral drugs for adults and adolescents: a public health approach. Report of a WHO working group meeting, Geneva, Switzerland, 21–22 May 2007*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/pub/meetingreports/art_meeting/en, accessed 5 May 2008).
46. *Use of antiretroviral therapy in resource-limited countries in 2007: distribution and uptake of first- and second-line regimens*. Geneva, World Health Organization (in press).
47. Renaud-Théry F et al. Use of antiretroviral therapy in resource-limited countries in 2006: distribution and uptake of first- and second-line regimens. *AIDS*, 2007, 21(suppl 4):S89–S95.
48. *Pharmacovigilance for antiretrovirals in resource-poor countries*. Geneva, World Health Organization, 2007 (http://www.who.int/medicines/en, accessed 5 May 2008).
49. *Survey of the quality of antiretroviral medicines circulating in selected African countries*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/amds/selection/en/index.html, accessed 5 May 2008).
50. Global Price Reporting Mechanism [web site]. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/amds/gprm/en/index.html, accessed, 5 May 2008.
51. *Addendum to 2006 WHO guidelines on antiretroviral therapy for HIV infection in adults and adolescents: new dosage recommendations for stavudine (d4T)*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/pub/guidelines/adult/en/index.html, accessed 5 May 2008).

52. *WHO case definitions of HIV for surveillance and revised clinical staging and immunological classification of HIV-related disease in adults and children*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/pub/guidelines/hivstaging/en/index.html, accessed 5 May 2008).
53. Phillips AN et al. Outcomes from monitoring of patients on antiretroviral therapy in resource-limited settings with viral load, CD4 count, or clinical observation alone: a computer simulation model. *Lancet*, 2008, 371:1443–1451.
54. *Global tuberculosis control 2008 – surveillance, planning, financing*. Geneva, World Health Organization, 2008 (http://www.who.int/tb/publications/global_report/en, accessed 5 May 2008).
55. d'Arminio Monforte A et al. The changing incidence of AIDS events in patients receiving highly active antiretroviral therapy. *Archives of Internal Medicine*, 2005, 165:416–423.
56. *Anti-tuberculosis drug resistance in the world. Fourth global report*. Geneva, World Health Organization, 2008 (http://www.who.int/mediacentre/news/releases/2008/pr05/en/index.html, accessed 5 May 2008).
57. *Interim policy on collaborative TB/HIV activities*. Geneva, World Health Organization, 2008 (http://www.who.int/hiv/pub/tb/tbhiv/en, accessed 5 May 2008).
58. Wobeser W et al. Outcome of pulmonary tuberculosis treatment in the tertiary care setting – Toronto 1992/3. Tuberculosis Treatment Completion Study Group. *Canadian Medical Association Journal*, 1999, 160:789–794.
59. *Guidelines for the prevention of tuberculosis in health care facilities in resource-limited settings*. Geneva, World Health Organization, 1999 (http://www.who.int/tb/publications/who_tb_99_269/en/index.html, accessed 5 May 2008).
60. *Tuberculosis infection control in the era of expanding HIV care and treatment: addendum to WHO guidelines for the prevention of tuberculosis in health care facilities in resource-limited settings*. Geneva, World Health Organization, 2006 (http://www.who.int/tb/publications/who_tb_99_269/en/index.html, accessed 5 May 2008).
61. World Health Organization and UNAIDS. *Policy statement on preventive therapy against tuberculosis in people living with HIV. Report of a meeting held in Geneva 18–20 February 1998*. Geneva, World Health Organization, 1998 (libdoc.who.int/hq/1998/WHO_TB_98.255.pdf, accessed 5 May 2008).
62. *The Global Plan to Stop TB 2006–2015*. Geneva, Stop TB Partnership, 2006 (http://www.stoptb.org/globalplan, accessed 5 May 2008).
63. Alter MJ. Epidemiology of viral hepatitis and HIV co-infection. *Journal of Hepatology*, 2006, 44:S6–S9.
64. Jaffe HW, Valdiserri RO, De Cock KM. The re-emerging HIV/AIDS epidemic in men who have sex with men. *Journal of the American Medical Association*, 2007, 298:2412–2414.
65. Lazarus J et al. HIV/hepatitis coinfection in eastern Europe and new pan-European approaches to hepatitis prevention and management. *International Journal of Drug Policy*, 2007, 18:426–432.
66. Palella FJ Jr et al. Mortality in the highly active antiretroviral therapy era: changing causes of death and disease in the HIV outpatient study. *Journal of Acquired Immune Deficiency Syndromes*, 2006, 43:27–34.
67. Smit C et al. Effective therapy has altered the spectrum of cause-specific mortality following HIV seroconversion. *AIDS*, 2006, 20:741–749.
68. Pacheco A et al. Increase in non-AIDS related conditions as causes of death among HIV-infected individuals in the HAART era in Brazil. *PLoS ONE*, 2008, 3:e1531.
69. Phillips A. Morbidity and mortality in the HAART era. *15th Conference on Retroviruses and Opportunities Infections 2008, Boston, MA, 3–6 February 2008* (Abstract 8; http://www.retroconference.org/2008/Abstracts/33423.htm, accessed 5 May 2008).
70. Newton R. HIV and cancer. *13th Conference on Retroviruses and Opportunistic Infections 2006, Denver, CO, 5–8 February 2006* (Abstract 11; http://www.retroconference.org/2006/Abstracts/28024.HTM, accessed 5 May 2008).
71. Bruyand M et al. Immunodeficiency and risk of AIDS-defining and non-AIDS-defining cancers: ANRS CO3 Aquitaine Cohort, 1998 to 2006. *15th Conference on Retroviruses and Opportunities Infections 2008, Boston, MA, 3–6 February 2008* (Abstract 15; http://www.retroconference.org/2008/Abstracts/31415.htm, accessed 5 May 2008).
72. Zoufaly A et al. Insufficient virus suppression during HAART is a strong predictor for the development of AIDS-related lymphoma: German CLINSURV cohort. *15th Conference on Retroviruses and Opportunities Infections 2008, Boston, MA, 3–6 February 2008* (Abstract 16; http://www.retroconference.org/2008/Abstracts/31284.htm, accessed 5 May 2008).

3. HIV TESTING AND COUNSELLING

Key findings

- The number of facilities providing HIV testing and counselling services increased substantially between 2006 and 2007 in countries with comparable data, accompanied by increased uptake.

- In low- and middle-income countries that conducted population-based surveys between 2005 and 2007:
  - a median of 10.9% of women and 10.3% of men had ever received an HIV test and the test results (data from 17 countries); and
  - a median of 20% of people living with HIV knew their HIV status (data from 12 countries).

- Evidence indicates that provider-initiated testing and counselling in health facilities can lead to increased testing uptake and clinical benefits

Scaling up access to HIV testing and counselling is a prerequisite for accelerating access to other HIV-related interventions. For people living with HIV, taking an HIV test is the first step to accessing treatment and care and presents an opportunity to obtain information and take measures to reduce the risk of HIV transmission. People who test HIV-negative can receive counselling on how to reduce their risk of exposure to HIV and stay negative. HIV testing and counselling therefore comprises a critical intervention in efforts to achieve universal access to HIV prevention, treatment, care and support.

Ensuring that HIV testing and counselling is accessible, acceptable, affordable, safe and reliable for everyone in need requires a comprehensive effort in policies and programmes. Countries are implementing diverse approaches to expand knowledge of HIV status and improve the quality of testing and counselling services. Nevertheless, global coverage of HIV testing and counselling remains low. In 2007, WHO and UNAIDS issued guidance on provider-initiated HIV testing and counselling in health facilities to increase the uptake of testing and counselling and improve access to health services *(1)*.

3.1 Global availability and coverage of HIV testing and counselling

Globally, several factors have expanded the coverage of HIV testing and counselling in recent years, including the use of rapid tests and increased support for provider-initiated approaches to HIV testing and counselling in health care settings, including for preventing the mother-to-child transmission of HIV. Greater awareness of the risks of HIV transmission and the availability of antiretroviral therapy probably also contributed to the increased number of people learning their HIV status.

Although the number of individuals receiving an HIV test can be counted, the coverage of HIV testing and counselling is more difficult to assess. Whether an adequate level of coverage has been reached depends on the size and characteristics of the population needing testing and counselling, which in turn depends on a country's epidemic and context, including how many people already know their HIV status. Having comparable country data on various approaches to testing and on population groups that receive testing services, supporting factors and barriers would be ideal. However, such data are not readily available globally. Efforts are ongoing to encourage country programmes to use standardized indicators to monitor the national utilization of HIV testing and counselling and to facilitate future analyses of global trends.

In the absence of standardized information, the uptake of HIV testing and counselling can be monitored over time in countries for which data are available and some trends and patterns can be assessed. The data presented below, compiled through WHO's annual questionnaires, are collected from two major sources: population-based surveys conducted in countries in recent years and national programme statistics. Population-based surveys such as demographic and health surveys *(2)* are useful as they provide a nationally representative picture of the population. Programme statistics are telling because they provide information on the actual uptake of various interventions provided.

Availability of HIV testing and counselling services

The most recent international guidance *(1)* states that HIV testing and counselling should be recommended to all people seen in all health facilities in generalized epidemics and in selected health facilities in low-level and concentrated epidemics.

Uptake of the recommended HIV testing and counselling is more likely to be achieved when the test can be provided on site. Seventeen countries[1] reported comparable data on the availability of HIV testing and counselling services in 2006 and 2007. They represent a range of HIV prevalence levels and responses to the epidemic in Africa and Asia. In these 17 countries, the total number of facilities providing testing and counselling services increased from 6294 in 2006 to 15 723 in 2007.

Additional countries reported data on the availability of HIV testing and counselling in 2007. Table 3.1 presents data from selected countries. The percentage of health facilities with testing and counselling services varies among some of the countries with the highest prevalence. For example, 31% of health facilities provided testing and counselling in Burkina Faso, 68% in Swaziland and 100% in Botswana.[2] Table 3.1 also shows large disparities in the availability of testing and counselling facilities in relation to population size, both in countries with generalized epidemics (varying from one facility for 1900 people in Botswana to one facility for 120 000 people in Papua New Guinea) and countries with low-level and concentrated epidemics (varying from one facility for 3900 people in Guyana to one for 190 000 people in India). These data will serve as a baseline to gauge and compare progress in the future.

1 The 17 countries are: Benin, Cameroon, China, Cote d'Ivoire, Democratic Republic of the Congo, Djibouti, Ghana, India, Islamic Republic of Iran, Malawi, Mozambique, Nigeria, Papua New Guinea, United Republic of Tanzania, Viet Nam, Yemen and Zimbabwe. Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2006 and 2007.

2 Based on data reported to WHO in the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

Table 3.1. Availability and density of facilities providing HIV testing and counselling services and access to HIV testing and counselling in selected countries, 2007

Country	Type of epidemic	Percentage of health facilities with testing and counselling services	Population aged ≥15 years per testing and counselling facility	Number of people aged ≥15 years who received an HIV test[d]	Number of tests per 1000 population aged ≥15 years
Botswana	Generalized	100%	1 900	270 000	220
Burkina Faso	Generalized	31%	18 000	85 000	11
Central African Republic	Generalized	4%	100 000	2 700	1
Madagascar	Concentrated	19%	18 000	48 000	4
Malawi	Generalized	78%	15 000	660 000	89
Mauritania	Concentrated	4%	86 000	870	<1
Nigeria	Generalized	3%	110 000	450 000	6
Rwanda	Generalized	70%	18 000	730 000[a]	130
Swaziland	Generalized	68%	6 400	52 000	75
Bolivia	Low	3%	61 000	11 000	2
Guyana	Concentrated	41%	3 900	13 000	26
Haiti	Generalized	19%	43 000	290 000	48
Cambodia	Concentrated	18%	49 000	180 000[b]	19
India	Concentrated	...	190 000	5 400 000	7
Iran (Islamic Republic of)	Concentrated	1%	180 000	21 000[c]	<1
Papua New Guinea	Generalized	5%	120 000	27 000	7

... not available.
a From January to November 2007;
b From January to September 2007;
c From March 2006 to February 2007;
d Based on country-reported data.

HIV epidemics are categorized as generalized, low and concentrated based on the following numerical proxies:

- generalized epidemics: HIV prevalence consistently exceeding 1% among pregnant women;
- low-level epidemics: HIV prevalence has not consistently exceeded 5% in any defined subpopulation; and
- concentrated epidemics: HIV prevalence consistently exceeding 5% in at least one defined subpopulation and HIV prevalence below 1% among pregnant women in urban areas.

Recent health facility surveys conducted in four high-prevalence countries in Africa *(3–6)* show that HIV testing and counselling services are generally more widely available in hospitals as compared to other health facilities, although the latter account for a large proportion of all facilities in most countries (Table 3.2). In Uganda, almost all hospitals and county-level facilities (amounting to 10% of health facilities nationwide) provide testing and counselling services. In contrast, less than one quarter of other health facilities (at the sub-county and parish levels, accounting for 90% of health facilities) provide these services.

The data also suggest that HIV testing and counselling services are more widely available in private-owned facilities than in public facilities.

Further, testing and counselling services are more widely available in cities than in rural areas *(3–6)*. The availability of testing and counselling services can also vary among regions within a country. In countries where most of the population lives in rural areas, expanding services in health facilities in more remote settings, if the services are not currently available, is important. Civil society organizations, especially nongovernmental organizations, have an important role to play in strengthening HIV testing and counselling in remote areas or among neglected subpopulations.

Uptake of HIV testing and counselling

The growing availability of services in the countries that reported data in 2006 and 2007 has been accompanied by increased uptake of HIV testing and counselling. In Honduras, the total number of individuals who received an HIV test increased from 5522 in 2006 to 98 566 in 2007. In Ghana, the total number of individuals who received an HIV test increased from 23 754 in 2006 to 306 759 in 2007. Similarly, the reported number of individuals tested increased two-fold in the Lao People's Democratic Republic and seven-fold in Malawi and Papua New Guinea over the same time period.

Population-based surveys provide information on HIV testing in a population, including the percentage of people who have ever been tested, when and where they were last tested and their knowledge of where they can get tested. Since these surveys are usually conducted every few years in a country, yearly trends over time cannot be monitored. A comparison of data from the most recent survey conducted in various countries may not refer to the same year due to differences in country survey schedules.

Table 3.3 presents data on the percentage of people who received an HIV test and the test results in the 12 months preceding the survey in 23 countries that conducted demographic and health surveys between 2005 and 2007 (including 16 countries in sub-Saharan Africa). These countries account for 31% of the global HIV epidemic in low- and middle-income countries and 29% of the epidemic in sub-Saharan Africa. The percentage of people tested in the 12 months preceding the survey varies among countries, including within sub-Saharan Africa. In Ethiopia, Guinea, India, Niger and Senegal, less than 3% of women and men responding to the survey had received an HIV test in the 12 months prior to the survey. In the Dominican Republic, Namibia[3], Swaziland (men) and Zambia (women), the percentage exceeded 15%. Overall, the median percentages of people tested in the 12 months preceding the survey in recent demographic and health surveys *(3)* are 6.5% among women and 6.1% among men. In sub-Saharan Africa, the median percentages are 3.9% among women and 3.8% among men. The percentage of women tested in the 12 months preceding the survey is higher than or equal to the corresponding percentage among men in 18 of the 23 countries.

Table 3.2. Percentage of facilities in which HIV testing is available in selected countries

Country	Year	By type of facility (%)		By ownership of facility (%)	
		Hospital	Health centre	Government-owned	Private
Kenya	2004	92	48	33	52
Uganda	2007	98	...	28	34
United Republic of Tanzania	2006	98	64	22	33
Zambia	2005	98	88 (urban) 25 (rural)	39	53

Sources: Service Provision Assessments [web site] *(3)*, Ministry of Health, Central Statistical Office and ORC Macro *(4)*, Muga et al. *(5)* and National Bureau of Statistics and ORC Macro *(6)*.
... not available.
Note: health centres provide services at a more decentralized level than hospitals.

3 Preliminary results.

Table 3.3 also provides data on the percentage of people who had ever received an HIV test and the test results in 17 countries, including 11 countries in sub-Saharan Africa. These countries represent 24% of the HIV epidemic in low- and middle-income countries and 19% of the epidemic in sub-Saharan Africa. The percentage of respondents who had ever received an HIV test and the test results varies among countries, from 1.9% (women in Niger) to 45.4% (women in Ukraine). The median percentages of respondents who had ever received an HIV test and the test results are 10.9% among women and 10.3% among men. In countries in sub-Saharan Africa for which this information is available, the median percentages are 9.5% among women and 7.9% among men. In Uganda, the percentage of people who had ever received an HIV test and the test results increased substantially between surveys conducted in 2004–2005 and 2006: from 12.7% to 24.8% among women and from 10.8% to 20.7% among men.

The ratio of people who received an HIV test in the 12 months preceding the survey relative to those who had ever received a test can provide an indication of trends in testing rates. Among people who had ever received an HIV test and the test result, a sizable proportion had received the test and the results in the 12 months preceding the survey. This suggests that these people have been tested in recent years.

Table 3.3. Percentages of women and men aged 15–49 years who were tested in the 12 months preceding the survey and received the test results, and who were ever tested for HIV and received the test results, selected countries, 2005–2007

Country	Type of epidemic	Year	% of people who were tested in the 12 months preceding the survey and received the results (A)		% of people who were ever tested and received the results (B)		% of people ever tested who had been tested in the 12 months preceding the survey (A/B)	
			Women	Men	Women	Men	Women	Men
Benin	Generalized	2006	6.5	4.8	15.1	10.3	43	47
Congo	Generalized	2005	3.2	3.1	9.5	10.9	34	28
Côte d'Ivoire	Generalized	2005	3.7	3.2	10.9	7.9	34	41
Democratic Republic of the Congo	Generalized	2007	4.1	3.8	...	...	...	...
Ethiopia	Generalized	2005	2.3	2.3	3.8	4.9	61	47
Ghana[a]	Concentrated	2006	3.9	2.9	...	...	...	...
Guinea	Generalized	2005	1.0	3.0	2.1	6.0	48	50
Mali	Concentrated	2006	3.1	2.7	6.6	6.4	47	42
Namibia[b]	Generalized	2006	28.6	17.6	...	...	...	...
Niger	Concentrated	2006	0.9	1.6	1.9	3.9	47	41
Rwanda	Generalized	2005	12.0	11.0	21.2	20.1	57	55
Senegal	Concentrated	2005	1.0	2.0	2.7	4.2	37	47
Swaziland	Generalized	2007	21.9	8.9	...	...	...	...
Uganda	Generalized	2004–2005	4.0	3.8	12.7	10.8	37	35
Uganda	Generalized	2006	12.0	10.4	24.8	20.7	48	50
Zambia	Generalized	2007	18.5	11.7	...	...	...	...
Zimbabwe	Generalized	2005–2006	7.0	7.0	21.7	16.4	32	43
Dominican Republic	Concentrated	2007	20.5	18.6	...	...	...	...
Guyana	Concentrated	2005	11.3	10.3	26.5	19.5	43	53
Haiti	Generalized	2005	7.5	5.2	16.6	10.3	45	51
Cambodia	Concentrated	2005	3.2	5.1	9.5	13.5	34	38
India	Concentrated	2005–2006	1.2	1.4	3.0	3.3	40	42
Moldova	Concentrated	2005	12.0	10.0	34.2	29.0	35	34
Ukraine	Concentrated	2007	12.3	7.2	45.4	21.4	27	34

Source: Demographic and health surveys [web site] *(3)*.
... not available.
a From a multiple indicator cluster survey (MICS) with a demographic and health survey component.
b Preliminary results.

The median percentages are similar for men and women in countries for which data are available: 43% of the people who had ever been tested had received a test in the 12 months before the survey.

Information on the proportion of people living with HIV who know their HIV status is critical to achieving universal access targets. Consenting respondents were tested for HIV in recent population-based surveys conducted in 12 countries (representing 21% of the epidemic in low- and middle-income countries), including 9 countries in sub-Saharan Africa (representing 18% of the epidemic in Africa) (Table 3.4). For these countries, the proportion of respondents living with HIV who knew their HIV status before the survey can be estimated.

The data show great variation, from 5.4% of people living with HIV who were aware of their HIV status before the survey in Guinea to 60.7% in the Dominican Republic. The median percentage for the 12 countries is 20%. The nine countries in sub-Saharan Africa also vary widely, with more than 20% of people living with HIV being aware of their HIV status in four countries (up to 31.4% in Rwanda) and less than 20% in five countries. The median percentage in the nine African countries is 16.5%. In India, the percentage of people living with HIV who knew their HIV status before the survey was 10.3%. A large proportion of people with HIV thus remain to be diagnosed. Universal access to HIV prevention, treatment and care will not be achieved without considerable efforts to increase the number of people who know their HIV status.

Overall, the available data indicate that, despite recent progress, knowledge of HIV status is low in most countries. The data also suggest that, in many countries, more women are receiving HIV testing and counselling services than men, possibly as a result of women's access to testing and counselling through services to prevent the mother-to-child transmission of HIV.[4]

Table 3.4. Percentages of women and men living with HIV aged 15–49 years who had received an HIV test and the test results prior to the survey, selected countries, 2005–2007

Country	Year	% of people living with HIV who knew their status and received results		
		Women	Men	Overall
Benin	2006	24.9	[a]	23.5
Côte d'Ivoire	2005	13.6	23.6	16.5
Democratic Republic of the Congo	2007	8.7	[a]	10.7
Ethiopia	2005	8.4	5.6	7.6
Guinea	2005	5.4	[a]	5.4
Mali	2006	13.0	[a]	12.9
Rwanda	2005	31.3	31.6	31.4
Swaziland	2007	44.0	28.8	38.7
Zimbabwe	2005–2006	26.3	19.3	23.7
Haiti	2005	30.7	15.6	24.5
Dominican Republic	2007	72.6	49.1	60.7
India	2005–2006	6.8	12.8	10.3

Source: Demographic and health surveys [web site] *(2)*.
a The number of cases is very small (n = 25–49 and cannot be interpreted).

4 Data on the coverage of HIV testing and counselling among people with TB and among pregnant women and children are presented in sections 2.2, 5.3 and 5.4 respectively.

3.2 Provision of HIV testing and counselling[5]

Countries are using diverse approaches to providing testing and counselling services. WHO recently proposed a clarification in terms that distinguishes between two types of HIV testing and counselling, both voluntary: client-initiated and provider-initiated testing and counselling. Client-initiated HIV testing and counselling corresponds to what is usually referred to as voluntary counselling and testing. Provider-initiated HIV testing and counselling is conducted at health facilities as part of clinical care to diagnose people who present with signs and symptoms suggesting HIV or to aid in providing care to people without symptoms in areas of high prevalence or at clinics used by populations that may be at special risk of HIV.

Client-initiated testing and counselling

Until recently, most low- and middle-income countries used a client-initiated approach to HIV testing and counselling through stand-alone facilities, facilities integrated in health settings, mobile services and community-based settings.

The uptake of client-initiated testing and counselling has increased in recent years by making testing more convenient for users. Primary health care facilities and counselling centres increasingly offer rapid tests, which do not require invasive procedures, specialized equipment or laboratory technicians. The use of rapid tests has increased the proportion of tested people who receive their test results.

Evidence also suggests that providing tests in locations and conditions that are convenient to clients, such as workplaces, health facilities and mobile clinics, contributes to increased uptake. Voluntary testing has also expanded as a result of innovative approaches such as home-based testing, which provides the HIV test, test results and counselling services to people in their homes. In four villages in Uganda, home testing increased acceptance of testing from 10% to 46% and eliminated differences in acceptance between women and men *(8)*.

However, despite some positive trends, evidence indicates that the uptake of client-initiated approaches has remained largely limited due to reasons such as fear, stigma, underestimation of personal risk, negative reactions to disclosure, limited access to treatment and care services and gender inequality.

Provider-initiated testing and counselling

Before antiretroviral therapy became available, there was little support to expand HIV testing and counselling other than through client-initiated approaches. The possibility that routine testing may lead to adverse consequences for individuals seemed to outweigh the public health benefits. With the availability of treatment, however, the need to scale up HIV testing and counselling is increasingly recognized both as a gateway to treatment and prevention and as a way to "normalize" and destigmatize HIV. Support has been growing for incorporating HIV testing and counselling into routine health care, including antenatal care, care for sexually transmitted infections, hospitalization or even general primary care.

Health facilities are a key point of contact for people living with HIV who need HIV prevention, treatment and care, and efforts have been made to encourage and support providers in initiating HIV testing and counselling. This can be done as part of interventions for preventing the mother-to-child transmission of HIV; clinical management of TB, hepatitis B and hepatitis C; management of sexually transmitted infections; and blood screening.

In 2007, WHO and UNAIDS released guidance on provider-initiated HIV testing and counselling *(1)*. The guidance advises that health care providers recommend HIV testing and counselling to:

- everyone who presents with conditions that might suggest underlying HIV disease;
- everyone attending all health facilities in generalized epidemics, as a standard part of health care (including antenatal care);
- everyone in selected health facilities (such as antenatal, TB, sexual health and health services for the populations most at risk) in concentrated and low-level HIV epidemics, depending on the epidemiological and social context;
- men seeking male circumcision as a prevention strategy; and
- all children seen in paediatric health services in generalized epidemic settings.

The guidance *(1)* emphasizes that provider-initiated HIV testing and counselling should be voluntary, confidential and undertaken with the consent of the person receiving services. Testing should not be conducted without information, and people should have the opportunity to decline the test. Provider-initiated testing and counselling should be accompanied by a recommended package of HIV-related prevention, treatment, care and support services and implemented within the framework of a national plan to achieve universal access to HIV services. Provider-initiated testing and counselling should be scaled up within a supportive social, policy and legal framework to maximize positive outcomes and minimize the potential harm to the people being tested.

5 Sections 3.2 to 3.5 draw largely from Obermeyer & Osborn *(7)*. The article has references to specific studies. These and additional references used in these sections are indicated as relevant.

3.3 Scaling up provider-initiated HIV testing and counselling

Several countries are expanding provider-initiated approaches in health care settings. Since 1995, many countries in Europe have introduced provider-initiated testing and counselling in the context of antenatal care (Table 3.5). In 2006, the United States Centers for Disease Control and Prevention issued revised guidelines recommending HIV screening for everyone aged 13–64 years when they attend health facilities in the United States *(9)*.

Table 3.5. Number of countries in Europe that implement provider-initiated HIV testing in specific population groups, 2006

Population group	Number of countries (of the 44 surveyed)
Pregnant women	37
Injecting drug users	32
Patients in sexually transmitted infection clinics	26
People with TB	21
Prisoners	20
Sex workers	17
Men who have sex with men	16
Immigrants	11
Hospital patients (non-TB)	9
Young people (<25 years)	6

Source: EuroHIV *(10)*.

Several low- and middle-income countries are also scaling up testing and counselling through provider-initiated approaches. In Thailand, all maternal and child health services have recommended voluntary HIV testing (with pretest information and the option to opt out) since 2000. Countries in sub-Saharan Africa have also introduced provider-initiated approaches in a variety of settings, including Botswana, Kenya, Malawi, South Africa and Uganda.

In 2007, of 79 reporting countries,[6] 57 (72%) had developed a national HIV testing and counselling policy and/or guidelines that included both client-initiated and provider-initiated testing and counselling strategies. Of the 27 countries with generalized epidemics on which information was available, 12 (44%) had a policy or guidelines stating that health care providers should recommend HIV testing and counselling in all encounters with service users, irrespective of symptoms presented or type of health facility.

Increased uptake and acceptance of provider-initiated testing and counselling

Evidence suggests that provider-initiated HIV testing and counselling can result in considerable increases in the uptake of HIV testing. In high-income countries such as Canada, Hong Kong Special Administrative Region of China, Norway, Singapore, United Kingdom and the United States, most clients (80% or more in most studies) agree to be tested. Increased uptake after provider-initiated testing and counselling are introduced has also been documented among adults and children in low-income settings, including postpartum wards in Botswana; paediatric wards in Zambia; and TB clinics, paediatric wards, maternity wards and sexually transmitted infection clinics in Uganda (Box 3.1) *(7)*. Section 5.3 presents further analysis on HIV testing and counselling in antenatal care settings.

Acceptance of provider-initiated testing and counselling has been documented in a number of settings. A comparison of three models of provider-initiated HIV testing and counselling in a TB clinic in Kinshasa, Democratic Republic of the Congo found that more than two thirds of clients preferred opt-out testing, such that the test would be performed unless they declined – even though participants thought that declining the test would be difficult. Studies have also shown that pregnant women are positively inclined to be tested when testing and counselling are integrated into antenatal care sites and when women believe it could benefit their baby *(7)*.

Some studies have also shown that, contrary to fears, provider-initiated testing and counselling does not deter people from accessing health services. In Botswana, introduction of provider-initiated approaches appears to have caused neither reduction in the use of antenatal care nor a decline in the proportion of people receiving test results.

6 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

Box 3.1. Scaling up provider-initiated approaches: the examples of Uganda and Papua New Guinea

Uganda

In Uganda, HIV testing and counselling services first became available in 1990 in one site in Kampala district. Testing and counselling expanded gradually in different settings in subsequent years, primarily through a client-initiated approach *(11)*.

The first national policy on testing and counselling was developed in 2003. The results from the 2004–2005 Uganda Sero-Behavioural Survey showed that only 13% of women and 11% of men aged 15–49 years had ever been tested for HIV and received their test results, and 70% wanted to be tested.

In 2005, Uganda introduced a policy of expanding provider-initiated approaches to scaling up testing and counselling, including recommending testing and counselling in clinical settings and expanding home-based testing and counselling. High acceptance rates of provider-initiated testing and counselling have been documented (more than 90% in two large hospitals in Uganda where HIV testing and counselling is offered free of charge *(12)*). In 2007, HIV testing and counselling was available in 45% of health facilities in the country, and 15% of people aged 15 years and above received HIV testing and counselling between September 2006 and October 2007.[7]

Papua New Guinea

In Papua New Guinea, voluntary testing and counselling services became available in 1987. However until mid-2006, the central public health laboratory was the only site that provided confirmatory HIV testing. In this country with rugged topography and weak transport infrastructure, the limited availability of diagnostic services resulted in delays of up to six months before HIV test results were available in some settings.

In recent years, efforts by the National Department of Health have resulted in an expansion of testing and counselling services. By the end of 2006, all provincial laboratories were equipped to undertake confirmatory HIV testing. In the first quarter of 2007, the National Department of Health introduced a policy of expanding provider-initiated testing and counselling and provided additional training to health care workers in HIV care, TB treatment and voluntary counselling and testing services. As a result of increased testing capacity and provider-initiated testing and counselling, the number of people tested for HIV increased seven-fold compared with the previous year.

Further, evidence from both high-income and low-income settings indicates that increased HIV testing is associated with clinical benefits for adults and children. Early diagnosis is particularly crucial for infants who are infected in utero, because many of these children will die without early initiation of treatment. A study in Mbarara Hospital in Uganda *(13)* found that individuals living with HIV were diagnosed at an earlier stage of disease progression after provider-initiated testing and counselling was introduced and were therefore more likely to be referred to treatment earlier.

A review of patient records in a sexual health centre in Canberra, Australia *(14)* showed that more than half the people living with HIV with delayed diagnosis had previously accessed health services, and almost all of these people had at least one factor that should have prompted health care providers to consider the need for HIV testing and counselling. In Thailand, the introduction of provider-initiated testing and counselling in TB clinics led to an increase in rates of HIV testing and the provision of co-trimoxazole and antiretroviral therapy *(15)*.

There are also indications that increased uptake of testing and counselling has the potential to lead to reduction in sexual risk behaviour. A study of sexual behaviour among serodiscordant couples in Lusaka, Zambia *(16)* found a marked increase in rates of condom use after joint counselling and testing, and the higher rates were sustained over 12 months of follow-up. In a qualitative study of serodiscordant couples in Kampala, Uganda *(17)*, clients indicated that receiving HIV testing and counselling as a couple had positively affected their lives, including behaviour change, reduced risk of transmission to the negative partner and better ability to plan for the future, especially for children. The evidence is, however, limited, and such positive outcomes need to be documented more systematically. A meta-analysis of voluntary counselling and testing in low- and middle-income countries *(18)* found increases in the proportion of sex that was protected following voluntary counselling and testing but no significant reduction in the number of sex partners.

7 Data reported by Uganda's Ministry of Health to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

Counselling

Guidance publications *(1)* emphasize that all testing must be accompanied by pretest information and informed consent, patient confidentiality, post-test counselling (sometimes referred to as the "three Cs") and referral to appropriate services. Available evidence indicates that many countries are making efforts in this direction, but much remains to be done. In Europe, for example, of 44 countries reporting in 2006, HIV testing was accompanied by pre- or post-test counselling or both in 35 countries when testing was provider-initiated and in 31 countries when testing was client-initiated *(10)*. Provider-initiated testing and counselling has been implemented in the countries in the Commonwealth of Independent States since the HIV epidemic began in these countries, but evidence is lacking on the extent to which testing is accompanied by the "three Cs" principles.

Studies have found that, in many resource-limited settings, providers do not always find the time or space for counselling due to heavy workloads and lack of training; that the information may be inadequate; and that the quality of counselling may be lower, especially for clients from less-privileged backgrounds.

Improving the quality of testing and counselling services, by making them responsive to client preferences and improving provider–client rapport, can lead to increases in rates of testing (Box 3.2). Providers' attitudes, providers' background characteristics (such as sex or ethnic group) and the extent to which clients trust them also influence clients' reactions to testing and counselling, which suggests several avenues to improve counselling and to assure quality. Service providers themselves need support to deal with their own emotional issues related to HIV, such as fear of infection, reluctance to be tested, pessimism and doubts about their own ability to provide care. They also need adequate resources, time, motivation and training to deliver high-quality services *(19–21)*.

Box 3.2. Building health sector capacity to roll out testing and counselling in India

In 2001–2002, India established centres of excellence for scaling up HIV testing and counselling in antenatal care settings and client-initiated (voluntary counselling and testing) sites. Based on the success of this experience, India began to roll out a model of integrated counselling and testing centres within health care facilities in 2006. These centres provide services to clients who are referred for testing and counselling by health care providers and to clients who voluntarily seek testing and counselling.

Between 2000 and 2006, the availability of HIV testing and counselling services expanded rapidly from large urban hospitals to rural health centres at the district and subdistrict levels. The number of integrated HIV testing and counselling centres in health facilities increased from 409 in 2002 to 3623 in 2006.

The number of people who received an HIV test at the recommendation of a service provider increased four-fold, from about 166 600 in 2002 to about 743 000 in 2006. The number of voluntary clients increased eight-fold, from 111 900 in 2002 to more than 900 000 in 2006. The largest increase in the number of people receiving an HIV test occurred in 2004, coinciding with the introduction of antiretroviral therapy in the public sector. An increasing proportion of people who tested positive were referred to adequate support services.

Each integrated HIV testing and counselling centre in district and subdistrict hospitals employs up to two full-time counsellors and one laboratory technician. Staff members are trained using standardized curricula. Testing protocols have been developed and disseminated. A large network of national and state-level reference laboratories conducts periodic quality assurance reviews of testing services.

Additional capacity is required to expand the provision of high-quality services at the subdistrict level and to target clients from the populations most at risk. Measures are also needed to fight stigma and discrimination inside and outside health facilities and to help health care workers in providing better care.

Source: *Expanding access to HIV counselling and testing in India (22).*

3.4 Diversifying approaches to scaling up HIV testing and counselling

Countries are using diverse approaches to expand testing and counselling depending on the local epidemiological and social context. Testing and counselling services are being provided in a variety of settings through partnerships between government, civil society and international partners. Box 3.3 documents country experiences.

Box 3.3. Diversifying approaches to scaling up testing and counselling

Reaching out with national campaigns in Lesotho, Malawi and El Salvador
Several countries are using national events and campaigns to generate awareness and encourage people to know their status. Such initiatives demonstrate that bringing services closer to people can significantly increase uptake.

Lesotho launched a national Know Your Status campaign in 2004 to expand testing and counselling at the community level in addition to services provided in health facilities (23). Between 2004 and 2007, about 320 000 people (all age groups) received an HIV test. Testing and counselling coverage in the country (including health facilities and community-level testing) increased from 2.7% in 2004 to 17.2% in 2007, with an average annual increase in HIV testing of 4.9% *(23)*. As of January 2008, 163 health facilities were providing HIV testing and counselling services in Lesotho.[8]

Malawi conducted an HIV Testing and Counselling Week in 2006 and 2007 *(24)*. A total of 186 631 people were tested and counselled, many more than the target of 130 000. Among the people tested, 53% were female and 41% were 15–24 years old. About one third of the people tested reported having been tested for HIV in the past, and of the total tested, 8.4% were HIV-positive.

El Salvador held its first annual National Day for HIV Testing in 2007 *(25)*. A total of 54 619 tests were conducted in 236 health facilities across the country, which represents around 2.8 times more tests conducted in one day than those conducted in the same month in 2006. Of the 54 619 individuals tested, 449 were positive. Increased use of rapid tests and the establishment of regional laboratories to conduct testing also facilitated access to testing.

Building on partnerships in Burkina Faso
HIV testing and counselling in Burkina Faso began in 1994 at the initiative of nongovernmental organizations *(26)*. Testing and counselling services expanded in an informal and unstructured manner through client-initiated approaches until 2001.

Between 2000 and 2003, Burkina Faso formulated a national strategy for scaling up voluntary counselling and testing and developed guidelines for quality assurance and training service providers. Since then, partnerships among the public sector, civil society and international agencies have resulted in a significant scale-up of testing and counselling in the country.

In 2003, the United Nations Development Programme (UNDP) and bilateral donors supported the initiation of the PAMAC (Programme d'Appui au Monde Associatif et Communautaire), which created a network of nongovernmental organizations involved in HIV testing, treatment, care and support. Access to HIV testing and counselling expanded rapidly between 2003 and 2007, reaching across urban and rural areas and different subpopulations through a variety of approaches: centres integrated in health facilities, stand-alone centres, campaigns among the general population and among specific population groups (women, sex workers and young people) and mobile teams in rural areas. The number of sites for testing and counselling increased from 35 in 2003 to 116 in 2006, covering about two thirds of the country. About 85 000 people received an HIV test and the test result in 2007.[9]

The experience of Burkina Faso highlights the success of partnerships among stakeholders in scaling up HIV testing and counselling. However, several challenges remain. The uptake of testing and counselling has not proceeded evenly across groups, and there are concerns that testing expands more rapidly among lower-risk groups, while higher-risk populations remain harder to reach.

8 Data reported by the Ministry of Health, Lesotho to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.
9 Data reported by the Ministry of Health, Burkina Faso to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

3.5 Addressing concerns related to HIV testing and counselling practice

As testing and counselling services are scaled up, several issues related to protecting individuals and ensuring appropriate referral need to be addressed. Since HIV tests first became available, there have been concerns about coercion and inadequate processes to obtain informed consent and protect confidentiality and privacy. Recent studies confirm that established practices in health services are sometimes insufficient to protect the confidentiality of test results and that the rights of those attending health care services can be compromised.

Several early cases highlighted the potential for stigma and discrimination, and fear of stigma is reportedly the main reason why people are reluctant to be tested, to disclose HIV status or to take antiretroviral drugs. Negative reactions to disclosure of HIV status are reported in multiple settings, but evidence also indicates neutral or even positive responses. A review of 17 studies in low- and middle-income countries found that negative consequences of disclosure, including violence, were reported in 3% to 15% of cases. A study in the United Republic of Tanzania found that about 50% of women experienced positive responses, while a systematic review of partner notification services in the United States showed few negative consequences overall. A study in Kenya and Zambia found that most women living with HIV reported positive outcomes, including some who feared they would not receive support. These results show the diversity of responses and the need for locally appropriate information on the manifestations of stigma and on practices to support and protect from discrimination those who disclose their HIV status. They also highlight the importance of the legal and institutional context in which disclosure takes place.

Evidence that health workers may stigmatize people living with HIV by treating them differently, using excessive precautions or withholding appropriate care underscores the need to address stigma and discrimination in health care settings. In a comparative study in India, Indonesia, the Philippines and Thailand, 34% of respondents reported breaches of confidentiality by health workers *(27)*. Efforts are needed to protect clients. Reassuring service providers on the front lines is also important, as they may have legitimate fears of contamination due to insufficient protective measures, lack of equipment, and inaccessible post-exposure prophylaxis.

In summary, several studies in specific settings suggest that provider-initiated testing and counselling comprises an acceptable and effective method of scaling up testing and counselling in health facilities and of improving outcomes for clients. Ensuring adequate implementation of provider-initiated testing and counselling requires measures to ensure appropriate supervision, capacity-building and support for providers, adequate infrastructure and commodities and quality assurance of tests. More systematic data from a greater number of settings are needed to document how provider-initiated testing and counselling will be implemented in countries with different epidemic levels and in resource-limited settings outside well-funded research projects. Additional evidence is also needed to identify best practices and problem areas and to build on the lessons learned to improve services.

References

1. *Guidance on provider-initiated HIV testing and counselling in health facilities*. Geneva, World Health Organization and UNAIDS, 2007 (http://www.who.int/hiv/pub/guidelines/pitc2007/en/index.html, accessed 5 May 2008).
2. Demographic and health surveys [web site]. Calverton, MD, MEASURE DHS (http://www.measuredhs.com, accessed 5 May 2008).
3. Service Provision Assessments [web site]. Calverton, MD, MEASURE DHS (http://www.measuredhs.com/aboutsurveys/spa.cfm, accessed 5 May 2008). The report for Uganda is being prepared.
4. Ministry of Health, Central Statistical Office and ORC Macro. *Zambia: HIV/AIDS service provision assessment survey 2005*. Calverton, MD, ORC Macro, 2006 (http://www.measuredhs.com/pubs/pdf/SPA11/SPA11.pdf, accessed 5 May 2008).
5. Muga R et al. *Kenya: service provision assessment survey 2004 – HIV/AIDS*. Calverton, MD, ORC Macro, 2005 (http://www.measuredhs.com/pubs/pub_details.cfm?ID=562&ctry_id=20&SrchTp=type, accessed 5 May 2008).
6. National Bureau of Statistics and ORC Macro. *Tanzania: service provision assessment survey 2006 (TSPA)*. Calverton, MD, ORC Macro, 2007 (http://www.measuredhs.com/pubs/pub_details.cfm?ID=725&ctry_id=39&SrchTp=type, accessed 5 May 2008).
7. Obermeyer M, Osborn M. The utilization of testing and counselling for HIV: a review of the social and behavioural evidence. *American Journal of Public Health*, 2007, 97:1762–1774.
8. Wolff B et al. Evaluation of a home-based voluntary testing and counselling intervention in rural Uganda. *Health Policy Planning*, 2005, 20:109–116.
9. Branson B et al. Revised recommendations for HIV testing of adults, adolescents and pregnant women in health care settings. *MMWR Morbidity and Mortality Weekly Report*, 2006, 55(RR14):1–17.
10. EuroHIV. *Report on the EuroHIV 2006 survey on HIV and AIDS surveillance in the WHO European Region*. Saint-Maurice, Institut de Veille Sanitaire, 2007.
11. Ministry of Health and World Health Organization. *A report on the status of HIV testing and counselling services in Uganda*. Kampala, Ministry of Health and World Health Organization, 2007 (unpublished).
12. Wanyenze K et al. Acceptability of routine HIV counselling and testing, and HIV seroprevalence in Ugandan hospitals. *Bulletin of the World Health Organization*, 2008, 86:302–309.
13. Andia I et al. Evolving clinical picture secondary to routine HIV testing and early linkage to care at the HIV clinic at Mbarara Regional Referral Hospital. *President's Emergency Plan for AIDS Relief Implementers Meeting, Durban, South Africa, 12–15 June 2006* (abstract no. 195; http://www.blsmeetings.net/implementhiv2006/orals176-200.htm#195, accessed 5 May 2008).
14. McDonald EA, Currie MJ, Bowden FJ. Delayed diagnosis of HIV: missed opportunities and triggers for testing in the Australian Capital Territory. *Sexual Health*, 2006, 3:291–295.
15. Varma JK et al. Evaluating the potential impact of the new Global Plan to Stop TB: Thailand, 2004–2005. *Bulletin of the World Health Organization*, 2007, 85:586–592.
16. Allen S et al. Sexual behaviour of HIV discordant couples after counseling and testing. *AIDS*, 2003, 17:733–740.
17. Bunnell R et al. Living with discordance: knowledge, challenges and prevention strategies of HIV-discordant couples in Uganda. *AIDS Care*, 2005, 17:999–1012.
18. Denison JA et al. HIV voluntary counselling and testing and behavioral risk reduction in developing countries: a meta-analysis, 1990–2005. *AIDS and Behavior*, 2008, 12:363–373.
19. Brouwer CN et al. Psychosocial and economic aspects of HIV/AIDS and counselling of caretakers of HIV-infected children in Uganda. *AIDS Care*, 2000, 12:535–540.
20. de Paoli MM, Manongi R, Klepp KI. Counsellors' perspectives on antenatal HIV testing and infant feeding dilemmas facing women with HIV in northern Tanzania. *Reproductive Health Matters*, 2002, 10:144–156.
21. Sherr L et al. Ante-natal HIV testing: an observational study of HIV test discussion in maternity care. *Counselling Psychology Quarterly*, 2001, 14:129–138.
22. *Expanding access to HIV counselling and testing in India*. New Delhi, National AIDS Control Organization and Ministry of Health and Family Welfare, India. 2007 (unpublished).
23. *Community HIV testing and counselling: know your status campaign*. Maseru, Ministry of Health and Social Welfare, Lesotho, 2008.
24. *A case study of the HIV testing and counselling week*. Lilongwe, Ministry of Health, Malawi, 2008.
25. *El Salvador National Day for HIV Testing*. San Salvador, Ministry of Health, El Salvador, 2007.
26. *HIV testing and counselling in Burkina Faso from 2000 to 2007, situation analysis report, July 2007*. Ouagadougou, Ministry of Health, Burkina Faso (unpublished).
27. Paxton S et al. AIDS-related discrimination in Asia. *AIDS Care*, 2005, 17:413–424.

4. HEALTH SECTOR INTERVENTIONS FOR HIV PREVENTION

Key findings

- Countries are successfully implementing targeted interventions to promote condom use and to manage sexually transmitted infections among sex workers and their clients, especially in Asia.

- In most countries in Eastern Europe and Central Asia, where injecting drug use accounts for more than 80% of all HIV infections, needle and syringe programmes regularly reach only 10% of the estimated number of injecting drug users.

- Countries in sub-Saharan Africa with high rates of heterosexual HIV transmission and low rates of male circumcision are exploring whether and how to scale up male circumcision.

- Patients continue to be at risk of HIV infection in health care settings owing to the lack of universal quality-assured screening of blood supplies and unsafe injection equipment. Post-exposure prophylaxis is available in 35% of the health facilities in 50 reporting countries.

- Trials of female microbicides, preventive vaccines and suppression of genital infections with herpes simplex virus did not show efficacy.

The scale of the HIV epidemic is a testimony to the failure to scale up and sustain prevention efforts to reduce new infections. Although prevention programmes in some countries have succeeded in scaling up HIV prevention services and decreasing HIV prevalence, more needs to be done: globally 2.5 million people were newly infected with HIV in 2007.

A public health approach to HIV service delivery needs to be balanced and comprehensive, recognizing that, in addition to providing treatment, care and support, the health sector must play a stronger role in HIV prevention *(1)*.

4.1 Preventing HIV infection among the population groups most at risk

Globally, an estimated 80% of all HIV infections are sexually transmitted, and 10% of all new infections (and as many as 30% outside sub-Saharan Africa) are among injecting drug users. The health sector has an important responsibility to reduce the frequency of behaviour that can expose people to HIV infection and to minimize the risk of HIV transmission when this behaviour takes place.

Focusing attention on population groups who may be most at risk of HIV infection through their behaviour, such as sex workers and their clients, injecting drug users, men who have sex with men and prisoners, is an important priority for the health sector. Promoting condom use and appropriately managing sexually transmitted infections are essential to prevent the sexual transmission of HIV. The health sector also delivers a range of interventions to reduce HIV transmission through injecting drug use and to provide treatment and care to injecting drug users, including antiretroviral therapy, opioid substitution therapy and other pharmacotherapy for substance dependence, as well as specific harm reduction interventions such as needle and syringe programmes. In addition, HIV testing and counselling needs to be integrated into services for managing sexually transmitted infections, reproductive health, harm reduction, prison health and primary health care to strengthen efforts to prevent HIV transmission.

In many countries, population groups at high risk of HIV transmission face barriers to accessing health services due to discrimination, social marginalization and unfavourable legislation such as laws criminalizing sex work, injecting drug use and homosexuality. Further, the criminalization of HIV transmission (such as exposing another person to the virus or unintentionally transmitting the virus) may impede efforts to implement HIV prevention services, especially for the people who test positive *(2,3)*. To achieve universal access, the health sector needs to develop models of service delivery to reach out to people at high risk and needs to intensify efforts to make services accessible and acceptable to these people. The health sector also has a role and responsibility to advocate for equitable access to health services for the population groups most at risk and to work with other stakeholders to ensure an enabling legal and policy environment for delivering priority interventions to these groups.

4.1.1 Sex workers and their clients

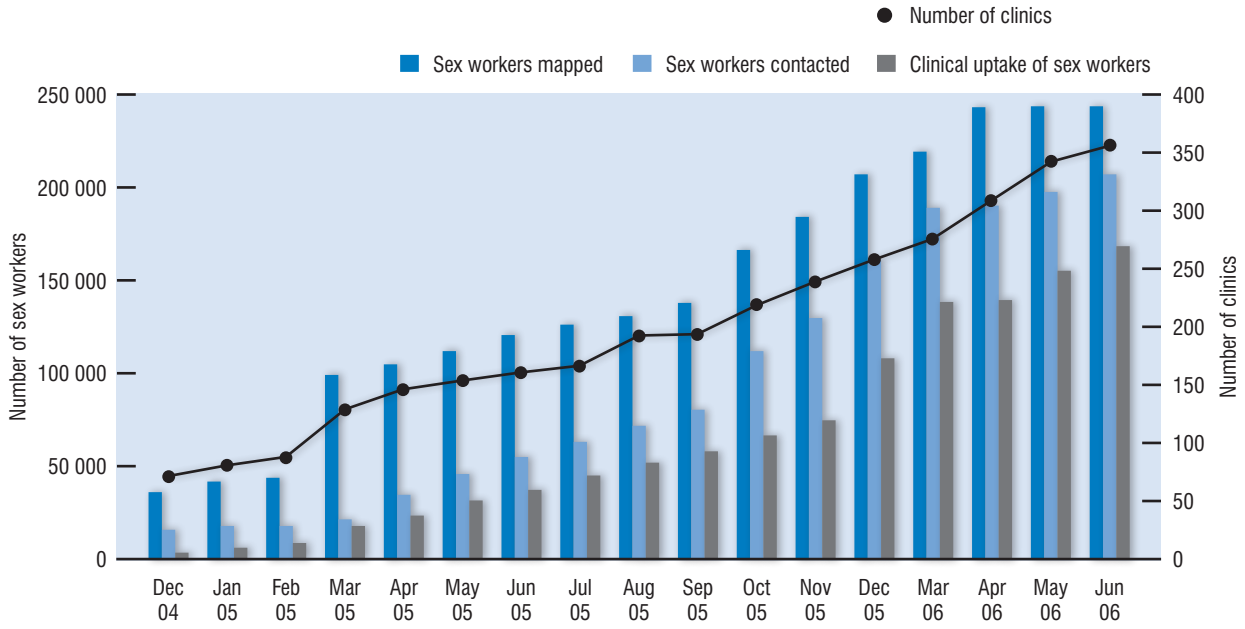
Sex workers face a high risk of acquiring and transmitting HIV. Sex workers and their clients are fuelling the HIV epidemic in many parts of the world, notably during the early phases of expansion of the epidemic.

Examples from several countries in Asia demonstrate that strong political commitment and appropriate policies to prevent HIV infection among sex workers can result in beneficial outcomes. In four countries in Asia with generalized HIV epidemics – Cambodia, Myanmar, Thailand and four states in India – large-scale implementation of targeted interventions in sex work settings resulted in declining rates of sexually transmitted infections and stabilizing or declining rates of HIV prevalence.

Thailand is widely recognized for its successful 100% condom use programme among sex workers. Rates of curable sexually transmitted infections fell by more than 95% during the 1990s, HIV prevalence declined in most population groups *(4)* and an estimated 5.7 million HIV infections had been averted by 2002 *(5)*. Since 2000, many other Asian countries, including Cambodia, China, Lao People's Democratic Republic, Mongolia, Myanmar, the Philippines and Viet Nam, have adapted Thailand's model to expand HIV prevention programmes among sex workers and their clients. The programmes were initiated with pilot demonstration sites selected based on several criteria, including the availability of health services for managing sexually transmitted infections and the presence of large numbers of establishment-based sex workers. The number of sites has expanded significantly in recent years. In Myanmar, for example, a 100% targeted condom promotion programme was piloted in four townships in 2001 and expanded to cover 154 of 325 townships in the country by 2006 *(6)*.

Experience from such countries as India and Mongolia has shown that such models can also be adapted to places where sex work is less structured or is street-based. The prevalence of sexually transmitted infections has been significantly reduced in countries with high rates of transmission. In India, for example, the Avahan India AIDS Initiative was established

Fig. 4.1. Scale-up of clinical services and outreach for sex workers under the Avahan India AIDS Initiative, December 2004–June 2006



Source: Steen et al. *(9)*.

in 2003 to expand outreach, community mobilization and dedicated clinics for sex workers (Fig. 4.1). By the end of 2005, clinics with community outreach for sex workers had been established in 274 settings covering 77 districts. In 65 districts in four large states, 183 000 sex workers were identified, 70% were contacted through peer outreach and 41% attended clinics at least once. The initial results suggest a declining proportion of ulcerative sexually transmitted infections *(7,8)*.

Successful targeted interventions among sex workers in sub-Saharan Africa have also resulted in lower transmission rates of sexually transmitted infections and HIV. A cohort study among female sex workers in Nairobi, Kenya found that the per-act rate of HIV acquisition declined dramatically between 1985 and 2005. This reduction correlated closely with decreases in gonorrhoea prevalence and predated reductions in HIV prevalence among the general population in Kenya by more than a decade. The study notes that this decline may represent the impact of improved prevention and therapy of sexually transmitted infections, among other factors *(10)*. In Abidjan, Côte d'Ivoire, prevention campaigns for female sex workers are likely to have increased rates of condom use and led to declines in the prevalence of HIV infection and other sexually transmitted infections *(11)*.

4.1.2 Injecting drug users

Globally, an estimated 13 million people inject drugs, and 3–4 million of these are living with HIV *(12)*.[1] Injecting drug use accounts for more than 80% of all HIV infections in Eastern Europe and Central Asia. High rates of HIV prevalence among injecting drug users have also been documented in several countries in the Middle East, North Africa, South-East Asia and Latin America.

HIV interventions using a harm reduction approach can reduce HIV transmission and provide effective treatment and care for injecting drug users. Several studies have consistently shown that needle and syringe programmes result in marked decreases in HIV transmission and that opioid substitution therapy is effective in reducing HIV transmission related to injecting drug use and in improving access and adherence to antiretroviral therapy *(13)*. WHO, other United Nations agencies and their partners advocate for a comprehensive package of interventions for prevention, treatment and care of HIV among injecting drug users.

At the end of 2007, 72 countries had introduced at least one needle and syringe programme, and 58 countries provided opioid substitution therapy using either methadone and/or buprenorphine (data from the United Nations Reference Group on HIV/AIDS Prevention and Care among Injecting Drug Users in Developing and Transitional Countries). Standardized global data on access to interventions to reduce the risk of HIV infection among injecting drug users are lacking. The available data suggest that, despite recent efforts, the overall coverage of services among this risk group remains limited.

Data on access to harm reduction services for injecting drug users in the WHO European Region *(20)* show that, in 2007, all high-income countries in Europe had at least one needle and syringe programme site per 1000 drug injectors, except

Box 4.1. Interventions for HIV prevention, treatment and care for injecting drug users

WHO and partners advocate for a comprehensive package of interventions for prevention, treatment and care of HIV in injecting drug users, which should include:

- needle and syringe programmes;
- opioid substitution therapy and other drug dependence treatment;
- HIV testing and counselling;
- HIV treatment and care, including antiretroviral therapy;
- prevention and treatment of sexually transmitted infections;
- condom programming for injecting drug users and their sexual partners;
- targeted information, education and communication for injecting drug users and their sexual partners;
- hepatitis (B and/or C) diagnosis, treatment and vaccination where appropriate; and
- TB prevention, diagnosis and treatment.

The interventions in the comprehensive package are based on substantial scientific evidence *(14–19)*. These interventions are given priority because they have the greatest effect on HIV prevention and/or treatment and care.

Generally speaking, for most countries, the most effective interventions are needle and syringe programmes; opioid substitution therapy and other drug dependence treatment; HIV testing and counselling; and HIV treatment and care, including antiretroviral therapy.

A comprehensive approach should include all interventions in the package. However, the mix of interventions and their content will depend on the country context and should be based on thorough assessment and understanding of the local situation. This includes the types of services available, the patterns of drug use (the types of drug most commonly used, such as opioids, amphetamine-type stimulants, cocaine and benzodiazepines) and the rate and frequency of injecting. The quality of services is also important.

1 The United Nations Reference Group on HIV/AIDS Prevention and Care among Injecting Drug Users in Developing and Transitional Countries will provide new estimates on the size of the injecting drug user population and the prevalence rates of HIV among injecting drug users in 2008.

for Cyprus, Greece, Sweden and Norway. Needle and syringe availability is lower in central and eastern Europe. In 2007, only the Czech Republic, Estonia, Hungary, Latvia, Lithuania and Poland (European Union (EU) members[2]) and Croatia, Tajikistan, Ukraine and Uzbekistan had more than one needle and syringe site per 1000 injecting drug users.

Needle and syringe programmes regularly reached fewer than 10% of the total estimated number of injecting drug users in most countries in central and eastern Europe (regular reach is defined as at least once per month). In the Russian Federation and Ukraine, the two countries in the European Region with the largest injecting drug user-related HIV epidemics, needle and syringe programmes regularly reached only 5% and 10% (respectively) of the estimated number of injecting drug users *(13)*.

There is evidence of substantial scale-up of opioid substitution therapy in EU countries since the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia was adopted in 2004 *(21)*. Opioid substitution therapy using methadone and/or buprenorphine was available in all EU countries at the end of 2007. Opioid substitution therapy is also becoming increasingly available in central and eastern Europe. Ukraine introduced the provision of methadone for opioid substitution therapy in late 2007. However, Armenia, Kazakhstan, the Russian Federation, Tajikistan and Turkmenistan still did not provide opioid substitution therapy in 2007, and coverage remains low in many other countries.

Injecting drug use is also a major factor in HIV transmission in many countries in Asia. Harm reduction programmes in Asia have had a limited impact to date because most have been implemented on a small scale. An increasing number of countries are making efforts to scale up access to services for injecting drug users. Although data are inadequate to develop regional coverage estimates for 2007, the available evidence suggests that the overall coverage of services remains limited.

Box 4.2. Harm reduction interventions in East and South-East Asia

China

Injecting drug use represents the second largest cause of HIV transmission in China, accounting for 29% of new infections at the end of 2007. China had 1.16 million registered drug users in 2005. The total number, including unregistered drug users, is believed to be much higher.

Needle and syringe programmes have expanded rapidly in recent years as a result of measures to increase the commercial availability of needles, provide health education regarding safe injecting practices and, in some cases, provide free needles. China had 775 needle and syringe programmes at the end of 2007, and more than 45 000 injecting drug users had access to clean needles and syringes every three months. Efforts to scale up needle and syringe programmes have focused on rural areas, where access to methadone maintenance therapy remains limited.

Opioid substitution therapy, in particular methadone maintenance therapy, was introduced on a large scale in 2006, with several measures to expand access to these services. Opioid substitution therapy is now included in the national AIDS regulations as a treatment for drug dependence, and the requirements for entry into methadone maintenance programmes have been relaxed. Many drug treatment clinics provide additional services such as HIV and hepatitis testing, counselling, antiretroviral therapy and skills-building. By the end of 2007, China had 503 methadone maintenance clinics covering 22 provinces, and 97 554 injecting drug users were enrolled. The annual retention rate among participants receiving treatment in these clinics was 72%.

An evaluation of several clinics conducted in 2007 found reductions in the rate of injecting drug use and drug-related criminal offences, increased employment opportunities and improved family relations. China has set a target to establish 1500 methadone maintenance therapy clinics by 2008. However, several challenges remain to be addressed to sustain current efforts and expand outreach.

Viet Nam

Injecting drug users in Viet Nam have a high HIV prevalence (23%), with rates exceeding 40% in some provinces. Harm reduction activities in Viet Nam have expanded in the last few years due to increasing political commitment to address HIV and legislative changes that accelerated the scaling up of harm reduction interventions for injecting drug users *(22)*.

2 From 1 January 2007, the EU countries are Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

The Ministry of Health has taken the lead in guiding and coordinating the delivery of harm reduction interventions, including condom promotion, needle and syringe programmes and opioid substitution therapy. The number of needles and syringes distributed by two major HIV prevention projects in Viet Nam increased from 0.2 million in 2005 to 11 million in 2007, which is sufficient to provide one needle and syringe per day to nearly one quarter of the registered injecting drug users in the country. The number of peer outreach workers, who have played a critical role in delivering these interventions, increased from 150 in 2005 to more than 1000 in 2007. Several peer support groups of sex workers and injecting drug users living with HIV have also been established. This, along with the expansion of antiretroviral therapy services, has fostered trust and links between the health sector and population groups at risk.

As Viet Nam shifts from a project-oriented approach towards integrated long-term programmes, several challenges need to be addressed. Service delivery needs to be expanded further, and additional efforts are needed to address fears related to the existing practice of compulsory long-term confinement for identified drug users.

Malaysia

Injecting drug use is also the primary mode of HIV transmission in Malaysia. Access to HIV treatment in drug rehabilitation centres began with only one centre during the initial phase of implementation in 2005. As of December 2007, four additional centres had been included under this programme, significantly improving treatment access to this marginalized population.

The availability of needle and syringe exchange has also expanded. Three drop-in centres providing sterile injecting equipment were established in 2006, and two more were added in 2007. The number of outreach service delivery points also increased significantly in 2007 with the establishment of 125 new outreach sites. Increasing support by community leaders, particularly religious leaders, has played a major role in scaling up services for the population groups at risk in Malaysia.

The countries in the Middle East and North Africa have a small but increasing population of injecting drug users, most of whom are in the Islamic Republic of Iran and Pakistan. A few countries have introduced successful harm reduction programmes. Harm reduction is highly developed in the Islamic Republic of Iran, demonstrating the feasibility and effectiveness of adapting harm reduction interventions to predominantly Islamic cultural and religious beliefs. Harm reduction programmes have also been initiated in Morocco.

Harm reduction networks and civil society organizations have played a key role in advocating for and helping introduce harm reduction approaches in many regions but have been weak in the Middle East and North Africa. In 2007, WHO and the International Harm Reduction Association collaborated to establish the Middle East and North Africa Harm Reduction Network to strengthen the role of civil society organizations in harm reduction in this region. Three subregional harm reduction knowledge hubs have also been established in the Islamic Republic of Iran, Lebanon and Morocco. This project is the largest investment to build capacity for harm reduction interventions in the region to date.

4.1.3 Men who have sex with men

The AIDS epidemic was first detected among men who have sex with men in North America and western Europe more than 25 years ago. Men who have sex with men continue to represent the largest population living with HIV in most high-income countries *(23)*. In the United States alone, 6000 men who have sex with men who had AIDS died in 2005, and there is increasing evidence of a resurgent epidemic among this group in North America *(24)*.

Men who have sex with men are the most affected population group in western Europe in terms of reported HIV cases, and HIV incidence rates remain high, especially in the United Kingdom *(25)*. HIV prevention activities targeting men who have sex with men clearly need to be renewed, reassessed and revised in these countries *(26)*.

In eastern Europe, HIV transmission among men who have sex with men appears to be greatly underreported *(27)*. In 2006, for instance, 7410 new cases of HIV were reported among men who have sex with men in western Europe (excluding Italy and Spain) versus only 190 new cases in eastern Europe. Nevertheless, in the same year, 36% of reported new HIV cases were categorized as "other" or "undetermined" in eastern Europe versus 18% in western Europe *(28)*. Many such undetermined cases in eastern Europe probably occurred among men who have sex with men, given the high level of HIV-related stigma in this region *(26,29,30)*.

Unprotected sex among men is an important factor in the HIV epidemic in Latin America, with HIV prevalence rates among men who have sex with men as high as 20% in many countries. The HIV prevalence among men who have sex with men is also high in some countries in Asia *(23)*. In sub-Saharan Africa, which has a generalized heterosexual epidemic, modelled estimates in at least one country suggest that 4.5% of new infections are related to men who have sex with men *(31)*.

A recent review of HIV studies of men who have sex with men in low- and middle-income countries *(30)* revealed substantially higher rates of HIV among this population group than in the general population in both generalized and concentrated epidemics. It noted that men who have sex with men urgently need prevention and care and appear to be both understudied and underserved.

Examples of successful health projects targeting men who have sex with men have been documented in some countries in Latin America and Asia, which provide evidence that strong community involvement is key for scaling up access to services among this population. *(32-34)*. In Colombia, a communication programme targeting men who have sex with men in Bogotá resulted in increased awareness of HIV prevention, diagnosis and treatment and led to an increase in the number of participants seeking an HIV test *(35)*.

Overall, data on HIV prevalence and access to health services for HIV prevention, treatment and care among men who have sex with men in low- and middle-income countries are limited. This is linked to several factors, including a lack of investment in understanding their health needs, inappropriate design of services and barriers to accessing services due to stigma and discrimination and, in more extreme cases, due to criminalization of sexual behaviour.

Until recently, there has also been a lack of international leadership and advocacy to address issues surrounding HIV transmission and access to health services for men who have sex with men. The health sector has an important role to play in including them in the programming priorities of the national health sector, ensuring links with community support organizations to expand access to health services for this group and advocating for decriminalization of same-sex acts and for legislation against discrimination based on sexual orientation.

4.1.4 Prisoners

Prisoners are at high risk of HIV infection, with prevalence rates often significantly higher than those in the general population *(36)*. Although most prisoners contract HIV infection outside of prison, the risk of HIV transmission while incarcerated is high due to sharing contaminated injecting equipment or unprotected sex *(37)*. However, this population is largely out of reach of the formal health care system in the community. Prisons should therefore be an important focus of health sector HIV interventions (Table 4.1).

Table 4.1. Selected studies that have examined injecting behaviour in prison, 2000–2005

Location	Sample size	Percentage of prisoners who inject drugs	Percentage of prisoners who share needles	Study
Canada	105 women	19%		DiCenso et al. *(38)*
Canada	>1200	27%	80%	Small et al. *(39)*
Canada	439 men, 158 women	3.3%	32%	Calzavara et al. *(40)*
European Union and Norway		0.2–34%		EMCDD *(41)*
Ireland	1178		70.5%	Allright et al. *(42)*
Mauritius	100 men, 50 women, 50 youth (25 men, 25 women)	10.8% of adults and 2.1% of youth		Rapid situation assessment Mauritius *(43)*
Russian Federation	1044	10%	66%	Frost & Tchertkov *(44)*
Russian Federation	277	13%		Dolan et al. *(45)*
Thailand	689	25%	77.8%	Thaisri et al. *(46)*
United States	281 men, 191 women	31% of injecting drug users with a history of imprisonment had used illegal drugs in prison, and nearly half of these had injected in prison		Clarke et al. *(47)*

Source: *Effectiveness of interventions to address HIV in prisons (14)*.

Even countries that have invested heavily in reducing drug demand and supply within prisons have not been able to stop injecting drug use. Sexual activity, including rape and other forms of non-consensual sex, are also commonly reported. Outbreaks of HIV infection have been documented in a number of prison systems, including Australia, the Islamic Republic of Iran, Lithuania, the Russian Federation and Scotland (UK), demonstrating how rapidly HIV can spread in prison unless effective action is taken to prevent transmission *(14)*.

Since the early 1990s, several countries have introduced HIV programmes in prisons. However, many of these are small in scale, restricted to a few prisons or exclude the interventions that are most effective, such as needle and syringe programmes.

In 2007, WHO commissioned a comprehensive review of the prevalence of HIV and risk behaviour in prison settings. The reviews *(15–18)* provide extensive evidence demonstrating that needle and syringe programmes, treatment of sexually transmitted infections, condom distribution, opioid substitution therapy and other drug dependence treatment programmes in prisons are feasible and effective (Box 4.3).

Box 4.3. HIV interventions for prisoners in South and South-East Asia

A recent report *(48)* reviewed access to priority HIV prevention, treatment and care interventions among prisoners in four countries in South and South-East Asia: India, Indonesia, Nepal and Thailand.

The extent of HIV transmission in prisons and its role in HIV prevalence in the broader community has been largely ignored in this region. Prison conditions in the countries reviewed do not meet internationally expected standards, and overcrowding and inadequate nutrition are common. The HIV prevalence in prisons in Thailand, India and Indonesia is estimated to be 2–15 times greater than in the community. No data were available for prisons in Nepal.

HIV risk behaviour such as sharing contaminated injecting equipment, unprotected sex and tattooing are common in all the prisons in the countries reviewed. Between one third and one half of all inmates with a history of injecting drug use continue to inject in prison, and both consensual and coerced sex between inmates is common. The prevalence of TB is up to 100 times higher in prisons than in the community. However, data on HIV and TB are not systematically collected in prisons in these countries.

Access to HIV prevention interventions

HIV education programmes were the most commonly implemented HIV prevention measure in prisons in all the countries surveyed. All countries had made condoms available in prisons through pilot or ad hoc projects; however, no country reviewed had introduced a national condom distribution programme in prisons. None of the four countries had implemented a prison needle and syringe programme. India, Thailand and Indonesia offered drug dependence treatment programmes. Indonesia was the only country to have introduced opioid substitution therapy and is the first country in the region to have done so.

Access to HIV treatment and care

Access to general health care was poor in all countries surveyed. Ad hoc support and care services are available in some prisons, such as support groups for prisoners living with HIV. No country routinely provided antiretroviral therapy to prisoners, although a few prisoners in India and Thailand were receiving antiretroviral therapy. Some prisons in India provided treatment for sexually transmitted infections. The DOTS strategy for TB has been implemented in prisons in Bangkok and the surrounding provinces in Thailand.

Recommendations for improving HIV prevention, treatment and care in prisons

Recommendations for improving HIV prevention, treatment and care in prisons include the following health-sector interventions:

- increasing resources and seeking funding specifically for prison health programmes;
- engaging health ministries closely in improving prisoner health;
- introducing prevention and care strategies, including condom distribution programmes, needle and syringe programmes, opioid substitution therapy, HIV testing and counselling and treatment for sexually transmitted infections;
- ensuring access to antiretroviral therapy for those entering and leaving prison through adequate discharge planning, pre- and post-release counselling and other continuity mechanisms;
- providing management of HIV-associated opportunistic infections; and
- strengthening strategic information such as biological and behavioural data on HIV, sexually transmitted infections and TB among prisoners.

Source: *HIV prevention, care and treatment in prisons in the South-East Asia Region (48)*.

4.2 Prevention and care for people living with HIV

All people living with HIV should have access to a core set of health sector interventions to prevent opportunistic infections, maximize their health, prevent further HIV transmission and, in some cases, delay the progression of HIV disease.

Addressing the prevention needs of people living with HIV is a challenge for the health sector. Increasing access to HIV testing and counselling and antiretroviral therapy will increase the number of people living with HIV who can benefit from comprehensive HIV prevention, care, and treatment services in the health sector. However, people living with HIV may be lost to follow-up after diagnosis or may not access health services due to fear or stigma until they have advanced HIV disease. Expanding HIV prevention and long-term care for people living with HIV will require additional capacity in the health sector, stronger links with networks of people living with HIV and measures to address stigma and discrimination within health care settings.

Box 4.4. Essential prevention and care for adults and adolescents living with HIV

WHO recommends the following areas of intervention of particular importance for people living with HIV:

- psychosocial counselling and support;
- testing and counselling;
- disclosure and partner notification;
- preventing and managing HIV/TB coinfection, including the "three Is" (isoniazid preventive therapy, intensified case-finding and infection control);
- preventing and managing opportunistic infections and comorbidity, including TB;
- preventing and managing sexually transmitted and other reproductive tract infections;
- preventing malaria;
- selected vaccine-preventable diseases (hepatitis B, pneumococcal infection, influenza and yellow fever);
- nutrition;
- family planning;
- preventing the mother-to-child transmission of HIV;
- needle-syringe programmes and opioid substitution therapy; and
- water, sanitation and hygiene.

Although not all countries need all interventions, relevant interventions should be provided depending on the local context and epidemiology. Many of these interventions will continue to be needed even after antiretroviral therapy is initiated and should be maintained throughout treatment.

4.3 Male circumcision

Male circumcision is now recognized as an additional important health sector intervention to reduce the risk of heterosexually acquired HIV infection in men, especially in countries with high rates of heterosexual HIV infection and low rates of male circumcision.

Three randomized controlled trials carried out in sub-Saharan Africa to assess the impact of male circumcision on HIV acquisition among heterosexual men *(49–52)* reported a strong protective effect, with an approximately 60% reduction in the risk of acquiring HIV. Mathematical models subsequently predicted that male circumcision could avert 2 million new HIV infections and 300 000 deaths over the next 10 years in sub-Saharan Africa and that HIV prevalence could be halved *(53,54)*. Another model estimated that the reduction in HIV incidence that could be obtained under some scenarios could reduce the reproductive rate (the average number of people infected by each person living with HIV) to less than one, effectively reversing the epidemic *(55)*.

It is still uncertain whether circumcision decreases the likelihood of HIV transmission from HIV-positive men to HIV-negative women or decreases transmission among men who have sex with men. Preliminary studies suggest that the female partners of circumcised men may have a lower prevalence of some reproductive tract infections *(56)*.

In 2007, WHO and UNAIDS, with the advice of experts at an international consultation, recommended that male circumcision be recognized as an additional important strategy for the prevention of heterosexually acquired HIV infection among men, an important landmark in the history of HIV prevention *(57)*.

The consultation recommendations emphasize that male circumcision should be scaled up as part of a comprehensive, integrated HIV prevention package, informed by the social and cultural context. Provider-initiated testing and counselling is recommended before male circumcision. The recommendations also reinforce that circumcision should be accompanied by appropriate communication regarding the limits of its protective effect for HIV-negative heterosexual men; that surgery should be delivered in an appropriate clinical setting by trained health care providers; and that human rights principles should guide service delivery. Ensuring sufficient time for wound healing before

Box 4.5. Scaling up male circumcision in Swaziland

In 2004, the HIV prevalence identified through antenatal clinics in Swaziland reached 42.6%, the highest in the world. Swaziland is an example of a country in which scaling up male circumcision services could markedly affect the HIV epidemic because HIV prevalence is high and the prevalence of male circumcision is low. Boys are not regularly circumcised; the prevalence is about 14%. Nevertheless, male circumcision is highly accepted in Swaziland, as it is elsewhere in sub-Saharan Africa *(59)*.

Adult circumcision is offered at the government referral hospital in Mbabane (the capital) two private clinics in Mbabane, several hospitals and the offices of private physicians. To help meet demand for circumcision, the government sponsored several one-day events – Circumcision Saturday – in 2007, where a surgical team circumcises several dozen men.

One Circumcision Saturday in the town of Mankayane addressed a group of 40 men aged 18–30 years. The event was advertised by distributing flyers. Group counselling was provided to the 40 men prior to the procedure. First, the nongovernmental organization Population Services International conducted a risk-reduction counselling session. This was followed by an educational session about male circumcision conducted by a nurse from the Family Life Association of Swaziland, who had clinical and educational experience in circumcision. Individual voluntary testing and counselling was available after the group sessions to men who were interested. One quarter of the participants received an HIV test.

In seven working hours, each surgeon completed an average of 10 procedures. No significant complications arose from any of the procedures. The men were seen for postoperative visits as necessary. Circumcision was provided free of charge, and the cost to the programme of the process was US$ 82 per circumcision.

Circumcision Saturday demonstrates how a public health programme can deliver safe circumcision services, with appropriate counselling and postoperative follow-up, in a resource-limited setting.

resuming sexual activity may be particularly critical, as evidence indicates an increased risk for HIV transmission during this time *(58)*.

Many high-burden countries in sub-Saharan Africa are exploring whether and how to scale up male circumcision programmes based on recommendations from the international consultation.[3] Several national and international partners are working with countries to develop a range of approaches to delivering male circumcision services.

Circumcision is currently not recommended for men living with HIV.

4.4 Preventing HIV transmission in health care settings

Within health care settings, the people receiving and giving health care are at potential risk of HIV exposure, depending on whether universal precautions are implemented. The people receiving care may be exposed to blood from contaminated blood supplies, from needles or instruments used on other people receiving care or, rarely, from the health care worker to the people receiving care during surgery. Health care workers are most commonly exposed to the blood of the people receiving care via accidental injuries from sharps (such as syringe needles, scalpels, lancets, broken glass or other objects potentially contaminated with blood).

Box 4.6. Vaccines, microbicides and new prevention technologies

Research on HIV vaccines and microbicides has advanced knowledge of immunology and virus-host interactions. However, efforts to develop vaccines and microbicides have had disappointing results over the past several years.

Vaccines

The genetic diversity and mutability of the HIV envelope protein has thwarted efforts to develop an efficacious preventive or therapeutic vaccine. The Phase III STEP trial of the Merck AIDS vaccine candidate, MRK-Ad5, was stopped in 2007 during mid-enrolment after interim data analysis indicated no protective effect; a more recent multivariate analysis of the data from that trial suggested an overall increase in HIV infection risk in the vaccine versus placebo arm of the trial *(68)*.

Microbicides and cervical barriers

A Phase III microbicide trial of cellulose sulfate gel was halted in early 2007 after data indicated that the cellulose sulfate gel may have contributed to an increased risk of HIV infection. The MIRA diaphragm trial reported no evidence of efficacy in July 2007, and in February 2008 the results of the Phase III trial of the Carraguard® microbicide found the product to be safe but ineffective at preventing HIV infection *(69,70)*.

New prevention technologies

Pre-exposure prophylaxis is an experimental strategy using antiretroviral drugs on a daily basis to prevent HIV infection. Clinical trials testing tenofovir and tenofovir + emtricitabine as pre-exposure prophylaxis agents experienced initial challenges, with several trials suspended before or during enrolment in Cambodia, Cameroon and Malawi. However, other trials of pre-exposure prophylaxis evaluating safety and efficacy are proceeding.

A study presented at the 16th International AIDS Conference *(71)* found tenofovir safe as pre-exposure prophylaxis. The results of large-scale Phase III pre-exposure prophylaxis trials in Thailand (testing the safety and efficacy of tenofovir among injecting drug users) are expected in 2008. Phase III trial results testing tenofovir + emtricitabine among heterosexually active young adults in Africa and among men who have sex with men in Peru and Ecuador are anticipated in 2009 and 2010, respectively *(72)*.

Herpes simplex virus type 2 suppressive therapy

Multiple observational studies have shown that infection with herpes simplex virus type 2, the type that most commonly causes genital herpes, is strongly associated with HIV infection ‹*73*›. This might be explained by the occurrence of ulcers among individuals infected with herpes simplex virus type 2, which provides an easy route of entry for HIV.

Two randomized controlled trials explored whether the daily use of medication to suppress the multiplication of herpes simplex virus type 2 and the appearance of genital ulcers can affect HIV acquisition. However, both trials failed to show a protective effect *(74,75)*. It is unclear why these well-conducted trials failed to show a protective effect among HIV-negative subjects. Additional trials are testing whether similar treatment of people living with HIV who are infected with herpes simplex virus type 2 can prevent the transmission of HIV.

3 In 2007, country consultations and planning to scale up male circumcision programmes took place in Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia and Zimbabwe.

HIV continues to be transmitted by blood transfusion due to the lack of universal quality-assured screening, undue reliance on family or paid donors and unnecessary use of blood. Globally, 80.7 million donations of whole blood were collected annually in 167 countries during 2004–2005 *(60)*.

Of these, 77.3 million were tested for HIV, and at least 0.6 million of the remaining 3.4 million donations were untested. However, the quality of testing is uncertain, as 75 (52%) of the 145 countries reporting 100% HIV testing either did not use or did not verify the use of standard operating procedures in all centres. Training health care providers can considerably lower the risk of HIV infection, as up to 50% of transfusions continue to be unnecessary *(61,62)*. Greater attention also needs to be paid to ensure adequate training follow-up and supervision of health care providers.

Unsafe injections continue to put the people receiving health care at risk of HIV infection. In low- and middle-income countries, an estimated 40% of all injections are given with injection equipment that is unsafe *(63)*. Recent studies in sub-Saharan Africa and Thailand suggest that unsafe injections are responsible for between less than 1% and 3% of all HIV infections *(31,64)*.

An estimated 327 000 health care workers throughout the world are percutaneously exposed to HIV annually. The highest numbers of workers exposed are reported in sub-Saharan Africa and South-East Asia. In eastern Africa alone, about 19% of health care workers are percutaneously exposed to HIV annually *(65)*.

The risk of acquiring HIV from a single percutaneous exposure to a needle contaminated with HIV is about 0.43%. However, this is an average figure, and deep injuries or injuries from devices with visible blood carry a higher risk of infection *(65)*. Sharps injuries cause between 200 and 5000 HIV infections among health care workers each year, and about 4% of all HIV infections among health care workers arise from occupational exposure *(66)*.

Post-exposure prophylaxis is a short-term course of antiretroviral therapy that aims to reduce the likelihood of HIV infection after potential exposure. WHO recommends that post-exposure prophylaxis be provided as part of a comprehensive, universal health sector prevention package that reduces staff exposure to infectious hazards *(67)*. In 2007, of 73 low- and middle-income countries that provided information on post-exposure prophylaxis, 64 (88%) had a national post-exposure prophylaxis policy or protocol.[4] However, the reported availability of post-exposure prophylaxis in health facilities is lower, and only 35% of health facilities in 50 reporting countries had post-exposure prophylaxis available. The national post-exposure prophylaxis policy or protocol covered occupational exposure (such as needle-stick injuries in a health care facility) in all 64 reporting countries. However only 40 of 64 countries (62%) covered non-occupational exposure (such as in cases of sexual assault).

4 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

References

1. WHO, UNAIDS and UNICEF. *Towards universal access: scaling up priority HIV/AIDS interventions in the health sector. Progress report, April 2007*. Geneva, World Health Organization, 2007 (http://www.who.int/mediacentre/news/releases/2007/pr16/en/index.html, accessed 5 May 2008).
2. *WHO technical consultation in collaboration with the European AIDS Treatment Group and AIDS Action Europe on the criminalization of HIV and other sexually transmitted infections*. Copenhagen, WHO Regional Office for Europe, 2006 (http://www.euro.who.int/Document/SHA/crimconsultation_latest.pdf, accessed 5 May 2008).
3. Weait M. *Intimacy and responsibility: the criminalisation of HIV transmission*. Abingdon, Routledge-Cavendish, 2007.
4. Rojanapithayakorn W. The 100% condom use programme in Asia. *Reproductive Health Matters*, 2006, 14:41–52.
5. Thai Working Group on HIV/AIDS. *Projections for HIV/AIDS in Thailand: 2000–2020*. Bangkok, Ministry of Public Health, 2001.
6. Ministry of Health of the Union of Myanmar and WHO Regional Office for South-East Asia. *Review of the Myanmar National AIDS Programme*. New Delhi, WHO Regional Office for South-East Asia, 2006 (http://www.searo.who.int/en/Section10/Section18/Section356_4613.htm, accessed 5 May 2008).
7. Steen R et al. Pursuing scale and quality in STI interventions with sex workers: initial results from Avahan India AIDS Initiative. *Sexually Transmitted Infections*, 2006, 82:381–385.
8. Mogasale V et al. Sexually transmitted infection (STI) capacity building to support scale-up of Avahan interventions with sex workers (SWs) in India. *16th International AIDS Conference, Toronto, Canada, 13–18 August 2006* (abstract no. MOPE0600; http://www.aegis.com/conferences/iac/2006/MoPE0600.html, accessed 5 May 2008).
9. Steen R et al. Pursuing scale and quality in STI interventions with sex workers: initial results from Avahan India AIDS Initiative. *Sexually Transmitted Infections*, 2006, 82:381–385.
10. Kimani J et al. Reduced rates of HIV acquisition during unprotected sex by Kenyan female sex workers predating population declines in HIV prevalence. *AIDS*, 2008, 22:131–137.
11. Ghys P et al. Increase in condom use and decline in HIV and sexually transmitted diseases among female sex workers in Abidjan, Cote d'Ivoire, 1991–1998. *AIDS*, 2003, 17(Suppl 4):121–122.
12. Aceijas C et al. Global overview of injecting drug use and HIV infection among injecting drug users. *AIDS*, 2004, 18:2295–2303.
13. Donoghoe MC et al. Setting targets for universal access to HIV prevention, treatment and care for injecting drug users (IDUs): towards consensus and improved guidance. *International Journal of Drug Policy*, 2008, 19(Suppl 1):S5–S14.
14. WHO/UNODC/UNAIDS. *Effectiveness of interventions to address HIV in prisons*. Geneva, World Health Organization, 2007 (Evidence for Action Technical Papers; http://www.who.int/hiv/idu/prison/en/index.html, accessed 5 May 2008).
15. WHO/UNODC/UNAIDS. *Interventions to address HIV in prisons: prevention of sexual transmission*. Geneva, World Health Organization, 2007 (Evidence for Action Technical Papers; http://www.who.int/hiv/idu/prison/en/index.html, accessed 5 May 2008).
16. WHO/UNODC/UNAIDS. *Interventions to address HIV in prisons: needle and syringe programmes and decontamination strategies*. Geneva, World Health Organization, 2007 (Evidence for Action Technical Papers; http://www.who.int/hiv/idu/prison/en/index.html, accessed 5 May 2008).
17. WHO/UNODC/UNAIDS. *Interventions to address HIV in prisons: drug dependence treatments*. Geneva, World Health Organization, 2007 (Evidence for Action Technical Papers; http://www.who.int/hiv/idu/prison/en/index.html, accessed 5 May 2008).
18. WHO/UNODC/UNAIDS. *Interventions to address HIV in prisons: HIV care, treatment and support*. Geneva, World Health Organization, 2007 (Evidence for Action Technical Papers; http://www.who.int/hiv/idu/prison/en/index.html, accessed 5 May 2008).
19. Ball A et al. Evidence for action for HIV prevention, treatment and care among injecting drug users. *International Journal of Drug Policy*, 2005, 16:S1–S6.
20. UNAIDS and WHO Regional Office for Europe. *Monitoring progress on the Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia*. Copenhagen, WHO Regional Office for Europe, 2008.
21. *Dublin Declaration on Partnership to Fight HIV/AIDS in Europe and Central Asia*. Dublin, Irish Presidency of the European Union, 2004 (http://www.eu2004.ie/templates/meeting.asp?sNavlocator=5,13&list_id=25, accessed 5 May 2008).
22. *HIV/AIDS in Viet Nam – action at national and local levels: legal documentation*. Hanoi, UNAIDS Office in Viet Nam, 2008 (http://www.unaids.org.vn/local/legal.htm, accessed 5 May 2008).

23. *2007 AIDS epidemic update*. Geneva, UNAIDS and World Health Organization, 2007 (http://www.unaids.org/en/KnowledgeCentre/HIVData/EpiUpdate/EpiUpdArchive/2007, accessed 5 May 2008).
24. Jaffe HW, Valdiserri RO, De Cock KM. The reemerging HIV/AIDS epidemic in men who have sex with men. *Journal of the American Medical Association*, 2007, 298:2412–2414.
25. UK Collaborative Group for HIV and STI Surveillance. *Testing times: HIV and other sexually transmitted infections in the United Kingdom: 2007*. London, Health Protection Agency, Centre for Infections, 2007.
26. Lazarus JV. *The spread of HIV in Europe: hidden epidemics and other barriers to universal access to prevention, treatment and care*. Lund, Sweden, Lund University, 2008.
27. Cáceres C, Konda K, Pecheny M, Chatterjee A, Lyerla R. Estimating the number of men who have sex with men in low and middle income countries. *Sexually Transmitted Infections*, 2006, 82:3–9.
28. European Centre for the Epidemiological Monitoring of AIDS (EuroHIV). *HIV/AIDS surveillance in Europe. End-year report 2006, No. 75*. Saint-Maurice, French Institute for Public Health Surveillance, 2007.
29. Ottoson D. *State-sponsored homophobia: a world survey of laws prohibiting same sex activity between consenting adults*. Brussels, International Lesbian and Gay Association, 2007 (http://www.ilga.org/statehomophobia/State_sponsored_homophobia_ILGA_07.pdf, accessed 5 May 2008).
30. Baral S et al. Elevated risk for HIV infection among men who have sex with men in low- and middle-income countries 2000–2006: a systematic review. *PLoS Medicine*, 2007, 4:e339.
31. Gouws E et al. Short-term estimates of adult HIV incidence by mode of transmission: Kenya and Thailand as examples. *Journal of Sexually Transmitted Infections*, 2006, 82:51–55.
32. Cáceres C. Access to health care by sexual minorities in Latin America. *16th International AIDS Conference, Toronto, Canada, 13–18 August 2006*.
33. *Report on the global AIDS epidemic*. Geneva, UNAIDS, 2006 (http://www.unaids.org/en/KnowledgeCentre/HIVData/GlobalReport/Default.asp, accessed 5 May 2008).
34. Segura E, Cáceres C. *Access to STI & HIV/AIDS-related health services by Peruvian men who have sex with men: brief report from a STI clinic-based survey in 5 large cities*. Unpublished, 2008.
35. Mejía A, Serrano C. *Validación de una estrategia de communication para promover el acceso al diagnóstico para VIH/ITS en hombres gay de Bogotá D.C. [Validation of a communication strategy for promoting access to testing for HIV among gay men in Bogotá]*. Bogotá, Fundación Henry Ardila and Pan American Health Organization, 2007.
36. *HIV/AIDS and hepatitis C in prisons: the facts*. Toronto, Canadian HIV/AIDS Legal Network, 2005 (http://www.aidslaw.ca/publications/publicationsdocEN.php?ref=171, accessed 5 May 2008).
37. *HIV/AIDS prevention, care, treatment and support in prison settings: a framework for an effective national response*. Vienna, United Nations Office on Drugs and Crime, 2006 (http://www.unodc.org/unodc/en/hiv-aids/publications.html, accessed 5 May 2008).
38. DiCenso A, Dias G, Gahagan J. *Unlocking our futures: a national study on women, prisons, HIV, and hepatitis C*. Toronto, PASAN, 2003.
39. Small W et al. Incarceration, addiction and harm reduction: inmates experience injecting drugs in prison. *Substance Use and Misuse*, 2005, 40:831–843.
40. Calzavara LM et al. Prior opiate injection and incarceration history predict injection drug use among inmates. *Addiction*, 2003, 98:1257–1265.
41. European Monitoring Centre on Drugs and Drug Addiction (EMCDDA). *The state of the drugs problem in Europe. Annual report 2005*. Luxembourg, Office for Official Publications of the European Communities, 2005.
42. Allright S et al. Prevalence of antibodies to hepatitis B, hepatitis C, and HIV and risk factors in Irish prisoners: results of a national cross sectional survey. *British Medical Journal*, 2000, 321:78–82.
43. *Rapid situation assessment Mauritius*. Unpublished, 2005.
44. Frost L, Tchertkov V. Prisoner risk taking in the Russian Federation. *AIDS Education and Prevention*, 2002, 14(Suppl B):7–23.
45. Dolan K, Bijl M, White B. HIV education in a Siberian prison colony for drug dependent males. *International Journal of Equity in Health*, 2004, 3:7.
46. Thaisri H et al. HIV infection and risk factors among Bangkok prisoners, Thailand: a prospective cohort study. *BMC Infectious Diseases*, 2003, 3:25.
47. Clarke JG et al. (2001). Active and former injection drug users report of HIV risk behaviors during periods of incarceration. *Substance Abuse*, 22:209–216.
48. *HIV prevention, care and treatment in prisons in the South-East Asia Region*. New Delhi, WHO Regional Office for South-East Asia, 2007 (http://www.searo.who.int/EN/Section10/Section18/Section356_4613.htm, accessed 5 May 2008).
49. Auvert B et al. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: the ANRS 1265 Trial. *PLoS Medicine*, 2005, 2:e298.
50. Bailey RC et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomised controlled trial. *Lancet*, 2007, 369:643–656.
51. Gray RH et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomised trial. *Lancet*, 2007, 369:657–666.

52. Weiss HA et al. Male circumcision for HIV prevention: from evidence to action? *AIDS*, 2008, 22:567–574.
53. Williams BG et al. The potential impact of male circumcision on HIV in sub-Saharan Africa. *PLoS Medicine*, 2006, 3:e262.
54. Nagelkerke NJ et al. Modelling the public health impact of male circumcision for HIV prevention in high prevalence areas in Africa. *BMC Infectious Diseases*, 2007, 7:16.
55. Gray RH et al. The impact of male circumcision on HIV incidence and cost per infection prevented: a stochastic simulation model from Rakai, Uganda. AIDS, 2007, 21:845–850.
56. Tobian A et al. Trial of male circumcision: prevention of HSV-2 in men and vaginal infections in female partners, Rakai, Uganda. *15th Conference on Retroviruses and Opportunistic Infections, Boston, MA, 3–6 February 2008* (Abstract 28LB; http://www.retroconference.org/2008/Abstracts/33369.htm, accessed 5 May 2008).
57. *New data on male circumcision and HIV prevention: policy and programme implications*. Geneva, World Health Organization and UNAIDS, 2007 (http://www.unaids.org/en/KnowledgeCentre/Resources/PolicyGuidance/Techpolicies/Male_Cir_Technical_policies.asp, accessed 5 May 2008).
58. Wawer M et al. Trial of male circumcision in HIV+ men, Rakai, Uganda: effects in HIV+ men and in women partners. *15th Conference on Retroviruses and Opportunistic Infections, Boston, MA, 3–6 February 2008* (Abstract 33LB; http://www.retroconference.org/2008/Abstracts/33461.htm, accessed 5 May 2008).
59. Tsela S, Halperin DT. Knowledge, attitudes and practices regarding male circumcision in the Manzini (central) region of Swaziland. *16th International AIDS Conference, Toronto, Canada, 13–18 August 2006* (http://www.iasociety.org/Default.aspx?pageid=11abstractid=2199111, accessed 5 May 2008).
60. *Global Database on Blood Safety report 2004–2005*. Geneva, World Health Organization (in press).
61. Sirchia G et al. *Safe and good use of blood in surgery (SANGUIS): use of blood products and artificial colloids in 43 European hospitals*. Luxembourg, European Commission, Directorate-General for Science, Research and Development, 1994.
62. Appropriateness and safety of blood transfusion. *British Medical Journal*, 2005, 330:104–105.
63. Hauri AM, Armstrong GL, Hutin YGF. The global burden of disease attributable to contaminated injections given in health care settings. *International Journal of STD and AIDS*, 2004, 15:7–16.
64. White RG et al. Quantifying HIV-1 transmission via unsafe injections. *Proceedings of the National Academy of Sciences of the United States of America*, 2007, 104:9794–9799.
65. Prüss-Üstün A, Rapiti E, Hutin Y. *Sharps injuries: global burden of disease due to sharps injuries in health care workers*. Geneva, World Health Organization, 2003 (Environmental Burden of Disease Series, No. 3; http://www.who.int/quantifying_ehimpacts/publications/9241562463/en/index.html, accessed 5 May 2008).
66. Rapiti E, Prüss-Üstün A, Hutin Y. *Sharps injuries: assessing the burden of disease from sharps injuries to health care workers at national and local levels*. Geneva, World Health Organization, 2005 (Environmental Burden of Disease Series, No. 11; http://www.who.int/quantifying_ehimpacts/publications/ebd11/en/index.html, accessed 5 May 2008).
67. *Post-exposure prophylaxis to prevent HIV infection: joint WHO/ILO guidelines on post-exposure prophylaxis (PEP) to prevent HIV infection*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/pub/guidelines/PEP/en/index.html, accessed 5 May 2008).
68. Kripke K. *Multivariate analysis of the STEP study (Merck V520 Protocol 023/HVTN 502)*. New York, AIDS Vaccine Advocacy Coalition, 2008 (http://avac.org/pdf/NIAID_STEP_slides.pdf, accessed 5 May 2008).
69. Padian N et al. Diaphragm and lubricant gel for prevention of HIV acquisition in southern African women: a randomised controlled trial. *Lancet*, 2007, 370:251–256.
70. *Trial shows anti-HIV microbicide is safe, but does not prove it effective*. Washington, DC, Population Council, 18 February 2008.
71. Petersen L et al. Findings from a double-blind, randomized, placebo-controlled trial of tenofovir disoproxil fumarate (TDF) for prevention of HIV infection in women. *16th International AIDS Conference, Toronto, Canada, 13–18 August 2006* (Abstract THLB0103; http://www.aids2006.org/pag/Abstracts.aspx?AID=51348, accessed 5 May 2008).
72. *HIV prevention research: a comprehensive timeline*. New York, AIDS Vaccine Advocacy Coalition, 2008 (http://avac.org/timeline-website/index.htm, accessed 5 May 2008).
73. Wald A. Synergistic interactions between herpes simplex virus type-2 and human immunodeficiency virus epidemics. *Herpes*, 2004, 11:70–76.
74. Watson-Jones D et al. Effect of herpes simplex suppression on incidence of HIV among women in Tanzania. *New England Journal of Medicine*, 2008, 358:1560–1571.
75. Celum C et al. HSV-2 suppressive therapy for prevention of HIV acquisition: results of HPTN 03. *15th Conference on Retroviruses and Opportunities Infections 2008, Boston, MA, 3–6 February 2008* (Abstract 32; http://www.retroconference.org/2008/Abstracts/31499.htm, accessed 5 May 2008).

5. SCALING UP HIV SERVICES FOR WOMEN AND CHILDREN

Key findings

- Global and national political commitment to scale up interventions for preventing mother-to-child transmission of HIV has intensified in recent years.
- An estimated 18% of pregnant women in low- and middle-income countries received an HIV test in 2007 versus 10% in 2004.
- An estimated 33% of pregnant women living with HIV received antiretrovirals to prevent transmission to their children in 2007, a substantial increase compared with only 10% in 2004. The most significant expansion was in sub-Saharan Africa.
- An increasing number of countries are providing combination antiretroviral prophylactic drug regimens to pregnant women living with HIV, which are more effective in reducing the mother-to-child transmission of HIV than one drug alone.
- Only 12% of pregnant women identified as being HIV-positive during antenatal care were assessed to determine whether they were eligible to receive antiretroviral therapy for their own health.
- Only 8% of infants born to pregnant women with HIV in 2007 were tested for HIV within the first two months of birth. In addition, only 4% of infants born to women living with HIV initiated co-trimoxazole prophylaxis as indicated in WHO guidelines.
- The number of children receiving antiretroviral therapy increased from about 75 000 in 2005 to almost 200 000 in 2007. However, many children living with HIV are still not receiving treatment, and mortality among them remains high.

The HIV epidemic is taking a heavy toll on women and children worldwide, especially in sub-Saharan Africa. In 2007, women accounted for approximately half of all people living with HIV worldwide and for more than 60% of all infections in sub-Saharan Africa. In other regions, women still represent less than half of all people with HIV (26% in Eastern Europe and Central Asia, 29% in Asia, 43% in the Caribbean), but their proportion continues to grow *(1)*.

An estimated 2.1 million [1.9 million to 2.4 million] children younger than 15 years were living with HIV in 2007, and more than 90% of them were infected through mother-to-child transmission *(1)*. Children account for 6% of all HIV infections, 17% of new infections and 14% of all HIV-related mortality. About 90% of children living with HIV are in sub-Saharan Africa.

An estimated 1.5 million of the 115 million births per year in low- and middle-income countries are from mothers living with HIV. Close to 90% of all pregnant women living with HIV in low- and middle-income countries live in 20 countries, and 75% are concentrated in 12 countries (Table 5.1).

HIV is also adversely affecting the overall health of children, especially in countries with a high HIV burden. HIV has been the leading cause of death among children younger than five years of age in six countries, all in eastern and southern Africa (Table 5.2).

Without any intervention, between 15% and 45% of infants born to mothers living with HIV will become infected (5–10% during pregnancy, 10–20% during labour and delivery and 5–20% through breastfeeding) *(3)*.

Table 5.1. Countries with the largest estimated numbers of pregnant women living with HIV and percentage of the total number of pregnant women living with HIV in low- and middle-income countries, 2007

Rank	Country	Estimated number of pregnant women living with HIV	% of the total in low- and middle-income countries
1	South Africa	220 000 [180 000–260 000]	15%
2	Nigeria	190 000 [130 000–240 000]	13%
3	United Republic of Tanzania	100 000 [91 000–110 000]	7%
4	Mozambique	97 000 [81 000–120 000]	7%
5	Uganda	78 000 [68 000–92 000]	5%
6	Kenya	76 000 [66 000–86 000]	5%
7	Zambia	76 000 [68 000–86 000]	5%
8	Malawi	73 000 [64 000–82 000]	5%
9	Ethiopia	66 000 [58 000–74 000]	4%
10	India	64 000 [37 000–92 000]	4%
11	Zimbabwe	52 000 [48 000–57 000]	4%
12	Democratic Republic of the Congo	38 000 [33 000–46 000]	3%
13	Cameroon	34 000 [22 000–42 000]	2%
14	Côte d'Ivoire	28 000 [21 000–34 000]	2%
15	Sudan	18 000 [12 000–26 000]	1%
16	Angola	18 000 [13 000–22 000]	1%
17	Chad	18 000 [10 000–22 000]	1%
18	Ghana	14 000 [12 000–16 000]	1%
19	Swaziland	13 000 [12 000–15 000]	1%
20	Lesotho	13 000 [11 000–14 000]	1%

Table 5.2. Percentage of deaths attributable to HIV among children younger than five years, selected high-burden countries, 2000

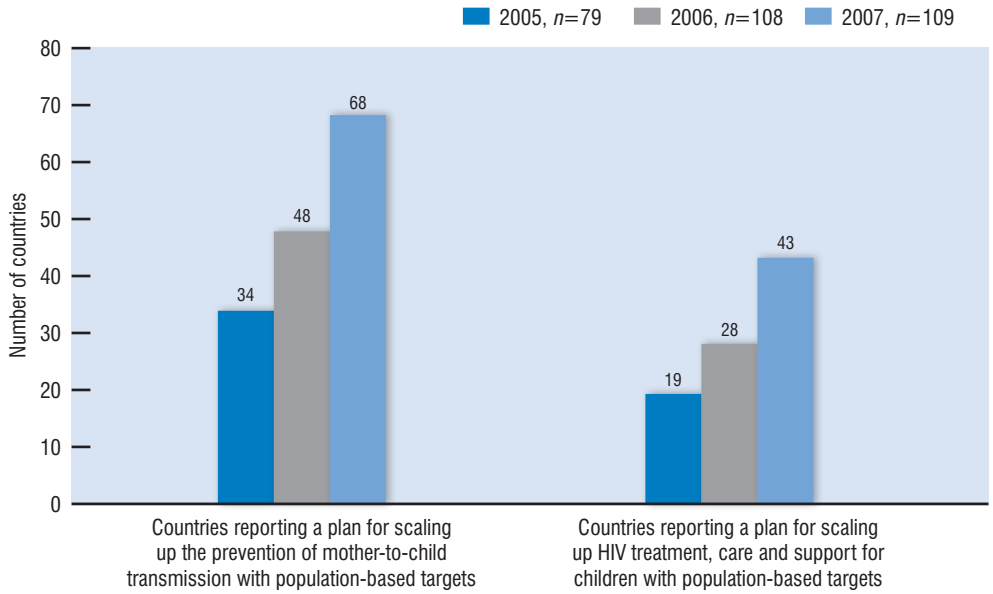
Country	Deaths among children younger than five years attributable to HIV (%)
South Africa	57
Lesotho	56
Botswana	54
Namibia	53
Swaziland	47
Zimbabwe	41

Source: *World health statistics 2008 (2)*.

In the Declaration of Commitment on HIV/AIDS adopted at the United Nations Special Session on HIV/AIDS in 2001 *(4)*, countries pledged to reduce the proportion of infants with HIV by 50% by 2010 and to ensure that 80% of pregnant women attending antenatal care have access to essential services to reduce mother-to-child transmission. Global and national political commitment to scale up interventions for preventing mother-to-child transmission has intensified in recent years, and an increasing number of countries are expanding their national programmes.

In 2007, nearly all of the 20 countries with the highest number of pregnant women with HIV had developed national plans for scaling up the prevention of mother-to-child transmission and HIV treatment, care and support for children. Globally, 88 of 109 reporting countries (81%) had a plan for scaling up the prevention of mother-to-child transmission, and 68 of these included population-based targets as called for in the Abuja Call to Action *(5)*. This represents a substantial increase from only 34 countries that had national plans with population-based targets in 2005. Sixty-two (57%) countries also reported having a plan for scaling up HIV treatment, care and support for children (and 43 of these included population-based targets), which is more than twice the number of countries with such a plan in 2005 (Fig. 5.1).

Fig. 5.1. Number of countries with national scale-up plans and population-based targets for the prevention of mother-to-child transmission and HIV treatment, care and support for children, 2005–2007



n: number of reporting countries

The United Nations recommends the implementation of a comprehensive strategic approach for preventing HIV infection among infants and children that includes four elements (Box 5.1) *(6)*:

- primary prevention of HIV infection among women of childbearing age;
- preventing unintended pregnancies among women living with HIV;
- preventing HIV transmission from women living with HIV to their infants; and
- providing appropriate treatment, care and support to mothers living with HIV and their children and families.

Scaling up this comprehensive range of interventions will bring countries closer to universal access goals by preventing new HIV infections in women and children; ensuring that women living with HIV and children exposed to HIV have access to treatment and care; and prolonging and preserving the quality of life for mothers, children and families.

The regional and country-level data on access to HIV services for women and children presented in this section have been compiled from information reported by national programmes in 109 countries[1] representing 93% of pregnant women and 99% of the estimated number of pregnant women living with HIV who need antiretrovirals for reducing mother-to-child transmission.

Box 5.1. The Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children

The Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children (IATT) is co-convened by UNICEF and WHO and represented by 20 partner agencies that work on preventing mother-to-child transmission of HIV and HIV treatment and care for children. The IATT works with partners to put into operation the four elements of the comprehensive approach and supports countries in making progress towards universal access goals.

The IATT has established five working groups in areas that require additional guidance and efforts to support country-level scale-up:
(1) laboratory support
(2) HIV treatment, care and support for children
(3) infant and young child feeding
(4) primary prevention and sexual and reproductive health of people living with HIV
(5) monitoring and evaluation.

In 2007, the IATT released guidance for the global scaling up of interventions to prevent the mother-to-child transmission of HIV *(7)*. The guidance recommends specific actions to accelerate the scaling up of activities based on the four elements and provides a framework for building partnerships among national governments, civil society and international agencies.

Recommended priority strategies and actions at the country level include:

- government leadership, commitment and accountability to the goal of universal access to prevention of mother-to-child transmission and HIV care and treatment for children;
- district-driven delivery of a standard package of comprehensive services;
- provider-initiated HIV testing and counselling in maternal, newborn and child health settings;
- longitudinal HIV care management in maternal, newborn and child health settings;
- increased access to antiretroviral therapy for pregnant women, mothers, children and families;
- strengthening advice on infant feeding and nutrition and counselling and support for women, their children and their families; and
- operationalizing the link between the delivery of services for preventing the mother-to-child transmission of HIV and sexual and reproductive health care.

1 Data reported in response to the 2007 Report Card on Prevention of Mother-to-Child Transmission of HIV and Paediatric HIV Care and Treatment in Low- and Middle-income Countries.

5.1 Primary prevention of HIV for women of childbearing age

The number of women living with HIV worldwide has increased by 1.6 million since 2001 *(1)*. Preventing new HIV infections among women is critical not only for their own health but also to reduce future HIV infections among infants, especially in sub-Saharan Africa, where half the female population is of childbearing age *(8)*.

WHO and UNICEF recommend integrating primary prevention into programmes for preventing mother-to-child transmission to assist women who test HIV-negative in remaining uninfected throughout pregnancy, childbirth and breastfeeding. This is especially important because recent seroconverters are more likely to transmit HIV to their infants.

Interventions for the primary prevention of HIV include a wide range of activities provided within communities and in health facilities with two main approaches: activities aimed at changing individual-level behaviour and community-level interventions.

HIV prevention messages for individual HIV risk reduction can be disseminated in various ways such as through the mass media, information campaigns and outreach to specific groups and within health facilities. Their translation into practice can be gauged through trends in individually reported behaviour and ultimately reflected in HIV incidence if recently acquired HIV can be measured accurately at the population level.

Data from recent population-based surveys *(9)* show that, in most countries, less than half of men and women with more than one sexual partner in the last 12 months reported using a condom during their last sexual intercourse (Table 5.3).

Table 5.3. Percentage of women and men aged 15–49 years in selected countries who had more than one partner in the past 12 months and reported using a condom during their last sexual intercourse, 2005-2007

Country	Year	15–24 years		25–49 years	
		Women	Men	Women	Men
Colombia	2005	35.5	…	26.5	…
Congo	2005	22.2	36.5	24.1	26.5
Côte d'Ivoire	2005	45.1	61.8	34.8	25.3
Democratic Republic of the Congo	2007	8.6	22.3	6.9	12.3
Haiti	2005	22.6	50.5	19.4	22.7
Mali	2006	7.9	28.2	8.3	9.1
Namibia	2007	73.7	82.2	55.5	68.8
Ukraine	2007	62.7	63.7	39.8	36.8
Zambia	2007	33.1[a]	43.1	33.1[a]	22.9

Source: Demographic and Health Surveys [web site] *(9)*.
… not available.
a For the age group 15–49 years.

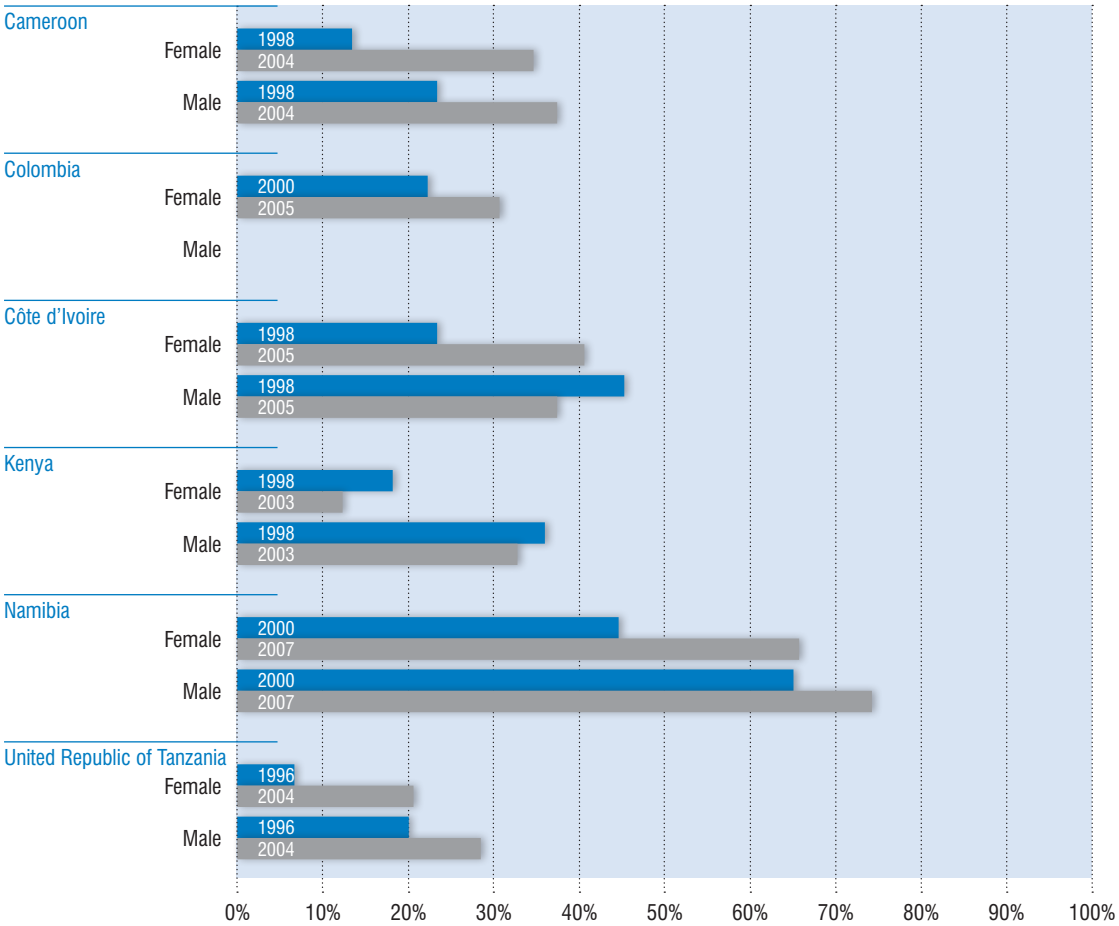
Trend data from countries with repeated population-based surveys *(9)* suggest that in most cases, reported condom use is increasing over time among people aged 15–49 years who had more than one partner in the past 12 months. However, condom use has declined in some countries, including among men in Côte d'Ivoire and among both men and women in Kenya (Fig. 5.2).

Health facilities provide an important setting for integrating priority HIV prevention interventions with sexual and reproductive health services for women and their sexual partners. Antenatal care settings that offer interventions for preventing mother-to-child transmission as part of a package of services can reinforce HIV primary prevention messages along with other information on HIV and routine information on antenatal care and delivery, sexually transmitted infections and family planning.

In addition, testing and counselling for couples is becoming an increasing focus for many programmes, providing an opportunity to increase the involvement of women's sexual partners in antenatal care. Condom promotion and distribution are also being integrated as a component of the package in many countries.

However, scaling up the provision of primary prevention services in the context of preventing mother-to-child transmission is hampered by several societal and structural barriers such as the overall lack of involvement of male partners and the shortage of skilled health care providers.

Fig. 5.2. Percentage of women and men aged 15–49 years who had more than one partner in the past 12 months and reported using a condom during their last sexual intercourse in selected countries with repeat demographic and health surveys, 1998–2007



Source: Demographic and Health Surveys [web site] *(9)*.

Several programmes in resource-limited settings are adopting approaches such as task-shifting and the use of less specialized health care workers, including community counsellors and people living with HIV, to address these concerns. Such approaches not only contribute to reducing the workload of more specialized health care workers but also facilitate individual post-test counselling for both HIV-positive and HIV-negative women *(10)*.

5.2 Preventing unintended pregnancies among women living with HIV

The prevention of unintended pregnancies among women living with HIV can be facilitated when they come into contact with health services providing HIV testing and counselling, reproductive health services, maternal and child health care and HIV care and antiretroviral therapy. Enabling women to time and space their pregnancies also leads to improvement in their health and can reduce maternal mortality and increase child survival.

Globally, about 80 million unintended pregnancies occur every year because an estimated 120 million couples have an unmet need for safe and effective contraception *(11)*. Unmet need for contraception and family planning refers to the proportion of all women who are at risk of pregnancy and want to space or limit their childbearing but are not using contraception.[2] Sub-Saharan Africa has the lowest levels of contraceptive use, with only 22% of women of reproductive age who are married or in union using any family planning method (with 15% using a modern method) *(14)*.[3] As a result, nearly 27 million women in sub-Saharan Africa have an unmet need for contraception. Meeting the contraceptive needs of these women, including women with HIV, will greatly reinforce efforts to reduce the number of HIV infections among infants.

Facility-based data from some settings confirm the existence of unmet need for family planning among women living with HIV. Studies undertaken by Family Health International have documented levels of unmet need ranging from 9% to 14% among clients of antiretroviral therapy services in Ghana *(15)*. Studies in Côte d'Ivoire, South Africa and Uganda have revealed higher levels of unintended pregnancies among women with HIV, ranging from 51% to 99% *(16,17)*.

Women living with HIV who know their status are in particular need of sexual and reproductive health services to make informed decisions about their future reproductive life, including when to seek appropriate support and services to prevent unintended pregnancies *(18)*. Many studies have emphasized the need to address both family planning and HIV prevention *(19)*. Male and female condoms are the only contraceptive methods that protect against the transmission of HIV and other sexually transmitted diseases as well as unwanted pregnancy. Family planning is now a recommended component of most services for preventing mother-to-child transmission. Antenatal care programmes are also beginning to offer contraceptive information to promote postpartum use *(20)*.

Scaling up such functional integration between services for preventing mother-to-child transmission and reproductive health programmes will enable countries to maximize HIV prevention and to improve maternal and child health outcomes (Box 5.2).

Box 5.2. Integrating sexual and reproductive health services with HIV services

Priority interventions to integrate sexual and reproductive health services with HIV services include:

- promoting and providing condoms (male and female) as a means of protection against both unintended pregnancy and sexually transmitted infections, including HIV;
- providing or referring to sexual and reproductive health services that include counselling on reproductive choices for people living with HIV, planning for a pregnancy, protecting against a pregnancy or interrupting an unintended pregnancy where abortion is legal;
- ensuring postpartum maternal health services that provide counselling about and offer family planning methods, including condoms; and
- providing advocacy and education on sexual health within HIV care and treatment services, reproductive health settings and youth-friendly services as an effective means of changing risk-taking behaviour that can potentially result in reduced unintended pregnancy and sexually transmitted infections, including HIV, and other illnesses related to sexual and reproductive health.

2 *Unmet need* constitutes: "Women who are at risk of pregnancy (fecund) who desire to either stop childbearing or postpone their next birth for at least two years, or who are undecided about if or when to have another child, and who are not using a contraceptive method, and who are pregnant or amenorrheic and whose pregnancies were unwanted or mistimed, among all women of reproductive age (15–49) who are married or in consensual union." (12,13).

3 Family planning method can be used interchangeably with contraceptive method. It includes clinic and supply (modern) methods and non-supply (traditional) methods. *Traditional methods* include rhythm, withdrawal, abstinence and lactational amenorrhoea. *Modern* methods include female and male sterilization, intrauterine devices (IDUs), hormonal methods (oral pills, injectable and hormone-releasing implants, skin patches and vaginal rings), condoms and vaginal barrier methods (diaphragms, cervical cap and spermicidal foams, jellies, creams and sponges). Surgical sterilization is usually considered to be contraception only if the operation is performed at least partly to avoid having more children (sterilization is also carried out solely for health reasons).

5.3 Preventing the vertical transmission of HIV from mother to child

Reducing HIV transmission from a pregnant woman living with HIV to her infant requires a range of interventions beginning with HIV testing and counselling for pregnant women; followed by antiretroviral prophylaxis for pregnant women with HIV and their newborn baby or antiretroviral therapy for the mother if eligible; safe obstetric interventions; and counselling and support for safer infant feeding options.

5.3.1 HIV testing and counselling

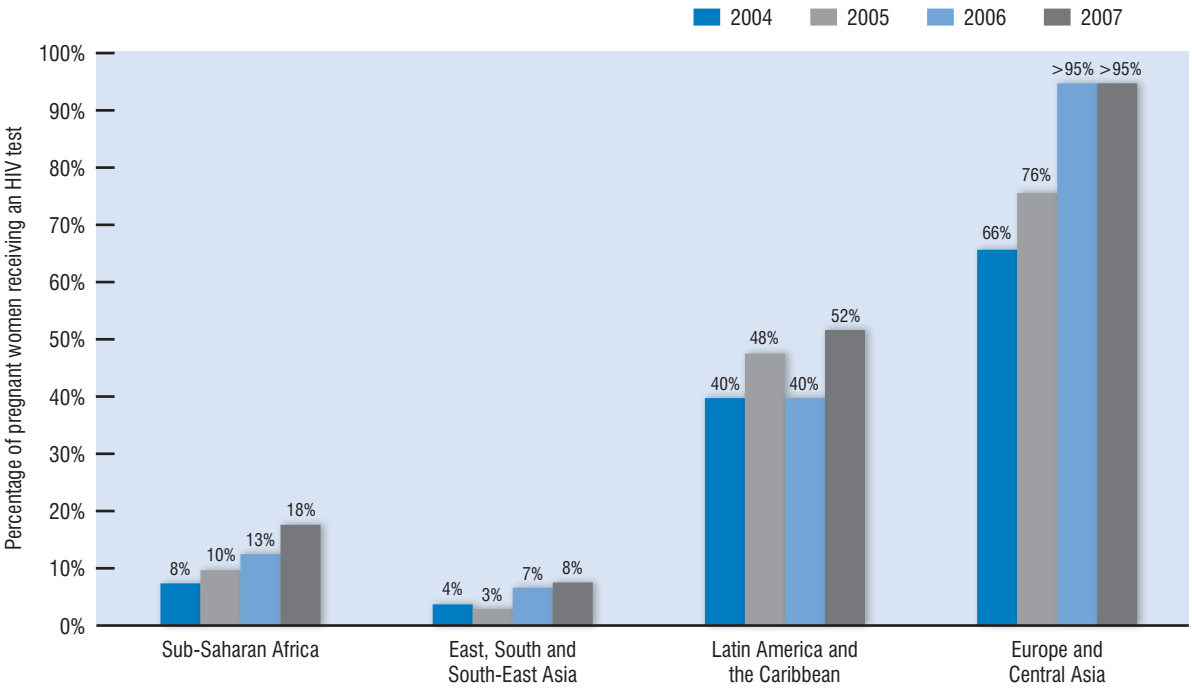
Global coverage of HIV testing among pregnant women has increased in recent years (Fig. 5.3). About 18% of the total estimated number of pregnant women in low- and middle-income countries (20.6 million of 115 million pregnant women) received an HIV test in 2007, compared with 16% in 2006 and 10% in 2004 and 2005. The percentages are slightly higher among women attending antenatal care during their pregnancy, with 21% tested in 2007 versus 13% in 2004.

Despite this progress, the overall level of testing remains low in all regions except Europe and Central Asia. In the 10 countries with the highest estimated numbers of pregnant women with HIV worldwide, HIV testing coverage among pregnant women varies between 4% in Nigeria to 64% in South Africa and 65% in Zambia.

Antenatal care coverage is relatively high in most low- and middle-income countries. This provides an important window of opportunity for health care providers to routinely recommend HIV testing and counselling to pregnant women as part of a comprehensive package of interventions for antenatal care and delivery. For example, both South Africa and Zambia have high rates of antenatal care coverage (92% and 93% respectively) and a corresponding high proportion of pregnant women tested for HIV (64% and 65% respectively) relative to the regional average.

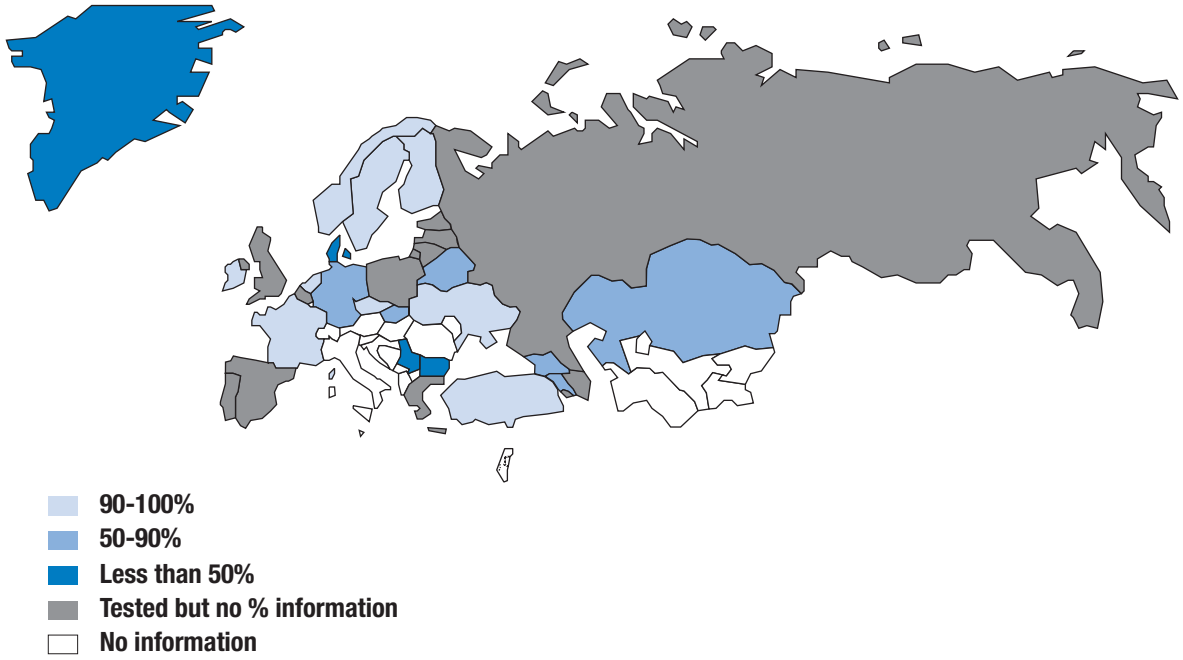
Introducing provider-initiated testing and counselling and rapid HIV testing into the standard package of antenatal care and delivery services in high prevalence countries has been shown to significantly increase access to services for

Fig. 5.3. Percentage of pregnant women in low- and middle-income countries receiving an HIV test, 2004–2007



No data are available for the Middle East and North Africa.

Fig. 5.4. Percentage of pregnant women tested for HIV as part of routine care[a] in the WHO European Region, 2006



Source: EuroHIV *(22)*.
a Different terms that mean "provider-initiated testing and counselling" may be used in different settings.

preventing mother-to-child transmission and has often been the factor determining high levels of HIV testing in antenatal care settings *(6,21)*. Provider-initiated testing and counselling in antenatal care settings is implemented widely in Europe and the United States (Fig. 5.4).

In 2007, 87 of 109 low- and middle-income countries reported the implementation of provider-initiated testing and counselling in all or in some sites, compared with 82 of 108 reporting countries in 2006 and 62 of 79 reporting countries in 2005. Among countries in sub-Saharan Africa, Botswana introduced provider-initiated testing and counselling in pregnant women as part of routine care in 2004. Within six months, antenatal HIV testing increased from 75% to 95% *(23)*. A recent study in urban Zimbabwe *(24)* showed that HIV testing rates increased from 65% to 99% in the first six months where a policy on provider-initiated testing and counselling was implemented.

In the absence of provider-initiated testing and counselling, on-site testing rates often remain low, even where antenatal care attendance rates are high. This is primarily because the test is not offered but also due to several other factors such as the unavailability of tests, inadequate counselling and fear of stigma *(25)*.

5.3.2 Antiretrovirals for preventing mother-to-child transmission

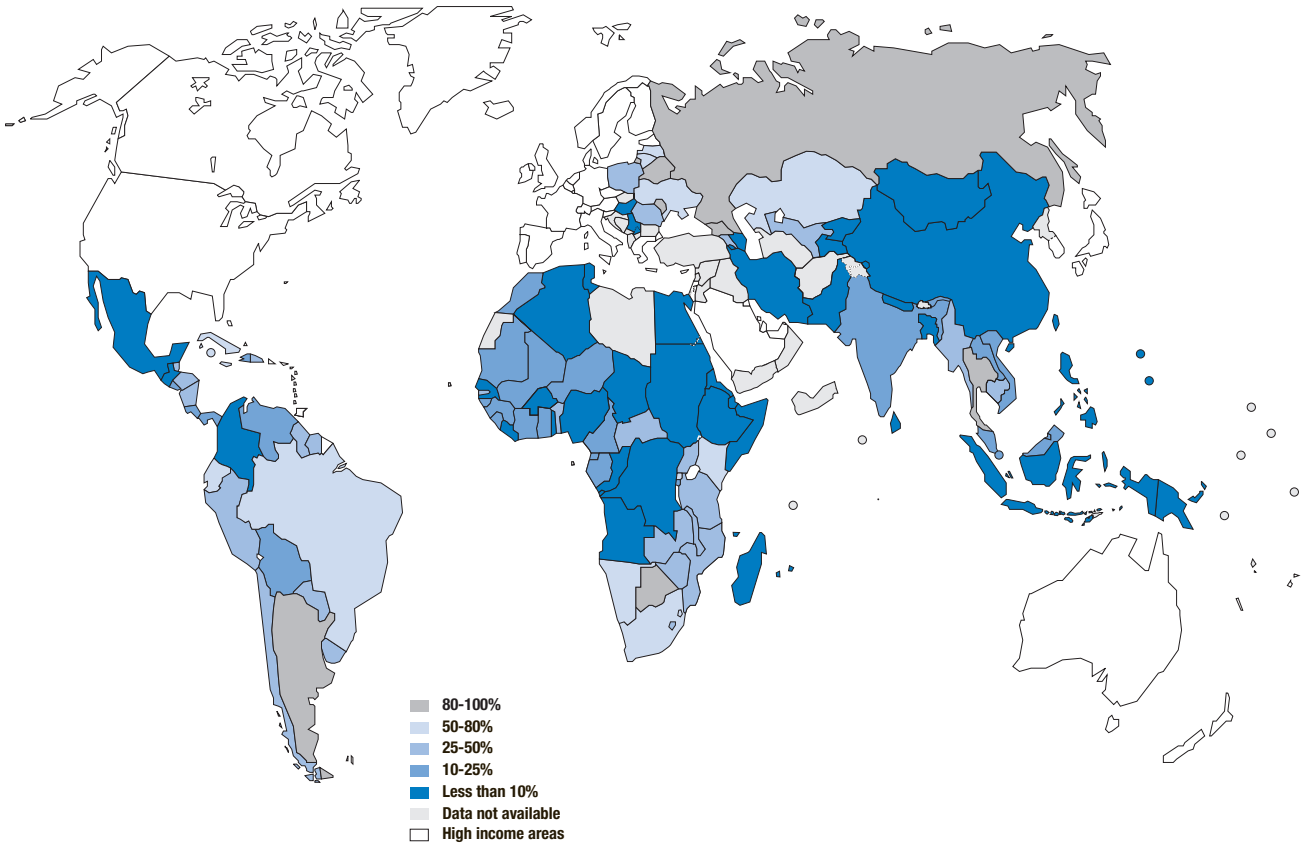
A pregnant woman with HIV must be assessed to determine whether she is eligible to receive antiretroviral therapy. When antiretroviral therapy is not indicated for her own health, pregnant women with HIV should receive combination antiretroviral prophylaxis to prevent HIV transmission to their infants *(26)*. Both antiretroviral prophylaxis for mothers not eligible to receive antiretroviral therapy for their own health and antiretroviral therapy for those who are eligible are effective at reducing the vertical transmission of HIV.

HIV-exposed infants also require antiretroviral prophylaxis as soon after delivery as possible. Combination regimens result in the greatest reduction of transmission and are always required if the mother did not receive antiretroviral prophylaxis. Research is ongoing on the role of extended antiretroviral prophylaxis among infants who continue to be at risk of acquiring HIV through breastfeeding and in the context of greater access to maternal antiretroviral therapy.

About 33% of pregnant women living with HIV received antiretrovirals to prevent mother-to-child transmission in 2007 (491 000 of the total estimated 1.5 million pregnant women living with HIV). This represents a noteworthy increase from 23% in 2006, 15% in 2005 and 10% in 2004 (Fig. 5.5). Certain countries have succeeded in dramatically reducing transmission by increasing the coverage of interventions to prevent mother-to-child transmission. The estimated mother-to-child transmission declined from 30.5% in 2001 to 11.4% in 2007 in Cambodia and from 30.5% in 2001 to 8.9% in 2007 in Rwanda[4].

Table 5.4 provides recent estimates of the number of women who need antiretrovirals (both antiretroviral prophylaxis and antiretroviral therapy) to prevent mother-to-child transmission in 2007.

Fig. 5.5. Coverage of antiretrovirals to prevent mother-to-child transmission of HIV in low- and middle-income countries, 2007



4 Estimates based on country data, UNAIDS/WHO estimates and projections using Spectrum software.

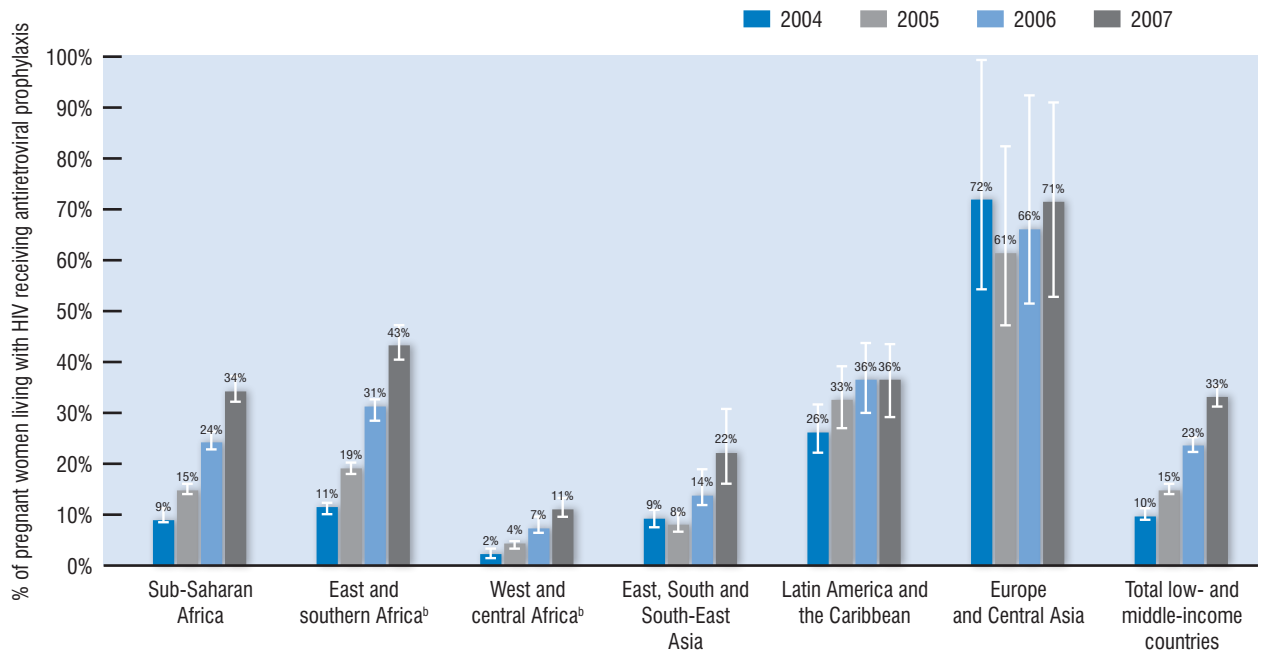
Table 5.4. Estimated number of pregnant woman with HIV receiving and needing antiretrovirals for preventing mother-to-child transmission and percentage coverage in low- and middle-income countries according to region, 2007

Geographical region	Number of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2007	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission, 2007 (range)	Estimated percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2007 (range)[a]
Sub-Saharan Africa	446 000	1 300 000 [1 200 000–1 400 000]	34% [32–37%]
Eastern and southern Africa	403 000	930 000 [860 000–1 000 000]	43% [40–47%]
Western and central Africa	43 000	390 000 [320 000–450 000]	11% [10–13%]
Latin America and the Caribbean	13 000	36 000 [30 000–45 000]	36% [29–43%]
Latin America	11 000	29 000 [23 000–37 000]	38% [30–48%]
Caribbean	2 300	7 200 [6 100–8 500]	32% [27–38%]
Europe and Central Asia	10 000	14 000 [11 000–19 000]	71% [53–91%]
Middle East and North Africa	<100	19 000 [13 000–27 000]	<1% [<1%]
East, South and South-East Asia	22 000	100 000 [72 000–140 000]	22% [16–31%]
All low- and middle-income countries	491 000	1 500 000 [1 400 000–1 600 000]	33% [31–35%]

Note: some numbers do not add up due to rounding. For an explanation of the methods used, see explanatory notes to Annex 3.
a The coverage estimate is based on the estimated numbers of pregnant women living with HIV receiving and needing antiretrovirals.

Sub-Saharan Africa, which accounts for nearly 90% of all pregnant women living with HIV in low- and middle-income countries, has made the most progress in the past three years. In western and central Africa, the number of pregnant women with HIV who received antiretrovirals to prevent mother-to-child transmission increased 5.5-fold between 2004 and 2007 (Fig. 5.6). However, despite this increase, only 11% [range 10–13%] of pregnant women who needed antiretrovirals had access in 2007 in this subregion. Coverage with antiretrovirals in eastern and southern Africa, which includes 12 of the 20 countries with the highest numbers of pregnant women with HIV, increased four-fold, reaching 403 000 women in 2007 versus 106 700 women in 2004 (coverage of 43% [range 40–47%]).

Fig. 5.6. Percentage of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission of HIV in low- and middle-income countries, 2004–2007[a]



The bar indicates the uncertainty range around the estimate.
a For an explanation of the methods used, see explanatory notes to Annex 3.
b Values for East and southern Africa and West and central Africa are included in sub-Saharan Africa.

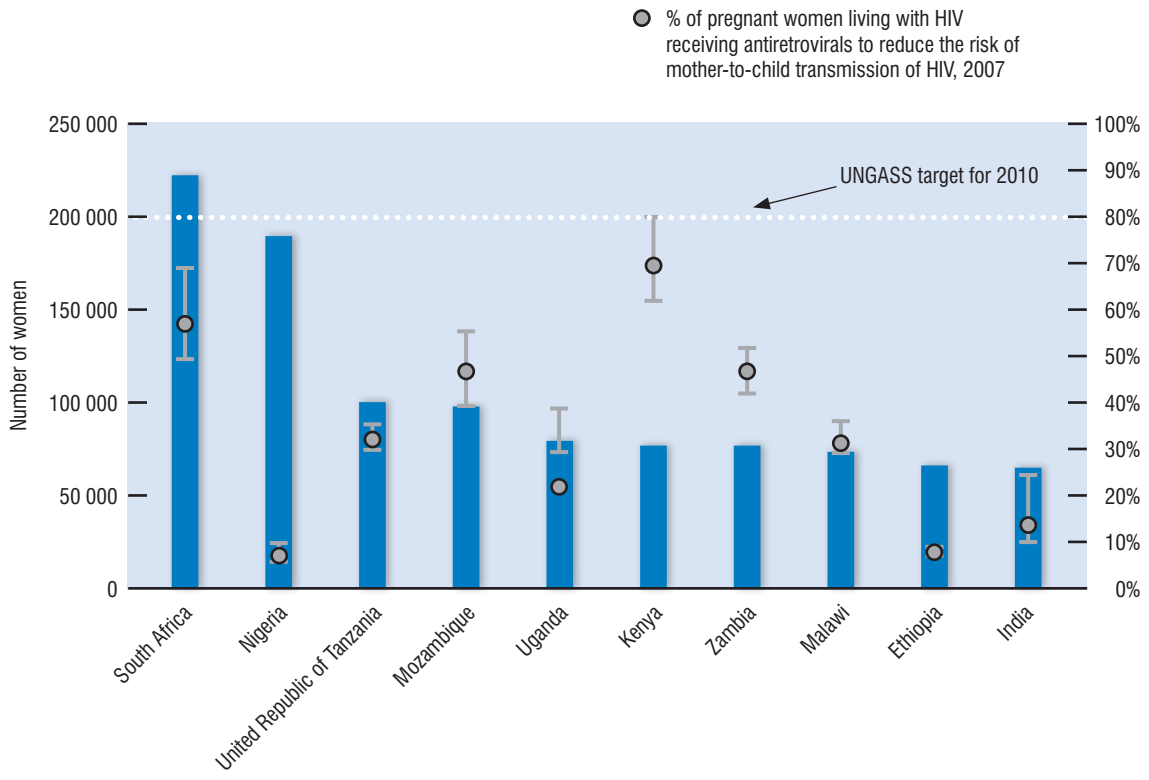
The coverage of antiretrovirals for preventing mother-to-child transmission varies among the 10 countries that have the largest number of pregnant women with HIV. In South Africa, home to more than 200 000 pregnant women living with HIV in 2007, the coverage of antiretrovirals for preventing mother-to-child transmission increased from 15% in 2004 to 57% in 2007 (Fig. 5.7). Coverage increased from 3% to 46% in Mozambique and from 25% to 75% in Kenya during the same time period.

Coverage also increased substantially in other countries between 2004 and 2007, including Cambodia (7% in 2004 to 14% in 2007), Central African Republic (2% to 34%), Ghana (1% to 21%), Guyana (21% to 43%), India (5% to 14%) and Thailand (48% to 92%).

However, progress has been slower in some large countries such as the Democratic Republic of the Congo, Ethiopia and Nigeria, where the coverage of antiretrovirals for preventing mother-to-child transmission remained below 10% in 2007. Urgent efforts are needed to scale up access to services in these countries to meet the target adopted by the United Nations General Assembly Special Session on HIV/AIDS which includes 80% coverage of antiretrovirals to reduce mother-to-child transmission.

The coverage of antiretroviral prophylaxis among infants born to women with HIV follows a similar trend, increasing from 7% in 2004 to 12% in 2005, 18% in 2006 and 20% by the end of 2007 (Fig. 5.8). The widening gap between coverage of antiretrovirals for mothers and for infants raises concern and needs to be addressed (Box 5.3).

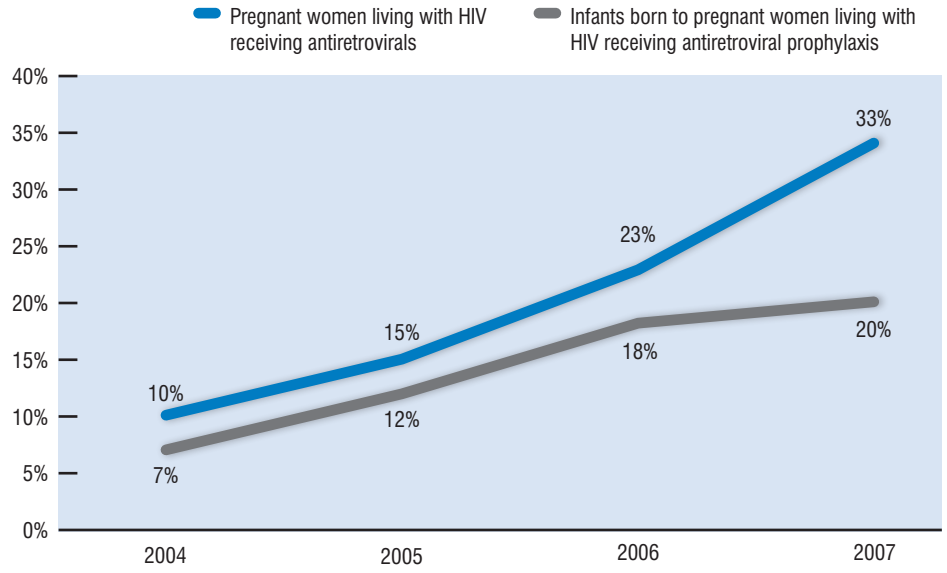
Fig. 5.7. Percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission of HIV in the 10 countries with the highest estimated number of pregnant women living with HIV, 2007



UNGASS: United Nations General Assembly Special Session on HIV/AIDS in 2001

The bar indicates the uncertainty range around the estimate.

Fig. 5.8. Pregnant women living with HIV and infants born to them who received antiretrovirals to reduce mother-to-child transmission, 2004–2007



Box 5.3. Involving male partners, families and communities

Stigma, domestic violence and lack of male involvement in antenatal care often discourage women from accessing services to prevent mother-to-child transmission *(28–31)*. Providing support to these women, including from their partners, families and communities, should be key components of all programmes for preventing mother-to-child transmission.

Several pilot projects have demonstrated improved outcomes when male partners are encouraged to take an HIV test and are involved in counselling and care for women *(32)*. In a health centre in Mwanza, United Republic of Tanzania, the involvement of male partners in counselling increased ten-fold and male partner testing by 30% within the first month of introducing a strategy to issue formal invitations to male partners. In Cambodia, women attending a "mother class" that offered testing and counselling for preventing mother-to-child transmission were four times more likely to accept testing if their partners also attended the class *(33)*.

A community-based mothers2mothers (m2m) programme was introduced in Western Cape, South Africa in 2001 to provide information, psychosocial mentoring and emotional support to pregnant and postpartum women with HIV and increase their utilization of health services *(34)*. By 2007, there were more than 100 m2m sites throughout South Africa. m2m employs new mothers as "mentor mothers" to support other women living with HIV through one-on-one and group support sessions in antenatal, maternal, newborn and child health care settings. Although it does not provide HIV testing or other health services, m2m helps to increase uptake of services by reducing stigma, misinformation and cultural barriers to access.

A recent study found that m2m programmes have resulted in increased access to antiretrovirals to prevent mother-to-child transmission for women and infants, safer infant feeding practices, increased numbers of women receiving a CD4 test and improved use of family planning post-pregnancy *(35)*. Drawing on this successful model, pilot sites have also been established or are planned in nine other countries in eastern and southern Africa *(34)*.

5.3.3 Antiretroviral regimens

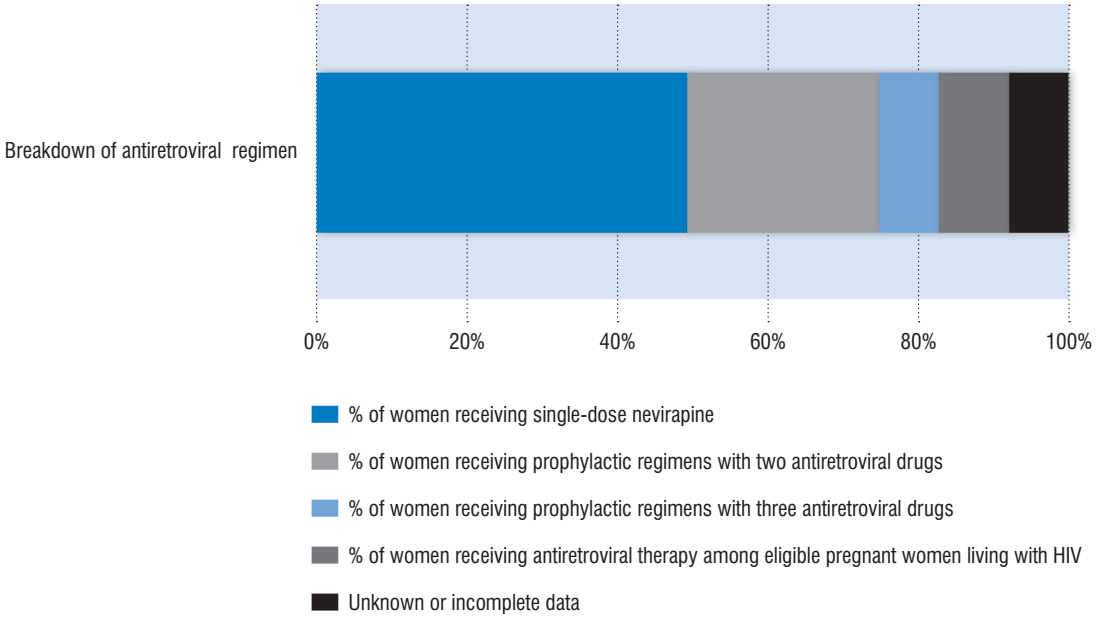
The effectiveness of antiretrovirals in preventing mother-to-child transmission varies with the type and combination used and the duration of treatment. Simple, short-course antiretroviral drug regimens have been proven to reduce mother-to-child transmission, but combination regimens (such as zidovudine and single-dose nevirapine) taken for longer periods of time are more effective *(36,37)*.

WHO guidelines (26) recommend the use of more efficacious prophylactic antiretroviral regimens for preventing mother-to-child transmission. They highlight the need to increase efforts to ensure that women who are eligible for antiretroviral therapy have access to treatment based on the scientific and programmatic rationale regarding the effectiveness and safety of various regimens *(26)*.

In 2007, 60 countries[5] provided disaggregated data on antiretroviral regimens used to prevent mother-to-child transmission. These data reveal that 49% of women (119 400 of 242 000) received single-dose nevirapine in 2007, 26% (62 000) received a regimen using a combination of two antiretroviral drugs and 8% (18 800) received a regimen using a combination of three antiretroviral drugs (Fig. 5.9).

In sub-Saharan Africa, more than half the reporting countries (26 of 44 countries) provided disaggregated data on the use of antiretroviral regimens in 2007. Among these countries, 42% of the total number of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission received single-dose nevirapine, 23% received a prophylactic regimen using a combination of two antiretroviral drugs,

Fig. 5.9. Distribution of antiretroviral regimens received by pregnant women living with HIV in 60 countries with disaggregated data, 2007



5 These 60 countries account for about 60% (911 500) of the 1.5 million estimated pregnant women living with HIV in low- and middle-income countries. The regional distribution of the 60 countries are: East, South and South-East Asia, 9 countries; Eastern Europe and Central Asia, 12 countries; Latin America and the Caribbean, 8 countries; North Africa and the Middle East, 5 countries; and sub-Saharan Africa, 26 countries.

5% received a highly active regimen for prophylaxis to prevent mother-to-child transmission using a combination of three antiretroviral drugs and 7% received antiretroviral therapy for their own health (for pregnant women living with HIV eligible for treatment).

Between 2006 and 2007, all regions reported a decrease in the number of countries using single-dose nevirapine as the most common antiretroviral regimen for preventing mother-to-child transmission. An increasing number of countries are shifting towards a national policy of providing more effective antiretroviral prophylactic regimens to pregnant women living with HIV. However, monitoring and evaluation systems in many countries cannot yet capture these data. As a result, accurate global data on the proportion of women accessing more efficacious regimens are currently not available.

5.3.4 Infant feeding

HIV can be transmitted from a mother to her child through breastfeeding. Without intervention, breastfeeding carries an additional transmission risk of about 5–20%, depending essentially on the disease status of the mother (measured by viral load and CD4 count), the duration and mode of breastfeeding and the existence of mastitis and breast abscess.

However, not breastfeeding carries important health risks to the infant, such as diarrhoeal disease, respiratory illness, malnutrition and increased mortality, especially if access to clean water is not assured.

In 2006, a technical consultation on HIV and infant feeding organized by United Nations agencies reviewed the most recent scientific evidence and programmatic experience in this area *(37)*. WHO and UNICEF have also developed a package of guidance and tools in collaboration with partners *(38)* to assist countries in designing and implementing policies and guidelines on infant feeding when the mother has HIV (Box 5.4). Many countries now have such policies in place.

A recent study in Côte d'Ivoire where antiretroviral prophylaxis and infant formula free of charge were offered to pregnant women living with HIV *(39)* provides evidence to support these recommendations. In this study and similar settings, the combined risk of HIV infection and death by 18 months of age among children who were breastfed for 3–6 months was similar to that among children who were formula-fed from birth *(40)*. Exclusive breastfeeding has also been shown to carry a lower risk of HIV transmission than mixed feeding (breastfeeding as well as feeding the infant other fluids or foods during the first six months of life) *(41)*. A recent study of an outbreak of infant diarrhoea in Botswana also found significantly higher rates of mortality among non-breastfed infants than among those who were breastfed, regardless of HIV status *(42)*.

Since many women living with HIV are unaware of their HIV status, promoting exclusive breastfeeding for the general population will probably lead to lower rates of HIV transmission among women living with HIV who do not know their HIV status *(43)*. The rates of exclusive breastfeeding among infants younger than six months of age have been slowly increasing worldwide, up by about 5–6 percentage points in the last 15 years to 39% as of 2005 *(44)*. Some countries such as Cambodia have had great success in increasing exclusive breastfeeding rates, from about 11% in 2000 to about 60% in 2005 *(45)*.

Outside research studies, few countries routinely report the infant feeding practices of women with HIV. Efforts are undergoing to implement a standardized indicator to monitor infant feeding practices among infants born to mothers with HIV. In Botswana's national programme, where formula is provided free of charge to all women with HIV, 97% of pregnant women living with HIV reportedly choose formula-feeding *(46)*. This proportion is lower in places that do not offer formula free of charge or where counsellors are able to fully explain the benefits and risks of different infant feeding options to mothers and support them in making a decision appropriate to their circumstances. In a research study in South Africa in which high-quality infant feeding counselling was made available, 9% of women living with HIV initially chose formula-feeding *(47)*.

Box 5.4. Recommendations on HIV and infant feeding

The key recommendations on HIV and infant feeding indicate the following.

- The most appropriate infant feeding option for a mother with HIV depends on her individual circumstances, including her health status and the local situation, but should take into consideration available health services and the counselling and support she is likely to receive.
- Exclusive breastfeeding is recommended for infants of mothers living with HIV for the first six months of life unless replacement feeding is acceptable, feasible, affordable, sustainable and safe for them and their infants before that time.
- When replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by mothers living with HIV is recommended.

Increasing evidence also indicates that giving women with HIV antiretroviral therapy can reduce the risk of transmitting HIV to their infants through breastfeeding. The benefits of this approach for women who need antiretroviral therapy for their own health are clear. However, new data are awaited on the use of this strategy for breastfeeding women not yet eligible for treatment, for example, data on when antiretroviral therapy can be safely discontinued, and on safety for the infant.

In addition to infant feeding choices in the first months of life, countries also face the challenge of supporting mothers to ensure optimal feeding of their infants after six months of age, when exclusive breastfeeding or formula-feeding alone is no longer adequate. Several countries are pilot-testing different approaches for feeding non-breastfed children of women living with HIV, including providing enriched foods. WHO has developed guidance on feeding infants and children 6–24 months of age to assist countries in developing their policies in this area *(48)*.

5.4 Treatment, care and support for women living with HIV and their children

The fourth element of the strategy for preventing mother-to-child transmission is providing treatment, care and support to mothers living with HIV, their children and their families. Until recently, the primary focus of programmes for preventing mother-to-child transmission had been to increase access to antiretrovirals to prevent transmission. Less emphasis was placed on ensuring that women in need have access to treatment services and that infants born to mothers living with HIV receive appropriate interventions including early diagnosis, co-trimoxazole preventive treatment and antiretroviral therapy. With the rapidly expanding availability of HIV care and treatment, strengthening links between services for preventing mother-to-child transmission and services providing HIV care and treatment is essential.

5.4.1 Increasing access to antiretroviral therapy for pregnant women

Treatment for pregnant women who are eligible to receive antiretroviral therapy is vital to reducing mother-to-child transmission and morbidity and mortality among women. However, many pregnant women living with HIV miss the opportunity to have timely access to antiretroviral therapy because health care workers are unable to appropriately assess their need for antiretroviral therapy, or due to lack of access to such services.

Data reported by national governments indicate that only about 12% of pregnant women living with HIV identified during antenatal care were assessed for their eligibility to receive antiretroviral therapy in 2007, either clinically through an assessment of clinical symptoms, or immunologically by determining their CD4 cell count.

Relying on clinical signs and symptoms alone can mean that some women with severe immunosuppression but without evident disease (WHO clinical stage 3 or stage 4) may not be identified as needing antiretroviral therapy. CD4 testing should be made more available to women as part of antenatal, delivery and postpartum care by increasing the availability of machines at the district level and ensuring that pregnant women are included in CD4 monitoring (Table 5.5).

Table 5.5. Availability of CD4 testing in antenatal care facilities, selected countries, 2007

Country	% of facilities providing antenatal care that provide CD4 testing on site or have systems for collection and transport
Botswana	100
Central African Republic	2
Haiti	55
Lesotho	10
Malawi	66
Papua New Guinea	12
Swaziland	31
Zambia	18
Zimbabwe	5

Data from some countries confirm that, although overall access to antiretroviral therapy among women is higher than or equal to that among men, pregnant women living with HIV have poor access to antiretroviral therapy for their own health. In Malawi, among 9150 women who started antiretroviral therapy in the last quarter of 2007 in the public sector, only 343 (4%) had been referred from the programme to prevent mother-to-child transmission *(49)*.

Ensuring access to antiretroviral therapy for pregnant women also contributes to child survival. A recent study in Uganda observed an 81% reduction in mortality among uninfected children over a 31-month period if their HIV-infected parents were receiving antiretroviral therapy and co-trimoxazole preventive therapy *(50)*.

Testing pregnant women for HIV hence not only provides an entry point for them to receive interventions to prevent transmission to the child but also facilitates the enrolment of women, their families and future infants into longitudinal HIV prevention, care and treatment. Linking HIV services to maternal, newborn and child health services is necessary to ensure that women identified as living with HIV who need treatment can receive the necessary interventions to maximize their health and reduce transmission to their infants and partners.

5.4.2 Diagnosing HIV among infants

Without care and treatment, about one third of children living with HIV will die in their first year of life and almost 50% by the second year of life. Early infant diagnosis of HIV among HIV-exposed children and adequate follow-up are essential to effectively identify infants living with HIV and ensure the timely initiation of care and treatment.

However, standard HIV antibody testing cannot identify infected infants in their first year of life, as it detects maternal HIV antibodies that are transferred to the baby during pregnancy (and subsequently decline slowly in the first year of life). More demanding testing methods that rely on detecting HIV, otherwise called virological tests, are required for diagnosing young infants. As infants with HIV frequently progress to severe disease or death without prior warning symptoms or signs, testing needs to be recommended for all HIV-exposed infants to detect HIV infection.

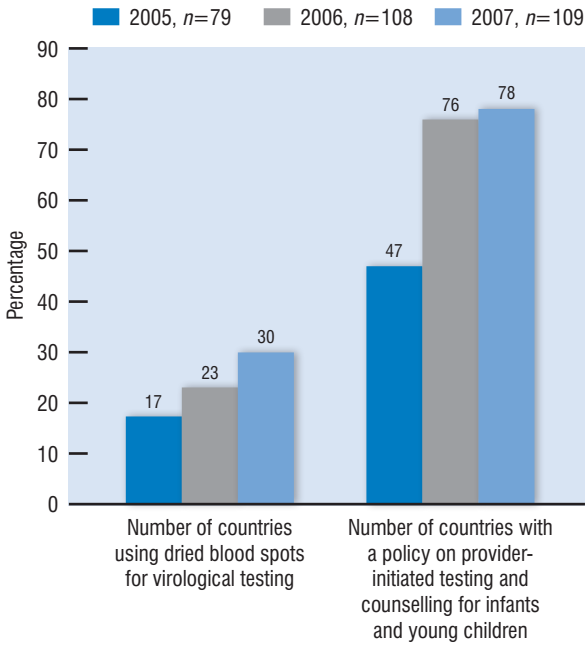
Where virological testing is unavailable, infants still need to be closely monitored, and clinical algorithms and HIV antibody and CD4 tests are needed to identify infected infants and children as early as possible *(51)*. HIV antibody testing can be used to identify HIV-exposed infants and, combined with close follow-up, may allow early recognition of infants with HIV and their referral for assessing the possible need for HIV treatment.

In 2007, 77 countries (71% of all reporting low- and middle-income countries) provided data on early testing of infants and young children. Of the 715 000 infants born to women living with HIV in 2007 in these countries, only 8% (54 900) were tested within the first two months of birth.

Virological testing detects HIV DNA or RNA. HIV DNA testing (and HIV antibody testing) can also be reliably performed on specimens collected onto filter paper (dried blood spots) and sent to laboratories with capacity for testing. The use of dried blood spots only requires a few drops of blood from an infant. Once specimens are collected, they can be easily stored and transferred without cold-chain systems to centralized testing locations for analysis. The use of dried blood spots enables blood samples to be collected in remote locations and allows countries with a limited number of specialized laboratories to expand access to virological testing.

Scaling up the use of dried blood spots has resulted in a significant increase in access to virological testing. The number of countries using dried blood spots for virological testing increased from 17 in 2005 to 30 in 2007 (Fig. 5.10).

Fig. 5.10. Number of low- and middle-income countries with virological testing and policies for provider-initiated testing and counselling for infants and young children, 2005–2007



n: number of reporting countries

Even where virological testing is available through the use of dried blood spots, transport time and logistics can still pose barriers to providing timely results. In addition, results may arrive at the facility but the infant may not be referred to HIV clinical services in a timely manner.

Maternal, newborn and child health clinics, where a child often receives his or her first set of vaccinations, provide important opportunities to identify and test infants and children who are known to be exposed to HIV. Several countries, including

Cameroon, Malawi, Rwanda, Swaziland, United Republic of Tanzania and Zimbabwe (Box 5.5), have begun to document the mother's HIV status on the mother's and/or child's health card to facilitate the identification of HIV-exposed infants and provide appropriate diagnostic and follow-up services.

Box 5.5. Documenting the mother's HIV status on the child health care in Zimbabwe

In Zimbabwe, the mother's HIV status is documented on the child health card so that health workers seeing the child at his or her six-week visit can provide appropriate care to the child. This includes referral for virological testing to determine whether the child has been infected with HIV and requires referral to treatment services.

INFANT FEEDING

Follow-up time	Birth	10D	6W	2M	3M	4M	5M
Infant feeding code							
Follow-up time	6M	7M	9M	12M	15M	18M	24M
Infant feeding code							

INFANT FEEDING CODES
1. Exclusive Breast Feeding
2. Exclusive Heat Treated Breast Milk
3. Exclusive Commercial Infant Formula
4. Exclusive Modified Animal Milk
5. Mixed Feeding
6. Other Specify

CARE

NVP/Other ARVs given at birth? (Circle Yes or No) NO YES

Follow-up time	6W	2M	3M	4M	5M
Cotrimoxazole (supplied)					
Follow-up time	6M	9M	12M	15M	18M
Cotrimoxazole (supplied)					

Parent/Caregiver pre-test counselled for child test (Circle Yes or No) NO YES

Child tested date:

Test Number: ..... Test Used (Specify) .....

Date Parent/Caregiver post-test counselled for child's result:

Child's sample result (Circle) 0 1

Continue Cotrimoxazole? (Circle Yes or No) NO YES
If yes refer to treatment card.

CARE COMMENTS:

MINISTRY OF HEALTH
CHILD HEALTH CARD
ZIMBABWE

GOOD INFANT FEEDING PRACTICE
Give only breast milk for the first 6 months. Introduce solids and liquids from 6 months. Continue breast feeding up to 24 months or beyond unless counseled otherwise by a health worker.

KUDYA KWAKANAKA KWEMWANA
Ipai mwana mukaka wezamu chete pamwedzi mitanhatu yekutanga.
Ipai kumwe kudya kana kunwa kubva pamwedzi mitanhatu.
Rambai muchiyamwisa kusvika pamakore maviri kana kudarika kunze kwekuti makataurirwa mukadziviswa neve utano.

MUNYISA OKUNGABANGELI INGOZI
Munyisa ingane yakho okwenyanga eziyisithupha zakuqala.
Qala ukuyipha okunye okudliwayo lo kunathwayo uma isilenyanga eziyisithupha.
Qhubeka ukumunyisa ingane yakho ize ifike iminyaka emibili loba ukwedlula, ngaphandle uma ucetshisiwe ngabezempilo kahle ukuba ungamunyisi.

NAME OF CHILD:
SURNAME OF CHILD:
SEX: DATE OF BIRTH:
NAME OF MOTHER:
PHYSICAL ADDRESS:

PLACE OF BIRTH:
HEALTH CENTRE:

For more information on infant feeding, contact your nearest Health Worker

However, most children are entering HIV care and treatment programmes for children at an older age after being identified in acute and chronic care facilities rather than as a follow-up of services for preventing mother-to-child transmission. HIV-exposed infants need to be followed up better as part of the package of services to prevent mother-to-child transmission to identify HIV-infected infants.

In countries such as Malawi and Zambia, provider-initiated testing and counselling for sick children has helped to substantially increase the numbers of HIV-infected infants and children who are detected. WHO and UNICEF are working with partners to develop operational guidance on provider-initiated testing and counselling for children.

5.4.3 Co-trimoxazole prophylaxis

Co-trimoxazole is a highly efficacious, affordable, cost-effective and widely available antibiotic that has been shown to significantly reduce morbidity and mortality among infants and children who are living with or are exposed to HIV. It has been part of the standard of care for preventing and treating *Pneumocystis jirovecii pneumonia* (PCP) since the early 1990s *(52)*. In 2006, WHO released guidance on the use of co-trimoxazole preventive therapy for children, adolescents and adults *(53)*, recommending that all HIV-exposed infants be treated with co-trimoxazole until they are no longer at risk of infection through breastfeeding and an HIV-negative status has been established. Most pneumocystis infections occur among infants younger than six months old *(54)*, which reinforces the need for timely provision of co-trimoxazole prophylaxis.

The limited data available on the provision of co-trimoxazole prophylaxis suggest that, although many national policies and recommendations now include co-trimoxazole prophylaxis, its implementation is poor. In 2007, less than 58 000 (4%) of the 1.5 million children born to pregnant women with HIV initiated co-trimoxazole by two months of age. Reasons for low coverage include the lack of national-level guidance to health care providers on co-trimoxazole prophylaxis, the lack of opportunities to document its provision in registers or child health cards and erratic supply and frequent stock-outs of drugs.

Scaling up co-trimoxazole prophylaxis for infants and children is essential and can markedly reduce morbidity and mortality among children caused by HIV simply and at low cost.

5.4.4 Antiretroviral therapy for children

HIV infection that infants acquire during pregnancy or around the time of delivery appears to progress very rapidly. In addition, a recent study indicated that early treatment of asymptomatic infants with HIV dramatically reduces the mortality rate *(55)*. Children living with HIV in low- and middle-income countries have been observed to have treatment outcomes comparable to those in adult population groups, with similar patterns of improved survival associated with initiating antiretroviral therapy at earlier stages of disease progression *(56)*. Studies also confirm that children in high-income, middle-income and low-income countries all respond well to treatment.

Substantial progress has been made in scaling-up antiretroviral therapy for children during the past two years, facilitated by several factors (Box 5.6). These include integrating HIV care and treatment for children into both existing antiretroviral therapy sites focused on adult care and into maternal, newborn and child health services; reducing the prices of antiretroviral formulations for children; approving and prequalifying fixed-dose antiretroviral combinations for children by the United States Food and Drug Administration and the WHO Prequalification Programme; and increasing advocacy for improved access to HIV care and treatment for children.

Box 5.6. Revised recommendations on initiating antiretroviral therapy among children

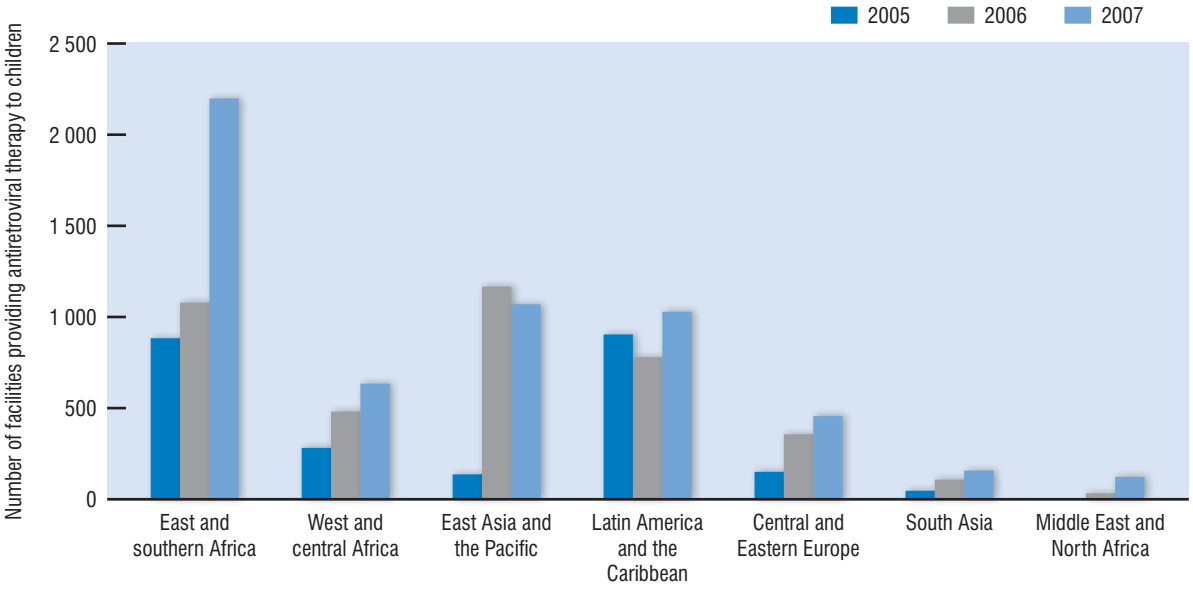
Recent studies in resource-limited settings confirm that disease progression and death occurs very rapidly in the first few months of life among infants acquiring HIV at or around delivery. More than 80% of surviving infants develop the eligibility criteria for starting antiretroviral therapy within the first six months of life *(55,57)*. A randomized clinical trial conducted in South Africa observed a 75% reduction in mortality among infants who started antiretroviral therapy as soon as they were diagnosed with HIV compared with infants who started treatment based on immunological or clinical criteria. Other research and observational data also suggest that providing antiretroviral therapy early in infancy avoids death and disease progression.

Previously, recommendations to initiate antiretroviral therapy among children were based on an immunological and clinical assessment before initiating treatment, and treatment was recommended only for the most severely affected children. In April 2007, WHO convened a guideline review meeting to examine the new evidence and consider the need to revise the existing recommendations. Experts recommended that revised criteria be developed for initiating antiretroviral therapy among infants. WHO therefore now recommends that all infants younger than one year of age with confirmed HIV infection should start antiretroviral therapy, irrespective of clinical or immunological stage.

This revised recommendation will have implications for national HIV programmes and for the estimation of HIV infection among infants and children. A special meeting of the UNAIDS Reference Group on Estimates, Modelling and Projections will be held in July 2008 to review the methods and assumptions underpinning the estimation of the burden of HIV among children to produce better estimates of the number of infants and children who need antiretroviral therapy.

This report only provides data on the number of children receiving antiretroviral therapy. Revised estimates of the antiretroviral therapy need among children will be used to assess the coverage of antiretroviral therapy among children in the next report.

Fig. 5.11. Number of facilities providing antiretroviral therapy to children, 2005–2007



A total of 5 660 facilities were reported to be providing antiretroviral therapy to children in 2007, more than twice the 2 400 facilities in 2005 (Fig. 5.11). The number of facilities providing antiretroviral therapy to children in eastern and southern Africa has increased notably. Increased early infant diagnosis and case-finding and simplified care management for children have contributed to the expansion in the number of sites providing antiretroviral therapy to children.

As of December 2007, about 198 000 children globally were receiving antiretroviral therapy, up from 127 300 in 2006 and 75 000 in 2005. This represents a 1.7-fold increase between 2006 and 2007 and a 2.6-fold increase between 2005 and 2007 (Fig. 5.12).

The vast majority of children living with HIV are in 10 countries that also comprise more than 60% of pregnant women living with HIV. Uptake of antiretroviral therapy in children increased in all 10 countries between 2005 and 2007 (Fig. 5.13). The number of children receiving antiretroviral therapy increased 2.6 times in South Africa, 3 times in Kenya, nearly 4 times in Mozambique and nearly 5 times in Zimbabwe.

Fig. 5.12. Number of children receiving antiretroviral therapy in low- and middle-income countries, 2005–2007

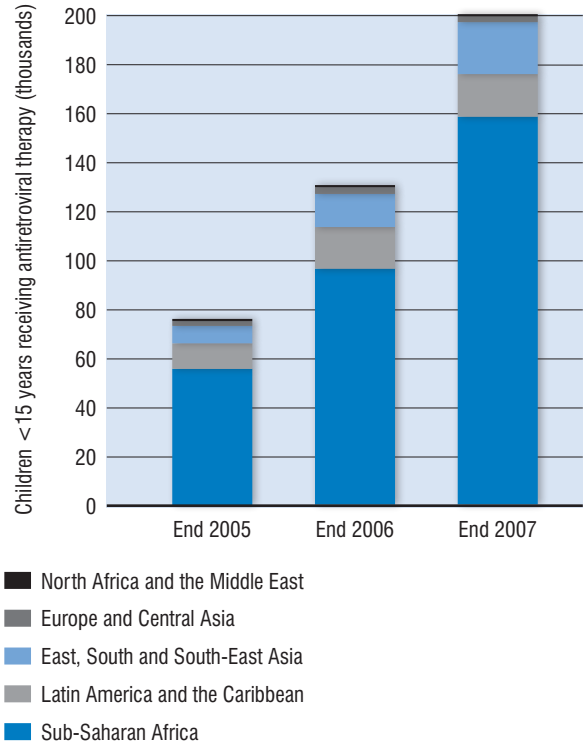
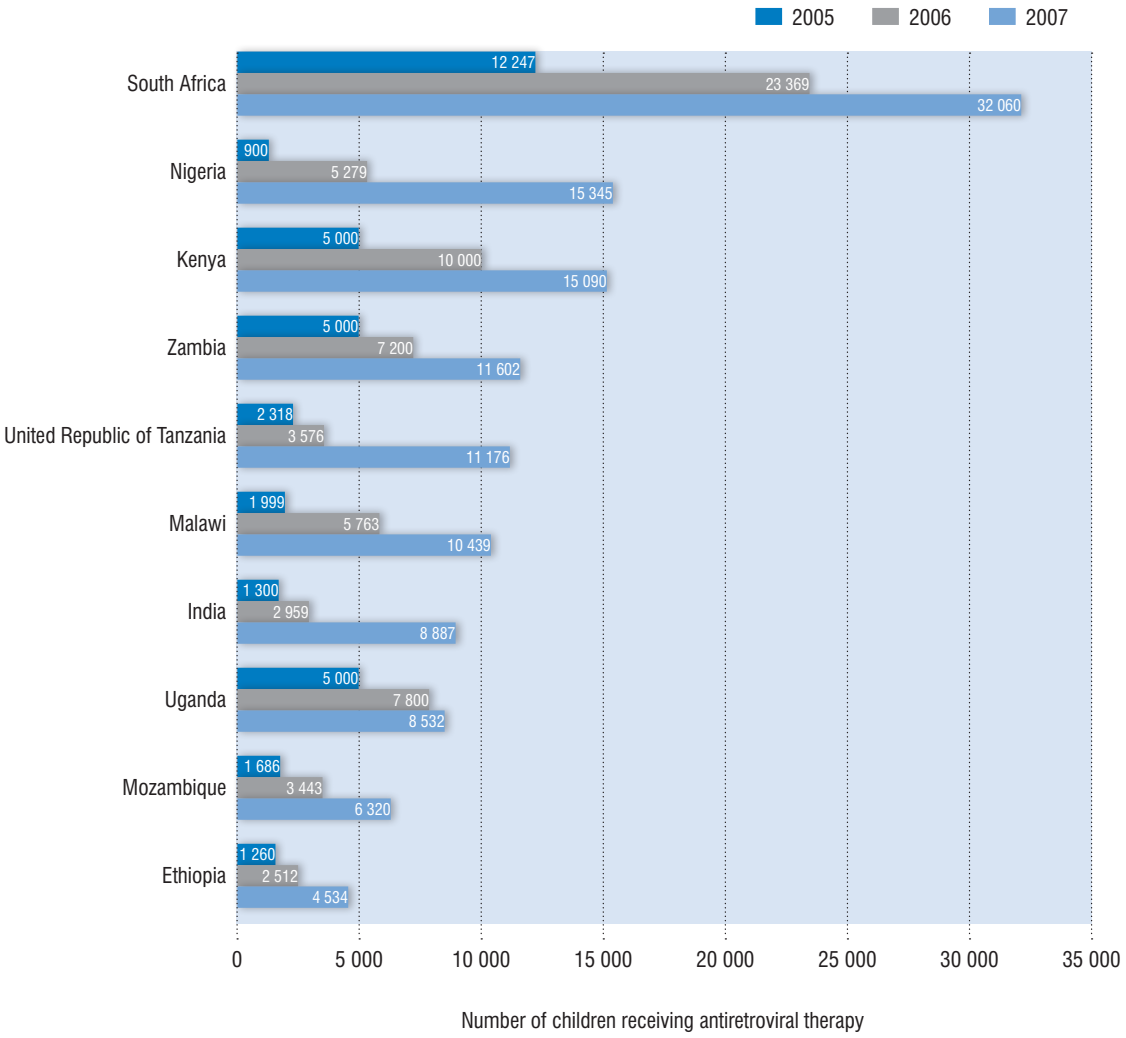


Fig. 5.13. Number of children (younger than 15 years) receiving antiretroviral therapy in the 10 countries with the highest estimated number of pregnant women living with HIV, 2005–2007



However, while tremendous progress has been made towards universal access to antiretroviral therapy for children in many countries, most children living with HIV who need antiretroviral therapy globally are still not receiving treatment, resulting in high rates of mortality among children younger than five years of age directly attributable to HIV. Efforts must continue to expand early infant diagnosis and the provision of treatment and care for children.

References

1. *2007 AIDS epidemic update*. Geneva, UNAIDS/WHO, 2007 (http://www.unaids.org/en/KnowledgeCentre/HIVData/EpiUpdate/EpiUpdArchive/2007, accessed 5 May 2008).
2. *World health statistics 2008*. Geneva, World Health Organization, 2008 (http://www.who.int/healthinfo/statistics/en, accessed 5 May 2008).
3. De Cock KM et al. Prevention of mother-to-child HIV transmission in resource-poor countries: translating research into policy and practice. *Journal of the American Medical Association*, 2000, 283:1175–1182.
4. United Nations General Assembly. *Declaration of Commitment on HIV/AIDS*. New York, United Nations, 2001 (http://www.unaids.org/en/AboutUNAIDS/Goals/UNGASS, accessed 5 May 2008).
5. *Call to Action: Towards an HIV-free and AIDS-free generation. Prevention of Mother to Child Transmission (PMTCT) High Level Global Partners Forum, Abuja, Nigeria, December 3, 2005*. Geneva, World Health Organization, 2005 (http://www.who.int/hiv/mtct/pmtct_calltoaction.pdf, accessed 5 May 2008).
6. *Strategic approaches to the prevention of HIV infection in infants: report of a WHO meeting, Morges, Switzerland, 20–22 March 2002*. Geneva, World Health Organization, 2003 (http://www.who.int/hiv/pub/mtct/pub35/en, accessed 5 May 2008).
7. WHO and UNICEF with the Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children. *Guidance on global scale-up of the prevention of mother-to-child transmission of HIV: towards universal access for women, infants and young children and eliminating HIV and AIDS among children*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/pub/mtct/pub35/en, accessed 5 May 2008).
8. United Nations Population Division. *World population prospects, 2006 revisions*. New York, United Nations, 2006.
9. Demographic and health surveys [web site]. Calverton, MD, MEASURE DHS (http://www.measuredhs.com, accessed 5 May 2008).
10. Shetty AK et al. The feasibility of voluntary counselling and HIV testing for pregnant women using community volunteers in Zimbabwe. *International Journal of STD and AIDS*, 2005, 16:755–759.
11. *Reproductive health strategy to accelerate the attainment of international development goals and targets*. Geneva, World Health Organization, 2004 (http://www.who.int/reproductive-health/publications/strategy.pdf, accessed 5 May 2008).
12. Westoff CF, Ochoa LH. *Unmet need and the demand for family planning*. Calverton, MD, Demographic and Health Surveys, Institute for Resource Development, Macro International, 1991 (Comparative Studies No. 5).
13. Westoff CF, Bankole A. *Unmet need: 1990–1994*. Calverton, MD, Macro International, 1995 (DHS Comparative Report No. 16).
14. *Reproductive health indicators: guidelines for their generation, interpretation and analysis for global monitoring*. Geneva, World Health Organization, 2006 (http://www.who.int/reproductive-health/publications/rh_indicators/guidelines.pdf, accessed 5 May 2008).
15. Adamchak S et al. Family planning use and unmet need among female ART clients in Ghana. *Linking Reproductive Health, Family Planning, and HIV/AIDS in Africa, 9–10 October 2006, Addis Ababa, Ethiopia* (http://www.jhsph.edu/gatesinstitute/_pdf/policy_practice/FP-HIV/Presentations/Session%202B/Adamchak_et%20al%20v4%20c.pdf, accessed 5 May 2008).
16. Rochat TJ et al. Depression among pregnant rural South African women undergoing HIV testing. *Journal of the American Medical Association*, 2006, 295:1376–1378.
17. Desgrées-du-Loû A et al. Contraceptive use, protected sexual intercourse and incidence of pregnancies among African HIV-infected women. DITRAME ANRS Project, Abidjan 1995–2000. *International Journal of STD and AIDS*, 2002, 13:462–468.
18. *Glion Call to Action on Family Planning and HIV/AIDS in Women and Children, 3–5 May 2004*. Geneva, World Health Organization and New York, United Nations Population Fund, 2004 (http://www.who.int/reproductive-health/stis/linking.html, accessed 5 May 2008).
19. Adamchak S, Reynolds H, Wilcher R. *Country assessments: documenting family planning–HIV integration models*. Research Triangle Park, NC, Family Health International, unpublished, 2007.
20. Rutenberg N, Baek C. Field experiences integrating family planning into programs to prevent mother-to-child transmission of HIV. *Studies in Family Planning*, 2005, 36:235–245.
21. *Guidance on provider-initiated HIV testing and counselling in health facilities*. Geneva, World Health Organization and UNAIDS, 2007 (http://www.who.int/hiv/pub/guidelines/pitc2007/en/index.html, accessed 5 May 2008).
22. EuroHIV. *Report on the EuroHIV 2006 survey on HIV and AIDS surveillance in the WHO European Region*. Saint-Maurice, Institut de Veille Sanitaire, 2007.
23. United States Centers for Disease Control and Prevention. Introduction of routine HIV testing in prenatal care – Botswana, 2004. *MMWR Morbidity and Mortality Weekly Report*, 2004, 53:1083–1086.
24. Chandisarewa W et al. Routine offer of antenatal HIV testing ("opt-out" approach) to prevent mother-to-child transmission of HIV in urban Zimbabwe. *Bulletin of the World Health Organization*, 2007, 85:821–900.

25. Medley A et al. Rates, barriers and outcome of HIV serostatus disclosure among women in developing countries: implications for prevention of mother-to-child transmission programmes. *Bulletin of the World Health Organization*, 2004, 82:299–307.
26. *Antiretroviral drugs for treating pregnant women and preventing HIV infection in infants: guidelines on care, treatment and support for women living with HIV/AIDS and their children in resource-constrained settings*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/mtct/guidelines/en, accessed 5 May 2008).
27. Kominami M et al. Factors determining prenatal HIV testing for prevention of mother to child transmission in Dar es Salaam, Tanzania. *Pediatrics International*, 2007, 49:286–292.
28. Okonkwo KC et al. An evaluation of awareness: attitudes and beliefs of pregnant Nigerian women toward voluntary counselling and testing for HIV. *AIDS Patient Care and STDs*, 2007, 21:252–260.
29. Homsy J et al. The need for partner consent is a main reason for opting out of routine HIV testing for prevention of mother-to-child transmission in a rural Ugandan hospital. *Journal of Acquired Immune Deficiency Syndromes*, 2007, 44:366–369.
30. Homsy J et al. Routine intrapartum HIV counseling and testing for prevention of mother-to-child transmission of HIV in a rural Ugandan hospital. *Journal of Acquired Immune Deficiency Syndromes*, 2006, 42:149–154.
31. Smart T with contributions from Sherriff L. Getting the most prevention and care out of programmes for the prevention of mother-to-child transmission. *HIV & AIDS Treatment in Practice*, 2006, 70 (http://www.aidsmap.com/cms1065529.asp, accessed 5 May 2008).
32. Kakimoto K et al. Influence of the involvement of partners in the mother class with voluntary confidential counselling and testing acceptance for Prevention of Mother to Child Transmission of HIV Programme (PMTCT Programme) in Cambodia. *AIDS Care*, 2007, 19:381–384.
33. *mothers2mothers 2007 annual report*. Cape Town, mothers2mothers, 2007 (http://www.m2m.org/about-us/download-information.html, accessed 5 May 2008).
34. Baek C et al. *Key findings from an evaluation of the mothers2mothers program in KwaZulu-Natal, South Africa. Horizons final report*. Washington, DC, Population Council, 2007.
35. Shaffer N et al. Short-course zidovudine for perinatal HIV-1 transmission in Bangkok, Thailand: a randomised controlled trial. Bangkok Collaborative Perinatal HIV transmission Study Group. *Lancet*, 1999, 353:773–780.
36. Guay LA et al. Intrapartum and neonatal single-dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomised trial. *Lancet*, 1999, 354:795–802.
37. WHO/UNICEF/UNFPA/UNAIDS. *HIV and infant feeding update: based on the technical consultation held on behalf of the Interagency Task Team (IATT) on Prevention of HIV Infection in Pregnant Women, Mothers and their Infants, Geneva, 25–27 October 2006*. Geneva, World Health Organization, 2007 (http://www.who.int/child_adolescent_health/documents/9789241595964/en/index.html, accessed 5 May 2008).
38. Nutrition and HIV/AIDS: list of publications [web site]. Geneva, World Health Organization, 2008 (http://www.who.int/nutrition/publications/hivaids/en/index.html, accessed 5 May 2008).
39. Leroy V et al. 18-month effectiveness of short-course antiretroviral regimens combined with alternatives to breastfeeding to prevent HIV mother-to-child transmission. *PLoS ONE, 2008*, 3:e1645.
40. Thior I et al. Breastfeeding plus infant zidovudine prophylaxis for 6 months vs formula feeding plus infant zidovudine for 1 month to reduce mother-to-child HIV transmission in Botswana: a randomized trial: the Mashi Study. *Journal of the American Medical Association*, 2006, 296:794–805.
41. Coovadia HM et al. Mother-to-child transmission of HIV infection during exclusive breastfeeding in the first +6 months of life: an intervention cohort study. *Lancet*, 2007, 369:1107–1116.
42. Creek T et al. A large outbreak of diarrhea with high mortality among non-breastfed children in Botswana, 2006 – implications for HIV prevention strategies and child health. *14th Conference on Retroviruses and Opportunistic Infections, Los Angeles, CA, USA, 25–28 February 2007* (http://www.retroconference.org/2007/Abstracts/30582.htm, accessed 5 May 2008).
43. Iliff PJ et al. Early exclusive breastfeeding reduces the risk of postnatal HIV transmission and increases HIV-free survival. *AIDS*, 2005, 19:699–708.
44. Van Esterik P, ed. 1990–2005 – *Celebrating the Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding: past achievements, present challenges and the way forward for infant and young child feeding*. Florence, UNICEF Innocenti Research Centre, 2005.
45. WHO Office for the Western Pacific and UNICEF. *Child survival profile: Cambodia*. Manila, WHO Office for the Western Pacific, 2007.
46. *PMTCT joint mission report*. Interagency Task Team on Prevention of Mother-to-Child Transmission of HIV and Paediatric HIV Care, unpublished, 2007.
47. Coovadia HM et al. Mother-to-child transmission of HIV infection during exclusive breastfeeding in the first 6 months of life: an intervention cohort study. *Lancet*, 2007, 369:1107–1116.

48. *Guiding principles for feeding non-breastfed children 6–24 months of age*. Geneva, World Health Organization, 2006 (http://www.who.int/child_adolescent_health/documents/9241593431/en/index.html, accessed 5 May 2008).
49. *Antiretroviral therapy in the public and private sectors in Malawi: results up to 30 December 2007*. Lilongwe, Ministry of Health, Malawi.
50. Mermin J et al. Mortality in HIV-infected Ugandan adults receiving antiretroviral treatment and survival of their HIV-uninfected children: a prospective cohort study. *Lancet*, 2008, 371:752–759.
51. *Antiretroviral therapy of HIV infection in infants and children in resource-limited settings: towards universal access. Recommendations for a public health approach*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/guidelines/art/en/index.html, accessed 5 May 2008).
52. Chintu C et al. Cotrimoxazole as prophylaxis against opportunistic infections in HIV infected Zambian children (CHAP): a double-blind randomized placebo-controlled trail. *Lancet*, 2004, 364:1865–1871.
53. *Guidelines on co-trimoxazole prophylaxis for HIV-related infections among children, adolescents and adults*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/guidelines/ctx/en, accessed 5 May 2008).
54. Maldonado YA, Araneta RG, Hersh AL. *Pneumocyctis carinii* pneumonia prophylaxis and early clinical manifestation of severe perinatal human immunodeficiency virus type 1 infection. Northern California Pediatric HIV Consortium. *Pediatric Infectious Disease Journal*, 1998, 17:398–402.
55. Violari A. Antiretroviral therapy initiated before 12 weeks of age reduces early mortality in young HIV-infected infants: evidence from the Children with HIV Early Antiretroviral Therapy (CHER) Study. *4th IAS Conference on HIV Pathogenesis, Treatment and Prevention, Sydney, Australia, 22–25 July 2007* (http://www.ias2007.org/abstract.aspx?elementid=200705557, accessed 5 May 2008).
56. Bolton MC et al. Clinical outcomes and CD4 cell response in children receiving antiretroviral therapy at primary health care facilities in Zambia. *Journal of the American Medical Association*, 2007, 298:1888–1899.
57. Prendergast A et al. Randomized, controlled trial of 3 approaches to management of HIV-infected infants. *15th Conference on Retroviruses and Opportunistic Infections, Boston, USA, 3–6 February 2008* (Abstract 77LLB; http://www.retroconference.org/2008/Abstracts/33523.htm, accessed 5 May 2008).

6. STRENGTHENING HEALTH SYSTEMS AND HEALTH INFORMATION

Key findings

- Investing in the HIV response can strengthen health systems as a whole and catalyse more effective and responsive health care delivery systems.
- Many countries are adopting strategies such as task-shifting to address health worker shortages, which involves moving specific tasks from highly specialized health workers to less specialized workers.
- Globally, 18% of all reporting treatment sites experienced at least one stock-out of antiretroviral drugs in 2007, with stock-outs highest in Africa and Latin America.
- Programme managers and health care workers need better strategic health information to guide service delivery and improve the impact of interventions in resource-limited settings.

6.1 Strengthening health systems

Strengthening health systems to support the unprecedented scale-up of HIV prevention, treatment and care interventions requires careful stewardship and integrating HIV programmes with other areas of the health system. All health systems have to carry out some basic functions to meet their goals, regardless of how they are organized. WHO identifies six building blocks for a strong health system: service delivery; health workforce; health information; medical products, vaccines and technologies; and leadership and governance *(1)*. Each of these functions is essential to improving health outcomes and ensuring the greatest possible efficiency in health investment.

Health workforce

The health workforce continues to represent one of the most significant challenges in scaling up priority HIV interventions in low- and middle-income countries. *The world health report 2006 (2)* indicated a worldwide shortage of 4.3 million doctors, nurses and midwives, with sub-Saharan Africa alone experiencing a shortage of 1 million health care workers. Additional challenges related to the health workforce include migration, lack of skills and poor working environments *(3)*.

HIV and other diseases have had an enormous effect on human resources in many countries in sub-Saharan Africa, where morbidity, mortality and absenteeism have undermined an already overstretched health workforce *(4)*. Some studies have estimated that up to 20% of the health workforce may be lost due to HIV and related illnesses *(3)*. A recent anonymous survey of 595 health care workers in South Africa *(5)* found that the HIV prevalence among health workers was 15.9%, comparable to the national average HIV prevalence of 15.5% among adults. Such results are unlikely to be markedly different in other high-burden countries.

These and other studies have emphasized the need to give priority to providing HIV interventions, including antiretroviral therapy, to health workers. A recent survey on the effect of scaling up treatment on human resources in Malawi, for example, estimated that, for 1024 health care workers accessing antiretroviral therapy as of June 2006, an estimated 250 lives were saved one year after treatment initiation, which accounts for a gain of 1000 health worker–days per week at the national level. This is equivalent to the total estimated number of health worker–days per week required for providing antiretroviral therapy services at the national level *(6)*.

In 2007, WHO worked with several international partners and Member States to develop a plan to address the health workforce crisis with a focus on three interventions *(7)*:

- treat: provide a comprehensive package of HIV interventions to health care workers;
- train: including task-shifting to less specialized types of workers; and
- retain: including occupational health and safety, financial and non-financial incentives to remain in the health workforce and measures to address the migration of health care workers to the private sector or to higher-income countries.

One of the key elements of the train component is task-shifting, which entails moving specific tasks, where appropriate, from highly qualified health workers to other health workers. Task-shifting was used successfully in resource-limited settings before the HIV epidemic emerged to address shortages of physicians in resource-limited settings, and several studies have demonstrated that this strategy is not only cost-effective but that auxiliary staff perform some tasks better than fully trained health care workers do *(8)*.

In 2007, 28 of 73 low- and middle-income countries reported[1] having a policy on task-shifting to allow reorganization of tasks among health care workers and hiring non-professional workers. WHO, together with the United States President's Emergency Plan for AIDS Relief and UNAIDS, recently developed global recommendations and guidelines on task-shifting, and launched them at the first-ever International Conference on Task Shifting held in January 2008 *(9)*. The recommendations provide overall guidance to countries that are considering adopting or further expanding a task-shifting approach to strengthening the health workforce.

Uptake of task-shifting in the delivery of HIV services has demonstrated beneficial results. A recent study in South Africa *(10)* found that, after six months of follow-up, outcomes such as viral suppression, adherence and retention of patients at sites without doctors were similar to those at sites with doctors.

Favourable outcomes of the task-shifting approach have also been documented in Haiti and Rwanda, where Partners in Health, a nongovernmental organization, delivers HIV treatment and care services using a model that shifts tasks towards nurses and community health workers. In Partners in Health sites in Haiti, where doctors exclusively perform only 2% of all tasks, the 12-month survival of the people ever started on antiretroviral therapy was comparable to survival outcomes in other resource-limited settings. The drop-out rates were less than 5% in Partners in Health sites in both countries, which has been attributed to the support of community health workers who accompany people through their treatment with daily supervision and monitoring. Nurses and doctors accepted task-shifting as an approach, and

1 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

community health workers were well respected. At all levels of the health care system, staff reported that they felt capable of taking on new or more complicated tasks with adequate training, materials and remuneration *(11)*. Similar results have also been reported in Uganda *(12)*.

Procurement and supply management

In addition to the human resources crisis, many health systems continue to face weak procurement and supply management systems that result in frequent stock-outs of antiretroviral drugs and other essential commodities *(13)*. Among 66 low- and middle-income countries reporting data on stock-outs of antiretroviral drugs,[2] 41 countries had not experienced any stock-out of antiretroviral drugs in 2007. The remaining 25 countries reported having experienced one or more episode of stock-out of antiretroviral drugs.

Globally, 18% of all reporting treatment sites had experienced at least one stock-out of antiretroviral drugs in 2007. However, countries in Africa and Latin America reported higher proportions of treatment sites experiencing stock-outs of antiretroviral drugs than other regions.[3]

To help countries to strengthen their procurement and supply management systems, the United States President's Emergency Plan for AIDS Relief funded the Supply Chain Management System, which brings together multiple stakeholders to procure essential medicines and other supplies at affordable prices, to build and strengthen reliable supply chain systems, and to foster coordination in this area among partners (Box 6.1).

Box 6.1. Strengthening supply chain management in Guyana and Zimbabwe

Guyana

AIDS is the leading cause of death for people between the ages of 25 and 44 in Guyana, and the government has given priority to timely access to treatment and care for people living with HIV. Guyana's supply chain is largely centralized, with a unit within the Ministry of Health to manage the procurement and distribution of all public-sector health commodities.

To increase warehousing capacity, the Ministry of Health, with the support of the Supply Chain Management System, opened a new model storage facility for HIV medicines and supplies in November 2007. The new facility provides a secure, temperature-controlled environment for storing antiretroviral drugs and other commodities used in HIV testing, care and treatment. A warehouse management system was also launched, incorporating hand-held and radio frequency technology into the new warehouse. Previous warehouse inventory systems were prone to inaccuracy, resulting in inefficiency and expired products. The new system has already greatly improved inventory management.

In 2007, the Supply Chain Management System also worked with other partner organizations to develop a national forecast of antiretroviral drugs, other essential medicines and test kits needed over the coming year and trained technical staff from the Ministry of Health and partner organizations in forecasting techniques. This will help to further strengthen the inventory systems and ensure that potential shortages of essential health commodities are averted.

Zimbabwe

In Zimbabwe, coordination among key stakeholders has been key to success in scaling up antiretroviral therapy programmes in the current unstable economic environment. To strengthen procurement and supply management systems, the Supply Chain Management System has provided support to the National Antiretroviral Treatment Partnership Forum, a programme of the Ministry of Health and Child Welfare that coordinates the activities of government agencies with donor organizations.

Zimbabwe is reducing stock-outs of key HIV commodities through an innovative programme first developed for its family planning programmes. In partnership with the Supply Chain Management System and the United States Agency for International Development, the Ministry of Health and Child Welfare and the Zimbabwe National Family Planning Council piloted a project to add HIV rapid test kits and nevirapine for preventing mother-to-child transmission of HIV to an existing distribution system that delivers condoms and contraceptives to health facilities in two provinces. Delivery team leaders carry commonly used commodities in large trucks – or "moving warehouses" – to health facilities, checking remaining supplies and leaving behind what is needed to replenish stocks. According to an evaluation conducted in January 2008, stock-out rates fell by 19% for rapid test kits and by 37% for nevirapine in one province alone. As a result, this programme was approved for nationwide rollout. The Supply Chain Management System is training local staff in the necessary skills and tools to do their own quantification and national supply management.

Source: Where we work: country highlights [web site] *(14)*.

2 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

3 Data reported to WHO in response to the annual questionnaire for monitoring the health sector response to HIV/AIDS, 2007.

HIV response and strengthening health systems

There has been significant debate in recent years about vertical (disease-specific) programming versus horizontal (health systems) investments. Some concern has been raised that funding for vertical programmes, such as those directed at providing HIV prevention, treatment and care services, distort the health system by diverting scarce resources in low- and middle-income countries away from other areas of the health system and complicating budgeting and planning processes for recipient countries *(15–17)*. In response, several stakeholders have noted the false dichotomy of vertical HIV programmes versus horizontal investment in health systems as if they were mutually exclusive. They suggest that, although concerns about distorting health systems are valid, effective design of disease-specific programmes and integration with other components of the health system can leverage disease-focused investment to strengthen other areas of underresourced health systems *(18,19)*.

The debate has stimulated significant discussion and evaluation on how HIV programme delivery affects the health systems of low- and middle-income countries. Several recent analyses of HIV programme implementation have provided new information on this, suggesting that investment in priority HIV interventions has effects throughout the health system, such as upgrading laboratory and clinical infrastructure *(20)*. Additional analyses provide the conceptual framework for how HIV programme delivery can catalyse more effective and responsive health care delivery systems (Box 6.2) *(21)*.

Box 6.2. Strengthening Cambodia's health system with HIV investment

In 2003, Cambodia released a plan to scale up the provision of a continuum of care package for providing integrated care and treatment to people living with HIV. The services provided through this plan include:

- voluntary testing and counselling;
- community-based services, including home-based care and support groups for people living with HIV;
- health facility–based care, including treatment for opportunistic infections, antiretroviral therapy for adults and children and laboratory and pharmacy services; and
- supportive networks of people living with HIV or Mond Mith Chouy Mith (centres for friends help friends activities).

Cambodia's National Center for HIV/AIDS, Dermatology and Sexually Transmitted Infections is leading the rollout of the plan from a single operational district in 2003 to an anticipated 40 of 68 operational districts by 2010.

One of the critical components of Cambodia's plan was coordinating the activities of government, nongovernmental organizations and international partners in delivering HIV services. This was particularly challenging given the number of different nongovernmental organizations that had been providing HIV services before any government services existed.

Another important component of the plan was providing additional training and incentives to health workers to address the increased workload involved in treating people living with HIV.

A case study was submitted in 2007 to provide a snapshot of the continuum of care in mid-scale-up, paying particular attention to the potential for HIV interventions to contribute to strengthening the health system. Evidence for broader strengthening of the health system included:

- improved management techniques developed for the national HIV plan and picked up by other parts of the health care system;
- increased technical abilities of clinicians to treat people who do not have HIV infection;
- increased utilization of other hospital services as a result of positive feedback within the community regarding the standard of care; and
- improved general laboratory and pharmacy operations.

Evidence for these effects in strengthening the health system was most evident in the operational district that first began implementing the plan, where training, equipment and renovations built general system capacity as much as HIV-specific care.

In addition, staff and resources from paediatric HIV services are also providing services to all children in need of care, leading to an improved quality of general paediatric care at these 22 hospitals. The National Center for HIV/AIDS, Dermatology and Sexually Transmitted Infections has initiated an integrated laboratory initiative to pool staff and laboratory equipment from the various vertical programmes to optimize laboratory output at the district hospital level.

Sources: *The continuum of care for people living with HIV/AIDS in Cambodia: linkages and strengthening in the public health system – a case study (22)* and the WHO Country Office for Cambodia.

6.2 Integrating HIV services with primary health care

Several studies have indicated that HIV services need to be integrated with other health services to maximize the impact of investment in HIV interventions *(23)*.

WHO has developed integrated tools and training materials health workers can use in delivering health services to people living with HIV. The Integrated Management of Adolescent and Adult Illness (IMAI) approach was built on the model of the Integrated Management of Childhood Illness (IMCI), which has been successfully implemented in countries since 1999. Rather than separate tools from different disease programmes, the IMAI and IMCI tools provide health workers with an integrated case management approach to managing multiple health problems while delivering priority prevention interventions.

Both approaches support a decentralized model of scaling up of health services that optimizes the use of human resources and fosters networks of health care provision at the district level. These district networks link communities, health centres and hospitals through systems of referral, consultation and mentoring and facilitate patient self-management. Such approaches also enable laboratory and clinical infrastructure and supply management to be strengthened and have the potential to strengthen the broader health system (Box 6.3).

Box 6.3. Integrated service provision in the United Republic of Tanzania

The United Republic of Tanzania has extensively implemented the IMCI strategy for several years. A large intervention study demonstrated that the integrated approach to delivering priority treatment and prevention interventions for children through IMCI resulted in a 13% greater reduction in child mortality than with using the same per capita resources for children's health delivered in a disintegrated fashion with disease-specific interventions *(24)*.

Building on the IMCI approach, the United Republic of Tanzania adapted the IMAI acute care, chronic HIV care and palliative care tools to use as the national curricula to train health care workers and support the decentralization of HIV services to the health centre level. Until mid-2006, antiretroviral therapy was delivered predominantly through care and treatment centres in 200 hospitals. In 2007, the Ministry of Health and Social Welfare trained care and treatment teams from 500 primary health facilities using the IMAI tools adapted to the United Republic of Tanzania to expand the delivery of antiretroviral therapy. The number of people receiving antiretroviral therapy increased from 46 124 people in October 2006 to 135 696 by December 2007. There are plans to train teams from an additional 500 primary health care facilities in 2008.

The Ministry of Health and Social Welfare has also reallocated the work of its implementing partners to strengthen the capacity of regional and district teams to manage HIV services. This policy of regionalization, combined with support for standardized national guidelines and curricula for the hospital and health centre level and active decentralization, are key to the further expansion of HIV services within a strengthened health system.

6.3 Investing in health information

Strategic information about the HIV epidemic at the local and national levels is essential for countries to guide planning, decision-making, implementation and accountability of their health sector response to HIV.

Surveillance

Knowing the HIV epidemic in a country is a prerequisite to designing an appropriate response. In 2000, UNAIDS and WHO launched the second-generation HIV surveillance method to improve HIV surveillance *(25)*. This strategy promotes the adaptation of information systems to the country-specific characteristics of the HIV epidemic and links various sources of information, including HIV prevalence in different population groups, information on sexual risk behaviour, reporting of AIDS cases and other sources of data. Most countries have adopted this approach to strengthen HIV surveillance, although the quality of surveillance and trends has varied over time.

A recent evaluation of the frequency and timeliness of data collection, the appropriateness of systems used and consistency of surveillance sites provided useful insights into the quality of HIV surveillance practice. Globally, among 137 low- and middle-income countries, 56 countries had fully implemented surveillance systems, 32 had partly implemented them and the remaining 49 countries had poor performing systems. This represents a slight increase in the quality of surveillance systems globally over the past few years, especially in countries with generalized epidemics *(26)*.

Since new HIV testing technologies – such as rapid tests and dried blood spot sampling – have become available, many countries have conducted nationally representative surveys to estimate HIV prevalence. National population surveys can provide more accurate and better-quality information on the levels of HIV infection in both urban and rural settings than estimates derived from sentinel surveillance. They also provide data on the age and sex distribution of the people living with HIV. During the past five years, about 30 national population-based surveys have been carried out, mostly in sub-Saharan Africa. Data from population-based surveys enable greater accuracy in generating global and regional estimates of the HIV epidemic.

Knowledge of the HIV epidemic in a country must include understanding the expected numbers and sources of new infections. WHO and UNAIDS are working with countries in eastern, western and southern Africa to generate better estimates of HIV incidence and inform programme planning. The study, which uses a modelling technique called modes of transmission, estimates the expected number of people newly infected per year based on the current distribution of infection and patterns of risk within a population *(27)*.

Monitoring and evaluation

Countries have made significant efforts and progress in strengthening monitoring and evaluation of their HIV programmes in recent years, as a result of increasing investment in the HIV response as well as pressure from multilateral and bilateral donors for greater accountability. Countries are better prepared to collect, use and analyse data to monitor and improve programme performance. Key stakeholders have also made efforts to improve coordination for monitoring and evaluation activities in accordance with the "three ones" principles *(28)*.

More and more countries recognize the need to strengthen systems to monitor the health-sector response to HIV/AIDS. As of December 2007, 67 low- and middle-income countries have developed or are developing a national monitoring and evaluation plan for the HIV response in the health sector. Most low- and middle-income countries (143 of 149 reporting countries) provided data for monitoring progress in the health sector towards universal access in 2007. An increasing number of countries are also able to monitor access to priority HIV interventions. For example, 131 low- and middle-income countries reported data on the number of people receiving antiretroviral therapy in 2007. However, the availability of detailed data, such as data disaggregated by sex and by age, is more limited. In 2007, only 101 countries were able to provide data on antiretroviral therapy disaggregated by sex and/or by age. Limited data are available from high-income countries. Nine of 44 high-income countries reported data on the number of people receiving antiretroviral therapy in 2007.

More progress is needed to ensure the availability of high-quality information and to make the best use of this information in developing national programmes, monitoring the impact of interventions and ensuring accountability. Regularly collecting and making available high-quality data on the impact and outcomes of key interventions is a pressing challenge for the future.

Although evidence is growing of the positive impact of scaling up antiretroviral therapy for individuals and communities, the high rates of loss to follow-up and early mortality among people initiating treatment raise concerns. Countries need the capacity to conduct cohort analyses and require appropriate tools, including electronic systems, to collect, compile and analyse data to monitor the outcome and impact of interventions and to take decisions for preventing undesirable results (Box 6.4).

At the global level, a high level of commitment from countries and donors will be sustainable only if evidence indicates that the large investments in the HIV response are mitigating morbidity and mortality and preventing new infections.

Box 6.4. Investing in a patient monitoring system for Ethiopia

Ethiopia developed its first National Monitoring and Evaluation Framework on HIV/AIDS in 2003. The national patient monitoring system for antiretroviral therapy was adopted in 2005 with its own package of data collection and reporting instruments. The patient monitoring system for antiretroviral therapy is used in all the 329 health facilities (119 hospitals and 210 health centres) currently delivering antiretroviral therapy. All health providers who provide antiretroviral therapy services are trained to use the national monitoring system for antiretroviral therapy, and the training is incorporated into the IMAI training modules.

To roll out the implementation of the patient monitoring system, Ethiopia trained and deployed data clerks to all health facilities providing antiretroviral therapy services. Data are collected using a paper-based system at the health facility level and compiled in an electronic database at the regional and national levels. Regional health information desks have data managers and monitoring and evaluation officers, with a central department responsible for coordinating monitoring and evaluation activities.

The national monitoring and evaluation system requires that all sites providing antiretroviral therapy services report patient information to their next administrative level on a monthly basis, with data disaggregated by age, sex and treatment regimen. Treatment outcome indicators begin to be reported six months after antiretroviral therapy is initiated and continue to be reported as patients reach 12 months, followed by each successive year on treatment. A total of 1129 testing and counselling sites and 502 sites providing interventions to prevent mother-to-child transmission follow the same procedures but report on a quarterly basis to the next administrative level.

National- and regional-level information on antiretroviral therapy is compiled, validated and disseminated monthly, and voluntary counselling and testing services and services to prevent mother-to-child transmission report nationally on a quarterly basis. National reports with aggregate data are disseminated electronically to key stakeholders and partners. The patient monitoring system has also provided the Ministry of Health and its partners with a rich source of research data to evaluate its national programme, for example, to evaluate how antiretroviral therapy affects morbidity and mortality in Ethiopia.

As the country's antiretroviral therapy programme is scaled up, the current paper-based information system will become an increasing challenge. It is labour-intensive and takes up a large amount of space. It is subject to errors, which could compromise the quality of data. There are also concerns about ensuring the privacy and confidentiality of individual records. The heavy workload of both health care workers and data entry clerks creates difficulty in ensuring timely follow-up of patients who miss appointments or other events that could signal treatment interruption. Increased capacity is needed to sustain the monitoring of patients, especially at the *woreda* level, the lowest programme management level in the Ethiopian health care system.

Research

Comprehensive strategic health information includes operational research to guide the implementation and scale-up of HIV prevention, care and treatment programmes. Key stakeholders have acknowledged the importance of operational research to fill gaps in knowledge and to ensure evidence-based implementation of health-sector interventions. The Sydney Declaration launched at the 4th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention in July 2007 calls for 10% of HIV/AIDS funding to be allocated for research *(29)*.

In March 2008, WHO and partners organized an international consultation to define priority areas of research to guide implementation of the public health approach to delivering care and treatment in resource-limited settings. The consultation considered four main areas of research: laboratory services, antiretroviral therapy, non–antiretroviral therapy care and health systems. The recommendations from the consultation will be published during 2008.

References

1. *Everybody's business. Strengthening health systems to improve health outcomes: WHO's framework for action*. Geneva, World Health Organization, 2007 (http://www.who.int/healthsystems/strategy/en, accessed 5 May 2008).
2. *The world health report 2006 – Working together for health*. Geneva, World Health Organization, 2006 (http://www.who.int/whr/2006/en, accessed 5 May 2008).
3. Chen L et al. Human resources for health: overcoming the crisis. *Lancet*, 2004, 364:1984–1990.
4. Tawfik L, Kinoti S. *The impact of HIV/AIDS on the health workforce in developing countries*. Geneva, World Health Organization, 2006 (http://www.who.int/hrh/documents/whr06_background_papers/en/index.html, accessed 5 May 2008).
5. Uebel KE, Nash J, Avalos A. Caring for the caregivers: models of HIV/AIDS care and treatment provision for health care workers in Southern Africa. *Journal of Infectious Diseases*, 2007, 196(Suppl 3):S500–S504.
6. Makombe SD et al. A national survey of the impact of rapid scale-up of antiretroviral therapy on health-care workers in Malawi: effects on human resources and survival. *Bulletin of the World Health Organization*, 2007, 85:851–857.
7. *Treat, train, retain: the AIDS and health workforce plan. Report on the Consultation on AIDS and Human Resources for Health, WHO, Geneva, 11–12 May 2006*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/meetingreports/ttr/en/index.html, accessed 5 May 2008).
8. Samb B et al. Rapid expansion of the health workforce in response to the HIV epidemic. *New England Journal of Medicine*, 2007, 357:2510–2514.
9. *Treat, train, retain: task shifting, global recommendations and guidelines*. Geneva, World Health Organization, 2008 (http://www.who.int/healthsystems/task_shifting/en/index.html, accessed 5 May 2008).
10. Pienaar D et al. *Models of care for antiretroviral service delivery*. Cape Town, South Africa, University of Cape Town, 2006.
11. Ivers L, Jerome G. *Task-shifting in HIV care: a community-based model for scale up of care in rural Haiti and Rwanda*. Boston, Partners In Health and Cambridge, Harvard Medical School, 2007 (unpublished).
12. WHO, UNAIDS and the United States President's Emergency Plan for AIDS Relief. *Treat, train, Retain. Study on task shifting, organization of clinical services – mapping study in Uganda*. December 2007 (unpublished).
13. *Improving AIDS drug access and advancing health care for all*. Bangkok, International Treatment Preparedness Coalition, 2007 (Missing the Target #5; http://itpcglobal.org/Latest/MISSING-THE-TARGET-5.html, accessed 5 May 2008).
14. Where we work: country highlights [web site]. Arlington, VA, Supply Chain Management System, 2008 (http://scms.pfscm.org/scms/where, accessed 5 May 2008).
15. England R. The dangers of disease-specific programmes. *British Medical Journal*, 2007, 365:565–567.
16. Garrett L. The challenge of global health. *Foreign Affairs*, 2007, January/February):14–38.
17. Halperin D. Putting a plague in perspective. *The New York Times*, 2008, 1 January.
18. *HIV/AIDS, communities and health systems strengthening: submission to DfID Health Strategy consultation*. Brighton, HIV/AIDS Alliance, 2006 (http://www.aidsalliance.org/custom_asp/publications/view.asp?publication_id=179&language=en, accessed 5 May 2008).
19. Farmer P, Garrett L. From "marvellous momentum" to health care for all: success is possible with the right programs. *Foreign Affairs*, 2006, July/August.
20. Wyss K, Weiss S. *Contributions of ART scaling-up to the strengthening of health systems in the framework of support provided by GFATM: the case of Tanzania, Chad and Burkina Faso*. Basle, Swiss Centre for International Health, 2005.
21. El-Sadr W, Abrams E. Scale-up of HIV care and treatment: can it transform healthcare services in resource-limited settings? *AIDS*, 2007, 21(Suppl 5):S65–S70.
22. *The continuum of care for people living with HIV/AIDS in Cambodia: linkages and strengthening in the public health system – a case study*. Manila, WHO Regional Office for the Western Pacific, 2006 (http://www.wpro.who.int/publications/PUB_9290612223.htm, accessed 5 May 2006).
23. Fredlund VG, Nash J. How far should they walk? Increasing antiretroviral therapy access in a rural community in northern KwaZulu-Natal, South Africa. *Journal of Infectious Diseases*, 2007, 196(Suppl 3):469–473.
24. Effectiveness and cost of facility-based Integrated Management of Childhood Illness (IMCI) in Tanzania. *Lancet*, 2004, 364:1583–1594.
25. UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance. *Guidelines for second generation HIV surveillance*. Geneva, World Health Organization and UNAIDS, 2000 (http://www.who.int/hiv/pub/epidemiology/pub3/en, accessed 5 May 2008).

26. Lyerla R, Gows E, Garcia-Calleja JM. The quality of serosurveillance in low- and middle-income countries: status and trends through 2007. *Sexually Transmitted Infections* (in press).
27. Epidemiological software and tools [web site]. Geneva, UNAIDS, 2008 (http://www.unaids.org/en/KnowledgeCentre/HIVData/Epidemiology/epi_software2007.asp, accessed 5 May 2008).
28. *"Three ones" key principles. Coordination of national responses to HIV/AIDS: guiding principles for national authorities and their partners*. Geneva, UNAIDS, 2004 (http://data.unaids.org/UNA-docs/Three-Ones_KeyPrinciples_en.pdf, accessed 5 May 2008).
29. Cooper D et al. The Sydney Declaration: a call to scale up research. *Lancet*, 2007, 370:7–8.

7. TOWARDS UNIVERSAL ACCESS: THE WAY FORWARD

Overall, progress in scaling up the health sector response to meet universal access targets for HIV prevention, treatment, care and support has accelerated. Key health sector interventions, such as antiretroviral therapy, prevention of mother-to-child transmission and testing and counselling, are increasingly available and accessible. Stronger national commitment, financial investment and technical guidance along with multilateral, bilateral and private sector initiatives have contributed to this progress.

Nevertheless, even at the current pace of scale-up, few countries are on course to meet universal access targets by 2010 or those laid out in the Millennium Development Goals by 2015. Although the gains in scaling up treatment are impressive, the annual number of new HIV infections continues to outstrip the annual additional number of people who receive treatment. In 2007, about 2.5 million people were newly infected with HIV, but less than 1 million more people received antiretroviral therapy compared with the end of 2006.

Predictable and sustainable funding, continuing political commitment, better coordination among stakeholders and additional research are required to address the formidable challenges that face the health sector. Proven HIV prevention measures, coupled with increased testing and counselling services, must be made more widely available to prevent new infections, and efforts must continue to expand access to treatment, care and support services for people living with HIV.

To achieve universal access goals, countries and partners must focus on the following priority areas in the health sector.

1. Strengthening the role of the health sector in HIV prevention

1.A Scaling up implementation of proven HIV prevention interventions

The health sector can and must play a greater role in scaling up and sustaining proven HIV prevention interventions, such as condom use and harm reduction strategies. HIV prevention must be an integral part of services for reproductive health, family planning and managing sexually transmitted infections.

Population groups at high risk of HIV infection, such as sex workers, injecting drug users, men who have sex with men and prisoners, continue to face barriers to accessing health services in many countries. The health sector must intensify its efforts to make evidence-based HIV prevention services available and accessible to these population groups.

The health sector also needs to ensure better follow-up of people diagnosed with HIV to ensure that they have access to services to prevent opportunistic infections and optimize their own health and to prevent further transmission.

1.B Intensifying interventions in health care settings

Patients and health care workers continue to be at risk of HIV infection in health care settings. Countries must ensure that universal precautions against HIV infection, including universal, quality-assured screening of blood supplies and injection safety, are implemented.

Countries must also expand the availability of post-exposure prophylaxis in health care settings for occupational and non-occupational exposure to HIV and provide appropriate training to service providers to effectively assess the risk of exposure and to manage post-exposure follow-up.

Infection control strategies aimed at preventing the spread of TB require greater attention. These include developing TB infection control plans, “fast-tracking” coughing patients, assuring rapid TB diagnosis and improving ventilation.

1.C Expanding male circumcision programmes

Male circumcision has been proven to reduce the risk of heterosexually transmitted HIV infection among men in countries with a high rate of heterosexual transmission and a low prevalence of male circumcision. Expanding male circumcision programmes in such settings requires that this intervention be undertaken by trained staff, integrated into a comprehensive prevention strategy and accompanied by accurate information on the limits of its protective effect.

2. Overcoming obstacles to increase knowledge of HIV status

Universal access will not be achieved if people do not know their HIV status. Provider-initiated testing and counselling in health care settings presents an opportunity to increase testing and counselling coverage and to ensure appropriate referral to other health services. Countries must also continue to promote client-initiated approaches to HIV testing and counselling and extend outreach to population groups at risk and to people with limited access to health facilities.

3. Strengthening and sustaining efforts to scale up HIV treatment and care

3.A Capitalizing on recent progress in scaling up access to treatment

Many low- and middle-income countries have expanded access to antiretroviral therapy for adults and children, especially in sub-Saharan Africa. However, the number of people receiving antiretroviral therapy continues to fall short of the need.

To scale up further, national treatment programmes must continue to provide life-long access to people currently receiving antiretroviral therapy and to deliver services to additional people in need. This includes people who are more difficult to reach, such as rural and populations most at risk. Further, with increased knowledge of HIV status, more people with HIV who are eligible to receive antiretroviral therapy will seek treatment services. International partners need to support countries in scaling up access to treatment through a public health approach based on simplified clinical decision-making, standardized regimens and decentralized and integrated delivery of services.

3.B Ensuring timely access to treatment and high levels of retention

Many adults and children eligible for treatment are diagnosed late in disease progression, and many either die before being able to access antiretroviral therapy or receive antiretroviral therapy too late. Countries must intensify efforts to ensure that people are referred for appropriate clinical assessment following an HIV-positive diagnosis.

Poor retention in treatment programmes threatens to undermine the impact of scaling up antiretroviral therapy services and to increase drug resistance. Improved patient monitoring systems, adequate resources and the integration of treatment programmes with other health services are prerequisites to maximizing the impressive gains made in scaling up antiretroviral therapy.

As treatment programmes are expanded, additional research will be required to guide decisions on when to initiate treatment and the acceptability, efficacy and optimal use of first-line treatment regimens. Additional evidence is also needed on how the public health approach can integrate wider access to laboratory monitoring for people receiving antiretroviral therapy.

3.C Reducing the cost of second-line regimens

Although the cost of first-line antiretroviral drug regimens has declined as a result of efforts by bilateral and multilateral partners, the cost of second-line drug regimens remains high. The cost of second-line regimens must be reduced as scale-up efforts continue, since increasing numbers of people may develop resistance or toxicity related to first-line regimens.

3.D Enhancing collaboration to respond to the dual epidemic of TB and HIV

Urgent action and strong political support are needed to prevent, diagnose and treat TB associated with HIV and avoid the emergence of multi-drug resistant and extensively drug-resistant TB. All national programmes should give greater priority to adopting and implementing WHO's policy on collaborative TB/HIV activities. Higher rates of HIV testing and counselling of people with TB are necessary to increase access to antiretroviral therapy and co-trimoxazole prophylaxis for people living with HIV and TB. The "three Is" – isoniazid preventive therapy, intensified case-finding for active TB and infection control for TB – are vital to expanding the prevention and treatment of TB among people living with HIV.

3.E Scaling up access to care, including co-trimoxazole prophylaxis

Countries must make co-trimoxazole prophylaxis available for adults, children and HIV-exposed infants. Co-trimoxazole prophylaxis is safe and one of the most cost-effective interventions for people living with HIV in resource-limited settings. However implementation has been slow, especially in rural areas. These policies should be implemented more widely to ensure that more adults and children enrolled in HIV care have sustained access to co-trimoxazole prophylaxis.

3.F Developing comprehensive strategies to prevent, diagnose and treat viral hepatitis and HIV coinfection

HIV, hepatitis B and hepatitis C coinfection represent a substantial public health threat, particularly in Eastern Europe and Central Asia, with high rates of HIV transmission through injecting drug use and of high levels of hepatitis C. Considering the great anticipated impact of HIV and hepatitis B and C coinfection in the coming years, countries must devote more resources to gauging the magnitude of

disease associated with hepatitis B and hepatitis C among people living with HIV and expand access to diagnosis, prevention and treatment strategies and policies for hepatitis B and hepatitis C control. This includes measures such as improving access to diagnostic tests, implementing harm reduction programmes and blood safety policies, promoting hepatitis B immunization and providing access to anti–hepatitis B and anti–hepatitis C therapies.

4. Accelerating access to HIV prevention, treatment and care for women and children

4.A Strengthening links with maternal, child and reproductive health services

Health care settings such as maternal, newborn and child health services and sexual and reproductive health services, including family planning, are vital points of contact in providing HIV services to women and children. Strengthening operational links between these services will enable health care providers to reinforce HIV prevention and care for women and children, including increasing HIV testing and counselling among pregnant women, early HIV diagnosis among children born to mothers living with HIV and antiretroviral therapy, care and support to women and children.

The high rates of antenatal care coverage in many high-prevalence countries provide an excellent opportunity to expand provider-initiated testing and counselling as a part of comprehensive antenatal screening. Health workers need to be adequately trained and supervised to increase the number of pregnant women who know their HIV status and who can benefit from the necessary interventions.

4.B Scaling up the provision of efficacious antiretroviral prophylaxis regimens

Global progress in providing access to antiretroviral medicines to pregnant women living with HIV to prevent HIV transmission to their child has been encouraging. Countries must continue efforts to scale up access to antiretroviral prophylaxis with regimens that have been shown to be more efficacious than single-dose nevirapine.

4.C Ensuring access to antiretroviral therapy for pregnant women living with HIV

Although access to antiretroviral medicines to prevent mother-to-child transmission is increasing, all pregnant women living with HIV must also be assessed for their eligibility to receive antiretroviral therapy for their own health. Identifying and treating women in need of antiretroviral therapy will also reduce transmission and prevent orphanhood.

4.D Expanding infant diagnosis and the availability of care and treatment for children

The availability of virological testing for infants and the timely reporting of results need to be expanded to ensure that more children receive the necessary care and treatment. Countries must also continue to expand the availability of co-trimoxazole prophylaxis to reduce morbidity and mortality among infants and children living with or exposed to HIV. Further, mothers living with HIV must receive appropriate information and counselling regarding optimal and safe infant feeding practices.

5. Implementing strategies to overcome health system weaknesses

Investing in HIV programmes can strengthen health systems if HIV interventions are appropriately integrated with other health services and aligned with national planning processes for the health sector as a whole. Greater attention must be paid to integrating HIV services into primary health care as part of managing chronic diseases while ensuring that the availability of treatment and care for people living with HIV is not compromised.

Countries must invest in building human resource capacity in the health sector by training health workers, decentralizing health service delivery, task-shifting and other approaches to addressing health worker shortages.

Countries must also develop strategies for strengthening procurement and supply management systems to ensure uninterrupted access to antiretroviral drugs. Additional investment and planning are needed to strengthen laboratory infrastructure to provide greater access to diagnostics for HIV testing and patient monitoring.

6. Improving the generation and use of strategic information to guide the health sector response

The availability of epidemiological data and information on access to priority health sector interventions is gradually improving. However, more investment and capacity are needed to generate and use quality information in several critical areas. These include:

- HIV descriptive epidemiology, including HIV incidence;
- the availability and coverage of essential health sector interventions such as HIV testing and counselling, management of sexually transmitted infections, care and access to health services for populations most at risk of HIV infection; and
- the impact and outcome of priority HIV interventions on mortality, HIV incidence, HIV prevalence and strengthening the health system.

Several high-priority operational research questions need to be answered to ensure the most effective delivery of health sector interventions using a public health approach. Increased human resources, research infrastructure and technical guidance will be necessary to implement operational research.

Annex 1. Estimated numbers of people receiving and needing antiretroviral therapy and coverage percentages, 2006-2007

Low- and middle-income countries[a]	Reported number of people receiving antiretroviral therapy, 2006[b]	Month and year of report[c]	Reported number of people receiving antiretroviral therapy, 2007[b]	Month and year of report[c]	Average monthly increase in the number of people receiving antiretroviral therapy in the last year[d]	Estimated number of people receiving antiretroviral therapy, December 2007[b]			Estimated number of people needing antiretroviral therapy based on UNAIDS/WHO methodology, 2007[e]			Estimated antiretroviral therapy coverage, December 2007[f]			Estimated number of people needing antiretroviral therapy based on country report, 2007[e]
						Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Afghanistan	0	Sep 06	0	Dec 07	0	0			...			...			...
Albania	45	Oct 06	74	Dec 07	2	<100		<100	...			...			...
Algeria	588	Nov 06	929	Oct 07	32	1 000	900	1 000	4 900	2 700	10 000	20%	10%	36%	...
Angola	6 514 [g]	Dec 06	11 540 [g]	Dec 07	419	12 000	10 000	13 000	47 000	33 000	110 000	25%	11%	35%	45 287
Argentina	35 211	Dec 06	38 242	Dec 07	253	38 000	36 000	40 000	53 000	38 000	67 000	73%	57%	>95%	38 242
Armenia	47	Dec 06	78	Dec 07	3	<100		<100	660	<500	1 000	12%	8%	17%	860
Azerbaijan	7	Dec 06	81	Dec 07	6	<100		<100	580	<500	1 300	14%	6%	24%	...
Bangladesh	53	Sep 06	178	Dec 07	10	<200		<200	2 400	1 500	4 000	7%	4%	12%	1 125
Belarus	638	Dec 06	884	Dec 07	21	900	800	1 000	4 300	3 000	6 200	20%	14%	29%	1 210
Belize	381	Sep 06	558	Dec 07	12	600	500	600	1 100	740	1 700	49%	32%	76%	...
Benin	7 417	Nov 06	9 765	Dec 07	181	9 800	8 800	11 000	20 000	16 000	24 000	49%	41%	60%	21 706
Bhutan	19	Dec 06	18	Dec 07	<1	<100		<100	<100	<100	<100	...			...
Bolivia	382	Dec 06	496	Dec 07	10	<500		500	2 300	1 700	3 100	22%	16%	30%	1 055
Bosnia and Herzegovina	19	Dec 06	30	Dec 07	1	<100		<100	...			...			30
Botswana	79 490 [g]	Dec 06	92 932 [g]	Dec 07	1 120	93 000	86 000	99 000	120 000	100 000	130 000	79%	69%	91%	110 000
Brazil	174 270	Dec 06	181 000	Dec 07	561	181 000	172 000	190 000	230 000	190 000	260 000	80%	69%	>95%	...
Bulgaria	196	Dec 06	221	Dec 07	2	<500		<500	...			...			...
Burkina Faso	14 079	Dec 06	15 888	Sep 07	350	17 000	15 000	19 000	48 000	39 000	58 000	35%	29%	43%	...
Burundi	8 048	Dec 06	10 894	Dec 07	237	11 000	10 000	11 000	47 000	35 000	59 000	23%	18%	31%	23 532
Cambodia	20 131	Dec 06	26 664	Dec 07	544	27 000	25 000	28 000	40 000	34 000	47 000	67%	57%	80%	29 200
Cameroon	28 403	Dec 06	45 817	Dec 07	1 451	46 000	44 000	48 000	180 000	140 000	220 000	25%	21%	32%	86 453
Cape Verde	223	Dec 06	291	Dec 07	6	<500		<500	...			...			1 028
Central African Republic	2 782	Dec 06	8 037	Sep 07	518	9 600	9 100	10 000	45 000	36 000	54 000	21%	18%	27%	36 920
Chad	5 500	Dec 06	7 400	Dec 07	158	7 400	6 700	8 100	55 000	41 000	79 000	13%	9%	18%	21 000
Chile	7 782	Dec 06	10 223	Dec 07	203	10 000	9 200	11 000	12 000	9 100	16 000	82%	64%	>95%	9 023
China	31 140 [g]	Dec 06	35 112 [g]	Dec 07	331	35 000	33 000	37 000	190 000	120 000	290 000	19%	12%	29%	85 000
Colombia	17 540 [g]	Dec 06	...		*208*	21 000	15 000	26 000	54 000	39 000	78 000	38%	26%	53%	...
Comoros	5	Dec 06	7	Dec 07	<1	<100		<100	<100	<100	<100	...			8
Congo	3 186	Dec 06	4 716	Sep 07	80	5 000	3 700	6 200	29 000	23 000	35 000	17%	14%	21%	...
Cook Islands	...		...		...	...			...			...			...

Low- and middle-income countries[a]	Reported number of people receiving antiretroviral therapy, 2006[b]	Month and year of report[c]	Reported number of people receiving antiretroviral therapy, 2007[b]	Month and year of report[c]	Average monthly increase in the number of people receiving antiretroviral therapy in the last year[d]	Estimated number of people receiving antiretroviral therapy, December 2007[b]			Estimated number of people needing antiretroviral therapy based on UNAIDS/WHO methodology, 2007[e]			Estimated antiretroviral therapy coverage December 2007[f]			Estimated number of people needing antiretroviral therapy based on country report, 2007[e]
						Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Costa Rica	2 866	Dec 06	2 952	Dec 07	7	3 000	2 700	3 200	2 800	1 600	4 600	>95%	64%	>95%	3 060
Côte d'Ivoire	36 348	Dec 06	46 007	Sep 07	1 935	52 000	49 000	54 000	190 000	150 000	230 000	28%	23%	35%	165 448
Croatia	291	Dec 06	310	Jun 07	2	<500		<500	...			…			…
Cuba	1 711	Dec 06	3 106	Dec 07	116	3 100	2 800	3 400	1 400	760	2 500	>95%	>95%	>95%	1 887
Democratic People's Republic of Korea	0	Dec 06	…		…	0			2 900	1 600	4 800	0%			…
Democratic Republic of the Congo	17 561	Dec 06	…		*947*	29 000	27 000	30 000	120 000	99 000	150 000	24%	20%	29%	347 490
Djibouti	578	Nov 06	705	Dec 07	9	700	700	800	4 500	3 300	5 900	16%	12%	21%	…
Dominica	37	Dec 06	39	Dec 07	<1	<100		<100	...			…			53
Dominican Republic	5 001	Dec 06	8 199	Dec 07	267	8 200	7 800	8 600	22 000	17 000	27 000	38%	31%	48%	…
Ecuador	1 700	Sep 06	3 214	Dec 07	101	3 200	2 900	3 500	7 600	4 500	13 000	42%	25%	71%	…
Egypt	205	Dec 06	209	Dec 07	<1	<500	<200	<500	2 200	1 600	3 100	9%	7%	13%	…
El Salvador	4 712	Dec 06	5 773	Dec 07	88	5 800	5 500	6 100	11 000	7 800	63 000	51%	9%	74%	4 840
Equatorial Guinea	396	Nov 06	859	Sep 07	42	1 000	1 000	1 200	3 100	2 300	4 300	31%	23%	43%	…
Eritrea	1 175	Dec 06	1 301	Dec 07	11	1 300	1 200	1 400	10 000	6 700	15 000	13%	9%	20%	12 940
Ethiopia	53 720	Dec 06	90 212	Dec 07	3 041	90 000	86 000	95 000	310 000	250 000	370 000	29%	25%	36%	260 000
Fiji	…		28	Dec 07	…	<100		<100	<200	<100	<200	…			…
Gabon	5 278	Dec 06	6 373	Dec 07	91	6 400	6 100	6 700	15 000	11 000	21 000	42%	30%	60%	14 598
Gambia	392	Sep 06	423	Sep 07	3	<500		<500	2 300	1 200	3 700	18%	12%	37%	4 787
Georgia	267	Dec 06	334	Nov 07	5	<500		<500	<500	<200	<500	…			476
Ghana	9 420	Nov 06	13 357	Dec 07	303	13 000	13 000	14 000	87 000	69 000	110 000	15%	13%	19%	74 060
Grenada	33	Dec 06	47	Dec 07	1	<100		<100	...			…			129
Guatemala	6 030	Dec 06	7 812	Dec 07	149	7 800	7 400	8 200	21 000	15 000	28 000	37%	28%	51%	11 113
Guinea	4 699	Dec 06	5 228	Sep 07	144	5 700	5 100	6 200	21 000	15 000	27 000	27%	21%	37%	23 250
Guinea-Bissau	349	Dec 06	890	Dec 07	45	900	800	1 000	4 400	2 900	6 600	20%	13%	30%	3 171
Guyana	1 569	Dec 06	1 965	Dec 07	33	2 000	1 900	2 100	4 300	3 200	6 000	45%	33%	61%	3 240
Haiti	8 796	Dec 06	14 514	Dec 07	477	15 000	14 000	15 000	36 000	29 000	43 000	41%	33%	51%	…
Honduras	4 674	Dec 06	5 580	Dec 07	76	5 600	5 000	6 100	12 000	7 900	19 000	47%	29%	71%	9 916
Hungary	412	Dec 06	452	Dec 07	3	<500		<500	2 000	1 200	3 600	22%	13%	38%	…
India	90 597 [g]	Dec 06	158 020[g,h]	Dec 07	5 619	158 000	138 000	178 000	… [i]			…			…
Indonesia	5 100	Dec 06	…		*122*	6 600	5 000	8 300	43 000	23 000	84 000	15%	8%	28%	…
Iran (Islamic Republic of)	522	Sep 06	829	Aug 07	28	900	900	1 000	19 000	13 000	26 000	5%	4%	7%	8 730
Iraq	0	Jun 06	0	Dec 07	0	0			...			…			…

Jamaica	2 633	Dec 06	3 637	Dec 07	84	3 600	3 300	4 000	8 500	6 000	11 000	43%	32%	60%	6 000
Jordan	45	Sep 06	53	Dec 07	1	<100		<100	...			...			...
Kazakhstan	326	Dec 06	442	Dec 07	10	<500		<500	1 900	1 200	3 200	23%	14%	36%	1 078
Kenya	125 026 [g]	Dec 06	177 000 [g]	Dec 07	4 331	177 000	166 000	188 000	470 000 [i]	370 000	570 000	38%	31%	48%	407 000
Kiribati	...		5	Dec 07	<1	<100		<100	...			...			...
Kyrgyzstan	47	Dec 06	87	Dec 07	3	<100		<100	610	<500	1 100	14%	8%	26%	345
Lao People's Democratic Republic	479	Dec 06	700	Dec 07	18	700	500	900	690	<200	1 200	>95%	59%	>95%	...
Latvia	301	Dec 06	323	May 07	4	<500		<500	2 200	1 500	3 400	15%	9%	22%	763
Lebanon	213	Dec 06	246	Dec 07	3	<500		<500	940	550	2 300	26%	11%	45%	432
Lesotho	14 579	Aug 06	21 710	Dec 07	446	22 000	20 000	24 000	85 000	66 000	100 000	26%	21%	33%	84 791
Liberia	715	Sep 06	1 414	Dec 07	47	1 400	1 300	1 600	8 500	6 100	17 000	17%	9%	23%	...
Libyan Arab Jamahiriya	450	Dec 05	1 000	Dec 07	23	1 000	900	1 100	...			...			...
Lithuania	75	Dec 06	98	Dec 07	2	<100		<200	550	<500	1 200	18%	8%	31%	311
Madagascar	89	Nov 06	138	Dec 07	3	<200		<200	3 200	2 000	5 400	4%	3%	7%	1 206
Malawi	59 980 [g]	Dec 06	100 649 [g]	Dec 07	3 389	101 000	96 000	106 000	290 000	240 000	340 000	35%	29%	42%	252 720
Malaysia	2 700	<05	6 590	Oct 07	86	6 800	6 100	7 400	20 000	14 000	28 000	35%	24%	49%	...
Maldives	1	Dec 06	...		*0*	<100		<100	<100	<100	<100	...			...
Mali	11 508	Dec 06	12 172	Nov 07	226	12 000	12 000	13 000	30 000	24 000	38 000	41%	32%	51%	31 198
Marshall Islands	...		1	Dec 07	<1	<100		<100	...			...			...
Mauritania	256	Dec 06	839	Dec 07	49	800	800	900	3 600	2 100	6 300	23%	13%	40%	1 627
Mauritius	243	Dec 06	321	Dec 07	17	<500		<500	1 500	1 000	2 400	22%	14%	32%	1 200
Mexico	39 295	Dec 06	...		*313*	43 000	32 000	54 000	76 000	54 000	110 000	57%	40%	80%	...
Micronesia (Federated States of)	...		1	Dec 07	<1	<100		<100	...			...			...
Moldova	262	Dec 06	464	Dec 07	17	<500		<500	800	540	1 100	58%	43%	86%	856
Mongolia	2	Nov 06	3	Dec 07	<1	<100		<100	<100	<100	<100	...			26
Montenegro	26	Dec 06	...		*0*	<100		<100	...			...			...
Morocco	1 370	Dec 06	1 648	Dec 07	23	1 600	1 500	1 800	5 300	3 700	7 900	31%	21%	44%	2 230
Mozambique	37 133	Oct 06	85 822	Nov 07	3 745	90 000	85 000	94 000	370 000	290 000	460 000	24%	20%	31%	294 986
Myanmar	4 845	Sep 06	11 100	Dec 07	416	11 000	10 000	12 000	76 000	55 000	100 000	15%	11%	20%	...
Namibia	33 593	Dec 06	52 316	Dec 07	1 394	52 000	50 000	55 000	59 000	48 000	72 000	88%	73%	>95%	...
Nauru	...		...		...	...			...			...			...
Nepal	522	Nov 06	1 240	Sep 07	64	1 400	1 300	1 600	20 000	13 000	30 000	7%	5%	11%	19 200
Nicaragua	387	Dec 06	522	Dec 07	11	500	<500	600	1 700	1 200	4 700	30%	11%	43%	1 233
Niger	1 168	Dec 06	1 474	Oct 07	31	1 500	1 500	1 600	16 000	12 000	22 000	10%	7%	13%	8 929
Nigeria	95 008 [g]	Dec 06	145 392 [g]	Sep 07	7 434	198 000	144 000	252 000	750 000	550 000	1 100 000	26%	17%	36%	...
Niue	...		...		...	...			...			...			...

Low- and middle-income countries[a]	Reported number of people receiving antiretroviral therapy, 2006[b]	Month and year of report[c]	Reported number of people receiving antiretroviral therapy, 2007[b]	Month and year of report[c]	Average monthly increase in the number of people receiving antiretroviral therapy in the last year[d]	Estimated number of people receiving antiretroviral therapy, December 2007[b]			Estimated number of people needing antiretroviral therapy based on UNAIDS/WHO methodology, 2007[e]			Estimated antiretroviral therapy coverage December 2007[f]			Estimated number of people needing antiretroviral therapy based on country report, 2007[e]
						Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Oman	225	Jan 06	260	Dec 07	3	<500		<500	...			...			...
Pakistan	164	Nov 06	550	Dec 07	32	600	500	600	20 000	13 000	34 000	3%	2%	4%	7 400
Palau	2	Dec 06	3	Dec 07	<1	<100		<100	...			...			3
Panama	2 835	Dec 06	3 994	Dec 07	97	4 000	3 600	4 400	7 200	5 600	9 300	56%	43%	71%	6 500
Papua New Guinea	1 098	Dec 06	2 250	Dec 07	96	2 300	2 100	2 400	5 900	5 000	6 800	38%	33%	45%	6 348
Paraguay	1 018	Sep 06	1 053	Nov 07	3	1 100	1 000	1 200	4 800	2 900	8 800	22%	12%	37%	3 066
Peru	8 424	Dec 06	10 860	Dec 07	203	11 000	9 800	12 000	23 000	17 000	30 000	48%	36%	62%	...
Philippines	170	Dec 06	336	Dec 07	14	<500		<500	1 100	740	1 500	31%	22%	45%	600
Poland	3 072	Dec 06	3 382	Dec 07	26	3 400	3 200	3 600	9 300	5 500	17 000	36%	20%	62%	4 390
Romania	6 790	Dec 06	6 500	Dec 07	- 24	6 500	6 200	6 800	8 900	5 400	10 000	73%	62%	>95%	6 418
Russian Federation	14 681	Dec 06	31 094	Dec 07	1 368	31 000	30 000	33 000	190 000	120 000	300 000	16%	10%	25%	33 365
Rwanda	34 636 [g]	Dec 06	48 569 [g]	Dec 07	1 161	49 000	46 000	51 000	68 000	58 000	78 000	71%	62%	84%	...
Saint Kitts and Nevis	39	Dec 06	...		*1*	<100		<100	...			...			...
Saint Lucia	50	Dec 06	72	Sep 07	2	<100		<100	...			...			384
Saint Vincent and the Grenadines	74	Sep 06	...		2	<100		<200	...			...			...
Samoa	...		6	Dec 07	<1	<100		<100	...			...			...
Sao Tome and Principe	51	Dec 06	74	Dec 07	2	<100		<100	...			...			300
Senegal	5 500	Dec 06	6 699	Dec 07	100	6 700	6 000	7 400	12 000	9 600	15 000	56%	44%	70%	10 465
Serbia	608	Dec 06	628	May 07	2	600	500	800	3 700	2 100	7 700	17%	8%	30%	...
Seychelles	82	Dec 06	...		1	<100		<200	...			...			...
Sierra Leone	1 416	Dec 06	2 649	Dec 07	103	2 600	2 400	2 900	13 000	9 000	20 000	20%	13%	30%	...
Slovakia	96	Dec 06	98	Jun 07	<1	<100		<200	...			...			...
Solomon Islands	...		3	Dec 07	<1	<100		<100	...			...			...
Somalia	111	Dec 06	211	Dec 07	8	<500		<500	6 300	3 500	11 000	...			...
South Africa	291 754 [g]	Sep 06	428 951 [g,j]	Sep 07	12 266	460 000	398 000	520 000	1 700 000	1 300 000	2 100 000	28%	22%	36%	889 000
Sri Lanka	69	Dec 06	107	Dec 07	3	<200	<100	<200	780	540	1 100	14%	10%	20%	776
Sudan	968	Dec 06	1 198 [k]	Dec 07	19	1 200	1 100	1 300	87 000	58 000	120 000	1%	1%	2%	...
Suriname	460	Dec 06	729	Dec 07	21	700	700	800	1 600	980	2 400	45%	29%	72%	...
Swaziland	17 160	Oct 06	24 535	Dec 07	503	25 000	23 000	26 000	59 000	49 000	68 000	42%	36%	50%	58 249

Syrian Arab Republic	60	Dec 05	75	Dec 07	1	<100		<100	...			…			…
Tajikistan	37	Dec 06	86	Dec 07	4	<100		<100	1 300	750	2 400	6%	4%	11%	79
Thailand	105 620 g	Sep 06	143 539 g	Sep 07	3 145	153 000	135 000	171 000	250 000	190 000	320 000	61%	47%	81%	252 387
The former Yugoslav Republic of Macedonia	11	Dec 06	15	Dec 07	<1	<100		<100	...			…			…
Timor-Leste	…		0	Dec 07	0	0			...			…			…
Togo	6 993	Dec 06	7 980	Dec 07	82	8 000	7 600	8 400	41 000	33 000	52 000	19%	15%	24%	26 232
Tonga	…		…		…	…			...			…			…
Tunisia	298	Dec 06	…		*0*	<500		<500	1 000	760	1 500	29%	20%	39%	…
Turkey	685	Dec 06	…		*17*	900	700	1 100	...			…			…
Turkmenistan	0	Dec 06	…		*0*	0			...			…			…
Tuvalu	…		1	Dec 07	<1	<100		<100	...			…			1
Uganda	89 193	Sep 06	111 232	Sep 07	1 372	115 000	110 000	121 000	350 000	290 000	430 000	33%	27%	40%	312 000
Ukraine	4 777	Dec 06	7 657	Dec 07	240	7 700	7 300	8 000	91 000	69 000	120 000	8%	7%	11%	21 770
United Republic of Tanzania	60 342	Dec 06	135 696	Dec 07	6 280	136 000	129 000	142 000	440 000	360 000	530 000	31%	26%	38%	1 867 918
Uruguay	1 495	Sep 06	1 776	Dec 07	23	1 800	1 600	2 000	3 100	1 700	7 800	56%	23%	>95%	1 970
Uzbekistan	259	Dec 06	…		*5*	<500		<500	1 400	630	3 500	24%	9%	51%	…
Vanuatu	2	Oct 06	2	Dec 07	0	<100		<100	...			…			…
Venezuela (Bolivarian Republic of)	15 417	Dec 05	…		…	…	12 000	19 000	35 000	21 000	89 000	…l			…
Viet Nam	8 310	Dec 06	14 969	Sep 07	795	17 000	16 000	18 000	67 000	41 000	110 000	26%	17%	42%	49 960
Yemen	0	Sep 06	107	Dec 07	9	<200		<200	...			…			…
Zambia	82 030 g	Dec 06	151 199 g	Dec 07	5 764	151 000	143 000	159 000	330 000	270 000	380 000	46%	40%	56%	370 000
Zimbabwe	66 920 g	Dec 06	97 692 g	Dec 07	2 564	98 000	93 000	103 000	570 000	440 000	690 000	17%	14%	22%	260 000

High-income countries	Reported number of people receiving antiretroviral therapy, 2006[b]	Month and year of report[c]	Reported number of people receiving antiretroviral therapy, 2007[b]	Month and year of report[c]
Andorra	24	Dec 06	…	
Antigua and Barbuda	114	Sep 06	148	Sep 07
Australia	…		…	
Austria	2 101	Dec 05	…	
Bahamas	1 252	Dec 06	1 244	Sep 07
Bahrain	…		…	
Barbados	623	Dec 06	660	Jun 07
Belgium	6 450	Apr 06	…	
Brunei Darussalam	…		…	
Canada	21 000	Sep 06	…	
Cyprus	…		151	Dec 07
Czech Republic	570	Dec 06	570	Jun 07
Denmark	2 800	Dec 06	…	
Estonia	495	Dec 06	772	Dec 07
Finland	450	Aug 06	…	
France	52 600	<05	…	
Germany	27 000	Dec 06	…	
Greece	…		3 500	Dec 07
Iceland	100	<05	…	
Ireland	1 600	Dec 05	…	
Israel	2 431	Dec 06	…	
Italy	81 600	<05	…	
Japan	48	Dec 06	…	
Kuwait	…		…	
Luxembourg	312	Dec 06	…	
Malta	…		65	Jun 07
Monaco	45	Dec 05	…	
Netherlands	…		7 919	Apr 07
New Zealand	…		…	
Norway	900	Dec 05	…	
Portugal	18 679	Dec 05	…	
Qatar	…		…	
Republic of Korea	…		…	
San Marino	…		…	
Saudi Arabia	…		…	
Singapore	…		…	
Slovenia	147	Dec 06	157	Jul 07
Spain	77 500	Dec 06	…	
Sweden	2 800	Dec 06	…	
Switzerland	…		…	
Trinidad and Tobago	2 133	Dec 06	2 592	Dec 07
United Arab Emirates	…		…	
United Kingdom	36 000	Jun 06	…	
United States of America	268 000	<05	…	

... Data not available or not applicable.
a See country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions.
b An increasing number of countries report the number of children younger than 15 years of age receiving antiretroviral therapy, and this table includes them. Annex 2 provides antiretroviral therapy data by age and sex.
c '<05' indicates that data exist but no update has been received since December 2004. These data should be interpreted cautiously, as they may reflect the situation in early 2004 or even 2003.
d The monthly increase in the number of people receiving antiretroviral therapy during, in most cases, the last six months of 2007, is calculated using two data points in 2007 with the longest period between them and applying a linear projection for each month up to December 2007. For countries with data available for both December 2006 and 2007, the monthly growth is calculated by dividing the growth in one year by 12. Except for Botswana and Zimbabwe, the calculated monthly growth rate only applies to the growth in the public sector. For countries that have not reported treatment data in 2007, the monthly growth is shown in italics.
e The needs estimates are based on the methods described in the explanatory notes to Annex 2.
f The coverage estimates are based on the estimated unrounded numbers of people receiving antiretroviral therapy and the estimated unrounded need for antiretroviral therapy (based on UNAIDS/WHO methodology). The ranges in coverage estimates are based on plausibility bounds in the denominator: that is, low and high estimates of need. No coverage has been calculated where the estimated need is less than 500.
g Private-sector data are included in the reported total.

Private-sector data included in the number of people receiving antiretroviral therapy		
Country	2006	2007
Angola	300	300
Botswana	8 500	9 514
China[1]	500	500
Colombia	1 000	…
India	35 000	35 000
Kenya	5 000	5 000
Malawi	2 624	3 937
Nigeria	5 000	30 000
Rwanda	500	500
South Africa	110 000	100 000
Thailand	10 000	10 000
Zambia	2 000	2 000
Zimbabwe	6 000	10 000

[1] World Bank project

h By December 2007, the government reported that 118 052 people were receiving antiretroviral therapy through the public sector at 137 sites. Nongovernmental organizations and intersectoral health centres treated about 5000 people at 10 sites. A further estimated 35 000 people were treated in the unorganized private sector. Overall, an estimated 158 000 [138 000–178 000] people were receiving antiretroviral therapy by the end of 2007, including people enrolled through private facilities.
i Estimates of the number of people needing antiretroviral therapy are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis.
j Includes a private-sector estimate of 100 000. The Department of Health reported a cumulative number of 371 731 for the public sector in September 2007. WHO/UNAIDS adjusted the public sector number for attrition.
k Two separate reports were received from Sudan: northern Sudan, 895; southern Sudan, 303.
l No coverage has been calculated as no data have been reported since December 2005.

Annex 2. Reported numbers of people receiving antiretroviral therapy in low- and middle-income countries by sex and by age, 2006-2007

Low- and middle-income countries[a]	Reported number of all males and females receiving antiretroviral therapy					Reported number of adults and children receiving antiretroviral therapy[b]				
	Month and year of report	Males	% of total	Females	% of total	Month and year of report[c]	Children (<15 years)	% of total	Adults (15+ years)	% of total
Afghanistan	Dec 07	0		0		Dec 07	0		0	
Albania		…		…		Dec 07	12	16%	62	84%
Algeria		…		…		Oct 07	45	5%	884	95%
Angola		…		…		Dec 07	363	3%	10 877	97%
Argentina	Dec 07	22 557	59%	15 685	41%	Dec 07	3 654	10%	34 588	90%
Armenia	Dec 07	52	67%	26	33%	Dec 07	4	5%	74	95%
Azerbaijan		…		…		Dec 07	0	0%	81	100%
Bangladesh		…		…			…		…	
Belarus	Dec 07	655	74%	229	26%	Dec 07	69	8%	815	92%
Belize	Dec 07	263	47%	295	53%	Dec 07	65	12%	493	88%
Benin		…		…		Dec 07	542	6%	9 223	94%
Bhutan	Dec 07	10	56%	8	44%	Dec 07	0	0%	18	100%
Bolivia	Dec 07	345	70%	151	30%	Dec 07	22	4%	474	96%
Bosnia and Herzegovina	Dec 07	22	73%	8	27%	Dec 07	1	3%	29	97%
Botswana	Dec 07	32 623	39%	50 795	61%	Dec 07	9 496	11%	73 922	89%
Brazil	Dec 07	109 057	60%	71 943	40%	Dec 07	6 815	4%	174 185	96%
Bulgaria	Dec 07	150	68%	71	32%	Dec 07	3	1%	218	99%
Burkina Faso	Sep 07	5 084	32%	10 804	68%	Sep 07	629	4%	15 259	96%
Burundi	Dec 07	3 486	32%	7 408	68%	Dec 07	1 198	11%	9 696	89%
Cambodia	Dec 07	13 118	49%	13 546	51%	Dec 07	2 541	10%	24 123	90%
Cameroon	Dec 07	16 036	35%	29 781	65%	Dec 07	1 694	4%	44 123	96%
Cape Verde	Dec 07	125	43%	166	57%	Dec 07	23	8%	268	92%
Central African Republic	Sep 07	3 215	40%	4 822	60%	Sep 07 [c]	380	6%	5 876	94%
Chad	Dec 07	2 738	37%	4 662	63%	Dec 07	148	2%	7 252	98%
Chile	Dec 07	8 495	83%	1 728	17%		…		…	
China	Dec 07 [d]	19 245	56%	15 148	44%	Dec 07	766	2%	33 846	98%
Colombia		…		…			…		…	
Comoros	Dec 07	4	57%	3	43%	Dec 07	1	14%	6	86%
Congo	Dec 07	1 886	40%	2 830	60%	Dec 07	462	10%	4 254	90%
Cook Islands		…		…			…		…	
Costa Rica		…		…			…		…	
Côte d'Ivoire	Sep 07 [c]	12 349	35%	22 525	65%	Sep 07 [c]	1 785	5%	33 089	95%
Croatia	Dec 06 [e]	232	80%	59	20%	Dec 06 [e]	5	2%	286	98%
Cuba		…		…		Dec 07	17	1%	3 089	99%
Democratic People's Republic of Korea		…		…			…		…	
Democratic Republic of the Congo	Dec 06	8 397	48%	9 164	52%	Dec 06	527	3%	17 034	97%
Djibouti	Dec 07	343	49%	362	51%	Dec 07	25	4%	680	96%
Dominica	Dec 07 [c]	9	24%	28	76%	Dec 07	2	5%	37	95%
Dominican Republic	Dec 07 [c]	3 661	49%	3 803	51%	Dec 07	589	7%	7 610	93%
Ecuador		…		…		Dec 07	252	8%	2 962	92%
Egypt		…		…			…		…	
El Salvador	Dec 07 [c]	2 136	48%	2 315	52%	Dec 07 [c]	693	16%	3 758	84%
Equatorial Guinea		…		…			…		…	
Eritrea		…		…		Dec 07	65	5%	1 236	95%
Ethiopia	Dec 07	40 138	44%	50 074	56%	Dec 07	4 534	5%	85 678	95%
Fiji		…		…		Dec 07	1	4%	27	96%
Gabon	Dec 07	2 886	45%	3 487	55%	Dec 07	73	1%	6 300	99%
Gambia		…		…			…		…	
Georgia	Nov 07	239	72%	95	28%	Nov 07	15	4%	319	96%
Ghana		…		…		Dec 07	576	4%	12 781	96%
Grenada	Dec 07 [c]	24	53%	21	47%	Dec 07	2	4%	45	96%

Low- and middle-income countries[a]	Reported number of all males and females receiving antiretroviral therapy					Reported number of adults and children receiving antiretroviral therapy[b]				
	Month and year of report	Males	% of total	Females	% of total	Month and year of report[c]	Children (<15 years)	% of total	Adults (15+ years)	% of total
Guatemala		…		…		Dec 07	597	8%	7 215	92%
Guinea	Sep 07	2 296	44%	2 932	56%	Sep 07	307	6%	4 921	94%
Guinea-Bissau	Dec 07	321	36%	569	64%	Dec 07	41	5%	849	95%
Guyana	Dec 07	894	45%	1 071	55%	Dec 07	162	8%	1 803	92%
Haiti	Dec 07	6 240	43%	8 274	57%	Sep 06 [e]	439	5%	7 597	95%
Honduras		…		…		Dec 07	751	13%	4 829	87%
Hungary	Dec 07	381	84%	71	16%	Dec 07	7	2%	445	98%
India	Dec 07 [f]	73 061	64%	40 888	36%	Dec 07	8 887	7%	114 133	93%
Indonesia		…		…			…		…	
Iran (Islamic Republic of)	Aug 07	697	84%	132	16%	Aug 07	21	3%	808	97%
Iraq	Dec 07	0		0		Dec 07	0		0	
Jamaica		…		…		Sep 06 [e]	223	10%	2 122	90%
Jordan	Dec 07	42	79%	11	21%	Dec 07	4	8%	49	92%
Kazakhstan	Dec 07	283	64%	159	36%	Dec 07	71	16%	371	84%
Kenya	Dec 07	60 200	35%	111 800	65%	Dec 07	15 090	9%	156 910	91%
Kiribati		…		…			…		…	
Kyrgyzstan	Dec 07	67	77%	20	23%	Dec 07	26	30%	61	70%
Lao People's Democratic Republic	Dec 07	427	61%	273	39%	Dec 07	36	5%	664	95%
Latvia	Dec 06 [e]	181	60%	120	40%	Dec 06 [e]	14	5%	287	95%
Lebanon	Dec 07	192	78%	54	22%	Dec 07	9	4%	237	96%
Lesotho	Dec 07	7 582	35%	14 128	65%	Dec 07	1 553	7%	20 157	93%
Liberia		…		…			…		…	
Libyan Arab Jamahiriya		…		…			…		…	
Lithuania	Dec 07	81	83%	17	17%	Dec 07	1	1%	97	99%
Madagascar		…	…	…			…		…	
Malawi	Sep 07 [c]	51 204	39%	79 284	61%	Sep 07 [c]	10 238	8%	120 250	92%
Malaysia		…		…			…		…	
Maldives		…		…		Dec 06	0	0%	1	100%
Mali	Nov 07	4 369	36%	7 803	64%	Nov 07	579	5%	11 593	95%
Marshall Islands		…	…	…			…		…	
Mauritania	Dec 07	469	56%	370	44%	Dec 07	23	3%	816	97%
Mauritius		…		…			…		…	
Mexico		…		…			…		…	
Micronesia (Federated States of)		…		…			…		…	
Moldova	Dec 07	261	56%	203	44%	Dec 07	19	4%	445	96%
Mongolia	Dec 07	3	100%	0	0%	Dec 07	0	0%	3	100%
Montenegro	Dec 06 [c]	17	81%	4	19%	Dec 06	2	8%	24	92%
Morocco	Dec 07	867	53%	781	47%	Dec 07	58	4%	1 590	96%
Mozambique	Nov 07	32 990	38%	52 832	62%	Nov 07	6 320	7%	79 502	93%
Myanmar	Dec 07	6 634	60%	4 466	40%		…		…	
Namibia	Sep 07 [c,e]	13 783	35%	25 939	65%	Sep 07 [c,e]	5 283	13%	34 439	87%
Nauru		…		…			…		…	
Nepal	Sep 07	762	61%	478	39%	Sep 07	51	4%	1 189	96%
Nicaragua	Dec 07	336	64%	186	36%	Dec 07	45	9%	477	91%
Niger	Oct 07	723	49%	751	51%	Oct 07	62	4%	1 412	96%
Nigeria	Sep 07 [c]	40 643	38%	65 429	62%	Dec 07 [c]	15 345	20%	61 381	80%
Niue		…		…			…		…	
Oman	Dec 07	200	77%	60	23%	Jan 06 [e]	25	11%	200	89%
Pakistan	Dec 07	415	75%	135	25%	Dec 07	21	4%	529	96%
Palau	Dec 07	1	33%	2	67%	Dec 07	0	0%	3	100%
Panama		…		…		Sep 06 [e]	167	6%	2 726	94%

Low- and middle-income countries[a]	Reported number of all males and females receiving antiretroviral therapy					Reported number of adults and children receiving antiretroviral therapy[b]				
	Month and year of report	Males	% of total	Females	% of total	Month and year of report[c]	Children (<15 years)	% of total	Adults (15+ years)	% of total
Papua New Guinea	Dec 07	1 037	46%	1 213	54%	Dec 07	185	8%	2 065	92%
Paraguay	Nov 07 [c]	678	71%	271	29%	Nov 07	104	10%	949	90%
Peru		…		…		Dec 07 [c]	322	4%	7 721	96%
Philippines	Dec 07	134	40%	202	60%	Dec 07	4	1%	332	99%
Poland	Dec 07	2 392	71%	990	29%	Dec 07	118	3%	3 264	97%
Romania	Dec 07 [c]	3 231	50%	3 187	50%	Dec 07	196	3%	6 304	97%
Russian Federation		…		…		Jan 06 [e]	330	7%	4 520	93%
Rwanda	Dec 07	17 980	37%	30 089	63%	Dec 07	4 350	9%	43 719	91%
Saint Kitts and Nevis		…		…			…		…	
Saint Lucia	Sep 07	40	56%	32	44%	Sep 07	2	3%	70	97%
Saint Vincent and the Grenadines		…		…			…		…	
Samoa		…		…			…		…	
Sao Tome and Principe	Dec 07	27	36%	47	64%	Dec 07	2	3%	72	97%
Senegal	Dec 07	2 220	33%	4 479	67%	Dec 07	384	6%	6 315	94%
Serbia	Dec 06 [e]	360	60%	240	40%	Dec 06 [e]	14	2%	586	98%
Seychelles		…		…			…		…	
Sierra Leone		…		…			…		…	
Slovakia	Jun 07 [c]	79	82%	17	18%	Jun 07	0	0%	98	100%
Solomon Islands		…		…			…		…	
Somalia	Dec 07	86	41%	125	59%	Dec 07	5	2%	206	98%
South Africa	Sep 07 [c]	73 882	36%	130 401	64%	Sep 07 [c]	32 060	9%	339 671	91%
Sri Lanka		…		…			…		…	
Sudan		…		…			…		…	
Suriname		…		…		Dec 07	58	8%	650	92%
Swaziland	Jun 07 [e]	7 702	37%	12 908	63%	Dec 07	2 123	9%	22 412	91%
Syrian Arab Republic	Dec 07	57	76%	18	24%	Dec 07	4	5%	71	95%
Tajikistan	Dec 07	57	66%	29	34%	Dec 07	4	5%	82	95%
Thailand		…		…		Sep 07	6 687	5%	126 852	95%
The former Yugoslav Republic of Macedonia	Dec 07	4	27%	11	73%	Dec 07	1	7%	14	93%
Timor-Leste		…		…			…		…	
Togo	Dec 07	2 793	35%	5 187	65%	Dec 07	559	7%	7 421	93%
Tonga		…		…			…		…	
Tunisia	Dec 06	204	68%	94	32%	Dec 06	3	1%	295	99%
Turkey	Dec 06	519	76%	166	24%	Dec 06	5	1%	680	99%
Turkmenistan	Dec 06	0		0		Dec 06	0		0	
Tuvalu		…		…			…		…	
Uganda	Sep 07 [c]	30 943	37%	52 606	63%	Sep 07	8 532	8%	102 700	92%
Ukraine	Dec 07	4 111	54%	3 546	46%	Dec 07	908	12%	6 749	88%
United Republic of Tanzania	Sep 07 [c]	30 100	36%	53 346	64%	Dec 07 [e]	11 176	8%	124 520	92%
Uruguay		…		…		Sep 06	70	5%	1 355	95%
Uzbekistan		…		…			…		…	
Vanuatu		…		…			…		…	
Venezuela (Bolivarian Republic of)		…		…			…		…	
Viet Nam	Sep 07 [c]	6 872	76%	2 118	24%	Sep 07	789	5%	14 180	95%
Yemen	Dec 07	69	64%	38	36%	Dec 07	1	1%	106	99%
Zambia	Dec 07	65 648	44%	83 551	56%	Dec 07	11 602	8%	137 597	92%
Zimbabwe	Dec 07 [c]	32 377	38%	52 837	62%	Dec 07 [c]	8 237	10%	77 479	90%

... Data not available or not applicable.
a See country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions.
b More recent data on children receiving antiretroviral therapy, which were not reported as part of the breakdown by age group, are listed below:

Country	Month and year of report	Children (<15 years)
Bangladesh	Dec 06	1
Burkina Faso	Dec 07	658
Central African Republic	Dec 07	417
Colombia	Dec 07	3
Costa Rica	Dec 06	52
Democratic Republic of the Congo	Dec 07	1 632
Egypt	Dec 07	18
Gambia	Dec 06	83
Haiti	Dec 06	867
Indonesia	Dec 07	19
Jamaica	Sep 07	336
Liberia	Sep 07	92
Madagascar	Dec 06	0
Malawi	Dec 07	10 439
Malaysia	Dec 07	500
Mexico	Dec 06	176
Montenegro	Dec 07	1
Myanmar	Dec 06	287
Niger	Dec 07	104
Panama	Dec 06	214
Saint Lucia	Dec 07	2
Sierra Leone	Dec 06	12
Sri Lanka	Dec 06	0
Turkey	Dec 07	9
Uruguay	Dec 06	160
Uzbekistan	Dec 07	225
Venezuela (Bolivarian Republic of)	Dec 06	611

c The latest available breakdowns refer to partial or cumulative data sets and do not reflect national-level data. See Annex 1 for national-level data.
d This breakdown excludes 219 people whose sex is not recorded. See Annex 1 for national-level data.
e The latest available breakdowns are not as recent as the latest reported national-level data. See Annex 1 for the latest reported national-level data.
f This breakdown excludes 184 transgender adults and 8887 children (younger than 15 years).

Annex 3. Preventing mother-to-child transmission of HIV in low- and middle-income countries, 2007

Low- and middle-income countries[a]	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission[b]	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission[c]			Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on country report	Pregnant women tested for HIV		Infants born to women living with HIV receiving antiretrovirals for preventing mother-to-child transmission		Infants born to women living with HIV receiving co-trimoxazole prophylaxis within two months of birth		Infants born to women living with HIV receiving a virological test by two months of age	
			Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate		Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage
Afghanistan	0	Jan 07–Dec 07	...			...			...	0 [d]	0%	0 [d]		0 [d]		0 [d]	
Albania	…		...			...			...	...		...		...		...	
Algeria	19	Jan 07–Dec 07	<500	<200	660	...	3%	12%	0	...		...		...		...	
Angola	1 645	Jan 07–Dec 07	18 000	13 000	22 000	9%	7%	13%	22 332	57 605 [d]	7%	899 [d]	5%	...		...	
Argentina	2 193	Jan 07–Dec 07	1 700	1 200	2 400	...	93%	>95%	2 530	584 000 [d]	85%	50 [d]	3%	...		2 148 [d]	>95%
Armenia	6	Jan 07–Dec 07	<100	<100	<100	...	19%	45%	6	34 364	>95%	7	35%	0	0%	0	0%
Azerbaijan	6	Jan 07–Dec 07	<100	<100	<200	...	4%	17%	...	162 565	>95%	1	1%	2	3%	4	6%
Bangladesh	5	Jan 06–Dec 06	<500	<200	<500	...	1%	4%	...	0 [d]	0%	5 [d]	2%	5 [d]	2%	0 [d]	0%
Belarus	127	Jan 07–Dec 07	<100	<100	<200	...	90%	>95%	144	122 614	>95%	136	>95%	136	>95%	114 [d]	>95%
Belize	55	Jan 07–Dec 07	<200	<100	<500	...	24%	64%	57	6 345	91%	57	39%	9	6%	51	35%
Benin	1 830	Jan 07–Dec 07	4 500	3 900	5 300	40%	35%	47%	1 158	83 776	23%	984	22%	984	22%	...	
Bhutan	…		<100	<100	<100	...			...	2 244 [d]	19%	0 [d]		0 [d]		0 [d]	
Bolivia	34	Jan 07–Dec 07	<200	<200	<500	...	13%	24%	763	7 933 [e]	3%	28	15%	...		...	
Bosnia and Herzegovina	0	Jan 07–Dec 07	...			...			1	1 198	3%	0		0		0	
Botswana	12 419	Jan 07–Dec 07	11 000	10 000	12 000	>95%	>95%	>95%	...	35 970	77%	6 632	58%	9 489	83%	...	
Brazil	6 188	Jan 07–Dec 07	8 600	5 600	13 000	...	49%	>95%	12 535	2 473 604	66%	4 386	79%	...		2 626	47%
Bulgaria	1	Jan 07–Dec 07	...			...			...	...		...		...		...	
Burkina Faso	1 480	Jan 07–Dec 07	8 300	6 800	10 000	18%	15%	22%	18 495	61 628	10%	1 366	16%	...		68	1%
Burundi	1 102	Jan 07–Dec 07	7 800	5 100	10 000	14%	11%	22%	18 010	17 422 [d]	5%	814 [d]	10%	814 [d]	10%	0 [d]	0%
Cambodia	505	Jan 07–Dec 07	1 600	1 200	2 000	...	25%	41%	4 509	72 450	19%	517	33%	203	13%	43	3%
Cameroon	7 516 [f]	Jan 07–Dec 07	34 000	22 000	42 000	22%	18%	34%	67 875	200 000 [e]	31%	4 948	14%	1 030	3%	... [k]	
Cape Verde	51	Jan 07–Dec 07	...			...			99	6 097 [d]	41%	31 [d]		31 [d]		0 [d]	
Central African Republic	3 714 [f]	Jan 07–Dec 07	11 000	9 800	12 000	34%	30%	38%	36 093	25 517	16%	749	7%	443 [d]	4%	117	1%
Chad	254	Jan 06–Dec 06	18 000	10 000	22 000	1%	1%	2%	...	...		128 [d]	1%	63 [d]	0%	0 [d]	0%
Chile	117	Jan 07–Dec 07	<500	<500	500	...	23%	45%	117	...		...		...		...	
China	593 [g]	Jan 07–Dec 07	6 800	4 300	11 000	...	6%	14%	787	1 309 625 [g]	8%	683 [g]	10%	650 [d]	10%	...	

Colombia	144	Jan 07–Dec 07	2 500	1 600	3 700	...	4%	9%	184	145 404	16%	131	5%	...		65	3%
Comoros	0	Jan 07–Dec 07	<100	<100	<100	...	0%	0%	4	181 [d]	1%	0 [d]	0%	0 [d]	0%	0 [d]	0%
Congo	240	Jan 07–Dec 07	4 400	3 400	5 400	5%	4%	7%	1 617	5 549	4%	462	10%	462	10%	462	10%
Cook Islands	…		...			...			...	...		...		...		...	
Costa Rica	21	Jan 06–Dec 06	<200	<100	<500	...	9%	25%	37	61 000 [d]	76%	40 [d]	28%	40 [d]	28%	40 [d]	28%
Côte d'Ivoire	3 240 [f]	Jan 07–Dec 07	28 000	21 000	34 000	12%	9%	16%	21 977	48 574	7%	1 672	6%	...		...	
Croatia	2	Jan 07–Dec 07	...			...			3	...		...		...		...	
Cuba	41	Jan 07–Dec 07	<100	<100	<200	...	37%	>95%	35	112 434	93%	41	75%	1	2%	41	75%
Democratic People's Republic of Korea	…		<100	<100	<200	...			...	...		...		...		...	
Democratic Republic of the Congo	3 435	Jan 07–Dec 07	38 000	33 000	46 000	9%	8%	10%	68 865	130 009	4%	1 930	5%	170 [d]	0%	...	
Djibouti	52	Jan 06–Dec 06	820	610	1 000	6%	5%	9%	...	6 992 [d]	29%	52 [d]	6%	52 [d]	6%	...	
Dominica	1	Jan 07–Dec 07	...			...			1	1 224 [d]		2 [d]		2 [d]		0 [d]	
Dominican Republic	795	Jan 07–Dec 07	1 600	1 200	2 200	...	36%	65%	1 649	97 350	42%	872	53%	...		43	3%
Ecuador	268	Jan 07–Dec 07	<500	<500	800	...	34%	>95%	347	114 000 [d]	40%	251 [d]	54%	...		...	
Egypt	5	Jan 07–Dec 07	<200	<200	<500	...	2%	4%	...	1 750	0%	2	1%	2	1%	5	3%
El Salvador	130	Jan 07–Dec 07	650	<500	1 100	...	12%	32%	130	103 498	65%	5	1%	111	17%	116	18%
Equatorial Guinea	103	Jan 06–Dec 06	710	530	950	14%	11%	20%	...	6 300 [d]	33%	...		...		...	
Eritrea	168 [f]	Jan 07–Dec 07	2 500	1 600	4 000	7%	4%	11%	3 578	34 884 [e]	19%	133	5%	150 [e]	6%	0	0%
Ethiopia	4 888	Jan 07–Dec 07	66 000	58 000	74 000	7%	6%	8%	75 420	157 919	5%	3 031	5%	388 [d]	1%	94 [d]	0%
Fiji	7	Jan 07–Dec 07	<100	<100	<100	...	82%	>95%	7	5 [d]	0%	...		2 [d]	25%	...	
Gabon	494	Jan 07–Dec 07	2 300	1 600	3 500	21%	14%	32%	2 570	10 918	32%	248	11%	58 [h]	2%	... [h]	
Gambia	133 [f]	Jan 07–Dec 07	510	<500	800	...	17%	58%	709	15 686 [i]	26%	116 [i]	23%	...		0 [d]	0%
Georgia	22	Jan 07–Dec 07	<100	<100	<100	...	41%	>95%	25	49 805 [j]	>95%	23	>95%	21	91%	23	>95%
Ghana	2 896	Jan 07–Dec 07	14 000	12 000	16 000	21%	18%	24%	19 918	109 334 [i]	16%	263 [d]	2%	...		...	
Grenada	7	Jan 07–Dec 07	...			...			10	...		...		...		...	
Guatemala	373	Jan 07–Dec 07	5 300	3 200	8 100	...	5%	12%	2 270	45 549	10%	184 [k]	3%	171 [k]	3%	... [k]	
Guinea	679 [f]	Jan 07–Dec 07	6 200	5 000	8 600	11%	8%	14%	1 722	29 919	8%	364 [k]	6%	334 [k]	5%	4 [k]	0%
Guinea-Bissau	349	Jan 07–Dec 07	1 500	1 000	2 100	24%	17%	34%	3 716	6 886	8%	217 [d]	15%	0	0%	0 [d]	0%
Guyana	144	Jan 06–Dec 06	<500	<200	<500	...	29%	>95%	...	13 041 [d]	>95%	174 [d]	52%	90 [d]	27%	0 [d]	0%
Haiti	1 107	Jan 07–Dec 07	5 100	4 200	6 100	22%	18%	26%	5 224	110 114	41%	1 752	35%	...		...	
Honduras	220	Jan 07–Dec 07	650	<500	1 200	...	19%	79%	...	79 507	40%	6	1%	...		196	30%
Hungary	1	Jan 07–Dec 07	<100	<100	<100	...	2%	8%	1	...		...		...		...	
India	8 816	Jan 07–Dec 07	64 000	37 000	92 000	...	10%	24%	86 121	2 771 665 [i]	10%	5 043	8%	1 200 [d]	2%	...	
Indonesia	89	Jan 07–Dec 07	3 300	2 100	5 300	...	2%	4%	...	4 830	0%	25	1%	25	1%	18 [d]	1%
Iran (Islamic Republic of)	22	Sep 06–Sep 07	1 300	940	1 800	...	1%	2%	220	158	0%	22 [m]	2%	13 [m]	1%	19 [m]	1%
Iraq	…		...			...			...	...		...		...		...	

Low- and middle-income countries[a]	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission[b]	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission[c]			Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on country report	Pregnant women tested for HIV		Infants born to women living with HIV receiving antiretrovirals for preventing mother-to-child transmission		Infants born to women living with HIV receiving co-trimoxazole prophylaxis within two months of birth		Infants born to women living with HIV receiving a virological test by two months of age	
			Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate		Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage
Jamaica	292 [f]	Jan 07–Dec 07	<500	<500	640	...	45%	>95%	171	12 080 [n]	22%	162 [n]	37%	...		...	
Jordan	2	Jan 07–Dec 07	...			...			0	6	0%	1		0 [d]		4	
Kazakhstan	126	Jan 07–Dec 07	<200	<100	<500	...	30%	>95%	210	406 129	>95%	153	87%	130	74%	150	85%
Kenya	52 858 [f]	Jan 07–Dec 07	76 000	66 000	86 000	69%	61%	80%	105 000	428 624	30%	18 874	25%	4 534 [o]	6%	17 000	22%
Kiribati	…		...			...			...	...		...		...		...	
Kyrgyzstan	3	Jan 07–Dec 07	<100	<100	<200	...	2%	8%	197	59 794	53%	1	1%	...		...	
Lao People's Democratic Republic	24	Jan 07–Dec 07	<200	<100	<500	...	9%	36%	235	1 860	1%	17	14%	16	14%	0	0%
Latvia	37	Jan 07–Dec 07	<100	<100	<200	...	33%	75%	38	...		...		...		...	
Lebanon	…		<100	<100	<100	...			...	...		...		...		...	
Lesotho	3 966	Jan 07–Dec 07	12 000	11 000	14 000	32%	29%	36%	12 750	23 965	41%	2 767	22%	...		3 437	28%
Liberia	224	Jan 07–Dec 07	3 100	2 400	3 900	7%	6%	9%	...	9 318	5%	197	6%	112	4%	4	0%
Libyan Arab Jamahiriya	…		...			...			...	...		...		...		...	
Lithuania	9	Jan 07–Dec 07	<100	<100	<100	...	27%	>95%	10	...		...		...		...	
Madagascar	25	Jan 07–Dec 07	<500	<500	760	...	3%	9%	1 521	66 983 [d]	9%	4 [d]	1%	2 [d]	0%	2 [d]	0%
Malawi	23 158	Jan 07–Dec 07	73 000	64 000	82 000	32%	28%	36%	71 847	280 446	50%	12 039	17%	8 803	12%	2 435	3%
Malaysia	183	Jan 07–Dec 07	1 300	770	2 000	...	9%	24%	158	380 346	68%	177	14%	...		177	14%
Maldives	…		<100	<100	<100	...			...	4 438	63%	...		...		...	
Mali	1 018	Jan 07–Dec 07	8 600	6 800	11 000	...	10%	15%	8 570	48 019 [k]	8%	602 [i]	7%	195 [p]	2%	63 [i]	1%
Marshall Islands	…		...			...			...	...		...		...		...	
Mauritania	45	Jan 07–Dec 07	<500	<500	770	...	6%	20%	800	6 840 [k]	7%	21	5%	18	4%	0	0%
Mauritius	19	Jan 07–Dec 07	<200	<100	<500	...	6%	23%	60	...		...		...		...	
Mexico	146	Jan 06–Dec 06	3 100	2 000	4 900	...	3%	7%	...	...		146 [d]	5%	...		176 [d]	6%
Micronesia (Federated States of)	…		...			...			...	...		...		...		...	
Moldova	73	Jan 07–Dec 07	<100	<100	<200	...	51%	>95%	86	36 879	84%	77	93%	0	0%	65	78%
Mongolia	0	Jan 07–Dec 07	<100	<100	<100	...	0%	0%	13	...		0	0%	0	0%	0	0%
Montenegro	1	Jan 07–Dec 07	...			...			...	...		1		...		...	
Morocco	42	Jan 07–Dec 07	<500	<500	550	...	8%	18%	544	...		...		...		...	
Mozambique	44 975	Jan 07–Dec 07	97 000	81 000	120 000	46%	39%	56%	150 995	366 281	43%	26 708	27%	...		585	1%

Myanmar	1 280 [f]	Jan 07–Dec 07	4 500	2 900	7 100	...	18%	43%	...	99 789 [d]	11%	1 008 [d]	22%	...		...		
Namibia	6 022	Jan 06–Dec 06	9 400	7 600	11 000	64%	53%	80%	...	42 322 [d]	80%	6 400 [d]	68%	...		...		
Nauru	…		...			...			...	...		...		...		...		
Nepal	36	Oct 06–Sep 07	1 500	990	2 300	...	2%	4%	1 800	32 553	4%	34	2%	31	2%	0	0%	
Nicaragua	43	Jan 07–Dec 07	<200	<100	<500	...	15%	44%	174	27 741 [k]	20%	43 [k]	26%	43 [k]	26%	43 [k]	26%	
Niger	1 006 [f]	Jan 07–Dec 07	3 300	2 100	5 000	...	20%	47%	6 710	66 775	10%	278	9%	...		...		
Nigeria	12 278	Jan 07–Dec 07	190 000	130 000	240 000	7%	5%	10%	...	207 107	4%	4 259	2%	...		...		
Niue	…		...			...			...	...		...		...		...		
Oman	…		...			...			...	...		...		...		...		
Pakistan	5	Jan 07–Dec 07	2 300	1 500	3 700	...	<1%	<1%	...	3 249	0%	3	0%	0	0%	4	0%	
Palau	…		...			...			...	...		...		...		...		
Panama	71 [f]	Jan 07–Dec 07	<500	<500	510	...	14%	29%	377	...		153 [d]	44%	...		...		
Papua New Guinea	84	Jan 07–Dec 07	1 900	1 800	2 100	4%	3%	5%	3 621	7 153	4%	25 [d]	1%	60	3%	0	0%	
Paraguay	141 [f]	Jan 07–Dec 07	<500	<500	830	...	17%	57%	374	35 000 [d]	23%	86 [d]	19%	42 [d]	9%	54 [d]	12%	
Peru	502	Jan 07–Dec 07	1 300	890	1 800	...	28%	56%	...	284 923 [d]	49%	634 [d]	49%	...		...		
Philippines	1	Jan 07–Dec 07	<200	<200	<500	...	<1%	<1%	2	798 [q]	0%	1	1%	0	0%	0	0%	
Poland	63	Jan 07–Dec 07	<200	<100	<500	...	26%	85%	63	...		...		...		...		
Romania	68	Jan 07–Dec 07	<500	<200	<500	...	22%	42%	70	81 439	38%	78 [d]	29%	78	29%	156	59%	
Russian Federation	6 419	Jan 07–Dec 07	7 300	4 500	11 000	...	59%	>95%	...	3 895 308 [d]	>95%	...		...		...		
Rwanda	6 485 [f]	Jan 07–Dec 07	11 000	9 100	13 000	60%	51%	71%	...	212 501 [k]	51%	5 951 [k]	55%	...		2 564	24%	
Saint Kitts and Nevis	…		...			...			...	...		...		...		...		
Saint Lucia	11	Jan 07–Dec 07	...			...			14	...		...		...		...		
Saint Vincent and the Grenadines	…		...			...			...	...		...		...		...		
Samoa	…		...			...			...	...		...		...		...		
Sao Tome and Principe	22	Jan 07–Dec 07	...			...			90	5 492	>95%	24		3 [d]		...		
Senegal	264	Jan 07–Dec 07	4 400	3 000	6 300	...	4%	9%	385	22 770 [d]	5%	...		...		...		
Serbia	2	Jan 06–Dec 06	<100	<100	<200	...	2%	5%	...	7 500 [d]	6%	2 [d]	3%	0 [d]	0%	2 [d]	3%	
Seychelles	…		...			...			...	...		...		...		...		
Sierra Leone	919	Jan 07–Dec 07	4 400	3 100	6 200	21%	15%	29%	520	52 258	20%	216	5%	66	2%	0	0%	
Slovakia	…		...			...			...	...		...		...		...		
Solomon Islands	…		...			...			...	...		...		...		...		
Somalia	11	Jan 07–Dec 07	940	510	1 700	...	<1%	2%	2 865	...		...		...		0 [d]	0%	
South Africa	127 164 [f]	Jan 07–Dec 07	220 000	180 000	260 000	57%	49%	69%	290 000	707 948 [d]	64%	89 962 [d]	41%	...		...		
Sri Lanka	1	Jan 06–Dec 06	<100	<100	<100	...	1%	3%	55	3 200 [d]	1%	1 [d]	2%	1 [d]	2%	0 [d]	0%	
Sudan	9 [r]		18 000	12 000	26 000	<1%	<1%	<1%	...	1 608	0%	2	0%	14	0%	0	0%	
Suriname	35	Jan 06–Dec 06	<200	<100	<200	...	18%	57%	...	7 156 [d]	80%	...		...		...		

Low- and middle-income countries[a]	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission[b]	Period	Estimated number of pregnant women living with HIV needingantiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission[c]			Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on country report	Pregnant women tested for HIV		Infants born to women living with HIV receiving antiretrovirals for preventing mother-to-child transmission		Infants born to women living with HIV receiving co-trimoxazole prophylaxis within two months of birth		Infants born to women living with HIV receiving a virological test by two months of age	
			Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate		Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage
Swaziland	8 772	Jan 07–Dec 07	13 000	12 000	15 000	67%	60%	74%	13 178	33 838	>95%	7 376	56%	725 [d]	6%	2 517	19%
Syrian Arab Republic	0	Jan 07–Dec 07	...			...			...	4	0%	0		0		1	
Tajikistan	9	Jan 07–Dec 07	<200	<100	<500	...	2%	11%	438	19 893	11%	9	5%	1	1%	1	1%
Thailand	9 352	Jan 07–Dec 07	10 000	6 400	15 000	...	62%	>95%	6 196	794 406 [s]	85%	6 196 [s]	61%	...		...	
The former Yugoslav Republic of Macedonia	…		...			...			...	...		0		...		...	
Timor-Leste	2	Jan 07–Dec 07	...			...			...	...		...		...		...	
Togo	705	Jan 07–Dec 07	8 000	6 300	10 000	9%	7%	11%	10 329	20 553	8%	749	9%	488	6%	0	0%
Tonga	…		...			...			...	...		...		...		...	
Tunisia	1	Jan 07–Dec 07	<100	<100	<100	...	1%	3%	...	110	0%	1	2%	0	0%	1	2%
Turkey	4	Jan 06–Dec 06	...			...			...	2 070 [d]	0%	4 [d]		0 [d]		0 [d]	
Turkmenistan	0	Jan 06–Dec 06	...			...			...	...		0 [d]		0 [d]		0 [d]	
Tuvalu	…		...			...			...	...		...		...		...	
Uganda	26 484	Jan 07–Dec 07	78 000	68 000	92 000	34%	29%	39%	91 000	476 994	34%	13 914	18%	...		5 437	7%
Ukraine	3 046	Jan 07–Dec 07	5 200	3 800	6 700	...	45%	79%	3 293	624 000	>95%	3 325	63%	3 325	63%	5 605	>95%
United Republic of Tanzania	31 863	Jan 07–Dec 07	100 000	91 000	110 000	32%	29%	35%	114 800	519 287 [i]	33%	21 093 [i]	21%	...		...	
Uruguay	53	Jan 06–Dec 06	<200	<100	<500	...	20%	76%	...	...		68 [d]	51%	70 [d]	52%	70 [d]	52%
Uzbekistan	95	Jan 07–Dec 07	<500	<200	840	...	11%	68%	...	58 063	9%	120	38%	...		...	
Vanuatu	…		...			...			...	...		...		...		...	
Venezuela (Bolivarian Republic of)	310	Jan 06–Dec 06	2 300	1 300	4 600	...	7%	24%	...	...		...		...		...	
Viet Nam	744	Oct 06–Sep 07	3 900	2 400	6 400	...	12%	31%	5 352	138 682	8%	705 [d]	18%	...		...	
Yemen	2	Jan 07–Dec 07	...			...			...	800	0%	2		0		0	
Zambia	35 314	Jan 07–Dec 07	76 000	68 000	86 000	47%	41%	52%	90 252	306 451	65%	15 631	21%	11 884	16%	7 664	10%
Zimbabwe	15 381	Jan 07–Dec 07	52 000	48 000	57 000	29%	27%	32%	16 769	130 429	35%	14 693	28%	9 975	19%	375 [h]	1%

... Data not available or not applicable.
a See country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions.
b Most countries have reported data for a full 12-month period in 2006 or 2007. For the countries with data reported for a period of less than 12 months in 2007, the values are projected to a 12-month period, based on the monthly value (see footnote f). Fifteen countries reported data for 2006. They reflect a 12-month period and the values are therefore not projected.
c The coverage estimates are based on the numbers of pregnant women living with HIV receiving antiretrovirals and the estimated unrounded need for antiretrovirals (based on UNAIDS/WHO methods). The point estimates and ranges are given for countries with a generalized epidemic, whereas only ranges are given for countries with a low or concentrated epidemic.
d The latest reported data are to December 2006.
e Data reported for the period January 2007–October 2007.
f Data were reported from January 2007 but not for the full year to December. The projection to a 12-month period is based on the monthly value (see the table below for the reported values).

Countries for which the numbers of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission are projected

Country	Period	Reported value
Cameroon	Jan 07–Oct 07	6 263
Central African Republic	Jan 07–Jun 07	1 857
Côte d'Ivoire	Jan 07–Jul 07	1 890
Eritrea	Jan 07–Oct 07	140
Gambia	Jan 07–Sep 07	100
Guinea	Jan 07–Sep 07	509
Jamaica	Jan 07–Jun 07	146
Kenya	Jan 07–Jun 07	26 429
Myanmar	Jan 07–Oct 07	1 067
Niger	Jan 07–Jun 07	503
Panama	Jan 07–Sep 07	53
Paraguay	Jan 07–Nov 07	129
Rwanda	Jan 07–Nov 07	5 945
South Africa	Jan 07–Sep 07	95 373

g From 271 programme counties, January–September 2007.
h Data reported for the period September–December 2007.
i Data reported for the period January–September 2007.
j Source: Vishnevskaya-Rostropovich Foundation.
k Data reported for the period January–November 2007.
l Does not include social services and private sector.
m Data reported for the period March 2006–February 2007.
n Data reported for the period January–June 2007.
o Data reported for the period April–September 2007.
p Data reported for the period January–August 2007.
q Data reported for the period July–December 2007.
r Northern Sudan reported 3 for the period August–December 2007, and southern Sudan reported 6 for the period January–December 2007, giving a total of 9.
s Data reported for the period October 2006–September 2007. Adjusted data.

Annex 4. Estimated numbers of people receiving and needing antiretroviral therapy and antiretrovirals for preventing mother-to-child transmission and coverage percentages in low- and middle-income countries by WHO and UNICEF regions, 2007

	Estimated number of people receiving antiretroviral therapy, December 2007 (range)[a]	Estimated number of people needing antiretroviral therapy, 2007 (range)[b]	Antiretroviral therapy coverage, December 2007 (range)[c]	Reported number of children younger than 15 years receiving antiretroviral therapy, 2007	Number of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, December 2007	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission, 2007 (range)[b]	Estimated percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2007 (range)[c]
WHO							
African Region	2 120 000 [1 925 000–2 315 000]	7 000 000 [6 250 000–7 900 000]	30% [27–34%]	158 008	446 000	1 300 000 [1 200 000-1 400 000]	34% [32–37%]
Region of the Americas	390 000 [350 000–430 000]	630 000 [550 000–770 000]	62% [51–70%]	16 571	13 000	36 000 [30 000–45 000]	36% [29–43%]
Eastern Mediterranean Region	7 500 [6 800–8 200]	150 000 [110 000–190 000]	5% [4–7%]	194	<200	24 000 [17 000–33 000]	1% [<1%]
European Region	55 000 [51 000–57 000]	320 000 [240 000–440 000]	17% [13–23%]	2 053	10 000	14 000 [11 000–19 000]	71% [53–91%]
South-East Asia Region	330 000 [290 000–370 000]	1 300 000 [1 000 000–1 700 000]	25% [19–33%]	15 932	20 000	84 000 [54 000–120 000]	24% [17–37%]
Western Pacific Region	89 000 [84 000–94 000]	320 000 [240 000–440 000]	28% [20–37%]	4 822	2 100	16 000 [12 000–21 000]	13% [10–18%]
All low- and middle-income countries	2 990 000 [2 700 000–3 280 000]	9 700 000 [8 700 000–11 000 000]	31% [27–34%]	197 580	491 000	1 500 000 [1 400 000–1 600 000]	33% [31–35%]
UNICEF							
Sub-Saharan Africa	2 120 000 [1 925 000–2 315 000]	7 000 000 [6 250 000–7 900 000]	30% [27–34%]	157 968	446 000	1 300 000 [1 200 000–1 400 000]	34% [32–37%]
Eastern and Southern Africa	1 690 000 [1 560 000–1 820 000]	5 300 000 [4 700 000–6 000 000]	32% [28–36%]	132 427	403 000	930 000 [860 000–1 000 000]	43% [40–47%]
West and Central Africa	430 000 [370 000–490 000]	1 700 000 [1 400 000–2 100 000]	25% [20–31%]	25 541	43 000	390 000 [320 000–450 000]	11% [10–13%]
Latin America and the Caribbean	390 000 [350 000–430 000]	630 000 [550 000–770 000]	62% [51–70%]	16 571	13 000	36 000 [30 000–45 000]	36% [29–43%]
East Asia and the Pacific	260 000 [230 000–290 000]	700 000 [570 000–870 000]	37% [30–46%]	11 815	13 000	34 000 [27 000–44 000]	38% [30–48%]
South Asia	160 000 [140 000–180 000]	950 000 [670 000–1 300 000]	17% [12–24%]	8 960	8 900	69 000 [40 000–97 000]	13% [9–22%]
Middle East and North Africa	7 700 [7 000–8 400]	130 000 [93 000–160 000]	6% [5–8%]	213	<200	21 000 [15 000–29 000]	1% [<1%]
Central and Eastern Europe and the Commonwealth of Independent States[d]	50 000 [47 000–53 000]	310 000 [230 000–420 000]	16% [12–22%]	1 913	10 000	14 000 [10 000–18 000]	71% [56–>95%]
All low- and middle-income countries	2 990 000 [2 700 000–3 280 000]	9 700 000 [8 700 000–11 000 000]	31% [27–34%]	197 440	491 000	1 500 000 [1 400 000-1 600 000]	33% [31–35%]

Note: some groups do not add up to the total due to rounding.
a Data on children – when available – are included.
b For an explanation of the methods used, see the explanatory notes for annexes.
c The coverage estimate is based on the estimated numbers of people receiving and needing antiretroviral therapy. Ranges around the levels of coverage are based on the uncertainty ranges around the estimates of need.
d UNICEF classifies five low- and middle-income countries (Hungary, Latvia, Lithuania, Poland and Slovakia) as industrialized countries, and their values are not included in these totals.

Classification of low- and middle-income countries by income level, epidemic level and geographical, UNAIDS, UNICEF and WHO regions

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Afghanistan	Low income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	Eastern Mediterranean Region
Albania	Lower middle income	Low	Europe and Central Asia	Western and Central Europe	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Algeria	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	African Region
Angola	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Argentina	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Armenia	Lower middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Azerbaijan	Lower middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Bangladesh	Low income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Belarus	Lower middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Belize	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Benin	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Bhutan	Lower middle income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Bolivia	Lower middle income	Low	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Bosnia and Herzegovina	Lower middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Botswana	Upper middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Brazil	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Bulgaria	Upper middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Burkina Faso	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Burundi	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Cambodia	Low income	Concentrated	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	Western Pacific Region
Cameroon	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Cape Verde	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Central African Republic	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Chad	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Chile	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
China	Lower middle income	Concentrated	East, South and South-East Asia	East Asia	East Asia and the Pacific	Western Pacific Region
Colombia	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Comoros	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Congo	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Cook Islands	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Costa Rica	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Côte d'Ivoire	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Croatia	Upper middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Cuba	Lower middle income	Low	Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Democratic People's Republic of Korea	Not a World Bank member	Low	East, South and South-East Asia	East Asia	East Asia and the Pacific	South-East Asia Region
Democratic Republic of the Congo	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Djibouti[a]	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Middle East and North Africa	Eastern Mediterranean Region
Dominica	Upper middle income		Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Dominican Republic	Lower middle income	Concentrated	Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Ecuador	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Egypt	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
El Salvador	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Equatorial Guinea	Upper middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Eritrea	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Ethiopia	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Fiji	Lower middle income	Low	Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Gabon	Upper middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Gambia	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Georgia	Lower middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Ghana	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Grenada	Upper middle income		Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Guatemala	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Guinea	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Guinea-Bissau	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Guyana	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Haiti	Low income	Generalized	Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Honduras	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Hungary	Upper middle income	Low	Europe and Central Asia	Western and Central Europe	Industrialized countries	European Region
India	Low income	Concentrated	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Indonesia	Lower middle income	Concentrated	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	South-East Asia Region
Iran (Islamic Republic of)	Lower middle income	Low	East, South and South-East Asia	South and South-East Asia	Middle East and North Africa	Eastern Mediterranean Region
Iraq	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Jamaica	Lower middle income	Concentrated	Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Jordan	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Kazakhstan	Upper middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Kenya	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Kiribati	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Kyrgyzstan	Low income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Lao People's Democratic Republic	Low income	Low	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	Western Pacific Region
Latvia	Upper middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Industrialized countries	European Region

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Lebanon	Upper middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Lesotho	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Liberia	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Libyan Arab Jamahiriya	Upper middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Lithuania	Upper middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Industrialized countries	European Region
Madagascar	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Malawi	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Malaysia	Upper middle income	Concentrated	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	Western Pacific Region
Maldives	Lower middle income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Mali	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Marshall Islands	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Mauritania	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Mauritius	Upper middle income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Mexico	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Micronesia (Federated States of)	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Moldova	Lower middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Mongolia	Low income	Low	East, South and South-East Asia	East Asia	East Asia and the Pacific	Western Pacific Region
Montenegro	Upper middle income	Low	Europe and Central Asia	Western and Central Europe	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Morocco	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Mozambique	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Myanmar	Low income	Concentrated	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	South-East Asia Region
Namibia	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Nauru	Not a World Bank member		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Nepal	Low income	Concentrated	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Nicaragua	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Niger	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Nigeria	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Niue	Not a World Bank member		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Oman	Upper middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Pakistan	Low income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	Eastern Mediterranean Region
Palau	Upper middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Panama	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Papua New Guinea	Low income	Generalized	East, South and South-East Asia	Oceania	East Asia and the Pacific	Western Pacific Region
Paraguay	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Peru	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Philippines	Lower middle income	Low	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	Western Pacific Region

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Poland	Upper middle income	Concentrated	Europe and Central Asia	Western and Central Europe	Industrialized countries	European Region
Romania	Upper middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Russian Federation	Upper middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Rwanda	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Saint Kitts and Nevis	Upper middle income		Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Saint Lucia	Upper middle income		Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Saint Vincent and the Grenadines	Upper middle income		Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Samoa	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Sao Tome and Principe	Low income		Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Senegal	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Serbia	Upper middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Seychelles	Upper middle income		Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Sierra Leone	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Slovakia	Upper middle income	Low	Europe and Central Asia	Western and Central Europe	Industrialized countries	European Region
Solomon Islands	Low income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Somalia	Low income	Concentrated	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	Eastern Mediterranean Region
South Africa	Upper middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Sri Lanka	Lower middle income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Sudan	Low income	Generalized	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Suriname	Lower middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Swaziland	Lower middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Syrian Arab Republic	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Tajikistan	Low income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Thailand	Lower middle income	Concentrated	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	South-East Asia Region
The former Yugoslav Republic of Macedonia	Lower middle income	Low	Europe and Central Asia	Western and Central Europe	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Timor-Leste	Low income	Low	East, South and South-East Asia	East, South and South-East Asia	East Asia and the Pacific	South-East Asia Region
Togo	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Tonga	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Tunisia	Lower middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Turkey	Upper middle income	Low	Middle East and North Africa	Middle East and North Africa	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Turkmenistan	Lower middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Tuvalu	Not a World Bank member		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Uganda	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Ukraine	Lower middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
United Republic of Tanzania	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Uruguay	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Uzbekistan	Low income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Vanuatu	Lower middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Venezuela (Bolivarian Republic of)	Upper middle income	Concentrated	Latin America and the Caribbean	Latin America	Latin America and Caribbean	Region of the Americas
Viet Nam	Low income	Concentrated	East, South and South-East Asia	South and South-East Asia	East Asia and the Pacific	Western Pacific Region
Yemen	Low income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Zambia	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Zimbabwe	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region

a For the analysis throughout the report, values for Djibouti have been included in sub-Saharan Africa based on UNAIDS classification, while UNICEF and WHO classify Djibouti under Middle East and North Africa, and Eastern Mediterranean Region respectively.

STATISTICAL ANNEXES: EXPLANATORY NOTES

Data collection and validation

Annexes 1–3 present country data related to two priority health sector interventions for HIV: antiretroviral therapy and the prevention of mother-to-child transmission.

The data presented in these annexes were collected through three international monitoring and reporting processes.

1) Health sector response to HIV/AIDS (WHO)

At the Fifty-ninth World Health Assembly in 2006, countries mandated WHO to monitor and report annually on the global health sector response to HIV/AIDS in recognition of the fundamental importance of the health sector in achieving universal access. WHO sent an annual questionnaire to its regional and country offices in the fourth quarter of 2007 to collect data on key indicators related to the availability, coverage and impact of priority health sector interventions for HIV *(1)*. Annexes 1–3 present data on selected interventions received from 143 countries by April 2008.

2) Prevention of mother-to-child transmission and HIV care and treatment for children (Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children)

Since 2004, UNICEF and WHO, on behalf of the Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children (see Box 5.1), have been jointly tasked with collecting national data to track progress towards goals for preventing mother-to-child transmission and HIV care and treatment for children *(2)*. An annual reporting form (Report Card on Prevention of Mother-to-Child Transmission of HIV and Paediatric HIV Care and Treatment in Low- and Middle-income Countries) was sent to UNICEF and WHO country offices in December 2007, to facilitate data collection in collaboration with national governments and other in-country implementing partners. By April 2008, 109 low- and middle-income countries had provided data.

3) Declaration of Commitment on HIV/AIDS (UNAIDS)

With the adoption of the Declaration of Commitment on HIV/AIDS by the United Nations General Assembly Special Session on HIV/AIDS in 2001, countries committed to providing a progress report to the General Assembly every two years. The UNAIDS Secretariat facilitates this reporting and develops regular reports for submission to the Secretary-General of the United Nations. As of March 2008, 147 countries had submitted country progress reports to UNAIDS based on international guidelines on the construction of core indicators *(3)*.

All three processes are linked through common indicators and a harmonized timeline for reporting. To facilitate collaboration at the country level, the country offices of WHO, UNICEF and UNAIDS worked jointly with national counterparts and partner agencies to collate and validate data in a single collaborative consultation process.

In addition, an international data reconciliation meeting was organized in February 2008 to review and validate data reported to WHO, UNICEF, the UNAIDS Secretariat, the Global Fund to Fight AIDS, Tuberculosis and Malaria, the United States President's Emergency Plan for AIDS Relief and MEASURE DHS (a project of demographic and health surveys supported by the United States Agency for International Development). When discrepancies were identified between data reported to the different organizations, follow-up letters were sent to UNAIDS, UNICEF and WHO country offices to liaise with national authorities to seek clarification and resolve the discrepancies. The analysis discussed in this report uses reconciled data values.

Explanatory notes for Annexes 1 and 2

Annexes 1 and 2 present country data on access to antiretroviral therapy.

Annex 1 provides country-specific data on the scaling up of antiretroviral therapy at the national level for all age groups in 149 low- and middle-income countries.

Annex 2 provides data on access to antiretroviral therapy disaggregated by sex and by age (adults constituting the age group 15 years and older and children constituting the age group younger than 15 years). For most countries, this disaggregation relates only to the public sector. Data on the number of children receiving antiretroviral therapy are available for 128 countries. For 27 of these 128 countries, more recent data on the number of children receiving antiretroviral therapy (which were not reported as part of the data breakdown by age group) were also available. Annex 2 includes these data (footnote b).

Number of people receiving antiretroviral therapy

This report provides the most recent reported data on the number of people receiving antiretroviral therapy and the estimated number of people receiving antiretroviral therapy in December 2007 in low- and middle-income countries. The report also presents the most recent reported data on the number of people receiving antiretroviral therapy in high-income countries.

The reported data were compiled from the most recent reports (see above) received by WHO and/or UNAIDS from health ministries or from other reliable sources in the countries, such as bilateral partners, foundations and nongovernmental agencies that are major providers of treatment services. WHO and UNAIDS work with countries to obtain as many facility-specific data as possible on the numbers of people receiving treatment.

The estimated number of people receiving antiretroviral therapy at the end of 2007 is derived through two processes: projections to the end of the year for countries that did not report data for December 2007 and analysis of the uncertainty related to these data.

End-of-year estimates are based on simple linear projections of reported numbers, using monthly increases to indicate growth. Of the 149 low- and middle-income countries, 104 countries provided data for December 2007 and hence no projections were necessary. Twenty-two countries provided updates for September 2007 or later, and hence projections of 1–3 months were made to December 2007. Together these 126 countries represent 96% of the total estimated number of people receiving antiretroviral therapy as of December 2007 in low- and middle-income countries. Among the remaining countries, five provided updates for a month between May and August 2007, and the data were extrapolated to December 2007. For 14 countries, data were available only for 2006 and, for one country, only for 2005. Projections were made for only nine of these countries (insufficient data were available for the other five countries). No data were available from four countries.

No projections to December 2007 were made for high-income countries because of the lack of an adequate number of recent data points on which to base extrapolation.

Estimating the number of people receiving antiretroviral therapy involves some uncertainty for countries that have not yet established regular reporting systems that can capture data on people who initiate treatment for the first time, rates of adherence among people who receive treatment, people who discontinue treatment, people lost to follow-up and deaths. A particular source of uncertainty is that, in some cases, country-reported figures do not distinguish between people who have ever started antiretroviral therapy and those who are still receiving it (continuing to pick up their medicine). The difference between the two numbers reflects discontinuation of treatment, losses to follow-up and mortality.

Uncertainty may also arise because of the difficulty in measuring the extent of treatment provision in the private sector. Many people receive treatment through local pharmacies and private clinics that do not report through official channels. Private companies may have programmes to support the provision of treatment to workers with advanced HIV disease, but in some cases the data relating to these programmes are not reported to the public health authorities.

Because of such uncertainties involved in estimating the overall number of people receiving antiretroviral therapy in a country, Annex 1 indicates uncertainty ranges around the estimates derived for December 2007. For reported data on the number of people receiving antiretroviral therapy through the public sector, uncertainty ranges from 5% to 25% have been used, depending on the strength of the monitoring system and the comprehensiveness of the reported data *(4)*. The same ranges have been used for countries reporting data on the public and private sectors combined. For data on the number of people receiving antiretroviral therapy through the private sector, which were reported separately in some countries, uncertainty ranges from 10% to 40% have been used. Annex 1 provides private-sector data in a table in the footnotes.

Annex 1 also presents an update of data on the number of people receiving antiretroviral therapy in 2006 published in the previous progress report *(5)* as more recent reported treatment data for December 2006 became available through the interagency data reconciliation process in 2007 described above. The updated global number of people receiving antiretroviral therapy at the end of 2006 is therefore 2 040 000 [1 850 000–2 230 000] instead of 2 015 000 [1 795 000–2 235 000] as previously published.

Estimating treatment need

UNAIDS and WHO have developed a standard method for estimating the size and course of the HIV epidemic, including estimates of the number of people living with HIV, new HIV infections, deaths attributable to AIDS and treatment need *(6,7)*.

The number of people who need antiretroviral therapy in a country is estimated using statistical modelling methods that include all people who meet criteria for initiating treatment, whether or not these people know their HIV status and their eligibility for antiretroviral therapy (see Box 2.1).

WHO recommends that, in resource-limited settings, adults and children living with HIV should start antiretroviral therapy when the infection has been confirmed and there are signs of clinically advanced disease *(6–8)*. The number of adults with advanced HIV infection who should start treatment is estimated based on the assumption that the average time from HIV seroconversion to eligibility for antiretroviral therapy is eight years and, without antiretroviral therapy, the average time from eligibility to death is about three years. These parameters were revised in 2007: the previous estimates were based on the assumption of seven years from seroconversion to eligibility and two years from eligibility to death in absence of treatment.

The total number of people needing antiretroviral therapy is calculated by adding the estimated number of people eligible for antiretroviral therapy to the number who were receiving treatment in the previous year and survived into the current year.

Annex 1 provides country estimates of treatment need in 2007 based on standard UNAIDS/WHO methods, including uncertainty ranges.[1] Some countries have developed their own methods of estimating the number of people who need antiretroviral therapy, which could differ from estimates derived using UNAIDS/WHO methods. It is not always clear how these country estimates have been generated. For example, in some cases they are based only on registered HIV cases and therefore do not account for people with HIV who are unaware of their HIV status. Annex 3 presents country-generated estimates of need based on individual country methods, but these are not aggregated and are not used for calculating and analysing regional and global coverage.

Antiretroviral therapy coverage

The estimates of antiretroviral therapy coverage presented in Annex 1 were calculated by dividing the estimated number of people receiving antiretroviral therapy as of December 2007 by the number of people estimated to need treatment in 2007 (based on UNAIDS/WHO methods). Ranges around the levels of coverage are based on the uncertainty ranges around the estimates of need *(10)*. When need is less than 500 people, no point estimate for coverage is provided.

Explanatory notes for Annex 3

Prevention of mother-to-child transmission

Annex 3 provides data on indicators collected through the 2007 Report Card on Prevention of Mother-to-Child Transmission of HIV and Paediatric HIV Care and Treatment in Low- and Middle-income Countries.[2]

Number of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission

The number of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission is based on national programme data aggregated from facilities or other service delivery sites and as reported by the country. Of 149 low- and middle-income countries, 91 countries reported data for the full calendar year in 2007, 15 countries for the full calendar year in 2006 and 3 countries for a 12-month period but not from January to December. Fourteen countries reported data from January 2007 but not for the full year to December. For these 14 countries, simple linear projections of reported numbers were calculated based on the monthly value. The data for Sudan comprise the data for northern and southern Sudan, which reported for different reporting periods. Twenty-five countries did not report data.

Estimating the number of pregnant women living with HIV who need antiretrovirals for preventing mother-to-child transmission

The number of pregnant women living with HIV who need antiretroviral medicine for preventing mother-to-child transmission is estimated using standardized statistical modelling based on UNAIDS/WHO methods that consider various epidemic and demographic parameters and national programme coverage of antiretroviral therapy in the country (such as HIV prevalence among women of reproductive age, effect of HIV on fertility and antiretroviral therapy coverage).[3] These statistical modelling procedures are used to derive a comprehensive population-based estimate of the number of all pregnant women living with HIV who need antiretrovirals for preventing mother-to-child transmission in the country.

Similar to the estimates on antiretroviral therapy need presented in Annex 1, Annex 3 presents uncertainty ranges around the estimated population needing antiretrovirals to prevent mother-to-child transmission of HIV and, accordingly, the coverage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission.

Coverage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission

The coverage of antiretrovirals for preventing mother-to-child transmission of HIV is calculated by dividing the number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission of HIV by the estimated number of pregnant women living with HIV who need antiretrovirals for preventing mother-to-child transmission in the country.

Estimates of coverage are based on the standardized estimates of pregnant women living with HIV who need antiretrovirals for preventing mother-to-child transmission derived using UNAIDS/WHO methods. Ranges around the levels of coverage are based on the uncertainty ranges around the estimates of need. Point estimates and ranges are given for countries with a generalized epidemic, whereas only ranges are given for countries with a concentrated epidemic. In general, the uncertainty around the estimates of need for preventing mother-to-child transmission in countries with a concentrated epidemic does not allow for releasing point estimates. See the classification of countries by level of income, HIV epidemic and geographical distribution for further information.

1 Revised estimates of antiretroviral therapy coverage in 2006 (based on updated parameters for estimating treatment need) are published in *World health statistics 2008 (9)*.
2 Data for 2004–2006 collected through the same process are also published in other reports *(11–13)*.
3 The reports of the UNAIDS Reference Group on Estimates, Modelling and Projections *(14)* provide further information on this method.

Some countries have developed their own methods of estimating the number of pregnant women living with HIV who need antiretroviral medicine to prevent mother-to-child transmission, which could differ from estimates derived using UNAIDS/WHO methods. It is not always clear how these specific country estimates have been generated. In some cases, they are based only on pregnant women attending antenatal care or maternal health services and therefore do not account for pregnant women who are unaware of their HIV status. Annex 3 presents country estimates of need based on individual country methods, but these are not aggregated and are not used for calculating and analysing regional and global coverage.

In addition, Annex 3 also presents data on the following indicators:

- the number and percentage of pregnant women tested for HIV
- the number and percentage of infants born to women living with HIV receiving antiretrovirals for preventing mother-to-child transmission;
- the number and percentage of infants born to women living with HIV receiving co-trimoxazole within two months of birth; and
- the number and percentage of infants born to women living with HIV receiving a virological test by two months.

Explanatory notes on the classification of countries by income, HIV epidemic level and geographical region

Classification by income

Unless stated otherwise, all data analysis in this report is based on data from 149 countries classified as low and middle income by the World Bank as of July 2007 *(15)*.

Economies are classified as low, middle or high income according to gross national income per capita in 2007, calculated using the World Bank Atlas method (to reduce the effect of exchange-rate fluctuation). The groups are: low income, US $905 or less; lower-middle income, US$ 906 to US$ 3595; upper-middle income, US$ 3596 to US$ 11 115; and high income, US$ 11 116 or more.

Classification by HIV epidemic level

HIV epidemics are categorized as generalized, low and concentrated based on the following numerical proxies:

- generalized epidemics: HIV prevalence consistently exceeds 1% among pregnant women;
- low-level epidemics: HIV prevalence has not consistently exceeded 5% in any defined subpopulation; and
- concentrated epidemics: HIV prevalence consistently exceeds 5% in at least one defined subpopulation and the HIV prevalence is below 1% among pregnant women in urban areas.

Classification by geographical region

This report presents data on 149 low- and middle-income countries by geographical region. The geographical regions are based on UNAIDS regions.[4] East, South and South-East Asia combines two UNAIDS regions as does Latin America and the Caribbean. The 149 countries are therefore categorized as follows: sub-Saharan Africa ($n = 47$); Latin America and the Caribbean ($n = 29$); East, South and South-East Asia ($n = 21$); Eastern Europe and Central Asia ($n = 25$); and the Middle East and North Africa ($n = 13$). In Oceania ($n = 14$), only Fiji and Papua New Guinea reported data. For this report, the values for Oceania are included in East, South and South-East Asia.

WHO has 193 Member States grouped in six regions, and 149 WHO Member States are low- and middle-income countries: WHO African Region ($n = 46$); WHO Region of the Americas ($n = 29$); WHO Eastern Mediterranean Region ($n = 16$); WHO European Region ($n = 26$); WHO South-East Asia Region ($n = 11$); and WHO Western Pacific Region ($n = 21$)). Annex 1 lists the remaining 44 high-income countries in the second section.

UNICEF groups the 149 low- and middle-income countries into seven regions: Eastern and Southern Africa ($n = 22$); West and Central Africa ($n = 24$); East Asia and the Pacific ($n = 26$); Latin America and the Caribbean ($n = 29$); South Asia ($n = 8$); Middle East and North Africa ($n = 14$); and Central and Eastern Europe and the Commonwealth of Independent States ($n = 21$). Five middle-income countries are classified as being industrialized.

4 UNAIDS brings together the efforts and resources of 10 United Nations System organizations in the response to HIV. The 10 UNAIDS Cosponsors are:

- Office of the United Nations High Commissioner for Refugees (UNHCR);
- United Nations Children's Fund (UNICEF);
- World Food Programme (WFP);
- United Nations Development Programme (UNDP);
- United Nations Population Fund (UNFPA);
- United Nations Office on Drugs and Crime (UNODC);
- International Labour Organization (ILO);
- United Nations Educational, Scientific and Cultural Organization (UNESCO);
- World Health Organization (WHO); and
- World Bank.

References

1. *Monitoring and reporting on the health sector's response towards universal access to HIV/AIDS prevention, treatment, care and support: WHO framework for global monitoring and reporting*. Geneva, World Health Organization, 2007 (http://www.who.int/entity/hiv/universalaccess2010/UAframework_Final%202Nov.pdf, accessed 5 May 2008).
2. WHO and UNICEF with the Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children. *Guidance on global scale-up of the prevention of mother-to-child transmission of HIV: towards universal access for women, infants and young children and eliminating HIV and AIDS among children*. Geneva, World Health Organization, 2007 (http://www.who.int/hiv/pub/mtct/pub35/en, accessed 5 May 2008).
3. *Monitoring the Declaration of Commitment on HIV/AIDS: guidelines on construction of core indicators. 2008 reporting*. Geneva, UNAIDS, 2007 (http://data.unaids.org/pub/Manual/2007/20070411_ungass_core_indicators_manual_en.pdf, accessed 5 May 2008).
4. Boerma TJ et al. Monitoring the scale-up of antiretroviral therapy programmes: methods to estimate coverage. *Bulletin of the World Health Organization*, 2006, 84:145–150.
5. WHO, UNAIDS and UNICEF. *Towards universal access: scaling up priority HIV/AIDS interventions in the health sector. Progress report, April 2007*. Geneva, World Health Organization, 2007 (http://www.who.int/mediacentre/news/releases/2007/pr16/en/index.html, accessed 5 May 2008).
6. *2006 report on the global AIDS epidemic*. Geneva, UNAIDS, 2006 (http://www.unaids.org:80/en/KnowledgeCentre/HIVData/GlobalReport/Default.asp, accessed 5 May 2008).
7. Improved methods and tools for HIV/AIDS estimates and projections. *Sexually Transmitted Infections*, 2006, 82(Suppl 3): iii1–iii91.
8. *Antiretroviral therapy for HIV infection in adults and adolescents: recommendations for a public health approach. 2006 revision*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/guidelines/adult/en/index.html, accessed 5 May 2008). *Antiretroviral therapy of HIV infection in infants and children in resource-limited settings: towards universal access. Recommendations for a public health approach*. Geneva, World Health Organization, 2006 (http://www.who.int/hiv/pub/guidelines/art/en/index.html, accessed 5 May 2008).
9. *World health statistics 2008*. Geneva, World Health Organization, 2008 (http://www.who.int/healthinfo/statistics/en, accessed 5 May 2008).
10. Morgan M et al. Improved plausibility bounds about the 2005 HIV and AIDS estimates. *Sexually Transmitted Infections*, 2006, 82(Suppl III):iii71–iii77.
11. *PMTCT report card 2005: monitoring progress on the implementation of programs to prevent mother to child transmission of HIV*. New York, UNICEF, 2005 (http://www.uniteforchildren.org/knowmore/files/ufc_PMTCTreportcard.pdf, accessed 5 May 2008).
12. *Report card on prevention of mother-to-child transmission of HIV and paediatric HIV care and treatment in low- and middle-income countries*. New York, Expanded Interagency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children c/o UNICEF, 2007 (http://www.unicef.org/aids/index_documents.html, accessed 5 May 2008).
13. UNAIDS, UNICEF and WHO. *Children and AIDS: second stocktaking report*. New York, UNICEF, 2008 (http://www.unicef.org/publications/index_43451.html, accessed 5 May 2008).
14. Publications: Reference Group reports [web site]. Geneva, UNAIDS Reference Group on Estimates, Modelling and Projections (http://www.epidem.org/publications.htm, accessed 5 May 2008).
15. Data & statistics: country classification [web site]. Washington, DC, World Bank, 2008 (http://go.worldbank.org/K2CKM78CC0, accessed 5 May 2008).

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