

ACCESS

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FOREWORD

Much has been accomplished since world leaders met at the 2006 United Nations General Assembly High-Level Meeting on AIDS and committed to scaling up towards the goal of universal access to HIV prevention, treatment, care and support services by 2010. As this third annual report on the health sector response to HIV shows, low- and middle-income countries have continued to scale up in 2008.

Indeed, 2008 was a busy year for all partners involved in providing and delivering HIV services in resource-limited settings. By December 2008, 4 million people were receiving antiretroviral therapy in low- and middle-income countries, 1 million more than the previous year. More people were counselled and tested for HIV in 2008 than in previous years. Almost half of all pregnant women living with HIV in low- and middle-income countries received antiretrovirals to prevent mother-to-child transmission, and more children living with HIV are benefiting from treatment and care programmes. More countries are now phasing in efficacious antiretroviral regimens for preventing the mother-to-child transmission of HIV, including antiretroviral therapy for pregnant women who need treatment. The increased access to antiretroviral therapy and appropriate care has resulted in reduced mortality among people living with HIV at the country and global levels.

Countries have also started to develop and adopt innovative solutions to tackle major health systems challenges, including the chronic shortage of qualified human resources. In many countries, HIV service delivery has been strengthened by integrating and decentralizing interventions to primary health care.

Nevertheless, this report also demonstrates that many low- and middle-income countries are still far from achieving universal access goals. More than 5 million people needing antiretroviral therapy do not have access to it. Far too many people access health services in late stages of HIV disease and are unable to receive maximum benefits from treatment. Recent surveys suggest that more than half of all people living with HIV remain unaware of their infection status. TB continues to be the leading cause of death among people living with HIV. Although countries are scaling up HIV diagnostic testing for infants, the referral of infants to care and treatment services remains a critical bottleneck.

The current pace of scaling up is clearly insufficient. Efforts can and must be accelerated by leveraging the political commitment and financial resources garnered by international commitments to achieve universal access and the Millennium Development Goals.

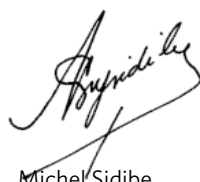
In addition to expanding coverage to those currently not accessing services, countries now face the challenge of sustaining and managing existing programmes. As we look ahead, ensuring the quality of services delivered will be critical, as only high-quality programmes can achieve optimal clinical outcomes. Greater attention must also be devoted to those who are harder to reach, including rural populations, who make up a substantial proportion of those currently without access to HIV services. The same applies to the population groups at high risk of HIV infection, such as men who have sex with men, injecting drug users and sex workers.

The hard-won gains of recent years are fragile and call for renewed commitment by all stakeholders. This is especially the case considering the unprecedented scope and depth of the crisis that has hit the world economy. Nevertheless, it is precisely due to the potential disruptive effects of the global economic downturn that we must redouble our efforts and build on the current operational momentum to support the global commitment to reaching universal access.

The more rapidly high-quality services are scaled up, the larger the dividend to be reaped from fewer infections and lower mortality and from having millions of people living longer, healthier and more productive lives.



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TOWARDS UNIVERSAL

EXECUTIVE SUMMARY

With 33 million people living with HIV and 2.7 million new infections in 2007, the HIV epidemic continues to be a major challenge for global health. Although political and financial commitments and country efforts have resulted in increasing access to HIV services in recent years, the annual number of new infections remains high and continues to outpace the annual increase in the number of people receiving treatment. This report provides a global update on progress in scaling up priority health sector interventions for HIV prevention, treatment and care in 2008 towards the internationally endorsed goal of universal access.

Key indicators of progress in low- and middle-income countries in 2008

	December 2007	December 2008
Number of adults and children receiving antiretroviral therapy	2 970 000 [2 680 000-3 260 000]	4 030 000 [3 700 000-4 360 000]
Antiretroviral therapy coverage among adults and children	33% [30-36%]	42% [40-47%]
Number of children younger than 15 years in need receiving antiretroviral therapy	198 000	275 700
Percentage of pregnant women living with HIV receiving antiretroviral drugs to prevent mother-to-child transmission	35% [29-44%]	45% [37-57%]

Overall, the availability and coverage of priority health sector interventions for HIV prevention, treatment and care continued to expand in low- and middle-income countries in 2008. Nevertheless, progress has been uneven across and within countries, and many gaps and challenges remain.

The volume and scope of data to measure progress in scaling up priority HIV interventions improved substantially in 2008. Of 192 United Nations Member States, 158 reported data to WHO, UNICEF and UNAIDS, including 139 low- and middle-income and 19 high-income countries, with higher reporting rates for many indicators compared with 2007, although there remain uncertainties related to the quality of data reported. This has allowed for more comprehensive global analysis of the health sector's achievements towards universal access to HIV prevention, treatment and care.

HIV testing and counselling

The availability and uptake of HIV testing and counselling services continued to increase in 2008. In 66 low- and middle-income countries with comparable data, the total number of health facilities providing HIV testing and

counselling increased by about 35%: from 25 000 in 2007 to 33 600 in 2008.

In population-based surveys conducted between 2005 and 2008, the median percentage of respondents aged 15-49 years living with HIV who reported having ever received a test and test results prior to the survey increased from about 15% (2005-2006, 12 countries) to 39% (2007-2008, 7 countries). These results can be attributed to the expansion of provider-initiated HIV testing and counselling in health care settings along with diverse client-initiated and community-based approaches. Yet despite the expansion of services, knowledge of HIV status remains low.

Health sector interventions for HIV prevention

More data became available in 2008 on the epidemiology of HIV infection among population groups at high risk of HIV such as injecting drug users, sex workers and men who have sex with men, including in countries with generalized epidemics.

Of 92 low- and middle-income countries that reported information on programmes and policies targeting injecting drug users, 30 countries were providing needle and syringe programmes in 2008, and 26 countries reported providing opioid substitution therapy. The median number of syringes distributed by needle and syringe programmes per injecting drug user per year was about 24.4 in Europe and Central Asia and 26.5 in East, South and South-East Asia, far below the internationally recommended target of 200 syringes per injecting drug user per year. The criminalization of injecting drug use and the failure to recognize comorbid conditions in many people who inject drugs pose barriers to scaling up necessary services in many countries.

Recent data have shed important light on the dynamics of the HIV epidemic among men who have sex with men, including in countries in sub-Saharan Africa, where same-sex relations have often been considered too taboo to be acknowledged. The median percentage of surveyed men who have sex with men in low- and middle-income countries who reported the use of a condom the last time they had anal sex with a male partner was about 60%. Rates of condom use vary widely across regions and countries, with the highest rates in Latin America. A series of global and regional consultations in 2008 re-emphasized the role of the health sector and defined priority interventions to address the health needs of men who have sex with men.

Surveys conducted among sex workers in 56 countries found a median percentage of 86% reporting the use of a condom with their most recent client, with wide variation across

countries. Further expansion of programmes promoting condom use among sex workers must consider the local context and the heterogeneity of formal or brothel-based and informal sex work.

Although some evidence indicates that access to HIV interventions is expanding in many settings, population groups at high risk of HIV infection continue to face technical, legal and sociocultural barriers in accessing health care services.

The year 2008 saw further progress in developing and implementing new prevention technologies. All 13 priority countries in sub-Saharan Africa with high rates of heterosexual HIV transmission and low rates of male circumcision had established policies and programmes to scale up male circumcision to reduce the risk of heterosexually acquired HIV infection in men. More countries also reported the establishment of policies to provide post-exposure prophylaxis for occupational and non-occupational exposure to HIV. Ongoing research is required on the use of antiretroviral drugs for HIV prevention, including for pre-exposure prophylaxis and microbicides.

Among countries that provided data on screening for transfusion-transmissible infections (including HIV, hepatitis B, hepatitis C and syphilis), about 25% reported being unable to screen all donated blood for one or more of these infections. Continued efforts are needed to ensure the safety of blood and blood products, especially in low-income countries.

Treatment and care for people living with HIV

Access to antiretroviral therapy continued to expand rapidly. At the end of 2008, more than 4 million [3 700 000–4 360 000] people were receiving antiretroviral therapy in low- and middle-income countries, an increase of more than 1 million (36%) compared with the end of 2007 and a 10-fold expansion in 5 years. The greatest expansion in the number of people receiving treatment in 2008 was in sub-Saharan Africa, where about 2 925 000 [2 690 000–3 160 000] people were receiving antiretroviral therapy at the end of 2008 versus 2 100 000 [1 905 000–2 295 000] people at the end of 2007.

The estimated coverage of antiretroviral therapy in low- and middle-income countries reached 42% [40–47%] in 2008, and coverage in sub-Saharan Africa was 44% [41–48%]. Despite progress, more than 5 million of the estimated 9.5 million [8 600 000–10 000 000] people needing antiretroviral therapy were still without access to treatment, making it absolutely critical to accelerate programme delivery to reach universal access goals.

Data disaggregated by sex show that adult women are slightly advantaged compared with adult men in access to antiretroviral therapy in low- and middle-income countries. About 60% of adults receiving antiretroviral therapy in reporting countries were women, who represent 55% of the people in need.

More countries provided national programme data on patient retention on antiretroviral therapy. Data showed that most patient attrition occurred during the first year of treatment. Patient retention tended to stabilize thereafter. In sub-Saharan Africa, the retention of people receiving antiretroviral therapy was estimated at 75% at 12 months following initiation and at 67% at 24 months. However, many people living with HIV continue to be diagnosed late, preventing the timely initiation of antiretroviral therapy when its impact on survival would be greatest.

Tuberculosis (TB) continues to be the leading cause of death among people living with HIV. In 2007, 16% of people with notified TB knew their HIV status, resulting in low rates of access to co-trimoxazole prophylaxis and antiretroviral therapy for people living with HIV and TB. There has been an increase in reported intensified TB case-finding and provision of isoniazid preventive therapy among people living with HIV, but coverage of these interventions also remains low overall. The data draw attention to the urgent need to strengthen integrated monitoring and evaluation systems to assess the progress and outcomes of collaborative HIV/TB interventions.

HIV services for women and children, including preventing mother-to-child transmission

Access to services for preventing mother-to-child transmission in low- and middle-income countries continued to expand in 2008. Twenty-one per cent of pregnant women received an HIV test in 2008, up from 15% in 2007, and 45% [37–57%] of pregnant women living with HIV received antiretroviral drugs to prevent mother-to-child transmission.

More countries moved towards using efficacious combination drug regimens for antiretroviral prophylaxis, although about 31% of pregnant women living with HIV in 97 reporting low- and middle-income countries continued to receive single-dose regimens.

An estimated 34% of pregnant women who tested positive for HIV were assessed for eligibility to receive antiretroviral therapy for their own health in 2008. Timely initiation of antiretroviral therapy among eligible mothers is not only critical to reduce maternal mortality, but also to reduce perinatal HIV transmission to the child or transmission during breastfeeding.

In 2008, 38% [31-47%] of the 730 000 [580 000-880 000] children estimated to need antiretroviral therapy in low- and middle-income countries had access. The number of health facilities providing antiretroviral therapy to children increased by about 80% between 2007 and 2008 and 39% more children were receiving antiretroviral therapy. About 8% of infants born to pregnant women with HIV initiated co-trimoxazole by two months of age, more than twice the percentage reported in 2007.

In 41 reporting low- and middle-income countries, only 15% of children born to mothers living with HIV were tested for HIV within the first two months of life. Efforts to improve early infant diagnosis and postnatal follow-up with integration of HIV services with services for maternal, newborn and child health are needed to provide a continuum of HIV prevention and care for women and children.

Health systems and HIV

Strong health systems and continuing synergy with investment in HIV programmes are essential to achieve universal access to HIV prevention, treatment and care services. Countries are adopting strategies such as task-shifting to address human resource shortages, with

increasing evidence of improvements in access, coverage and quality of health services at comparable or lower costs than traditional delivery models. Attention to the quality of the services provided, continued opportunities for health worker training and measures to prevent stigma and discrimination against people living with HIV in health care settings are equally essential.

Procurement and supply management of HIV drugs and other commodities have also been strengthened in many countries, with some evidence of beneficial effects on the overall systems. Nevertheless, in 2008, 34% of reporting low- and middle-income countries had experienced at least one stock-out of a required antiretroviral drug.

Investment in health information systems remains vital to ensure that countries are able to generate and use strategic information to monitor progress in scaling up HIV services in the health sector and assess the effects of programmes. Although more data are becoming available from national programmes and surveys, their quality and completeness are uneven. Data are also necessary to ensure accountability in relation to international and national goals and to guarantee sustained funding for the HIV response, especially given economic recession.

1. INTRODUCTION

The health sector plays a central role in providing services for HIV prevention, treatment, care and support, guided by evidence-based recommendations and delivered through strengthened health systems. Although the global response to HIV/AIDS has facilitated the tremendous advances of the past five years – notably concerted political and financial commitments and ever-increasing access to prevention, treatment and care interventions – the annual number of new infections remains high and exceeds the annual increase in the number of people who are able to access treatment. The health sector confronts concerns regarding the sustainability of programmes and the persistent inequity in access to services. Nevertheless, new scientific evidence continues to provide opportunities to promote more integrated approaches to HIV prevention and treatment in the future.

This report provides a comprehensive global update on progress in scaling up the health sector response to HIV/AIDS in 2008. The current report is the third in a series of annual progress reports published by WHO, UNICEF and UNAIDS in collaboration with international and national partners (1,2) to document the expansion of priority health sector interventions for HIV prevention, treatment and care worldwide, building on previous “3 by 5” reports on the scaling up of antiretroviral therapy (3–6). It assesses current achievements and ongoing challenges in moving towards the goal of universal access to HIV prevention, treatment, care and support and discusses priority actions for the future.

1.1. Background and global context in 2008

With about 33 million [30 million–36 million] people living with HIV and 2.7 million [2.2 million–3.2 million] new infections in 2007, the HIV epidemic continues to be a major challenge for global health (7). About 2 million [1.9 million–2.3 million] of those living with HIV in 2007 were children younger than 15 years of age, most of whom acquired HIV infection from their mothers during pregnancy, birth or breastfeeding. Sub-Saharan Africa remains the most severely affected region, accounting for two thirds of the people living with HIV worldwide. The epidemics have begun to stabilize or decline in many countries in this region, although at very high levels. In other regions, infections are on the rise in a number of countries and disproportionately affect sex workers, people who inject drugs and men who have sex with men. Recent data also show that these groups are at high risk of HIV infection in countries with generalized HIV epidemics.

Box 1.1. The Millennium Development Goals

The eight United Nations Millennium Development Goals, agreed upon by United Nations Member States in 2000, commit countries and development partners to achieve the following by 2015:

- ❶ eradicate extreme poverty and hunger;
- ❷ achieve universal primary education;
- ❸ promote gender equality and empower women;
- ❹ reduce child mortality;
- ❺ improve maternal health;
- ❻ combat HIV/AIDS, malaria and other diseases;
- ❼ ensure environmental sustainability; and
- ❽ develop a global partnership for development.

Each goal includes specific, measurable targets to guide action. Goal 6 calls on countries to have halted by 2015 and begun to reverse the spread of HIV/AIDS and to achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it. Progress in the response to HIV/AIDS is critical not only to achieve Goal 6 but also to reach Goals 4 and 5, which commit to reducing child and maternal mortality and promoting universal access to reproductive health services. The response to the HIV/AIDS epidemic will also influence the achievement of other goals.

During the past 10 years, the international community has continually given priority to responding to HIV/AIDS as part of commitments to achieve global health goals. In 2001, the first United Nations General Assembly Special Session on HIV/AIDS adopted a Declaration of Commitment to respond to a growing epidemic, echoing global consensus to halt and reverse the spread of HIV as part of the broader Millennium Development Goals (Box 1.1) (8,9). With the launch of the “3 by 5” initiative in 2003, international and national partners galvanized unprecedented support to scale up access to HIV treatment for people living with HIV in low- and middle-income countries as a public health emergency (10). Subsequently, at the United Nations General Assembly High-Level Meeting on AIDS in 2006, countries committed to work towards universal access to comprehensive HIV prevention, treatment, care and support by 2010 (11). This global commitment was accompanied by an agreement to set national targets based on country-specific needs and resources.

Political commitments have also been backed by considerable financial support from partners such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, the United States President’s Emergency Plan for AIDS Relief and other bilateral, national and nongovernmental or private sources (Box 1.2). At the meeting of the Group of Eight countries (G8) held in L’Aquila, Italy in July 2009, heads

of state committed to “implement further efforts towards universal access to HIV/AIDS prevention, treatment, care and support by 2010” and to “promote a comprehensive and integrated approach to the achievement of health-related Millennium Development Goals” (12). Although international assistance for the HIV response from the G8, the European Commission and other donor governments

reached its highest level to date in 2008, a gap of more than US\$ 6 billion remains between the needed and available resources (13). Financing a sustained and comprehensive response to HIV remains a challenge for the future, particularly given the global economic downturn that struck the global economy in 2008.

Box 1.2. Global financing architecture for the HIV response

The resources allocated to the HIV response have increased substantially in recent years through an evolving global funding architecture.

International funding

Between 2002 and 2008, commitments and disbursements for the HIV response from high-income countries increased by more than five-fold each. Overall commitments in HIV funding from high-income countries totalled US\$ 8.7 billion in 2008, up from US\$ 6.6 billion the previous year, and reaching their highest level to date. Overall disbursements of HIV-related official development assistance from high-income countries totalled US\$ 7.7 billion in 2008, up 56 % from 2007 (13).

New global initiatives have become important mechanisms for financing the scaling up of HIV interventions. The Global Fund to Fight AIDS, Tuberculosis and Malaria is now a major source of funding for HIV programmes worldwide and channelled about 23% of total resource flows in 2008 (14). The Global Fund approved 94 new proposals in its eighth round of grant applications in November 2008, bringing the value of the Global Fund's total portfolio to more than US\$ 15 billion, financing grants in 140 countries.

The World Bank has also expanded its financial and technical support for HIV programmes, providing both concessionary and non-concessionary loans, in addition to grants, to low- and middle-income countries. The World Bank Multi-Country HIV/AIDS Program for Africa has committed more than US\$ 1.8 billion in 35 countries, including five regional projects addressing cross-border issues (15). Overall HIV-related funding totalled more than US\$ 3.1 billion from 1989 until 21 July 2009 (16).

UNITAID has continued to consolidate its role as a key contributor to scaling up access to medicines and diagnostics for HIV, malaria and TB. Funded in part by the proceeds of a levy on airline tickets, UNITAID approved new projects worth US\$ 192 million in 2008, bringing total commitments to US\$ 450 million (17).

Bilateral aid flows from members of the Development Assistance Committee of the Organisation for Economic Co-operation and Development have also increased, reaching US\$ 3.5 billion in 2006–2007 (18). The United States of America, via the United States President's Emergency Plan for AIDS Relief, has been one of the major drivers of this increase in bilateral aid flows. The United States President's Emergency Plan for AIDS Relief, the world's largest bilateral AIDS programme, was reauthorized in July 2008, allowing up to US\$ 48 billion through 2013 to address HIV, TB and malaria. Overall, the United States of America remained the largest contributor to the global HIV response in 2008, accounting for more than half (51.3%) of disbursements by donor governments. The United Kingdom accounted for the second largest share (12.6%), followed by the Netherlands (6.5%), France (6.4%), Germany (6.2%), Norway (2%) and Sweden (2%).

The past year also witnessed the launch of several new initiatives aimed at improving coordination and increasing synergies among partners. The Innovative-8 (I-8) Group for the Millennium Development Goals, which brings together finance initiatives, United Nations agencies and representatives of civil society to explore and scale up innovative mechanisms for global health financing, held its first meeting in May 2009 (19). The High-Level Task Force on Innovative International Financing for Health Systems, operating in connection with the International Health Partnership, recently published recommendations on innovative financing mechanisms to achieve the Millennium Development Goals (20).

Domestic funding

Globally, the major sources of financing for HIV programmes at the end of 2008 were domestic expenditure in the affected countries (52%), direct bilateral cooperation (31%), multilateral institutions (12%) and the philanthropic sector (5%) (21). International aid is estimated to have to further complement domestic resources to close the gap between the required and available resources for achieving universal access.

Philanthropic 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 over the past several years. The Bill & Melinda Gates Foundation is the single largest source of private development assistance for health, with annual commitments reaching nearly US\$ 2 billion in both 2006 and 2007 (22).

More data were available to assess progress in the health sector in 2008 than ever before, allowing for a more complete assessment of the current situation and gaps. The data show that access to priority health sector interventions for HIV prevention, treatment, care and support expanded in low- and middle-income countries worldwide, although progress in many settings remains constrained by weaknesses in health systems and sociocultural barriers faced by people at high risk of HIV infection. Continued investment in strategic information to “know the epidemic” and monitor the response remains essential to improve programmes and their outcomes.

Significant political and technical developments also marked the health sector response to HIV in 2008. The international HIV community welcomed the award of the 2008 Nobel Prize in Medicine to scientists Françoise Barré-Sinoussi and Luc Montagnier for their discovery of HIV in 1981 and their contribution to the current understanding of the disease and its treatment (23). New scientific evidence accumulated on the initiation and management of antiretroviral therapy for adults and adolescents and on the use of antiretroviral drugs to prevent the mother-to-child transmission of HIV. In late 2009, WHO will review current guidance in the light of this evidence and update these recommendations for future implementation (24,25). The need to combine behavioural with biomedical approaches for HIV prevention received greater attention, as new evidence has become available on the role of antiretroviral drugs as pre-exposure prophylaxis to prevent HIV transmission.

Also in 2008, more data and increased advocacy helped to refocus attention on the prevention and care needs of population groups at high risk of HIV infection, encompassing men who have sex with men and injecting drug users, including in generalized epidemics. A reassessment of the HIV/TB co-epidemic doubled the estimated number of people living with HIV and TB worldwide, reiterating the need to strengthen collaborative interventions. Numerous studies and international forums further affirmed the importance of synergy between global health initiatives, strengthening health systems and renewing primary health care. These developments will shape future efforts to scale up the HIV response towards universal access goals.

1.2. Data sources and methods

International commitments to scale up the response to HIV/AIDS must be accompanied by concerted efforts to track achievements and maintain accountability towards these goals among national and international authorities. In recent years, WHO, UNICEF and UNAIDS have collected data from countries regularly to monitor progress towards international targets, including the United Nations General

Assembly Special Session Declaration of Commitment on HIV/AIDS, “3 by 5”, scaling up towards universal access and the Millennium Development Goals.

For the first time in 2009, WHO, UNICEF and UNAIDS jointly collected data from national programmes worldwide through a common reporting tool to monitor and report on progress in the health sector response towards universal access (Box 1.3). The tool includes 46 indicators to track progress towards universal access to HIV prevention, treatment and care in the health sector in the following areas (see list of indicators in annex):

- HIV testing and counselling;
- HIV prevention in health care settings;
- preventing sexual transmission of HIV and transmission through injecting drug use;
- managing sexually transmitted infections;
- HIV care and interventions to address HIV/TB coinfection;
- antiretroviral therapy;
- HIV interventions for women and children, including preventing mother-to-child transmission; and
- health systems.

The reporting tool also includes questions related to policies and programmes. The indicators are selected in accordance with *Monitoring and reporting on the health sector's response towards universal access to HIV/AIDS treatment, prevention, care and support, 2009–2010: WHO framework for global monitoring and reporting* (26) and the Report Card on Prevention of Mother-To-Child Transmission of HIV and

Box 1.3. Measuring progress towards universal access

“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. Making services available, affordable and acceptable is an essential precondition to achieve universal access.

Coverage is defined as the proportion of the people needing an intervention who receive it. Coverage is influenced by the supply or provision of services, and by the demand from those who need services and their health-seeking behaviour.

Outcome and impact are defined in terms of medium-term effects, such as behavioural change or higher survival rates, and long-term effects, such as lower infection rates, respectively. Outcome and impact are the result of coverage and depend on the efficiency and effectiveness of interventions.

Paediatric HIV Care and Treatment in Low- and Middle-income Countries, issued jointly by UNICEF and WHO on behalf of the Expanded Inter-Agency Task Team on Prevention of HIV Infection in Pregnant Women, Mothers and their Children (27). Indicators are aligned with related efforts of partner agencies, such as the Declaration of Commitment on HIV/AIDS of the United Nations General Assembly Special Session on HIV/AIDS (28).

Between January and April 2009, the country offices of WHO, UNICEF and UNAIDS worked with national authorities to collect a comprehensive set of data on global progress in scaling up the health sector response to HIV/AIDS in 2008. Data were then validated at regional and global levels through a process of collective review and communication with country-level partners, and reconciled at the global level with data collected by other international partners, including other bilateral and multilateral organizations (see the explanatory notes to the statistical annexes for further details).

This report also presents data from other sources, including special surveys (such as on pricing and utilization of antiretroviral drugs and other supplies and surveillance of HIV drug resistance), more detailed population-based surveys (such as the Demographic and Health Surveys (29)) and scientific literature. By bringing together multiple sources of information, the report provides a comprehensive and authoritative annual update on the health sector's achievements towards universal access to HIV prevention, treatment and care in 2008.

In 2008, WHO, UNICEF and UNAIDS received data from 158 countries (among 192 United Nations Member States), including 139 low- and middle-income countries and 19 high-income countries. Response rates varied by indicator and are presented in the corresponding chapters. Although

this report focuses primarily on progress in low- and middle-income countries, key data from high-income countries have also been included where relevant and available.

1.3. Structure of the report

This report is structured as follows:

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

Chapter 2 presents global progress in scaling up HIV testing and counselling.

Chapter 3 presents global progress in scaling up health sector interventions for HIV prevention, including for population groups at high risk of HIV infection.

Chapter 4 presents global progress in scaling up access to treatment and care for people living with HIV.

Chapter 5 presents global progress towards scaling up HIV services for women and children, including interventions to prevent the mother-to-child transmission of HIV.

Chapter 6 summarizes available information on health systems and the HIV response.

Chapter 7 identifies the main challenges and the way forward towards achieving international goals.

The statistical annexes provide country-specific data on the global coverage of antiretroviral therapy and services to prevent mother-to-child transmission and additional notes on data sources and methods.

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2. HIV TESTING AND COUNSELLING

Key findings

- More countries provided information on HIV testing and counselling than in previous years. In 2008, 119 countries reported data on the availability of HIV testing and counselling in health facilities and 101 countries reported on the uptake of these services, up from 81 and 53 countries (respectively) in 2007.
- Nearly 90% of reporting countries had national HIV testing and counselling policies in 2008, up from 70% in 2007. Among the 53 countries with generalized HIV epidemics that reported information on provider-initiated HIV testing and counselling, half reported that their policies encourage health care workers to propose testing and counselling to everyone, regardless of presenting symptoms and type of facility.
- The reported number of health facilities providing HIV testing and counselling increased to 95 300 in 2008 (119 countries), up from 30 500 in 2007 (81 countries) and 21 900 in 2006 (52 countries). In 66 low- and middle-income countries reporting comparable data in 2007 and 2008, the combined availability of HIV testing and counselling services increased from 25 000 to 33 600, with varying rates across countries.
- The expansion of HIV testing and counselling services was accompanied by an increase in uptake. In 39 low- and middle-income countries which reported comparable data in 2007 and 2008, the combined reported number of HIV tests performed in these countries more than doubled over the two-year period.
- Data from 6 countries in sub-Saharan Africa which have conducted repeated population-based surveys since 2002 show that an increasing percentage of survey participants report having received an HIV test in recent years. The data also show that on the whole, more women report being tested than men.
- Despite these reported increases in the availability and uptake of HIV testing and counselling, knowledge of HIV status remains inadequate. Seven population-based surveys conducted in 2007 and 2008 indicate that the median percentage of people living with HIV who knew their HIV status prior to the survey remains below 40%.
- Reported proportions of population groups most at risk who received HIV testing and counselling in the past 12 months are also low. The median percentage of those who had received HIV testing and counselling was 38% among sex workers (45 reporting countries), 23% among people who inject drugs (26 reporting countries) and 30% among men who have sex with men (31 reporting countries).
- The use of diverse and appropriate provider-initiated and client-initiated approaches is necessary to expand HIV testing and counselling uptake and facilitate access to prevention, care and treatment services.

HIV testing and counselling is often referred to as the gateway to HIV prevention, treatment and care services, and needs to be linked to prevention and care to increase the coverage of services around HIV. Although diverse client-initiated and provider-initiated models are increasing service availability and more people are being tested for HIV, people's knowledge of HIV status remains low and HIV infection is often diagnosed late. Low uptake of HIV testing is one of the reasons for delayed access to antiretroviral therapy for people in need and in high mortality in the months after treatment is initiated (see Chapter 4). Even when people report being aware of their HIV-negative status, their knowledge may not be accurate or up to date.

This chapter synthesizes the global situation regarding the availability and coverage of HIV testing and counselling. Although the evidence is still insufficient, information is increasingly available on policies and programmes from low- and middle-income countries and the process by which this information is collected and compiled is improving rapidly. In 2008, as many as 119 countries reported information on the availability of HIV testing and counselling in health facilities and 101 countries reported on the uptake of these services, up from 81 and 53 countries (respectively) in 2007. All sources of data indicate upward trends in the availability and uptake of HIV testing and counselling services. They also show that progress is uneven across and within countries (Box 2.1).

2.1. HIV testing and counselling policies

WHO and UNAIDS recommend continuing the scale-up of client-initiated HIV testing and counselling (in which individuals actively seek HIV testing and counselling at a

facility that offers these services) and provider-initiated HIV testing and counselling in health facilities, in which health care providers recommend an HIV test:

- for everyone, irrespective of epidemic setting, whose clinical presentation might result from underlying HIV infection;
- as a standard part of health care for everyone attending health facilities in generalized HIV epidemics; and
- more selectively in concentrated and low-level epidemics.

Data show that the number of countries that have developed national policies on HIV testing and counselling has increased in recent years. Nearly 90% (111 of 125 countries reporting) indicated having national HIV testing and counselling policies, an increase since 2007 when 70% (58 of 82 countries reporting) had HIV testing and counselling policies.

Second, HIV testing and counselling is increasingly shifting from the client-initiated model (also referred to as voluntary counselling and testing) towards including other modalities, especially provider-initiated testing and counselling. Country efforts have increased attention to testing at health facilities, facilitated by normative guidance by WHO and UNAIDS. The WHO/UNAIDS guidance on provider-initiated HIV testing and counselling in health facilities issued in 2007 (3) defined the conditions under which testing would be offered and conducted at health facilities as well as the key elements designed to ensure that individuals' rights would be respected. Reports by countries indicate that policies are indeed giving greater attention to provider-initiated testing and counselling. Of 110 countries reporting this information on their policies in 2008, 95 indicated that the policy promoted provider-initiated testing and counselling

Box 2.1. Data sources and interpretation

Describing availability and coverage of HIV testing and counselling requires information about the services themselves as well as estimates of the size of the population considered to need services, which in turn, depend on assessments of the state of the HIV epidemic and its characteristics in various countries. Thus, data need to be compiled from several sources, such as information on the procurement of HIV tests (Box 2.2); national health sector programme records; surveys among specific populations or reports by various groups; and population-based surveys. Some limitations exist when information from different countries is combined: definitions may not be standardized, and measurements depend on how services are organized. For instance, data on service availability and uptake may not cover all public, private and nongovernmental health facilities in the country or may not include all service delivery areas where HIV testing and counselling services are provided.

Despite these limitations, a broad picture of HIV testing and counselling can be obtained at the global and regional levels in 2008. This section uses the following data sources: reports by national programmes to WHO, UNICEF and UNAIDS over different time periods; population-based surveys conducted between 2005 and 2008, with special attention to repeated surveys conducted in the same countries; the Global Price Reporting Mechanism of the AIDS Medicines and Diagnostics Service (1); and the district-level assessments of service availability and uptake conducted in selected countries as part of the five-year evaluation of the Global Fund to Fight AIDS, Tuberculosis and Malaria (2). The picture described here represents an effort to make sense of these multiple sources of information. Further analyses would require more systematic investment of resources in strategic information.

in health facilities. In addition, 89 countries reported that their guidelines on provider-initiated testing and counselling ensure confidentiality and informed consent.

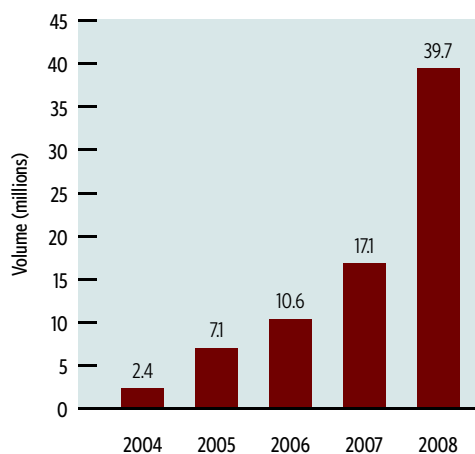
The WHO/UNAIDS guidance recommends that, in settings with generalized epidemics, HIV testing be initiated as a standard part of health care at health facilities, whereas in low-level or concentrated epidemics, HIV testing be

scaled up in selected health facilities. Among the 53 countries with generalized HIV epidemics that reported information on provider-initiated testing and counselling policies in 2008, half (including 20 in sub-Saharan Africa) report that their policies encourage health care workers to propose testing and counselling to everyone, regardless of presenting symptoms and type of facility. In 2007, only 12 of 27 reporting countries with generalized epidemics had reported having such policies.

Box 2.2. Transaction volumes of HIV tests

Data on the procurement of HIV tests at the global level also indicate the growing demand and uptake of HIV testing worldwide. The Global Price Reporting Mechanism (GPRM) provides information on the transaction prices and volumes of HIV diagnostics procured by low-income, lower-middle-income and upper-middle-income countries (1). At the end of 2008, data on transactions were available from 75 countries. These data were analysed for 15 rapid tests for the period from 2004 to the first quarter of 2009 and for six ELISA (enzyme-linked immunosorbent assay) and four confirmatory tests purchased between 2007 and the first quarter of 2009. They show that the number of rapid tests procured almost doubled from 2007 to 2008 (Fig. 2.1). Analysing the representativeness of these data from the GPRM and their comparability over time is difficult because they cover only a fraction of the global transactions in diagnostic tests. Nevertheless, they are consistent with programmatic reports about the increased uptake of testing.

Fig. 2.1. Transaction volumes of rapid HIV tests, 2004–2008



1 Rapid tests: Capillus HIV 1/2, Clearview Complete HIV 1/2, Determine HIV 1/2, DoubleCheck Gold HIV 1/2, First Response HIV 1.2.0, Genie II HIV 1/2, HIV 1/2 Antibody Colloidal Gold, HIV Tri-dot, Immunocomb II Bispot HIV 1/2, OraQuick HIV 1/2, Retrocheck HIV test, SD Bioline HIV 1/2 3.0, Serodia HIV 1/2, Stat-Pak HIV 1/2, Uni-Gold HIV, ELISA (enzyme-linked immunosorbent assay) tests: Enzygnost Anti-HIV 1/2, Genedia HIV Ag-Ab, Genscreen HIV 1/2 V2, HIV EIA Elisa, Murex HIV Ag-Ab, Vironostika HIV Uni-form II. Confirmatory tests: HIV BLOT 2.2, Inno-Lia HIV 1/2, New LAV Blot, Pepti-LAV.

Similarly, 66 of 82 countries with low-level or concentrated epidemics had policies or guidelines to scale up HIV testing and counselling in selected health facilities such as those providing antenatal services, TB services, sexual health services and health services for population groups most at risk; 17 of these countries were in East, South and South-East Asia, 12 in Latin America and the Caribbean, 17 in Europe and Central Asia and 9 in the Middle-East and North Africa.

A third major observation regarding policies related to HIV testing and counselling is that most countries make HIV tests available free of charge in the public sector. In 2008, 94 of 101 countries across all regions had policies to provide free HIV testing in the public sector (Box 2.2).

2.2. HIV testing and counselling programmes

The results showing considerable expansion of HIV testing and counselling policies are consistent with the evidence available in the public health literature on HIV testing and counselling programmes. Reports from several countries in sub-Saharan Africa document the considerable expansion of testing and counselling and the emergence of new ways to encourage its use. Whereas in the 1990s, HIV testing and counselling was conducted largely in client-initiated testing sites, provider-initiated testing initiatives have been established in numerous countries and outreach programmes have been put in place: for example, in tertiary hospitals in Kenya, Malawi and Uganda (4–6) and in TB wards in Kenya and Uganda (7,8). Testing in the course of prenatal care, which was the first provider-initiated approach in such countries as Botswana, Kenya and Zimbabwe (9–13), has continued and expanded to an increasing number of countries. National testing and counselling campaigns have been planned and implemented in Burkina Faso, Kenya, Lesotho, Malawi, Namibia, Rwanda, South Africa, Swaziland, Uganda and the United Republic of Tanzania, and innovative approaches have included offering tests at workplaces such as in Rwanda and Zimbabwe (14,15), through mobile units or at people's homes (16,17).

There is less evidence on progress in HIV testing and counselling in the published literature outside sub-Saharan Africa, in part because where HIV prevalence is lower

and concentrated among particular groups, the epidemic has not mobilized as much attention and resources as in sub-Saharan Africa. There are, nevertheless, examples of promising initiatives in Asia and Latin America, showing that making services accessible at health facilities, such as in labour wards, TB wards or private-sector facilities (18–21), increases the uptake of HIV testing and can reduce costs and increase effectiveness.

In high-income countries, despite the availability of services, many people living with HIV tend to be diagnosed late, after their immunity is compromised. Studies in Europe, Australia and the United States show that individuals who are eventually diagnosed with HIV had previously visited health facilities but were not offered an HIV test. Recent estimates (22–24) show that, in Europe, 15–38% of all people living with HIV present late when their CD4 counts are less than 200 per mm³. Such evidence underscores the missed opportunity that contact with health services represents. Similar delays are also noted in the United States. In 2006, the United States Centers for Disease Control and Prevention had recommended HIV screening for all people aged 13–64 years who attend health facilities in the United States, to address this problem. Such changes are expected to result in reaching individuals earlier in the process of

infection to provide the needed counselling, prevention and treatment services.

Scaling up access to testing and counselling services in Europe also raises a number of other issues that are common to low-prevalence settings in which the epidemic is concentrated among marginalized groups (Box 2.3). While in western Europe the challenge is to increase the uptake of testing and counselling services, in eastern Europe and central Asia the priority is to make quality services available and accessible, specially for populations at high risk. Policies need to be harmonized in accordance with the protection of individuals' rights and need to address stigma and discrimination. Services are not easily accessible to the people who need them the most – marginalized population groups – and their quality is uneven. The WHO Regional Office for Europe has initiated the development of a regional policy framework for testing and counselling, and a tool is being developed for this purpose.

2.3. Availability of HIV testing and counselling services

More countries are reporting on the number of health facilities providing HIV testing and counselling services; from 52 countries in 2006 to 81 countries in 2007 and 119 countries in 2008. The 119 countries reported 95 300 health facilities providing HIV testing and counselling services in 2008, up from 30 500 reported by 81 countries in 2007 and 21 900 by 52 countries in 2006. Such improvements in reporting allow the availability of HIV testing and counselling services to be described more comprehensively at the regional and global levels.

In 66 low- and middle-income countries that reported comparable data for 2007 and 2008, the total number of health facilities increased by about 35%, from 25 000 facilities in 2007 to 33 600 in 2008, with the increase ranging from 1.5 to 2 times across regions (Fig. 2.2).¹ In sub-Saharan Africa, the total number of health facilities providing HIV testing and counselling services increased by 50%, from 11 000 in 2007 to 16 500 in 2008, in the 37 countries in this region with comparable data for 2007 and 2008.

Increases in the number of facilities providing these services between 2007 and 2008 have been uneven (Table 2.1).

Box 2.3. HIV testing and counselling in Europe: the experience of Portugal

Portugal illustrates both the challenges of scaling up testing and counselling in Europe and possible responses to the epidemic. Until recently, HIV testing and counselling in Portugal was limited to formal health structures; it was mainly conducted as part of blood safety procedures, during the diagnostic work-up of people suspected of having HIV infection or for risk assessment at the request of the client who might have HIV infection or the health care provider.

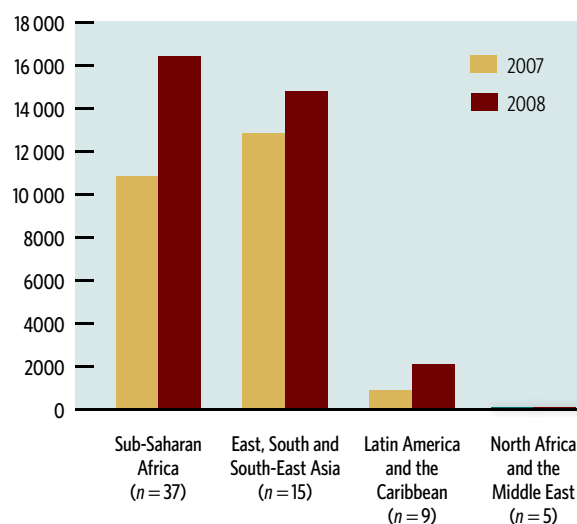
Growing awareness of the missed opportunities for diagnosing those who would benefit from HIV counselling, treatment, care and prevention has led to a rapid expansion of testing. Now about 1 million tests are performed yearly free of charge, most as part of the universal offer of testing to pregnant women. HIV testing is also conducted among drug users and in TB centres; this has helped to double the number of people receiving an HIV test between 2006 and 2008, reaching 85% of those receiving health care. The number of HIV tests performed in anonymous voluntary counselling and testing centres has increased tenfold, especially after rapid tests were introduced in 2007. Despite these efforts, multiple problems remain with access barriers, inconvenient schedules and unfriendly attitudes towards the most-vulnerable population groups. The proportion of people diagnosed with CD4 counts under 350 per mm³ remains high at 60%. A national testing policy to expand testing to non-formal health settings (including prisons) and to increase the use of rapid tests in primary care is under discussion.

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009. The 66 countries considered for the analysis include those that reported data using consistent definitions in 2007 and 2008. Countries that clearly indicated that the data were not nationally representative were not included. The 66 countries include low- and middle-income countries from the regions of sub-Saharan Africa; East, South and South-East Asia; Latin America and the Caribbean; and the Middle East and North Africa. Data for an additional 11 countries in Europe and Central Asia are available for 2006 and 2008.

For instance, some countries have increased by 50–100%, such as Burkina Faso (from 454 to 815 facilities), Cameroon (1107 to 1860), Ethiopia (1005 to 1469) and the United Republic of Tanzania (527 to 1035), whereas others show smaller increases. Overall availability of services, measured by the proportion of total health facilities in a country that offer HIV testing and counselling, varies considerably, from less than 10% in the Central African Republic, Congo, the Democratic Republic of the Congo, Gabon, Mauritania, Niger, Nigeria and Somalia to more than 70% in Botswana, Lesotho, Malawi, Namibia, Rwanda, Sao Tome and Principe, Swaziland and Zimbabwe.

Among 15 countries in East, South and South-East Asia with comparable data for 2007 and 2008, the total reported number of health facilities providing HIV testing and counselling services increased from 13 000 to 15 000. China reported an additional 740 facilities providing these services in 2008, bringing the total to 6082. The reported number of facilities increased from 4269 to 4817 in India and from 961 to 1014 in Thailand. In Papua New Guinea, which has a generalized HIV epidemic, the reported number of facilities increased from 32 in 2007 to 118 in 2008.

Fig. 2.2. Reported number of health facilities providing HIV testing and counselling services in low- and middle-income countries with comparable data, by region, 2007 and 2008



n: number of countries by subregion among all 66 countries with comparable data for 2007 and 2008.

Table 2.1. Number of health facilities with HIV testing and counselling services and ratio of adult population (≥15 years) per testing and counselling facility in 77 reporting low- and middle-income countries, by region, 2007 and 2008

	Epidemic level	Number of facilities with HIV testing and counselling, 2007	Number of facilities with HIV testing and counselling, 2008	Population ≥15 years per testing and counselling facility, 2007	Population ≥15 years per testing and counselling facility, 2008
Sub-Saharan Africa					
Angola	Generalized	154	221	54 000	38 000
Benin	Generalized	183	389	22 000	10 000
Botswana	Generalized	634	643	2 000	2 000
Burkina Faso	Generalized	454	815	16 000	9 000
Burundi	Generalized	180	266	23 000	16 000
Cameroon	Generalized	1107	1860	8 000	5 000
Cape Verde	Generalized	32	32	8 000	8 000
Central African Republic	Generalized	24	78	86 000	27 000
Comoros	Concentrated	4	13	85 000	26 000
Congo	Generalized	54	101	33 000	17 000
Côte d'Ivoire	Generalized	124	457	79 000	21 000
Democratic Republic of the Congo	Generalized	286	315	100 000	91 000
Djibouti	Generalized	24	28	19 000	16 000
Eritrea	Generalized	109	130	23 000	19 000
Ethiopia	Generalized	1005	1469	37 000	25 000
Gabon	Generalized	75	75	10 000	10 000
Gambia	Concentrated	26	32	30 000	24 000
Ghana	Generalized	422	524	28 000	22 000
Lesotho	Generalized	163	204	6 000	5 000
Liberia	Generalized	12	90	149 000	20 000
Madagascar	Concentrated	630	757	14 000	12 000
Malawi	Generalized	504	677	13 000	10 000
Mali	Generalized	58	260	104 000	23 000
Mauritania	Concentrated	22	17	74 000	96 000

	Epidemic level	Number of facilities with HIV testing and counselling, 2007	Number of facilities with HIV testing and counselling, 2008	Population ≥15 years per testing and counselling facility, 2007	Population ≥15 years per testing and counselling facility, 2008
Mozambique	Generalized	359	359	29 000	29 000
Namibia	Generalized	253	306	4 000	4 000
Niger	Concentrated	145	172	43 000	36 000
Nigeria	Generalized	736	897	97 000	80 000
Rwanda	Generalized	312	341	15 000	14 000
Sao Tome and Principe	Low level	32	40	2 000	2 000
Senegal	Concentrated	190	281	31 000	21 000
Sierra Leone	Generalized	165	370	16 000	7 000
Somalia	Concentrated	17	19	240 000	215 000
Swaziland	Generalized	110	170	5 000	3 000
Uganda	Generalized	554	812	25 000	17 000
United Republic of Tanzania	Generalized	1 035	1 677	19 000	12 000
Zimbabwe	Generalized	791	1 560	8 000	4 000
East, South and South-East Asia					
Cambodia	Concentrated	190	212	41 000	37 000
China	Concentrated	5 342	6 082	142 000	125 000
Fiji	Low level	26	31	17 000	14 000
India	Concentrated	4269	4817	147 000	130 000
Indonesia	Concentrated	290	547	436 000	231 000
Lao People's Democratic Republic	Low level	36	91	87 000	35 000
Mongolia	Low level	30	59	54 000	27 000
Nepal	Concentrated	106	137	138 000	107 000
Papua New Guinea	Generalized	32	118	103 000	28 000
Philippines	Low level	52	52	908 000	908 000
Sri Lanka	Low level	26	29	407 000	365 000
Thailand	Concentrated	961	1014	39 000	37 000
Viet Nam	Concentrated	210	244	236 000	203 000
Latin America and the Caribbean					
Belize	Concentrated	17	11	9 000	14 000
Bolivia	Concentrated	98	225	49 000	21 000
Dominican Republic	Concentrated	127	150	41 000	35 000
El Salvador	Concentrated	198	515	15 000	6 000
Guatemala	Concentrated	41	183	154 000	35 000
Guyana	Concentrated	131	147	3 000	3 000
Haiti	Generalized	140	144	36 000	35 000
Honduras	Concentrated	153	655	24 000	6 000
Paraguay	Concentrated	87	102	37 000	31 000
Middle East and North Africa					
Iraq	Low level	10	27	1 458 000	540 000
Jordan	Low level	4	12	836 000	279 000
Lebanon	Low level	23	20	100 000	116 000
Tunisia	Low level	6	11	980 000	534 000
Yemen	Low level	11	13	989 000	837 000
Europe and Central Asia^a					
Armenia	Concentrated	29	150	56 000	11 000
Azerbaijan	Low level	19	43	265 000	117 000
Bosnia and Herzegovina	Low level	9	12	218 000	164 000
Georgia	Low level	64	35	35 000	64 000
Kazakhstan	Concentrated	325	3 360	27 000	3 000
Kyrgyzstan	Concentrated	39	17	77 000	176 000
Romania	Low level	120	120	91 000	91 000
Serbia	Low level	20	75	242 000	65 000
Tajikistan	Low level	140	224	25 000	16 000
The former Yugoslav Republic of Macedonia	Low level	17	16	63 000	67 000
Ukraine	Concentrated	216	1806	110 000	13 000

Data on adult population size are from the United Nations Population Division (25).

^aFor Europe and Central Asia, data refer to 2006 (instead of 2007) and 2008.

Box 2.4. Measuring the impact of providing HIV testing and counselling in community-based settings

Community-based modalities for testing and counselling, such as through mobile, home-based or door-to-door outreach, can potentially reach population groups who are often missed through health facility-based services. These groups include men in general, women who are not accessing reproductive health services, young people, rural population groups with poor access to health care, ethnic minorities and populations most at risk. Community-based approaches represent a departure from the health service-based approach, which requires users to invest time, effort and resources to come to the service and may therefore discourage HIV testing. There have been numerous efforts to take services to people and offer testing and counselling in easily accessible and convenient locations, and assessing their effectiveness is important.

Project Accept HPTN 043 is the first international multi-site community-based randomized controlled study designed to determine the efficacy of a prevention intervention by measuring HIV incidence and stigma reduction as study endpoints (26). This large-scale trial randomized 34 sites in South Africa, the United Republic of Tanzania and Zimbabwe and 14 communities in Thailand to receive either standard, client-initiated testing and counselling or a community-based testing and counselling intervention. Intervention strategies include community outreach to encourage discussions about HIV, normalize knowledge of HIV status and increase HIV testing as well as post-test support services.

The trial is ongoing and is expected to be completed by June 2011. Preliminary data indicate that the uptake of HIV testing increased four-fold in the communities receiving the intervention, suggesting that it is possible to break barriers, reduce stigma, promote discussion and encourage people to be tested (27).

In Latin America and the Caribbean, nine countries report a two-fold increase in the number of health facilities providing HIV testing and counselling services, from nearly 1000 in 2007 to more than 2000 in 2008.

In addition to the 66 countries which reported data for 2007 and 2008, 11 countries from Europe and Central Asia provided data from 2006 and 2008. Overall, the data show a more than fivefold increase in the reported number of sites from about 1000 to nearly 6000, although individual country statistics are not unequivocal.

Table 2.1 also presents the ratio of the adult population per testing and counselling facility. This ratio decreases when testing expands. The data show that the number of adults served per testing and counselling facility between 2007 and 2008 has consistently declined, showing greater availability, but also show that wide differences remain among countries.

2.4. Uptake and coverage of HIV testing and counselling

In 2008, 101 countries reported data on the uptake of HIV testing and counselling versus 53 countries in 2007. Although this clearly indicates improvements in the monitoring and reporting of HIV testing and counselling services, these data must be interpreted carefully – not only in relation to their completeness and national representativeness but also because they may include individuals re-testing for HIV during the reporting period.

Thirty-nine low- and middle-income countries, 19 of which are in sub-Saharan Africa, reported comparable data in

both 2007 and 2008¹ (Table 2.2). The combined reported number of tests in these countries more than doubled over the two-year period, in accordance with the reported increase in the number of health facilities providing these services. The reported increases in most countries appear to be consistent with what is known about efforts at the country level to scale up HIV testing, such as through provider-initiated approaches or through testing campaigns.

Once again, the data vary widely between countries, with some reporting very large increases in testing and counselling uptake. In Ethiopia, for instance, 4.5 million individuals were reported to have received testing and counselling during 2008, up from 1.9 million in 2007. In Swaziland, the reported uptake of testing and counselling increased from 52 000 during 2007 to 81 000 during 2008.

Similarly, nine countries in East, South and South-East Asia reported a combined increase of 63% in testing and counselling uptake, and nine countries in Latin America and the Caribbean reported a combined increase of about 50% from 2007 to 2008.

In addition to the 39 countries which reported data for 2007 and 2008, eight countries in Europe and Central Asia provided data on the uptake of testing in 2006 and 2008. Although not documented in every country, the combined data show an increase in the reported number of people who received an HIV test by more than 50% over the two-year period.

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009. The 39 countries considered for the analysis include those that reported data using consistent definitions in 2007 and 2008. Countries that clearly indicated that the data were not nationally representative were not included. The 39 countries include low- and middle-income countries from the regions of sub-Saharan Africa; East, South and South-East Asia; Latin America and the Caribbean; and the Middle East and North Africa. Data for an additional eight countries in Europe and Central Asia are available for 2006 and 2008.

Table 2.2. Number of people ≥ 15 years old who received HIV testing and counselling and number of tests per 1000 people ≥ 15 years old in 47 reporting low- and middle-income countries, 2007 and 2008^a

	Epidemic level	Number ≥ 15 years old tested in past 12 months, 2007	Number ≥ 15 years old tested in past 12 months, 2008	Number of tests per 1000 population, 2007 ^b	Number of tests per 1000 population, 2007 ^b
Sub-Saharan Africa					
Benin	Generalized	71 103	175 086	18	43
Botswana	Generalized	273 676	218 313	263	210
Cape Verde	Generalized	12 523	17 000	48	65
Central African Republic	Generalized	2 860	56 177	1	27
Congo	Generalized	2 771	55 892	2	32
Eritrea	Generalized	75 369	137 339	31	56
Ethiopia	Generalized	1 893 369	4 524 862	51	121
Gambia	Concentrated	27 022	17 693	35	23
Ghana	Generalized	306 759	467 936	26	40
Guinea-Bissau	Generalized	18 290	20 521	25	29
Lesotho	Generalized	168 952	184 091	171	186
Mauritania	Concentrated	865	9 073	1	6
Niger	Concentrated	36 756	130 354	6	21
Sao Tome and Principe	Low level	13 276	14 079	169	179
Senegal	Concentrated	108 355	134 460	19	23
Sierra Leone	Generalized	78 330	6 5908	29	25
Somalia	Concentrated	4 779	7 714	1	2
Swaziland	Generalized	52 292	81 021	90	139
Uganda	Generalized	1 490 930 ^d	2 015 057 ^e	108	146
East, South and South-East Asia					
Bangladesh	Low level	10 562	24 101	0	0
Cambodia	Concentrated	234 900	296 510	30	38
India	Concentrated	5 364 239	8 734 504	9	14
Indonesia	Concentrated	53 929	109 544	0	1
Iran, Islamic Republic of	Low level	21 146	40 862	0	1
Lao People's Democratic Republic	Low level	16 207	14 481	5	5
Malaysia	Concentrated	409 494	676 454	28	46
Myanmar	Concentrated	177 057	257 158	6	9
Nepal	Concentrated	49 130	86 567	3	6
Papua New Guinea	Generalized	26 934	107 615	8	33
Viet Nam	Concentrated	101 230	181 448	2	4
Latin America and the Caribbean					
Belize	Concentrated	15 529	17 767	97	112
Ecuador	Concentrated	139 086	314 868	20	45
Guatemala	Concentrated	47 000	27 112	7	4
Guyana	Concentrated	13 011	60 812	33	154
Haiti	Generalized	291 225	454 290	58	91
Honduras	Concentrated	98 566	88 189	27	24
Mexico	Concentrated	831 584	1 228 298	14	21
Nicaragua	Concentrated	70 000	118 592	24	40
Paraguay	Concentrated	72 276	68 564	23	22
Middle East and North Africa					
Iraq	Low level	1 423	1 571	0	0
Yemen	Low level	121	2 176	0	0
Europe and Central Asia^c					
Armenia	Concentrated	44 437	70 962	27	43
Azerbaijan	Low level	263 443	346 968	52	69
Bosnia and Herzegovina	Low level	20 874	21 496	11	11
Georgia	Low level	40 638	40 205	18	18
Kazakhstan	Concentrated	725 815	1 047 712	84	121
Lithuania	Low level	47 689	178 245	28	104
Romania	Low level	143 417	276 496	13	25
Tajikistan	Low level	87 912	122 842	25	34

^a Figures in the table are from reports from national programmes to WHO and provide estimates of the use of testing at the level of countries. Analysing changes over time based on these figures would require a process of cross-checking and validation.

^b Data on adult population size are from the United Nations Population Division (25).

^c For Europe and Central Asia, data refer to 2006 (instead of 2007) and 2008.

^d October 2006 - September 2007.

^e October 2007 - September 2008.

It is also useful to summarize data on the uptake of HIV testing and counselling services by specific population groups, such as people with TB, pregnant women and population groups most at risk. Chapter 4 provides details on HIV testing of people with TB, and Chapter 5 outlines data on HIV testing and counselling for pregnant women and children.

Information on HIV testing and counselling among sex workers, people who inject drugs and men who have sex with men is presented below. Reported proportions of population groups most at risk who received HIV testing and counselling in the past 12 months are low, and show the need for greater investment to monitor the access to essential services by these population groups. In 2008, 45 low- and middle-income countries reported data on access to HIV testing among sex workers, 26 for injecting drug users and 31 for men who have sex with men. Although these data may have been generated through surveys that are not nationally representative, and the sample sizes and methods are not comparable, compiling the available information

is nevertheless useful, keeping in mind that countries and regions vary widely. It should also be noted that some survey results may misestimate the proportion of injecting drug users accessing these services; for instance, where reported coverage is close to 100%, they may represent people enrolled in treatment services or other settings where an HIV test is required to access the service.

Table 2.3 shows the coverage of HIV testing and counselling programmes among populations most at risk of HIV acquisition. Among the 45 countries that reported data on sex workers, the median proportion of sex workers who knew their status from a recent HIV test was 38%. Similarly, the median of those who had received HIV testing and counselling was 23% among people who inject drugs (26 reporting countries) and 30% among men who have sex with men (31 reporting countries). Many population groups at high risk of HIV infection, including men who have sex with men, injecting drug users and prisoners, thus continue to face obstacles in accessing essential HIV prevention, treatment and care services.

Table 2.3. Percentage who received an HIV test and the test results in the past 12 months and reported knowledge of HIV status among sex workers, people who inject drugs and men who have sex with men in low- and middle-income countries, 2006–2008

Number of countries reporting	Percentage of population groups most at risk who received an HIV test in the past 12 months and who know the results ^a			Percentage of people 15–49 years old who know their HIV status
	Sex workers	Injecting drug users	Men who have sex with men	
45	26	31	27	
Europe and Central Asia				
Bosnia and Herzegovina	14%	53%	23%	
Georgia	33%	9%		
Kazakhstan	68%	52%	44%	36%
Latvia		4%	100%	
Lithuania			56%	
Republic of Moldova	31%	34%		27%
Romania		19%		
Serbia	45%	32%	31%	
The former Yugoslav Republic of Macedonia		44%	56%	
Ukraine	46%	29%	26%	
Median for Europe and Central Asia	39%	32%	44%	—
Latin America and the Caribbean				
Bolivia (Plurinational State of)	29%		23%	
Brazil			24%	39%
Colombia	61%			
Dominican Republic	95%			75%
Ecuador	87%		51%	
Guyana				23%
Honduras	71%		39%	19%
Mexico	98%	98%	98%	
Paraguay	52%	12%	34%	
Peru	54%		21%	
Median for Latin America and the Caribbean	66%	—	34%	—

	Percentage of population groups most at risk who received an HIV test in the past 12 months and who know the results ^a			Percentage of people 15-49 years old who know their HIV status
	Sex workers	Injecting drug users	Men who have sex with men	
Middle East and North Africa				
Jordan	9%		3%	
Lebanon	81%	66%	35%	
Morocco	51%			
Saudi Arabia		1%		
Median for Middle East and North Africa	—	—	—	—
East, South and South-East Asia				
Bangladesh	5%	4%	3%	
Cambodia	68%	54%	57%	11%
China	36%	42%	30%	
Fiji	21%	11%	6%	
India ^b	34%	3-70%	3-67%	3%
Indonesia	31%	36%	32%	
Iran (Islamic Republic of)	20%	23%		
Lao People's Democratic Republic	18%		5%	
Mongolia	53%		81%	
Myanmar	71%	27%		
Nepal	32%	21%	30%	
Pakistan	8%	12%	13%	
Philippines	12%	4%	16%	0%
Thailand				
Timor-Leste				100%
Viet Nam	15%	11%	16%	
Median for East, South and South-East Asia	26%	21%	16%	—
Sub-Saharan Africa				
Benin				96%
Burkina Faso			28%	
Burundi	71%			
Cameroon				16%
Chad	34%			22%
Comoros				86%
Côte d'Ivoire	51%			
Democratic Republic of the Congo	37%			9%
Djibouti				
Gabon	54%			
Gambia				2%
Ghana				7%
Guinea-Bissau	3%			
Kenya				37%
Madagascar	49%			
Mali				7%
Mauritania	100%			
Namibia				46%
Nigeria	39%	23%	30%	11%
Rwanda	65%			21%
Senegal	19%		16%	
Sierra Leone	21%			100%
Swaziland				27%
Togo	40%			16%
Uganda				24%
Zambia	20%			28%
Median for Sub-Saharan Africa	39%	—	—	22%

^a This table includes data from surveys, including behavioural surveillance surveys, conducted in 2006, 2007 or 2008. Surveys with sample sizes of less than 100 people are not included.

^b Median values are calculated by region if data from more than five countries were available.

^c Ranges are not included in the calculation of the median.

Box 2.5. Scaling up HIV testing and counselling at truck stops in Kenya

A study in Kenya (28) collected data on an innovative HIV testing and counselling programme at truck stops that targeted young male and female sex workers to develop networks of youth engaged in sex work together with their clients. HIV testing and counselling services were provided daily from 18:00 to 02:00 in selected high-risk areas. Overall, 8860 network members (including youth engaged in sex work and truck drivers) received testing and counselling within an 8-month period. Uptake of services was greater among men (62%) than among women (38%). In contrast, HIV prevalence was greater among young women (4%) than young men (2%). HIV prevalence rates were positively correlated with age: women aged 15-19 years had a prevalence rate of 2%, a number that increased markedly to 6% among 20- to 24-year-olds. Similarly, HIV prevalence among men aged 20-24 years, at 1.7%, was more than double the figure for those aged 15-19 years, which stood at 0.8%.

Socioeconomic status can also play an important role in determining equity of access to priority interventions (Box 2.6).

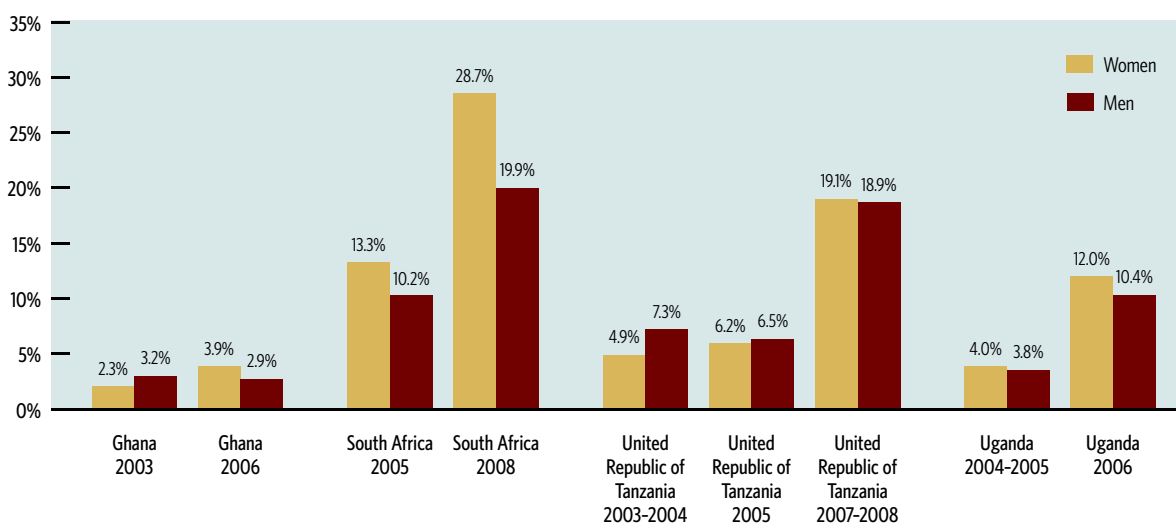
The coverage of HIV testing and counselling can be examined more closely by reviewing data from population-based surveys. Countries conduct these surveys every few years, and the results can help to assess trends to in a country over time. However, establishing clear regional or global time trends in scaling up HIV testing and counselling across

countries as a whole is difficult, because these surveys are not comparable across countries and are not conducted according to a regular schedule. Further, the data may not adequately reflect rapid changes that may take place over a short period of time. Nevertheless, available data can be used to assess the following indicators of progress:

- in the countries that have conducted more than one survey, progress can be inferred from successive surveys by comparing the percentage of survey respondents who report having received an HIV test and the test results in the 12 months preceding the survey;
- although global or regional trends cannot be inferred, median values of testing rates from surveys conducted in different countries in successive time periods can be examined for uni-directional changes. This includes changes in the percentage of survey respondents who report ever having received an HIV test and the test results prior to the survey, as well as the percentage of those having received an HIV test in the 12 months preceding the survey, among the general population and among people living with HIV.

Six countries in sub-Saharan Africa have conducted repeated population-based surveys in the past 10 years. As expected, the data from these surveys show that more people are being tested in recent years (Fig. 2.4). For instance, in the United Republic of Tanzania, less than 7% of women and men had reported receiving an HIV test and test results in the 12 months before the survey in 2005, increasing to about 19% among both sexes in the survey in 2007-2008. In Uganda, the corresponding rates increased from about

Fig. 2.4. Percentage of women and men receiving an HIV test and test results in the 12 months preceding the survey in countries with repeat population surveys, 2003-2008



Source: Demographic and Health Surveys (30).

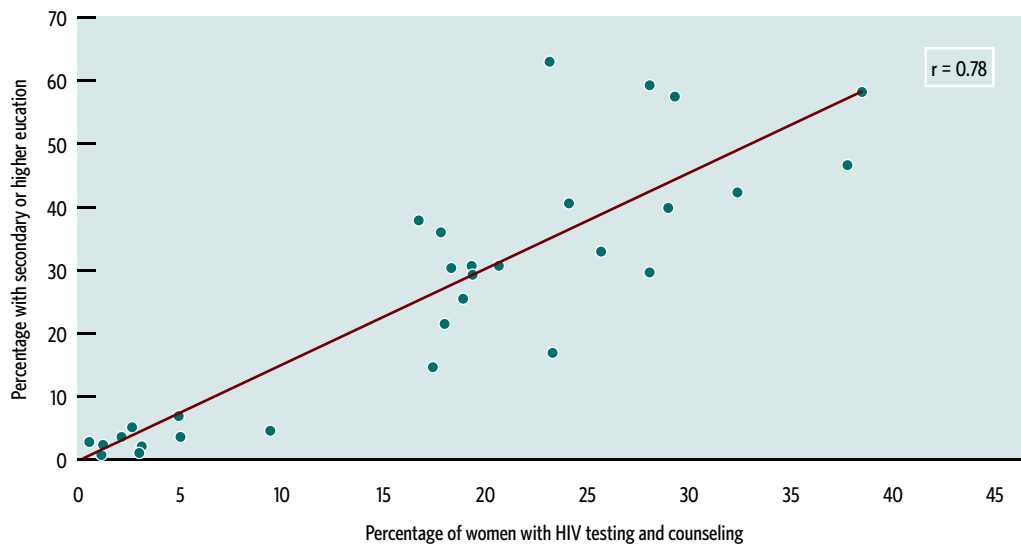
Box 2.6. Socioeconomic determinants of HIV testing and counselling: results from the Global Fund Five-Year Evaluation

Since it was established in 2002, the Global Fund to Fight AIDS, Tuberculosis and Malaria has become a major source of funding for the response to the three diseases, with more than US\$ 15 billion committed to nearly 600 programmes in 140 countries worldwide (29). In 2006, the Global Fund initiated a comprehensive evaluation of its first five years of operation in three study areas, including the health impact of collective investments on HIV, TB and malaria (2). Eighteen countries participated in the study, and new data were collected for eight countries (Burkina Faso, Cambodia, Ethiopia, Haiti, Malawi, Peru, United Republic of Tanzania and Zambia) using a comprehensive assessment at the individual, household and facility levels in a selected number of districts. The districts were chosen through purposive sampling to cover each major region in the country, with the number of districts varying between 7 and 15 per country.¹ Data were collected in the first half of 2008 for most countries.

These data describe in detail the expansion of HIV testing and counselling. A comparison of the proportion of health facilities with HIV testing and counselling services in four countries shows that the availability in rural districts varies across countries and that, overall, the median density of HIV testing and counselling facilities per 100 000 population was higher in urban districts than in rural districts.

Analysis of the data collected through household surveys in Burkina Faso, Ethiopia, Haiti and Zambia shows that, despite the increase in the number of facilities providing HIV testing and counselling in these countries, socioeconomic factors continue to represent differentials in access: positive associations are documented between service utilization and education level, residence and household wealth. Among surveyed women aged 15-49 years who gave birth in the two preceding years, those with secondary education were most likely to have been counselled, have been offered and accepted an HIV test and have received the results, followed by women with primary education and no education (Fig. 2.3). The results were similar for HIV testing and counselling among people aged 15-24 years. The data also show that women from higher wealth quintiles were more likely to receive HIV testing and counselling and the test results in all countries except Zambia, where the disparities between wealth groups were smaller.

Fig. 2.3. Percentage of women with HIV testing and counselling and percentage of women with secondary or higher education, district comprehensive assessment districts in Burkina Faso, Haiti and Zambia, 2008



Source: Global Fund five-year evaluation, study area 3: the impact of collective efforts on the reduction of the disease burden of AIDS, tuberculosis and malaria. Final report (2).

¹ Health facilities were surveyed in each selected district. In most countries, a census of all public and private facilities was conducted in the selected districts (555 facilities in 13 districts in Burkina Faso; 207 facilities in 7 operational districts in Cambodia; 210 facilities in 9 departments in Haiti; 358 facilities in 6 major urban areas in Peru; and 338 facilities in 9 districts in Zambia). In Ethiopia, a purposeful sample of hospitals and 4 nearby health centres was surveyed in each of 11 regions with a total of 158 facilities; and in Malawi a purposeful sample of 113 facilities was surveyed in 9 districts. The results from Ethiopia and Malawi are therefore not representative of the district or the pooled districts and should be interpreted with caution. Data from the United Republic of Tanzania were not available at the time this report was written.

4% among both sexes in a survey in 2004–2005 to 12% among women and 10% among men in a survey in 2006.

Nine countries, seven of which were in sub-Saharan Africa, countries conducted population-based surveys during 2007 and 2008 and provided information on HIV testing rates, (Table 2.4). Together these countries account for 32% of the people living with HIV globally and 45% of those in sub-Saharan Africa. Among these countries, a median of 37% of female and 21% of male respondents aged 15–49 years had ever received an HIV test and the test results before the survey. Among the seven countries in sub-Saharan Africa, the median percentages were 30% among women and 17% among men. Data from these countries (excluding Kenya, for which this information was not available) also show that a median of 19% of women and 10% of men reported having received an HIV test and the test result in the 12 months preceding the survey.

A comparison with data from 22 countries (including 16 in sub-Saharan Africa) presenting such information from population-based surveys conducted in 2005 and 2006 suggests positive uni-directional changes in testing coverage over time.¹ In surveys conducted in 2005 and 2006, a median of about 10% of women and men report having ever

¹ The 21 countries are: Benin (2006), Cambodia (2005), Cape Verde (2005), Central African Republic (2006), Congo (2005), Côte d'Ivoire (2005), Ethiopia (2005), Ghana (2006), Guinea (2005), Guyana (2005), Haiti (2005), India (2005–2006), Mali (2006), Namibia (2006), Niger (2006), Republic of Moldova (2005), Rwanda (2005), Senegal (2005), South Africa (2005), Uganda (2006), Viet Nam (2005 and Zimbabwe (2005–2006) (30,32).

Table 2.4. Percentages of women and men 15–49 years old who were tested for HIV in the past 12 months preceding the survey; and who were ever tested for HIV and received the test results, population-based surveys, 2007–2008

Country	Year of survey	Percentage of people tested who had received an HIV test and the test results in the past 12 months		Percentage of people who had ever received an HIV test and the test results	
		Women	Men	Women	Men
Democratic Republic of the Congo	2007	4.1	3.8	8.6	9.2
Dominican Republic	2007	20.5	18.6	61.8	40.4
Kenya	2007			43.0	25.0
Liberia	2007	1.6	2.3	3.2	4.9
South Africa	2008	28.7	19.9	56.7	43.0
Swaziland	2007	21.9	8.9	35.8	17.1
Ukraine	2007	12.3	7.2	45.4	21.4
United Republic of Tanzania	2007–2008	19.1	18.9	37.2	26.5
Zambia	2007	18.5	11.7	35.3	19.8

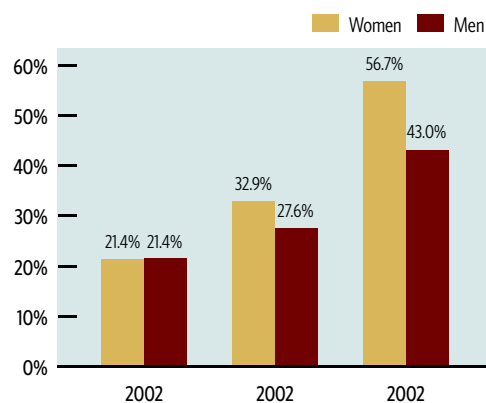
Sources: Demographic and Health Surveys (30); Shisana et al. (31–33); Kenya AIDS Indicator Survey 2007: preliminary report (34).

Box 2.7. Scaling up HIV testing and counselling in South Africa

From June 2008 to March 2009, South Africa conducted the third in a series of national population-based surveys to assess HIV prevalence, incidence and HIV-related knowledge and behaviour (31). A comparison of data from this survey with data from the two previous surveys conducted in 2005 (32) and 2002 (33) shows a very sizeable increase in the proportion of respondents reporting access to HIV testing services in all provinces. Only 20% of respondents aged 15 years and older had ever received an HIV test in 2002, increasing to about 50% of respondents in the recent survey in 2008.

Progress is evident among both sexes, although more marked among women. In 2002, an equal proportion of female and male respondents (21%) reported ever having received an HIV test. In 2005, 33% of women and 28% of men had ever had an HIV test, increasing further to 57% and 43%, respectively, by 2008 (Fig. 2.5). Between 2005 and 2008, the percentage of women and men who reported having received an HIV test and the test results in the 12 months preceding the survey increased nearly two-fold from 13% to 29% among women and from 10% to 20% among men.

Fig. 2.5. Percentage of women and men (>= 15 years) who had ever received an HIV test and test results, South Africa, 2002, 2005 and 2008



Source: Shisana et al. (31–33).

In addition, the data show that HIV testing is increasing among high-risk population groups. In 2008, about 14% of recreational drug users were aware of their HIV status in 2005 and 23% in 2008. Data among men who have sex with men were only available for 2008 and show testing coverage of 27% of those surveyed.

received an HIV test and the test results; and a median of 4% of women and 5% of men report having received it in the 12 months preceding the surveys.

Although median percentages provide a midpoint statistic, individual countries vary widely in testing rates. In the surveys conducted in 2007 and 2008, less than 10% of women and men reported ever having received an HIV test in the Democratic Republic of the Congo versus more than 50% of women and more than 40% of men in the Dominican Republic and in South Africa.

The data also suggest that, on the whole, more women are being tested than men. In all surveys conducted in 2007 and 2008, except for the Democratic Republic of the Congo and Liberia, the proportion of women who report having ever been tested for HIV was consistently higher than the proportion of men, likely reflecting initiatives to propose HIV tests in the course of prenatal care.

Population-based surveys also provide information on the proportion of people living with HIV who had ever been tested and received results before the survey. Although these data provide some indication of knowledge of HIV status among people living with HIV, they should be interpreted with caution. Among those who report having received a test and its result before the survey,

some may have received that test long before the survey was conducted and may have been infected since; thus, they may inaccurately report themselves as “knowing” that they are negative.¹ Thus, the above percentages of people living with HIV who report having received an HIV test and the test result should be considered as providing an upper limit estimate of how many people have correct knowledge regarding their HIV-positive status.

In 2008, based on 12 population surveys conducted between 2005 and 2007, WHO/UNICEF/UNAIDS reported that a median of 20% of people living with HIV had received an HIV test and the test result prior to the survey (35). Data from additional, more recent surveys became available in 2009. Although the results of country surveys conducted in 2007 and 2008 cannot be directly compared with those conducted in 2005 and 2006, the results can be examined for a change in the median percentage of people living with HIV who had learned their HIV status in the successive time periods. The median percentage of respondents 15–49 years old living with HIV who reported having ever been tested and receiving results in 12 countries with surveys in 2005–2006 was 15%. In 2007–2008, the median for seven countries was 39% (Table 2.5). In the United Republic of Tanzania, where two consecutive surveys were conducted, the combined percentage of respondents living with HIV who reported having ever received an HIV test and test result before the survey increased from 21% in 2003–2004 to 39% in 2007–2008.

In conclusion, 2008 showed evidence of country efforts to scale up HIV testing and counselling services and to improve programme monitoring and reporting systems to assess progress. The data clearly show that more people are gaining knowledge of their HIV status but with wide differences in access across countries. The analysis also provides evidence of differences among population groups – more women have access to HIV testing and counselling services than men – but access for high-risk population groups remains limited.

Table 2.5. Percentages of women and men 15–49 years old living with HIV who were ever tested for HIV and received the test results, population-based surveys, 2007–2008

Country	Year of survey	Percentage of people living with HIV who had ever received an HIV test and test results		
		Women	Men	Both sexes
Democratic Republic of the Congo	2007	8.7	(14.5) ^a	10.7
Dominican Republic	2007	72.6	49.1	60.7
Kenya	2007			43.0
Liberia	2007	8.0	11.5	9.2
Swaziland	2007	44.0	28.8	38.7
United Republic of Tanzania	2007-2008	43.7	30.8	39.0
Zambia	2007	45.4	28.3	38.4

^a Denominator based on 25–49 cases.

Sources: Demographic and Health Surveys (30); Kenya AIDS Indicator Survey 2007: preliminary report (34).

¹ For instance, the Kenya AIDS Indicator Survey of 2007 (34), which tested survey participants for HIV, shows that, among the 43% who reported ever having received an HIV test, only 16% correctly reported their HIV status; 26% self-reported being uninfected but tested positive during the survey.

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3. HEALTH SECTOR INTERVENTIONS FOR HIV PREVENTION

Key findings

- More data are becoming available on the epidemiology of HIV infection among population groups at high risk of HIV, including in generalized HIV epidemics. Yet, of 149 low- and middle-income countries, only 41 reported conducting systematic surveillance of HIV among people who inject drugs, 44 among men who have sex with men and 65 among sex workers. Data on the coverage of HIV prevention, treatment and care among these groups are also limited.
- Among 92 low- and middle-income countries which provided information on programmes and policies targeted at injecting drug users, 30 reported having needle and syringe programmes, and 26 offered opioid substitution therapy. Needle and syringe programmes distributed a median of 24.4 syringes per injecting drug user per year in Europe and Central Asia and 26.5 in East, South and South-East Asia, far below the internationally recommended target of 200 syringes per injecting drug user per year. While there are examples of scale-up efforts in many settings, injecting drug users continue to face legal and social barriers in accessing health services.
- The median percentage of condom use by surveyed men who have sex with men during the last time they had anal sex with a male partner was around 60% in 37 low- and middle-income countries, with country variations. HIV prevalence among men who have sex with men is higher than among the general population in many countries; and homophobia and criminalization of same-sex behaviour continue to hinder the response. The year 2008 refocused international attention on the HIV epidemic among men who have sex with men with the publication of new data and scientific consultations to define priority health sector interventions to address their needs.
- Among sex workers, the median reported rate of condom use with their most recent client was 86% among 56 low- and middle-income countries. Programmes promoting 100% condom use by sex workers have been successfully implemented in many settings. Such approaches should be expanded with due attention to the local context and the heterogeneity of sex work, both formal and informal.
- Early identification and treatment of sexually transmitted infections is a critical element in controlling HIV infection, especially among people with multiple sexual partners. The median reported prevalence of syphilis among sex workers in low- and middle-income countries was 6% (42 countries).
- All 13 priority countries in sub-Saharan Africa with high rates of heterosexual HIV transmission and low rates of male circumcision have established policies and programmes to scale up male circumcision to reduce the risk of heterosexually-acquired HIV infection in men. Recent studies showed that the protective effect of male circumcision on HIV acquisition was sustained for at least 42 months. Future efforts will focus on improving service delivery with quality assurance.
- Among countries that provided data on screening for transfusion-transmissible infections (including HIV, hepatitis B, hepatitis C and syphilis), around 25% reported being unable to screen all donated blood for one or more of these infections. The availability and safety of blood and blood products for transfusion is of continuing concern, especially in low- and middle-income countries.
- More low- and middle-income countries reported the establishment and implementation of post-exposure prophylaxis policies in 2008. All reporting countries indicated that their policies covered occupational exposure to HIV, and 75% covered non-occupational exposure, such as in the case of sexual assault.
- Ongoing research on new prevention technologies, such as vaccines, microbicides and antiretroviral pre-exposure prophylaxis, offers future opportunities for the health sector to expand its contribution to HIV prevention. Further research is also needed on the optimal use of antiretroviral therapy for HIV prevention in the future, including the feasibility and acceptability of such approaches.

It is recognized now more than ever that an effective health sector response to HIV requires a balanced approach that integrates HIV prevention, treatment, care and support. More than 25 years since the beginning of the epidemic, the number of new infections continues to be unacceptably high, with as many as 2.7 million [2.2 million – 3.2 million] people, including 370 000 [330 000–410 000] children, newly infected with HIV in 2007. Improved data from low- and middle-income countries have highlighted the importance of population groups at high risk of acquiring HIV (including injecting drug users, sex workers and men who have sex with men) in influencing the spread of HIV, including in countries with generalized epidemics. Consequently, greater emphasis is being placed on tailoring HIV prevention programmes to the local country or community context and on using

combination prevention approaches that deliver a range of prevention interventions at the same time.

The health sector plays a key role in scaling up the implementation of HIV prevention interventions.¹ Priority health sector interventions include a combination of various behavioural and biomedical approaches, including established interventions such as promoting the use of condoms and clean injecting equipment; providing opioid substitution therapy and other drug dependence treatment; preventing HIV infection in health care settings; and preventing and managing other sexually transmitted infections, including viral hepatitis. HIV prevention in the health sector also focuses on averting HIV transmission from mother to child (Chapter 5) and making focused HIV prevention services available to population groups most at risk. In 2007, male circumcision was also recommended as an HIV prevention intervention, following evidence from three randomized controlled trials that clearly indicated its effect in protecting against HIV acquisition among heterosexual men (section 3.3). In addition, health services need to engage meaningfully with affected communities of people living with HIV to address their prevention needs, maximize their health and prevent further transmission.

Box 3.1. Using antiretroviral drugs for HIV prevention

The use of antiretroviral drugs to prevent HIV transmission is emerging as a potential new set of interventions for the prevention portfolio. Antiretroviral drugs, combined with HIV testing of pregnant women and appropriate infant feeding practices, are already being used to prevent HIV transmission from pregnant women to their children (Chapter 5). Guidance also exists on the use of antiretroviral drugs for post-exposure prophylaxis, and research is ongoing on their use for pre-exposure prophylaxis (section 3.6). Studies have also provided observational evidence that antiretroviral therapy may reduce the sexual transmission of HIV in generalized epidemics, especially among discordant couples (1).

Some recent research studies have modelled the effects of antiretroviral therapy on HIV prevention. In a mathematical model using data from British Columbia, Canada, researchers assessed the effect of expanding antiretroviral therapy coverage on the number of individuals testing newly positive for HIV and on related costs over the next 25 years (2). They estimated that expanding antiretroviral therapy can substantially reduce the growth of the epidemic and related costs. Scientists from WHO presented a theoretical mathematical model of the potential impact of universal voluntary HIV testing and counselling followed by immediate antiretroviral therapy, irrespective of clinical stage or CD4 count (3). The results of the modelling exercise suggested that, in a generalized epidemic as severe as that in southern Africa, HIV incidence may be reduced by 95% in 10 years and this approach may save money in the medium term.

These theoretical models raise several questions regarding their assumptions and their applicability in other settings. In November 2009, WHO will convene an international consultation of researchers, clinicians, prevention experts, human rights specialists and ethicists, national programme representatives and community groups to identify research priorities to explore the feasibility, acceptability and implications of the optimal use of antiretroviral therapy for HIV prevention.

Ongoing research on new biomedical prevention approaches and technologies, such as vaccines, topical microbicides and antiretroviral pre-exposure prophylaxis, offers future opportunities for the health sector to expand its contribution to HIV prevention. Recent studies involving serodiscordant couples have also suggested the potential of antiretroviral therapy to reduce HIV transmission (1). Further research is needed to identify the population-level effects of scaling up antiretroviral therapy on HIV epidemics and to carefully consider the financial and operational feasibility of such approaches in the future, including their ethical implications (Box 3.1).

3.1. Preventing HIV infection among populations at high risk of acquiring HIV

This section presents data on access to HIV prevention programmes by injecting drug users, sex workers and men who have sex with men. Focusing attention on these population groups, which may be at high risk of HIV infection through their behaviour, is an important priority for the health sector. Data on access to HIV interventions by prisoners are also reported due to the confluence of high-risk behaviour and lack of access to prevention services among the incarcerated population.

¹ This chapter focuses on health sector interventions for HIV prevention, and does not address multisectoral HIV prevention interventions outside of the health sector.

Box 3.2. Methodological notes on the quality and interpretation of data

The data collated and discussed in this section on population groups most at risk of acquiring HIV were submitted directly by Member States to WHO, UNICEF and UNAIDS in 2009.¹ Additional data were included from other published sources for countries that did not report.

Much of the data on the coverage and impact of interventions for population groups most at risk of acquiring HIV come from surveys whose methods and sample sizes can be highly heterogeneous. As a result, estimates of coverage may not always be based on nationally representative estimates of the size of the population needing these services and may not be comparable across countries. In addition, interpretations of coverage data must consider the fact that many surveys were conducted in a few large urban areas and the results may not necessarily reflect prevailing conditions at the national level.

Country reports also indicate that several data came from services run by government or other official entities. This is likely to underestimate the coverage of services that are typically provided by nongovernmental organizations, such as needle and syringe programmes. Failure to report, however, does not imply that services are absent, although this may be the case. In addition, the fact that a particular policy may be available does not indicate the level, scope or quality of services actually delivered.

The analysis in this section does not include surveys conducted before 2006 and those based on samples smaller than 100 participants. Median figures are provided by region whenever five or more country data points are available. In the coming years, data quantity and quality are expected to improve and trends will become discernible.

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

Biological and behavioural surveillance of a population group most at risk of acquiring HIV is critically important for programme planning. UNAIDS and WHO are developing guidance on conducting surveillance among population groups at risk of HIV infection as a result of high-risk behaviour. Nevertheless, in 2008, of 149 low- and middle-income countries, only 41 reported conducting systematic surveillance of HIV among people who inject drugs, 44 among men who have sex with men and 65 among sex workers.¹ Although a country's priorities for conducting HIV surveillance among various population groups depend on the local epidemic pattern, these data highlight the overall need to expand and strengthen data collection and analysis efforts to better address the needs of different population groups at risk (Box 3.2).

3.1.1. People who inject drugs

Globally, the number of people who inject drugs appears to be growing. In 2008, the Reference Group to the United Nations on HIV and Injecting Drug Use published population size estimates of injecting drug users from 148 countries (4). The authors estimate that between 11 and 21 million people inject drugs worldwide, with the largest numbers concentrated in China, the United States of America and the Russian Federation. Based on available data, the authors also estimate that between 0.8 million and 6.6 million people worldwide who inject drugs are living with HIV, of whom the largest numbers are in eastern Europe, East and South-East Asia and Latin America.

New guidance, higher-quality surveillance and improved reporting by targeted programmes for injecting drug users have encouraged countries and partners to focus on the needs and coverage of services for this population and provide evidence of progress. However, too many countries continue to fall short of meeting their health promotion and HIV prevention needs. Further, remembering that substance dependence is a health condition is important. The criminalization of this behaviour and the failure to recognize comorbid conditions in many people who inject drugs are important factors which prevent universal access to HIV interventions for them in many countries.

WHO, UNODC and UNAIDS recommend a comprehensive package of nine interventions for HIV prevention, treatment and care among people who inject drugs (5). These are: (1) needle and syringe programmes, (2) opioid substitution therapies (for opioid users) and other drug dependence treatments, (3) HIV testing and counselling, (4) antiretroviral therapy, (5) prevention and treatment of sexually transmitted infections, (6) condom promotion for injecting drug users and their sexual partners, (7) targeted information, education and communication, (8) diagnosis, treatment and vaccination of viral hepatitis and (9) prevention, diagnosis and treatment of TB. These nine interventions are included in the recommended comprehensive package because they have the greatest impact on HIV prevention and treatment and are based on a wealth of scientific evidence that supports their efficacy (6–8). The combination of interventions and their content depends on the country context (Box 3.3).

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

Box 3.3. Developing and updating normative guidance on harm reduction

WHO and partners continue to review the evidence base and develop normative guidance on issues related to harm reduction. Recent publications include *Policy guidelines for collaborative TB and HIV services for injecting drug users and other drug users: an integrated approach* (9), *Guide to managing and scaling up needle and syringe programmes* (10) and *Guidelines for the psychosocially assisted pharmacological treatment of opioid dependence* (11) and region-specific publications (12–16).

In addition, the WHO, UNODC, UNAIDS technical guide for countries to set targets for universal access to HIV prevention, treatment and care for injecting drug users (5) has provided an important step forward towards harmonizing definitions and interventions to be included in a comprehensive package of HIV prevention, treatment and care for injecting drug users and proposing consistent methods to measure and compare countries' progress towards universal access. Several regional and national programmes as well as the Reference Group to the United Nations on HIV and Injecting Drug Use have already adopted the framework and indicators proposed in this guide. Other United Nations bodies, including the Commission on Narcotic Drugs, have referred to adopting and using this framework, and major bilateral and multilateral donors have expressed interest in using the indicators. In July 2009, a United Nations Economic and Social Council Resolution on HIV/AIDS (17) endorsed this guide. This is the first year that WHO, UNICEF and UNAIDS have collected and reported data on the key indicators recommended in the guide. More detailed information is expected to become available through this process in the coming years.

Table 3.1. Number of low- and middle-income countries reporting the availability of the comprehensive package of interventions for the prevention, treatment and care of HIV among people who inject drugs, 2008

Availability of intervention	Needle and syringe programmes	Opioid substitution therapy	Other drug dependence treatment	HIV testing and counselling	Antiretroviral therapy	Prevention and treatment of sexually transmitted infections	Condom programming for injecting drug users and their sexual partners	Targeted information, education and communication	Viral hepatitis diagnosis, treatment and vaccination	Prevention, diagnosis and treatment of TB among injecting drug users
East, South and South-East Asia										
Yes	14	10	14	21	19	21	16	18	9	12
No	9	13	9	2	4	2	6	5	13	11
Europe and Central Asia										
Yes	11	11	11	10	11	9	11	10	8	7
No	0	0	0	2	0	3	0	1	3	4
Latin America and the Caribbean										
Yes	3	2	6	10	11	9	7	8	4	4
No	13	14	9	6	5	7	9	8	12	12
Middle East and North Africa										
Yes	2	3	6	8	8	8	2	8	5	5
No	9	8	5	3	3	3	9	3	6	6
Sub-Saharan Africa										
Yes	0	0	2	12	12	12	3	8	4	1
No	31	31	29	19	19	19	28	23	27	30
Total										
Yes	30	26	39	61	61	59	39	52	30	29
No	62	66	52	32	31	34	52	40	61	63

Note: The total number of reporting countries varies across interventions because some countries did not provide information for all interventions.

Several organizations monitor the global response to the HIV epidemic among people who inject drugs, including WHO, UNODC, the Reference Group to the United Nations on HIV and Injecting Drug Use and the International Harm Reduction Association. Each regularly publishes important data using official and unofficial sources that help put the response and measures of progress towards universal access into context.

Ninety-two low- and middle-income countries reported information to WHO, UNAIDS and UNICEF on the existence of programmes and policies targeted at injecting drug users (Table 3.1). Needle and syringe programmes were available in 30 countries, and 26 reported providing opioid substitution therapy. Sixty-one countries have policies permitting (and 59 countries offering) antiretroviral therapy and the prevention and treatment of sexually transmitted infections among injecting drug users. Targeted testing and counselling was available in 61 countries (Chapter 2); and targeted information, education and communications programmes for injecting drug users were used in 52 countries.¹

The data also show regional variation in the availability of interventions for people who inject drugs. All reporting countries in Europe and Central Asia (no information was available from the Russian Federation, the country with the most injecting drug users in this region) indicated providing needle and syringe programmes, opioid substitution therapy and other drug dependence treatment. Most reporting countries in East, South and South-East Asia also provided these interventions. In Latin America and the Caribbean, as well as the Middle East and North Africa, most reporting countries do not provide these three interventions. In sub-Saharan Africa, no countries provide needle and syringe programmes or opioid substitution therapy. Opioid substitution therapy is relevant only in countries with epidemics of opioid dependence but not in countries where other drugs may be in use, such as in some parts of Latin America.

Table 3.2 presents information on the availability of policies related to HIV prevention, treatment and care for people who inject drugs among 30 low- and middle-income countries that also reported data on HIV prevalence among injecting drug users. Of the regions with the most countries reporting, the median reported HIV prevalence among injecting drug users was about four times higher in East, South and South-East Asia than in Europe and Central Asia. Many of the

countries with high reported HIV prevalence (>5%) among injecting drug users indicate having adopted a number of the recommended prevention policies, although the adoption of needle and syringe programmes and opioid substitution therapy is clearly still lagging. In the only two sub-Saharan African countries (Kenya and Nigeria) reporting these

Table 3.2. Availability of selected policies for HIV prevention, treatment and care for people who inject drugs among 30 countries submitting data on HIV prevalence among people who inject drugs, 2008

Country	Number of interventions adopted as policy ^a	Needle and syringe programmes	Opioid substitution therapy	Percentage of injecting drug users who are living with HIV
Afghanistan	7	Yes		9%
Bangladesh	9	Yes		2%
Bosnia and Herzegovina	9	Yes	Yes	0%
Cambodia	6	Yes		24%
China	8	Yes	Yes	8%
Indonesia	9	Yes	Yes	52%
Iran (Islamic Republic of)	10	Yes	Yes	19%
Jordan	6			0%
Kazakhstan	10	Yes	Yes	4%
Kenya	6			35%
Latvia	6	Yes	Yes	23%
Lithuania	10	Yes	Yes	4%
Maldives	6		Yes	0%
Morocco	8	Yes		2%
Myanmar	10	Yes	Yes	34%
Nepal	8	Yes	Yes	35%
Nigeria	0			6%
Oman	8	Yes	Yes	1%
Pakistan	9	Yes		21%
Philippines	7	Yes		1%
Republic of Moldova	6	Yes	Yes	17%
Romania	9	Yes	Yes	1%
Serbia	10	Yes	Yes	5%
Tajikistan	10	Yes	Yes	19%
Thailand	10	Yes	Yes	48%
The former Yugoslav Republic of Macedonia	10	Yes	Yes	1%
Ukraine	10	Yes	Yes	14%
Viet Nam	7	Yes	Yes	20%
Total (Yes)		26	19	

^aThe nine recommended interventions are:

- (1) needle and syringe programmes,
- (2) opioid substitution therapies (for opioid users) and other drug dependence treatments,
- (3) HIV testing and counselling,
- (4) antiretroviral therapy,
- (5) prevention and treatment of sexually transmitted infections,
- (6) condom promotion for injecting drug users and their sexual partners,
- (7) targeted information, education and communication,
- (8) diagnosis, treatment and vaccination of viral hepatitis, and
- (9) prevention, diagnosis and treatment of TB.

For the purpose of counting in this table, opioid substitution therapies and other drug dependence treatments are counted as two interventions, bringing the total to 10 interventions.

¹ The number of countries reporting the existence of needle and syringe programmes and opioid substitution therapy is roughly half the figure reported by the International Harm Reduction Association (IHRA) in March 2009. This discrepancy may be partially explained by the different scope of the respective surveys. While data reported to WHO, UNICEF and UNAIDS focus on low- and middle-income countries, the IHRA provides a global overview and also reports data from high-income countries. In addition, harm reduction services delivered by nongovernmental organizations may not be fully reflected in official government reporting processes (18).

Table 3.3 Availability and coverage of harm reduction programmes for people who inject drugs in reporting low- and middle-income countries, by region, 2006–2008^a

	Number of needle and syringe programme sites per 1000 injecting drug users	Number of opioid substitution therapy sites per 1000 injecting drug users	Syringes and needles distributed by needle and syringe programmes per injecting drug user per year	Percentage of injecting drug users reached with HIV prevention programmes in the past 12 months	Percentage of injecting drug users reporting the use of sterile injecting equipment the last time they injected	Percentage of injecting drug users reporting the use of a condom the last time they had sexual intercourse	Percentage of injecting drug users who are living with HIV
Number of countries reporting	32	28	28	19	27	25	31
Europe and Central Asia							
Armenia		0.0	15.1	54%	95%	56%	7%
Azerbaijan	0.7	0.1			62%	21%	10%
Belarus	0.8	0.0	21.7			74%	8%
Bosnia and Herzegovina	1.0	1.0			32%	21%	0%
Estonia		0.8			94%	66%	55%
Georgia	0.1	0.2	3.1	17%	93%	48%	
Kazakhstan	1.2	0.0	116.4	47%	60%	42%	4%
Kyrgyzstan	2.0	0.7	16.1		23%	27%	26%
Latvia	1.3	0.1	18.3		83%		23%
Lithuania	2.3	3.3	43.5				4%
Montenegro							0%
Republic of Moldova					96%	68%	17%
Romania	2.9	0.4	66.0		84%	23%	1%
Serbia	0.7	0.8	15.6	21%	80%	29%	5%
Tajikistan	1.2		54.4		63%	39%	19%
The former Yugoslav Republic of Macedonia	1.9	1.0	24.4		73%	51%	1%
Ukraine	3.4	0.4	28.8	46%	84%	55%	14%
Uzbekistan	7.0	6.7	37.5	40%	84%	36%	13%
Median - Europe and Central Asia	1.3	0.4	24.4	43%	83%	42%	8%
Latin America and the Caribbean							
Brazil	1.1						
Colombia		0.8					
Mexico	0.4						
Paraguay					70%	73%	
Middle East and North Africa							
Morocco	0.4		6.7				
Oman	0.3	0.3	0.8				
East, South and South-East Asia							
Afghanistan	0.9						9%
Bangladesh	2.3	0.0	101.8	2%	32%	43%	2%
Cambodia	1.0		58.8	56%	66%	68-79% ^c	24%
India ^b	1.1	0.3	28.6	10-83%	29-88%	44-100%	7%
Indonesia	2.7	0.4	6.8	45%	82%	34%	52%
Iran (Islamic Republic of)	2.6	2.7	34.0	20%	74%	33%	19%
Malaysia	1.0	0.6	15.9				
Maldives				0%			0%
Myanmar	0.2	0.1	46.8	53%	81%	78%	34%
Nepal	1.3	0.1	24.4	31%	93%	58%	35%
Pakistan	0.1	0.0	22.2	51%	77%	31%	21%
Philippines	0.1		2.5	14%	48%		
Sri Lanka	0.0	0.0	0.0				
Thailand							48%
Viet Nam	10.5	0.0	181.1	43%	89%	57%	20%
Median - East, South and South-East Asia	1.0	0.1	26.5	33%	77%	43%	20.5%
Sub-Saharan Africa							
Kenya	0.0	0.0	0.0	35%			35%
Nigeria				1%	63%	40%	6%
Median - all reporting countries	1.1	0.3	24.4	37.5%	79%	42%	13%

^a These data must be considered in the context of the methodological notes on the quality and interpretation of data (Box 3.2). Data from national programmes (the number of needle and syringe programmes per 1000 injecting drug users, the number of opioid substitution therapy sites per 1000 injecting drug users, and the number of syringes and needles distributed by needle and syringe programmes per injecting drug user per year) cannot be compared with the other data presented in this table which are derived from surveys, which may represent small sample sizes and misestimate coverage.

^b Ranges are excluded from median calculations.

^c 79% with commercial sex partners and 68% with non-regular partners.

data, neither needle and syringe programmes nor opioid substitution therapy are available. The epidemic among injecting drug users in sub-Saharan Africa is increasingly recognized as important, and surveillance is relatively recent.

Data on the coverage of harm reduction interventions are limited (Table 3.3). Thirty-two countries reported data on the number of sites providing needle and syringe programmes per 1000 injecting drug users and 28 countries on the number of opioid substitution therapy sites per 1000 injecting drug users, with most reports from two regions: Europe and Central Asia (14 and 15 countries for the two interventions respectively) and East, South and South-East Asia (13 and 10 countries respectively). Europe and Central Asia had about 1.3 needle and syringe sites per 1000 injecting drug users, slightly more than in East, South and South-East Asia (1.0). The pattern of availability of opioid substitution therapy services is similar: 0.4 sites per 1000 injecting drug users in Europe and Central Asia and 0.1 in East, South and South-East Asia.

Europe and Central Asia and East, South and South-East Asia are also the two regions where information is more widely available on the number of syringes and needles distributed by needle and syringe programmes per injecting drug user per year. The median numbers of syringes distributed by needle and syringe programmes per injecting drug user per year were about 24.4 in Europe and Central Asia and 26.5 in East, South and South-East Asia, but with important variation among countries. These coverage levels are far below the internationally recommended target of 200 syringes provided per injecting drug user per year, which is likely to have affect the HIV epidemic (5).

Additional data are available from surveys among people who inject drugs. Among the 19 countries reporting data from surveys measuring the coverage of HIV prevention programmes, less than 40% of injecting drug users report having been reached by such programmes in the last 12 months.¹ In Europe and Central Asia, the median percentage of injecting drug users reporting the use of sterile injecting equipment the last time they injected was 83%, but the median percentage reporting the use of a condom the last time they had sexual intercourse was only 42%. The same pattern can be seen among injecting drug users in East, South and South-East Asia. These data are self-reported from surveys among injecting drug users and cannot be

compared to data received through national reporting. The survey data also may misestimate coverage (Box 3.4).

3.1.2. Men who have sex with men

The year 2008 marked a turning point for refocusing international attention on the HIV epidemic among men who have sex with men with the publication of new data, scientific consultations and community mobilization. The XVII International AIDS Conference held in Mexico City in 2008 provided an unprecedented platform to draw attention to the need to strengthen HIV surveillance, prevention and care for men who have sex with men. It called for improved access to health services for men who have sex with men and for transgender people, greater investment in strategic information related to the HIV epidemic and response and an end to stigma, discrimination, homophobia and prejudiced legislation in all regions of the world.

WHO and UNDP hosted a global consultation in September 2008 to define interventions and identify the role of the health sector in scaling up the provision of prevention and treatment of HIV and sexually transmitted infections for men who have sex with men (21). It recommended that health services be provided within a framework of sexual health that also considers mental issues of identity, self-esteem and sexual behaviour and care for substance use disorders and victims of violence. Surveillance, monitoring and research are equally essential to understand the epidemic and to tailor adequate responses.

In addition, regional consultations were held in Asia and the Pacific, Europe, Latin America and the Caribbean and sub-Saharan Africa to address specific epidemiological, programmatic and human rights issues related to scaling up HIV services for men who have sex with men (Box 3.5). Consultations noted gaps in knowledge due to a lack of surveillance or behavioural surveys and absent or underutilized health services and emphasized the need to address the social and legal obstacles to scaling up programmes (22,23).

Several recent publications have provided data on the epidemiology of HIV among men who have sex with men in different regions. More and more Asian countries are now conducting routine HIV surveillance among men who have sex with men. Cohort studies are under way in countries such as Thailand and have allowed HIV incidence data to be measured among these populations (24). The data from Thailand show that the HIV incidence increased in each biennial survey (2003 onwards), with a notable increase in incidence among the youngest age group of men who have sex with men (15–22 years). The HIV prevalence among men who have sex with men in China, where many cities now have several years of repeated surveys, is also climbing steadily (25,26). The HIV prevalence in Indonesia ranges between 2.0% in Bandung and 8.1% in Jakarta (27).

¹ United Nations General Assembly Special Session on HIV/AIDS (UNGASS) indicator 9 on the percentage of injecting drug users reached with HIV prevention programmes in the last 12 months. Survey respondents were asked the following questions: (1) Do you know where you can go if you wish to receive an HIV test? (2) In the last 12 months, have you been given condoms (e.g. through an outreach service, drop-in centre or sexual health clinic)? (3) In the last 12 months, have you been given sterile needles and syringes (e.g. by an outreach worker, a peer educator or from a needle-exchange programme)? The numerator of the indicator is the number of respondents from most-at-risk population groups who replied yes to both questions, and the denominator is the total number of respondents surveyed.

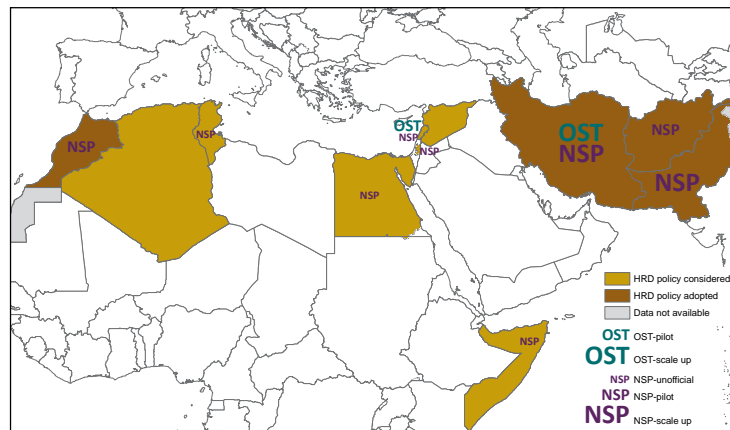
Box 3.4. Country experiences in scaling up interventions for people who inject drugs

MENAHRA – creating a positive policy environment in the Middle East and North Africa

In 2007, WHO and the International Harm Reduction Association partnered to establish the Middle East and North Africa Harm Reduction Network (MENAHRA) with the support of the Drosos Foundation. MENAHRA consists of three subregional knowledge hubs (in the Islamic Republic of Iran, Lebanon and Morocco) as well as a regional network and provides financial support to strengthen the role of civil society in implementing harm reduction in the region. In the first year of activity, the Network focused on setting priorities among the countries in the region based on thorough assessment of the severity of their situations, their needs and their readiness to implement harm reduction interventions (Fig. 3.1). Capacity-building

of the knowledge hubs themselves and training of about 1500 people in the region took place in the second year. By the end of 2013, MENAHRA aims to introduce or scale up opioid substitution therapy and needle and syringe programmes in most participating countries.

Fig. 3.1. Situation analysis of harm reduction interventions in the Middle East and North Africa at baseline, 2008



Measuring the level of the epidemic and service coverage in Zanzibar, United Republic of Tanzania

Although injecting drug use has probably been present in the African continent for more than a decade, efforts to conduct surveillance and provide prevention services are very recent. A 2007 survey in Zanzibar, United Republic of Tanzania, found that three fourths of injecting drug users have been injecting for seven years or more. The same survey revealed that nearly half (47%) of injecting drug users could not obtain clean needles when needed, most typically citing vendors (pharmacy or illicit drug sellers) being closed or otherwise unavailable (19). Condom use in this population was rare, regardless of sex partner type (paid or unpaid). Overall, less than half knew where to obtain an HIV test, and only 22% reported having had the test. The survey found an HIV prevalence of 16%; 13% of male injecting drug users were men who have sex with men; and 25% of female injecting drug users were involved in sex work. The HIV prevalence among men who have sex with men who injected drugs was 25% (20).

Scaling up HIV interventions in Ukraine

An estimated 300 000 to 400 000 people 15 years and older live with HIV in Ukraine. Among those tested, more than half have reported injecting drug use, making this a major risk factor of the HIV epidemic in Ukraine. In 2008, 95 000 of the estimated 230 000-360 000 injecting drug users were reached by various HIV prevention activities: needle and syringe programmes, voluntary HIV testing and counselling, testing and treatment of sexually transmitted infections, counselling and referral. Nevertheless, access to opioid substitution therapy is still severely limited: by August 2009, only 4300 of the conservatively estimated 53 000 opiate injecting drug users needing opioid substitution therapy were enrolled in buprenorphine- and methadone-based programmes.

Buprenorphine-based pilot programmes started in Ukraine in 2004 and confirmed the effectiveness, efficiency and safety of substitution therapy. Methadone was accepted and imported in mid-2008 as an additional substitution medicine, paving the way for significant scaling up of these services. More than 3500 injecting drug users were admitted to methadone programmes between June 2008 and July 2009. Along with the introduction of opioid substitution therapy came the development of models of integrated care, aiming at addressing commonly clustered health conditions, including HIV, drug dependence, TB, hepatitis and sexually transmitted infections, in a comprehensive and coordinated manner.

A new National HIV/AIDS Plan 2009-2013 was developed based on an extensive external evaluation undertaken in 2007. It recognizes the importance of expanding the focus of targeted services for injecting drug users from prevention to treatment. It is expected that 20 000 people will be receiving opioid substitution therapy by 2013 in accordance with international recommendations, helping to redress imbalances in access to antiretroviral therapy and to break the chain of HIV transmission associated with injecting drug use. The integrated approach to care and treatment will be a leading theme in the upcoming expansion of antiretroviral therapy and opioid substitution therapy services in the country, which in turn should provide a model for the region.

Box 3.5. Regional political commitments to address the health needs of men who have sex with men

Latin America and the Caribbean

The population of homosexual, bisexual and other men who have sex with men and transgender people has been disproportionately affected by the HIV epidemic in the Americas. Although the HIV prevalence is less than 1% among the general population in most countries of the region, it may be between 5 and 20 times higher among men who have sex with men. Stigma and discrimination associated with homophobia play a significant role in fuelling the epidemic, and fear of ostracism and mistreatment, associated with feelings of guilt and shame, alienate people from accessing preventive programmes, outreach activities and health services for screening and treatment of infections.

Countries such as Argentina, Brazil, Colombia and Mexico have addressed homophobia through sensitization campaigns to reduce negative attitudes towards sexual minorities and improve their overall quality of life. All countries in Latin America have removed punitive legislation that prosecuted men who have sex with men, thereby enabling strategies and actions to address the prevention and care needs of these groups. During the XVII International AIDS Conference in Mexico City in 2008, health and education ministers from the countries of Latin America and the Caribbean declared that comprehensive sexuality education and health care services for youth must pay due attention to sexual diversity. The WHO Regional Office for the Americas is providing support to an initiative launched by the national AIDS programmes of Brazil and Mexico to expand access, coverage and utilization of high-quality care services for men who have sex with men in the region. Two regional expert consultations were held in 2008 and 2009 to develop a toolkit to ensure the provision of high-quality care services for homosexual, bisexual and other men who have sex with men in the context of primary health care.

Asia and the Pacific

In February 2009, the WHO Regional Office for the Western Pacific held a region-wide consultation on the health sector response to HIV/AIDS among men who have sex with men. The consultation, which marked a first step to give higher priority to the health needs of men who have sex with men in the region, was conducted in partnership with UNDP, UNAIDS and national partners and attended by participants from 13 countries in the region. The main objectives of the consultation were to define ways to improve the availability of data on the HIV epidemic among men who have sex with men and transgender people; to review experiences of provision of health services to these groups in the region; and to identify key actions and recommendations to scale up their access to services.

The consultation served as a platform to galvanize regional commitment to address the needs of men who have sex with men and transgender people and drew consensus around regional priorities for action. Participants recognized the gaps in information on the epidemic among men who have sex with men and transgender people and called for efforts to strengthen and harmonize data collection. The consultation also recommended that steps be taken to build the capacity of health providers to address the specific health of men who have sex with men and transgender people, set priorities for the allocation of resources and promote enabling environments. A follow-up meeting defined an essential package of health services for men who have sex with men in the region, to be published by the end of 2009.

In Latin America and the Caribbean, where the HIV epidemic is recognized as mainly affecting men who have sex with men and transgender people, half of all HIV infections in this region in 2007 were estimated to result from unprotected anal intercourse between men (28). Across the region, the ratio of male:female HIV infection remains at 2-3 to 1.

Recent data have also shed important light on the dynamics of the HIV epidemic in many countries in sub-Saharan Africa, where homophobia and criminalization of same-sex relations have often hindered an effective response. The reported HIV prevalence among men who have sex with men was found to be as high as or higher than the background prevalence among men, as measured in general population surveys such as in the United Republic of Tanzania (29). A study in Botswana, Malawi and Namibia found that condom use was rare, and petroleum-based lubricants were reportedly used frequently, thus rendering the condoms ineffective. Sixteen per cent of men surveyed also reported concurrent

male and female sex partners (30). Data from Kenya show an HIV-1 prevalence of 43% among men who reported sex with men exclusively and 12% among men who reported sex with both men and women; and 44% of recently sexually active men reported no condom use at all with casual partners (31). In South Africa, reported HIV prevalence among men who have sex with men approached 50% in Johannesburg versus 11% among men participating in a household survey (32) and 14% in Kwazulu-Natal (33). A recent literature review of HIV infection among men who have sex with men in Africa (34) identified 19 surveys published through May 2009 from 13 countries in addition to several unpublished works, highlighting the expansion of available data. For each country, the HIV prevalence among men who have sex with men was higher than that among the adult male population. The article concludes that national commitments to achieve universal access to HIV services for men who have sex with men are lagging, running against strong social currents that include the illegality of sex among men.

Table 3.4. Availability, coverage and impact of prevention interventions for men who have sex with men in reporting low- and middle-income countries, 2006–2008^a

	Percentage of men who have sex with men reached with HIV prevention programmes in the past 12 months	Percentage of men reporting the use of a condom the last time they had anal sex with a male partner	Percentage of men who have sex with men who are living with HIV
Number of countries reporting	25	37	34
Europe and Central Asia			
Armenia	10%		2%
Azerbaijan	49%		1%
Belarus		70%	3%
Bosnia and Herzegovina		49%	1%
Estonia		47%	
Georgia		62%	
Kazakhstan	31%	74%	0%
Latvia		49%	4%
Lithuania	29%	51%	
Romania	55%	64%	
Serbia	12%	67%	6%
The former Yugoslav Republic of Macedonia		56%	
Ukraine	50%	39%	5%
Uzbekistan	31%	61%	7%
Median - Europe and Central Asia	31%	53.5%	4%
Latin America and the Caribbean			
Argentina			12%
Bolivia (Plurinational State of)		63%	
Brazil		70%	
Chile		29%	
Colombia		62%	26%
Costa Rica	26%	79%	
Dominican Republic			7%
Ecuador	49%	23%	19%
El Salvador	62%	84%	
Guatemala			71%
Honduras	24%	69%	6%
Paraguay		63%	9%
Uruguay			9%
Median - Latin America and the Caribbean	37.5%	63%	10.5%
East, South and South-East Asia			
Bangladesh	8%	31%	0%
Cambodia			
China	39%	75%	6%
India ^a	17-97%	13-87%	7%
Indonesia	40%	55%	5%
Lao People's Democratic Republic		24%	6%
Maldives	0%		0%
Mongolia	70%	87%	1%
Myanmar			29%
Nepal	24%	74%	3%
Pakistan	13%	5%	4%
Philippines	19%	34%	
Sri Lanka	14%		0%
Thailand			5%
Timor-Leste	94%	36%	
Viet Nam	26%	61%	9%
Median - East, South and South-East Asia	24%	45.5%	5%
Sub-Saharan Africa			
Burkina Faso	28%		3%
Burundi			
Ghana		51%	25%
Mali		54%	
Nigeria	14%	57%	13%
Senegal		75%	22%
Togo		60%	
Median - Sub-Saharan Africa	21%	57%	17.5%
Median - all reporting countries	28%	61%	6%

^a These data must be considered in the context of the methodological notes on the quality and interpretation of data (Box 3.2).

^b Ranges are excluded from median calculations.

In Europe and Central Asia, the HIV prevalence among men who have sex with men has been documented to be at least 5% in some low- and middle-income countries, such as Croatia, Estonia, Georgia, Latvia and the Russian Federation; and even higher in convenience samples of men who have sex with men in particular locations such as Tashkent, Uzbekistan (11%) and Odessa, Ukraine (23%). Several countries such as Bulgaria, Croatia, Georgia, Kyrgyzstan and the Russian Federation (Yekaterinburg) also report high lifetime syphilis prevalence among men who have sex with men (35).

In North America, western Europe and Australia, where longitudinal data are more widely available, a recently published analysis suggests that recent upward trends in HIV prevalence among men who have sex with men are not limited to emerging economies and resource-limited countries (36). The rate of HIV notifications among men who have sex with men declined by 5.2% per year from 1996–2000 but increased by 3.3% per year from 2000–2005. During the period of increasing HIV diagnoses, primary and secondary syphilis diagnoses also increased among men who have sex with men.

Among countries reporting data from surveys to WHO, UNICEF and UNAIDS in 2009, median coverage by prevention programmes for men who have sex with men in the 12 months preceding the surveys was 24% in East, South and South-East Asia and 31% in Europe and Central Asia (Table 3.4).¹

Men who have sex with men in Latin American and the Caribbean reported the highest median rate of condom use during the last anal intercourse with a male partner (62%), with considerable regional disparities. The range of reported condom use was also wide in East, South and South-East Asia, varying from 5% to 87%. These data indicate the need to redouble efforts to reach these populations with tailored prevention messages and activities, combat legal and social stigma and discrimination and increase political commitment to ensure access to health irrespective of sexual orientation.

¹ United Nations General Assembly Special Session on HIV/AIDS (UNGASS) indicator 9 on the percentage of men who have sex with men reached with HIV prevention programmes in the past 12 months. Respondents were asked the following questions: (1) Do you know where you can go if you wish to receive an HIV test? (2) In the last 12 months, have you been given condoms (e.g. through an outreach service, drop-in centre or sexual health clinic)? The numerator of the indicator is the number of respondents in the most-at-risk population group who replied yes to both questions, and the denominator is the total number of respondents surveyed.

3.1.3. Sex workers

Almost 20 years after Thailand instituted a 100% condom use policy for sex workers and 15 years after the major impact of the programme was reported, the median percentage of sex workers reporting condom use with their most recent client among 56 reporting low- and middle-income countries was 86% (Table 3.5). As expected, the range of individual country figures was wide, varying from 13% to 99%, indicating that some countries are lagging behind in coverage.

Sub-Saharan Africa had the highest median reported HIV prevalence among sex workers (20% for 13 reporting countries), despite median coverage by prevention programmes² of 76% and a median rate of condom use with the last client of 86%. East, South, and South-East Asia, in contrast, had the lowest median HIV prevalence, 2%, with substantial variation among countries. Coverage by prevention programmes and use of condom with the last client were lower, at 49% and 80%, respectively. In Latin America and the Caribbean, among 13 countries that reported data, median HIV prevalence among sex workers reached 4%. Condom use with the last client was relatively high, at 95%.

The evidence indicates unequivocally that efforts to reach male and female sex workers must be reinforced and expanded. Further, a focus on brothel-based sex workers alone is clearly insufficient to assure adequate prevention coverage. The 100% condom use message pioneered in Thailand (Box 3.6) should be replicated, but greater sensitivity to the heterogeneity of sex work, both formal and informal, is required. Innovative outreach programmes that bring sex workers in contact with public health services are required to overcome the hidden nature of many sex workers in societies where sex work is illegal and poorly tolerated. Outreach work may also be required where opportunity costs related to taking the time to access services are high. Universal access for sex workers can only be achieved if policies and services reflect the needs of the sex workers.

² Respondents were asked the following questions: (1) Do you know where you can go if you wish to receive an HIV test? (2) In the last 12 months, have you been given condoms (e.g. through an outreach service, drop-in centre or sexual health clinic)? The numerator of the indicator is the number of respondents in the most-at-risk population group who replied yes to both questions, and the denominator is the total number of respondents surveyed.

Table 3.5. Availability, coverage and impact of prevention interventions for sex workers in reporting low- and middle-income countries, 2006–2008^a

	Percentage of sex workers reached with HIV prevention programmes in the past 12 months	Percentage of female and male sex workers reporting the use of a condom with their most recent client	Percentage of sex workers who are living with HIV
Number of countries reporting	43	56	51
Europe and Central Asia			
Armenia	41%	91%	0%
Azerbaijan	40%	21%	2%
Belarus		86%	2%
Bosnia and Herzegovina		36%	0%
Estonia		94%	8%
Georgia	80%	94%	
Kazakhstan	72%	93%	1%
Kyrgyzstan		80%	2%
Lithuania		92%	
Montenegro			1%
Republic of Moldova		93%	3%
Romania	66%	91%	
Serbia	32%	91%	2%
Tajikistan	39%	69%	2%
Ukraine	69%	86%	9%
Uzbekistan	75%	75%	2%
Median - Europe and Central Asia	66%	90.5%	2%
Latin America and the Caribbean			
Argentina	90%		5%
Barbados			
Bolivia (Plurinational State of)	29%		1%
Chile			1%
Colombia		94 %	1%
Costa Rica		84%	0.1%
Dominican Republic	42%		5%
Ecuador	76%	95%	4%
El Salvador	73%	97%	
Guatemala			5%
Honduras	23%	68%	3%
Mexico	36%	96%	6%
Paraguay		96%	9%
Peru		42%	1%
Uruguay			19%
Median - Latin America and the Caribbean	42%	95%	4%
Middle East and North Africa			
Algeria			4%
Morocco	49%	4%	2%
Yemen		61%	1.6%
East, South and South-East Asia			
Bangladesh	12%	63%	0.3%
Cambodia	94%	99%	13%
China	55%	85%	0.5%
India ^b	56%	13–87%	5%
Indonesia	40%	70%	10%
Iran (Islamic Republic of)	58%	55%	
Lao People's Democratic Republic	49%	95%	0.5%
Maldives	0%		
Myanmar	76%	96%	18%
Mongolia	60%	94%	0%
Nepal	41%	75%	2%

Pakistan	2%	41%	0%
Philippines	14%		
Sri Lanka	44%	75%	0%
Thailand			4%
Viet Nam	65%	94%	3%
Median - East, South and South-East Asia	49%	80%	2%
Sub-Saharan Africa			
Angola		97%	
Benin	81%	78%	32%
Burkina Faso			
Burundi	97%	82%	38%
Chad	72%	83%	
Comoros	59%	59%	0%
Côte d'Ivoire ^c	93%	96%	18%
Democratic Republic of the Congo ^c		61%	14%
Eritrea		49%	11%
Gabon	29%	67%	20%
Ghana		99%	38%
Madagascar	88%	79%	0.5%
Mali		99%	35%
Mauritania	36%	91%	8%
Niger		92%	
Nigeria	19%	98%	33%
Rwanda	83%	87%	
Senegal		99%	20%
Togo	76%	85%	
Median - Sub-Saharan Africa	76%	86%	20%
Median - all reporting countries	56%	86%	3%

^a These data must be considered in the context of the methodological notes on the quality and interpretation of data (Box 3.2).

^b Ranges are excluded from median calculations.

^c Data collected between December 2004 and March 2006.

Box 3.6. Country experiences in scaling up HIV interventions for sex workers

Addressing the needs of non-brothel-based sex workers in Thailand

Recent evidence suggests that the highly successful HIV prevention programmes aimed at sex workers over the past decade may now be eroding. The structure of sex work has changed substantially, with fewer brothel-based sex workers and more non-venue-based sex workers who are excluded from the annual sentinel surveillance system. A survey of HIV prevalence and risk behaviours among female sex workers in Bangkok and Chiang Rai interviewed 707 sex workers in Bangkok and 366 in Chiang Rai. A total of 73% of Bangkok participants were non-venue-based versus 24% in Chiang Rai. The adjusted rate of condom use with the last client was higher in Bangkok (93%) than Chiang Rai (69%); HIV prevalence was also higher in Bangkok (20%) than in Chiang Rai (10%). Importantly, the HIV prevalence in this survey was significantly higher than 2007 sentinel surveillance findings among sex workers (Bangkok, 2.5%; Chiang Rai, 2.6%) (37).

Promoting 100% condom use in Côte d'Ivoire

In 2008, the Government of Côte d'Ivoire and WHO undertook a detailed assessment of the epidemic situation and the national response to improve the provision of HIV prevention and care services for sex workers in the country. The situation analysis revealed that, despite some success, existing programmes were only distributing an average of 16 condoms per sex worker per year and there was no national policy to promote and support the widespread use of condoms by sex workers. It also noted that programmes were mostly outside the Ministry of Health and did not involve district health authorities. Following the assessment, the Government of Côte d'Ivoire, along with partners and stakeholders, plans to scale up a 100% condom use programme among sex workers across the country, with free distribution of condoms and increased access to HIV testing, care and treatment services. It will also accelerate efforts to develop norms and guidelines for treating sexually transmitted infections, build programme management capacity, and expand surveillance among these groups. Other countries in sub-Saharan Africa such as Kenya are following a similar approach to meet the objectives of the regional strategy to accelerate HIV prevention (38).

3.1.4. Prisoners

Detained or incarcerated people are often at higher risk for HIV infection than the non-incarcerated population (39). Although most prisoners contract HIV infection outside of prison, the risk of HIV transmission while incarcerated is augmented by sharing contaminated injecting, tattooing or other body-piercing equipment or through unprotected

sex. In addition, this population group is largely out of reach of the formal health care system in the community, making prisons an important focus of health sector HIV interventions. An increasing number of countries have introduced HIV programmes in prisons since the early 1990s (Box 3.7), but many exclude the most effective interventions such as needle and syringe programmes

Box 3.7. Country experiences in scaling up HIV interventions in prisons

Providing a comprehensive package of interventions in the Republic of Moldova

Local nongovernmental organizations in the Republic of Moldova began providing HIV education and a wide range of harm reduction services, including psychological support, counseling, distribution of clean injection equipment and condoms, and more recently, methadone, in prisons in 1999. Ten years later, the Republic of Moldova remains one of only a few countries in the world that provide comprehensive harm reduction services in prisons, granting prisoners free, anonymous and confidential access to an extensive range of materials and supplies that can greatly reduce risks to their health.

Overall, more than two thirds of adult prisoners sentenced in the Republic of Moldova have access to harm reduction services. In all the prisons where harm reduction services are provided, the experience has been positive – needles have never been used to cause harm to prison staff or fellow prisoners, drug use has not increased and available data suggest a reduction in HIV and hepatitis C incidence. The total number of needles and syringes exchanged in prisons in the Republic of Moldova increased from 3650 in 2000–2001 when the project was operating in only one prison to about 84 000 in 2006–2007. About 2000 HIV tests are performed each year.

The Republic of Moldova initiated methadone treatment in 2004. Despite various measures to expand access, the overall coverage of methadone remains low, reaching less than 1% of the estimated number of people who inject opioids in the country. The Republic of Moldova was also the first among the countries of the former Soviet Union to introduce methadone in penitentiary institutions in 2005. Since then, 120 prisoners have received methadone in the five opioid substitution therapy sites within the penitentiary system (40).

Service delivery has been accompanied by the expansion of training; and awareness about HIV and risk behaviour is nearly universal among prisoners and prison staff, from guards to administrators. The awareness has helped reduce HIV-related discrimination and stigma, thereby improving the lives of prisoners living with HIV. Priorities for the future include ensuring a continuum of care, including harm reduction and opioid substitution therapy, following the detainee's release and ensuring better access to treatment for hepatitis C in prison settings.

Providing HIV testing and counselling in Swaziland (41)

Swaziland has 12 prisons each with a maximum capacity of 500 prisoners. In 2007, Population Services International collaborated with the Ministry of Health and the Correctional Services to bring HIV testing and counselling to Matsapha Prison, the country's central prison. Monthly outreach services were also initiated in the 12 prison institutions, and a permanent testing and counselling site was established at Matsapha central. Inmates who tested positive were referred to the nearest hospitals or health centres for further care (transported by the correctional services for security reasons). According to the Prisons Act, condoms cannot be distributed to inmates, but other education and communication materials for HIV prevention were provided to inmates whether they test HIV positive or negative. In total, 198 inmates and officers were trained as peer educators, with a further 10 officers receiving training to provide HIV testing and counselling. Approximately 1150 inmates, prison personnel and their dependants tested for HIV at the site. The HIV prevalence within the facility was 26% for the prisoners.

Peer education to scale up HIV prevention Thailand

A study in Thailand established an HIV peer education programme and testing and counselling service in a prison of 900 male inmates (Prison A). One year later, a cross-sectional survey was conducted to evaluate the intervention at Prison A and to assess needs at Prison B, a 4000-inmate men's facility with no HIV intervention (42). At Prison A, 50 volunteer inmates were trained to provide peer education on HIV, including referrals to prison testing and counselling services, and condoms were made available on request. A total of 746 male inmates were surveyed in both prisons. Potential HIV risk behaviour in prison included sharing tattoo equipment (64%), modifying the penis such as cuts or insertions intended to increase sexual pleasure (27%), anal sex (14%) and injecting drugs (1%). Most inmates at Prison A had been exposed to peer education (82%) and reported that they trusted the confidentiality of prison-based HIV counselling and testing services (70%) and planned to use these services (75%). Among inmates engaging in anal sex, all of those at Prison A and 20% at Prison B believed that condoms were easy to access in prison; further, easy access to condoms, made possible through the HIV intervention at Prison A, was strongly associated with condom use. Of 171 inmates who accessed testing and counselling, 13 (8%) tested HIV-positive; all 13 were enrolled in HIV care and 3 began antiretroviral therapy.

Table 3.6. Percentage of detainees who received an HIV test in the past 12 months and who know the results, 2006–2008

Country	Received an HIV test and know the results
Bosnia and Herzegovina	97%
Kazakhstan	57%
Latvia	48%
Republic of Moldova	7%
Serbia	14%
Tajikistan	11%
Ukraine	25%
Median	25%

or opioid substitution therapy. Data available from seven countries in Europe and Central Asia (Table 3.6) indicate that only one quarter of prisoners were able to access and receive an HIV test in the past 12 months.

3.2. Prevention and management of sexually transmitted infections

A critical element in controlling the spread of HIV is the quick identification and subsequent treatment of sexually transmitted infections, especially among people with multiple sexual partners. Sexually transmitted infections synergistically increase the transmission probability of HIV through a variety of mechanisms (43). Scientific evidence has accumulated over the past two decades regarding the role of genital ulcer diseases and other sexually transmitted infections in facilitating the sexual transmission of HIV. Substantial clinical data indicate that sexually transmitted infections can boost HIV shedding in the genital tract, which amplifies HIV infectiousness. Sexually transmitted infections also appear to increase susceptibility to HIV.

Many interventions for controlling sexually transmitted infections have proven to be effective, including syndromic management of genital ulcer disease and urethral discharge, treating male partners for trichomoniasis, brief counselling about risk reduction and treating partners for gonococcal and chlamydial infections. These interventions have resulted in a decline in the prevalence of certain major sexually transmitted infections (such as chancroid, syphilis and gonorrhoea) in many parts of the world. The control of major sexually transmitted infections may also have contributed to the gradual decline in HIV prevalence in several low- and middle-income countries.

Although the effects of treating people for sexually transmitted infections on HIV transmission and acquisition differ in different phases of the HIV and sexually transmitted infection epidemics, priorities should be set among the populations and pathogens to be targeted to maximize

impact. In generalized HIV epidemics, with a rising prevalence of HIV infection and high rates of curable sexually transmitted infections, treating sexually transmitted infections is likely to affect the incidence of HIV infection at the population level. Similarly, in low-level or concentrated HIV epidemics, especially when control of sexually transmitted infections is poor, the prevalence of curable sexually transmitted infections (genital ulcer disease) is high and high-risk sexual behaviour is common. In such epidemics, the treatment of curable sexually transmitted infections is also likely to strongly affect the incidence of HIV infection at the population level (Box 3.8).

Access to services for controlling sexually transmitted infections is crucial to prevent HIV infection among population groups at high risk of acquiring HIV such as sex workers and men who have sex with men. Access to services for controlling sexually transmitted infections also provides opportunities for early treatment of sexually transmitted infections, counselling and communication for behaviour change; provides access to HIV testing in population groups with sexually transmitted infections and offers opportunities for prevention education and counselling for people with acute or established HIV infection; and serves as an entry point into care programmes for people living with HIV.

Among 42 countries that provided data on the prevalence of syphilis¹ among sex workers, the median reported prevalence was 6%. The highest rates were reported from countries in Europe and Central Asia. Data available from 31 countries suggest that syphilis is also an issue of concern among men who have sex with men, especially in Latin America and the Caribbean, where the median prevalence rate was above 10%, more than double the global median.

Sex workers have special social and health needs, especially in societies with high levels of stigma or legal barriers that impede their access to health services. In such settings, dedicated services may need to be offered to ensure high levels of access to health interventions. Thirty-five low- and middle-income countries reported data on the targeted delivery of services to sex workers for the prevention and management of sexually transmitted infections in 2008.² The global median availability was just under 1 clinic per 1000 sex workers, ranging from 0.5 in the Middle East and North Africa to 2.1 in Europe and Central Asia. In Asia, among 12 reporting countries, the estimated median service provision was 0.92 service points for every 1000 sex workers, ranging from 0.06 per 1000 in Malaysia to 5 per 1000 in the Lao People's Democratic Republic.

¹ The definition of a case of syphilis varies. These data should be construed, at a minimum, as representing serological history of syphilis: rapid plasma reagin (RPR) or Venereal Disease Research Laboratory (VDRL) screening.

² Several countries indicated that sex workers receive services for sexually transmitted infections in non-targeted clinics, so this figure is likely to underestimate true coverage.

Box 3.8. Herpes simplex virus type 2 and HIV

Genital herpes caused by herpes simplex virus type 2 (HSV-2) infection is a major factor in fuelling the HIV epidemic, with research showing that people who have HSV-2 infection are two times more likely to acquire HIV compared with those who are not infected with HSV-2, and individuals who are HIV and HSV-2 coinfecting are five times more likely to transmit HIV to their sexual partner and have higher levels of HIV in their blood and genital secretions. Although recent trial outcomes showed that treating HSV-2 with an antiviral drug reduces genital ulcers due to HSV-2 and modestly reduces HIV levels in the blood, these effects were not sufficient to reduce the risk of HIV transmission. Since HSV-2 infection is one of the most common sexually transmitted infections worldwide and is especially prevalent in areas with high rates of HIV infection, with up to 90% of people who have HIV also being infected with HSV-2, preventing primary herpes infection is an important intervention for preventing HIV transmission. In addition, the general public and health care workers have low awareness of HSV-2 in most low- and middle-countries. HIV and sexually transmitted infection programmes should be better coordinated and make optimal use of opportunities for synergy. More potent interventions to control HSV-2 infection are needed to affect HIV transmission as is the availability of a vaccine against HSV-2 infection.

3.3. Male circumcision

Male circumcision is now recognized as an additional important health sector intervention to reduce the risk of men heterosexually acquiring HIV infection, 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 (44–46) showed a strong protective effect, with an approximately 60% reduction in the risk of acquiring HIV. Additional research has demonstrated that the duration of the beneficial impact of male circumcision on HIV transmission is also longer than indicated by earlier evidence (47). Data presented at the XVII International AIDS Conference in Mexico City in 2008 showed that the protective effect of male circumcision was sustained for at least 42 months, well beyond the 2-year period originally estimated.

A growing body of evidence also suggests that male circumcision can protect against other sexually transmitted infections. Research carried out in Uganda concluded that circumcision significantly reduced the incidence of HSV-2 and the prevalence of human papillomavirus infections (48). In one study in South Africa, male circumcision helped reduce the risk of acquiring HSV-2 by about half (49). In the

United States, researchers found that male circumcision may reduce persistent human papillomavirus infections. Among study participants who became infected with human papillomavirus, circumcised men were more likely than uncircumcised men to have their immune systems clear the virus by the end of the study (50).

In 2007, an international panel of experts convened by WHO and UNAIDS provided guidance for country managers, policy-makers and implementing partners on how male circumcision services should be introduced and expanded (51). The 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 HIV testing and counselling is recommended before male circumcision. The recommendations also reinforce that circumcision should be accompanied by appropriate communication regarding the lack of evidence of its protective effect in heterosexual men living with HIV; that surgery should be delivered in an appropriate clinical setting by trained health care providers; and that human rights principles should guide service delivery.

The consultation meeting also reached consensus that countries with HIV prevalence rates above 15%, generalized heterosexual HIV epidemics and low rates of male circumcision should consider urgently scaling up access to male circumcision services. Thirteen countries, including Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, the United Republic of Tanzania, Zambia and Zimbabwe, were identified as priorities for action.

Since then, all 13 countries have made progress towards establishing the necessary conditions to increase the availability of male circumcision services. Political commitment has been strong, with active political involvement at the highest levels. The successful engagement of traditional leaders and elders in Kenya (Box 3.9), Lesotho and Namibia in supporting male circumcision has also been pivotal, as has been the effective involvement of women's groups in Zimbabwe. Partnerships involving national and local governments, donors and technical support agencies have been created to sustain and accelerate progress. The Male Circumcision Consortium in Kenya and the Male Circumcision Partnership in Swaziland and Zambia are actively supporting their respective government programmes.

Situation analyses have been conducted or are underway in all 13 priority countries with multi-stakeholder consultations. Kenya has formally adopted national guidance on male circumcision, while Lesotho, Namibia, South Africa, Swaziland and Zimbabwe all have draft policies. Botswana

Box 3.9. Scaling up male circumcision to reduce the risk of HIV infection among heterosexual men in Kenya

In 2007, Kenya adopted a guidance statement on the role of voluntary male circumcision in reducing the risk of HIV infection among sexually active, HIV-negative men (53). Since then, the country has moved swiftly to operationalize the provision of male circumcision services as part of an integrated prevention approach that includes behaviour change, condom use and HIV testing.

Male circumcision is now formally integrated into Kenya's National AIDS Strategic Plan III (2009/2010 - 2012/2013), which aims at increasing the proportion of circumcised men aged 15-49 years from 84% to 94% by 2013 on a nationwide basis, with coverage in each region reaching at least 80% (54). The successful completion of these targets will require performing 150 000 male circumcisions per year over five years, and they are expected to contribute significantly to achieve the national goal of cutting the rate of new HIV infections by half by the end of this period. The resources required to perform 750 000 male circumcisions are estimated to be between US\$ 37 million and US\$ 56 million.

Community engagement has been vital throughout policy design and rollout. Consultations involved a wide range of participants, including health care workers, faith-based organizations, women's and youth groups and community leaders. The service delivery model is centred on clinical officers and nurses as initial providers, and procedures can be performed at all levels of care, including mobile, dedicated "voluntary male circumcision clinics". Currently, 124 facilities offer comprehensive male circumcision services in Nyanza Province, where HIV prevalence is 15%, more than twice the national average. Three hundred providers have been trained, including physicians, clinical officers, nurses and support staff. As of May 2009, 20 000 male circumcisions had already been performed. In April 2009, a team involving partners and the Ministry of Health carried out quality assurance visits in several sites and concluded that most performed well according to WHO standards.

Kenya's experience shows that rolling out male circumcision is feasible and that political and sociocultural challenges are surmountable with the right partnerships and the appropriate level of buy-in and involvement. However, while piecemeal interventions may yield positive benefits at the individual level, the full public health effects of male circumcision programmes can only be realized through rapid scale-up.

and Kenya have already officially launched national strategies, while Swaziland, Zambia and Zimbabwe have developed draft implementation plans. In Botswana, the objective is to increase the proportion of circumcised adult males to 80% by 2014. Most countries have integrated catch-up strategies to reach adult men first, given the low prevalence rates of male circumcision, but longer-term, neonatal circumcision is also being considered as an additional approach. Actual service provision has started in Kenya, with pilot projects in South Africa, Zimbabwe and Zambia. Adverse event rates in all countries remain low, at less than 3%.

To further assist programme managers, WHO developed several tools and guidelines in 2008 in collaboration with countries and implementing partners to facilitate programme planning, situation analysis, costing and impact assessment and monitoring and evaluation. Technical reference manuals, with training and quality assurance packages, were also produced, along with a communication guide and an information kit to enhance country-level communication and advocacy. A male circumcision clearinghouse web site was launched, with the aim of facilitating policy and programmatic decision-making by collating available evidence and research outcomes on male circumcision, including the tools and guidelines mentioned above (52).

Although considerable progress has been achieved in the past two years, several important constraints still need to be addressed. Human resources for country programming as

well as for service delivery must be considerably increased and reinforced. Programme managers need greater clarity regarding the availability of funding to scale up male circumcision services and how to access them. Further guidance is needed on how to effectively engage traditional providers in service delivery, address sociocultural barriers and reach men living with HIV without discriminating and stigmatizing them. Future efforts will focus on strengthening service delivery with quality assurance and increasing the numbers of circumcisions performed.

3.4. Blood safety

All types of blood donors give more than 85 million blood donations every year.¹ The availability and safety of blood and blood products for transfusion is of continuing concern, especially in low- and middle-income countries, where HIV and other infections, such as hepatitis B, hepatitis C and syphilis, being transmitted through blood transfusion remains an issue of concern. Curtailing the burden of HIV due to unsafe blood transfusion requires implementing an integrated strategy, with a nationally coordinated blood transfusion service; collecting blood from voluntary, unpaid donors; screening all donated blood for transfusion-transmissible infections such as HIV; and ensuring adequate training and follow-up of health care providers.

¹ Based on 2007 data from 162 countries participating in the WHO Blood Safety Indicators Survey.

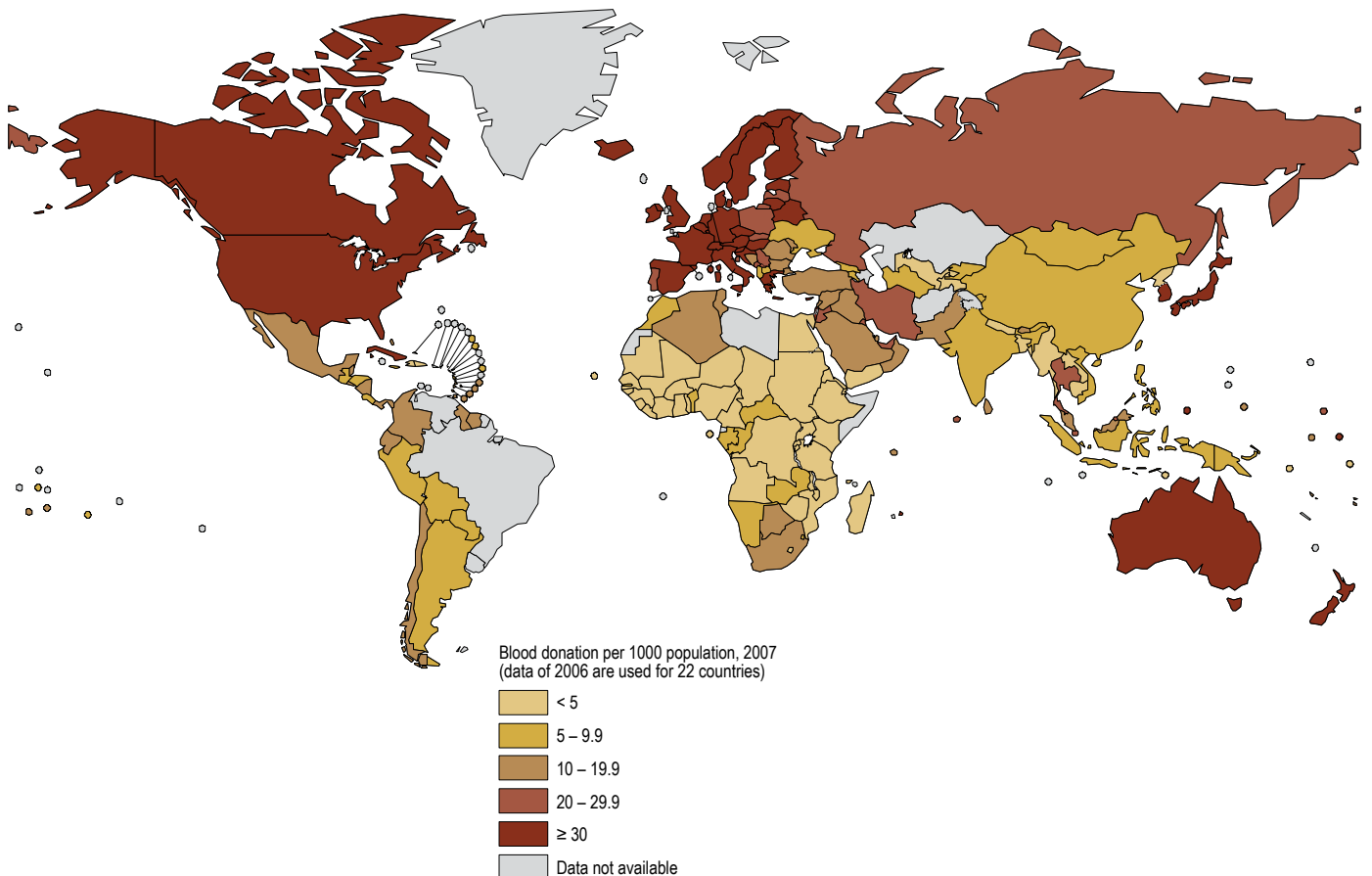
The minimum level of donation required to meet a country's most basic requirements for blood is estimated to include 1% of the population. These requirements are higher in countries with more advanced health care systems. The availability of blood, as measured by donations per 1000 population, varies widely across the world, with the lowest levels in low- and middle-income countries. The average blood donation rate in high-income countries is 16 times greater than that in low-income countries. Seventy-three low- and middle-income countries report collecting fewer than 10 donations per 1000 population (Fig. 3.2). Blood shortages not only lead to serious health effects such as death from postpartum haemorrhage but also contribute to an increased risk of HIV and hepatitis transmission because an inadequate stock of blood forces reliance on unsafe family replacement or paid donors and greater pressure to issue blood without testing.

Ensuring blood donation from voluntary, unpaid donors and screening blood for HIV and other transfusion-transmissible infections with appropriate quality assurance procedures are key to minimizing the risk of introducing infected blood into

the blood supply. Although 57 countries report collecting 100% of their blood supplies from voluntary, unpaid donors, 42 countries collect less than 25% of their supplies from these donors, and a significant amount of the blood supply still depends on family or replacement and paid blood donors. Thirty-one countries still report collecting paid donations, amounting to more than 1 million donations in total.

Of 162 countries that provided data on screening for transfusion-transmissible infections (including HIV, hepatitis B, hepatitis C and syphilis), 41 reported being unable to screen all donated blood for one or more of these infections. Data from 121 countries indicate that only 40% of blood donations collected in low-income countries are screened following basic quality assurance procedures (use of standard operating procedures and participation in external quality assessment) versus 74% in middle-income countries and 99% in high-income countries. For 22% of the total donations collected in 41 countries, the status of whether the basic quality assurance procedures are followed for blood screening is still unknown.

Fig. 3.2. Blood donation per 1000 population, 2007



Hospital transfusion committees and systems for reporting adverse transfusion reactions are prerequisites to monitor the safe and rational use of blood and blood products. Data provided by 96 countries indicate that only 39% of hospitals performing transfusions in low-income countries, 62% in middle-income countries and 80% in high-income countries have a transfusion committee. In addition, 40% of hospitals in low-income countries, 71% in middle-income countries and 92% in high-income countries have a system for reporting adverse transfusion events. Further efforts are clearly needed to ensure safe blood supplies worldwide.

3.5. Post-exposure prophylaxis

Post-exposure prophylaxis is short-term antiretroviral therapy to reduce the likelihood of HIV infection after potential exposure, either occupationally or through sexual intercourse. WHO recommends that health care settings provide post-exposure prophylaxis as part of a comprehensive universal precautions package that reduces staff exposure to infectious hazards at work. The recommendations also cover exposure to HIV in non-occupational situations, such as in sexual assault (55).

Box 3.10. New prevention technologies

Pre-exposure prophylaxis

Pre-exposure prophylaxis is an experimental strategy using antiretroviral drugs to prevent HIV infection. Animal models have demonstrated proof of concept, and a trial completed in western Africa has shown safety (56). Clinical trials testing the efficacy of tenofovir and tenofovir/emtricitabine as pre-exposure prophylaxis agents are underway in multiple countries on four continents. Most of these trials use daily oral prophylaxis, although some test topical formulations and intermittent strategies as well. Efficacy trials of daily oral pre-exposure prophylaxis among men who have sex with men in Latin America and among injecting drug users in Thailand, as well as a trial of a topical gel among women in South Africa, are likely to provide the first results, possibly in early 2010. If results are promising, much work will still remain to assure that the research can be translated into an effective intervention that health systems can deliver. Further research will also need to be carried out to understand how the widespread use of pre-exposure prophylaxis may affect drug resistance levels and its impact on compensating for behaviour and adverse health effects. A consultation hosted by WHO in October 2009 will address what additional research is critical and must be conducted on a priority basis to enable the implementation of pre-exposure prophylaxis to move forward if the current trials demonstrate effectiveness.

Microbicides

Microbicides are products that can be used to prevent HIV infection through sexual intercourse with an HIV-positive partner. Women can use them to protect themselves from HIV infection through sexual intercourse with an HIV-positive partner. Most products tested to date have been in the form of vaginal gels applied before intercourse, similarly to spermicidal gels, and are designed to kill the HIV virus, prevent the virus from accessing the vaginal tissues or block key steps in the process whereby the virus attaches itself to target cells.

Only one of these products has shown any reduction in the risk of HIV infection when tested in large-scale clinical trials among women at risk of acquiring HIV infection. This product, 0.5% PRO 2000 gel, showed a 30% reduction in HIV incidence (not statistically significant) compared with users of a similar "placebo" gel that contained no active ingredient - HIV incidence was reduced from 3.9 infections per 100 woman-years to 2.7 infections per 100 woman-years. The study showed that the product was safe and well tolerated with minimal side effects (57).

A further study of the same product conducted by the Microbicides Development Programme is expected to release results in late 2009. If it confirms the results of the previous study, PRO 2000 will be the first microbicide product shown to be safe and effective in preventing HIV infection in women. Subsequent work will focus on ensuring that the product is made available to women who would benefit most and on ensuring product registration and adoption in countries with generalized HIV epidemics. Even a partly effective product, if widely used, could strongly affect HIV incidence in such countries (58).

Other microbicide products in early clinical trials or in preclinical evaluation are based on antiretroviral agents, similar to those used for therapy, that specifically target different stages of the HIV life cycle - attachment, entry or replication. Although the products most advanced in clinical testing are gels, similar to the previous types of microbicides, the new products have the potential to be delivered through slow-release systems similar to how hormonal contraception can be delivered through a vaginal ring that protects for up to three months. A trial currently underway in South Africa with tenofovir gel is expected to release results in early 2010.

Although the main focus of microbicide research and development is on products that will prevent HIV acquisition during vaginal intercourse, products that are also safe and effective for reducing HIV risk during anal intercourse urgently need to be developed. Such products would be used by both men and women. Rectal safety is a critical element of the evaluation of current microbicide candidates, as any product might be used as a lubricant during anal sex. A product shown to be effective vaginally might be assumed to be safe and effective for anal intercourse, but rectal tissue is very much more vulnerable to HIV than vaginal tissue. This remains an active and important area for research.

More countries provided information regarding the establishment and implementation of post-exposure prophylaxis policies in 2008 than in 2007. In 2008, 107 of 110 reporting low- and middle-income countries declared having a national policy or protocol to provide post-exposure prophylaxis versus 69 of 73 reporting low- and middle-income countries in 2007. Of 70 countries that provided this information in both 2007 and 2008, 4 countries (Burundi, Cambodia, Ethiopia and Lao People's Democratic Republic) did not report having a policy in 2007 but indicated having one in 2008.

All reporting low- and middle-income countries with post-exposure prophylaxis policies in both 2007 and 2008 indicated that these policies covered occupational exposure to HIV, such as through needle-stick injuries in health care settings. In 2008, 75% of reporting countries with post-exposure prophylaxis policies covered non-occupational exposure versus 62% in 2007.

The percentage of health facilities providing post-exposure prophylaxis services varies widely across countries, creating difficulty in assessing global trends. Establishing policies and protocols does not translate simultaneously into programme implementation. In 44 countries that provided comparable data on the availability of post-exposure prophylaxis services in health facilities, the reported number of health facilities with post-exposure prophylaxis available increased from 3516 in 2007 to 4150 in 2008. The availability of post-exposure prophylaxis services is higher at the tertiary levels of the health care system. In 2008, 92% of reporting countries provided post-exposure prophylaxis in reference hospitals and centres at the tertiary level, 80% at the regional or district levels and 72% in all sites providing antiretroviral therapy, including at the community level.

3.6. Prevention and care for people with HIV

All people living with HIV have the right to health with access to essential HIV prevention and care services to know their HIV status, improve their quality of life, delay progression of disease and prevent transmission to others. In 2008, WHO issued guidance outlining a core set of 13 evidence-based health sector interventions for adults and adolescents living with HIV resource-limited settings, to be adapted according to countries' burdens of disease, epidemiology and infrastructure capacity (59). These interventions include:

- psychosocial counselling and support;
- disclosure, partner notification and testing and counselling;

- co-trimoxazole prophylaxis;
- prevention and management of TB/HIV coinfection;
- preventing fungal infections;
- sexually transmitted and other reproductive tract infections;
- preventing malaria;
- selected vaccine-preventable diseases (hepatitis B, pneumococcal disease, influenza and yellow fever);
- nutrition;
- family planning;
- preventing the mother-to-child transmission of HIV;
- needle and syringe programmes and opioid substitution therapy; and
- water, sanitation and hygiene.

The implementation and promotion of these essential interventions require close collaboration between the health sector and communities of people living with HIV. At an international technical consultation co-organized by the Global Network of People Living with HIV/AIDS (GNP+) and UNAIDS in 2009, participants agreed that efforts to implement positive prevention must address the myriad health and prevention needs of individuals living with HIV and recognize the links between prevention, treatment, care, support and human rights. The key elements of such an approach would begin with leadership and engagement of people living with HIV to scale up access to the essential health sector interventions as defined by WHO as well as efforts to reduce stigma and discrimination; promote gender equality; provide social and economic support; and empower people living with HIV.

The consultation also generated consensus on the use of a new, working term labelled "positive health, dignity and prevention" to better describe this integrated paradigm, with agreement that such an approach requires a human rights framework supported by protective laws to ensure non-discrimination, reduce stigma, change harmful gender norms and enable people living with HIV to protect themselves and others through empowerment and with dignity.

Numerous community-based projects provide examples of such collaborative efforts between the health sector and people living with HIV, such as the Community Education and Referral: Supporting Adherence to Antiretroviral Treatment and Prevention for People with HIV in Zambia (ACER) project and the Regional Outreach Addressing AIDS through Development Strategies (ROADS) project in eastern and central Africa (Box 3.11).

Box 3.11. Positive Health, Dignity and Prevention in practice in Nepal

The National Association of People Living with HIV/AIDS in Nepal (NAP+N), in collaboration with Family Health International Nepal, has been supporting eight community-based organizations led by people living with HIV to implement positive prevention programmes that address the HIV prevention needs of people living with HIV and their partners, families and communities (60). This work is being undertaken in collaboration with the National Centre for AIDS and STD Control in Nepal, a government body within the Ministry of Health and Population.

The project includes individual-level interventions such as counselling for serodiscordant and seroconcordant couples on disclosure and safer sexual and injecting behaviour; condom promotion and distribution; the promotion of healthy lifestyles and positive thinking and living; and referral to HIV counselling and testing and HIV care, support and treatment services.

At the community level, participating organizations coordinate education and outreach activities through community discussion forums that include peer support and sensitization around reducing HIV-related stigma and discrimination and capacity-building activities for the community-based organizations. The programme has noted increased self-esteem and confidence and improved health-seeking behaviour among people living with HIV as well as strengthened advocacy efforts at the local level. The engagement of people living with HIV in the programme has also increased access to care, support and treatment services.

The role of the health sector remains crucial in addressing the needs of people living with HIV and their communities. It is essential that the health sector address the prevention of common illnesses along with addressing people's sexual and reproductive health needs and rights. To do so, health care workers should be trained in the technical aspects of prevention and care for people living with HIV and receive training to confront incidents of stigma and discrimination within health care settings. In this experience in Nepal, partnering and collaborating with community-based organizations of people living with HIV has been an important step for addressing these needs comprehensively.

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4. TREATMENT AND CARE FOR PEOPLE LIVING WITH HIV

Key findings

- More than 4 million [3 700 000–4 360 000] adults and children were receiving antiretroviral therapy in low- and middle-income countries at the end of 2008; over one million more people than at the end of 2007. This represents a 36% increase in one year, and a 10-fold increase in 5 years. The greatest increase in the number of people receiving treatment in 2008 was in sub-Saharan Africa, the region with the greatest need.
- Despite progress, antiretroviral therapy coverage in low- and middle-income countries stood at 42% [40–47%] of the 9.5 million [8 600 000–10 000 000] people in need at the end of 2008, up from 33% [30–36%] at the end of 2007.
- Around 275,700 children under 15 years of age were receiving antiretroviral therapy in low- and middle-income countries at the end of 2008, up from 198 000 at the end of 2007. Antiretroviral therapy coverage for children was 38% [31–47%]. Disaggregated data by sex suggest that adult women are slightly advantaged as compared to adult men in accessing antiretroviral therapy in low- and middle-income countries overall.
- More countries provided national programme data on patient retention on antiretroviral therapy. The data showed that most patient attrition occurred during the first year of treatment. Patient retention tended to stabilize thereafter. Retention in sub-Saharan Africa was estimated at 75% at 12 months following initiation, and at 67% at 24 months, consistent with data obtained from cohort studies. However, many people living with HIV continue to be diagnosed late, preventing the timely initiation of antiretroviral therapy when its impact on survival would be greatest.
- Implementation of various elements of the WHO global strategy for prevention and assessment of HIV drug resistance continued to expand during 2008. Data from 9 countries which conducted surveys in geographical areas where antiretroviral therapy was first provided in the country suggest that transmitted resistance to all drugs and drug classes was below 5%.
- The vast majority of adults on treatment in low- and middle-income countries are receiving first-line antiretroviral drug regimens, and only 2% are receiving second-line regimens. Data also suggest that the majority of national HIV programmes are following WHO-recommended treatment guidelines.
- The weighted average median price of the four combinations most widely used in first-line treatment was US\$ 143 per person per year in low-income countries, US\$ 162 per person per year in lower-middle income countries and US\$ 161 per year in upper middle-income countries. The prices of most first-line regimens decreased by between 30–68% from 2004 to 2008 in low- and middle-income countries. Second-line regimens continue to be more expensive.
- More countries are providing data on collaborative interventions to address the dual epidemic of HIV and TB, although further efforts are needed to enable comprehensive global analysis. Around 16% of notified TB patients knew their HIV status in reporting low- and middle-income countries in 2007, with evidence of scale-up in many high-burden countries. Antiretroviral therapy coverage among people living with HIV and TB remains low. Implementation of the “3 Is” - intensified TB case finding among HIV patients, isoniazid preventive therapy and TB infection control - shows some evidence of progress, but data are incomplete and political commitment remains insufficient to accelerate scale-up.

Since 2003, the international momentum generated by the “3 by 5” initiative has continued to support efforts to scale up access to antiretroviral therapy for people living with HIV in low- and middle-income countries. With a public health approach to treatment characterized by simplified and standardized clinical decision-making, drug regimens and systems to monitor the outcomes of people receiving antiretroviral therapy, resource-limited countries have been able to make antiretroviral therapy available to an increasing number of those in need, reaching over 4 million people by the end of 2008 and showing evidence of retaining people on treatment and improved health outcomes.

Nevertheless, current global access to treatment services falls far short of need, raising questions regarding the sustainability of these programmes in the coming years, especially given the current global economic downturn. Further, as the number of people enrolled in treatment programmes continues to grow, several challenges are emerging. People are being diagnosed at a late stage of disease progression, resulting in delayed access to treatment and high rates of mortality in the early months after initiation, and the prices of second-line drug regimens continue to be high. Treatment services are often inequitably distributed between urban and rural areas or unavailable to some population groups such as injecting drug users or in some settings such as prisons. Expanded access to HIV testing and counselling must accompany the scaling up of treatment programmes, and continued high-quality services and improved patient monitoring systems are needed to increase retention.

The dual epidemic of TB and HIV also continues to be a major factor in morbidity and mortality among people living with HIV, especially in sub-Saharan Africa, undermining efforts to prevent and control HIV. Evidence indicates progress in scaling up collaborative interventions and improvement in the capacity of national HIV programmes to report on progress, but efforts need to be redoubled to achieve universal access to HIV testing, treatment and care, as well as intensified TB case-finding, isoniazid preventive therapy and TB infection control (the “three I’s”).

Further, coinfection with viral hepatitis, especially hepatitis B and hepatitis C, is an increasing challenge in countries with concentrated HIV epidemics, especially among people who inject drugs. Underlying viral hepatitis is becoming a major cause of death among people with HIV and hepatitis coinfection who are being treated with anti-HIV drugs. Malignancies other than classic AIDS-associated Kaposi’s sarcoma, non-Hodgkin lymphomas and cervical cancer are also emerging as causes of morbidity and mortality in settings where people are surviving longer with access to antiretroviral therapy. Similar to HIV/TB coinfection, an integrated package of collaborative activities is needed to

diagnose, treat and prevent these conditions in affected populations.

4.1. Antiretroviral therapy

4.1.1. Global, regional and country progress in access to antiretroviral therapy

When the “3 by 5” initiative was launched in 2003, an estimated 400 000 people were receiving antiretroviral therapy in low- and middle-income countries (1). Since then, political commitment and efforts by multiple stakeholders have resulted in a massive increase in the number of people receiving antiretroviral therapy.

At the end of 2008, WHO, UNICEF and UNAIDS estimate that 4 030 000 people [3 700 000–4 360 000] were receiving antiretroviral therapy, more than 1 million more people than at the end of 2007 (Table 4.1). This represents a 36% increase in 1 year and a 10-fold increase in 5 years (Fig. 4.1). It is important to note that this figure of 1 million more people receiving antiretroviral therapy at the end of 2008 is lower than the exact number of people who initiated antiretroviral therapy during the year due to attrition from treatment programmes (see Section 4.1.5 and Box 4.4). The total number of people who initiated antiretroviral therapy during 2008 was not reported by countries.

The greatest increase in the number of people receiving treatment in 2008 was in sub-Saharan Africa, the region with the greatest need. About 2 925 000 [2 690 000–3 160 000] people were receiving antiretroviral therapy at the end of 2008 in this region versus 2 100 000 [1 905 000–2 295 000] people in 2007. This represents a regional increase of 39% in 1 year and a 30-fold increase since the end of 2003.

Progress was substantially higher in Eastern and Southern Africa, with 2 395 000 [2 205 000–2 585 000] people receiving antiretroviral therapy at the end of 2008, representing a 43% increase in one year, than in Western and Central Africa (530 000 people receiving antiretroviral therapy, a 26% increase). Of the 20 low- and middle-income countries with the highest number of people on antiretroviral therapy at the end of 2008 (representing 83% of the total), 15 are in sub-Saharan Africa, of which 12 in Eastern and Southern Africa (Table 4.2).

About 445 000 [405 000–485 000] people were receiving antiretroviral therapy in Latin America and the Caribbean in December 2008. The percentage increase in the number of people receiving treatment (14%) is lower than in other regions. Since many large countries in this subregion have already reached high levels of coverage, their capacity to generate large increases within one year is more limited

Table 4.1. Estimated number of adults and children (combined) receiving antiretroviral therapy and needing antiretroviral therapy and percentage coverage in low- and middle-income countries by region, December 2003 to December 2008^a

Geographical region	Estimated number of people receiving antiretroviral therapy, December 2008 [range]	Estimated number of people needing antiretroviral therapy, 2008 [range] ^a	Antiretroviral therapy coverage, December 2008 [range] ^b	Estimated number of people receiving antiretroviral therapy, December 2007 [range]	Estimated number of people needing antiretroviral therapy, 2007 [range] ^a	Antiretroviral therapy coverage, December 2007 [range] ^b	Estimated number of people receiving antiretroviral therapy, December 2003 [range]
Sub-Saharan Africa	2 925 000 [2 690 000-3 160 000]	6 700 000 [6 100 000-7 100 000]	44% [41-48%]	2 100 000 [1 905 000-2 295 000]	6 400 000 [5 900 000-7 000 000]	33% [30-36%]	100 000 [75 000-125 000]
Eastern and Southern Africa	2 395 000 [2 205 000-2 585 000]	5 000 000 [4 500 000-5 300 000]	48% [45-53%]	1 680 000 [1 550 000-1 810 000]	4 700 000 [4 300 000-5 200 000]	36% [33-39%]	75 000 [56 000-94 000]
Western and Central Africa	530 000 [485 000-575 000]	1 800 000 [1 500 000-1 900 000]	30% [28-34%]	420 000 [360 000-480 000]	1 700 000 [1 500 000-1 900 000]	25% [22-28%]	25 000 [19 000-31 000]
Latin America and the Caribbean	445 000 [405 000-485 000]	820 000 [750 000-870 000]	54% [51-60%]	390 000 [350 000-430 000]	770 000 [700 000-820 000]	50% [47-55%]	210 000 [160 000-260 000]
Latin America	405 000 [370 000-440 000]	740 000 [680 000-790 000]	55% [52-60%]	360 000 [320 000-400 000]	700 000 [640 000-750 000]	51% [47-56%]	206 000 [156 000-255 000]
Caribbean	40 000 [35 000-45 000]	75 000 [66 000-83 000]	51% [46-59%]	30 000 [25 000-35 000]	70 000 [61 000-80 000]	43% [37-49%]	4 000 [3 000-5 000]
East, South and South-East Asia	565 000 [520 000-610 000]	1 500 000 [1 200 000-1 900 000]	37% [31-47%]	420 000 [375 000-465 000]	1 500 000 [1 100 000-1 800 000]	29% [23-37%]	70 000 [52 000-88 000]
Europe and Central Asia	85 000 [80 000-90 000]	370 000 [310 000-450 000]	23% [19-27%]	54 000 [51 000-57 000]	340 000 [280 000-410 000]	16% [13-19%]	15 000 [11 000-19 000]
North Africa and the Middle East	10 000 [9 000-11 000]	68 000 [52 000-90 000]	14% [11-19%]	7 000 [6 000-8 000]	63 000 [48 000-86 000]	11% [8-14%]	1 000 [750-1 250]
Total	4 030 000 [3 700 000-4 360 000]	9 500 000 [8 600 000-10 000 000]	42% [40-47%]	2 970 000 [2 680 000-3 260 000]	9 000 000 [8 200 000-9 900 000]	33% [30-36%]	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 for Annex 1. See Box 4.2 on estimating treatment need for an interpretation of the data on antiretroviral therapy need and coverage in 2007 and 2008.

^b The coverage estimate is based on the unrounded estimated numbers of people receiving and needing antiretroviral therapy.

Fig. 4.1. Number of people receiving antiretroviral therapy in low- and middle-income countries, by region, 2002–2008

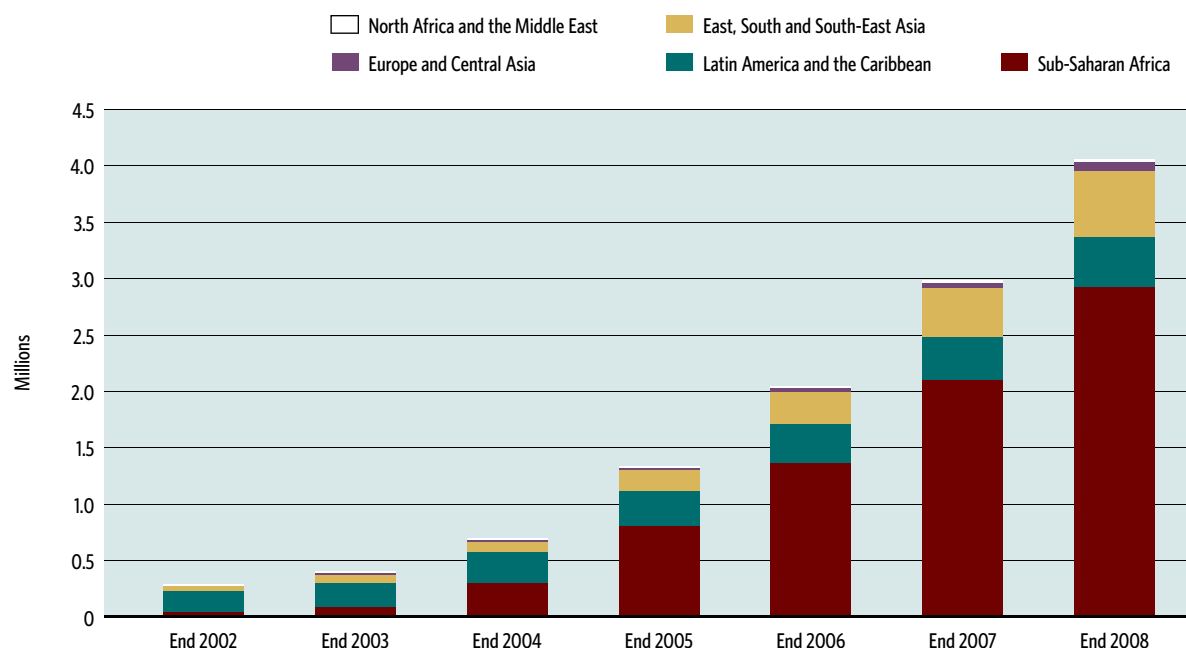


Table 4.2. Twenty low- and middle-income countries with the highest number of people receiving antiretroviral therapy in December 2008, progress between 2007 and 2008 in these countries and their representative share of the total number of people receiving antiretroviral therapy in low- and middle-income countries in 2008

Country	Geographical region	Number of people receiving antiretroviral therapy in December 2007	Number of people receiving antiretroviral therapy in December 2008	Percentage of total, 2008	% increase 2007-2008
South Africa	Sub-Saharan Africa	458 951	700 500	17%	53%
Kenya	Sub-Saharan Africa	177 000	242 881	6%	37%
Nigeria	Sub-Saharan Africa	197 694	238 659	6%	21%
India	East, South and South-East Asia	158 020	234 581	6%	48%
Zambia	Sub-Saharan Africa	151 199	225 634	6%	49%
Brazil	Latin America and the Caribbean	181 000	190 101	5%	5%
Thailand	East, South and South-East Asia	152 974	179 557	4%	17%
Uganda	Sub-Saharan Africa	115 348	164 341	4%	42%
United Republic of Tanzania	Sub-Saharan Africa	135 696	154 468	4%	14%
Zimbabwe	Sub-Saharan Africa	97 692	147 804	4%	51%
Malawi	Sub-Saharan Africa	100 649	146 657	4%	46%
Ethiopia	Sub-Saharan Africa	90 212	132 379	3%	47%
Mozambique	Sub-Saharan Africa	89 592	128 330	3%	43%
Botswana	Sub-Saharan Africa	92 932	117 045	3%	26%
Rwanda	Sub-Saharan Africa	48 569	63 149	2%	30%
Cameroon	Sub-Saharan Africa	45 817	59 960	1%	31%
Namibia	Sub-Saharan Africa	52 316	59 376	1%	13%
Mexico	Latin America and the Caribbean	43 051	55 000	1%	28%
Russian Federation	Europe and Central Asia	31 094	54 900	1%	77%
Côte d'Ivoire	Sub-Saharan Africa	38 221 ^a	51 833	1%	36%

^a This figure differs from the one published in the 2008 progress report (2), as the reported data were cumulative and not the number currently receiving antiretroviral therapy at the end of 2007.

than in other regions. In the Caribbean subregion, 33% more people were receiving treatment at the end of 2008 40 000 [35 000–45 000] than at the end of 2007.

In Europe and Central Asia, 85 000 [80 000–90 000] people were receiving antiretroviral therapy at the end of 2008 versus 54 000 [51 000–57 000] people at the end of 2007. Between 2007 and 2008, 57% more people started receiving antiretroviral therapy in this region. Europe and Central Asia had the highest percentage regional increase worldwide, although the antiretroviral therapy need in this region is not as high as that in other regions.

In East, South and South-East Asia, 565 000 [520 000–610 000] people were receiving antiretroviral therapy at the end of 2008. This represents a regional increase of 35% in one year and an 8-fold increase over the 70 000 [52 000–88 000] people receiving treatment at the end of 2003.

In North Africa and the Middle East, 10 000 [9000–11 000] people had access to antiretroviral therapy in 2008 versus 7000 [6000–8000] in 2007, a 43% increase.

More high-income countries reported data on the number of people receiving antiretroviral therapy in 2008 than in 2007.

However, recent data are not available from some of these countries, including countries in North America where no data from the United States of America have been reported since 2003. The number of people receiving antiretroviral therapy in high-income countries is estimated to be at least

Box 4.1. The Global Fund to Fight AIDS, Tuberculosis and Malaria and the United States President's Emergency Plan for AIDS Relief, the two largest funders of antiretroviral therapy programmes in low- and middle-income countries

The two major international sources of funding for antiretroviral therapy programmes in low- and middle-income countries are the Global Fund to Fight AIDS, Tuberculosis and Malaria and the United States President's Emergency Plan for AIDS Relief. At the end of 2008, Global Fund-supported programmes provided treatment to 2.0 million people (3), and programmes financed by the Emergency Plan supported antiretroviral therapy for 2.1 million people (4). However, about 1.15 million people were receiving treatment through programmes jointly financed by the two initiatives; hence, together they supported programmes that provided treatment to almost 2.95 million people at the end of 2008.

695 500 (Table 4.3). Worldwide, the total number of people accessing antiretroviral therapy in both low- and middle-income countries and high-income countries at the end of 2008 is estimated to be more than 4.7 million.

Table 4.3. Estimated number of people receiving antiretroviral therapy in high-income countries at the end of 2008

Europe	382 000
Asia, Oceania and Middle East	13 500
North America and the Caribbean	300 000
Total	695 500

4.1.2. Antiretroviral therapy coverage in low- and middle-income countries

Coverage of antiretroviral therapy in low- and middle-income countries reached 42% [40–47%] of the 9.5 million [8.7 million – 10.0 million] people in need at the end of 2008 (Box 4.2 explains recent revisions in estimates of treatment need). In 2007, coverage was 33% [30–36%].

In sub-Saharan Africa, antiretroviral therapy coverage was 44% [41–48%] in 2008 compared with 33% [30–36%] in 2007.¹ Differences in coverage among subregions are increasing: 48% [45–53%] of those in need had access to antiretroviral therapy in Eastern and Southern Africa versus 30% [28–34%] in Western and Central Africa. Sub-Saharan

¹ The 2007 estimates presented here have been updated with revised treatment needs. They differ slightly from the estimates published in the 2008 progress report (2).

Africa represents 70% of the estimated treatment need in low- and middle-income countries and 73% of the total number of people receiving treatment at the end of 2008.

Regional coverage in Latin America and the Caribbean was 54% [51–60%] in 2008 versus 50% [47–55%] in 2007. In Latin America, coverage was 55% [52–60%], the highest coverage for any group of low- and middle-income countries. Coverage in the Caribbean was 51% [46–59%]. Latin America and the Caribbean represents only 8% of the estimated treatment need in low- and middle-income countries but 11% of the total number of people receiving treatment at the end of 2008.

In Europe and Central Asia, antiretroviral therapy coverage was 23% [19–27%] at the end of 2008, up from 16% [13–19%] in 2007. This region represents 4% of the estimated global total treatment need and about 2% of those reported to be receiving treatment.

Antiretroviral therapy coverage in East, South and South-East Asia was 37% [31–47%] in 2008 versus 29% [23–37%] in 2007. This region represents 16% of the estimated treatment need in low- and middle-income countries and 14% of the total number of people receiving treatment at the end of 2008.

Coverage in North Africa and the Middle East increased from 11% [8–14%] in 2007 to 14% [11–19%] in 2008.

Box 4.2. Estimating antiretroviral therapy need and coverage among adults

Antiretroviral therapy coverage measures the proportion of people needing antiretroviral therapy who 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 needing antiretroviral therapy) is generated using a standardized statistical modelling approach (5). Estimating the number of people who need antiretroviral therapy raises some definition and measurement issues, which in turn influence estimates of coverage.

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 (5). The national HIV estimates are used as a basis to calculate the number of people in need. This includes all people who meet treatment initiation criteria, whether or not these people know their HIV status and their eligibility for antiretroviral therapy.

Treatment needs are estimated using a software package called Spectrum (6,7). This takes into consideration the national epidemiological data and some key assumptions that include the adult prevalence over time, the average survival of people living with HIV with and without antiretroviral therapy and the average time between seroconversion and eligibility for antiretroviral therapy. In addition, the number of people receiving treatment is taken into account to generate estimates of treatment need.

Definition of eligibility for antiretroviral therapy

Currently, WHO recommends that adults living with HIV in resource-limited settings should start antiretroviral therapy when the infection has been confirmed and there are signs of clinical advanced disease (HIV disease stage IV, regardless of CD4 cell count; and stage III with CD4 cell count below 350 cells per mm³) or laboratory evidence of severe immunosuppression (CD4 cell count below 200 per mm³ irrespective of disease stage) (8).

Estimation methods

Country estimates of treatment need are the sum of the estimated need among adults and among children younger than 15 years of age. UNAIDS and WHO use the Spectrum software to calculate the total number of adults who need antiretroviral therapy by adding the number of adults newly needing antiretroviral therapy in a given year to those who were already receiving treatment in the previous year and survived into the current year, plus those who needed treatment in the previous year and are still alive but have not yet begun receiving treatment (Chapter 5 discusses methods for estimating the number of children needing antiretroviral therapy).

Several factors thus influence estimates of treatment need. Country estimates and the corresponding regional and global estimates of antiretroviral therapy need are updated every two years based on the most recent epidemiological information and updated estimation methods. In 2009, the factors that had the greatest influence on estimates of treatment need were changes to estimated HIV prevalence in several countries and updated assumptions about the progression from seroconversion to eligibility for antiretroviral therapy.

Changes in HIV prevalence

For several countries in sub-Saharan Africa, new data from surveillance or surveys indicate a lower HIV prevalence than what was estimated in 2007-2008 reports, including for countries that have been recently recognized to have declining HIV prevalence, such as the Central African Republic, Ethiopia, Lesotho, Mali, Namibia, Niger, South Africa, Sudan and Zambia. Less substantial changes have also been made to HIV prevalence estimates for other regions, resulting in higher estimates in some countries and lower estimates in others.

Second, for countries with a generalized HIV epidemic, the estimation model used in 2009 considered evolution in the percentage of the population living in urban areas over time, whereas previous models had applied the percentage in the current year to all preceding years. Since HIV prevalence is typically higher in urban areas and most countries had a lower percentage of their population living in urban areas in the early years of the AIDS epidemic, this has resulted in slightly lower national HIV prevalence estimates for the early years of the epidemic. For countries with relatively recent epidemics, this change results in a slightly lower estimate of the number of people living with HIV who need antiretroviral therapy.

Changes in progression to antiretroviral therapy eligibility

The progression curves representing the estimated time from HIV infection to treatment eligibility and from treatment eligibility to death in the absence of treatment have been modified based on further analysis of cohort data on the median time from infection to eligibility and the age-standardized net mortality pattern of time from infection to AIDS-related death (9,10). This has resulted in slightly slower average progression from the time of infection to treatment eligibility than was previously applied. Based on the most updated evidence, the median time from HIV infection and these eligibility criteria is estimated at 8.2 years for men (up from 7.5 in 2007 models) and 8.6 years for women (up from 8.5 years in 2007 models). In countries in which HIV subtype E is dominant (some countries in South-East Asia), the median progression time is estimated to be 5.8 years for men and 6.6 years for women, respectively.

Estimates of treatment need evolve with these changing parameters. In 2008, 9.5 million [8.6 million - 10.0 million] people were estimated to need antiretroviral therapy. Taking into account the new available data and applying new revisions to the estimation model, 9.0 million [8.2 million - 9.9 million] people are now estimated to have needed antiretroviral therapy in 2007 in low- and middle-income countries instead of 9.7 million [8.7 million - 11.0 million] as published last year (2). Based on these new estimates, total coverage in low- and middle-income countries in 2007 was 33% (30-36%) instead of 31% (27-34%) as previously published.

At the end of 2009, WHO will consider the latest evidence from epidemiological studies to revise its treatment guidelines for adults, including evidence suggesting earlier thresholds for initiating treatment. Depending on whether the recommendations are revised, the effect on estimates of treatment need for adults could be substantial - up to two times more than those currently estimated. As a result, country coverage estimates would be affected and would decrease. Since these guidelines are currently being revised, this report does not publish country-specific estimates of need and coverage. The analysis focuses only on trends in coverage in low- and middle-income countries, total and by region.

4.1.3. Access to antiretroviral therapy among women and children

About 275 700 children younger than 15 years of age were receiving antiretroviral therapy at the end of 2008, up from 198 000 at the end of 2007, or a 39% increase in 1 year (Chapter 5 analyses treatment of children in detail). Overall, children represent 6.8% of people receiving antiretroviral therapy, with regional differences varying from 3.5% in Latin America to 8.1% in Eastern and Southern Africa.

Among 730 000 [580 000-880 000] children in need overall in low- and middle-income countries, 38% [31-47%] had access to treatment versus 43% for adults [39-46%]. In Latin America and the Caribbean, East, South and South-East Asia and Europe and Central Asia, coverage for children is higher than for adults (Table 4.4).

Disaggregated data by sex on the number of adults (<15 years) receiving antiretroviral therapy is available from 90 low- and middle-income countries, representing

Table 4.4. Number of adults and children younger than 15 years receiving antiretroviral therapy and estimated antiretroviral therapy need and coverage among adults and children in low- and middle-income countries by region, December 2008^a

Geographical region	Reported number of adults (≥15 years) receiving antiretroviral therapy, December 2008	Estimated number of adults needing antiretroviral therapy, 2008 [range] ^a	Antiretroviral therapy coverage among adults, December 2008 [range] ^b	Reported number of children (0-14 years) receiving antiretroviral therapy, December 2008	Estimated number of children needing antiretroviral therapy, 2008 [range] ^a	Antiretroviral therapy coverage among children, December 2008 [range] ^b
Sub-Saharan Africa	2 700 000	6 100 000 [5 700 000-6 500 000]	44% [41-47%]	224 900	640 000 [500 000-770 000]	35% [29-45%]
Eastern and Southern Africa	2 200 000	4 500 000 [4 200 000-4 900 000]	49% [45-52%]	195 100	440 000 [340 000-540 000]	44% [36-57%]
Western and Central Africa	500 000	1 600 000 [1 400 000-1 700 000]	32% [29-35%]	29 800	200 000 [140 000-260 000]	15% [11-22%]
Latin America and the Caribbean	429 000	800 000 [730 000-850 000]	54% [51-59%]	16 100	21 000 [18 000-25 000]	76% [65-91%]
Latin America	393 000	730 000 [660 000-770 000]	54% [51-59%]	13 700	17 000 [14 000-20 000]	82% [70->95%]
Caribbean	36 000	70 000 [63 000-79 000]	51% [46-57%]	2 500	4 600 [3 400-5 800]	55% [43-72%]
East, South and South-East Asia	537 000	1 500 000 [1 200 000-1 800 000]	36% [30-46%]	30 000	58 000 [41 000-78 000]	52% [38-73%]
Europe and Central Asia	80 000	370 000 [310 000-440 000]	22% [18-26%]	4 200	4 900 [2 700-7 500]	85% [56->95%]
North Africa and the Middle East	9 400	62 000 [49 000-83 000]	15% [11-19%]	400	6 700 [3 400-11 000]	6% [4-12%]
Total	3 755 000	8 800 000 [8 100 000-9 500 000]	43% [39-46%]	275 700	730 000 [580 000-880 000]	38% [31-47%]

Note: some numbers do not add up due to rounding.

^a For an explanation of the methods used, see the explanatory notes for Annex 1.

^b The coverage estimate is based on the unrounded estimated numbers of people receiving and needing antiretroviral therapy.

80% of the 3.76 million adults receiving treatment in 2008.¹ The data show that, in low- and middle-income countries overall, adult women are slightly advantaged compared with adult men in accessing antiretroviral therapy. About 45% of women in need and 37% of men in need received antiretroviral therapy at the end of 2008. About 60% of the adults receiving antiretroviral therapy among the reporting countries are women, while they represent 55% of the people in need.

These overall figures hide regional differences. In sub-Saharan Africa, women are advantaged compared with men: in 35 countries with disaggregated data, 64% of adults receiving antiretroviral therapy were women while they represent 60% of adults in need. On the other hand, men are advantaged in North Africa and the Middle East (eight countries): 48% and 55%. In the three other regions, access to antiretroviral therapy is equitable between men and women: in Latin America and the Caribbean (9 countries reporting disaggregated data), 33% of people receiving

antiretroviral therapy were women while they represent 33% of people in need; in East, South and South-East Asia (18 countries), both figures were 39%; in Europe and Central Asia (19 countries) the figures were 43% and 42% respectively. See Annex 2 for country-specific data on people receiving antiretroviral therapy by age and sex.

4.1.4. Availability of antiretroviral therapy

The number and distribution of health facilities providing antiretroviral therapy are key indicators of the scale-up of a national treatment programme and increased access to treatment services. In 2008, 115 low- and middle-income countries reported 12 400 health facilities providing antiretroviral therapy. Of these facilities, 74% were in the public sector and 11% in the private sector (15% were unspecified).

Eighty-one countries provided data for both 2007 and 2008. In these countries, the reported number of health facilities providing antiretroviral therapy increased from 6820 to 9200, or a 35% increase in 1 year. The number of facilities increased by 51% in sub-Saharan Africa (from 3820 to 5770 in 40 countries); 20% in Latin America and the Caribbean

¹ Some of these countries provided disaggregated data only for a proportion of all adults receiving antiretroviral therapy in the country while for other countries only disaggregated data were reported for all ages combined. For those countries with incomplete datasets, treatment data for adults by sex were obtained by applying male/female ratios from existing data to the numbers of adults on treatment.

Box 4.3. Decentralizing antiretroviral therapy services in Cameroon (12)

Cameroon launched its national antiretroviral therapy programme in 2001 by providing services at the main tertiary-level reference hospitals. The programme was subsequently decentralized to district hospitals in 2005. Antiretroviral therapy was made available free of charge in the public sector in 2007, and by June 2008, treatment services were available in 106 of 174 districts, with 5238 people receiving antiretroviral therapy.

Between September 2006 and April 2007, France's Agence nationale de recherche sur le sida et les hépatites virales conducted an evaluation in 27 hospitals offering antiretroviral therapy with the objective of documenting the experience of service decentralization to district hospitals and its impact on the effectiveness of treatment and the quality of life of the people receiving antiretroviral therapy.

The evaluation found that 71% of the people receiving antiretroviral therapy were women, and about three fourths were living below the poverty line. People enrolled in district hospitals had a more precarious social situation than those in reference hospitals, with lower levels of education and income. Following an HIV diagnosis, people in district hospitals initiated antiretroviral therapy earlier than people in reference hospitals and at slightly higher CD4 counts. People in district hospitals adhered to treatment better than those in reference hospitals. People followed in district hospitals and reference hospitals had similar immune restoration at six months and similar quality of life.

This evaluation also documented the structural factors associated with treatment interruption for more than two days. Besides the stock-out of drugs at treatment sites, the absence of clinicians, the consequent shifting of tasks to paramedical staff and the lack of psychosocial support by professional social workers were associated with more frequent treatment interruptions and lower quality of life. The study, which was conducted before antiretroviral therapy became free of charge in the public sector, also showed that 20% of people could not buy their antiretroviral drugs in the previous month, leading to treatment interruption. Making antiretroviral therapy available free of charge is a major step in increasing the reach of the national treatment programme in Cameroon.

(from 1010 to 1220 in 16 countries), 40% in North Africa and the Middle East (from 63 to 88 in 9 countries); and 11% in East, South and South-East Asia (from 1920 to 2130 in 14 countries).

In addition, progress between 2005 and 2008 can be assessed in 47 countries that reported these data for all four years. The number of health facilities providing antiretroviral therapy in these countries nearly doubled during this period, from 4700 to 9360. Progress was especially significant in the 26 sub-Saharan African countries reporting comparable data, increasing by 264% from 1440 health facilities providing antiretroviral therapy in 2005 to 5240 in 2008.

The average number of people receiving antiretroviral therapy per health facility decreased from 300 in 2007 to 250 in 2008. Health facilities in sub-Saharan Africa continue to treat more people per site than in the rest of the world (370 people per health facility providing antiretroviral therapy in sub-Saharan Africa versus 60 in Europe and Central Asia, 140 in East, South and South-East Asia, 80 in North Africa and the Middle East, and 180 in Latin America and the Caribbean.

Improving access to treatment for hard-to-reach populations, including those who are located far from urban centres, is critical if countries are to reach universal access to treatment services. Data need to be disaggregated further to assess equity in service availability for people living in rural areas and for marginalized or hard-to-reach populations (Box 4.3). Evidence from such countries as Malawi suggests that such services are being gradually

decentralized. Models of decentralized care, including the WHO Integrated Management of Adolescent and Adult Illness (IMAI) model, have been developed to ensure that the quality of services is maintained as treatment sites expand and decentralize (11).

4.1.5. Outcomes and impacts of scaling up antiretroviral therapy

Outcomes at the programme level: retention on antiretroviral therapy

Antiretroviral therapy is a life-long intervention. The long-term outcomes and effects of treatment programmes need to be determined to monitor and improve programme performance and to build and sustain political commitment to programme efforts. Annual documentation of the percentage of adults and children with HIV who continue to receive treatment after initiating antiretroviral therapy¹ is useful for programmes, as it helps in understanding how effective they are at retaining people on antiretroviral therapy over time (Box 4.4).

Countries have substantially improved the monitoring and reporting of retention data. Data collected by WHO, UNICEF and UNAIDS show that, in 2008, 59% of reporting low- and middle-income countries provided information on the retention of people receiving antiretroviral therapy at 12 months following treatment initiation. An increasing number

¹ United Nations General Assembly Special Session on HIV/AIDS (UNGASS) indicator 24 on the percentage of adults and children with HIV known to be receiving treatment at 12 months after initiation of antiretroviral therapy, and yearly thereafter.

Box 4.4. Challenges in monitoring HIV treatment cohorts

Antiretroviral therapy is a life-long intervention that requires careful monitoring and follow-up. With treatment being rapidly scaled up since 2003, cohort monitoring – following up people as they continue receiving antiretroviral therapy over time – has become critical for successful programme management and generating evidence on the outcomes of antiretroviral therapy and patient retention, or the proportion of people who continue antiretroviral therapy among those who ever started. Although efforts have been made in this direction, the existence of highly heterogeneous monitoring systems and the use of non-standardized definitions across programmes create additional hurdles for accurately measuring the success of programmes.

Attrition from an antiretroviral therapy programme – or the number of people in a cohort who discontinue treatment – is classified in three underlying causes: treatment stop, death and lost to follow-up (Fig. 4.2).

Treatment stop refers to a health care decision to interrupt antiretroviral therapy. It can be permanent or temporary, such as in case of severe toxicity. A systematic literature review of cohorts in sub-Saharan Africa estimated that less than 5% of attrition in cohort studies falls in this category (13).

Death is the main outcome used to estimate the survival of people who start treatment. In many low- and middle-income countries, where vital registration systems are weak and most people die at home, health information systems incompletely capture deaths. When a person who started antiretroviral therapy dies and the information is not reported to the clinic, the person is considered as being lost to follow-up and reported as such in cohort monitoring.

A person is considered as being lost to follow-up when he or she does not come back to the treatment facility for a refill of antiretroviral drugs until the end of the reporting period. The definition of lost to follow-up varies considerably in the literature, ranging from a missed appointment to numerous months of absence.

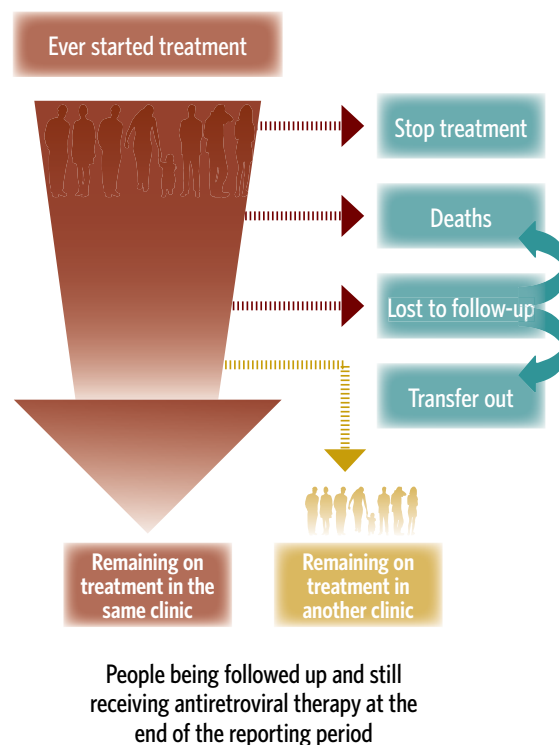
In fact, “lost to follow-up” covers people in many different circumstances. Some may have died, and others may have moved – on their own or by referral from their original clinics – to another site, where they continue to receive treatment. A meta-analysis of 17 studies from sub-Saharan Africa tracking outcomes among 6420 people lost to follow-up found that 34% were not traceable due to registration problems, 29% had died and 37% were alive. Among the last group, many people, ranging from 12% to 54% depending on the study, had actually transferred to another clinic (14).

The number of people receiving antiretroviral therapy who transfer from one clinic to another is increasing with the scaling up and the decentralization of services. A study in Malawi tracing 805 people transferred found that 737 (92%) of them could be found in their new clinic and were continuing to receive antiretroviral therapy (15). Nevertheless, as people remain on treatment, albeit at a different clinic, the transfer seems to remain mostly an issue of monitoring and proper recording rather than attrition.

In addition to definitional issues, recent evidence indicates that the quality of the data collected at the clinical level can also vary substantially among programmes. In Malawi, researchers performing supervision and data control in 89 facilities estimated that routine reports undercounted the number of people receiving antiretroviral therapy by 5% and the number of people receiving first-line antiretroviral drug regimens by 12% (16). In Mali, the opposite was found: a data quality control study undertaken for the Global Fund estimated that routine reports overcounted the number of people receiving antiretroviral therapy by 7% (17).

Fig. 4.2. Measuring attrition from antiretroviral therapy programmes

People receiving antiretroviral therapy at least once for their own health



of countries also reported data on retention over longer time frames, with one in every four countries providing retention data at 48 months. In 2007, only two countries in sub-Saharan Africa reported retention rates at 24 months and none at 48 months.

Of 61 low- and middle-income countries reporting data, 30 (49%) exhibited patient retention rates of over 80%, 10 (16%) of which exceeded 90% retention at 12 months. In total, despite regional variation, 51 (84%) countries reported

retention rates at 12 months greater than 70% (Fig. 4.3). Table 4.5 shows regional trends after aggregating data reported by individual countries. Among countries in sub-Saharan Africa, patient retention on antiretroviral therapy was estimated to be 75% at 12 months (22 countries reporting) and 67% at 24 months (13 countries reporting) (Table 4.5 and Fig. 4.5).

Aggregate retention rates across reporting countries did not differ by sex or by age. Twenty-five countries reported

Fig. 4.3. Retention on antiretroviral therapy at 12 months after initiation of treatment in 61 low- and middle-income countries by region, 2008

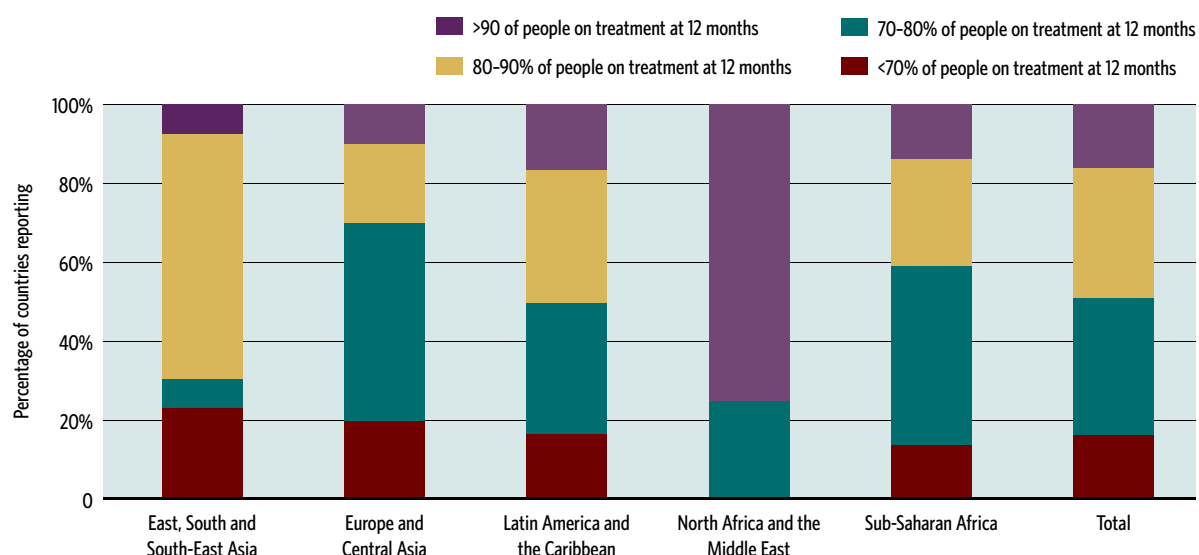


Table 4.5. Retention on antiretroviral therapy at 12, 24, 36 and 48 months – estimates from aggregated country reports, low- and middle-income countries by region, 2008

		East, South and South-East Asia	Europe and Central Asia	Latin America and the Caribbean	North Africa and the Middle East	Sub-Saharan Africa	Total
12 months	Number of countries reporting	13	10	12	4	22	61
	Percentage of people receiving antiretroviral therapy	80.2	74.1	85.5	89.6	75.2	79.5
	Number of people receiving antiretroviral therapy (numerator)	43 392	897	83 031	784	108 318	236 422
	Number of people assessed for outcomes (denominator)	54 116	1 211	97 168	875	144 038	297 408
24 months	Number of countries reporting	7	9	10	3	13	42
	Percentage of people receiving antiretroviral therapy	68.7	63.4	78.6	92.3	66.8	74.8
	Number of people receiving antiretroviral therapy (numerator)	3 403	453	68 496	597	26 067	99 016
	Number of people assessed for outcomes (denominator)	4 952	714	87 097	647	39 017	132 427
36 months	Number of countries reporting	4	7	6	3	10	30
	Percentage of people receiving antiretroviral therapy	66.7	63.4	77.0	86.8	65.6	73.8
	Number of people receiving antiretroviral therapy (numerator)	1 304	286	28 827	165	8 221	38 803
	Number of people assessed for outcomes (denominator)	1 956	451	37 452	190	12 523	52 572
48 months	Number of countries reporting	4	4	6	3	5	22
	Percentage of people receiving antiretroviral therapy	55.4	66.8	74.5	78.4	67.2	73.1
	Number of people receiving antiretroviral therapy (numerator)	416	175	15 857	156	1 999	18 603
	Number of people assessed for outcomes (denominator)	751	262	21 278	199	2 973	25 463

disaggregated retention rates at 12 months by sex and 21 countries by age. The retention rate was estimated at 77.3% (6960 of 9001) among men; 76.8% (7186 of 9351) among women; 77.9% (959 of 1231) among children younger than 15 years old; and 78.3% (16 896 of 21 585) among adults and adolescents.

The availability of comparable programme data from high-income countries is limited, although some cohort studies have documented retention in care. A study among 2619 military veterans in the United States who started to receive antiretroviral therapy and were followed up to 2002 (18) showed that at least 36% missed one quarterly visit or more during the first year on antiretroviral therapy, which was associated with worse survival on treatment. This study concluded that retention on care remained an issue even in high-resource settings.

The data on retention reported by national programmes are consistent with those obtained from cohort studies. A review of results from 33 cohorts comprising 74 289 people who started antiretroviral therapy in 13 countries

in sub-Saharan Africa estimated the proportion of people continuing on antiretroviral therapy to be 80% at 6 months, 75% at 12 months and 62% at 24 months. “Lost to follow-up” accounted for 56% of attrition and death for 40% (13). Retention rates in the cohorts differed vastly depending on whether services were supported by the public sector, nongovernmental organizations, the private sector or workplaces, on whether any fees for service were charged (free of charge or full or partial user charge) and on the period of enrolment (most were enrolled between 2001 and 2004).

Several programmes have published outcomes based on longer follow-up from routine monitoring data that include baseline characteristics. Botswana’s national treatment programme published data on 633 people starting antiretroviral therapy in 2002. At baseline, the median CD4 count was 67 cells per mm³, and 85% were at WHO clinical stages 3 or 4. At five years, survival was estimated at 79% and the probability of being lost to follow-up was 22%; thus, about 57% were on antiretroviral therapy after 5 years (19). The Province of Cape Town, South Africa published results

Box 4.5. Methodological issues in measuring the percentage of adults and children with HIV known to be receiving treatment 12 months after initiating antiretroviral therapy

Definitions

Estimates of retention in treatment programmes, or the percentage of adults and children with HIV who are known to be receiving antiretroviral therapy 12 months after initiation, should be generated for each calendar year to document annual progress. Retention rates are calculated as follows:

$$\frac{\text{Number of people alive and still on antiretroviral therapy at 12 months}}{\text{Number of people started on antiretroviral therapy in the preceding calendar year}}$$

For example, in 2008, the denominator must comprise everyone who started receiving antiretroviral therapy during 2007 (or the most recent local calendar year in use). The numerator should include everyone who started receiving antiretroviral therapy in 2007 and was still alive and on treatment after 12 months – thus, people who died before 12 months, stopped treatment and did not restart before 12 months or were lost to follow-up before 12 months should not be included in the numerator. A similar approach should be used to estimate retention at 24, 36 and 48 months and at subsequent 12-month intervals. All treatment facilities should produce this indicator and the results should be aggregated to produce national figures.

Major constraints in generating and interpreting data

The quality of the information produced depends on the cohort monitoring system in place at treatment facilities and on how well it can capture attrition (see Box 4.4). Challenges exist in measuring both sides of the equation. For the denominator, some countries may produce this indicator by selecting only a sample of treatment facilities, which may therefore not reflect a true national picture. Others may generate a cumulative indicator, adding together everyone ever started on antiretroviral therapy and not only those who started during the most recent year, thereby underestimating the current rate of retention, as overall programme performance may have improved over the years.

Determining the numerator can also be complex because it is not always clear how the monitoring systems record people who are no longer being seen in the facility. Some countries may exclude people who die from their calculations, keeping those no longer being seen, resulting in an overestimation of the actual retention on antiretroviral therapy. Incomplete records of transfers between facilities may also underestimate retention.

These issues highlight the difficulties programme managers and researchers face when producing and analysing data on retention in treatment programmes. Nevertheless, interpretation depends largely on the methods employed by local managers (see Box 4.12 on three interlinked patient monitoring systems).

based on monitoring data compiled from all of its treatment sites and including 12 587 adults and 1709 children. Among adults, 23% started treatment with a CD4 count lower than 50 cells per mm³. The proportions retained on treatment at four years were 76% among adults and 82% at three years among children (20). Thailand's national treatment programme published data on the outcomes of 58 008 people who started antiretroviral therapy between 2000 and 2005. At baseline, the median CD4 count was 41 cells per mm³ and 51% had AIDS. Survival at five years was estimated at 78%; in addition, 9% were lost to follow-up and 1% permanently stopped treatment (21).

The data also show that late access to antiretroviral therapy remains the most important threat to survival, a challenge that can only be resolved by dramatically expanding earlier access to HIV diagnosis and screening for treatment eligibility.

The data on short- and mid-term retention on antiretroviral therapy reported by low- and middle-income countries confirm the effectiveness of treatment programmes and the substantial gains in terms of survival and averted mortality due to antiretroviral therapy. This result is especially remarkable given the advanced stage of disease

Box 4.6. Scaling up antiretroviral therapy in Papua New Guinea from 2004 to 2008

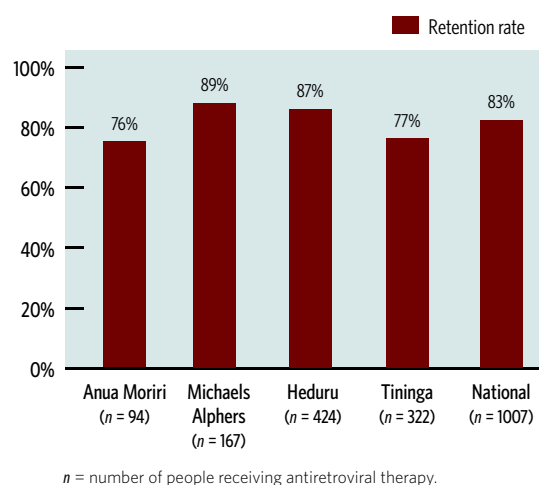
Since the first HIV case was reported in 1987, the HIV epidemic in Papua New Guinea has been growing rapidly. The epidemic was characterized as being generalized in 2004, and by the end of 2008, the adult HIV prevalence was estimated at 0.95%, with more than 36 000 adults and children living with HIV.

In 2004, Papua New Guinea established a national antiretroviral therapy programme, beginning with two pilot treatment sites in collaboration with development partners including WHO, AusAID and the Asian Development Bank. In 2005, Papua New Guinea began scaling up antiretroviral therapy provision with financial support from the Global Fund, which enabled commodities such as antiretroviral drugs and HIV test kits to be procured, human resources to be recruited and trained and treatment sites and laboratory services to be improved. The number of treatment sites increased to 52 by the end of 2008, with 5195 people receiving antiretroviral therapy. About 500 health workers were trained in service delivery using the WHO model of Integrated Management of and Adolescent Adult Illness (IMAI). The training model and materials, treatment guidelines and patient monitoring tools were reviewed in collaboration with WHO and other development partners. The expansion of antiretroviral therapy has been accompanied by efforts to expand HIV testing and counselling and improve laboratory infrastructure, which facilitated the identification of people and their enrolment in treatment services. In addition, eight CD4 machines were made available for laboratory monitoring as well as the use of dried blood spots to improve HIV diagnosis among children.

To reinforce the monitoring of people receiving antiretroviral therapy, support service delivery and measure outcomes, computerized national and site-specific databases were established and health care workers were trained and mentored to use these databases. This mechanism is also used to monitor early warning indicators of HIV drug resistance. National retention rates of people receiving antiretroviral therapy were high and comparable with other countries in the region (Fig. 4.4).

The successful scaling up of treatment services has not been without challenges. Papua New Guinea has rugged topography with limited communication infrastructure. The capital city is not linked by road to most provinces, and air transport remains the main way of accessing most provinces and districts, where 87% of the population resides according to a 2006 census. The country established a vertical drug supply mechanism to allow uninterrupted drug supplies, and contracted a company to supply drugs to treatment sites from the capital. Nevertheless, the treatment programme continues to face delays in the delivery of HIV test results and access to treatment services, especially in remote areas. Insufficient treatment facilities for children, frequent breakdowns of laboratory equipment due to electrical power fluctuations, inadequate use of data to inform programme implementation and persistent stigma and discrimination all hamper the provision of services in the country.

Fig. 4.4. 12-month retention of people receiving antiretroviral therapy in selected treatment sites, Papua New Guinea, 2008



at which most people enrol in treatment programmes. Indeed, the baseline CD4 count has been shown to be the most important predictor of survival (22) and of immune reconstitution (23). People initiating therapy at higher CD4 levels tend to achieve comparably greater CD4 cell counts and tend to do so more rapidly (23). In low- and middle-income countries, the median survival without antiretroviral therapy of people with clinical AIDS is estimated to be less than 1 year, and that for people with a CD4 count below 200 cells per mm³ is estimated to be 2.1 years (24). Considering that treatment is often initiated well below this CD4 threshold, the importance of these results should not be underestimated.

The data also confirm that most attrition from treatment – or the number of people starting antiretroviral therapy who discontinue it – occurred within the first year after initiation of therapy and tended to decline or to stabilize after 12 months (Fig. 4.5). These trends corroborate the view that most attrition in the first year following initiation of treatment seems to be due to high mortality rates related to late access to antiretroviral therapy. Regional differences in retention rates also reflect a difference in the stage at which antiretroviral therapy was initiated.

Various cohort studies in low- and middle-income countries have shown that most deaths among people receiving antiretroviral therapy occur in the early months following treatment initiation and that mortality declines substantially

thereafter (20,22,25). Evidence suggests that early high mortality rates probably depend not only on the care delivered by programmes but more fundamentally on the stage of disease at the time of enrolment in the programme and the quality of preceding health care (25).

Even in high-income countries, many people start treatment at a disease stage more advanced than if HIV had been diagnosed earlier. In studies from high-income countries, among people first diagnosed with HIV, the proportion with severe disease – defined by clinical AIDS conditions or by CD4 counts below 200 CD4 cells per mm³ – varied from 24% to 45% (26).

Unfortunately, many national programmes provide access to antiretroviral therapy when HIV is at a severe disease stage, mostly due to late access to HIV diagnosis and screening for antiretroviral therapy. Data from national programmes on baseline characteristics at the start of antiretroviral therapy are limited, and available data are mostly derived from cohort studies, which may not always be representative of a country or a region. The ART-LINC Collaboration¹ of 17

¹ 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 France's Agence nationale de recherche 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.

Fig. 4.5. Trends in retention on antiretroviral therapy in low- and middle-income countries by region, 2008

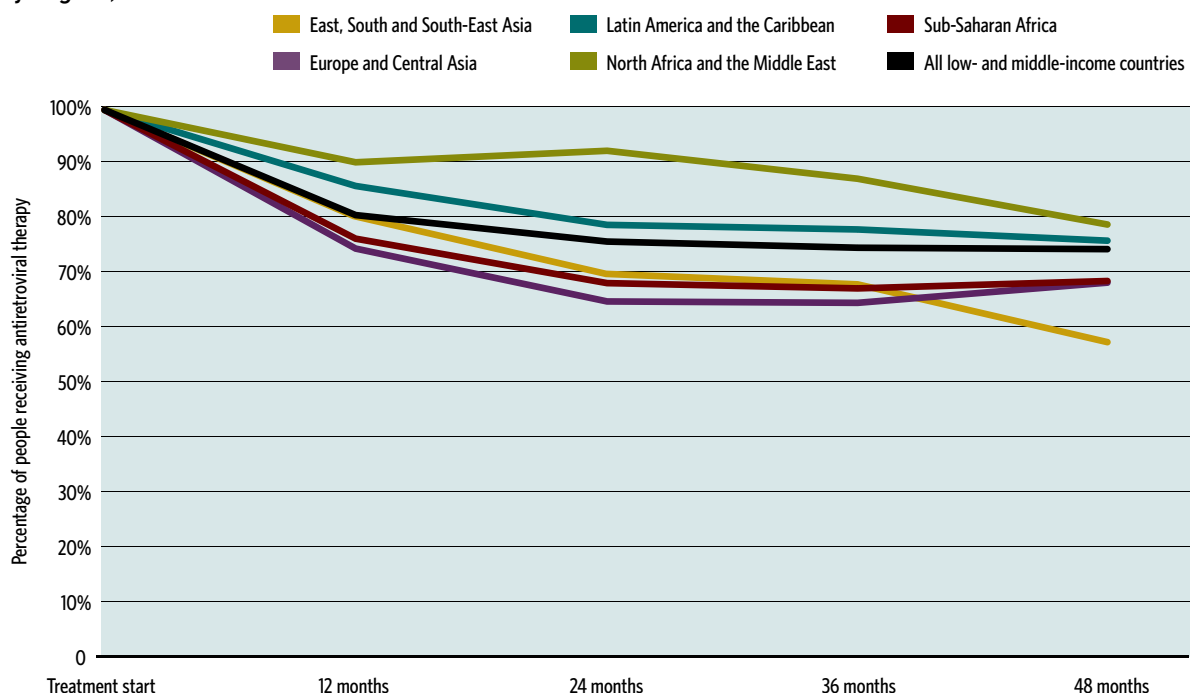
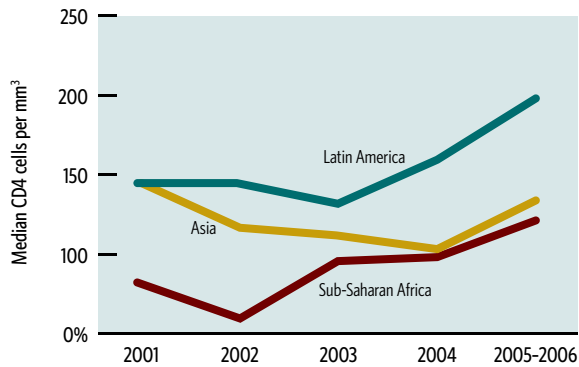


Fig. 4.6. Trends over time in the median CD4 count at baseline count of 36 715 adults starting antiretroviral therapy between 2001 and 2006



Source: Keiser et al. (27).

cohorts in low- and middle-income countries has produced data on the baseline CD4 count of 36 715 adults initiating antiretroviral therapy between 2001 and 2006. People are increasingly starting treatment earlier in low- and middle-income countries, with more starting therapy at higher CD4 levels than before (Fig. 4.6), highlighting regional differences. People in sub-Saharan Africa tended to gain access to antiretroviral therapy at a more severe stage of disease than people in other regions (27). An analysis of cohort-level aggregated indicators in eight countries in sub-Saharan Africa supported by the United States President's Emergency Plan for AIDS Relief showed that the median CD4 count when treatment was initiated increased from 115 cells/mm³ in 2005 to 140 in 2008 (28).

Data from programme monitoring in Cape Town Province, South Africa show that the severity of illness among people starting antiretroviral therapy decreased over time as baseline CD4 count increased: indeed, while the proportion of adults starting antiretroviral therapy below 50 CD4 cells per mm³ decreased from 51.3% in 2001 to 21.5% in 2005, mortality during the first six months of antiretroviral therapy almost halved over the same period: from 12.7% to 6.6% (20).

Late diagnosis due to lack of knowledge of HIV status remains an issue to be reckoned and dealt with, as it continues to prevent the initiation of antiretroviral therapy when its effect on survival would be greatest.¹ Data also suggest that delays in initiating antiretroviral therapy following HIV diagnosis, including for people with low CD4 counts, could contribute to early mortality. A prospective analysis of 896 people enrolled in HIV care in Durban, South Africa (30) showed that they are often severely immunosuppressed at HIV

¹ Among people who need antiretroviral therapy in Kenya, 39% are already being treated, 4% know their status but do not have access to treatment and 57% do not even know that they are living with HIV (29).

diagnosis (64% of those tested had CD4 count <200 per mm³), and only half of those eligible started antiretroviral therapy within 12 months. Countries must redouble efforts to make adequate testing and counselling available to everyone and ensure immediate referral to HIV care services for regular screening for treatment eligibility, follow-up and timely initiation of treatment in case of need. Continued efforts are also needed to address issues related to stigma, discrimination and mental barriers such as feelings of fear, denial or shame.

Several additional factors related to the quality of health services and to differences in general population health across sites, programmes and regions are also likely to affect mortality. For instance, strong supply management systems are essential to ensure uninterrupted life-long access to antiretroviral therapy (see Chapter 6). In countries reporting a stock-out of antiretroviral drugs during 2008, this programmatic bottleneck may have contributed to attrition.

Even when antiretroviral drugs are distributed free of charge, fees for service and user charges paid for biological monitoring and other services appear to be related to lower retention (22,31). A systematic review of 33 cohorts in low- and middle-income countries showed that programmes that required no payment had higher retention rates (13). In a fee-for-service HIV clinic in Uganda, the probability of remaining alive and in care at four years was estimated to be 35% (32).

The quality of services and adherence support provided must also be considered. Facilities with long delays, insufficient staff and deficient infrastructure are unlikely to retain people on treatment and increase survival adequately in the long term. The geographical location of treatment sites can also increase barriers to treatment – both directly, such as through increased costs associated with transport and food, and indirectly, in terms of time spent on travel and waiting in queues (33).

Further, improving HIV care and diagnosis and treatment of opportunistic infections, strengthening HIV/TB activities with the three I's for HIV/TB (see section 4.2) and ensuring access to co-trimoxazole prophylaxis remain key to improving the survival of people receiving antiretroviral therapy and the performance of programmes. The Development of Antiretroviral Therapy in Africa (DART) study included 3316 people starting antiretroviral therapy in Uganda and Zimbabwe and showed that co-trimoxazole prophylaxis reduced mortality by half in the first 12 weeks of antiretroviral therapy (Box 4.7) (34).

The added value to survival of laboratory monitoring is unclear. The DART clinical trial, which compared laboratory and clinical monitoring with clinically driven monitoring,

Box 4.7. Development of Antiretroviral Therapy in Africa (DART) trial

The DART clinical trial compared two approaches to monitoring people receiving antiretroviral therapy (35,37). Conducted in Uganda and Zimbabwe, the study included 3316 adults initiating antiretroviral therapy for the first time and allocated them randomly to two groups: the first group received laboratory and clinical monitoring and the second clinically driven monitoring. In the laboratory and clinical monitoring group, full blood count, biochemistry and CD4 count were systematically monitored every 12 weeks; in the clinically driven monitoring group, the results of full blood count and biochemistry were returned when requested by health care personnel, but the results of CD4 count were not returned.

Sixty-five per cent of the study participants were women. At baseline, the median CD4 count was 86 cells per mm³, and 33% of participants had a CD4 count of less than 50 cells per mm³. The participants were followed up until December 2008, with a median follow-up period of 4.9 years. Overall, 7% of the participants were reported as being lost to follow-up, with a similar rate in the groups.

The trial showed no differences in disease progression and survival between groups during the first two years of antiretroviral therapy and a small but statistically significant benefit in the laboratory and clinical monitoring group only from the third year onwards related to a later switch to second-line regimens in the clinically driven monitoring group compared with the laboratory and clinical monitoring group. Survival at five years was estimated to be 90% in the laboratory and clinical monitoring group versus 87% in the clinically driven monitoring group. The authors compare this to a historical cohort (Entebbe cohort) from the period before the introduction of antiretroviral therapy, which estimated survival at five years to be 8%. At the end of the study period, 78% of the participants in the laboratory and clinical monitoring group and 81% in the clinically driven monitoring group remained on the first-line regimen. The groups had similar immune restoration. In participants remaining on a first-line regimen, the median CD4 count was 356 cells per mm³ at the end of the trial. There were few and nonsignificant differences between the groups in the rate of detection of adverse events.

In a separate cost-effectiveness analysis, the incremental cost-effectiveness ratio for using laboratory and clinical monitoring versus clinically driven monitoring was estimated to be US\$ 9016 per year of life gained. The authors concluded that antiretroviral therapy can be delivered safely without laboratory monitoring in sub-Saharan Africa, questioning the need for routine CD4 monitoring over and above routine clinical monitoring, particularly from the second year of antiretroviral therapy.

showed no differences in disease progression and survival during two years and a small but statistically significant benefit in the group with laboratory and clinical monitoring only from the third year of antiretroviral therapy (35). A simulation model found modest benefit of viral load and CD4 versus clinical monitoring for people starting treatment with stavudine (d4T), lamivudine (3TC) and nevirapine (NVP) (36).

Impacts of antiretroviral therapy on mortality at the population level

The absence or the delay in generating vital statistics explains most of the current difficulty in assessing how antiretroviral therapy affects mortality at the population level. Many low- and middle-income countries have weak vital or civil registration systems, especially countries with a high HIV burden, creating difficulty in measuring HIV-attributable mortality. Even when these systems exist, they are usually not exhaustive and the cause of death is misreported or underreported. The use of data from these systems also suffers from delays in reporting. Surveys sometimes use verbal autopsies to retrospectively assess HIV-attributable mortality in a population; however, this approach often lacks baseline data for assessing how access to antiretroviral therapy affects HIV-related mortality.

Direct population assessments are still rare (Box 4.8). In Addis-Ababa, Ethiopia, surveillance of burials was conducted

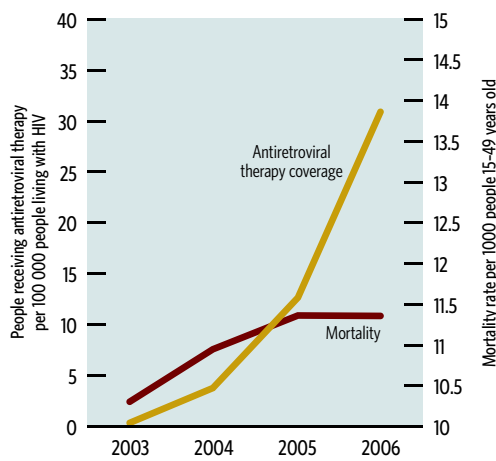
as a substitute for deficient vital registration systems. For HIV-attributable deaths, lay reports of cause of death were ascertained by a verbal autopsy in a sample of cases. From 2001 to 2007, this study estimated that HIV-attributable deaths in adults were reduced by half over the five years, and the decline, which was reported in both sexes, accelerated after a policy to provide free antiretroviral therapy was introduced in 2005 (38). Demographic surveillance linked with verbal autopsy among 32 000 people in northern Malawi from 2002 to 2006 also demonstrated the rapid effect of scaling up antiretroviral therapy. Before antiretroviral therapy, 65% of deaths among adults were attributed to HIV. Eight months after a treatment clinic opened, the overall mortality among adults in this population declined by 10%, with the greatest decline (35%) along the main road where the mortality was highest (39).

In four countries in sub-Saharan Africa, the mortality in five large treatment programmes was compared with the mortality in the general population. Mortality in the first three months after starting antiretroviral therapy was 130 times higher than in the general population and declined to 4 times higher during the second year of antiretroviral therapy. The excess mortality was correlated with the disease stage at the start of therapy and, for the people starting at WHO stages 1 or 2 and with a CD4 count exceeding 200 cells per mm³, the mortality after one year of treatment was almost the same as that among the general population. The authors

Box 4.8. HIV-attributable mortality in South Africa

A recent ecological analysis of all-cause mortality and HIV treatment data (41) demonstrates a flattening of the mortality rate linked to the rapid rise in the number of people receiving treatment (Fig. 4.7). This ecological association is highly suggestive and intuitive; when large numbers of people living with HIV receive antiretroviral therapy in a mature epidemic, the mortality rate or the increase in the rate will decline.

Fig. 4.7. Antiretroviral therapy coverage and all-cause mortality in South Africa, 2003–2006



suggest that much of the excess mortality in this cohort receiving antiretroviral therapy could have been prevented by initiating treatment earlier (40).

The UNAIDS/WHO Reference Group on Estimates, Modelling and Projections also develops estimates of mortality. These estimates are derived by statistical modelling using data from surveillance and programme monitoring with the software packages Estimation and Projection Package (EPP) and Spectrum (6,7). Based on this modelling, the estimated global annual number of AIDS deaths declined from 2.2 million [1.9 million – 2.6 million] in 2005 to 2.0 million [1.8 million – 2.3 million] in 2007 (42). Other data sources also indicate declining rates of HIV-related mortality. In an evaluation of outcomes in 12 countries supported by the United States President’s Emergency Plan for AIDS Relief, deaths from HIV or AIDS were estimated to have declined by an average of 6.3% per year over the period of scale up supported by the United States President’s Emergency Plan for AIDS Relief versus a 14.1% mean annual increase before. HIV-related deaths had declined by 10.5% (95% confidence interval: -16.6 to -4.4) in countries supported by the United States

President’s Emergency Plan for AIDS Relief compared with other countries (43). In Botswana, the national programme reported that the annual number of adult AIDS-related deaths was estimated to have halved from a peak exceeding 15 500 in 2003 to 7400 in 2008 with 80% treatment coverage (44). Continued research and improved mortality registration systems are needed to better assess how antiretroviral therapy affects mortality at the population level.

4.1.6. Prevention and assessment of HIV drug resistance

As access to antiretroviral therapy continues to expand, the emergence of HIV drug resistance is inevitable due to the high rates of replication and mutation of HIV and the sustained, life-long need for treatment. To support the optimal functioning of treatment programmes and maintain the effectiveness of first- and second-line antiretroviral drug regimens, WHO recommends that countries develop and implement national and regional strategies to prevent and assess the emergence of HIV drug resistance using a public health approach. The key elements of the strategy include establishing national HIV drug resistance working groups and implementation plans; routine monitoring “early warning” programme indicators at (selected) representative treatment sites; conducting surveys to assess the prevention, emergence and transmission of drug resistance; supporting the adherence of people receiving antiretroviral therapy and continuity of drug supplies at antiretroviral therapy sites; providing quality-assured laboratory testing for surveillance of HIV drug resistance; and producing regular reports with recommendations for public health action (45).

At the global level, HIVResNet, an international network of experts, countries and institutions working together to support and evaluate efforts to prevent and assess drug resistance, advises on implementing the WHO strategy. Implementation of various elements of the WHO strategy continued to expand during 2008 and into 2009. By mid-2009, WHO and HIVResNet partners had provided technical assistance to 54 countries, up from 25 at the end of 2007. To plan and implement the WHO strategy, 29 new countries developed national HIV drug resistance strategies and established terms of reference for national drug resistance working groups (Fig. 4.8).

WHO HIVResNet also coordinates a global network of accredited laboratories that perform quality-assured genotyping for HIV drug resistance surveillance and monitoring at the country level (46). As of June 2009, 24 laboratories had been accredited worldwide, up from 7 at the end of 2007. This was accompanied by the provision of training to laboratory technicians and efforts to increase technology transfer and knowledge sharing between laboratories with different capacities.

Fig. 4.8. Countries implementing at least one element of the WHO Global Strategy for the Prevention and Assessment of HIV Drug Resistance and locations of HIV drug resistance testing laboratories, February 2009

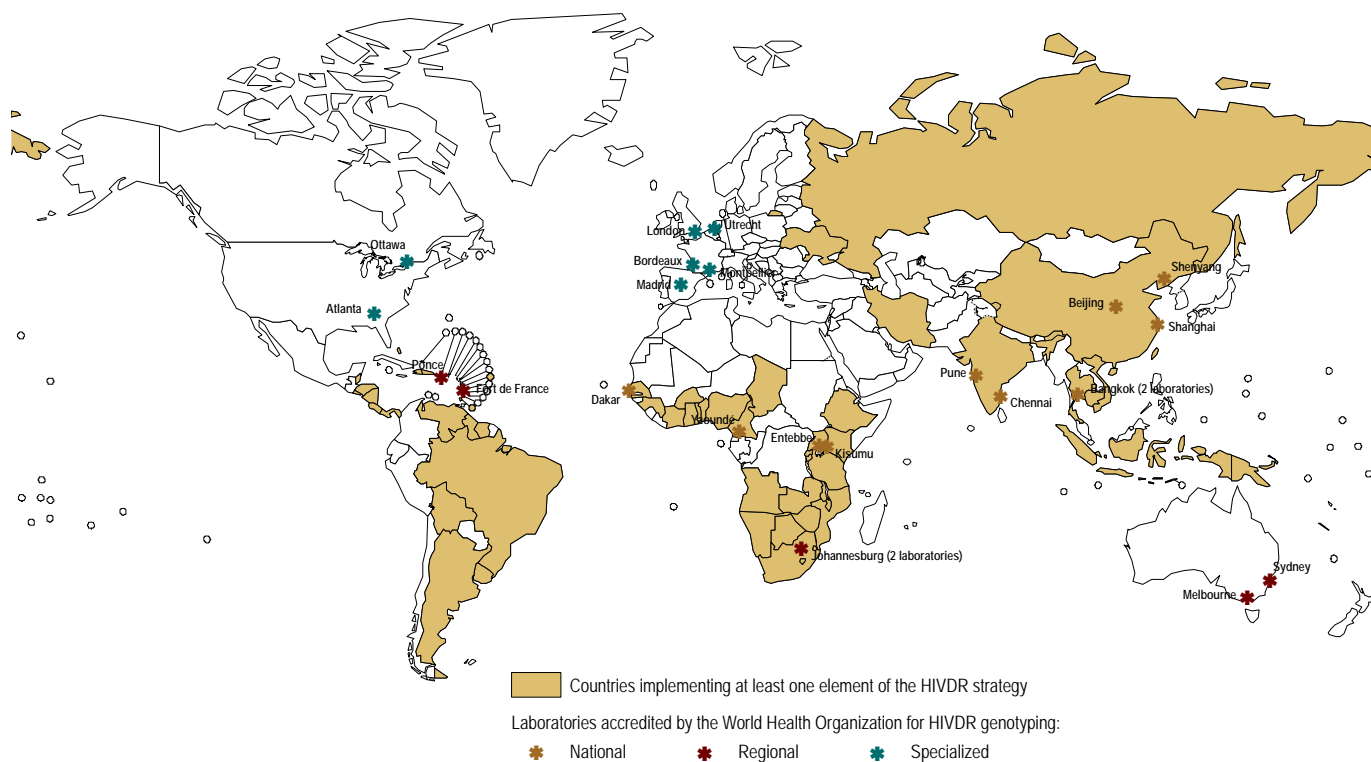


Table 4.6. Surveys of transmitted HIV drug resistance

Country	Area	Period	Site type	Predominant HIV-1 subtypes	Transmitted resistance classification (all antiretroviral drug classes)
Ethiopia (49)	Addis Ababa	Apr-Aug 2005	Antenatal care	C	<5%
India	Mumbai	2007	Voluntary counselling and testing	C	<5%
Malawi (50)	Lilongwe	Nov-Dec 2006	Prevention of mother-to-child transmission	C	<5%
South Africa (51)	Gauteng Province	Oct 2002	Antenatal care	C	<5%
South Africa (51)	Gauteng Province	Oct 2004	Antenatal care	C	<5%
South Africa (52)	Gauteng Province	2005	Antenatal care	C	<5%
South Africa (52)	KwaZulu-Natal	2005	Antenatal care	C	<5%
South Africa (52)	Gauteng Province	2006	Antenatal care	C	<5%
South Africa (52)	KwaZulu-Natal	2006	Antenatal care	C	<5%
South Africa (52)	Western Cape	2006	Antenatal care	C	<5%
South Africa (52)	Gauteng Province	2007	Antenatal care	C	<5%
South Africa (52)	KwaZulu-Natal	2007	Antenatal care	C	<5%
Swaziland (53)	Manzini-Mbani Corridor	Jul-Aug 2006	Antenatal care	C	<5%
Thailand (54)	Bangkok	Jul 2005-Apr 2006	Blood donation	CRF01-AE	<5%
Thailand (54)	Bangkok	Jul-Dec 2005	Voluntary counselling and testing	CRF01-AE	<5%
United Republic of Tanzania (55)	Dar Es Salaam	Nov 2005-Feb 2006	Antenatal care	A1, C	<5%
Viet Nam (56)	Hanoi	Feb-Jun 2006	Voluntary counselling and testing	CRF01-AE; CRF15-01B	<5%
Uganda (57)	Kampala	2006	Antenatal care	A, D, C	<5%

Early warning indicators are programme-based quality assurance indicators for antiretroviral therapy programmes. Strengthening specific aspects of first-line antiretroviral therapy programme delivery will minimize preventable HIV drug resistance and prolong the efficacy of the more affordable first-line regimens. Fourteen countries had piloted the monitoring of early warning indicators in antiretroviral therapy sites as of mid-2009. Seven countries had begun to implement surveys to monitor the prevention of HIV drug resistance and associated factors in sentinel antiretroviral therapy sites using the WHO protocol; eight additional countries are developing protocols or have submitted protocols for review. Through mid-2009, 25 countries had completed or were in the process of implementing HIV drug resistance threshold surveys to evaluate transmitted drug resistance with technical support from WHO and partners. Nine countries reported data from surveys performed in geographical areas where antiretroviral therapy was first provided in the country (47–55). All surveys reported less than 5% transmitted resistance to all drugs and drug classes in these areas (Table 4.6).

4.1.7. Antiretroviral drug regimens

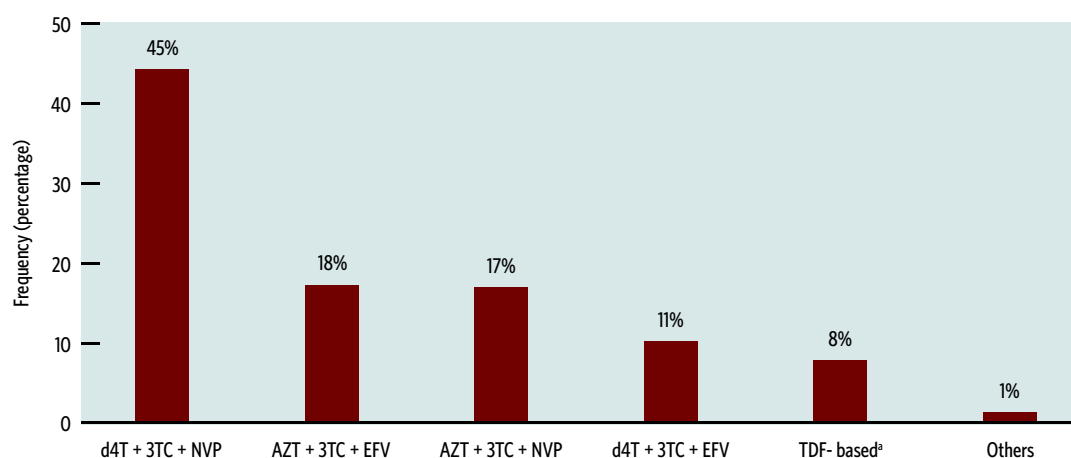
In 2009, the WHO AIDS Medicines and Diagnostics Service (56) conducted the third annual survey on the distribution and composition of first- and second-line antiretroviral therapy regimens used in low- and middle-income countries. A standardized questionnaire was sent

to 43 countries with the highest number of people receiving antiretroviral therapy as of December 2008. Thirty-six countries¹ reported 2 634 000 people receiving antiretroviral therapy, or 65% of the estimated 4 million people receiving antiretroviral therapy in low- and middle-income countries as of December 2008. In these 36 countries, 93% of the people receiving antiretroviral therapy were adults (2 450 000) and 7% were children (184 000).

The first key finding was that, among adults, the vast majority (2 400 000) were receiving first-line regimens. Information on specific first-line regimens was available for 98% of the adults; 99% were receiving first-line regimens in accordance with 2006 WHO treatment guidelines (8). A majority (45%) of adults (Fig. 4.9) used stavudine (d4T) + lamivudine (3TC) + nevirapine (NVP), followed by zidovudine (AZT) + 3TC + efavirenz (EFV) (18%), AZT + 3TC + NVP (17%), d4T + 3TC + EFV (11%) and tenofovir (TDF)-based regimens (8%). These included TDF + emtricitabine (FTC) + NVP (3%), TDF + FTC + EFV (3%), TDF + 3TC + NVP (1%) and TDF + 3TC + EFV (1%). In total, 67% of adults receiving first-line antiretroviral therapy were receiving NVP as the non-nucleoside component versus 32% receiving EFV.

¹ The 36 responding countries included Angola, Benin, Botswana, Burkina Faso, Burundi, Cambodia, Cameroon, Chad, China, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Ethiopia, Ghana, Guyana, India, Islamic Republic of Iran, Kenya, Lesotho, Liberia, Malawi, Mali, Mozambique, Namibia, Nigeria, Pakistan, Rwanda, Senegal, Sudan, Swaziland, Togo, Uganda, Ukraine, United Republic of Tanzania, Zambia and Zimbabwe.

Fig. 4.9. Main first-line antiretroviral regimens used among 2.4 million adults in 36 low- and middle-income countries, December 2008



^a TDF-based regimens: TDF + FTC + NVP (3%), TDF + FTC + EFV (3%), TDF + 3TC + NVP (1%) and TDF + 3TC + EFV (1%).

Only 2% of adults (51 000) among the study population were receiving second-line regimens. Information on specific regimens used was available for 50 000 people and showed that 81% were receiving regimens recommended by the 2006 WHO treatment guidelines (8). Ritonavir-boosted lopinavir (LPV/r) was the predominant protease inhibitor used by 93% of adults receiving second-line treatment. Other protease inhibitors used were indinavir with a ritonavir boost (1%) and saquinavir with a ritonavir boost (1%). A majority of adults used TDF + FTC + LPV/r or TDF + 3TC + LPV/r (35%), AZT + FTC + TDF + LPV/r or AZT + 3TC + TDF + LPV/r (17%), abacavir (ABC) + didanosine (ddI) + LPV/r (15%), AZT + 3TC + LPV/r (8%) and AZT + ddI + LPV/r (5%) (Fig. 4.10).

The vast majority of children (97%) from responding countries were receiving first-line regimens (178 000), with information on specific regimens available for 99% of them. About 173 000 were receiving first-line regimens recommended by the WHO treatment guidelines (8). The most commonly used regimen was d4T + 3TC + NVP (41%), followed by AZT + 3TC + NVP (37%), AZT + 3TC + EFV (12%) and d4T + 3TC + EFV (7%) (Fig. 4.11). The distribution between regimens containing AZT (51%) and d4T (48%) is almost equal. In total, 79% of children receiving first-line antiretroviral therapy were receiving NVP as the non-nucleoside component versus 19% receiving EFV.

Fig. 4.10. Main second-line antiretroviral regimens used among adults (n=51 135) in 36 low- and middle-income countries, December 2008

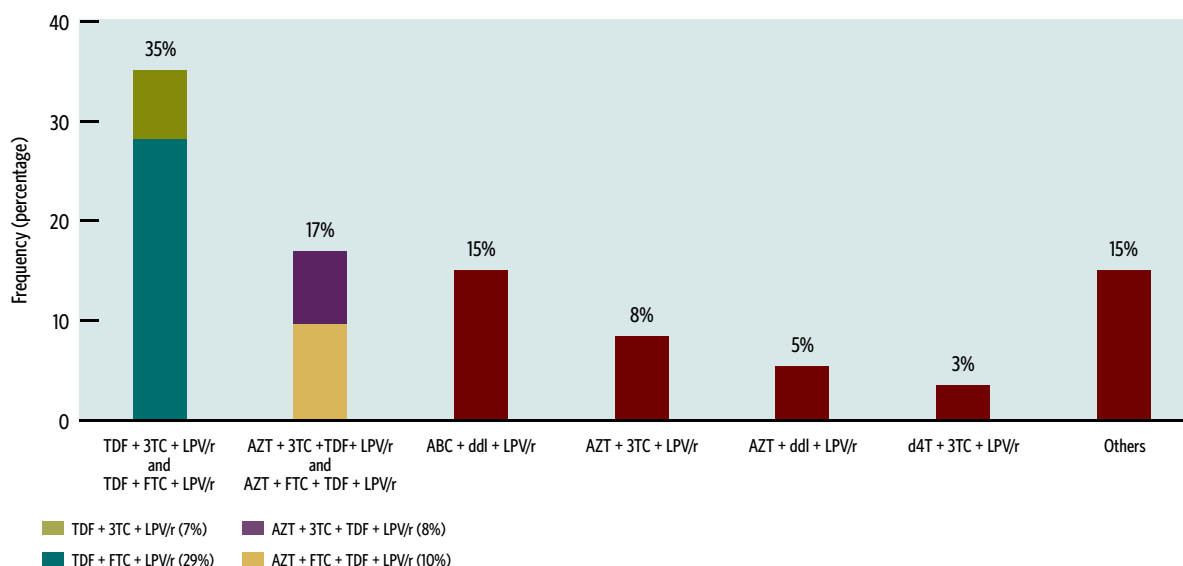


Fig. 4.11. First-line regimens used among children (n=177 064) in 36 low- and middle-income countries, December 2008

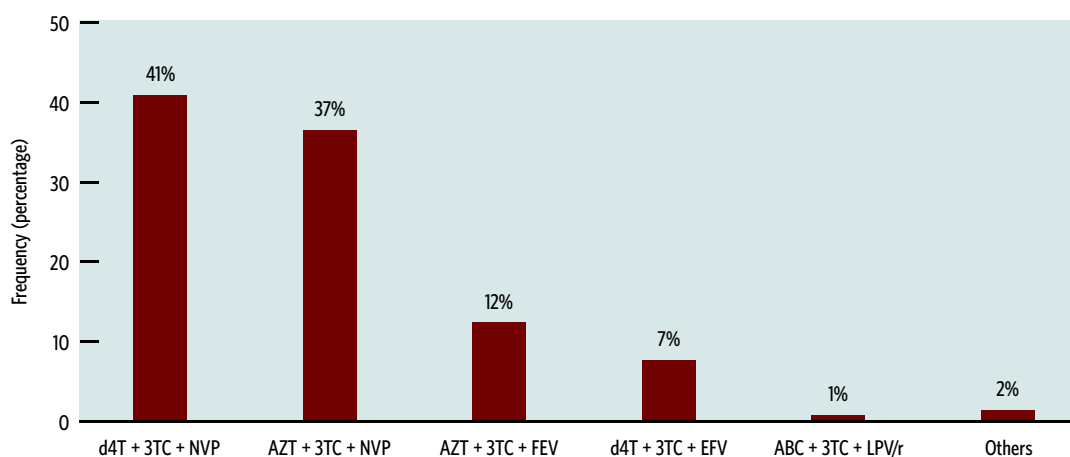
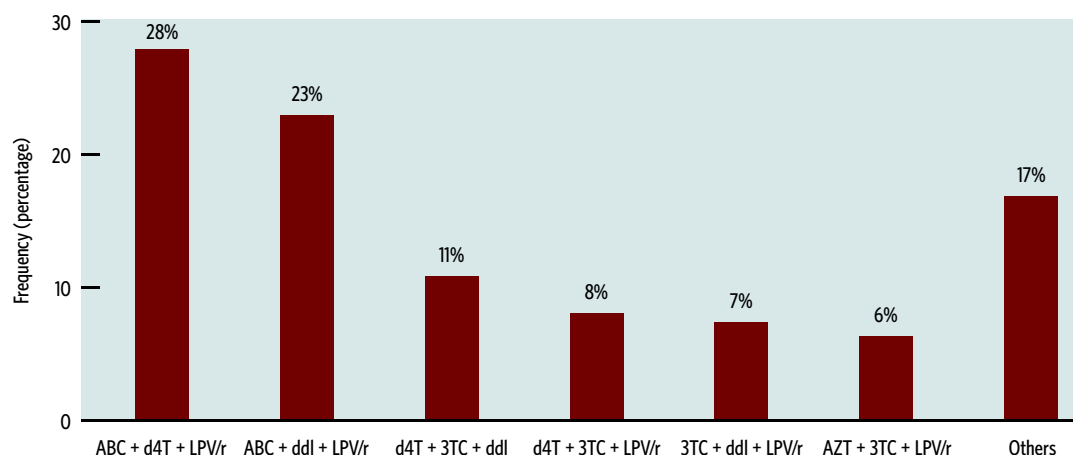


Fig. 4.12. Second-line regimens used among children (n=5997) in 35 low- and middle-income countries, December 2008



Three per cent of children in the study population (around 6000) were receiving a second-line regimen. Information on specific regimens was available for 98% of them. The most common regimen was ABC + d4T + LPV/r (28%) followed by ABC + ddl + LPV/r (23%), d4T + 3TC + ddl (11%), d4T + 3TC + LPV/r (8%), 3TC + ddl + LPV/r (7%) and AZT + 3TC + LPV/r (6%) (Fig. 4.12). LPV/r was the predominant protease inhibitor and used by 83% children receiving second-line therapy. The remaining 17% of children received a second-line regimen without a protease inhibitor, which is recommended as the backbone of second-line regimens in WHO guidelines (8).

With 1 million more people receiving antiretroviral therapy in December 2008 than 12 months earlier, the market for antiretroviral drugs continues to expand rapidly in low- and middle-income countries. Uptake of most individual antiretroviral drugs increased in 2008 for first- and second-line regimens among both adults and children. However, the proportion of adults receiving second-line regimens remained low in 2008, amounting to not more than 2% of adults on antiretroviral therapy in the responding countries. The two preceding surveys conducted by the WHO AIDS Medicines and Diagnostics Service found similar results in 2007 (3%) and 2006 (4%). There could be numerous explanations for these trends, including the continued effectiveness of most first-line regimens; the limited capacity of countries to accurately diagnose treatment failure, resulting in low rates of switching to second-line regimens; or the limited availability of second-line drugs, due in part to high costs.

Table 4.7 summarizes key findings in antiretroviral drug use trends among adults, including for individual antiretroviral

Table 4.7. Trends in antiretroviral drug use in low- and middle-income countries reporting to WHO, 2006–2008

Major parameters	2006	2007	2008
Proportion of people receiving first-line therapy	96%	97%	98%
Proportion of people receiving second-line therapy	4%	3%	2%
Use of d4T in first-line regimens	69%	63%	56%
Use of AZT in first-line regimens	25%	24%	35%
Use of TDF in first-line regimens	<1%	1.5%	8%
Use of TDF in second-line regimens	4%	14%	56%

Source: Renaud-Thery et al. (57) and Towards universal access: scaling up priority HIV/AIDS interventions in the health sector. Progress report 2008 (2).

drugs, from 2006 to 2008. Preliminary analysis of 2008 data confirms some of the trends observed in 2007. In 2008, the data show a net increase in the use of TDF, with 8% of adults receiving TDF in first-line regimens and 56% of adults receiving it in second-line regimens versus 1.5% and 14% in 2007 and <1% and 4% in 2006 respectively. The data also show a decrease in the use of d4T, with 56% of adults receiving a d4T-containing first-line regimen in 2008, 63% in 2007 and 69% in 2006. The use of AZT increased from 24% in 2007 and 25% in 2006 to 35% of adults receiving a first-line regimen in 2008.

An increase in the use of second-line drugs and of AZT and TDF in first-line and second-line regimens implies a rise in the cost of drugs for HIV programmes in low- and medium-income countries (see section 4.1.6 for data on drug prices) This represents a major challenge for country programmes, national authorities and the international development community, who will need to raise additional resources to sustain and expand treatment access.

Finally, the survey results provide evidence of evolution in treatment guidelines at the country level. Of 36 responding countries, 16 countries reported being in the process of revising treatment protocols for adults and 19 countries in the process of revising treatment protocols for children. The most frequently reported changes in adult treatment guidelines were the introduction of TDF (nine countries), a change from d4T as the preferred first-line option (seven countries) and an increase in the CD4 threshold for treatment initiation to below 250 cells per mm³ (two countries) or below 350 cells per mm³ (four countries). For guidelines for treating children, the major reported change was the introduction of antiretroviral therapy as

soon as HIV infection is confirmed in infants, regardless of CD4 count (four countries), as WHO recommended in June 2008 (58).

The 2006, 2007 and 2008 surveys also confirmed that most national HIV programmes are following WHO-recommended treatment guidelines (8): 99% and 81% of people on first- and second-line antiretroviral drug regimens, respectively. These recommendations will be revised in 2009 (Box 4.9), with a review of evidence on the optimal time to initiate treatment and the choice of drugs. WHO will continue to report on evolving trends in the use of antiretroviral drug regimens.

Box 4.9. When to start: revising the WHO antiretroviral therapy guidelines for adults and adolescents

Current WHO guidelines on antiretroviral therapy for HIV infection in adults and adolescents (8) recommend that, in resource-limited settings, adults living with HIV should start antiretroviral therapy when the infection has been confirmed and there are signs of advanced or severe clinical disease or where laboratory testing confirms severe or advanced immunosuppression. However, the ideal starting-point for treatment among asymptomatic people with CD4 cell counts above this level has not been established. These guidelines take a public health approach to scaling up antiretroviral therapy based on standardized regimens and monitoring and simplified management of people receiving antiretroviral therapy (8).

The question of the optimal time to initiate antiretroviral therapy has gained importance in recent scientific discussion, as data from observational studies conducted in high-income countries suggest that initiating antiretroviral therapy earlier can reduce the occurrence of non-AIDS events, including cancer and cardiovascular, renal and hepatic complications. Some studies suggest that treatment initiation should be considered among people with CD4 values of less than 350 cells per mm³ or even higher thresholds in some situations (59–63). Such emerging evidence is important to inform future revisions of international treatment guidelines along with assessing the feasibility and acceptability of any changes in recommendations.

At the population level, recommendations on when to initiate antiretroviral therapy need to consider several factors. The recent evidence on the benefits of early initiation is based on observational cohorts from high-income countries and cannot be assumed to be directly applicable to people living with HIV in all settings. Mortality rates and the range of morbidity differ between high-income and resource-limited settings. The available range of antiretroviral drugs, their cost-effectiveness and the options for treatment monitoring and support may also be more limited in low- and middle-income countries. The toxicity profile of the preferred first-line regimens and the local burden of AIDS and non-AIDS events in the epidemic will influence decisions on the optimal time to start antiretroviral therapy. Data from cohorts in low-income countries have also shown that treatment initiation is occurring later in the course of disease as compared with high-income settings, mainly due to late diagnosis of HIV infection, and treatment is frequently initiated based on clinical status alone because of poor access to laboratory facilities. Various randomized clinical trials currently underway will generate further, more definitive evidence on the optimal time for initiating treatment.

In late 2009, WHO will lead an expert consultative process to review new evidence; grade its quality in terms of the study design, relevance of outcomes and consistency of results; and revise its recommendations as appropriate. It will not only consider the latest evidence on the threshold for initiating treatment but also the toxicity of preferred first-line treatment regimens, the choice of drugs for second-line treatment when first-line therapy fails and recommendations on the use of viral load and CD4 in monitoring treatment outcomes in resource-limited settings. It will consider issues related to antiretroviral therapy for people living with HIV and TB or viral hepatitis and specific considerations for childbearing women and injecting drug users.

For national programmes, any increase in the threshold of treatment initiation will also affect the overall numbers of people needing antiretroviral therapy and the resources required to achieve universal access goals. A preliminary model suggests that initiating treatment at a threshold CD4 cell count of less than 275 cells per mm³ could increase treatment need by about 50%, and a threshold of less than 350 cells per mm³ could double treatment need compared with current parameters. If estimates of treatment need increase, current measurements of treatment coverage will decline.

4.1.8. 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 106 low- and middle-income countries since January 2007 (64).

The data show that the prices of most first-line regimens decreased by 30–68% from 2004 to 2008 and by 10–40% from 2006 to 2008, contributing greatly to the wider availability of treatment. However, prices remain high in most countries in Europe and Central Asia, East, South and South-East Asia and Latin America. The average prices paid for second-line regimens continue to be high in both low- and middle-income countries in all regions (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 countries¹

The median price paid for first-line treatment (prequalified by WHO or approved or tentatively approved by the United States Food and Drug Administration) in low-income countries in 2008 ranged from US\$ 88 per person per year for the fixed-dose combination of d4T + 3TC + NVP (the most widely used combination) to US\$ 261 for the fixed-dose combination (AZT + 3TC) and EFV (Fig. 4.13). The weighted average median price of the four combinations

most widely used in first-line treatment (representing 91% of the prescribed first-line treatments in low-income countries) was US\$ 143 per person per year in 2008, 16% lower than the price in 2007. The decline in drug prices between 2004 and 2008 (48%) can be attributed to the sustained scaling up of treatment programmes, growing transaction volumes and predictability of demand, competition between a growing number of products prequalified by WHO and favourable pricing policies by pharmaceutical companies.

The prices of formulations for children (weighing 10 kg or more) declined even more rapidly, from US\$ 436 per person per year in 2004 to US\$ 105 in 2008 for the most common used formulation of AZT + 3TC + NVP. This decrease in prices can similarly be attributed to an increasing market share of formulations for children, the successful negotiations between the William J. Clinton Foundation and major generic manufacturers and the development of fixed-dose combination formulations for children.

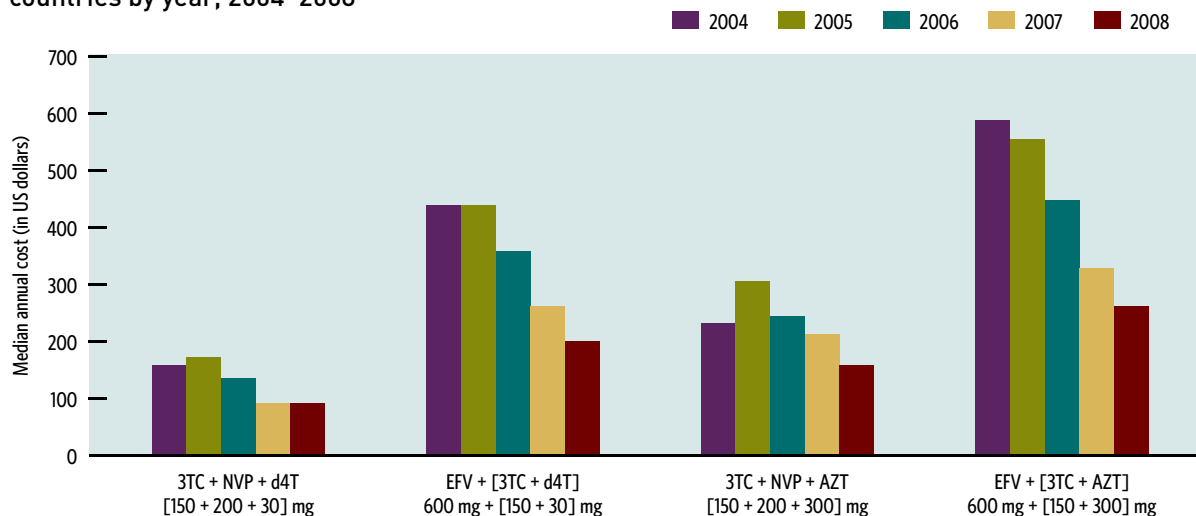
Prices of first-line regimens in lower-middle-income countries²

The average prices paid for first-line regimens declined significantly in lower-middle-income countries and approached those paid in low-income countries. The median

¹ Countries with a gross national income per capita of US\$ 935 or less.

² Countries with a gross national income per capita between US\$ 936 and US\$ 3705.

Fig. 4.13. Median annual cost (in US dollars) of first-line antiretroviral drug regimens in low-income countries by year, 2004–2008



prices in 2008 ranged from US\$ 100 per person per year for the least expensive regimen of d4T + 3TC + NVP to US\$ 293 per person per year for the most expensive regimen of AZT + 3TC + EFV (Fig. 4.14). In the same year, the weighted median price of the four most widely used combinations in first-line treatment was US\$ 162 per person per year, a decrease of 22% from the 2007 price.

The formulations for children (weighing 10 kg or more) declined more substantially in price, from US\$ 235 per person per year in 2004 to US\$ 105 in 2005 for the most commonly used formulation of AZT + 3TC + NVP.

Prices of first-line regimens in upper-middle-income countries¹

The average prices paid for first-line regimens also declined significantly in upper-middle-income countries and approached those paid in low- and lower-middle income countries. The median prices in 2008 ranged from US\$ 110 per person per year for the least expensive regimen of d4T + 3TC + NVP to US\$ 289 per person per year for the most expensive regimen of AZT + 3TC + EFV (Fig. 4.15). In the same year, the weighted average median price of the four most widely used combinations in first-line treatment was US\$ 161 per person per year. The formulations for children

¹ Countries with a gross national income per capita between US\$ 3706 and US\$ 11 455.

Fig. 4.14. Median annual cost (in US dollars) of first-line antiretroviral drug regimens in lower-middle-income countries by year, 2004–2008

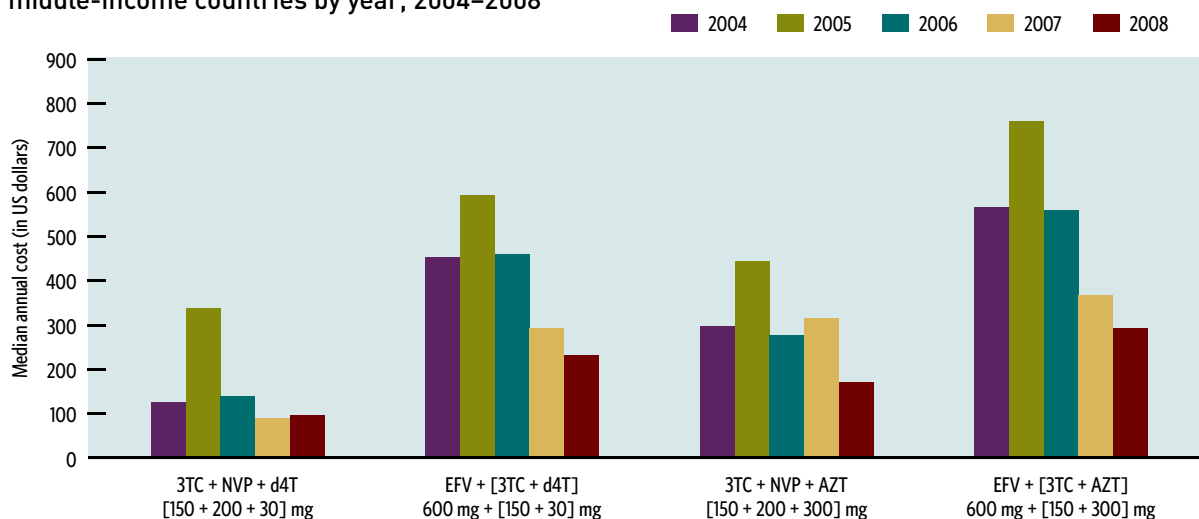
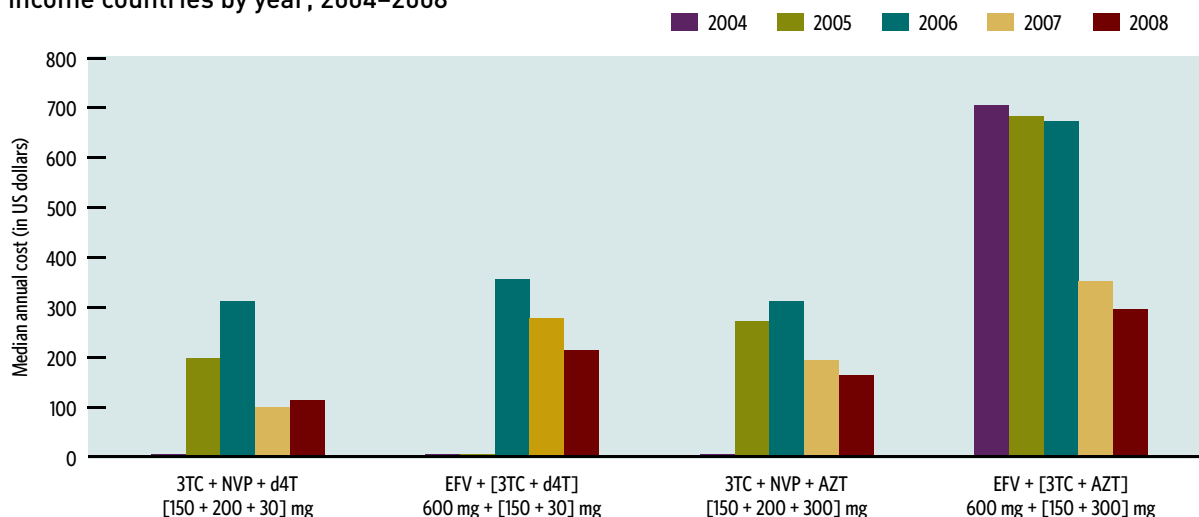


Fig. 4.15. Median price (in US dollars) of first-line antiretroviral drug regimens in upper-middle-income countries by year, 2004–2008



(weighing 10 kg or more) declined in price from US 785 per person per year to US\$ 221 for the most commonly used formulation of AZT + 3TC + NVP.

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

The average prices paid for second-line regimens also declined but continue to be significantly more expensive than first-line regimens in low-income, lower-middle-income and upper-middle-income countries. In 2008, the median cost of a regimen of ddl + ABC + LPV/r, the most expensive commonly used second-line regimen, was US\$ 1105 per person per year in low-income countries, US\$ 2192 in lower-middle-income countries and US\$ 2634 in upper-middle-income countries. The median cost of TDF + FTC + LPV/r, the most commonly used second-line regimen, was US\$ 819 per person per year in low-income countries, US\$ 1479 in lower-middle-income countries and US\$ 1677 in upper-middle-income countries. The actual prices paid for second-line regimens vary significantly between countries.

The decline in the prices of second-line drugs between 2004 and 2008 can be attributed to the prequalification of generic alternatives of LPV/r, TDF and ABC and the scaling up of treatment programmes, increased competition between WHO-prequalified products and new pricing policies by pharmaceutical companies. As the number of people who

need access to second-line regimens continues to grow, addressing the high cost of second-line regimens will become increasingly important to ensure the most cost-effective use of available resources.

4.2. Prevention, care and management of HIV/TB coinfection¹

The problem of HIV-related TB remains a serious challenge for the health sector response to HIV. Recent data show that, of the 9.27 million incident TB cases worldwide in 2007, an estimated 1.37 million were among people living with HIV (Box 4.11). About 456 000 people living with HIV died from TB in 2007, 23% of the estimated 2 million HIV-related deaths in that year. The revised estimates of TB cases among people living with HIV also suggest that the risk for acquiring TB is 20 to 37 times greater among people living with HIV than in the general population, depending on the prevalence of HIV in the population. In some countries in sub-Saharan Africa, up to 80% of people with TB are also living with HIV.

Sub-Saharan Africa continues to account for the majority of people living with HIV and TB in the world. In 2007, about 79% of the estimated total people living with HIV and TB were in this region, of whom about one quarter were living in South Africa. South-East Asia, mainly India, accounts for 11% of the remaining cases (Fig. 4.16).

Data on drug-resistant forms of TB show that, of the 9.27 million incident TB cases in 2007, an estimated 0.5 million involved cases of multidrug-resistant TB. The region of Europe and Central Asia is especially severely affected. Of the 27 countries that account for 85% of multidrug-resistant TB cases globally, 15 are in the WHO European Region. In addition, 55 countries and territories reported at least one case of extensively drug-resistant TB in 2007. People living with HIV have a higher risk of drug-resistant forms of TB due to difficulty and delays in diagnosis, lack of access to antiretroviral therapy and complications of concomitant TB treatment and antiretroviral therapy, poor implementation of isoniazid preventive therapy and inadequate TB infection control measures, with increased mortality and greatly reduced survival time (65–67).

Collaborative activities between national TB and HIV programmes are essential to prevent, diagnose and treat TB among people living with HIV. The activities include establishing mechanisms for collaboration (such as coordinating bodies, joint planning, surveillance and monitoring and evaluation); decreasing the burden of HIV among people with TB (with HIV testing and counselling,

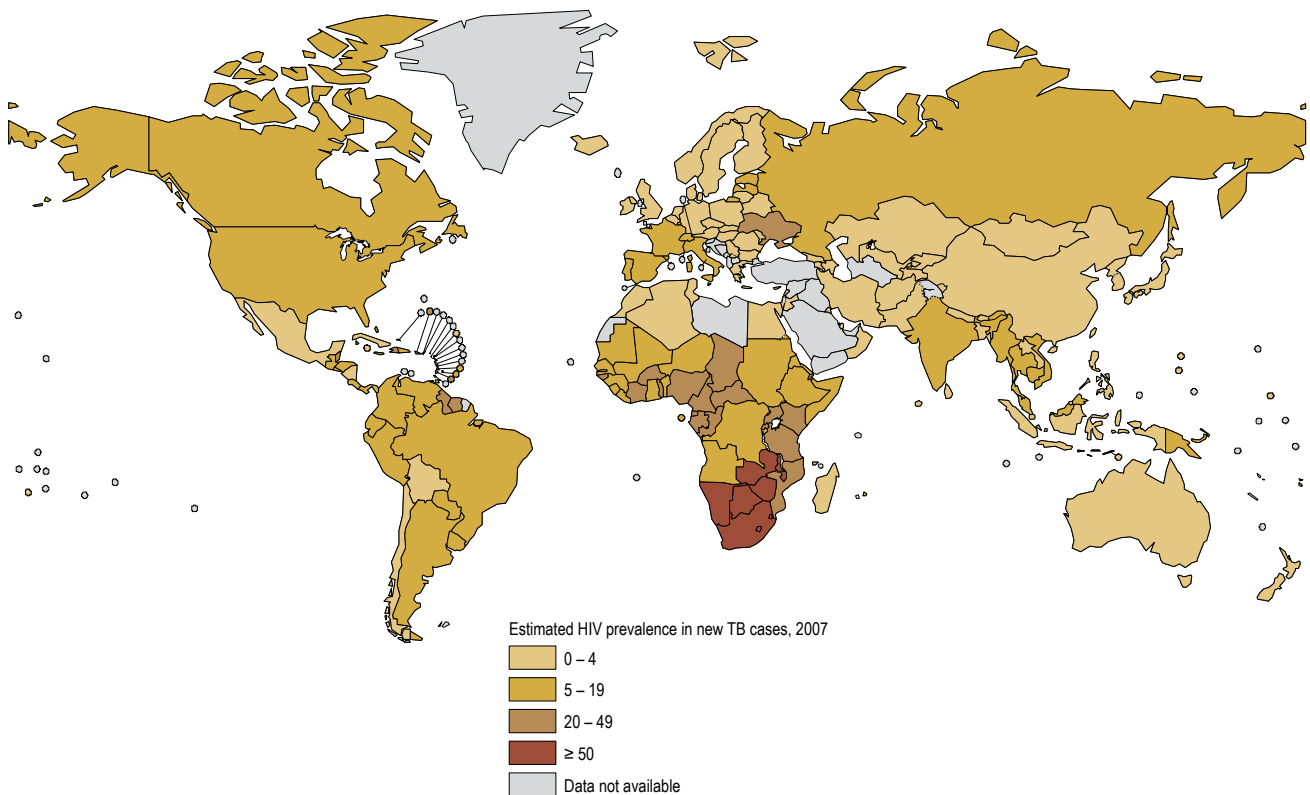
Box 4.10. Pharmacovigilance

The rapid scaling up of antiretroviral therapy needs to be accompanied by the development of sound pharmacovigilance practice to track adverse events, ensure consistent reporting and support patient safety and clinical management. In 2008, WHO launched a project to improve the safety of antiretroviral drugs in low- and middle-income countries. The project, funded by the Bill & Melinda Gates Foundation, aims to develop and harmonize definitions and tools for pharmacovigilance of antiretroviral drugs, support priority countries, formulate a research agenda and improve the sharing and dissemination of information. The pharmacovigilance efforts rely upon partnership with other related WHO programmes (such as those for essential medicines, maternal health, malaria and tropical diseases research), research groups and regulatory authorities within countries, and nongovernmental organizations.

The project will help guide the development of treatment recommendations and better identify the laboratory and diagnosis infrastructures needed for improving antiretroviral therapy management. By improving and harmonizing the detection and reporting of adverse events and toxicity, it will also contribute to generating better knowledge of adverse events associated with antiretroviral drug; these are currently widely underreported and their importance remains unknown in low- and middle-income countries.

¹ This section draws largely from *Global tuberculosis control 2009 – epidemiology, strategy, financing* which reported 2007 data (68). Additional references are cited where relevant.

Fig. 4.16. Estimated HIV prevalence (%) among people newly infected with TB, 2007



Box 4.11. Revised estimates of the number of people with TB among those living with HIV

The estimated numbers of TB cases and deaths among people living with HIV in 2007 are approximately double those published in previous years. These revised estimates do not reflect an increase in the number of incident TB cases but upwardly revise the estimated proportion of people with incident TB who are living with HIV. These estimates are based on more extensive data on the prevalence of HIV among people with TB that became available during 2007, both from programme data and surveillance reports. The expansion of provider-initiated HIV testing and counselling provided reliable data on the prevalence of HIV among people with TB in 49 countries in 2007 versus only 13 countries in 2006. In addition, country-specific measurements of the prevalence of HIV among people with TB were also available from an additional 15 countries through surveys or sentinel surveillance. Such direct measurement from these 64 countries enabled the numbers of people living with HIV who had TB and died from TB in 2007 to be more accurately estimated.

The data were also used to recalculate previous estimates of the numbers of cases and deaths to analyse trends. Better coverage of HIV surveillance among people with TB and improved monitoring of national HIV programmes will enable these data to be improved further in the future.

co-trimoxazole preventive therapy, antiretroviral therapy and HIV prevention, care and support); and decreasing the burden of TB among people with HIV (with the three I's for HIV/TB: intensified case-finding, isoniazid preventive therapy and infection control for TB).

Joint mechanisms for collaboration

Progress in developing policies and collaborative mechanisms was analysed among 63 priority countries that collectively account for 99% of the estimated TB cases among people living with HIV worldwide.¹ Among these countries, the number of countries with a coordinating body for collaborative HIV/TB activities increased from 35 in 2005 to 44 in 2007 (representing 70% of the total estimated TB cases among people living with HIV accounted for by reporting countries), and the number of countries with joint plans increased from 34 to 42 over the same time period. Forty-six countries (88% of total estimated TB cases among people living with HIV accounted for by reporting countries) conducted HIV surveillance among people with TB in 2007 versus 28 countries in 2005.

¹ These refer to 41 countries that were identified as priorities at the global level in 2002 and that account for 97% of the estimated people living with HIV and TB globally, plus additional 22 countries identified by UNAIDS as having a generalized HIV epidemic.

Reducing the burden of HIV among people with TB and their communities

HIV counselling and testing serves as a gateway for access to HIV and TB prevention, treatment and care and is recommended for everyone presenting with signs and symptoms of TB and people with confirmed TB. There has been substantial progress in expanding HIV testing and counselling for people with TB in recent years. The number of countries with a policy for HIV testing and counselling of people with TB among the 63 HIV/TB priority countries accounting for 99% of the global HIV/TB burden increased from 38 in 2005 to 52 in 2007 (covering 96% of estimated TB cases living with HIV).

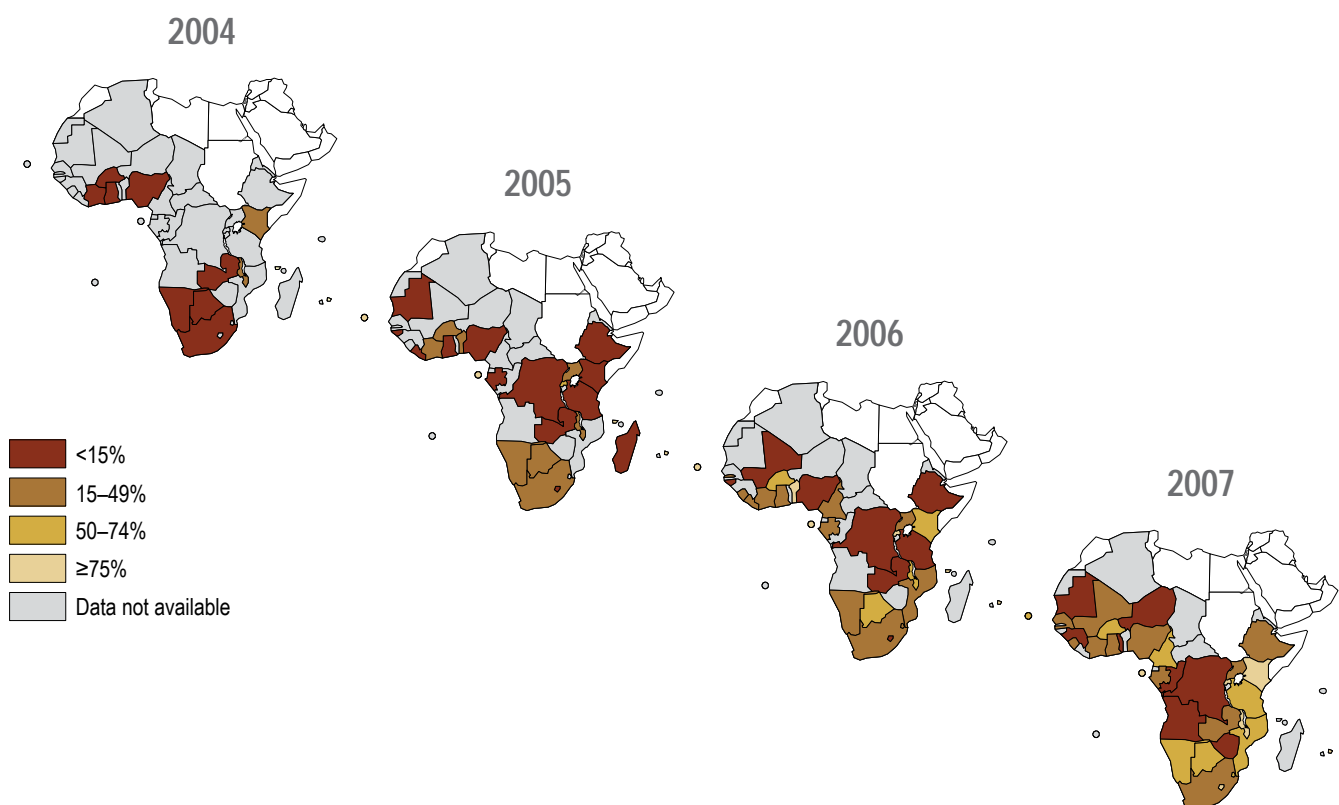
Data on programme coverage are analysed for all reporting countries. Almost 1 million people with TB (16% of notified TB cases) knew their HIV status across 135 reporting countries in 2007 versus about 700 000 people in 112 countries in 2006 and 22 000 people in 9 countries in

2002. In sub-Saharan Africa, nearly 492 000 people with TB knew their HIV status in 2007, representing 37% of known people with TB and an increase of about 10 times since 2004 (Fig. 4.17). Among the countries with high prevalence of HIV among people with TB in this region, Kenya, Lesotho, Malawi, Rwanda and Swaziland achieved high rates of HIV testing in 2007. In Kenya, for instance, 79% of notified TB cases were tested for HIV in 2007 versus 60% in 2006.

The number of people with TB with known HIV status also increased in other regions. In India, more than 80 000 people with TB have been tested for HIV.

Antiretroviral therapy is a high-priority life-saving intervention for people living with HIV. Studies and modelling efforts suggest that early initiation of antiretroviral therapy for people living with HIV who develop TB may lead to reduced mortality and incidence of TB (69–73).

Fig. 4.17. Rates of HIV testing among people with TB in countries in sub-Saharan Africa, 2004–2007



The number of people living with HIV and TB who received antiretroviral therapy across all reporting countries increased from about 67 000 in 69 reporting countries in 2006 to about 90 000 in 73 reporting countries in 2007 and to 125 000 people in 77 reporting countries in 2008. Of these, 105 000 people were in sub-Saharan Africa, 12 000 in East, South and South-East Asia, 7000 in Latin America and the Caribbean, 1000 in Europe and Central Asia and 150 in North Africa and the Middle East. This represents 16% of the estimated people living with HIV and TB in reporting countries receiving antiretroviral therapy, which is much lower than the overall estimated global antiretroviral therapy coverage. Given the increasing evidence of access to testing for people with TB, the clear benefits of antiretroviral therapy for people with TB and better links between TB and HIV services, this gap may reflect the weaknesses of reporting access to care among people with HIV and TB by settings providing HIV services. It may also reflect the difficulties in managing antiretroviral therapy among people with TB.

Co-trimoxazole has been proven to reduce morbidity and mortality among people living with HIV and TB. Provision of co-trimoxazole preventive therapy also increased in the past years. The total number of people living with HIV and TB who were treated with co-trimoxazole preventive therapy in all reporting countries increased by 38% from 145 000 in 2006 (55 countries) to nearly 200 000 in 2007 (60 countries). However, these data also suggest that HIV testing alone may not guarantee access to other HIV prevention, treatment and care services.

Reducing the burden of TB among people with HIV

In 2008, a WHO-convened expert consultation recognized the limited implementation of interventions to decrease the burden of TB among people living with HIV and re-emphasized the importance of three priority public health actions to prevent and treat TB among them – the three I's for HIV/TB of isoniazid preventive treatment, intensified case-finding and infection control for TB (74). Available data show that countries are making efforts to scale up each of these interventions and to report on progress; however, many countries have not begun to implement the three I's (Box 4.12).

Intensified case-finding for TB is a vital first step in providing access to necessary health services to those in need. Information on TB control policies shows that among the 63 priority countries accounting for 99% of the global HIV/TB burden, 52 countries had policies for intensified TB case-finding among people with HIV in 2007, up from 44 in 2006 and 24 in 2005.

A comparison of countries reporting data in 2007 and 2008 provides evidence of substantial improvements in rates of reporting.¹ Thirty-seven countries (with 29% of the estimated global HIV/TB burden) reported 322 000 people living with HIV screened for TB in 2008 versus 38 000 in 30 countries (2% of the global HIV/TB burden) in 2007. Nine

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2008 and 2009.

Box 4.12. Supporting implementation and monitoring of the three I's for HIV/TB

The WHO strategy for Integrated Management of Adolescent and Adult Illness (IMAI) and the related tools support an integrated approach to primary health care and strengthening health systems based on both clinical and management and logistical input to strengthen the district health system or district network.

Since 2006, the integrated package of tools has been expanded further to include integrated services for preventing the mother-to-child transmission of HIV (with antiretroviral therapy delivered through antenatal sites) and HIV/TB interventions (75). The HIV/TB co-management and TB infection control clinical module has been developed for primary care providers at health centres and at district hospital outpatient clinics. These primary care tools operationalize updated normative guidance for HIV service providers to accelerate the implementation of the three I's. These tools help health workers to recommend HIV testing and counselling to people with TB and those suspected of having TB, provide evidence-based training on when to suspect TB disease among people living with HIV, assess people living with HIV for TB during initial visits and each follow-up visit, co-manage TB and HIV and implement basic TB infection control measures in their health facilities. Of the 35 countries using the IMAI approach, 11 countries (representing 30% of the global estimated HIV-related TB cases) have already adapted the HIV/TB modules.

Three interlinked patient monitoring systems for HIV care/ART, MCH/PMCT (including malaria prevention during pregnancy), and HIV/TB (76) being developed jointly by WHO, UNICEF, UNAIDS, the United States Centres for Disease Control and Prevention and other partners thus supports the monitoring of TB preventive therapy, TB screening and TB and antiretroviral therapy co-treatment within HIV services. The revised HIV care and antiretroviral therapy monitoring tools also allocate space for recording TB screening among people living with HIV. These interlinked tools are critical to ensure improved monitoring of the interventions through a comprehensive approach, especially in countries with high mortality from TB among people with HIV, including those on antiretroviral therapy.

countries reporting data for both 2007 and 2008 show an increase of around 30% in intensified case-finding. However, 7 of the 10 countries containing 68% of global estimated HIV-related TB cases did not report data on screening for TB among people living with HIV in 2008. Thus, although more countries are reporting this information, current reporting rates remain inadequate to analyse the global coverage of intensified case-finding for TB in 2008.

WHO policy also recommends isoniazid preventive therapy for people living with HIV. Information on national policies shows that the number of countries with policies related to providing isoniazid preventive therapy increased marginally from 24 countries in 2005 to 29 countries in 2007 among the 63 priority countries. This indicates that many countries continue to lack commitment and efforts to scale up this key intervention.

Country data on the provision of isoniazid preventive therapy to people living with HIV also show improvements in reporting and provide some evidence of progress. Comparing data reported in 2007 and 2008,¹ the reported number of people with HIV receiving isoniazid preventive therapy increased about 11-fold from 5000 in 2007 (25 countries representing 3% of the global HIV/TB burden)

to 62 000 people in 2008 (18 countries representing 18% of the global HIV/TB burden). Within six countries that reported providing isoniazid preventive therapy in both 2007 and 2008, the number of people living with HIV who received isoniazid preventive therapy increased from 2000 to 3100. However, once again, of the 10 countries with the highest estimated HIV-related TB burden, 8 did not provide data on this indicator in 2008, creating difficulty in assessing the global situation at the end of the year.

TB infection control measures are equally important in settings providing health services, particularly to people with HIV, but this critical TB prevention intervention is often overlooked. The large expansion of HIV services in areas with high TB prevalence has often created conditions for hospital-related TB transmission among vulnerable patients, their families and health care workers. Several serious TB outbreaks have been reported in health care settings among people living with HIV and the health workforce (77–82). Among the 63 priority countries, 34 reported having a policy for infection control in 2007, up from 20 in 2005 and 31 in 2006. Although more countries are reporting infection control policies in health care settings, opportunities exist for improved implementation as part of HIV and TB prevention, treatment and care.

Box 4.13. Improving monitoring and evaluation systems for HIV/TB interventions

National TB programmes (interventions to reduce the burden of HIV among people with TB) and national HIV programmes (interventions to reduce the burden of TB among people living with HIV) generate data on progress in scaling up collaborative HIV/TB interventions. International partners such as WHO collect these data annually to monitor and report on progress in achieving global TB and HIV targets. Although all these data suggest year-on-year improvements in reporting, they also shed light on some limitations in current reporting systems and issues to be addressed in the coming years.

The data on implementing the three I's for HIV/TB for reducing the burden of TB among people with HIV need to be interpreted with caution. Despite visible improvement in country-level monitoring and reporting efforts during the past two years, most countries still do not have the capacity for timely and quality reporting at the national level. Although the reported numbers of people living with HIV receiving TB screening and receiving isoniazid preventive therapy are increasing, assessing the exact proportion those in need who are receiving these services is difficult due to the weaknesses in reporting.

In addition to the incompleteness of reporting, the analysis of country reports also highlights discrepancies between data on the three I's reported to WHO via national TB programmes versus via national HIV programmes. In 2007, more countries provided data via national TB programmes than via HIV programmes for the same indicators related to collaborative HIV/TB interventions. For instance, in 2007, 84 countries reported data to WHO on TB screening of people living with HIV, representing 65% of the global estimated number of people living with HIV and TB. Of these 84 countries, 54 reported results through national TB programmes, 13 through national HIV programmes and 17 through both.

These differences in reporting rates underscore the urgent need to build capacity in national HIV programmes and create synergy with the long-established national TB programmes. WHO's TB programme has been collecting these data from national HIV programmes via the national TB programmes since 2002, and WHO's HIV programme began collecting these data directly from national HIV programmes in 2006 in response to international commitments to monitor and report on progress towards universal access to HIV prevention, treatment and care. The international community is supporting country efforts to strengthen WHO-recommended integrated monitoring and reporting systems for HIV/TB programmes and promote greater harmonization of data generating and reporting in the future.

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To conclude, more people living with HIV have TB than previously estimated, and TB remains a leading cause of death and a life-threatening disease among people living with HIV. Although clear, evidence-based strategies to prevent, diagnose and treat TB have been widely articulated and agreed, the implementation of many of these interventions continues to lag behind at the country level. In some of the countries with the highest burdens of HIV-related TB, the lack of political commitment and investment in collaborative TB/HIV interventions are undermining the effects of HIV programmes.

Some progress has been made in recent years, yet the data show that access to essential interventions to decrease the burden of HIV-related TB coinfection remains far from the

goal of universal access. Urgent political commitment and capacity-building are required to increase access to HIV testing, treatment and care for people with TB and to scale up the three I's for HIV/TB for people living with HIV.

The data also draw attention to the urgent need to strengthen integrated monitoring and evaluation systems to assess the progress and outcomes of collaborative HIV/TB interventions. With weak programme monitoring and low reporting rates, global analysis of progress cannot fully reflect country efforts, even where access to interventions may be expanding. Greater investment in joint indicators and integrated monitoring tools are urgently needed to ensure access to vital HIV/TB services in the coming years (Box 4.13).

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5. SCALING UP HIV SERVICES FOR WOMEN AND CHILDREN

Key findings

- National political commitments to expand HIV prevention, treatment and care services for women and children have intensified in recent years. In 2008, 70 low- and middle-income countries had established a national scale-up plan with population-based targets to prevent mother-to-child transmission of HIV; up from 34 in 2005. Similarly, 54 low- and middle-income countries had national plans incorporating population-based targets to scale up paediatric HIV services in 2008, as compared with 19 in 2005.
- HIV testing and counselling among pregnant women is increasing with the expansion of provider-initiated approaches in health care settings. In 2008, 21% of pregnant women giving birth in low- and middle-income countries received an HIV test, up from 15% in 2007. In sub-Saharan Africa, the corresponding percentage increased from 17% to 28%, with specially high rates of increase in countries in Eastern and Southern Africa.
- The percentage of HIV-positive pregnant women who received antiretrovirals to prevent HIV transmission to their children increased from 35% [29–44%] in 2007 to 45% [37–57%] in 2008. Within sub-Saharan Africa, countries in Eastern and Southern Africa reported substantial progress, reaching a coverage of 58% [47–76%] in 2008. The coverage of infant antiretroviral prophylaxis also increased, reaching 32% in 2008, up from 20% in 2007.
- More low- and middle-income countries provided data on the distribution of antiretroviral drug regimens received by HIV-positive pregnant women in 2008 than in previous years and provide evidence of a shift towards the use of more efficacious regimens. In 97 reporting countries, around 31% of women receiving antiretrovirals to prevent mother-to-child transmission were given a single-dose regimen, as compared to 49% in 2007.
- Around one-third (34%) of pregnant women who tested positive for HIV were assessed, either clinically or by CD4 cell count, for eligibility to receive antiretroviral therapy for their own health in 2008. The percentage of those who were assessed using a CD4 cell count increased from 12% in 2007 to 24% in 2008.
- HIV-positive mothers need to balance competing risks associated with different infant feeding options. Data on infant feeding practices of women living with HIV are limited; however 12 population-based surveys in sub-Saharan Africa undertaken between 2003 and 2006 indicate that 31% of HIV-positive women and 38% of HIV-negative women exclusively breastfed their infants up to six months of age.
- Rates of early virological testing of HIV-exposed infants remain low. In 41 reporting countries, only 15% of children born to HIV-positive mothers received an HIV test within the first two months of life. Better follow-up of known HIV-exposed infants is needed to identify HIV infection and provide the necessary care and treatment.
- The number of health facilities providing paediatric antiretroviral therapy in low- and middle-income countries increased by around 80% from 2007 to 2008. The number of children receiving antiretroviral therapy increased from 197 000 in 2007 to about 275 700 in 2008, reaching 38% [31–47%] of the 730 000 [580 000–880 000] children estimated to be in need of antiretroviral therapy in low- and middle-income countries. Increased efforts are needed to expand access to HIV care and treatment services for children. Also in 2008, only 8% of infants born to pregnant women with HIV initiated co-trimoxazole by two months of age.

5.1. Overview

5.1.1. HIV among women and children

With continuously increasing numbers of women, infants and children living with HIV every year, the HIV epidemic continues to dramatically affect their health, livelihood and survival across regions. The estimated number of women living with HIV increased from 14.1 million in 2001 to 15.5 million by 2007 (1). In sub-Saharan Africa, women now account for almost 60% of the adults living with HIV, although in other regions women continue to represent less than half of all people living with HIV. About 40% of the people living with HIV in South-East Asia are women and

30% in Latin America and the Caribbean, East Asia and Europe and Central Asia. Globally, the percentage of adult women (15 years and older) among people living with HIV has remained stable at 50% for the past 10 years (1).

HIV is the leading cause of mortality among women of reproductive age worldwide (2). HIV can affect mortality both directly and indirectly; one way HIV comprises the underlying cause of death is by worsening pregnancy outcomes. A study from Zimbabwe found that HIV accounted for 27% of reported maternal deaths in 2006 (3). A five-year audit of maternal mortality at one of the largest public hospitals in Johannesburg, South Africa from 2003

Box 5.1. Estimating the number of children and pregnant women needing services

Estimating the number of people needing HIV services is related to estimating the number of people living with HIV. Trends in HIV prevalence and the number of people living with HIV by country are estimated regularly through a collaborative process involving country representatives from ministries of health and statistical units, UNAIDS, WHO and partner organizations, based on the latest country data available (5). The estimates were most recently revised in 2009 and included the most recent country-reported data from 2008. The methods and assumptions of the UNAIDS and WHO estimation model continue to evolve and are regularly updated as new data become available. In addition, improved country data on HIV prevalence also contribute to revising and updating the model over time. The latest estimates of need for antiretroviral therapy are slightly lower than previously estimated due to changes in HIV prevalence and other factors (see Box 4.2). UNAIDS and WHO will publish the results of the new estimates in an AIDS epidemic update report in November 2009.

Estimating the number of women needing antiretrovirals to prevent mother-to-child transmission

The number of women needing antiretrovirals to prevent mother-to-child transmission in any given year is based on the HIV prevalence among pregnant women, which is estimated through the number of women living with HIV, the fertility rate adjusted for age and the reduction in fertility caused by HIV. In addition, it is assumed that 15% of pregnancies do not come to term due to miscarriages and other events; these pregnancies are not included in the estimates of women needing antiretrovirals to prevent mother-to-child transmission of HIV.

Changing estimates for HIV prevalence within a country also changes the estimates of the numbers of women needing antiretrovirals to prevent mother-to-child transmission. WHO/UNICEF/UNAIDS estimated in 2007 that about 1.5 million [1.4 million - 1.6 million] pregnant women were living with HIV in low- and middle-income countries and needed antiretrovirals to prevent mother-to-child transmission (6). In 2009, based on new data and parameters, the previous 2007 estimate of the number of pregnant women needing antiretrovirals to prevent mother-to-child transmission has been revised downward to 1.4 million [1.1 million - 1.7 million]. The corresponding coverage of antiretrovirals to prevent mother-to-child transmission in 2007 has been recalculated to be 35% [29-44%] instead of 33% [31-35%] as previously published (section 5.4.2).

Estimating the number of children needing antiretroviral therapy

According to WHO guidelines, all children with HIV younger than one year of age need antiretroviral therapy. After the age of one year, the children needing treatment are defined as the children living with HIV who have moderate to severe disease (7). The number of children needing antiretroviral therapy in a given year is based primarily on the number of infants newly infected with HIV and their survival to the time when they need antiretroviral therapy. The number of infants newly infected with HIV is a function of the HIV prevalence among pregnant women and the estimated rate of mother-to-child transmission according to antiretroviral regimen coverage and infant feeding practices. HIV disease progression and the survival of children with and without co-trimoxazole prophylaxis and antiretroviral therapy are applied to account for deaths among children living with HIV.

Pregnant women living with HIV may receive the following five categories of antiretroviral regimen for preventing mother-to-child transmission of HIV, each of which leads to different mother-to-child transmission probabilities: none; single, dual and triple prophylactic antiretroviral regimens; and antiretroviral therapy. Additional transmission can occur after birth through breastfeeding, and different monthly probabilities of HIV transmission are applied for the following infant feeding practices: exclusive breastfeeding, replacement feeding and mixed feeding.

Guidelines on antiretrovirals to prevent the mother-to-child transmission of HIV and for antiretroviral therapy for children will be reviewed at the end of 2009 in light of new evidence. This may lead to changes in the estimation assumptions and methods. The collection of better data may also allow the model parameters to be better adjusted to reflect the programmatic impact of interventions to prevent mother-to-child transmission on the number of children newly infected with HIV.

to 2007 documented that maternal deaths were six times higher among women living with HIV than among HIV-negative mothers (4). The combined effect of maternal morbidity and death also has devastating effects on children's health, well-being and survival.

In 2008, an estimated 1.4 million pregnant women living with HIV in low- and middle-income countries gave birth. Sub-Saharan Africa accounted for 91% of all pregnant women living with HIV, of whom about 70% were concentrated in Eastern and Southern Africa and the remaining 30% in West and Central Africa. East, South and South-East Asia accounted for 6% of the total number of pregnant women living with HIV and other regions for 2% and less.

The number of children younger than 15 years living with HIV also increased from 1.6 million [1.4 million–2.1 million] in 2001 to 2.0 million [1.9 million–2.3 million] in 2007, although the number of newly infected children has been declining since 2003 (1), probably due to the global stabilization of HIV prevalence among women and increasing coverage of programmes to prevent mother-to-child transmission. In 2007, children accounted for 6% of all people living with

HIV, 17% of the people newly infected and 14% of all HIV-related mortality worldwide.

More than 90% of the children living with HIV are infected through mother-to-child transmission during pregnancy, around the time of birth or through breastfeeding (1). Other routes of HIV transmission among children include blood transfusion with HIV-contaminated blood, injections with contaminated needles and sexual transmission among children experiencing an early sexual debut.

Overall, 20 countries in sub-Saharan Africa and East, South and South-East Asia account for about 90% of the pregnant women needing antiretrovirals to prevent mother-to-child transmission. The same countries are also home to over 80% of the children younger than 15 years needing antiretroviral therapy in low- and middle-income countries (Box 5.1). Given their high levels of HIV burden among women and children, progress in these countries can substantially influence the overall rates of global progress in preventing the mother-to-child transmission of HIV and expanding access to HIV care and treatment for children (Table 5.1).

Table 5.1. Twenty low- and middle-income countries with the highest estimated numbers of pregnant women living with HIV in need of antiretrovirals to prevent mother-to-child transmission of HIV and numbers of children in need of antiretroviral therapy

Rank by number of pregnant women living with HIV	Country	Estimated number of pregnant women in need of antiretrovirals in 2008 [range]	% of the total in low- and middle-income countries	Estimated number of children in need of antiretroviral therapy in 2008 [range]	% of the total in low- and middle-income countries
1	Nigeria	210 000 [110 000-300 000]	15%	110 000 [57 000-160 000]	15%
2	South Africa	200 000 [120 000-280 000]	14%	94 000 [53 000-130 000]	13%
3	Mozambique	110 000 [50 000-180 000]	8%	45 000 [24 000-67 000]	6%
4	Kenya	110 000 [53 000-160 000]	8%	49 000 [25 000-71 000]	7%
5	United Republic of Tanzania*	... [40 000-130 000]	6%	40 000 [20 000-66 000]	5%
6	Uganda	82 000 [44 000-120 000]	6%	42 000 [23 000-60 000]	6%
7	Zambia	70 000 [38 000-96 000]	5%	34 000 [18 000-47 000]	5%
8	Malawi*	... [32 000-82 000]	4%	... [17 000-45 000]	4%
9	Zimbabwe	53 000 [29 000-73 000]	4%	37 000 [22 000-50 000]	5%
10	India	49 000 [25 000-80 000]	4%	30 000 [16 000-46 000]	4%
11	Ethiopia	36 000 [18 000-54 000]	3%	23 000 [12 000-33 000]	3%
12	Cameroon	36 000 [19 000-52 000]	3%	18 000 [10 000-26 000]	2%
13	Democratic Republic of the Congo	32 000 [17 000-48 000]	2%	16 000 [9 900-22 000]	2%
14	Côte d'Ivoire	22 000 [11 000-34 000]	2%	14 000 [6 900-21 000]	2%
15	Burundi	16 000 [7 200-24 000]	1%	8 000 [4 400-11 000]	1%
16	Angola	16 000 [8 000-24 000]	1%	7 400 [3 900-12 000]	1%
17	Chad	15 000 [7 700-23 000]	1%	7 300 [3 700-11 000]	1%
18	Lesotho	14 000 [8 600-19 000]	1%	7 300 [4 300-9 700]	1%
19	Ghana	13 000 [6 400-19 000]	1%	5 900 [2 600-9 200]	1%
20	Botswana	12 000 [7 500-16 000]	1%	7 900 [4 900-10 000]	1%

* No point estimate is provided as the estimated number of pregnant women living with HIV in need of antiretrovirals (in the United Republic of Tanzania and Malawi) and the estimated number of children living with HIV in need of antiretroviral therapy (in Malawi) are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis.

5.1.2. Commitments, goals and targets to address HIV among women and children

During the past decade, the international community has continually committed to scale up access to health services and reduce the burden of HIV among women and children. In the Declaration of Commitment on HIV/AIDS adopted at the United Nations General Assembly Special Session on HIV/AIDS in 2001 (8), countries committed to reduce the proportion of infants with HIV by 50% by 2010 by ensuring that 80% of pregnant women and their children have access to essential prevention, treatment and care services to reduce the mother-to-child transmission of HIV. These commitments were re-affirmed by the Group of Eight (G8) countries in 2005 (9) and 2007 (10), the Abuja Call to Action Towards an HIV-free and AIDS-free Generation in 2005 (11) and the Political Declaration of the United Nations General Assembly High-Level Meeting on AIDS to work towards universal access to HIV prevention, treatment, care and support in 2006 (12). These global commitments have been accompanied by regional commitments (Box 5.2).

Box 5.2. Eliminating the vertical transmission of HIV and syphilis in the Caribbean

HIV and syphilis are major public health problems affecting women and their newborn infants in the Caribbean. In 2009, the Caribbean region adopted the Regional Initiative for the Elimination of Mother-to-Child Transmission of HIV and Congenital Syphilis jointly proposed by the WHO Regional Office for the Americas and UNICEF.

The Initiative envisions eliminating the mother-to-child transmission of HIV and syphilis as public health problems in all countries and territories in the Caribbean by 2015. Through an interactive process that involved a wide range of stakeholders, an elimination strategy was developed during 2008-2009. The strategy builds on current global technical and programmatic guidance and proposes an integrated approach focusing on four strategic lines of action:

- enhancing the capacity of maternal, newborn and child health services for the early detection, care and treatment of HIV and syphilis among pregnant women, their partners and infants;
- strengthening the surveillance of HIV and syphilis in maternal and child health services and health information systems;
- integrating interventions for managing HIV and sexually transmitted infections with services for sexual and reproductive health and other relevant services; and
- strengthening health systems.

With support from WHO and UNICEF, several countries in the Caribbean region are currently developing and starting to implement plans to roll out the initiative at country level. At the regional level, the initiative is coordinated by a technical working group consisting of regional experts and representatives of key partners in the HIV response.

Beyond the goal of ensuring an HIV-free and AIDS-free generation, global action to prevent the mother-to-child transmission of HIV directly contributes to achieving the Millennium Development Goals 4, 5 and 6 (Box 1.1), which target reducing by two thirds the mortality rate of children younger than five years, reducing by three quarters the maternal mortality ratio and halting and beginning to reverse the spread of HIV/AIDS by 2015.

Several multilateral and bilateral agencies have also prioritized to action to reduce the burden of HIV among women and children. In May 2009, UNAIDS issued a call to action to significantly improve the delivery of services for preventing mother-to-child transmission of HIV as a critical step towards achieving universal access (13). The Global Fund to Fight AIDS, Tuberculosis and Malaria is committed to supporting efforts to prevent the mother-to-child transmission of HIV and to expand HIV care and treatment for children (14). The United States President's Emergency Plan for AIDS Relief has realigned targets of its new multi-year programme (PEPFAR II) to the Declaration of Commitment on HIV/AIDS, aiming to provide services for the prevention of mother-to-child transmission to 80% of all pregnant women and exposed infants and to reduce transmission by 40% in recipient countries (15).

UNITAID has become an important partner in global efforts to accelerate access to HIV treatment by supporting the provision of drugs and diagnostic commodities for preventing the mother-to-child transmission of HIV, HIV treatment and care for children and second-line regimens for treatment for adults. Since 2006, UNITAID and the Clinton HIV/AIDS Initiative have catalysed reductions in the prices of leading antiretroviral drugs in low-income countries (16).

At the international level, an Interagency Task Team (IATT) on Prevention of HIV Infection in Pregnant Women, Mothers and their Children brings together international partners that work on preventing mother-to-child-transmission of HIV and providing children with HIV treatment, care and support. The IATT issues guidance for scaling up interventions to prevent the mother-to-child transmission of HIV and provide HIV treatment and care for children and promotes collaborative and coordinated technical assistance to countries. In 2007, in *Guidance on global scale-up of the prevention of mother-to-child transmission of HIV* (17), the IATT recommended specific targets and coverage levels of core interventions to guide national programmes as they scale up interventions to address HIV among women and children (Box 5.3).

Box 5.3. Recommended targets and coverage levels for preventing the mother-to-child transmission of HIV and HIV treatment and care for children at the national level

- At least 80% of all pregnant women attending antenatal care are provided with information on preventing the mother-to-child transmission of HIV.
- At least 80% of all pregnant women attending antenatal care are tested for HIV, including those previously confirmed to be living with HIV.
- At least 80% of pregnant women living with HIV receive antiretroviral prophylaxis or antiretroviral therapy to reduce the risk of mother-to-child transmission.
- At least 80% of eligible pregnant women living with HIV receive antiretroviral therapy for their own health.
- At least 80% of pregnant women living with HIV receive infant feeding counselling and support at the first infant follow-up visit.
- At least 80% of women living with HIV are successfully referred and enrolled in comprehensive longitudinal care and treatment.
- At least 80% of infants born to women living with HIV receive a virological HIV test within two months of birth.
- At least 80% of infants and children living with HIV and in need receive co-trimoxazole prophylaxis and/or antiretroviral therapy.

Source: WHO, UNICEF and the Inter-Agency Task Team (IATT) on Prevention of HIV Infection in Pregnant Women, Mothers and their Children Prevention of HIV Infection in Pregnant Women, Mothers and their Children.

5.1.3. Tracking progress towards international commitments for scaling up national services to prevent mother-to-child transmission and achieve an HIV-free generation

On behalf of the IATT, UNICEF and WHO established a global reporting mechanism to monitor progress towards achieving goals related to preventing mother-to-child transmission in 2004 and HIV treatment and care for children in 2005 (18). In 2008, UNICEF, WHO and UNAIDS collected data through a joint process to monitor the health sector response to HIV/AIDS towards universal access (section 1.3). More countries are providing data on progress towards targets associated with the United Nations General Assembly Special Session on HIV/AIDS and universal access related to HIV services for women and children, increasing from 108 countries in 2006 to 142 in 2008.

The range of data requested and reported from countries has also increased with the evolution and scaling up of interventions to prevent the mother-to-child transmission of HIV. Some recent additions include data on the categories of antiretroviral regimens provided to pregnant women living with HIV to monitor progress in the implementation of international guidance to provide more efficacious regimens; data on infant testing and co-trimoxazole prophylaxis to monitor progress in infant follow-up; data on country targets; and information related to programmes and policies.

In 2008, 142 countries, including 123 low- and middle-income countries, reported data on HIV related services among women and children.

This chapter analyzes data and summarizes progress on access and uptake in the 123 (of the total of 149) low- and middle-income countries that reported data. These 123 countries account for 97% of the 124 million women who gave birth in low- and middle-income countries in 2008 and nearly all (99.8%) of the estimated 1.4 million pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission in low- and middle-income countries. All these women need effective interventions to prevent mother-to-child transmission of HIV, including antiretroviral therapy or prophylaxis for preventing transmission of the virus to their children.

In 2009, UNAIDS and WHO refined the HIV/AIDS estimation methods to reflect the availability of more reliable data from numerous countries. As a result, new HIV estimates of women and children needing interventions related to preventing mother-to-child transmission have been generated using the refined methods, including for past years, by recalculating previous estimates based on the new parameters. Global estimates of the number of women and children needing services for preventing the mother-to-child transmission of HIV and the data on the coverage of key interventions reported for 2004, 2005, 2006 and 2007 were thus recalculated using the newly generated estimates (Box 5.1).

Similarly, to achieve consistency and establish a comparative measurement of progress, trend analyses of progress were recalculated using only the newly generated estimates.¹

Box 5.4. Monitoring progress in preventing mother-to-child transmission and data quality

Programmes for preventing mother-to-child transmission are difficult to monitor accurately at the national level for several reasons: 1) they comprise a cascade of multiple interventions; 2) the interventions are often integrated across various service delivery points: for instance, these interventions can be delivered in facilities providing antenatal care, labour and delivery services, child health services or HIV care and treatment services; and 3) mother and child follow-up is often poor and records of interventions and outcomes are not linked, resulting in a lack of information on longitudinal follow-up after the pregnancy period. Further, the key intervention – the provision of antiretrovirals to a pregnant women living with HIV to reduce the risk of transmission to the baby – is recorded at health facilities based on whether the drug was dispensed and whether the drug was actually adhered to is often unknown. This could result in a bias in measuring how the intervention affects HIV transmission from mother to child.

Common data quality issues exist in many countries. Double-counting across multiple service delivery points is a common issue with which countries grapple when compiling national statistics related to preventing the mother-to-child transmission of HIV. For example, in settings in which the same pregnant woman living with HIV may receive antiretrovirals at antenatal care, in a maternity ward during labour and delivery or in HIV care sites, there is potential to double-count if data are aggregated across all service delivery points. In addition, many countries face incomplete recording of data in patient registers and inaccurate aggregation, recording and reporting from the facilities to the subnational and the national levels. Some countries were unable to report data on interventions such as the number of pregnant women living with HIV receiving antiretroviral therapy for their own health, since they have not yet established data collection mechanisms to capture this information. Countries are aware of these issues and are making efforts to improve their monitoring systems. This chapter attempts to provide the best available data reflecting the actual situation where possible.

The IATT has developed a guide for monitoring and evaluation, including recommended indicators and issues to consider in improving and strengthening the monitoring of national programmes for preventing mother-to-child transmission. It will be published in late 2009.

¹ For example, estimates have been revised for the number of pregnant women (19) and the number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission (see Box 5.1), affecting the coverage of pregnant women receiving an HIV test and the coverage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, which were published in previous WHO/UNICEF/UNAIDS reports.

5.1.4 HIV interventions for women and children

The global and country-level response to the mother-to-child-transmission of HIV is based on a comprehensive approach recommended by the United Nations that includes the following four strategic elements, also known as the four prongs (20):

- 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.

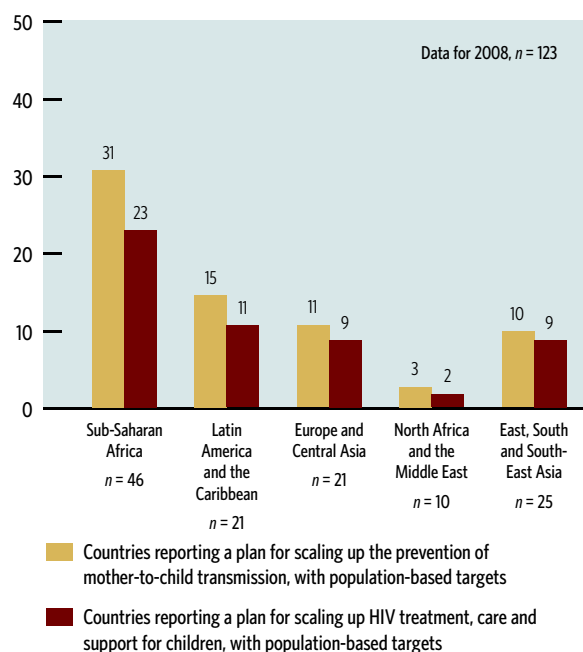
As countries scale up their national programmes, ensuring that all four elements of the comprehensive approach are delivered to women and children in need is critical. The core principle of this approach rests on the concept of a continuum of care for women, children and their families – sequential interventions that begin before pregnancy and continue through pregnancy, labour and delivery and subsequently as part of routine or specialized chronic care services for mother, child and family after the child is born.

5.1.5 National scale-up plans

National political commitment towards scaling up HIV prevention, treatment and care among women and children has intensified in recent years. An increasing number of countries have moved from donor-supported pilot projects to comprehensive national programmes, supported by the development and implementation of national scale-up plans. In addition, setting targets at population level within national plans by identifying the population groups needing various interventions and determining how many people to reach with interventions helps to develop a realistic and concrete plan to achieve national goals. National scale-up plans with population-based targets agreed on by key stakeholders are therefore critical to define strategies tailored to the local demographic, epidemiological and socioeconomic contexts, strengthen the coordination and mobilization of necessary resources and ensure the expansion of services to reach the majority of women and children in need.

In 2008, 70 of 123 reporting low- and middle-income countries (57%) had established a national plan for scaling up services to prevent the mother-to-child transmission of HIV that included population-based targets. Fifty-four countries (44%) had a national plan for scaling up HIV treatment and care for children with population-based targets. In 2005, only 34 and 19 countries had scale-up plans with population-based targets for preventing mother-to-child transmission and for HIV services for children, respectively.

Fig. 5.1. Number of low- and middle-income countries with national scale-up plans including population-based targets for preventing mother-to-child transmission and for HIV care and treatment for children, by region, 2008



Source: Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

Not all countries require such national plans; in particular, countries with extremely low levels of HIV infection may not need to develop national plans with population-based targets. In 2008, sub-Saharan Africa and Latin America and the Caribbean had a high proportion of countries that reported having plans with targets. About 87% and 67% of countries in sub-Saharan Africa and 86% and 71% of countries in Latin America and the Caribbean had national plans including population-based targets for preventing mother-to-child transmission of HIV and for HIV care and treatment for children, respectively (Fig. 5.1).

5.2 Primary prevention of HIV infection among women of childbearing age

Primary prevention of HIV infection among women of childbearing age, including preventing HIV acquisition through sexual transmission or through the use of infected needles, is one of the most cost-effective ways to prevent HIV infections among children (21). In most resource-limited countries, programmes to prevent the mother-to-child transmission of HIV, delivered in the context of maternal, newborn and child health services, represent the main

gateway to primary prevention of HIV among women of childbearing age and to HIV prevention, treatment, care and support services (17).

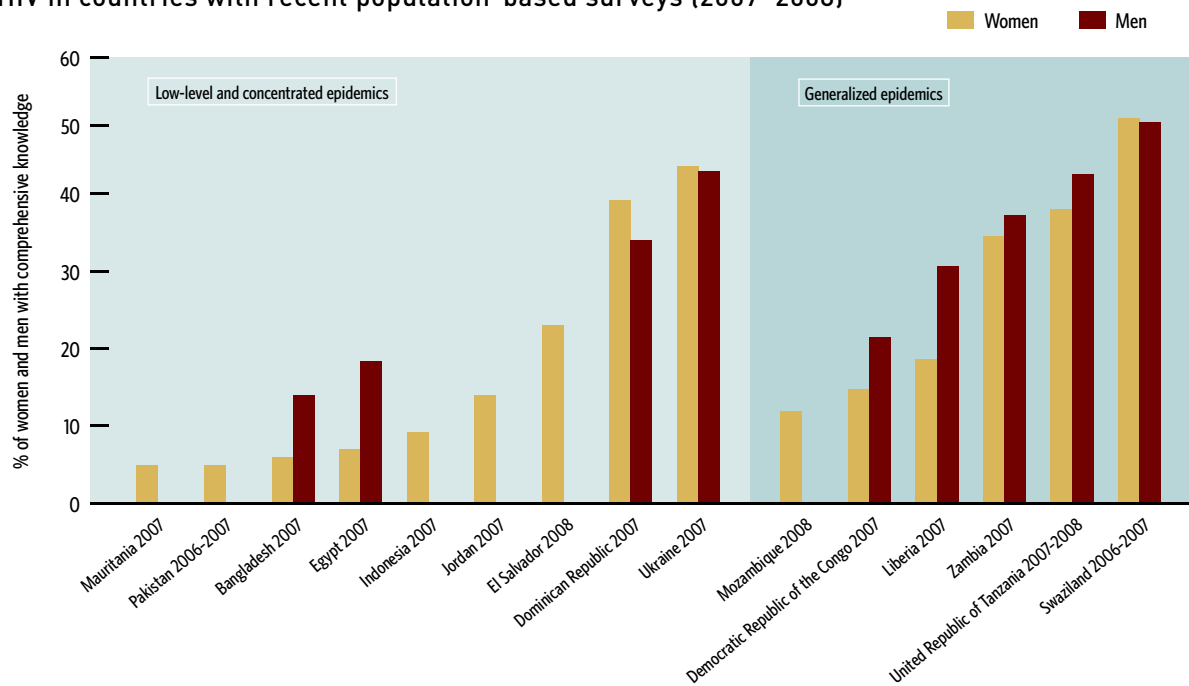
Primary prevention of HIV for pregnant women found to be uninfected when they access programmes to prevent mother-to-child transmission is also important to ensure they remain HIV-negative through pregnancy, childbirth and breastfeeding. In a large study in Rakai, Uganda, women had nearly twice the risk of acquiring HIV while pregnant compared with non-pregnant women, irrespective of their sexual behaviour or their partners' plasma viral load (22). Thus, it remains very important for antenatal programmes for pregnant women and postnatal programmes for breastfeeding women to stress the need for using condoms to protect both mother and baby from HIV infection during the perinatal period and during lactation if breastfeeding.

In the context of preventing the mother-to-child transmission of HIV, primary prevention involves a range of interventions delivered at the health facility and in the community, primarily targeting pregnant women and their male partners and tailored according to the context of the epidemic. Specific interventions include health information and education on HIV and sexually transmitted infections (Fig. 5.2), HIV testing and counselling, promotion of condom-based dual protection (17) and harm reduction interventions for women who inject drugs. Interventions should be age-appropriate and include access to sex education and sexual and reproductive services such as contraceptive use (23,24).

Although interventions for primary prevention of HIV infection have been defined, levels of HIV knowledge remain low (Fig. 5.2). Survey data collected between 2007 and 2008 show that, in many countries with recent population-based surveys, less than half of women and men 15–49 years old have comprehensive and correct knowledge of HIV, varying from 5% in Mauritania to 52% in Swaziland among women and from 14% in Bangladesh to 51% in Swaziland among men. Among eight countries with sex-disaggregated data, six show more comprehensive knowledge among men. Moreover, people 15–24 years old also have little knowledge of HIV. Globally, about 30% of men and 19% of women 15–24 years old in low- and middle-income countries have comprehensive and correct knowledge of HIV/AIDS, far from the target from the United Nations General Assembly Special Session on HIV/AIDS of 95% by 2010 (28).

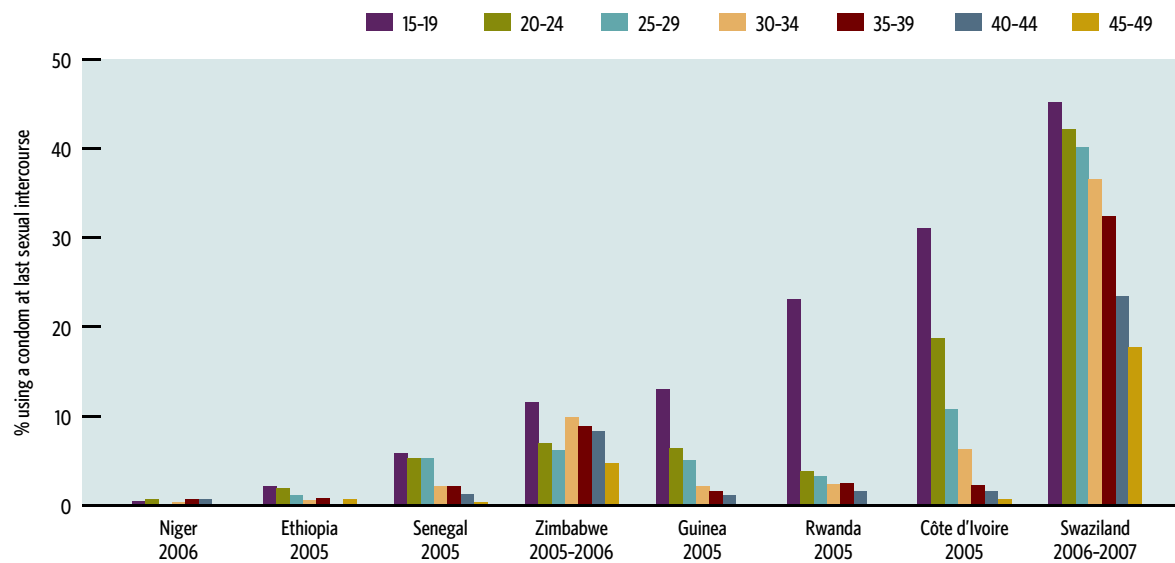
Active involvement of male partners is critical to address issues related to stigma, discrimination, domestic violence and, more importantly, to support the uptake of available services to prevent mother-to-child transmission. Data show that, in mature, generalized HIV epidemics, a large proportion of new HIV infections occur within HIV-discordant couples (29). The Partners HSV-2 Study, the

Fig. 5.2. Percentage of women and men aged 15–49 years with comprehensive knowledge^a of HIV in countries with recent population-based surveys (2007–2008)



^a Comprehensive knowledge is defined as those who correctly identify the two major ways of preventing the sexual transmission of HIV (using condoms and limiting sex to one faithful, uninfected partner), who reject the two most common local misconceptions about HIV transmission, and who know that a healthy-looking person can transmit HIV.
Source: AIS overview [web site] (25); DHS overview [web site] (26); Multiple Indicator Cluster Survey [web site] (27), 2007–2008.

Fig. 5.3. Reported percentage condom use at last sexual intercourse among women 15–49 years old who had sex in the past year by five-year age groups in selected population-based surveys, 2005–2007



Source: DHS overview [web site] (26), 2005–2007.

first large HIV-1 prevention trial in Eastern and Southern Africa involving HIV-1 discordant couples, found that almost half (49%) of couples across all study sites and among all couples with one HIV-1-infected partner were HIV-1 discordant (30). This has direct implications for preventing mother-to-child transmission of HIV due to the high risk of incident infection among pregnant and lactating women and the related high risk of mother-to-child transmission.

Greater emphasis is thus needed on couple HIV testing and counselling (31). Studies from Burkina Faso, Cambodia, Kenya, Uganda and the United Republic of Tanzania show that providing couple HIV testing and counselling increases acceptance of HIV testing by pregnant women (32–37).

Primary prevention strategies that link interventions targeting pregnant women with those implemented at the population level should also include the promotion of condom use. In selected countries with data from population-based surveys conducted between 2005 and 2007, condom use at the last sexual intercourse was less than 50% among women of all reproductive age groups (Fig. 5.3). Condom use was highest among those 15–19 years old and declined with increasing age. This finding may be related to the fact that people entering marital or cohabiting relationships are less likely to use condoms. Women's economic, social and cultural position relative to men may also prevent them from effectively negotiating the consistent use of condoms within marriage or long-term stable partnerships.

The promotion and consistent use of condoms within marriages or cohabiting couples, especially in sub-Saharan Africa, also faces other challenges. Condom use is often negatively associated with lack of trust and illicit sex. Such an observation in generalized epidemic settings highlights the need for reviewing current strategies, which are primarily based on promoting condoms for married women and men. An encouraging finding related to concurrent partnerships, however, shows that, in most countries with survey data between 2003 and 2007, women with two or more partners in the past year are at least twice as likely as women with only one partner to have used a condom at last sexual intercourse (38).

Scaling up HIV prevention within maternal and child health services is also hampered by several systemic bottlenecks and social factors, including financial fees related to the services and transport, shortage of skilled health care providers, lack of basic health care commodities at the health facilities and inadequate support from male partners. In many settings, fear of being identified as HIV-positive or fears of rejection and abandonment prevent many women from learning their HIV status, adopting preventive behaviour or accessing health services. The involvement

Box 5.5. Involving male partners and communities in scaling up HIV services for women and children – examples from sub-Saharan Africa

Community health workers can play an important role in increasing the uptake of interventions to prevent mother-to-child transmission by providing information on access to services, expanding treatment literacy related to the use of antiretrovirals, supporting treatment preparedness and adherence and encouraging positive prevention and disclosure of HIV status. In Kenya, for instance, community health workers successfully provide follow-up services for people receiving antiretroviral therapy (39).

Male partners play an equally important role in the uptake of services to prevent mother-to-child transmission. In Botswana and Zambia, where disclosure of HIV status among pregnant women is relatively high, families and male partners are involved in decisions around antiretroviral therapy (40). In Rwanda (41), treatment sites supported by the United States President's Emergency Plan for AIDS Relief use a tracking system to follow-up women in the community, remind them of scheduled antenatal care appointments, provide them with information, education and communication materials on using antiretrovirals to prevent mother-to-child transmission and provide antiretrovirals to the women in their homes in some communities. Since the intervention, the percentage of women receiving antiretrovirals for preventing mother-to-child transmission increased from about 60% to 90%, and more than 10 sites have been providing this service to 100% of eligible women for many months.

To be successful, programmes to prevent mother-to-child transmission of HIV thus must include strategies to reduce stigma by engaging opinion leaders at the community level, normalize HIV and facilitate access to services by women living with HIV. Programmes must also strengthen the relationship between the formal health system and community organizations to expand HIV prevention services and treatment literacy and preparedness.

of communities, including male partners, families and communities, is essential to expand women's uptake of prevention services and to address sociocultural barriers related to stigma, discrimination and domestic violence (Box 5.5).

5.3 Preventing unintended pregnancies among women living with HIV

Women living with HIV who know their HIV-positive status especially need sexual and reproductive health services to make informed decisions about their future reproductive life, including when to seek support and services to prevent unintended pregnancies (42). However, there are limited systematic data either from national health information systems or population-based surveys to assess the access and uptake of family planning services among women living

with HIV at the population level. The available data mainly document family planning practices among women of reproductive age in general.

Globally, an estimated 80 million (38%) of the 211 million pregnancies each year are unintended (43). Further, data from population-based surveys between 2006 and 2008 in countries with a generalized epidemic show a high unmet need for family planning among married women in several countries (Fig. 5.4). Half the countries report more than 25% unmet need for family planning, with Togo and Uganda reporting the highest rates at 41%.

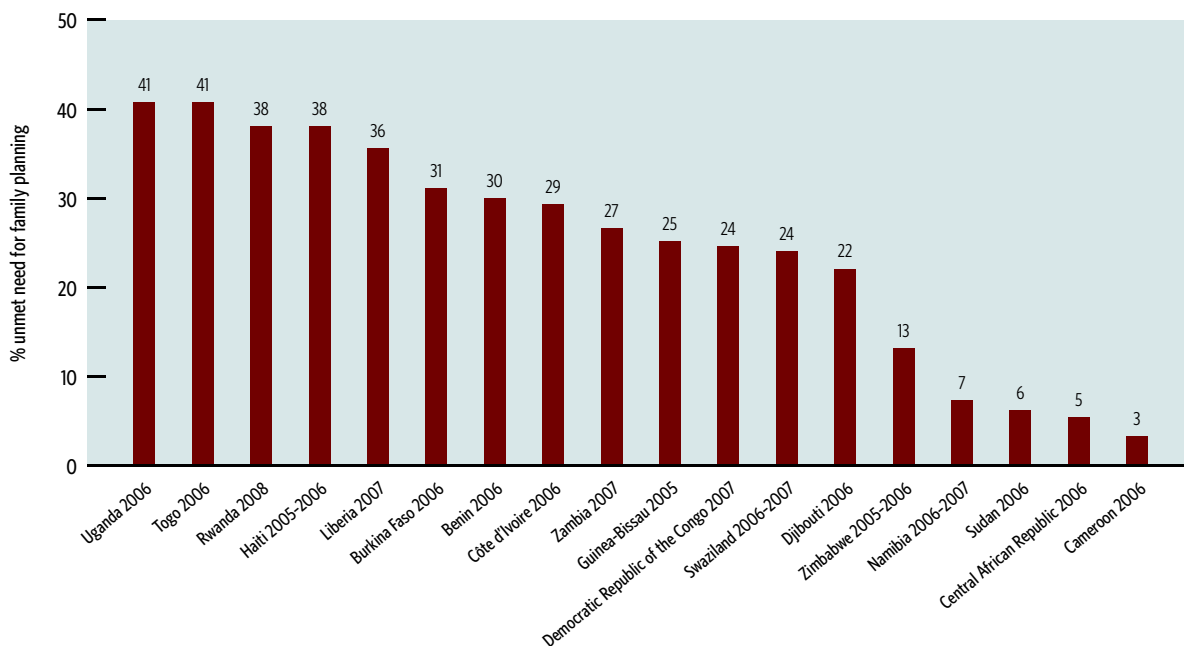
Studies from generalized epidemic settings in sub-Saharan Africa suggest that the rates of unintended pregnancy among women living with HIV may be higher than in the general population. Studies from Côte d'Ivoire, South Africa and Uganda have reported rates of unintended pregnancy that range from 51% to more than 90% in various populations of women living with HIV (45–47). A cross-sectional study among 459 women and men living with HIV in Cape Town, South Africa (48) provided some information on the fertility needs of people living with HIV. The study found that 57% of men and 45% of women reported being open to the possibility of having a child. Among women enrolled in HIV treatment, about 11% of women reported having been pregnant after initiating treatment; all these pregnancies

were reported as unintentional, and only half these women had accessed a programme to prevent mother-to-child transmission during the pregnancy. The study also found that one third of women and two thirds of men expressed desire for an opportunity to discuss fertility intentions with a health care provider. Such findings reaffirm the importance of strengthening links between HIV treatment and sexual and reproductive health services and a critical need for better integrating family planning services with services to prevent the mother-to-child transmission of HIV, by expanding family planning services to settings such as antiretroviral therapy clinics and by integrating HIV interventions into family planning services.

5.4 Preventing transmission of HIV from women living with HIV to their infants

Since the first clinical trials demonstrating the efficacy of short-course antiretroviral regimens in preventing the transmission of HIV infection from mothers to their infants in 1998, scientific evidence and programmatic experience around HIV prevention, treatment, care and support for women and children have continued to evolve rapidly, accompanied by a corresponding evolution in international normative guidance.

Fig. 5.4. Unmet need for family planning among married women 15–49 years old (%) in countries with a generalized epidemic, 2006–2008



Source: DHS overview [web site] (26); Multiple Indicator Cluster Survey [web site] (27); Sudan Household Health Survey [web site] (44).

Preventing HIV transmission from a woman living with HIV to her infant requires a set of sequential interventions:

- HIV testing and counselling for pregnant women and their partners;
- clinical and immunological (CD4) assessment to determine the eligibility of mothers for treatment;
- antiretroviral therapy for eligible mothers for their own health or antiretroviral prophylaxis for mothers and antiretroviral prophylaxis for their infants to prevent vertical transmission;
- safer delivery practices; and
- counselling on and support for feeding infants and young children in the context of HIV.

Comprehensive programmes for women and children also include early diagnosis and follow-up of HIV-exposed infants and effective links to care and support for mothers and infants (section 5.5).

5.4.1 HIV testing and counselling among pregnant women

HIV testing and counselling for pregnant women in the context of preventing mother-to-child transmission is the main gateway to providing HIV prevention, treatment, care and support services to women and children in resource-limited settings. Access to an HIV test as early as possible during pregnancy enables pregnant women living with HIV to benefit from the necessary interventions to reduce the risk of transmitting HIV to their children. Knowledge of HIV status among HIV-negative pregnant women is equally important to provide them with the necessary information and support to remain uninfected and especially to prevent acquiring HIV infection during pregnancy and breastfeeding, as the risk of mother-to-child transmission is high if seroconversion occurs during these periods.

International guidance (49) recommends that HIV testing and counselling be offered to all women attending antenatal, delivery and postnatal services in generalized HIV epidemics. In settings with concentrated epidemics and low HIV prevalence, the decision to make provider-initiated HIV testing and counselling a routine component of antenatal, childbirth and postpartum services needs to be based on the local epidemiological and social context and available resources. The recommendation of an HIV test should always be accompanied by providing necessary information and post-test counselling and undertaken with the women's consent.

In settings with high HIV prevalence, the expansion of provider-initiated HIV testing and counselling in health care settings as part of the standard package of antenatal care and delivery services, based on rapid HIV testing with return of results on the same day, has been instrumental in increasing the uptake of HIV testing among pregnant women.

By the end of 2008, 68 of 123 reporting countries (55%) were implementing provider-initiated testing and counselling with informed consent in at least 25% of facilities providing antenatal care. Thirty-seven countries (30%) had implemented the policy in more than 75% of their antenatal care facilities, including 5 of 21 reporting countries (24%) in Latin America and the Caribbean and 25 of 46 reporting countries (54%) in sub-Saharan Africa.

Sixty-four low- and middle-income countries (52%) indicated that they provide rapid HIV testing with the same-day return of results in at least 25% of facilities providing antenatal care in 2008. Thirty-eight countries (31%) had implemented this service in at least 75% of their antenatal facilities, including 25 countries in sub-Saharan Africa.

Further, of the 20 countries with the highest burden of HIV disease among pregnant women, 10 (Botswana, Cameroon, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Uganda, Zambia and Zimbabwe) had scaled up both provider-initiated testing and counselling and HIV rapid testing to at least 75% of their antenatal care facilities.

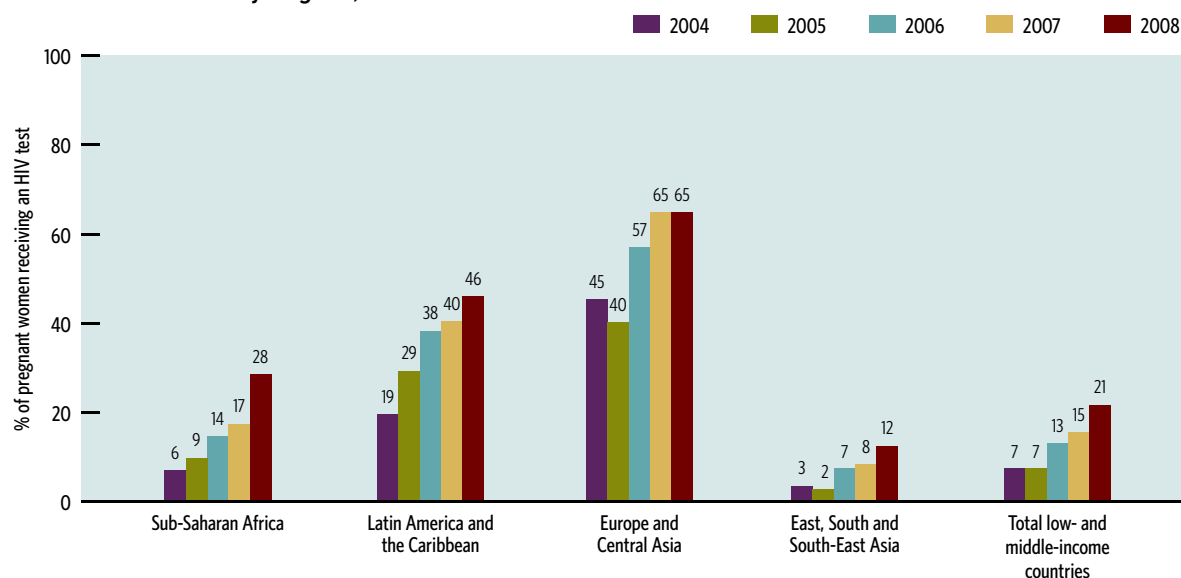
The percentage of pregnant women who received an HIV test in low- and middle-income countries increased from 15% in 2007 to 21% in 2008 (Fig. 5.5). In sub-Saharan Africa, the percentage of pregnant women who received an HIV test increased from 17% in 2007 to 28% in 2008. Countries in Eastern and Southern Africa increased substantially from 29% in 2007 to 43% in 2008, and West and Central Africa increased from 7% to 16% over the same period.

In Latin America and the Caribbean, 46% of pregnant women received an HIV test during their pregnancy in 2008 versus 40% in 2007. Coverage rates are lower in East, South and South-East Asia: from 8% in 2007 to 12% in 2008. Such low coverage rates are probably due to the lack of policies promoting the routine offer of an HIV test to all pregnant women in settings with low-level and concentrated HIV epidemics. In North Africa and the Middle East, less than 1% of pregnant women received an HIV test during pregnancy in 2008.

Although the coverage of HIV testing among pregnant women is only 21% in low- and middle-income countries, 6 of the 10 countries estimated to have the largest numbers of pregnant women living with HIV have reached testing coverage of around 60–80% among pregnant women: Kenya, Malawi, Mozambique, South Africa, United Republic of Tanzania and Zambia.

Nineteen low- and middle-income countries reported coverage rates of HIV testing and counselling among pregnant women exceeding 80% in 2008. These include 3 countries from sub-Saharan Africa (Botswana, Namibia

Fig. 5.5. Percentage of pregnant women who received an HIV test in low- and middle-income countries by region, 2004–2008^a



^a Figures on the coverage of HIV testing among pregnant women were recalculated for previous years based on the revised estimates available.

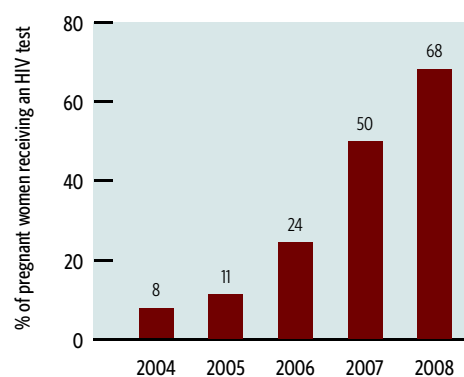
Box 5.6. Scaling up HIV testing among pregnant women in Malawi

In 2008, Malawi reached 68% (406 000 of 599 000) of pregnant women with HIV testing and counselling during pregnancy or childbirth (Fig. 5.6). The country has demonstrated consistent expansion of HIV testing during the past five years: 8% in 2004, 11% in 2005, 24% in 2006, 50% in 2007 and 68% in 2008.

Strong political will and strategic leadership have been the underlying drivers of the remarkable progress made in accelerating the scaling up of services to prevent mother-to-child transmission in Malawi. The development of an acceleration plan with clear objectives, targets and strategic approaches and the existence of strong and coordinated partnerships with both development and implementing partners were crucial to leveraging resources and technical assistance for the rapid rolling out of HIV interventions for women and children. Over the past few years, Malawi has received substantial resources through the Global Fund to Fight AIDS, Tuberculosis and Malaria to support the response to HIV.

Innovative approaches to service delivery have also been instrumental in accelerating scale-up. For instance, the annual national HIV testing week has not only helped to increase access to and uptake of HIV testing services but has also helped to alleviate stigma and discrimination, thereby increasing acceptance of HIV testing at routine service delivery points. Malawi has also improved the supply chain management system that has led to consistent availability of essential commodities and strengthened the monitoring and evaluation system with high-quality data collection and reporting.

Fig. 5.6. Percentage of pregnant women who received an HIV test in Malawi, 2004–2008



and Sao Tome and Principe), 5 from Latin America and the Caribbean (Argentina, Belize, Costa Rica, Cuba and Guyana), 10 from Europe and Central Asia (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Lithuania, Republic of Moldova, Russian Federation and Ukraine) and one from East, South and South-East Asia (Thailand).

Testing male partners for HIV in the context of preventing mother-to-child transmission remains a challenge in most low- and middle-income countries. In 2008, 57 countries documented the number of male partners of pregnant women attending antenatal care who received an HIV test. The proportion of pregnant women attending antenatal care whose male partners were tested for HIV was 5% in 2008 versus 2% in 2007 (570 000 male partners tested in these countries in 2008 versus 360 000 partners tested in 2007). Rwanda had a notable achievement: the proportion of pregnant women attending antenatal care whose sexual

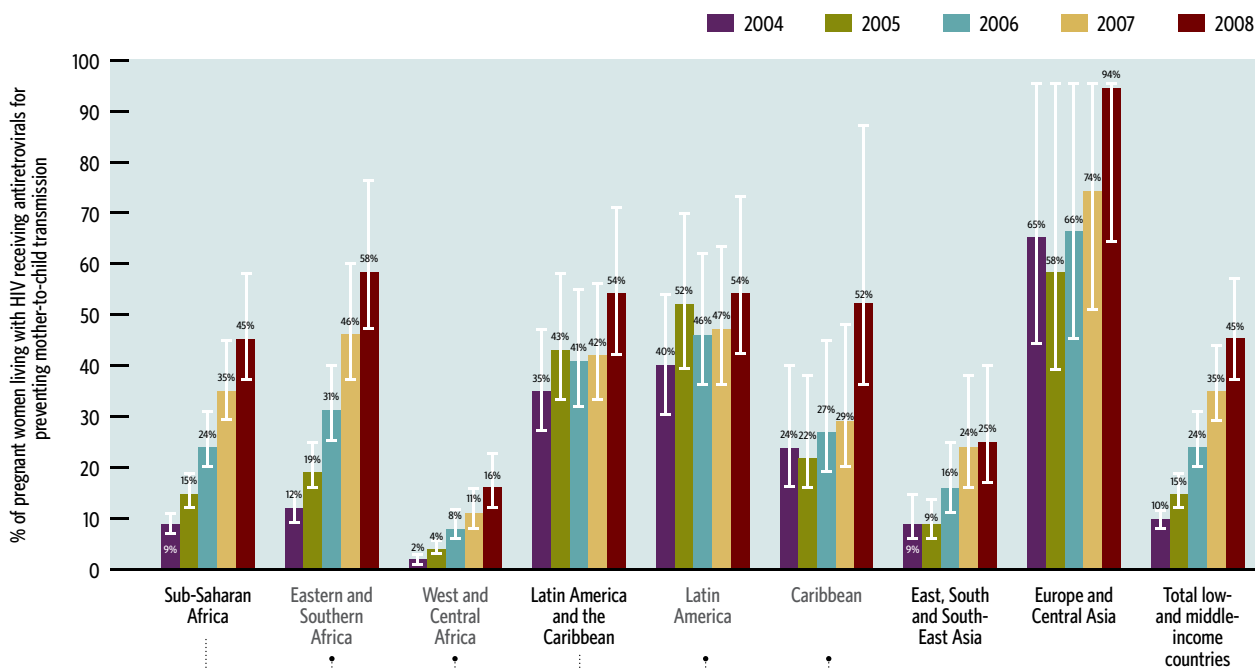
partners were tested for HIV increased from 65% in 2007 to 77% in 2008.

5.4.2 Antiretrovirals to prevent mother-to-child transmission, including antiretroviral therapy for eligible mothers

Coverage of antiretrovirals among pregnant women living with HIV

In 2008, 45% [37–57%] of pregnant women living with HIV living in low- and middle-income countries (628 400 of 1.4 million pregnant women with HIV) received antiretroviral drugs to prevent HIV transmission to their infants, including antiretroviral therapy for their own health (Fig. 5.7). This represents a significant increase in coverage of antiretroviral drugs for the prevention of mother-to-child transmission from 10% [8–12%] in 2004, 15% [12–18%] in 2005, 24% [20–31%] in 2006 and 35% [29–44%] in 2007.

Fig. 5.7. Percentage of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission of HIV in low- and middle-income countries by region, 2004–2007



The bar indicates the uncertainty range around the estimate.

Source: Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

Table 5.2. Estimated number of women needing and receiving antiretrovirals for preventing mother-to-child transmission in low- and middle-income countries by region, 2008^a

Geographical region	Number of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2008	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission, 2008 [range]	Estimated percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2008 [range] ^b	Percentage of the estimated number of HIV-positive pregnant women needing antiretrovirals for preventing mother-to-child transmission
Sub-Saharan Africa	576 800	1 280 000 [990 000-1 600 000]	45% [37-58%]	91%
Eastern and Southern Africa	516 500	900 000 [680 000-1 100 000]	58% [47-76%]	64%
Western and Central Africa	60 300	380 000 [260 000- 510 000]	16% [12-23%]	27%
Latin America and the Caribbean	17 100	32 000 [24 000- 41 000]	54% [42-71%]	2%
Latin America	13 000	24 000 [18 000- 31 000]	54% [42-73%]	2%
Caribbean	4 100	7 900 [4 700- 11 000]	52% [36-87%]	1%
East, South and South-East Asia	21 700	85 000 [54 000- 130 000]	25% [17-40%]	6%
Europe and Central Asia	12 600	13 400 [8 100- 20 000]	94% [64->95%]	1%
North Africa and the Middle East	<200	13 400 [6 800- 22 000]	1% [1-2%]	1%
All low- and middle-income countries	628 400	1 400 000 [1 100 000-1 700 000]	45% [37-57%]	100%

Note: some numbers do not add up due to rounding.

^a Annex 3 provides country-specific data.

^b The coverage estimate is based on the unrounded estimates of pregnant women receiving and needing antiretroviral for preventing mother-to-child transmission.

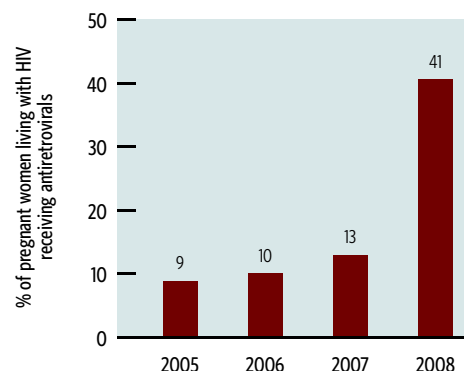
Box 5.7. Expanding access to antiretrovirals to prevent the mother-to-child transmission of HIV in Côte d'Ivoire

In 2008, Côte d'Ivoire reached 41% (9296 of 22 450) of pregnant women living with HIV with antiretrovirals to prevent the transmission of the virus to their infants, up from 13% in 2007 and less than 10% in 2005 and 2006 (Fig. 5.8). This is the most significant increase in percentage points among the countries in West and Central Africa.

This remarkable progress is the result of strong advocacy, policy development, innovative programmatic approaches and sustained technical assistance, including through the IATT. In 2008, the national government opted for decentralization of service delivery with a district-based approach, including the establishment of district operational plans in some regions with support from UNICEF, the Elizabeth Glaser Pediatric AIDS Foundation, International Center for AIDS Care and Treatment Programs and ACONDA Association/ESTHER (Ensemble pour une Solidarité Thérapeutique Hospitalière en Réseau). As a result, the proportion of facilities providing antenatal care services that offer both HIV testing and antiretrovirals for preventing mother-to-child transmission increased from 21% (147 of 716) in 2006 to 44% (356 of 716) in 2008.

With support from implementing partners, including the United States President's Emergency Plan for AIDS Relief, the national programme has also introduced performance-based financing in selected districts to mobilize resources for decentralized scale-up efforts, motivate health service providers, improve the quality of services and increase their uptake. Peer support groups have been established in each service delivery site to promote community engagement as a component of the scale-up strategy. Some of the factors that have contributed to increasing access to and uptake of maternal antiretrovirals include improved forecasting and supply chain management for antiretroviral drugs and related commodities; harmonization of monitoring and evaluation systems; and coordination of technical assistance from development partners, especially through IATT's joint technical missions.

Fig. 5.8. Percentage of pregnant women living with HIV who received antiretrovirals to prevent mother-to-child transmission of HIV in Côte d'Ivoire, 2005–2008



In sub-Saharan Africa, coverage of antiretrovirals for preventing mother-to-child transmission of HIV reached 45% [37-58%] in 2008. Eastern and Southern Africa made substantial progress, with coverage increasing from 46% [37-60%] in 2007 to 58% [47-76%] in 2008. Coverage in West and Central Africa, which increased from 11% [8-16%] in 2007 to 16% [12-23%] in 2008, was lower than the coverage in Eastern and Southern Africa but largely influenced by the results in two countries, the Democratic Republic of the Congo and Nigeria, which bear the most significant HIV disease burden in the region.

Countries in Europe and Central Asia maintained high coverage levels, with 94% [64% to >95%] of pregnant women living with HIV receiving antiretrovirals. Coverage in Latin America increased from 42% [33-56%] in 2007 to 54% [42-73%] in 2008. Notable progress was observed in the Caribbean, where 52% [36-87%] of pregnant women living with HIV received antiretrovirals versus 29% [20-48%] in 2007. In East, South and South-East Asia, only 25% [17-40%] of pregnant women living with HIV received antiretrovirals for preventing mother-to-child transmission of HIV. Coverage rates were lower in North Africa and the Middle East, where about 1% of pregnant women living with

HIV received an antiretroviral regimen for preventing vertical transmission of HIV infection (Table 5.2).

The coverage of antiretrovirals to prevent mother-to-child transmission varies among the 20 countries that account for the largest number of pregnant women living with HIV, ranging from 5% in Chad and the Democratic Republic of the Congo to more than 95% in Botswana (Fig. 5.9). All 20 countries, with the exception of the Democratic Republic of the Congo, have documented progress in the uptake of maternal antiretroviral prophylaxis since 2007, with rapid acceleration in Côte d'Ivoire (from 13% in 2007 to 41% in 2008 (Box 5.7)) and Lesotho (from 27% in 2007 to 57% in 2008).

Fig. 5.9 represents the 20 countries estimated to have the largest numbers of women needing antiretrovirals to reduce mother-to-child transmission and the estimated coverage of antiretrovirals for preventing mother-to-child transmission. Twelve of these countries currently reach less than 50% of the pregnant women living with HIV needing antiretrovirals. Of the 20 countries, only Botswana has achieved the United Nations General Assembly Special Session on HIV/AIDS target of 80% antiretroviral coverage for preventing mother-to-child transmission (Fig. 5.10).

Fig. 5.9. Percentage of pregnant women living with HIV receiving antiretrovirals to prevent the mother-to-child transmission of HIV in 20 countries with the highest HIV disease burden among pregnant women (in descending order), 2008

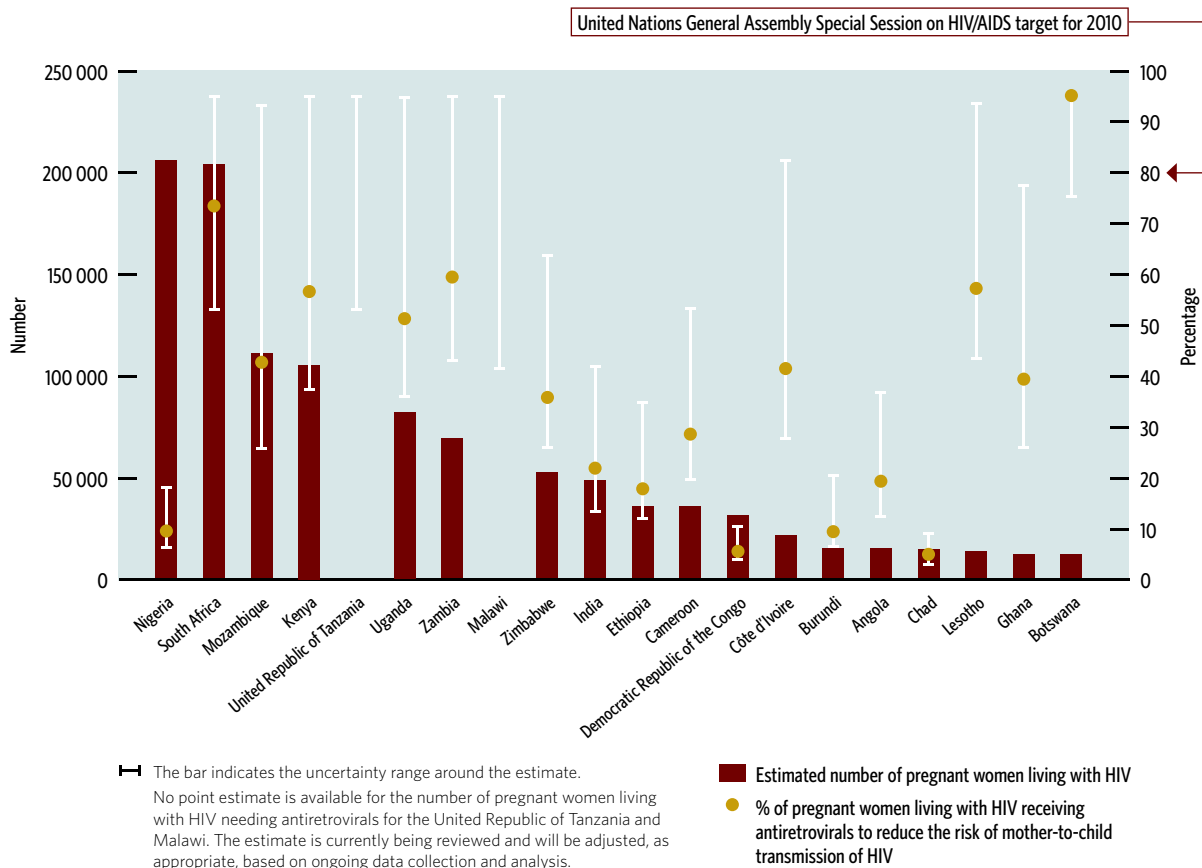
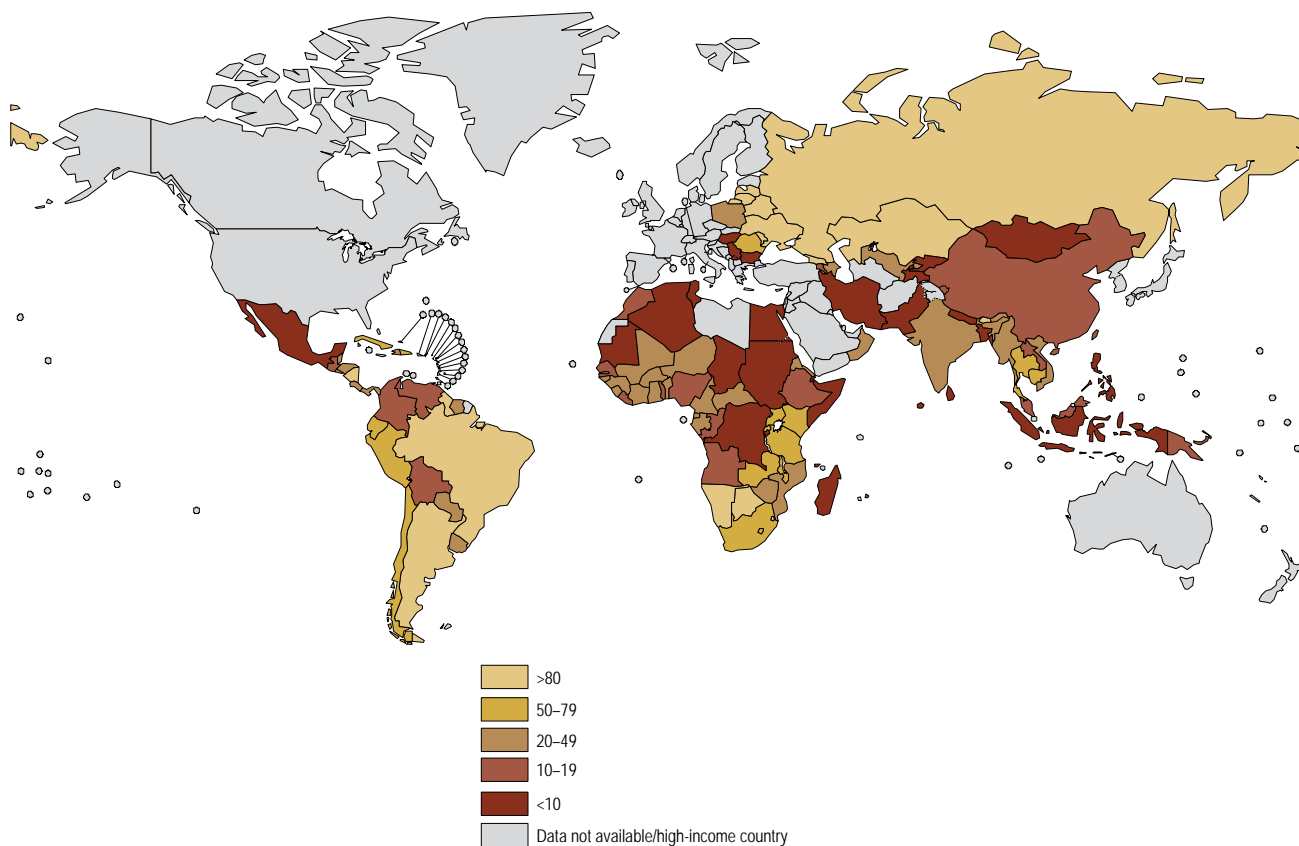


Fig. 5.10. Coverage of antiretrovirals to prevent the mother-to-child transmission of HIV, 2008



The efficacy of antiretrovirals in preventing the mother-to-child transmission of HIV varies with the type of drug combinations used and the duration of the regimens. Since 2006, an increasing number of countries have shifted away from providing single-dose nevirapine regimens towards the use of more efficacious regimens, with combinations of two or three antiretroviral drugs.

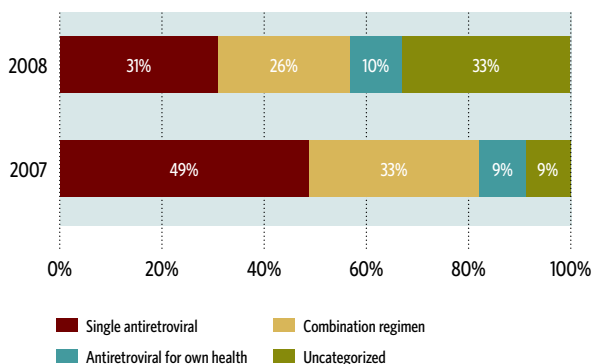
More countries are able to report disaggregated data on the distribution of antiretroviral regimens received by pregnant women living with HIV to prevent mother-to-child transmission (from 59 countries in 2007 to 97 in 2008). However, analysing the global distribution of various antiretroviral regimens is difficult because many countries are still setting up functional national monitoring mechanisms. In one third of the countries, disaggregated data on the antiretroviral regimen received were not available for all women. Thus, although it is encouraging that more countries have established monitoring systems to track the use of more efficacious regimens, these systems are not yet functioning nationally in many countries. As a result, a large proportion of antiretroviral regimens received by women living with HIV remain uncategorized (increasing from 9% in 2007 to 33% in 2008).

In the 97 countries reporting disaggregated data on antiretroviral regimens for 2008, 31% of women receiving antiretrovirals to prevent mother-to-child transmission received a single-dose regimen versus 49% in 2007 (Fig. 5.11). The percentage receiving a combination prophylactic regimen was 26%, but given the large proportion of regimens received being reported as uncategorized, overall, more countries are probably moving away from single-dose regimens towards more efficacious combination prophylactic regimens and providing antiretroviral therapy for pregnant women living with HIV who need it for their own health.

The distribution of regimens varies across regions. In sub-Saharan Africa, at least 30%¹ of women accessing antiretrovirals for preventing mother-to-child transmission received single-dose regimens in 2008 versus 49% in 2007. Countries in Latin America and the Caribbean, Europe and Central Asia and North Africa and the Middle East provided the more efficacious regimen to the large majority of women receiving antiretrovirals to prevent mother-to-

¹ "At least" 30% because a portion of the uncategorized regimen is a single-dose regimen.

Fig. 5.11. Percentage distribution of various antiretroviral regimens provided to pregnant women in low- and medium-income countries in 2007 and 2008, based on available data



child transmission, whereas those in East, South and South-East Asia provided the least efficacious regimen.

Achieving the United Nations General Assembly Special Session on HIV/AIDS target of reaching 80% of pregnant women living with HIV with antiretrovirals to prevent mother-to-child transmission requires that at least 1.1 million of the estimated 1.4 million pregnant women living with HIV have access to this intervention. This defines the overall gap in the global response – at least half a million additional pregnant women living with HIV need to be reached by antiretrovirals in low- and middle-income countries to achieve the target in addition to the 628 400 mothers who had access to this intervention in 2008.

At the end of 2008, the following countries are estimated to have reached the United Nations General Assembly Special Session on HIV/AIDS target for preventing mother-to-child transmission of HIV by ensuring that at least 80% of pregnant women living with HIV were provided with antiretrovirals: Argentina, Belarus, Bhutan, Botswana, Brazil, Georgia, Guyana, Jamaica, Kazakhstan, Latvia, Lithuania, Namibia, Nicaragua, Republic of Moldova, Russian Federation, Swaziland, Thailand and Ukraine.¹

¹ The listed countries other than Botswana, Namibia and Swaziland have a low-level or concentrated epidemic, and greater uncertainty exists for the estimates of the number of women needing antiretrovirals for preventing mother-to-child transmission. In addition, Belarus, Bhutan, Georgia, Guyana, Jamaica, Kazakhstan, Latvia, Lithuania, Nicaragua and the Republic of Moldova have a low estimated number of women needing antiretrovirals to prevent mother-to-child transmission (less than 500), and data for these countries should be interpreted cautiously. Estimates of the number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission in Brazil are currently being reviewed, but these countries have reached the targets of the United Nations General Assembly Special Session on HIV/AIDS according to preliminary estimates.

Box 5.8. Normative guidance on antiretroviral regimens to prevent the mother-to-child transmission of HIV

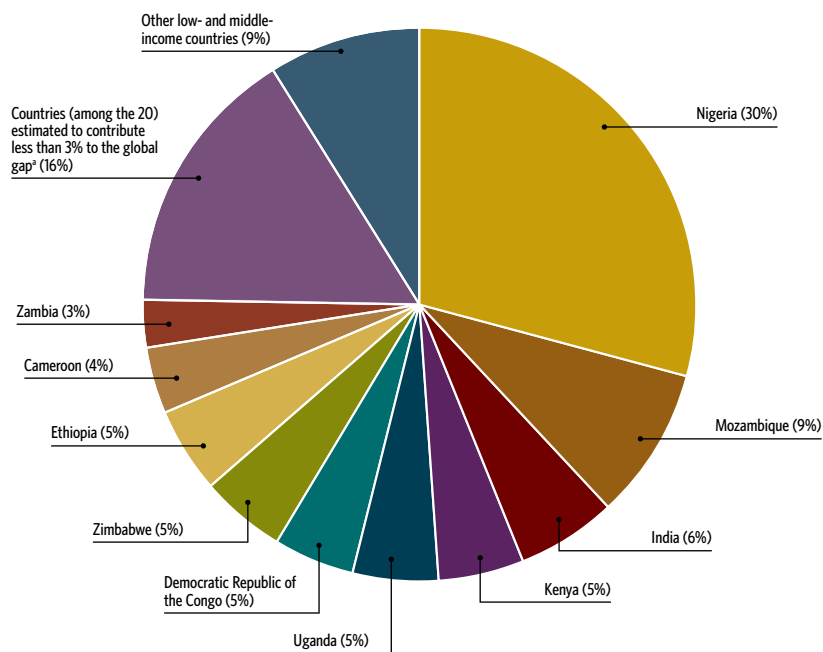
The 2006 WHO guidance (50) recommends clinical and immunological screening of all pregnant women who test positive for HIV. Pregnant women living with HIV found eligible to receive antiretroviral therapy for their own health should receive antiretroviral therapy immediately. Initiating antiretroviral therapy among pregnant women who need it not only improves their own health but also significantly reduces HIV transmission to their infants. Securing the health of the mothers improves children's well-being and survival.

For pregnant women with HIV who do not yet require antiretroviral therapy, the WHO guidelines recommend the use of combination antiretroviral prophylactic regimens to prevent the mother-to-child transmission of HIV. The recommended regimen by WHO is based around zidovudine (from 28 weeks of pregnancy or as soon as possible thereafter) plus single-dose nevirapine and lamivudine during labour and a maternal 7-day tail of zidovudine and lamivudine and a single dose of nevirapine and 1 or 4 weeks of zidovudine for the infant. In settings that do not currently have the capacity to deliver the recommended prophylactic regimen to prevent mother-to-child transmission, implementing the single-dose (mother and infant) nevirapine regimen may be necessary – as an absolute minimum.

Preventing the mother-to-child transmission of HIV is a rapidly evolving field in which new research data and programme experiences are rapidly becoming available. In November 2008, WHO convened an expert consultation to review and analyse new evidence that has become available since the 2006 guidelines regarding the use of antiretroviral drugs for preventing mother-to-child transmission. The consultation recommended revising the guidance to initiate antiretroviral therapy among pregnant women for their own health at an earlier stage (such as for women to be eligible for treatment at a higher CD4 count than currently recommended), revising guidelines on infant antiretroviral prophylaxis and simplifying the current normative guidance to facilitate country-level implementation. WHO will revise the current guidelines at the end of 2009.

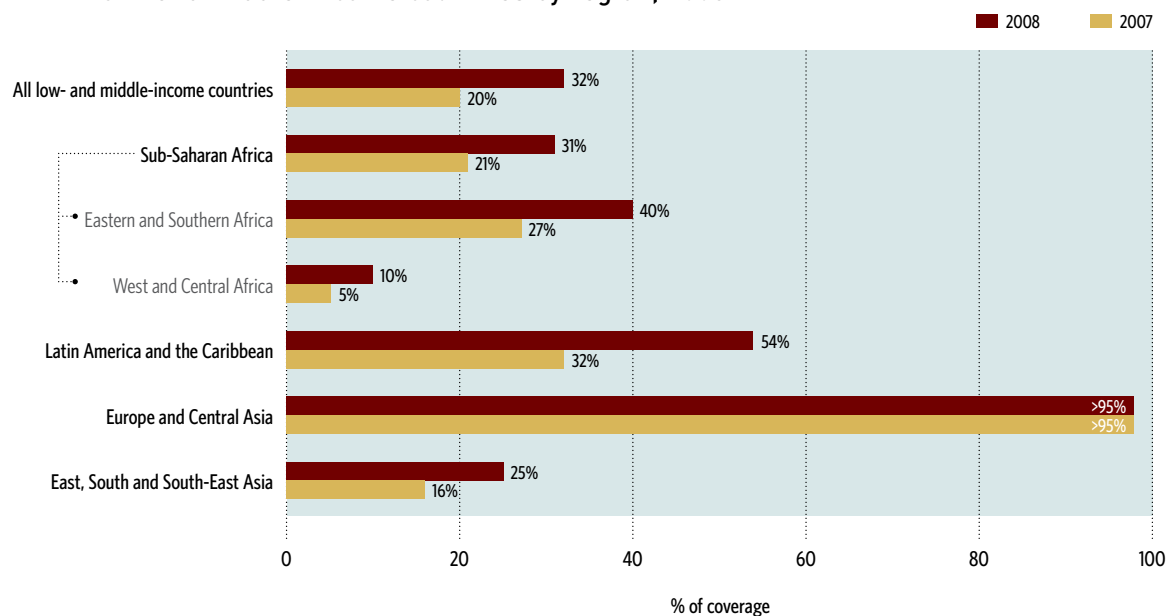
The 20 countries with the largest numbers of pregnant women living with HIV in 2008 collectively contribute about 90% of the global gap in reaching the United Nations General Assembly Special Session on HIV/AIDS target of providing 80% of women with antiretrovirals for preventing the mother-to-child transmission of HIV (Fig. 5.12). The global gap is the difference between the current number of women who have access to antiretrovirals for preventing mother-to-child transmission and the estimated number who must be reached to achieve the 80% coverage target (United Nations General Assembly Special Session on HIV/AIDS target). Nigeria alone contributes to 30% of this gap. Mozambique, by attaining the 80% threshold, would reduce the global coverage gap by 8%, India by 6% and the

Fig. 5.12. Contribution of the 20 countries with the largest numbers of women needing antiretrovirals for preventing the mother-to-child transmission of HIV to the global gap to reach 80% of those in need, 2008



^a These countries include Angola, Botswana, Burundi, Chad, Côte d'Ivoire, Ghana, Lesotho, Malawi, South Africa and the United Republic of Tanzania.

Fig. 5.13. Coverage of antiretroviral prophylaxis among infants born to mothers living with HIV in low- and middle-income countries by region, 2008



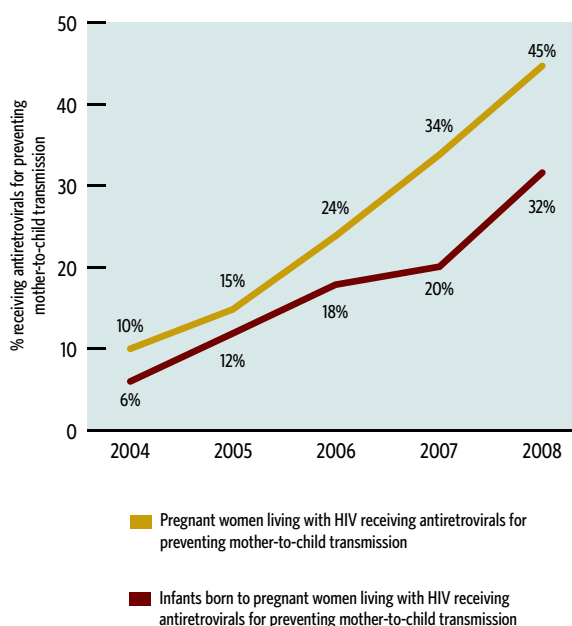
Democratic Republic of the Congo, Ethiopia, Kenya, Uganda and Zimbabwe by 5%. Rapid scale-up in these countries is clearly crucial to achieving the goal of HIV-free generations in the future.

Antiretroviral prophylaxis among infants born to mothers living with HIV

The coverage of infant antiretroviral prophylaxis also increased in accordance with the increasing uptake of antiretrovirals by pregnant women living with HIV. In 2008, 32% of an estimated 1.4 million infants born to mothers living with HIV received antiretrovirals for preventing mother-to-child transmission versus 20% in 2007, 18% in 2006, 12% in 2005 and 6% in 2004 (Fig. 5.14).

Coverage in Europe and Central Asia is very high: close to 100%. In Latin America and the Caribbean, more than half the children in need (54%) had access to this intervention in 2008, up from 32% in 2007. In sub-Saharan Africa, Eastern and Southern Africa substantially increased coverage from 27% in 2007 to 40% in 2008. West and Central Africa almost doubled the number of HIV-exposed children who benefited from antiretrovirals for preventing mother-to-child transmission; however, coverage in this subregion remains very low (10%). Coverage was also low in East, South and South-East Asia, reaching only 25% in 2008. Coverage in North Africa and the Middle East was about 1%.

Fig. 5.14. Percentage of pregnant women living with HIV and infants born to them who received antiretrovirals for preventing mother-to-child transmission, 2004–2008



Despite overall progress, a significant gap remains between the uptake of infant and maternal antiretroviral regimens (430 000 versus 624 000, respectively). Although the gap between the numbers of mothers and infants reached by antiretroviral prophylaxis partly reflects the inadequacy of monitoring and evaluation systems to capture the data on the services provided, bridging the gap will also require strengthening follow-up mechanisms within and outside health care systems.

Assessing the eligibility of pregnant women living with HIV to receive antiretroviral therapy for their own health

When a pregnant woman is identified as living with HIV, her clinical stage of disease and, where available, her CD4 cell count should be assessed to determine whether she is eligible to receive antiretroviral therapy for her own health or to receive only antiretroviral prophylaxis to prevent mother-to-child transmission. WHO recommendations for a public health approach emphasize the benefits of wider availability of CD4 testing to guide decisions about when to initiate antiretroviral therapy. In resource-limited settings, where CD4 cell count is not widely available, the criteria for initiating antiretroviral therapy are primarily based on WHO clinical staging.

In 2008, an estimated 34% of pregnant women who tested positive for HIV were assessed for their eligibility to receive antiretroviral therapy either through clinical staging or CD4 cell count. About 24% were assessed through CD4 cell count, up from 12% reported in 2007. An increasing number of countries are building national capacity, including within maternal and child health services, to expand access to CD4 cell count testing for the majority of pregnant women living with HIV. Countries are also increasingly building systems to collect data on CD4 assessment and track progress.

5.4.3. Infant feeding within the context of preventing mother-to-child transmission

Breastfeeding by a mother living with HIV is associated with the risk of HIV transmission to her infant for as long as she breastfeeds. However, avoiding breastfeeding places the infant at increased risk of death due to diarrhoea, pneumonia and/or malnutrition. Mothers living with HIV need to balance these competing risks when deciding how to feed their newborn children.

Despite years of experience, services to support mothers living with HIV in making safer infant-feeding decisions remain inadequate in many countries: HIV counselling during antenatal care may be insufficient or infrequent; health workers may not always provide women with information on alternative options according to their individual circumstances (51); support for good infant-feeding practices may be minimal at child health clinics;

Box 5.9. Latest scientific evidence on HIV and infant feeding

Strong evidence is now available from research studies to suggest that antiretroviral interventions can reduce HIV transmission through breastfeeding. The Mma Bana (54), BAN (55) and Kesho Bora (56) randomized controlled trials reported postnatal transmission rates of 1-3% when mothers living with HIV with CD4 counts greater than 200 per mm³ were given three antiretroviral drugs during the course of breastfeeding. These studies are still to report whether the same mothers developed resistance after they stopped receiving antiretrovirals and whether this had any adverse effects on them if they needed to start antiretroviral therapy for their own health.

The BAN (55), Malawi PEPI (57) and SWEN (58) studies assessed the impact of giving nevirapine daily to the infants of mothers living with HIV who were breastfeeding. When infants received nevirapine daily for up to 6 months of breastfeeding, postnatal transmission rates were only 1.8%. Once the nevirapine was stopped, transmission occurred again, highlighting the need to address the full period of breastfeeding and not just the first months. Other studies are examining the extended use of nevirapine and other drugs as alternatives to nevirapine.

Research is providing clearer directions to improve feeding practices for HIV-exposed infants. Every effort is needed to identify and initiate lifelong antiretroviral therapy among women living with HIV who meet eligibility criteria. For infants of mothers who are not eligible to receive antiretroviral therapy, emerging evidence suggests that the use of antiretrovirals by mothers during the period of breastfeeding or giving an antiretroviral drug to the infant as prophylaxis while breastfeeding can reduce transmission, thereby making breastfeeding a safer option for mothers living with HIV. These interventions, combined with knowledge about the benefits of exclusive breastfeeding, offer an important opportunity to improve the HIV-free survival of future generations of HIV-exposed infants. At the end of 2009, WHO will review guidelines on HIV and infant feeding in the light of new evidence.

and HIV testing of HIV-exposed infants at six weeks of age (for the purpose of early infant diagnosis) may be mistakenly used as a time to revise feeding practices. In these circumstances, the practices of feeding HIV-exposed infants generally do not optimize their chances of healthy survival free of HIV infection (Box 5.9).

The rates of exclusive breastfeeding among infants younger than six months of age continue to increase worldwide, especially in sub-Saharan Africa (up from 24% to 32% between 1996 and 2006) (52). Population-based surveys collect information on infant-feeding practices, but not many surveys provide disaggregated data by maternal HIV status. A recent analysis of 12 population-based surveys between 2003

and 2006 in sub-Saharan Africa showed that 31% of women living with HIV and 38% of HIV-negative women exclusively breastfed their infants up to six months of age (53).

Few national health information systems routinely capture the feeding practices of mothers living with HIV and their infants. In 2008, very few countries reported information on infant-feeding practices among women living with HIV.

5.4.4 Assessing the impact of programmes to prevent mother-to-child transmission

An increasing number of countries are able to track national progress in the number of women accessing various services related to preventing the mother-to-child transmission of HIV. However, the actual measured impact of scaled-up programmes and service delivery, including on HIV infections averted and on maternal and child survival, is not well documented in many low- and middle-income countries except from specific settings or research sites. Most routine data collected on preventing mother-to-child transmission provide information about the processes that deliver these interventions rather than their effect.

Assessing how many infants of pregnant women living with HIV ever become infected is difficult for at least two reasons. First, not all pregnant women living with HIV are identified during antenatal care (or women become infected during pregnancy or postpartum breastfeeding), and the infants of these women are therefore not usually tested after birth. Second, in many settings, even when mothers do know their status and have even received an antiretroviral intervention to prevent HIV transmission to their child, relatively few bring their children for testing at follow-up clinics, and tests for infants are not always available.

The programmatic effects of interventions aimed at preventing mother-to-child transmission in sub-Saharan Africa have seldom been systematically evaluated. The PEARL study (Box 5.10), funded by the United States Centers for Disease Control and Prevention and the Elizabeth Glaser Pediatric AIDS Foundation and implemented in Cameroon, Côte d'Ivoire, South Africa and Zambia, aims to evaluate the effectiveness of country programmes for preventing mother-to-child transmission by combining cord blood surveillance for traces of antiretrovirals from live deliveries, facility surveys, community-based surveys and a cost-effectiveness evaluation (59). Another study in KwaZulu-Natal, South Africa has assessed the effects of programmes through a surveillance approach, testing all children coming to immunization clinics at six weeks of age. Both studies demonstrate that the effects of programmes for preventing mother-to-child transmission can be measured and provides a powerful tool to evaluate programme effectiveness (Box 5.10).

Box 5.10. Assessing the effects of interventions to prevent the mother-to-child transmission of HIV

The PEARL study – cord blood surveillance to measure the actual uptake of antiretrovirals for preventing the mother-to-child transmission of HIV

One element of the PEARL study tested cord blood samples from live births for traces of antiretrovirals and collected information on the mother's age, number of previous births, acceptance of HIV testing, whether results were received and documentation of receipt of antiretrovirals for the mother and infant.

The study defined coverage of antiretrovirals for preventing mother-to-child transmission as the proportion of mother-infant pairs with confirmed nevirapine ingestion. Maternal ingestion was confirmed by the presence of nevirapine in the cord blood, and infant ingestion was confirmed by reviewing relevant documentation.

Between April 2007 and October 2008, 28 060 cord blood specimens were collected across 43 randomly identified centres (in Cameroon, Côte d'Ivoire, South Africa and Zambia) of which 12%, or 3250, were HIV-positive. Of these, 2996 had complete data available on file. Cumulatively, coverage as defined by the study was only 50% with confirmed mother and infant nevirapine ingestion. The reasons for non-coverage were multiple. Sixteen per cent of women not covered were not offered an HIV test. A further 6% declined it. Thirteen per cent did not receive their HIV-positive test result, and 7% did not receive nevirapine for preventing mother-to-child transmission. In 27% of the cases, the mother did not adhere to the treatment prescribed, and 14% of infants were not dosed. Higher coverage was positively associated with the age of the mother and with the number of antenatal care visits. Failed maternal adherence (the absence of cord blood nevirapine in women documented to have received nevirapine) was more likely among women who were prescribed zidovudine and single-dose nevirapine than among women who received only nevirapine.

The study demonstrates that programmes for preventing mother-to-child transmission must pay greater attention to each step of the standard cascade of interventions, from HIV testing to actual drug delivery and adherence. Bottlenecks must be carefully monitored and identified so that corrective actions can be implemented to maximize the likelihood that services to prevent mother-to-child transmission can reach those in need and can ultimately avert new HIV infections.

Encouraging data from KwaZulu-Natal, South Africa on the effects of interventions to prevent the mother-to-child transmission of HIV

In 2008–2009, in the Province of KwaZulu-Natal, South Africa, the effects of services for preventing mother-to-child transmission were assessed using a simple but robust approach. All mothers bringing their infants for routine six-week immunization were asked for permission for the surveillance team to take a dried blood sample from their infant. All mothers were approached irrespective of whether they had tested HIV-positive or HIV-negative in the last pregnancy or whether they indicated having received an intervention for preventing mother-to-child transmission. Mothers were asked to disclose their HIV status, whether they had received any antiretrovirals and other sociodemographic information. The sample was first tested for HIV antibodies using an ELISA test. Antibodies detected in the infant at this age are maternal antibodies and therefore indicate maternal prevalence and HIV exposure status of the infant. If antibodies were detected, then an HIV viral test was conducted on the same sample, which would indicate infant HIV status. Thus with one sample, maternal HIV prevalence, infant HIV prevalence and mother-to-child infant vertical transmission rates were determined.

In the course of 11 months, 374 clinics in 6 districts were each visited for about 6–8 weeks by one of several dedicated project teams. Dried blood spots were collected from 20–25 infants at each site.

97% of women agreed to provide information about past pregnancies (about 38 000 women); 89% of the mothers of six-week-old infants consented to blood spots being collected from their infants to perform HIV tests ($n = 8013$).

■ Proportion of mothers who had ever tested for HIV.....	98.5%
■ Proportion of mothers who tested for HIV in the last pregnancy.....	89.2%
■ Mothers who self-reported being HIV-positive.....	40.2%
■ Among mothers who reported enrolling in the programme for preventing mother-to-child transmission ($n = 3212$):	
% receiving single-dose nevirapine only.....	9%
% receiving zidovudine and single-dose nevirapine.....	74%
% receiving antiretroviral therapy.....	13%
% receiving nothing.....	3%
■ Proportion of infants with antibodies present (= maternal HIV prevalence).....	40.4%
■ Proportion of all infants - HIV DNA positive (= infant HIV prevalence).....	2.8%
■ Proportion of HIV-exposed infants - HIV DNA positive (= vertical transmission rate) - all.....	7.0%

A similar surveillance exercise was previously performed in 2004–2005 but with a smaller sample ($n = 2437$) at a time when only single-dose nevirapine was available. The six-week vertical transmission rate was 21% versus 7% in 2008–2009. The dramatic reduction in transmission can

be attributed to three factors: the vast majority of women had tested during pregnancy and knew their HIV status; about 13% of women living with HIV were receiving antiretroviral therapy; just three months after zidovudine was introduced to the clinical protocol in South Africa, antenatal care services had switched from single-dose nevirapine to the more efficacious regimen such that 74% of pregnant women living with HIV reported having received the two drugs.

These data demonstrate that effective antiretroviral interventions can be delivered at scale and that transmission rates can be reduced dramatically. Although they only reflect success at one point in time and do not include later transmissions due to breastfeeding, they are a major encouragement and show what can be achieved if adequate commitment, leadership, training and supervision come together within district health systems. KwaZulu-Natal is a good example of impact assessment providing very timely and positive feedback to services for preventing mother-to-child transmission.

Source: Personal communication with Sandile Buthelezi, Chief Director HIV/AIDS, KwaZulu-Natal Department of Health, Pietermaritzburg, South Africa and Christiane Horwood, Deputy Director, Centre for Rural Health, Nelson R. Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa.

5.5 Treatment, care and support for children with HIV

5.5.1 Diagnosing infants

HIV infection follows a more aggressive course among infants and children than among adults. One third of children living with HIV die before the age of one year and almost 50% by the second year. WHO recommends that antiretroviral therapy be initiated in all infants diagnosed with HIV in their first year of life (7).

HIV testing is required to reliably identify HIV infection among infants and children and initiate care and treatment interventions in a timely manner. Standard HIV antibody testing (either rapid or laboratory based) identifies the antibodies produced in response to HIV infection. However, among HIV-exposed infants, maternal HIV antibodies are passively transferred to the infant during pregnancy and may persist during the first year of life (and exceptionally

beyond), creating difficulty in interpreting positive HIV antibody test results in infants during this time. HIV infection in the first year of life is therefore most reliably diagnosed by virological tests, by detecting the presence of components of the HIV virus itself, usually nucleic acid (HIV DNA or HIV RNA) or viral antigens.

All HIV-exposed infants should receive early virological testing at or around 4–6 weeks of age. Infants with a positive virological test result should be assumed to be HIV-positive and started on antiretroviral therapy immediately; and HIV infection should be confirmed by repeat viral testing. Virological testing can be reliably performed on site with adequate laboratory capacity or through specimens collected onto filter paper (dried blood spots) and sent to laboratories with capacity for testing. 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. However, the operationalization of diagnostic protocols is often challenged by lack of technical competencies, underdeveloped laboratory capacity and weak systems for transporting blood specimens and results.

Countries have made significant progress in expanding access to HIV testing services at the point of care. In 2008, 83 of 123 reporting countries (67%) reported that they provide HIV testing services, on site, through the use of dried blood spots or by referral to laboratory services. This represents an increase of 46% from 57 countries that reported in 2007.

However, globally, the uptake of HIV testing among children remains low. In 41 countries reporting data on the number of children accessing this intervention in 2008, only 15% of children born to mothers living with HIV in 2008 were tested within the first two months of life. In 21 countries reporting data in 2007 and 2008, representing 13% of the total number of pregnant women needing antiretrovirals in low- and middle-income countries, the number of infants

Box 5.11. Review of recommendations on diagnosing HIV infection in infants and children

WHO convened a meeting in November 2008 to review recommendations for the diagnostic testing of HIV infection in infants and children and proposed updated recommendations (60). Critical issues identified in developing the recommendations were:

- identifying HIV-exposed infants as early as possible including through HIV testing at birth and/or in routine maternal and child health clinics in high-burden settings;
- confirming initially positive HIV test results to avoid giving unnecessary antiretroviral therapy;
- reaffirming the value of early (at or around six weeks of age) HIV testing for infants known to be exposed to HIV;
- ensuring that breastfeeding is not stopped to perform HIV tests; and
- ensuring that positive HIV test results are fast-tracked to the mother-baby pair so that antiretroviral therapy can be started as early as possible.

Box 5.12. Scaling up early infant diagnosis in Namibia

Namibia's HIV prevalence rate among women using antenatal care services is 18%. An estimated 14 000 new infections occur annually (61), one third of which are among women 15–24 years old and 9% among children younger than 15 years. In 2005, Namibia decided to introduce early infant diagnosis of HIV infection, piloting the service at Katutura State Hospital in Windhoek. The intervention was subsequently rolled out nationally from January 2006. As of March 2009, a network of 202 sites collected and submitted dried blood spot samples for analysis at the central HIV viral testing laboratory in Windhoek, where HIV testing is centralized.

According to Namibia's national early infant diagnosis policy, HIV DNA testing is available for all HIV-exposed and symptomatic children from as early as six weeks of age. The test is also repeated two months after weaning if the initial result was negative and the infant was breastfed. An initially positive HIV DNA test result is confirmed through a rapid or enzyme-linked immunosorbent assay (ELISA) test once the infant reaches 18 months.

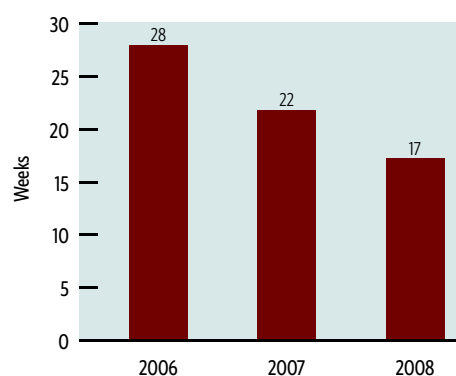
As of March 2009, more than 25 000 HIV tests had been performed since the intervention was introduced. About 75% of all HIV tests are first-time tests. Between 1 April 2008 and 31 March 2009, of a projected 9600 HIV-exposed babies, 7877 had an HIV test, although not all were conducted in the first two months of life.

About 13% of tests were positive in 2006, and the percentage has steadily declined ever since. In 2008, the rate of positive diagnosis reached 9%, a decrease of almost one third. Preliminary results for 2009 show a continued decline in positive results.

The average age of testing has also gradually declined. In 2006, infants tested were 28 weeks old on average, a figure that had been cut to 17 weeks by 2008. This is a promising trend, as more infants are being tested at a younger age, allowing them to access life-saving antiretroviral therapy earlier, with significant positive effects on survival (Fig. 5.15). However, the age of diagnosis still needs to be decreased further to maximize survival for infants living with HIV.

Rapid and widespread scale-up of early infant diagnosis in Namibia has contributed to high coverage of treatment for infants needing antiretroviral therapy: 7622 children were receiving antiretroviral therapy as of March 2009, representing more than 95% coverage. The downward trend in the rate of positive diagnosis since services for early infant diagnosis were rolled out is also encouraging and, with the introduction of combination antiretroviral prophylaxis for preventing mother-to-child transmission and continued scale-up of HIV services for women and children, as well as the decline in antenatal HIV seroprevalence, the number of HIV DNA samples testing positive is expected to decline further.

Fig. 5.15. Average age of infants at their first HIV DNA test in Namibia in weeks, 2006–2008



Source: Ministry of Health and Social Services, Namibia

tested within two months of birth increased by 30% from 24 300 in 2007 to 31 700 in 2008. In many countries, reporting systems may not be able to accurately capture this information at the national level.

Early testing of HIV-exposed infants must be given priority within the global and national-level scaling up of programmes to prevent mother-to-child transmission. Much can be learned from the successful interventions implemented by a number of countries in Eastern and Southern Africa with substantially higher coverage of early infant diagnosis, such as Swaziland (30%) and Zambia (27%). An important strategy these countries use to improve the follow-up of known HIV-exposed infants is including HIV-specific information on child health cards to better enable health care workers to identify infants needing HIV

testing and innovative approaches such as using mobile phones to connect with mothers living with HIV and their infants.

Where HIV testing is unavailable, infants still need to be closely monitored, and clinical algorithms and HIV antibody and CD4 tests are needed to identify children living with HIV as early as possible.

5.5.2 Co-trimoxazole prophylaxis in HIV-exposed infants

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 exposed to HIV. Data from randomized clinical trials and observational

studies demonstrate the effectiveness of co-trimoxazole in preventing pneumocystis pneumonia (*Pneumocystis jiroveci* pneumonia) and other infections among infants living with HIV (62).

In 2006, WHO released guidance on the use of co-trimoxazole preventive therapy for children, adolescents and adults (63) recommending that all HIV-exposed children born to mothers living with HIV start co-trimoxazole preventive treatment at 4–6 weeks after birth and continue until HIV infection has been excluded and the infant is no longer at risk of acquiring HIV through breastfeeding. The development and implementation of national policies and recommendations specific to the use of co-trimoxazole prophylaxis for infants and children exposed to or living with HIV, consistent with WHO recommendations, has started to improve the coverage and uptake of this important intervention.

In 2008, 8% of infants born to pregnant women with HIV are reported to have initiated co-trimoxazole prophylaxis by two months of age. This is more than double what was reported in 2007, when only 4% of the infants started co-trimoxazole at the same age. In Eastern and Southern Africa, the subregion most affected by HIV, coverage increased from 5% in 2007 to 9% in 2008 but remains low.

Overall, the data may underestimate the coverage of co-trimoxazole prophylaxis in low- and middle-income countries, as only 67 countries reported data on this indicator in 2008. In 31 countries reporting data in 2007 and 2008, representing 26% of the total number of pregnant women with HIV, the number of infants initiating co-trimoxazole within the first two months of life increased from 52 100 in 2007 to 80 500 in 2008 (by 55%), and coverage increased from 14% to 22%. Despite this increase, however, greater programme efforts need to be directed to scaling up this critical intervention in the years ahead, as coverage levels are still well below the target of 80% coverage.

A major reason for the limited uptake of essential interventions such as early infant diagnosis of HIV infection and co-trimoxazole prophylaxis is the weakness and lack of integration of postnatal follow-up systems in maternal, newborn and child health settings. Although many women are identified as living with HIV during pregnancy and receive critical HIV interventions, many of their infants remain unidentified in the postnatal period, thereby missing out on critical interventions such as co-trimoxazole prophylaxis. Some countries have attempted to address this weakness by incorporating HIV-related information on child health cards to prompt health care workers to identify children exposed to HIV so that they can receive these services in a timely manner.

5.5.3 Antiretroviral therapy for children

Many HIV-related deaths among children could be avoided through early diagnosis of HIV and timely provision of effective care and treatment. International guidance recommends that, if HIV infection is detected in infancy, immediate antiretroviral therapy is crucial; however, currently most children entering treatment programmes are older.

Countries across all geographical regions have expanded both facility and population-based coverage of antiretroviral therapy for children during the past three years. HIV treatment and care for children is increasingly integrated into existing antiretroviral therapy sites for adult care and into maternal, newborn and child health services. A total of 10 300 facilities were reported to be providing antiretroviral therapy to children in 2008 versus 5660 facilities in 2007, an increase of 82%.

As of December 2008, about 275 700 children younger than 15 years were receiving antiretroviral therapy in low- and middle-income countries, up from 197 000 in 2007, 127 300 in 2006 and 75 000 in 2005 (Table 5.3, Fig. 5.16). These children represent an estimated 38% of all children younger than 15 years estimated to need antiretroviral therapy worldwide. Overall, the number of children receiving antiretroviral therapy in low- and middle-income countries increased by 40% between 2007 and 2008 and by more than 3.5-fold between 2005 and 2008.

Regional coverage of antiretroviral therapy for children varies from 6% [4–12%] in North Africa and the Middle East to 85% [56% to >95%] in Europe and Central Asia (Table 5.3). All regions saw notable progress in the number of children younger than 15 years receiving treatment in 2008 versus 2007, except for Latin America, where coverage was already as high as 82% [70% to >95%].

Eastern and Southern Africa achieved particularly substantial progress: 224 900 children received antiretroviral therapy in 2008, representing coverage of 44% [36–57%] versus 132 500 (30% [25–39%]) in 2007. Progress in West and Central Africa was much more limited, increasing from 25 500 children receiving antiretroviral therapy in 2007 (13% [10–19%]) to 29 800 (15% [11–22%]) in 2008. In East, South and South-East Asia, 30 000 children were receiving treatment in 2008 (52% [38–73%]) versus 20 800 in 2007 (36% [26–52%]).

Factors contributing to the expanded uptake of antiretroviral therapy for children include sustained global advocacy, enhanced national commitment, increased availability of antiretroviral products and reduced prices of drug formulations for children (section 4.1.8).

Table 5.3. Estimated number of children younger than 15 years receiving antiretroviral therapy, children needing antiretroviral therapy and percentage coverage in low- and middle-income countries according to region, December 2008^a

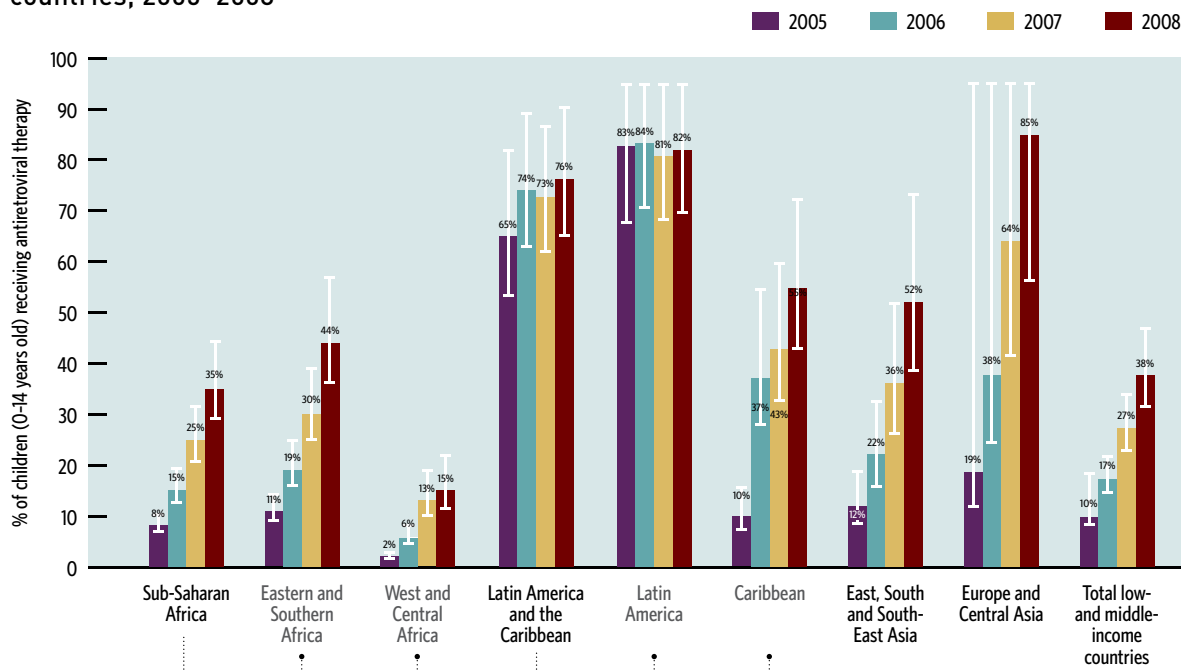
Geographical region	Reported number of children (0-14 years) receiving antiretroviral therapy, December 2008	Estimated number of children needing antiretroviral therapy, 2008 [range] ^a	Antiretroviral therapy coverage among children, December 2008 [range] ^b	Percentage of total need
Sub-Saharan Africa	224 900	640 000 [500 000-770 000]	35% [29-45%]	88%
Eastern and Southern Africa	195 100	440 000 [340 000-540 000]	44% [36-57%]	61%
Western and Central Africa	29 800	200 000 [140 000-260 000]	15% [11-22%]	27%
Latin America and the Caribbean	16 100	21 000 [18 000-25 000]	76% [65-91%]	3%
Latin America	13 700	17 000 [14 000-20 000]	82% [70->95%]	2%
Caribbean	2 500	4 600 [3 400-5 800]	55% [43-72%]	1%
East, South and South-East Asia	30 000	58 000 [41 000-78 000]	52% [38-73%]	8%
Europe and Central Asia	4 200	4 900 [2 700-7 500]	85% [56->95%]	1%
North Africa and the Middle East	400	6 700 [3 400-11 000]	6% [4-12%]	1%
Total	275 700	730 000 [580 000-880 000]	38% [31-47%]	100%

Note: some numbers do not add up due to rounding.

^a For an explanation of the methods used, see the explanatory notes to Annex 1 and 2.

^b The coverage estimate is based on the estimated unrounded number of children receiving and needing antiretroviral therapy.

Fig. 5.16. Percentage of children receiving antiretroviral therapy in low- and middle-income countries, 2005–2008



— The bar indicates the uncertainty range around the estimate.

However, although substantial progress has been made towards achieving universal access to antiretroviral therapy for children, two thirds of children living with HIV who need antiretroviral therapy globally are still not receiving treatment. In addition, the number of infants and children newly placed on antiretroviral therapy is still not keeping pace with the numbers of infants newly infected as a result of failure to prevent new infections. Additional investment in material and programmatic support, including greater uptake of services for early infant diagnosis of HIV infection, is needed to further increase the initiation of antiretroviral therapy for children living with HIV. Countries also need to begin preparing more intensively for the increasing number of children who need to receive second-line antiretroviral regimens and the associated programmatic challenges.

5.6 Providing a continuum of care for women and children

To be effective, evidence-based preventive, treatment and care interventions for pregnant women living with HIV, mothers and their children must be provided within a continuum of care. However the data suggest that several critical gaps continued along this continuum at the end of 2008.

- The proportion of pregnant women attending antenatal care services for at least one visit is high (77%) (28),

but the coverage (21%) of HIV testing and counselling among pregnant women is relatively lower.

- The low number of pregnant women identified with HIV who are assessed for their eligibility to receive antiretroviral therapy for their own health (34%) is higher than those who actually receive antiretroviral therapy for their need.
- The third critical gap lies in providing antiretrovirals to prevent mother-to-child transmission to mother-baby pairs. Only 32% of infants born to mothers living with HIV in 2008 received antiretrovirals versus 45% of mothers who received antiretrovirals for preventing mother-to-child transmission.
- Finally, the data show a significant gap between the number of children born to mothers living with HIV who received antiretroviral prophylaxis (32%) and those that continued into the critical services for early infant diagnosis (15%) and co-trimoxazole prophylaxis (8%).

To maximize the effectiveness of programmes for preventing mother-to-child transmission of HIV, integrated packages of services must be systematically targeted at the facility level, and systems should be developed to track and improve performance at every step of the cascade through follow-up mechanisms and links to the essential treatment, care and support services.

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6. HEALTH SYSTEMS

Key findings

- Evidence on the interaction between HIV investments and health systems strengthening shows many positive impacts, but also some evidence of missed opportunities for overall system strengthening.
- Countries are adopting strategies to address critical health worker shortages, including task-shifting approaches which have been shown to result in improvements in access and quality of health services at comparable or lower costs than traditional delivery models. More efforts are needed to improve working conditions and access to health care for health workers themselves, as well as to ensure continued learning opportunities, quality assurance and measures to counter stigma and discrimination against people living with HIV in the health care setting.
- Collaboration between national and international partners has helped to strengthen HIV drug procurement and supply management systems in many countries, with some evidence of broader beneficial effects on overall systems. Yet, 34% of reporting low- and middle-income countries had experienced at least one stock-out during 2008, increasing the risk of treatment interruptions, failure or drug resistance.
- More data are becoming available to assess coverage and impacts of expanding HIV programmes. In 2008, 139 of 149 low- and middle-income countries worldwide responded to the joint WHO, UNICEF and UNAIDS questionnaire to monitor progress towards universal access, with higher reporting rates for many indicators as compared with 2007. However data quality and completeness remain uneven. Continued investment in strategic information is necessary to improve programmes and ensure accountability and sustained funding.

Achieving universal access to HIV prevention, treatment and care as well as the broader Millennium Development Goals rests on the capacity of health systems to deliver these services while respecting the principles of universal coverage, equity, participation and multisectoral action as enshrined in the landmark Declaration of Alma-Ata (1).

There has been much debate in recent years on whether the expansion of disease-specific global health initiatives, such as the global response to HIV, has strengthened or weakened health systems in countries with high disease burdens. The evidence shows that HIV investment has had many positive effects on health systems, but some evidence also indicates negative effects or missed opportunities for strengthening the overall system. More significantly, with its attention to the values of universal coverage, client-centred service delivery, community participation and multisectoral action, the international response to HIV has highlighted weaknesses in health systems in many areas and driven action towards improving human resource capacity, infrastructure, supply chains, health financing and information systems. A renewed international emphasis on expanding access to primary health care increases the importance of ensuring that investment in HIV programmes can be leveraged to create positive synergy between the HIV response and the development of health systems, and to draw on and use the lessons learned.

6.1. Health systems, primary health care and the HIV response

Numerous studies have examined the evidence base regarding the interaction between disease-specific global health initiatives and strengthening health systems (2–8). They concur in their assessment that, although data are limited, the available evidence demonstrates mostly positive and some negative effects. Importantly, these studies have also found that scaling up responses to HIV, TB and malaria has not resulted in decreased coverage of interventions for maternal and child health.

A multi-country evaluation by the Global Fund to Fight AIDS, Tuberculosis and Malaria also assessed financial flows and found that the total external funding directed towards HIV increased substantially between 2003 and 2006 but not at the expense of funding for maternal, neonatal and child health – which also grew, although not by as much. A comprehensive assessment of development assistance for health between 1990 and 2007 also documented a substantial increase in resources for global health, not just for the response to HIV (9). Clearly, continued commitment by international and national partners is needed to increase funding for health as a whole, and efforts are needed to maximize positive synergy with global health initiatives.

At the country level, analysing the interaction between disease-specific programmes, health systems and the additionality of resources is more complex due to weaknesses in data quality and availability and the interchangeable nature of earmarked international and domestic funding. Nevertheless, positive associations or benefits are visible in different contexts. Data from Rwanda show an important positive relationship between HIV interventions and improved antenatal care and family planning services (10). This may be partly explained by the fact that HIV-specific funds were used to build health facilities, train human resources and improve laboratories. Similarly, the results from a programme developed and implemented by Partners in Health in Haiti show a positive association between integrated prevention and care for HIV and vaccination, family planning and TB detection and treatment (11).

Global health initiatives have been rapidly adapting their approaches to foster synergy with efforts to strengthen health systems. The Global Fund, for example, has created financing windows for strengthening health and community systems, with countries being able to request funding for strengthening health systems as part of disease-specific proposals (12,13). The Fund reports that, so far, more than one third of its committed funding of US\$ 4.2 billion has been allocated to strengthening health systems, including strengthening infrastructure (such as laboratories), increasing human resources, improving skills and competencies of health workers and developing and supporting health information systems (14). The United States President's Emergency Plan for AIDS Relief reported spending a similar proportion of its funding for strengthening health systems and has introduced a specific target of training at least 140 000 new health care workers in its second phase of implementation. UNITAID, which supports the scaling up of access to treatment for HIV, TB and malaria by leveraging price reductions for high-quality diagnostics and medicines, is also contributing to broader strengthening of health systems and sustainability through innovative financing mechanisms for essential drugs.

These actions are closely intertwined with recent efforts to renew primary health care. At the 62nd World Health Assembly in 2009, Member States affirmed the interdependence of strengthening health systems, primary health care and disease-specific programmes, noting that they are mutually reinforcing and contribute to achieving the health-related Millennium Development Goals. Resolution WHA62.12 (15) calls on countries and partners to ensure that disease-specific programmes are developed, integrated and implemented in the context of integrated primary health care.

The world health report 2008. Primary health care – Now more than ever (16) articulated four key areas of reform to address

inequity in health between countries and populations and the changing nature of health problems in an evolving global context. The four areas of reform articulate different facets of health systems.

❶ **Universal coverage.** Ensuring that health systems contribute to health equity, social justice and the end of exclusion, by moving towards universal access and social health protection.

❷ **Service delivery.** Reorganizing health services around people's needs and expectations to render them more socially relevant and more responsive to the changing world while producing better outcomes.

❸ **Public policy.** Securing healthier communities by integrating public health actions with primary care and by pursuing healthy public policies across sectors.

❹ **Leadership.** Replacing disproportionate reliance on command and control on the one hand and laissez-faire disengagement of the state on the other with the inclusive and participatory leadership required by the complexity of contemporary health systems.

The international response to HIV has upheld and promoted reform in each of these areas. The political and financial commitment to achieving universal access to HIV prevention, treatment and care, implemented through a public health approach and carefully considering the needs of vulnerable population groups, has fostered inclusiveness and equity in the response to HIV. Service delivery approaches have been developed with attention to human rights and have been implemented through partnerships with affected communities, including people living with HIV. The HIV response has equally forced debate on major policy issues such as access to HIV treatment free of user charges and the balance between intellectual property rights and access to medicines, and has resulted in the condemnation of discriminatory laws that stigmatize people engaged in high-risk behaviour. Action against HIV has been truly multisectoral in its leadership, bringing together professionals from various sectors, including civil society groups. Continued commitment to such approaches is necessary to ensure that scaling up services for HIV positively affects the delivery of primary health care services through strong, equitable and efficient health systems (Box 6.1).

Box 6.1. Providing HIV services within an integrated approach to strengthening health systems and renewing primary health care

WHO's integrated management tools and training materials for health service delivery – Integrated Management of Adolescent and Adult Illness (IMAI), Integrated Management of Childhood Illness (IMCI) and Integrated Management of Pregnancy and Childbirth (IMPAC) – support a strategy for delivering health services that can efficiently strengthen district-level health care in resource-limited settings. The tools allow for decentralized scale-up of health services with optimal use of human resources and support the strengthening of health systems at three levels: by building clinical teams at the decentralized level and strengthening the community delivery of services; by supporting strong programme management and logistics; and by empowering patient self-management and community involvement.

Based on normative guidelines from WHO, these service delivery tools are implemented through training modules for health workers, clinical mentoring and quality management tools. The tools also include guidance on interlinked longitudinal patient monitoring systems for HIV care and antiretroviral therapy, prevention of mother-to-child transmission integrated within maternal and child health services; and TB/HIV.

By placing emphasis on strengthening district-level health systems to provide integrated primary care, the tools result in improved patient referral, case management and communication between levels of the health system. Strong involvement of people living with HIV as expert patients during training and their participation in clinical teams and as community health workers supports effective chronic care. The decentralization of services to the community level provides services close to home, supports family-based care and empowers patient self-management. Such community-based approaches to health service delivery not only help to overcome geographical distances but also address social distances by ensuring that health services are responsive to the needs of the community.

Country-level demand for these approaches is growing. IMCI has been adapted for use in more than 100 countries and IMAI has been adapted and implemented in 36 countries, most with a high HIV burden.

6.2. Human resources for health

One of the most critical challenges in scaling up access to HIV prevention, treatment and care in the health sector remains the shortage of adequately prepared human resources (2). WHO estimates that the global shortage of trained health workers exceeds 4 million; and the Global Health Workforce Alliance estimates that an additional 1.5 million trained workers are needed to address the current shortfall in health systems in Africa (2). Not only does the scarcity of human resources impede the effective delivery of HIV services, but the HIV epidemic has further depleted the health workforce in many countries with a high HIV burden. The World Bank has estimated that a country with 15% adult HIV prevalence can expect to lose up to 3.3% of its health care providers from HIV-related illness annually (17).

In 2006, WHO, the International Labour Organization and the International Organization for Migration outlined a strategy to address the health workforce crisis with a focus on three key interventions: comprehensive HIV treatment, prevention, care and support services for health workers (“treat”); measures to empower health workers to deliver universal access to HIV services (“train”); and strategies to retain health workers in the public health system, including financial and other incentives and improved working conditions (“retain”) (18). These priority actions are important in supporting the scale-up of HIV services towards universal access but also to strengthen the overall capacity of human resources in countries affected by the HIV epidemic.

A situation analysis of health workers’ access to HIV and TB services in Ethiopia, Kenya, Malawi, Mozambique and Zimbabwe reported a high proportion of deaths among health workers due to HIV and TB and identified gaps in the implementation of policies on health worker entitlements (19). Access to antiretroviral therapy for health workers living with HIV was reported as being widespread but lacking in measures to protect confidentiality and privacy. Further, only 28% of health workers reported any recent training on injection safety or the use of post-exposure prophylaxis, and 68% reported that their facilities lacked essential supplies such as gloves, sharps bins and water. As many as 62% of health workers surveyed were exposed to people with suspected or confirmed TB on a daily basis. Another subsequent study including countries from other regions found similar results (20). Such findings draw attention to the need to establish or extend existing occupational health services with HIV prevention, treatment and care for all health workers, especially in countries with a high burden of disease.

One human resource strategy to tackle the health workforce crisis and maximize capacity to provide HIV prevention,

treatment and care services is task-shifting, which entails delegating specific tasks, where appropriate, from highly qualified health workers to other health workers. In 2008, 49 of 93 reporting countries (53%) indicated that they had developed policies to address human resource shortages through task-shifting strategies. In sub-Saharan Africa, the corresponding percentage among reporting countries was 63% (Box 6.2).¹

Evidence is growing on the experience and results of scaling up task-shifting approaches. A recent article (21) reviewed current evidence and concluded that task-shifting can improve access to, coverage of and quality of health services at comparable or lower costs than traditional delivery models. However, such approaches require political and financial commitment and careful attention to health service organization. Another article describing the experience of Médecins sans Frontières in using task-shifting in efforts to scale up antiretroviral therapy in Lesotho, Malawi and South Africa (22) noted that the strategy had enabled increased access to life-saving treatment, improved the workforce skills mix, increased the efficiency of health systems, enhanced the role of communities, saved costs and reduced attrition and international brain drain. However, it also drew attention to the ongoing challenges of maintaining quality and safety, addressing professional and institutional resistance and sustaining motivation and performance.

Concurrently, evidence is emerging that lessons learned from task-shifting in HIV are being applied in other settings. For example, given the enormous shortage of surgeons and anaesthesiologists in Africa, efforts have been made to shift tasks on surgical services.

In addition to task-shifting strategies, countries with high HIV burdens and health worker shortages also need longer-term investment to expand the number and capacity of health workers, such as providing preservice training in HIV to doctors and nurses, and opportunities for continued learning. Attention also needs to be paid to the attitudes of health workers towards people living with HIV and people at high risk of HIV infection. A recent study by the Asia Pacific Network of People Living with HIV/AIDS (24) surveyed the experience of more than 3000 people living with HIV in accessing HIV-related health services in 2008. About 37% of women and 13% of men who have sex with men and transgender people participating in the survey reported that they had been tested for HIV without informed consent, and 12% of men who have sex with men and transgender people had their HIV status disclosed to others without their knowledge. Both injecting drug users and men who have sex with men reported experiences of denial of services and

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

physical assault by health care workers. Similar studies in other regions (25–27) have also revealed evidence of stigma and discrimination in health services against people living with HIV, ranging from breaches of patient confidentiality to delays or refusal to provide care. Although factors such as increasing awareness of HIV and the expansion

of antiretroviral therapy may help to reduce HIV-related discrimination in health care settings in some countries, other factors such as homophobia continue to pose barriers for people most at risk of HIV infection to seek testing or treatment in health services.

Box 6.2. Country experiences in implementing task-shifting approaches for HIV service delivery

Introducing task-shifting in national antiretroviral therapy policies in Malawi

Since HIV treatment started to be scaled up 5 years ago, Malawi has expanded to 223 fixed and 96 outreach clinics that have initiated more than 215 000 people on antiretroviral therapy and documented their treatment outcomes.

According to the first national antiretroviral therapy guidelines in 2003, doctors and clinical officers were the only personnel who could initiate and prescribe antiretroviral therapy, while nurses and medical assistants with appropriate training could follow up the people receiving antiretroviral therapy. In the first 2 years, 60 treatment clinics were set up, mainly in hospitals, and about 40 000 people started antiretroviral therapy. However, as the number of people being treated increased, it became apparent that nurses were de facto running the clinics. It was also apparent that data recording and reporting crucially depended on clerks and that better access and follow-up necessitated decentralization to peripheral health centres where clinical officers were often not present.

The new antiretroviral therapy scale-up plan (2006–2010) specified a target of 250 000 people to start treatment by 2010, to be achieved by decentralizing follow-up, initiating antiretroviral therapy at health centres and task-shifting. The new national treatment guidelines stipulated that doctors, clinical officers and medical assistants could initiate antiretroviral therapy from 2006 and nurses from 2008. In 2008 alone, 76 000 people initiated antiretroviral therapy and, of the 170 sites in the public sector, almost half were health centres.

Each quarter, data are collected to estimate the number of full-time equivalent clinicians, nurses and clerks needed to deliver antiretroviral therapy nationwide in the public sector. From 2006 to 2008, the workforce needed to deliver antiretroviral therapy to an increasing number of people has had to double. If Malawi continues to enrol 75 000 people per year, by 2015 the country might expect 750 000 people to start antiretroviral therapy, which will require 500 full-time equivalent clinicians and 500 full-time equivalent nurses just to staff the antiretroviral therapy clinics. This will considerably burden the existing health work force. Strategies to address this increasing burden include implementing simplified standard protocols, improving service delivery through operational research, increasing the recruitment of data clerks and considering shifting tasks to lower levels of health workers such as health surveillance assistants.

Task-shifting and community mobilization to optimize HIV treatment in primary health care in Lesotho

Lesotho faces a severe shortage of health care workers, with only 5 doctors and 62 nurses per 100 000 inhabitants. Eighty per cent of doctors are from other countries, primarily from other countries in Africa, and many are awaiting certification to practice medicine in South Africa.

In early 2006, antiretroviral therapy was available only at the hospital level and provided almost exclusively by doctors. Recognizing the health care worker shortage as a major challenge to expanding HIV treatment, the Government of Lesotho developed an emergency human resources plan in late 2007, recruiting 200 nurses from both within and outside Lesotho to reinforce the capacity to manage antiretroviral therapy at the health centre level and providing rural and other allowances to retain health workers. The Ministry of Health and Social Welfare also formally adopted task-shifting at the national level (especially nurse-based HIV care in primary health care) and the use of lay community and facility-based health workers for nonclinical support tasks drawing on the experience from SELIBENG SA TŠEPO (Wellspring of Hope), a joint pilot programme launched in 2006 with Médecins sans Frontières which provides HIV care and treatment, including antiretroviral therapy, in primary health care in a rural health zone with a population of 200 000, of whom an estimated 30 000 are living with HIV (23).

As of February 2009, SELIBENG SA TŠEPO had trained over 150 nurses in delivering antiretroviral therapy and managing opportunistic infections. Given the high turnover of nursing staff, training is repeated regularly through one week of comprehensive training in HIV treatment and care conducted at least three times a year, combined with an intensive, two-month clinical mentorship from the Médecins sans Frontières mobile team and from more experienced clinical nurses. Targeted on-the-job training is also provided on issues identified during supervision visits. The programme also recruited HIV/TB lay counsellors, usually people living with HIV, village health workers or peer educators from within the community, who were trained by Médecins sans Frontières and were supervised directly by nurses in charge of clinics. These lay counsellors are facility-based, receive structured training, have clear task descriptions and are paid for their services. They manage HIV testing and counselling services, provide treatment adherence support and carry out general clinic support tasks.

6.3. Procurement and supply management

Achieving universal access to HIV prevention, treatment and care services requires collaborative efforts among national authorities, pharmaceutical companies and international agencies to ensure an uninterrupted and affordable supply of a wide variety of HIV-related commodities including antiretroviral drugs and HIV diagnostics. In 2008, the United Nations Secretary-General held a meeting with 17 research-based and generic pharmaceutical and diagnostics companies to review and strengthen collective efforts to expand access to HIV-related drugs in low- and middle-income countries (28). The pharmaceutical companies committed to continuing research and development of new HIV-related drugs adapted to resource-limited settings in accordance with WHO guidance. They also committed to developing reliable and affordable technologies to diagnose HIV and TB among people living with HIV, including infant diagnosis, and to invest further in research and development of new biomedical HIV prevention technologies such as vaccines, microbicides and pre- and post-exposure prophylaxis regimens.

At the country level, sound policies and efficient systems for procurement and supply management are required

to ensure that supplies of essential commodities such as antiretroviral drugs are maintained. Stock-outs of antiretroviral drugs may lead to interrupted treatment, increasing the risk of treatment failure or the emergence of drug-resistant HIV variants. In 2008, among 97 reporting countries, 85 (88%) had national policies or guidelines for procurement and supply management of antiretroviral drugs and other essential commodities, including test kits.¹ Drug stock-outs continue to be an issue of concern in low- and middle-income countries. Of the 90 countries that provided information on the experience of stock-outs of required antiretroviral drugs in 2008, 31 (34%) reported that their health facilities dispensing antiretroviral drugs had experienced at least one stock-out during the year, similar to 2007, when 25 (38%) of 66 reporting countries had experienced at least one episode of stock-out of antiretroviral drugs. A higher proportion of countries in sub-Saharan Africa and the Americas experienced stock-out in 2008 compared with other regions. WHO and partners will develop an early warning system to prevent drug stock-out and its serious effects on treatment interruption and the emergence of drug resistance.

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

Box 6.3. Strengthening procurement and supply management systems for antiretroviral drugs in Ethiopia

Ethiopia began to scale up access to antiretroviral therapy in 2006. At that time, there were no reliable logistics systems for antiretroviral drugs and other commodities, and coordination among partners was weak.

Since 2006, the Supply Chain Management System of the United States President's Emergency Plan for AIDS Relief and the Ethiopian Federal HIV/AIDS Prevention and Control Office have undertaken a number of measures to build a strong network of systems and partners to support the scale-up of the treatment programme (29). These measures have included mobilizing resources, quantifying needs and regular management of supply plans in coordination with partners. Ethiopia has also revised the logistics system for antiretroviral drugs to allow health facilities to place orders in relation to their need and established a new logistics system for laboratory items to ensure their uninterrupted supply.

These efforts have enabled an increased and sustained supply of antiretroviral drugs, rapid test kits, laboratory commodities and drugs for opportunistic infections to support the national programme. They have also resulted in the virtual elimination of stock-outs of antiretroviral drugs at the national level. In 2008, none of the 420 health facilities dispensing antiretroviral drugs in Ethiopia reported having experienced a stock-out of a required antiretroviral drug.¹ A national coordination mechanism brings together donors and programme implementers to jointly respond to growing programme demands, and regional coordination mechanisms are being established.

In addition, efforts to strengthen procurement and supply management for antiretroviral drugs have brought wider benefits to the overall system. Access to other essential medicines, such as those to treat opportunistic infections, has improved with support from the Global Fund to Fight AIDS, Tuberculosis and Malaria, and national training on methods to quantify the need for antiretroviral drugs has been useful to conduct similar assessments for other drugs. The lessons learned from strengthening procurement and supply management systems for antiretroviral drugs are being applied to establish a national Pharmaceutical Fund and Supply Agency for all pharmaceutical drugs and commodities.

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS.

Additional information on procurement and supply management systems is available from specific country-level studies. During 2007 and 2008, through close collaboration with international partners, 15 countries in sub-Saharan Africa¹ undertook literature reviews and country surveys to evaluate their national procurement and supply management systems. The studies revealed complex structures for procurement and supply management of medicines, with inadequate coordination among national authorities and partners and a lack of adequately trained human resources. Following these evaluation studies, nine countries are participating in a regional project to establish harmonized procedures for procurement and supply management in collaboration with partners and to provide technical assistance to strengthen national procurement and supply management systems. Some countries are also taking measures to improve the coordination of national partners involved in procurement and supply management at the country level (Box 6.3).

6.4. Laboratories

A cornerstone of the public health approach to scaling up access to antiretroviral therapy has been the effective use of WHO's clinical staging system for initiating antiretroviral therapy in the absence of adequate laboratory capacity to measure CD4 cell counts. Clinical follow-up has also been successfully undertaken in resource-limited environments to monitor toxicity and thus substitute antiretroviral drugs when necessary, and to identify treatment failure, critical for initiating second-line regimens.

Nevertheless, as the number of people receiving antiretroviral therapy increases substantially, efforts to strengthen laboratory capacity must continue alongside to enable health services to diagnose HIV infection, assess the immune status of people living with HIV, formulate treatment plans and monitor treatment outcomes such as adverse events and treatment failure. Unfortunately, laboratory services are often underfunded, lack quality assurance and frequently operate without satisfactory strategic coordination between the local and national levels of a country's tiered laboratory network (an integrated system of laboratories organized in alignment with the public health delivery network in a country). Weak infrastructure and an inadequate number of skilled technical staff create additional hurdles for wider system development.

¹ These countries include Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Ghana, Mali, Nigeria, Rwanda, Senegal, United Republic of Tanzania and Zambia.

A recent assessment of human resource needs to support essential laboratory services for HIV, TB and malaria in Côte d'Ivoire and the United Republic of Tanzania revealed many gaps in laboratory capacity (30,31). The size of the national laboratory workforce was about half the size recommended by national guidelines in both countries. Further, facilities and technicians to provide essential diagnostic services at the peripheral levels were severely lacking, as were appropriate training curricula, teaching materials and supervision. To address these gaps, Côte d'Ivoire is developing the country's first national laboratory policy and national laboratory strategic plan. The United Republic of Tanzania is also taking measures to strengthen its laboratory capacity. The assessment recommended several additional priority actions, including increasing investment in laboratory staff as an essential component of the health workforce, establishing incentives for staff to work in rural and remote settings and providing appropriate supervision and on-site training.

In 2008, countries in sub-Saharan Africa adopted the Maputo Declaration on Strengthening of Laboratory Systems for HIV, TB and malaria, agreeing to develop national laboratory policies and implement national laboratory strategic plans that reflect an integrated public health approach to disease control (32). Several countries are already taking steps to reinforce their laboratory networks. Standardized laboratory equipment and related items have been adopted in several countries, including Botswana, Kenya, the United Republic of Tanzania and Zambia (Box 6.4). Such measures bring significant financial and operational benefits, including substantially reducing costs due to bulk procurement and economies of scale; greater efficiency in supply chain management with reduced stock-outs and expiry of reagents; simpler service maintenance; improved planning and quantification of needs; and standardized staff training requirements.

International partners such as WHO, UNICEF, the United States Centers for Disease Control and Prevention and other agencies are supporting countries in developing agile and effective laboratory systems through activities such as developing technical and operational recommendations to harmonize and standardize clinical laboratory testing; strengthening tiered, integrated laboratory networks in resource-limited settings; and endorsing a well-defined package of equipment and items required for each level of the laboratory network. UNICEF, WHO, UNITAID, the United States President's Emergency Plan for AIDS Relief and the Global Fund to Fight AIDS, Tuberculosis and Malaria have also made special efforts to improve laboratory capacity for early diagnosis of HIV among infants.

Box 6.4. Strengthening laboratory capacity in the United Republic of Tanzania and Zambia

The United Republic of Tanzania has a multi-tiered health laboratory system, with decreasing complexity in functions and expertise from the national level to the health centre and dispensary levels. There is 1 national reference laboratory and 4 zonal referral, 23 regional, 90 district and 6099 health centre (577) and dispensary (5522) laboratories. After a national plan to scale up antiretroviral therapy was established in 2002, the Ministry of Health and Social Welfare and partners assessed the readiness of the laboratory system to meet the increasing demand for services. This was followed by a broad review of the National Health Laboratory Standard Guidelines, which prescribe the institutional framework behind the national laboratory system, the organizational structure of laboratory services, minimum standards of physical infrastructure, the range of essential tests to be performed at each level of laboratory services and minimum personnel requirements for all levels. An Operational Plan for the National Laboratory System to Support HIV/AIDS Care and Treatment was further elaborated in 2005. Currently, 94% of the equipment in the public health laboratory system is standardized as outlined in the Operational Plan, with turn-around times for most laboratory tests of less than 24 hours.

In Zambia, the Ministry of Health developed a National Medical Laboratory Policy in 1997. The policy included a five-year implementation plan, one step of which was to standardize laboratory procedures and equipment. In about 1999, the Ministry of Health developed a list of essential equipment for different levels of the laboratory network. With the expansion of the antiretroviral therapy programme, the government recognized the need for strengthening its laboratory infrastructure to conduct essential diagnostic and monitoring tests. In May 2006, the Laboratory Technical Working Group, formed to develop a coordinated approach to improving laboratory services in the country, created the Operational Plan for the National Laboratory System (2006–2008) and developed a list of potential standard equipment by facility level.

Zambia currently has 216 active laboratories in the public sector. The process of standardization reduced the number of laboratory commodities by about 80%, thus reducing overall procurement costs through economies of scale. In addition, supply chain management has improved significantly. During 2007, an estimated 70% of the 185 priority laboratory commodities were out of stock at least once at the centralized warehouse. By the end of 2008, the stock-out rate had dropped to 2%.

6.5. Health financing

Achieving universal access requires that people be able to access affordable HIV prevention, treatment and care services. Since countries with limited resources have the greatest HIV burden, financing HIV services has been a major impediment to achieving universal access. The public sector often does not have enough resources to provide essential prevention and treatment services; and individuals and households often lack the means to pay for such services or may be unable to bear the indirect costs of seeking services, such as loss of productive time and transport costs.

Promoting affordable HIV prevention, treatment and care services must therefore be an essential part of a comprehensive strategy to achieve universal access. The evidence suggests that HIV services should ideally be provided free of charge at the point of delivery (33). Charging fees to recover costs from end-users is likely to inhibit prevention, discourage HIV testing, reduce uptake of antiretroviral therapy and decrease adherence among those already receiving it (34).

Many countries are implementing measures to provide HIV services free of charge in the public sector. The considerable increases in the availability of funding from international partners such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and the United States President's

Emergency Plan for AIDS Relief in recent years has enabled countries to either reduce or eliminate user fees for essential services. Substantial funds are also being made available to strengthen the health systems that are critical to delivering these services. In 2008, 88% of reporting low- and middle-income countries had policies to provide antiretroviral therapy free of charge in the public sector.¹ Countries also reported that they had policies in place for free provision of co-trimoxazole (83%), laboratory monitoring (77%) and HIV testing (93%).

Given the global economic crisis that started in 2008, providing HIV services free of charge may not be sustainable in some countries. A staff perception survey conducted by the World Bank, WHO and UNAIDS in 71 countries in early 2009 (35) suggested that domestic and international funding for HIV is already being affected in 11% of the countries surveyed and that some impact is expected in 31% of the countries in 2009. International funding commitments are secure only through 2009 or 2010 in about 40% of the countries surveyed. Respondents also indicated concern about the possible negative effect on funding for prevention programmes, which are politically easier to reduce than treatment programmes.

¹ Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.

Striking the right balance between international and domestic funding is a challenge for sustainable financing for HIV programmes. In many countries, (such as Myanmar and Papua New Guinea), antiretroviral therapy is funded entirely or almost entirely by funds provided by international donors. Any reductions in funds received will affect the treatment programme, as national budgets will not be able to make up the difference. For example, Uzbekistan, which relies almost exclusively on the Global Fund for funding antiretroviral therapy programmes, has been unsuccessful in securing funding in subsequent rounds. In Cameroon, where the HIV prevalence is considerably higher, half the funding for treatment programmes comes from external sources. This funding is committed only through 2009, and no other funding sources have been identified. This will create difficulty in ensuring treatment continuity for those already receiving antiretroviral therapy or cover the new people who are becoming eligible for treatment, raising the risk of treatment interruption, HIV drug resistance and death.¹ As agreed at the Fifty-Eighth World Health Assembly in 2005, it is crucial for countries to manage and organize external funds in a way that contributes to the development of sustainable financing mechanisms for the country as a whole and to ensure that health financing systems provide protection against financial risk for individuals (36).

6.6. Strategic information

Strategic information on the HIV epidemic and response is essential to understand the disease burden and its determinants, develop policies and programmes and improve service delivery. The expansion in international funding for the HIV response from such agencies as the Global Fund and the United States President's Emergency Plan for AIDS Relief has been accompanied by an increased emphasis on performance-based programme management and implementation and attention to the cost-effectiveness of different strategies. The planning and scale-up of interventions is thus increasingly tied to monitoring and evaluation frameworks, with indicators to track progress in different implementation areas and to ensure accountability in relation to national and global goals.

¹ Information reported to WHO, UNAIDS and World Bank in response to a staff perception survey on the global economic crisis and the HIV response, 2009.

In 2008, 139 of the 149 low- and middle-income countries responded to the joint WHO, UNICEF and UNAIDS annual reporting form on the health sector's response to HIV/AIDS (data were also received from 19 high-income countries). Data were jointly validated at the country and regional levels with national authorities and partner agencies and reconciled at the global level. The yearly increase in the number of countries that provide national data to WHO, UNICEF and UNAIDS to monitor the global health sector response to HIV is testimony to their recognition of the importance of strategic information and their efforts to improve data collection, analysis and interpretation. Nevertheless, data quality is uneven across countries and intervention areas, such as data on access to services by populations at high risk of acquiring HIV. Further effort is needed to improve data collection and its use to inform programme improvement (Box 6.6).

HIV surveillance is the cornerstone of knowing an epidemic and designing a response. In 2008, WHO and UNAIDS continued to provide guidance and technical support to countries to strengthen their HIV surveillance systems. An increasing number of countries also conducted population-based demographic and health surveys with HIV testing, and five countries had conducted at least two such nationally representative surveys by 2008, enabling trends to be assessed over time. More data are expected from at least 10 additional country surveys to be completed during 2009 and 2010.

The increase in the numbers of people receiving antiretroviral therapy also draws attention to the importance of cohort analysis in collecting, compiling and analysing data to monitor the outcomes and impacts of expanding programmes. *Three interlinked patient monitoring systems for HIV care/ART, MCH/PMTCT (including malaria prevention during pregnancy), and TB/HIV* being developed jointly by WHO, UNICEF, UNAIDS, the United States Centres for Disease Control and Prevention and other partners, provides a standardized set of tools to support countries in improving patient monitoring and show evidence of results (Box 6.5) (37).

Box 6.5. Implementing a nationwide patient monitoring system for HIV care and antiretroviral therapy in India

India's free public-sector antiretroviral therapy programme began in 2004 in eight public hospitals. As of May 2009, 232 908 adults and children were receiving antiretroviral therapy in 217 public health facilities.¹ The roll-out of the treatment programme has been accompanied by a standard national patient monitoring system based on the global patient monitoring tools recommended by WHO (38). In the first year of the roll-out of antiretroviral therapy, WHO provided support for adapting these generic materials in the country and for developing training tools and capacity-building. This monitoring system consisted of a paper-based system using a combination of recording tools (including patient-held and facility-held patient cards, pre-antiretroviral therapy and antiretroviral therapy registers and drug-dispensing and stock inventory registers) and reporting tools (including a monthly report and a cohort analysis report) to assess patient outcomes and programme performance related to HIV care and antiretroviral therapy.

In 2009, WHO in collaboration with the national programme conducted a case study to document the implementation of the patient monitoring system in India, identify action at the country level that is necessary for sustainability and continued good performance and share the experience with other countries. India's experience successfully demonstrates how a standardized, nationwide patient monitoring system can be implemented in a vast and diverse country with many people receiving HIV treatment and care services. The National AIDS Control Organization (NACO) centrally coordinates the patient monitoring system, which covers all public and NACO-funded treatment sites (such as private hospitals or nongovernmental organizations linked to the NACO) in the country. The system has evolved under strong leadership by the NACO, with secure financial resources and investment in human resources and infrastructure. Each treatment site has at least one data manager, one pharmacist and two counsellors to support data management, all of whom receive training from the NACO. The clinicians and counsellors record data on paper-based cards and registers. Patient data are subsequently entered into patient monitoring software by data managers and analysed to derive statistics for monthly reports to the NACO.

India has also succeeded in integrating patient monitoring and procurement and supply management at site level within the same system, with drug-dispensing and stock inventory registers maintained by pharmacists. As a result of these efforts, the extensive patient monitoring system is well organized and produces regular, timely and complete reports. Information generated through the system is being used to inform programme implementation, such as anticipating drug shortages by ensuring that at least three months of supplies are always in stock.

Nevertheless, sustaining an efficient and effective paper-based system in a large country is challenging. Given the growing monitoring-related workload with an increasing number of people accessing services and requiring follow-up, India is implementing a national electronic patient monitoring system initially piloted at selected sites which, since 2008, has been expanded nationally to all antiretroviral therapy centres with support from the William J. Clinton Foundation. When all functions for clinic and patient management have been built into the system, the software will greatly facilitate data management, generate monthly and cohort reports and provide a quality check for missing or incomplete data. India is also working towards strengthening cohort analysis from selected sites to enable programme evaluation over time and building capacity to use information not just for reporting but also for facilitating decision-making at all levels.

India's successful experience underscores the following core elements of a well-functioning patient monitoring system:

- ensuring national leadership and commitment to one strategy and one patient monitoring system;
- investing in human resources for data management functions to support clinical staff;
- ensuring an uninterrupted supply of user-friendly recording and reporting tools;
- international agencies providing technical support for patient monitoring;
- decentralizing responsibility and effective supervision and mentoring;
- using the information generated at all levels for decision-making; and
- securing financial resources.

¹ In addition, 5442 people were receiving antiretroviral therapy through the intersectoral health sector and centres supported by the Global Fund and nongovernmental organizations as well as an estimated more than 35 000 in the unorganized private sector – data reported to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS and updated data from the National AIDS Control Organisation (NACO).

Operational research for learning by doing is an equally important component of strategic information, linking research to policies and practices and providing evidence to improve programmes. During the past few years, countries have become more interested in incorporating operational research into their efforts to scale up HIV testing, prevention, treatment and care. WHO and partners have sought to respond to this increasing demand for technical assistance, supported by the commitment of the Global Fund to fund

monitoring, evaluation and research activities. Tools to formulate and implement operational research projects have been developed and technical assistance is being provided, although more concerted efforts and resources are needed in this area.¹

¹ In 2009, WHO published a set of generic tools to facilitate the conduct of operational research in four priority areas – the utilization of HIV testing and counselling; disclosure, stigma and support; adherence to antiretroviral therapy; and HIV prevention in the context of scaled-up access to HIV treatment (39).

Box 6.6. Improvements in data availability and quality, but major gaps remain

The five-year evaluation funded by the Global Fund to Fight AIDS, Tuberculosis and Malaria in 18 countries (Box 2.6) showed that the scale-up of HIV programmes has led to a number of improvements in the availability and quality of data on programme outputs and health outcomes. Some areas of improvement include:

- Monitoring of HIV prevalence through the implementation of population-based surveys with HIV testing, better antenatal clinic-based HIV surveillance systems, and limited improvements in surveillance among populations at high risk of HIV infection;
- Information on risk behaviours and coverage of interventions through more frequent population-based surveys with HIV/AIDS-related questions;
- Data on HIV service provision through facility assessments sometimes carried out in combination with other health programmes;
- Clinic reporting systems for HIV, in some instances through electronic reporting of aggregate data and electronic health records;
- Regular compilation of data from multiple sectors supported by UNAIDS and co-sponsors for global reporting in relation to the goals established in the United Nations General Assembly Special Session (UNGASS) Declaration of Commitment, as well as commitments to achieve universal access to HIV prevention, treatment, care and support; and
- Availability of financial data through the implementation of national AIDS spending assessments, although the quality of these data is variable and out-of-pocket expenses are not taken into account.

There are, however, a number of persistent data weaknesses that hamper the ability to monitor, manage and evaluate programmes, which in turn affect the ability of WHO and partners to monitor progress. These data weaknesses include:

- Lack of data on AIDS mortality due to a failure to invest in civil registration systems with cause of death certification in hospitals or verbal autopsy for nonhospital deaths; as well as a long lag time between data collection and availability of results (e.g., 2-3 years for HIV surveillance) and lack of trend data related to populations at high risk of HIV infection;
- Limited data on antiretroviral treatment outcomes, including adherence and survival;
- In some countries, poor quality of data on the provision of interventions (including antiretroviral therapy, interventions for prevention of mother-to-child transmission, and HIV testing and counseling) emanating from health facility reports and poorly maintained national databases with insufficient quality control;
- Fragmentation in information flows as different partners and donors track information on their own activities and services with a lack of standardized, transparent and joint reporting systems;
- Incomplete and inaccurate data on community interventions (such as care and support, including for orphans) collected through administrative records involving large numbers of service delivery organizations. Such data are often used for performance-based disbursement but cannot be translated into population coverage estimates; and
- Lack of data quality-control mechanisms.

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7. TOWARDS UNIVERSAL ACCESS: THE WAY FORWARD

The year 2008 witnessed sustained progress in expanding access to HIV prevention, treatment and care services in low- and middle-income countries. With continued commitment and efforts by countries, technical partners, nongovernmental organizations and communities of people living with and most at risk for HIV, an additional 1 million people were receiving antiretroviral therapy at the end of 2008 than at the end of 2007. This brings the total number of people receiving antiretroviral therapy in low- and middle-income countries to 4 million – an important feat, considering the costs and technical complexity associated with successfully delivering a life-long intervention in resource-limited settings. Evidence increasingly shows the positive effects of scaling up treatment on mortality and life expectancy at the population level, including in some of the most severely affected countries. Further, in 2008, 45% of pregnant women living with HIV received antiretroviral drugs to prevent mother-to-child transmission of HIV in low- and middle-income countries, and 38% of children younger than 15 years received antiretroviral therapy. Available data indicate an upward trend in the availability and uptake of HIV testing and counselling services, and improved epidemiological and behavioural data have allowed for more effective and targeted prevention interventions, including among people at high risk of acquiring HIV.

Despite considerable progress, more than 2.7 million people became newly infected in 2007 alone. More than 5 million of the estimated 9.5 million people needing antiretroviral therapy are still unable to access it. The vast majority of people living with HIV remain unaware of their infection status. Moreover, in addition to expanding coverage to those who currently do not have access, countries also face the concomitant challenge of sustaining ongoing programmes and interventions. Without significant acceleration in the rate at which services are expanded and people are reached, millions of new infections will occur, more lives will be lost and the human and economic burden on future generations will continue to increase.

More data are now available than ever before from a greater number of countries, allowing policy to be more effectively formulated and the programmatic and policy gaps to be better understood. The following are the critical priority areas demanding the focus of countries and partners in the coming years.

❶ Expanding the availability and utilization of HIV testing and counselling services

Considering the role of HIV testing and counselling services as the gateway to other key health sector interventions, scaling up knowledge of HIV status is a necessary condition

for achieving universal access targets at the country level. The expansion of provider-initiated HIV testing and counselling in health care settings has been critical to the significant increase in the number of people in low- and middle-income countries who receive an HIV test and its results. Provider-initiated testing and counselling has already been incorporated in many maternal and reproductive health care services and has become an integral part of strategies to prevent the mother-to-child transmission of HIV. However, in countries with recent population surveys, more than two thirds of people living with HIV still did not know their HIV status. Programmes must continue to promote provider-initiated testing and counselling in health facilities and expand other approaches that can reach people outside health care settings. Such approaches include individual client-initiated testing and counselling and couple counselling where appropriate as well as outreach services including mobile, community-based, door-to-door and family testing strategies.

❷ Expanding access to effective HIV prevention interventions through the health sector

Significantly scaling up HIV prevention interventions requires combining multiple disciplines and methods, including behavioural, biomedical and structural approaches. The health sector is a key entry point for providing and delivering HIV prevention services and must continue to advocate for expanding them. Countries must ensure that universal precautions against HIV infection are implemented, including universal, quality-assured screening of blood supplies and injection safety.

Efforts to scale up male circumcision in countries with a high rate of heterosexual transmission and a low prevalence of male circumcision must be accompanied by appropriate training for health care workers and integrated into a comprehensive prevention strategy, and accurate information must be provided on the limits of its protective effect. Recent supportive data on the effectiveness of vaginal microbicides and pre-exposure prophylaxis indicate that they may also soon become available as biomedical tools for prevention. Further research is necessary to rapidly assess the technical, financial, behavioural and ethical implications of population-level use of antiretroviral therapy for HIV prevention and to further examine how to optimally leverage antiretroviral drugs to control the epidemic.

Countries must further strengthen prevention programmes aimed at people living with HIV, whose circumstances and needs require the development of specific strategies, including health and social interventions. Such programmes must aim to improve the health and well-being of people

living with HIV, to reduce HIV transmission and to promote collaboration between the health sector and communities of people living with HIV.

3 Devoting greater attention to population groups at high risk of HIV infection, including in countries with generalized epidemics

Increased attention must be devoted to the needs of population groups at high risk of HIV infection, including people who inject drugs, men who have sex with men and sex workers, who are still frequently unwilling or unable to use health services due to stigma, discriminatory laws and social prejudice. Prisoners also face a high risk of acquiring HIV infection, yet access to prevention and care remains far below the level prevailing in the community and continuity of care after release from prison is often lacking.

HIV testing and counselling interventions must be devised to effectively address the circumstances these population groups face, including by adequately training service providers and providing special models of service delivery. Epidemiological dynamics must be more closely monitored, including in countries with generalized epidemics. Countries should also redouble efforts to remove the technical, legal and sociocultural barriers that have prevented the introduction or expansion of evidence-based interventions among most-at-risk population groups, such as needle and syringe programmes and opioid substitution therapy for injecting drug users.

4 Ensuring timely access to treatment

Late initiation of antiretroviral therapy – often because people do not know their HIV status and because of underlying stigma and discrimination – is the major cause of the high mortality rates observed in the first year after adults and children initiate treatment. Treatment initiation may also be delayed due to structural constraints. Expanding access to HIV testing and counselling services must continue to be a priority to ensure timely diagnosis of HIV infection and access to treatment and care, and the capacity of health facilities to absorb new demand must be reinforced as a matter of urgency.

Evidence is also growing that the early initiation of antiretroviral therapy with respect to clinical and biological eligibility criteria may have a beneficial effect on individual morbidity, mortality and survival outcomes. WHO will be reviewing the available evidence in late 2009 to proceed with any necessary revisions to its treatment guidelines for low- and middle-income countries.

5 Enhancing treatment retention and adherence and the quality of services delivered

Only high-quality treatment programmes can sustain

retention and adherence to treatment among people receiving antiretroviral therapy at adequate levels and ensure the long-term technical and financial sustainability and expansion of national programmes.

Indeed, low adherence and retention are two critical reasons for poor treatment outcomes among people receiving antiretroviral therapy. In addition to directly affecting personal well-being, poor adherence and retention rates may compromise programmatic and economic efficiency, as many people receiving first-line regimens would fail to respond to treatment at an unnecessarily early stage and would therefore need to switch to more expensive, and often unavailable, second-line regimens. Low retention can also negatively affect public health by increasing drug resistance.

The management of antiretroviral therapy must continue to be simplified and streamlined to keep the workload and costs under control. Moreover, although antiretroviral therapy is considered to be the backbone of treatment programmes, a comprehensive care package must also encompass other critical interventions such as co-trimoxazole prophylaxis and social support to optimize clinical outcomes.

6 Expanding efforts to respond to the dual epidemic of TB and HIV

National HIV and TB programmes should give greater emphasis to adopting and implementing WHO's framework on collaborative HIV/TB activities, especially in HIV services. More countries are reporting collaboration between TB and HIV programmes, but the coverage and availability of collaborative prevention, treatment and care interventions remain insufficient. This situation is unlikely to change unless treating the dual epidemic of TB and HIV becomes a true public health priority.

Reported intensified case-finding of TB among people living with HIV has increased somewhat, but isoniazid preventive therapy is still infrequently provided. Infection control strategies need greater attention, such as developing TB infection control plans, fast-tracking people with cough, assuring rapid TB diagnosis and improving facility ventilation. Higher rates of HIV testing and counselling among people with TB are necessary to increase access to antiretroviral therapy and co-trimoxazole prophylaxis for people living with HIV and TB.

7 Improving access to comprehensive HIV services for women and children

Progress in scaling up access to key prevention, treatment and care interventions for women and children, including interventions to prevent mother-to-child transmission, has been substantial. Nevertheless, most countries are still far from reaching universal access to many interventions.

One concern is that only one third of pregnant women who are identified as living with HIV during access to services for preventing mother-to-child transmission are currently assessed for their eligibility to receive antiretroviral therapy for their own health and to minimize transmission to their infants.

Increased attention is needed to follow up children born to mothers living with HIV, including increasing access to co-trimoxazole prophylaxis and virological HIV testing at six weeks of age as well as antiretroviral therapy.

Recent scientific evidence shows the potential benefit of providing antiretroviral therapy to eligible women and extended antiretroviral prophylaxis to infants in reducing the risk of HIV transmission from mother to child during breastfeeding. The programmatic implications of these research results need to be addressed rapidly to translate them into action.

Countries also need to continue investing in follow-up mechanisms to improve uptake across the continuum of care and treatment interventions for women and children. Establishing effective functional links between national HIV programmes and routine maternal, neonatal and child health services and specialized care services is a priority. Measuring and evaluating the impact of programmatic efforts is equally important to demonstrate and improve progress.

8 Strengthening, decentralizing and integrating HIV programmes with broader health systems

Achieving universal access to prevention, treatment and care services will require health systems capable of delivering high-quality interventions on a vastly expanded scale. Harnessing and building the resources and systems needed to sustain such an increase in service availability will be one of the greatest challenges countries face in the coming years.

The push to achieve universal access presents a major opportunity to leverage funding for HIV programmes to have a lasting and broad-based transformative effect on health systems. Countries and partners must take advantage of this opportunity and invest in building and reinforcing both human and physical infrastructure. More health care workers need to be trained and retained – and tasks shifted among them as needed to address labour shortages. Moreover,

countries should capitalize on efforts to strengthen the procurement and supply management of antiretroviral drugs to improve broader drug distribution systems.

Finally, universal access requires further integrating HIV services with related services, including maternal and child health, sexually transmitted infections, hepatitis, TB and drug dependence services and decentralizing HIV service delivery to primary health care.

9 Strengthening strategic information capacity and investing in further research

Country efforts to scale up towards universal access must be accompanied by continued efforts to collect, analyse and use high-quality data to develop evidence-driven policies and interventions and to monitor their effects. Countries need additional support in building and strengthening systems for generating data and in improving data quality. As countries accelerate efforts to expand and maintain the coverage of key interventions, a robust operational research programme is also critical to capture more and better information and to address issues that arise while implementing programmes.

In the past two years, international recognition of the need for research, including biological, clinical and sociobehavioural research has been renewed, to continually improve and adapt policies and programmes in accordance with the best-available evidence.

Initial studies have shown that pre-exposure prophylaxis provides encouraging results in reducing HIV transmission rates. Further research is needed, however, to properly identify the implications for service delivery and the ethical implications of providing antiretroviral drugs to HIV-negative people in environments with limited treatment coverage.

New simplified laboratory technologies for diagnosis and monitoring urgently need to be developed and validated and more effective once-daily fixed-dose combinations for first- and second-line regimens urgently need to be developed to expand and sustain the scaling up of antiretroviral therapy, especially in rural areas and among hard-to-reach population groups. Additional research, including operational research, is also critical to guide public health decisions and programmes on when to initiate and switch between first- and second-line regimens and how to improve patient safety and adherence to treatment.

Annex 1. Adults and children (combined) receiving antiretroviral therapy, 2007–2008

Low- and middle-income countries ^a	Reported number of people receiving antiretroviral therapy, 2006–2007 ^b	Month and year of report	Reported number of people receiving antiretroviral therapy, 2008 ^b	Month and year of report	Average monthly increase in the number of people receiving antiretroviral therapy in the last year ^c	Estimated number of people receiving antiretroviral therapy, December 2008 ^b		
						Estimate	Low estimate	High estimate
Afghanistan	0	Dec 07	0	Dec 08	0	0	0	0
Albania	74	Dec 07	110	Dec 08	3	<200	<200	<200
Algeria	929	Oct 07	1 111	Dec 08	10	1 100	1 100	1 200
Angola	11 540 ^d	Dec 07	13 000	Dec 08	122	13 000	9 800	16 300
Argentina	38 242	Dec 07	42 041	Dec 08	317	42 000	39 900	44 100
Armenia	78	Dec 07	100	Dec 08	2	<200	<100	<200
Azerbaijan	81	Dec 07	159	Dec 08	7	<200	<200	<200
Bangladesh	178	Dec 07	283	Dec 08	9	<500	<500	<500
Belarus	884	Dec 07	1 249	Dec 08	30	1 200	1 200	1 300
Belize	558	Dec 07	630	Dec 08	6	<1 000	<1 000	<1 000
Benin	9 765	Dec 07	12 078 ^d	Dec 08	193	12 100	10 900	13 300
Bhutan	18	Dec 07	30	Dec 08	1	<100	<100	<100
Bolivia (Plurinational State of)	496	Dec 07	659	Dec 08	14	<1 000	<1 000	<1 000
Bosnia and Herzegovina	30	Dec 07	33	Dec 08	0	<100	<100	<100
Botswana	92 932 ^d	Dec 07	117 045 ^d	Dec 08	2 009	117 000	107 000	127 000
Brazil	181 000	Dec 07	190 101	Dec 08	758	190 000	181 000	200 000
Bulgaria	221	Dec 07	251	Dec 08	3	<500	<500	<500
Burkina Faso	15 888	Sep 07	21 103	Dec 08	347	21 100	13 600	15 100
Burundi	10 894	Dec 07	14 343 ^d	Dec 08	287	14 000	14 000	15 000
Cambodia	26 664	Dec 07	31 999	Dec 08	445	32 000	30 400	33 600
Cameroon	45 817	Dec 07	59 960 ^d	Dec 08	1 179	60 000	57 000	63 000
Cape Verde	291	Dec 07	360	Dec 08	6	<500	<500	<500
Central African Republic	8 037	Sep 07	9 550 ^d	Dec 08	101	9 600	9 100	10 000
Chad	7 400	Dec 07	13 360 ^e	Oct 08	596	14 600	10 900	18 200
Chile	10 223	Dec 07	11 051 ^d	Dec 08	69	11 100	9 900	12 200
China	35 112 ^d	Dec 07	48 254	Dec 08	1 095	48 300	45 800	50 700
Colombia	...		23 116 ^d	Dec 08	274	23 100	17 200	29 000
Comoros	7	Dec 07	8	Dec 08	0	<100	<100	<100
Congo	4 716	Sep 07	9 400 ^d	Dec 08	312	9 400	8 500	10 300
Cook Islands	...		1	Dec 08	0	<100	<100	<100
Costa Rica	2 952	Dec 07	...		7	3 000	2 300	3 800
Côte d'Ivoire	38 221 ^f	Dec 07	51 833	Dec 08	1 134	52 000	49 000	54 000
Croatia	310	Jun 07	398	Dec 08	5	<500	<500	<500
Cuba	3 123 ^f	Dec 07	3 999	Dec 08	73	4 000	3 800	4 200
Democratic People's Republic of Korea	0	Dec 06	0	Dec 08	0	0	0	0
Democratic Republic of the Congo	...		24 523	Dec 08	290	24 500	23 300	25 700
Djibouti	705	Dec 07	816	Dec 08	9	<1 000	<1 000	1 000
Dominica	39	Dec 07	...		1	<100	<100	<100
Dominican Republic	8 199	Dec 07	11 048	Dec 08	237	11 000	10 500	11 600
Ecuador	3 214	Dec 07	3 728	Dec 08	43	3 700	3 500	3 900
Egypt	209	Dec 07	291	Dec 08	7	<500	<500	<500
El Salvador	5 773	Dec 07	7 104	Dec 08	111	7 100	6 700	7 500
Equatorial Guinea	859	Sep 07	839	Dec 08	-1	<1 000	<1 000	<1 000
Eritrea	1 301	Dec 07	3 692	Dec 08	199	3 700	3 300	4 100
Ethiopia	90 212	Dec 07	132 379 ^d	Dec 08	3 514	132 000	126 000	139 000
Fiji	28	Dec 07	39	Dec 08	1	<100	<100	<100
Gabon	6 373	Dec 07	7 773 ^d	Dec 08	117	7 800	7 400	8 200

Low- and middle-income countries ^a	Reported number of people receiving antiretroviral therapy, 2006-2007 ^b	Month and year of report	Reported number of people receiving antiretroviral therapy, 2008 ^b	Month and year of report	Average monthly increase in the number of people receiving antiretroviral therapy in the last year ^c	Estimated number of people receiving antiretroviral therapy, December 2008 ^b		
						Estimate	Low estimate	High estimate
Gambia	423	Sep 07	770	Dec 08	23	<1 000	<1 000	<1 000
Georgia	334	Nov 07	498	Dec 08	13	<500	<500	<1 000
Ghana	13 357	Dec 07	21 541	Dec 08	682	21 500	20 500	22 600
Grenada	47	Dec 07	...		0	<100	<100	<100
Guatemala	7 812	Dec 07	9 694	Dec 08	157	9 700	8 700	10 700
Guinea	5 228	Sep 07	9 212 ^d	Dec 08	266	9 200	8 800	9 700
Guinea-Bissau	890	Dec 07	1 809 ^d	Dec 08	77	1 800	1 700	1 900
Guyana	1 965	Dec 07	2 473	Dec 08	42	2 500	2 300	2 600
Haiti	14 514	Dec 07	19 287	Dec 08	398	19 300	17 400	21 200
Honduras	5 580	Dec 07	6 288	Dec 08	59	6 300	5 700	6 900
Hungary	452	Dec 07	500	Dec 08	4	<1 000	<500	<1 000
India	158 020 ^d	Dec 07	234 581 ^{d,g}	Dec 08	6 380	235 000	211 000	259 000
Indonesia	...		10 616	Dec 08	228	10 600	9 600	11 700
Iran (Islamic Republic of)	829	Aug 07	878	Sep 08	4	<1 000	<1 000	<1 000
Iraq	0	Dec 07	4	Dec 08	<1	<100	<100	<100
Jamaica	3 637	Dec 07	3 878 ^e	Dec 08	20	3 900	2 900	4 800
Jordan	53	Dec 07	58	Dec 08	<1	<100	<100	<100
Kazakhstan	442	Dec 07	707	Dec 08	22	<1 000	<1 000	<1 000
Kenya	177 000 ^d	Dec 07	242 881 ^d	Dec 08	5 490	243 000	229 000	257 000
Kiribati	5	Dec 07	6	Dec 08	0	<100	<100	<100
Kyrgyzstan	87	Dec 07	89	Dec 08	6	<200	<200	<200
Lao People's Democratic Republic	700	Dec 07	1 009	Dec 08	26	1 000	<1 000	1 100
Latvia	323	May 07	334	Dec 08	<1	<500	<500	<500
Lebanon	246	Dec 07	611	Dec 08	30	<1 000	<1 000	<1 000
Lesotho	21 710	Dec 07	45 262	Dec 08	1 963	45 300	43 000	47 500
Liberia	1 414	Dec 07	...		47	2 000	1 500	2 500
Libyan Arab Jamahiriya	1 000	Dec 07	...		23	1 300	<1 000	1 600
Lithuania	98	Dec 07	127	Dec 08	2	<200	<200	<200
Madagascar	138	Dec 07	162	Dec 08	2	<200	<200	<500
Malawi	100 649 ^d	Dec 07	146 657 ^d	Dec 08	3 834	147 000	132 000	161 000
Malaysia	6 950 ^f	Dec 07	8 197	Dec 08	104	8 200	6 100	10 200
Maldives	...		2	Dec 08	<1	<100	<100	<100
Mali	12 172	Nov 07	17 098 ^d	Dec 08	379	17 100	15 400	18 800
Marshall Islands	1	Dec 07	4	Dec 08	<1	<100	<100	<100
Mauritania	839	Dec 07	938 ^e	Dec 08	8	<1 000	<1 000	1 200
Mauritius	321	Dec 07	...		7	<500	<500	<1 000
Mexico	...		55 000 ^d	Dec 08	654	55 000	52 000	58 000
Micronesia (Federated States of)	1	Dec 07	3	Dec 08	<1	<100	<100	<100
Mongolia	3	Dec 07	5	Dec 08	<1	<100	<100	<100
Montenegro	...		25	Dec 08	0	<100	<100	<100
Morocco	1 648	Dec 07	2 207	Dec 08	47	2 200	2 000	2 400
Mozambique	85 822	Nov 07	128 330	Dec 08	3 270	128 000	122 000	135 000
Myanmar	11 100	Dec 07	15 191	Dec 08	341	15 200	13 700	16 700
Namibia	52 316	Dec 07	59 376	Dec 08	588	59 000	56 000	62 000
Nauru	...		0	Dec 08	0	0	0	0
Nepal	1 240	Sep 07	2 536 ^d	Dec 08	86	2 500	2 300	2 800
Nicaragua	522	Dec 07	743	Dec 08	18	<1 000	<1 000	<1 000
Niger	1 474	Oct 07	2 846	Dec 08	98	2 800	2 700	3 000
Nigeria	145 392 ^d	Sep 07	238 659 ^d	Dec 08	5 712	239 000	213 000	265 000
Niue	...		0	Dec 08	0	0	0	0
Oman	260	Dec 07	412	Dec 08	13	<500	<500	<500

Low- and middle-income countries ^a	Reported number of people receiving antiretroviral therapy, 2006–2007 ^b	Month and year of report	Reported number of people receiving antiretroviral therapy, 2008 ^b	Month and year of report	Average monthly increase in the number of people receiving antiretroviral therapy in the last year ^c	Estimated number of people receiving antiretroviral therapy, December 2008 ^b		
						Estimate	Low estimate	High estimate
Pakistan	550	Dec 07	907	Dec 08	30	<1 000	<1 000	<1 000
Palau	3	Dec 07	3	Dec 08	0	<100	<100	<100
Panama	3 994	Dec 07	4 071	Dec 08	6	4 100	3 700	4 500
Papua New Guinea	2 250	Dec 07	5 195	Dec 08	245	5 200	4 900	5 500
Paraguay	1 053	Nov 07	1 613	Dec 08	43	1 600	1 500	1 700
Peru	10 860	Dec 07	13 816	Dec 08	246	13 800	13 100	14 500
Philippines	336	Dec 07	532	Dec 08	16	<1 000	<500	<1 000
Poland	3 382	Dec 07	3 822	Dec 08	37	3 800	3 600	4 000
Republic of Moldova	464	Dec 07	682	Dec 08	18	<1 000	<1 000	<1 000
Romania	6 500	Dec 07	7 434	Dec 08	78	7 400	7 100	7 800
Russian Federation	31 094	Dec 07	54 900	Dec 08	1 984	55 000	52 000	58 000
Rwanda	48 569 ^d	Dec 07	63 149	Dec 08	1 257	63 000	60 000	66 000
Saint Kitts and Nevis	39	Dec 06	...		1	<100	<100	<100
Saint Lucia	72	Sep 07	...		2	<200	<100	<200
Saint Vincent and the Grenadines	74	Sep 06	...		2	<200	<100	<200
Samoa	6	Dec 07	8	Dec 08	<1	<100	<100	<100
Sao Tome and Principe	74	Dec 07	109	Dec 08	3	<200	<200	<200
Senegal	6 699	Dec 07	7 474 ^d	Dec 08	65	7 500	6 700	8 200
Serbia	628	May 07	842	Dec 08	12	<1 000	<1 000	<1 000
Seychelles	...		113	Dec 08	1	<200	<100	<200
Sierra Leone	2 649	Dec 07	4 656	Feb 09	143	4 700	4 200	5 100
Slovakia	98	Jun 07	97	Dec 08	0	<100	<100	<200
Solomon Islands	3	Dec 07	7	Dec 08	<1	<100	<100	<100
Somalia	211	Dec 07	413	Dec 08	17	<500	<500	<1 000
South Africa	428 951 ^d	Sep 07	700 500 ^{dh}	Dec 08	16 070	701 000	611 000	790 000
Sri Lanka	107	Dec 07	146	Dec 08	3	<200	<200	<200
Sudan	1 198	Dec 07	2 317 ⁱ	Dec 08	93	2 300	2 100	2 500
Suriname	729	Dec 07	...		10	<1 000	<1 000	1 100
Swaziland	24 535	Dec 07	32 701 ^d	Dec 08	681	32 700	31 100	34 300
Syrian Arab Republic	75	Dec 07	...		1	<100	<100	<200
Tajikistan	86	Dec 07	173	Dec 08	7	<200	<200	<200
Thailand	143 539 ^d	Sep 07	179 557 ^d	Dec 08	2 413	180 000	167 000	192 000
The former Yugoslav Republic of Macedonia	15	Dec 07	23	Dec 08	<1	<100	<100	<100
Timor-Leste	0	Dec 07	29	Dec 08	2	<100	<100	<100
Togo	7 980	Dec 07	11 211	Dec 08	269	11 200	10 700	11 800
Tonga	...		2	Dec 08	<1	<100	<100	<100
Tunisia	...		346	Dec 08	2	<500	<500	<500
Turkey	...		900	Dec 08	9	<1 000	<1 000	1 100
Turkmenistan	0	Jan 06	...		0	0	0	0
Tuvalu	1	Dec 07	1	Dec 08	0	<100	<100	<100
Uganda	111 232	Sep 07	153 718	Sep 08	3 541	164 000	156 000	173 000
Ukraine	7 657	Dec 07	10 653	Dec 08	250	10 700	10 100	11 200
United Republic of Tanzania	135 696	Dec 07	154 468	Dec 08	1 564	154 000	147 000	162 000
Uruguay	1 776	Dec 07	...		30	2 100	1 600	2 700
Uzbekistan	...		1 200	Dec 08	39	1 200	<1 000	1 500
Vanuatu	2	Dec 07	2	Dec 08	0	<100	<100	<100
Venezuela (Bolivarian Republic of)	...		28 266	Dec 08	357	28 300	21 200	35 300
Viet Nam	14 969	Sep 07	27 059	Dec 08	806	27 100	25 700	28 400
Yemen	107	Dec 07	189	Dec 08	7	<200	<200	<200
Zambia	151 199 ^d	Dec 07	225 634 ^d	Dec 08	6 203	226 000	212 000	239 000
Zimbabwe	97 692 ^d	Dec 07	147 804 ^d	Dec 08	4 176	148 000	137 000	159 000

High-income countries	Reported number of people receiving antiretroviral therapy, 2005–2007	Month and year of report ¹	Reported number of people receiving antiretroviral therapy, 2008	Month and year of report
Andorra	25 ^f	Dec 07	...	
Antigua and Barbuda	148	Sep 07	...	
Australia	9 933 ^f	Dec 07	...	
Austria	...		2 250	Dec 08
Bahamas	1 244	Sep 07	...	
Bahrain	...		...
Barbados	660	Jun 07	719	Dec 08
Belgium	6 928	Dec 07	...	
Brunei Darussalam	...		10	Dec 08
Canada	...		27 000	Dec 08
Cyprus	151	Dec 07	170	Dec 08
Czech Republic	570	Jun 07	...	
Denmark	...		3 000	Dec 08
Estonia	772	Dec 07	1 004	Dec 08
Finland	450	Aug 06	...	
France	...		79 680	Dec 08
Germany	...		36 500	Dec 08
Greece	3 746 ^f	Dec 07	4 236	Dec 08
Iceland	100	<05	...	
Ireland	1 600	Dec 05	...	
Israel	...		2 876	Dec 08
Italy	...		95 000	Dec 08
Japan	48	Dec 06	...	
Kuwait	...		...
Luxembourg	...		344	Dec 08
Malta	65	Jun 07	91	Dec 08
Monaco	45	Dec 05	...	
Netherlands	7 919	Apr 07	9 272	Dec 08
New Zealand	...		...
Norway	900	Dec 05	...	
Portugal	...		12 366	Dec 08
Qatar	...		...
Republic of Korea	...		...
San Marino	...		...
Saudi Arabia	...		865	Dec 08
Singapore	...		...
Slovenia	157	Jul 07	...	
Spain	...		82 710	Dec 08
Sweden	2 800	Dec 06	...	
Switzerland	...		...
Trinidad and Tobago	2 592 ^f	Dec 07	3 172	Dec 08
United Arab Emirates	59 ^f	Sep 07	...	
United Kingdom	39 556	Dec 07	...	
United States of America	268 000	<05	...	

... Data not available or not applicable.

a See the country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions.

b Annex 2 provides antiretroviral therapy data by age and sex.

c The monthly increase in the number of people receiving antiretroviral therapy during is calculated using two data points: the most recent reported data in 2007 (most often December 2007) and the most recent in 2008 (most often December 2008). The growth between those periods is divided by the number of months between them. For countries that have not reported treatment data in 2008, the monthly growth is shown in italics.

d Private-sector data are included in the reported total:

Country	2007	2008
Angola	300	...
Benin	...	3 436
Botswana	9 514	21 994
Burundi	...	9 180
Cameroon	...	12 172
Central African Republic	...	...
Chile	...	1 500
China	500	...
Colombia	...	1 000
Congo	...	1 162
Ethiopia	...	7 777
Gabon	...	582
Guinea	...	...
Guinea-Bissau	...	220
India	...	35 000
Kenya	5 000	5 000
Malawi	3 937	5 261
Mali	...	8 500
Mexico	...	2 500
Nepal	...	88
Nigeria	30 000	7 580
Rwanda	500	...
Senegal	...	215
South Africa	100 000	130 500
Swaziland	...	2 250
Thailand	10 000	10 000
Zambia	2 000	6 058
Zimbabwe	10 000	10 000

The 2008 figure includes 10 935 patients in the private sector and 11 059 public patients outsourced to the private sector.

Private sector data have been included in the total number of people on treatment in 2008, but a numerical value has not been reported.

Private sector data have been included in the total number of people on treatment in 2008, but a numerical value has not been reported.

The 220 refers to non-profit private sector (NGO) facilities. The number does not include people treated in the "for profit" private sector.

The 2008 figure is a reported value, but an estimate could be not obtained for 2008. Last year, 30 000 were estimated to have received treatment through the private sector.

e Only cumulative data have been reported, and have therefore been adjusted for attrition.

f Updated 2007 value.

g By December 2008, the government reported that 199 581 people were receiving antiretroviral therapy through the public sector at 197 sites, including 5422 people treated at 10 sites in nongovernmental organizations and intersectoral health centres. A further estimated 35 000 people were treated in the unorganized private sector. Overall, an estimated 235 000 [211 000-259 000] people were receiving antiretroviral therapy by the end of 2008, including people enrolled through private facilities.

h The Department of Health reported a cumulative number of 678 550 for the public sector in December 2008. WHO/UNAIDS adjusted the public sector number for attrition. A private-sector estimate of 130 500 was obtained by projecting a mid-2008 estimate to December 2008 as published in an article in the *South African Medical Journal* (Adam MA, Johnson LF. Estimation of adult antiretroviral treatment coverage in South Africa. *South African Medical Journal*, 2009; 99:661-667).

i Two separate reports were received from Sudan: northern Sudan, 1353; southern Sudan, 964.

j '<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.

Annex 2. Reported number of people receiving antiretroviral therapy in low- and middle-income countries by sex and by age, estimated number of children receiving and needing antiretroviral therapy and coverage percentages, 2008

Low- and middle-income countries ^a	Reported number of all males and females receiving antiretroviral therapy ^b				Reported number of adults and children receiving antiretroviral therapy ^b				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2008 ^c				Estimated antiretroviral therapy coverage among children, December 2008 ^d			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Males	% of total	Females	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Afghanistan	Dec 08	0	...	0	89%	Dec 08	0	...	0	11%	...	...	...	...	...	...
Albania	Dec 08	...	...	...	...	Dec 08	98	89%	12	11%	...	...	...	...	...	...
Algeria	Dec 08	556	50%	555	50%	Dec 08	1 050	95%	61	5%	...	<100	<1 000	...	11%	79%
Angola	Dec 08 ^e	2 444	31%	5 440	69%	Oct 08 ^f	10 538	94%	702	6%	7 400	3 900	12 000	9%	6%	18%
Argentina	Dec 08	26 791	64%	15 250	36%	Dec 08	40 041	95%	2 000	5%	...	<500	<500	...	>95%	>95%
Armenia	Dec 08	66	66%	34	34%	Dec 08	96	96%	4	4%	...	<100	<100	...	27%	67%
Azerbaijan	Dec 08	112	70%	47	30%	Dec 08	159	100%	0	0%	...	<100	<100	...	0%	0%
Bangladesh	Dec 08	...	...	...	...	Dec 08	277	98%	6	2%	...	<100	<100	...	13%	35%
Belarus	Dec 08	487	39%	762	61%	Dec 08	1 164	93%	85	7%	...	...	...	...	...	...
Belize	Dec 08	308	49%	322	51%	Dec 08	566	90%	64	10%	...	<100	<200	...	57%	80%
Benin	Dec 08	...	...	...	...	Dec 08 ^h	11 428	95%	650	5%	1 500	<1 000	2 400	44%	27%	94%
Bhutan	Dec 07	14	47%	16	53%	Dec 08	29	97%	1	3%	...	<100	<100	...	13%	50%
Bolivia (Plurinational State of)	Dec 07	345	70%	151	30%	Dec 08	621	94%	38	6%	...	<100	<500	...	14%	41%
Bosnia and Herzegovina	Dec 08	24	73%	9	27%	Dec 08	32	97%	1	3%	...	...	...	...	...	...
Botswana	Dec 08 ^e	36 384	38%	58 667	62%	Dec 08 ^h	109 954	94%	7 091	6%	7 900	4 900	10 000	90%	70%	>95%
Brazil	Dec 07	109 057	60%	71 943	40%	Dec 08	183 683	97%	6 418	3%	...	...	...	...	...	...
Bulgaria	Dec 08	167	67%	84	33%	Dec 08	248	99%	3	1%	...	<100	<100	...	19%	50%
Burkina Faso	Dec 08	6 334	33%	13 118	67%	Dec 08	20 075	95%	1 028	5%	4 100	2 100	6 100	25%	17%	48%
Burundi	Dec 08 ^h	5 845	41%	8 498	59%	Dec 08 ^h	13 043	91%	1 300	9%	8 000	4 400	11 000	16%	12%	30%
Cambodia	Dec 08	15 545	49%	16 454	51%	Dec 08	28 932	90%	3 067	10%	...	1 800	2 400	...	>95%	>95%
Cameroon	Sep 08 ^{gh}	17 569	33%	35 669	67%	Sep 08 ^h	53 238	96%	2 090	4%	18 000	10 000	26 000	11%	8%	20%
Cape Verde	Dec 07	125	43%	166	57%	Dec 08	331	92%	29	8%	...	...	...	...	...	...
Central African Republic	Dec 08 ^h	4 321	45%	5 229	55%	Dec 08 ^h	9 088	95%	462	5%	4 700	2 400	6 700	10%	7%	19%
Chad	Dec 07 ^e	2 738	37%	4 662	63%	Dec 08 ^e	16 220	97%	480	3%	7 300	3 700	11 000	7%	4%	13%
Chile	Dec 07	8 495	83%	1 728	17%	Dec 08 ^h	10 865	98%	186	2%	...	<200	<500	...	70%	>95%
China	Dec 08	27 145	58%	20 015	42%	Dec 08	47 134	98%	1 120	2%	...	...	...	...	...	...

Low- and middle-income countries ^a	Reported number of all males and females receiving antiretroviral therapy ^b				Reported number of adults and children receiving antiretroviral therapy ^b				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2008 ^c				Estimated antiretroviral therapy coverage among children, December 2008 ^d			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Males	% of total	Females	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Colombia	...	...	...	...	...	Dec 07 ^{e,f}	...	...	3	...	...	<1000	2 600	...	<1%	<1%
Comoros	Dec 08	5	63%	3	38%	Dec 08	7	88%	1	13%	...	<100	<100	...	20%	>95%
Congo	Dec 08	3 565	40%	5 347	60%	Dec 08 ^h	8 912	95%	488	5%	2 300	1 100	3 500	21%	14%	44%
Cook Islands	...	...	...	...	...	Dec 08	1	100%	0	0%	...	...	...	...	...	...
Costa Rica	...	...	...	...	...	Dec 06 ⁱ	2 814	98%	52	2%	...	<100	<100	...	53%	>95%
Côte d'Ivoire	Dec 08	17 332	33%	34 501	67%	Dec 08	49 012	95%	2 821	5%	14 000	6 900	21 000	20%	13%	41%
Croatia	Dec 08	328	82%	70	18%	Dec 08	394	99%	4	1%	...	...	...	...	...	...
Cuba	Dec 08 ^e	3 181	82%	713	18%	Dec 08	3 980	100%	19	0%	...	<100	<100	...	37%	>95%
Democratic People's Republic of Korea	...	...	...	...	...	...	...	...	...	...	...	<100	<100	...	...	...
Democratic Republic of the Congo	...	...	...	...	...	Dec 08	20 470	83%	4 053	17%	16 000	9 900	22 000	25%	18%	41%
Djibouti	Dec 08	382	47%	434	53%	Dec 08	792	97%	24	3%	<500	<200	<1 000	7%	4%	13%
Dominica	Dec 07 ^e	9	24%	28	76%	Dec 07	37	95%	2	5%	...	...	...	...	...	...
Dominican Republic	Dec 07 ^e	3 661	49%	3 803	51%	Dec 08	10 266	93%	782	7%	...	...	...	...	...	...
Ecuador	...	...	...	...	...	Dec 08	3 699	99%	29	1%	...	<500	<1 000	...	5%	10%
Egypt	...	...	...	...	...	Dec 08	268	92%	23	8%	...	<100	<200	...	13%	55%
El Salvador	Dec 08	4 262	60%	2 842	40%	Dec 08	6 542	92%	562	8%	...	<100	<500	...	>95%	>95%
Equatorial Guinea	Dec 08	235	28%	604	72%	Dec 08	825	98%	14	2%	<1 000	<500	<1 000	3%	2%	6%
Eritrea	...	...	...	...	...	Dec 08	3 443	93%	249	7%	<1 000	<500	1 400	29%	17%	54%
Ethiopia	Dec 08 ^h	57 034	43%	75 345	57%	Dec 08 ^h	124 980	94%	7 399	6%	23 000	12 000	34 000	33%	22%	61%
Fiji	Dec 08	18	46%	21	54%	Dec 08	39	100%	0	0%	...	<100	<100	...	0%	0%
Gabon	Dec 08 ^h	3 498	45%	4 275	55%	Dec 08 ^h	7 556	97%	217	3%	<1 000	<500	1 300	26%	16%	58%
Gambia	...	...	...	...	...	Dec 08	461	60%	309	40%	...	<200	<1 000	...	44%	>95%
Georgia	Dec 08	359	72%	137	28%	Dec 08	474	95%	24	5%	...	<100	<100	...	>95%	>95%
Ghana	Dec 08	6 834	32%	14 707	68%	Dec 08	20 712	96%	829	4%	5 900	2 600	9 200	14%	9%	31%
Grenada	Dec 07 ^e	24	53%	21	47%	Dec 07	45	96%	2	4%	...	...	...	...	...	...
Guatemala	...	...	...	...	...	Dec 08	9 295	96%	399	4%	...	<1 000	1 700	...	23%	54%
Guinea	Dec 08 ^e	3 550	42%	4 902	58%	Dec 08 ^h	8 701	94%	511	6%	2 400	1 100	3 600	22%	14%	47%
Guinea-Bissau	Dec 08	582	32%	1 227	68%	Dec 08	1 712	95%	97	5%	<1 000	<500	1 200	13%	8%	26%
Guyana	Dec 08	1 113	45%	1 360	55%	Dec 08	2 308	93%	165	7%	...	<100	<200	...	>95%	>95%
Haiti	Dec 08	8 068	42%	11 219	58%	Dec 08	17 999	93%	1 288	7%	3 600	2 500	4 700	36%	27%	52%

Low- and middle-income countries ^a	Reported number of all males and females receiving antiretroviral therapy ^b						Reported number of adults and children receiving antiretroviral therapy ^b						Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2008 ^c				Estimated antiretroviral therapy coverage among children, December 2008 ^d			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Males	% of total	Females	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
																				Dec 07
Honduras	...	...	...	...	...	Dec 08	5 628	90%	660	10%	...	<1000	1 100	...	63%	>95%	...	63%	>95%
Hungary	Dec 07	381	84%	71	16%	Dec 07	445	98%	7	2%	...	<100	<100	...	>95%	>95%	...	>95%	>95%	
India	Dec 08	118 479	61%	75 039	39%	Dec 08	180 307	93%	13 211	7%	...	16 000	46 000	...	29%	82%	...	29%	82%	
Indonesia	Dec 08	7 934	75%	2 682	25%	Dec 08	10 260	97%	356	3%	...	<500	1 500	...	24%	78%	...	24%	78%	
Iran (Islamic Republic of)	Sep 08	719	82%	159	18%	Sep 08	848	97%	30	3%	...	<500	<1 000	...	4%	11%	...	4%	11%	
Iraq	Dec 08	4	100%	0	0%	Dec 08	4	100%	0	0%	...	...	...	...	...	...	...	...	...
Jamaica	...	...	...	...	...	Dec 08	3 478	90%	400	10%	...	<500	<500	...	94%	>95%	...	94%	>95%
Jordan	Dec 08	44	76%	14	24%	Dec 08	56	97%	2	3%	...	...	...	...	...	...	...	...	...
Kazakhstan	Dec 08 ^e	365	65%	196	35%	Dec 08	575	81%	132	19%	...	<100	<100	...	>95%	>95%	...	>95%	>95%	
Kenya	Sep 08 ^{e,f}	77 677	35%	141 975	65%	Dec 08	217 364	91%	20 517	9%	49 000	25 000	71 000	42%	29%	83%	42%	29%	83%	
Kiribati	...	...	...	...	...	Dec 08	6	100%	0	0%	...	...	...	...	...	...	...	...	...
Kyrgyzstan	Dec 08	72	81%	17	19%	Dec 08	52	58%	37	42%	...	<100	<200	...	28%	>95%	...	28%	>95%	
Lao People's Democratic Republic	Dec 08	556	55%	453	45%	Dec 08	937	93%	72	7%	...	<100	<200	...	53%	>95%	...	53%	>95%	
Latvia	Dec 08	240	72%	94	28%	Dec 08	311	93%	23	7%	...	<100	<100	...	>95%	>95%	...	>95%	>95%	
Lebanon	Dec 07 ^f	192	78%	54	22%	Dec 07 ^f	237	96%	9	4%	...	<100	<100	...	28%	69%	...	28%	69%	
Lesotho	Dec 08	15 418	34%	29 844	66%	Dec 08	42 224	93%	3 038	7%	7 300	4 300	9 700	42%	31%	70%	42%	31%	70%	
Liberia	...	...	...	...	...	Sep 07 ^f	1 322	93%	92	7%	1 100	<1 000	1 800	8%	5%	17%	8%	5%	17%
Libyan Arab Jamahiriya	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lithuania	Dec 08	103	81%	24	19%	Dec 08	126	99%	1	1%	...	<100	<100	...	50%	>95%	...	50%	>95%	
Madagascar	...	...	...	...	...	Dec 08	158	98%	4	2%	...	<200	1 000	...	0%	3%	...	0%	3%
Malawi	Sep 07 ^e	51 204	39%	79 284	61%	Dec 08	133 057	91%	13 600	9%	...	17 000	45 000	...	33%	84%	...	33%	84%	
Malaysia	...	...	...	...	...	Dec 08	7 696	94%	501	6%	...	<500	<1 000	...	55%	>95%	...	55%	>95%
Maldives	Dec 08	2	100%	0	0%	Dec 08	2	100%	0	0%	...	<100	<100	...	0%	0%	...	0%	0%	
Mali	Dec 08 ^e	4 211	34%	8 144	66%	Dec 08 ^h	15 715	92%	1 383	8%	...	<1 000	3 400	...	41%	>95%	...	41%	>95%	
Marshall Islands	Dec 08	...	...	...	...	Dec 08	4	100%	0	0%	...	...	...	...	...	...	...	...	...
Mauritania	Dec 08 ^e	165	49%	174	51%	Dec 08 ^e	326	96%	13	4%	...	<100	<1 000	...	3%	14%	...	3%	14%	
Mauritius	...	...	...	...	...	...	...	...	...	...	...	<100	<100	...	...	...	...	...	...
Mexico	Dec 08 ^h	42 574	77%	12 426	23%	Dec 08 ^h	53 644	98%	1 356	2%	...	1 300	3 600	...	38%	>95%	...	38%	>95%	
Micronesia (Federated States of)	...	...	...	...	...	Dec 08	3	100%	0	0%	...	...	...	...	...	...	...	...	...

Low- and middle-income countries ^a	Reported number of all males and females receiving antiretroviral therapy ^b						Reported number of adults and children receiving antiretroviral therapy ^b						Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2008 ^c				Estimated antiretroviral therapy coverage among children, December 2008 ^d			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Males	% of total	Females	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
																				Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Mongolia	Dec 08	5	100%	0	0%	Dec 08	5	100%	0	0%	...	<100	<100	...	0%	0%	...	0%	0%	
Montenegro	Dec 08	21	84%	4	16%	Dec 08	24	96%	1	4%	...	...	...	...	...	...	...	...	...
Morocco	Dec 08	1 055	52%	1 055	48%	Dec 08	2 101	95%	106	5%	...	<100	<500	...	48%	>95%	...	48%	>95%	
Mozambique	Dec 08	48 397	38%	79 933	62%	Dec 08	118 937	93%	9 393	7%	45 000	24 000	67 000	21%	14%	40%	...	14%	40%	
Myanmar	Dec 08	8 553	56%	6 638	44%	Dec 08	14 225	94%	966	6%	...	1 400	4 700	...	21%	71%	...	21%	71%	
Namibia	Sep 07 ^{e1}	13 783	35%	25 939	65%	Dec 08	51 872	87%	7 504	13%	5 800	3 100	7 800	>95%	>95%	>95%	>95%	>95%	>95%	
Nauru	Dec 08	0	...	0	...	Dec 08	0	...	0	...	...	...	...	...	...	...	...	...	...
Nepal	Dec 08	1 512	60%	1 024	40%	Dec 08	2 417	95%	119	5%	...	<500	1 200	...	10%	26%	...	10%	26%	
Nicaragua	Dec 08	491	66%	252	34%	Dec 08	675	91%	68	9%	...	<100	<100	...	>95%	>95%	...	>95%	>95%	
Niger	Dec 08	1 287	45%	1 559	55%	Dec 08	2 706	95%	140	5%	...	<1 000	3 200	...	4%	16%	...	4%	16%	
Nigeria	Sep 08 ^{e1}	71 706	36%	126 356	64%	Dec 08	218 514	95%	12 565	5%	110 000	57 000	160 000	12%	8%	22%	...	8%	22%	
Niue	Dec 08	0	...	0	...	Dec 08	0	...	0	...	...	...	...	...	...	...	...	...	...
Oman	Dec 08	262	64%	150	36%	Dec 08	382	93%	30	7%	<100	<100	<100	...	>95%	>95%	...	>95%	>95%	
Pakistan	Dec 08	698	77%	209	23%	Dec 08	869	96%	38	4%	<1 000	<500	1 400	...	3%	12%	...	3%	12%	
Palau	Dec 08	1	33%	2	67%	Dec 08	3	100%	0	0%	...	...	...	...	...	...	...	...	...
Panama	Dec 08	1 870	45%	2 291	55%	Dec 08	3 804	93%	267	7%	<200	<100	<500	...	90%	>95%	...	90%	>95%	
Papua New Guinea	Dec 08 ^e	1 022	69%	461	31%	Dec 08	4 866	94%	329	6%	<1 000	<1 000	1 500	33%	22%	61%	...	22%	61%	
Paraguay	Dec 08 ^e	5 364	68%	2 479	32%	Dec 08	13 390	97%	426	3%	<500	<200	<1 000	...	58%	>95%	...	58%	>95%	
Peru	Dec 08 ^e	372	77%	112	23%	Dec 08	521	98%	11	2%	<100	<100	<200	...	8%	31%	...	8%	31%	
Philippines	Dec 08	2 730	71%	1 092	29%	Dec 08	3 705	97%	117	3%	<100	<100	<100	...	>95%	>95%	...	>95%	>95%	
Poland	Dec 08	442	65%	240	35%	Dec 08	651	95%	31	5%	...	...	...	...	...	...	...	...	...
Republic of Moldova	Dec 08	3 783	51%	3 651	49%	Dec 08	7 218	97%	216	3%	<500	<100	<1 000	...	33%	>95%	...	33%	>95%	
Romania	Dec 08	...	...	...	...	Dec 08	52 902	96%	1 998	4%	...	...	...	...	...	...	...	...	...
Russian Federation	Dec 08	24 058	38%	39 091	62%	Dec 08	57 514	91%	5 635	9%	5 600	2 600	8 300	>95%	68%	>95%	>95%	>95%	>95%	
Rwanda	Dec 08	...	...	...	...	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Kitts and Nevis	Sep 07	40	56%	32	44%	Sep 07	70	97%	2	3%	...	...	...	...	...	...	...	...	...
Saint Lucia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Vincent and the Grenadines	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Samoa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Low- and middle-income countries ^a	Reported number of all males and females receiving antiretroviral therapy ^b						Reported number of adults and children receiving antiretroviral therapy ^b						Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2008 ^c				Estimated antiretroviral therapy coverage among children, December 2008 ^d			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Males	% of total	Females	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
																				Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Sao Tome and Principe	Dec 08	42	39%	67	61%	Dec 08	104	95%	5	5%	...	...	...	...	...	...	...	...	...
Senegal	Dec 08 ^h	3 133	42%	4 341	58%	Dec 08 ^h	6 888	92%	586	8%	...	<1 000	2 800	...	2 1%	68%	...	2 1%	68%	
Serbia	Dec 08	551	65%	291	35%	Dec 08	832	99%	10	1%	...	<100	<100	...	>95%	>95%	...	>95%	>95%	
Seychelles	Dec 08	67	59%	46	41%	Dec 08	102	90%	11	10%	...	...	...	...	...	...	...	...	...
Sierra Leone	Nov 08 ⁱ	1 542	37%	2 680	63%	Dec 08 ⁱ	3 985	94%	237	6%	1 300	<1 000	2 100	18%	11%	38%	...	11%	38%	
Slovakia	Dec 08	70	72%	27	28%	Dec 08	97	100%	0	0%	...	...	...	...	...	...	...	...	...
Solomon Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Somalia	Dec 07 ^f	78	38%	125	62%	Dec 08	404	98%	9	2%	...	<500	1 400	...	1%	2%	...	1%	2%	
South Africa	Sep 08 ^{ef}	141 978	35%	268 160	65%	Dec 08	513 153	90%	57 228	10%	94 000	53 000	130 000	61%	45%	>95%	...	45%	>95%	
Sri Lanka	Dec 08	78	53%	68	47%	Dec 08	139	95%	7	5%	...	<100	<100	...	16%	64%	...	16%	64%	
Sudan	Dec 08 ^{ei}	1 163	52%	1 064	48%	Dec 08 ^{eh}	1 872	92%	153	8%	6 200	2 900	10 000	2%	1%	5%	...	1%	5%	
Suriname	...	...	...	...	...	Dec 07	791	93%	58	7%	...	<100	<200	...	48%	>95%	...	48%	>95%
Swaziland	Dec 08 ^h	11 948	37%	20 753	63%	Dec 08 ^h	29 804	91%	2 897	9%	3 200	2 000	4 100	89%	70%	>95%	...	70%	>95%	
Syrian Arab Republic	Dec 07	57	76%	18	24%	Dec 07	83	95%	4	5%	...	...	...	...	...	...	...	...	...
Tajikistan	Dec 08	112	65%	61	35%	Dec 08	169	98%	4	2%	...	...	...	...	...	...	...	...	...
Thailand	...	...	...	...	...	Dec 08	160 821	95%	8 736	5%	...	11 000	17 000	...	52%	81%	...	52%	81%
The former Yugoslav Republic of Macedonia	Dec 08	17	74%	6	26%	Dec 08	22	96%	1	4%	...	...	...	...	...	...	...	...	...
Timor-Leste	Dec 08	11	38%	18	62%	Dec 08	26	90%	3	10%	...	...	...	...	...	...	...	...	...
Togo	Dec 08	3 794	34%	7 417	66%	Dec 08	10 539	94%	672	6%	3 100	1 400	5 000	22%	14%	49%	...	14%	49%	
Tonga	...	...	...	...	...	Dec 08	2	100%	0	0%	...	...	...	...	...	...	...	...	...
Tunisia	Dec 08	222	64%	124	36%	Dec 08	336	97%	10	3%	...	<100	<100	...	38%	>95%	...	38%	>95%	
Turkey	...	...	...	...	...	Dec 07 ^{ef}	...	...	9	...	...	...	...	...	...	...	...	...	...
Turkmenistan	Jan 06	0	...	0	...	Jan 06	0	...	0	...	...	...	...	...	...	...	...	...	...
Tuvalu	...	...	...	...	...	Dec 08	1	100%	0	0%	...	...	...	...	...	...	...	...	...
Uganda	Sep 08 ^e	47 400	36%	83 437	64%	Sep 08	140 305	91%	13 413	9%	42 000	23 000	60 000	32%	23%	59%	...	23%	59%	
Ukraine	Dec 08	5 474	51%	5 179	49%	Dec 08	9 397	88%	1 256	12%	...	<500	1 600	...	80%	>95%	...	80%	>95%	
United Republic of Tanzania	Sep 08 ^{ef}	50 001	36%	88 567	64%	Dec 08	141 646	92%	12 822	8%	40 000	20 000	66 000	32%	20%	65%	...	20%	65%	
Uruguay	...	...	...	...	...	Dec 06 ^{ef}	...	...	160	...	...	...	...	...	...	...	...	...	...
Uzbekistan	...	...	...	...	...	Dec 07 ^{ef}	...	...	225	...	...	<100	<200	...	>95%	>95%	...	>95%	>95%

Low- and middle-income countries ^a	Reported number of all males and females receiving antiretroviral therapy ^b					Reported number of adults and children receiving antiretroviral therapy ^b					Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2008 ^c				Estimated antiretroviral therapy coverage among children, December 2008 ^d		
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Males	% of total	Females	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
																	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Vanuatu	Dec 08	1	50%	1	50%	
Venezuela (Bolivarian Republic of)	...	...	...	...	...	Dec 06	...	...	611	...	<1000	2 400	...	25%	84%
Viet Nam	Sep 08 ^{ef}	11 240	73%	4 083	27%	Dec 08	25 597	95%	1 462	5%	...	2 500	...	58%	>95%		
Yemen	Dec 08	123	65%	66	35%	Dec 08	180	95%	9	5%	...	...	...	...	...
Zambia	Dec 08 ^e	53 759	34%	105 510	66%	Dec 08	200 891	92%	18 040	8%	34 000	18 000	47 000	38%	>95%		
Zimbabwe	Dec 08 ^e	49 701	37%	85 625	63%	Dec 08 ^g	123 141	90%	13 254	10%	37 000	22 000	50 000	27%	60%		

... Data not available or not applicable.

a See the country classification by income, level of the epidemic, and geographical, UNAIDS, UNICEF and WHO regions.

b Does not include private sector data unless stated otherwise. The estimated number of people receiving antiretroviral therapy in the private sector is listed in Annex 1, footnote d.

c The needs estimates are based on the methods described in the explanatory notes to the annexes and in Box 5.1. The estimates for individual countries may differ according to the local methods used.

d The coverage estimates are based on the estimated unrounded numbers of children receiving antiretroviral therapy and the estimated unrounded need for antiretroviral therapy (based on UNAIDS/WHO methods). The ranges in coverage estimates are based on plausibility bounds in the denominator: that is, low and high estimates of need. 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.

e 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.

f The latest available breakdowns are less recent than the latest reported national-level data. See Annex 1 for the latest reported national-level data.

g Estimates of the number of children needing antiretroviral therapy are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis. Therefore, some countries have requested only a range to be published or no needs at all.

h Breakdown includes data for the private sector.

i Two separate reports were received from Sudan: northern Sudan, total 1353 (786 males, 567 females; 138 children and 1013 adults and 202 people whose age group is not known); and southern Sudan, total 964 (377 males, 497 females and 90 people whose sex has not been recorded; 15 children and 859 adults and 90 people whose age group is not known).

Annex 3. Preventing mother-to-child transmission of HIV in low- and middle-income countries, 2008

Low- and middle-income countries ^a	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods ^b			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission ^c			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 cotrimoxazole 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	...	Jan 08-Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Albania	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Algeria	18	Jan 08-Dec 08	<500	<200	1 600	...	1%	9%	...	...	...	...	...	...	...	...
Angola	2 962	Jan 08-Oct 08	16 000	8 000	24 000	19%	12%	37%	162 598	21%	1 682	11%	...	...	...	...
Argentina	2 463	Jan 08-Dec 08	1 100	<1 000	1 800	...	>95%	>95%	598 123	87%	2 280	>95%	2 160	>95%	...	...
Armenia	6	Jan 08-Dec 08	<100	<100	<100	...	9%	40%	40 067	85%	5	14%	4	11%	0	0%
Azerbaijan	17	Jan 08-Dec 08	<100	<100	<100	...	25%	>95%	172 153	>95%	14	37%	13	34%	15	39%
Bangladesh	6 ^d	Jan 08-Dec 08	<100	<100	<200	...	5%	<1%	62 ^d	<1%	4	5%	4	5%	...	...
Belarus	153	Jan 08-Dec 08	...	...	...	...	...	...	126 527	...	159	...	170	...	114	...
Belize	65	Jan 08-Dec 08	<200	<100	<500	...	20%	68%	6 558	88%	63	32%	9 ^f	5%	66	33%
Benin	1 447	Jan 08-Dec 08	3 600	1 700	5 500	40%	26%	86%	127 763	37%	1 314	36%	1 314	36%	...	...
Bhutan	19	Jan 08-Dec 08	<100	<100	<100	...	86%	>95%	2 244 ^g	15%	13	>95%	7	70%	...	...
Bolivia	35 ^h	Jan 08-Dec 08	<500	<200	<1 000	...	6%	21%	42 726	16%	28 ^f	8%	27	8%	23	7%
Bosnia and Herzegovina	1	Jan 08-Dec 08	...	...	...	...	...	...	1 198 ^f	...	...	...	...	...	...	...
Botswana	11 971	Jan 08-Dec 08	12 000	7 500	16 000	>95%	75%	>95%	41 311	87%	10 308	83%	7 485	60%	...	...
Brazil	6 844	Jan 08-Dec 08	...	...	...	...	...	...	2 381 280	...	7 511	...	...	...	2 306	...
Bulgaria	1	Jan 07-Dec 07	<100	<100	<100	...	3%	9%	...	...	...	...	...	...	...	...
Burkina Faso	1 333	Jan 08-Dec 08	6 700	3 400	10 000	20%	13%	39%	161 455	22%	1 294 ⁱ	19%	462	7%	84	1%
Burundi	1 488	Aug 07-Sep 08	16 000	7 200	24 000	9%	6%	21%	28 179	10%	1 299	8%	1 046	7%	...	...
Cambodia	777	Jan 08-Dec 08	1 400	<1 000	2 200	...	35%	>95%	103 768	29%	768	54%	203 ^f	14%	43 ^f	3%
Cameroon	10 144	Jan 08-Dec 08	36 000	19 000	52 000	28%	20%	53%	276 177	39%	8 315	23%	8 315 ^f	23%	1 543	4%
Cape Verde	57	Jan 08-Dec 08	...	...	...	...	...	...	7 345	61%	54	...	54	...	54	...
Central African Republic	1 936	Jan 08-Dec 08	8 300	4 400	12 000	23%	16%	44%	22 073	14%	1 167	14%	741	9%	124	1%
Chad	722	Jan 08-Dec 08	15 000	7 700	23 000	5%	3%	9%	10 967	2%	454	3%	63 ^g	0%	...	...
Chile	203	Jan 08-Dec 08	<500	<200	<1 000	...	32%	>95%	126 097	50%	...	...	...	...	141	36%
China	980 ^h	Jan 08-Dec 08	...	...	...	...	...	...	1 824 624 ^k	...	1 105	...	650 ^g	...	...	...
Colombia	404	Jan 08-Dec 08	3 200	1 700	5 100	...	8%	24%	316 179	34%	472	15%	...	...	...	...
Comoros	0	Jan 08-Dec 08	<100	<100	<100	...	0%	0%	1 199	6%	0	0%	0	0%	0	0%
Congo	438	Jan 08-Dec 08	4 300	2 200	6 300	10%	7%	20%	23 530	19%	360	8%	...	...	...	...
Cook Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Low- and middle-income countries ^a	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods ^b			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission ^c			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 cotrimoxazole 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
Costa Rica	21	Jan 06-Dec 06	<100	<100	<200	...	13%	50%	61 000 ^g	81%	40 ^g	43%	40 ^g	43%	40 ^g	43%
Côte d'Ivoire	9 296	Jan 08-Dec 08	22 000	11 000	34 000	41%	28%	83%	230 159	32%	4 743	4%	...	...	...	...
Croatia	2	Jan 07-Dec 07	...	<100	<200	...	34%	>95%	112 434 ^f	>95%	41 ^f	55%	1 ^f	1%	41 ^f	55%
Cuba	41	Jan 07-Dec 07	<100	<100	<100	...	...	...	...	...	...	...	...	...	...	...
Democratic People's Republic of Korea	...	...	<100	<100	<100	...	...	...	...	...	...	...	...	...	...	...
Democratic Republic of the Congo	1 776	Jan 08-Dec 08	32 000	17 000	48 000	5%	4%	10%	236 919	8%	1 790	6%	83 ⁱ	0%	...	...
Djibouti	43	Jan 08-Dec 08	<1 000	<500	1 100	6%	4%	13%	8 118	34%	36	5%	93	13%	...	...
Dominica	1	Jan 07-Dec 07	...	...	...	...	...	...	1 224 ^g	...	2 ^g	...	2 ^g	...	...	...
Dominican Republic	1 034	Jan 08-Dec 08	1 900	<1 000	2 800	...	37%	>95%	114 001	51%	1 172	63%	...	...	391	21%
Ecuador	277	Jan 08-Dec 08	<1 000	<500	1 200	...	24%	81%	222 564	79%	274	39%	...	...	...	...
Egypt	3	Jan 08-Dec 08	<500	<100	<500	...	1%	3%	1 750 ^f	<1%	2 ^f	...	...	...	5 ^f	2%
El Salvador	189	Jan 08-Dec 08	<1 000	<500	<1 000	...	23%	69%	87 186	70%	155	29%	10	2%	...	...
Equatorial Guinea	567	Jan 08-Dec 08	1 400	<1 000	2 300	40%	25%	76%	6 470	26%	...	...	...	...	...	...
Eritrea	424	Jan 08-Dec 08	1 500	<1 000	2 600	29%	16%	59%	46 544	26%	424	29%	225	15%	...	...
Ethiopia	6 354	Jan 08-Dec 08	36 000	18 000	54 000	18%	12%	35%	292 238	9%	3 974	11%	895	2%	...	...
Fiji	3 ^m	Jan 08-Dec 08	<100	<100	<100	...	17%	75%	9 041 ⁿ	51%	1	13%	2	25%	1	13%
Gabon	634	Jan 08-Dec 08	1 800	<1 000	2 900	35%	22%	70%	16 340	41%	282	15%	219	12%	...	...
Gambia	321	Jan 08-Dec 08	1 000	<1 000	1 800	...	18%	64%	26 434	43%	232	22%	393	38%	...	...
Georgia	25	Jan 08-Dec 08	<100	<100	<100	...	78%	>95%	58 769	>95%	19	>95%	19	>95%	19	>95%
Ghana	4 991	Jan 08-Dec 08	13 000	6 400	19 000	39%	26%	78%	257 466	34%	2 450	19%	...	...	...	...
Grenada	7	Jan 07-Dec 07	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Guatemala	321	Jan 08-Dec 08	2 300	1 100	3 600	...	9%	29%	102 957	23%	159	7%	222	10%	...	...
Guinea	1 205	Jan 08-Dec 08	5 400	2 700	8 200	22%	15%	45%	38 586	10%	326	6%	869	16%	4 ^o	<1%
Guinea-Bissau	305	Jan 08-Dec 08	1 600	<1 000	2 500	20%	12%	39%	8 235	13%	143	9%	...	...	0	0%
Guyana	211	Jan 08-Dec 08	<200	<100	<500	...	85%	>95%	14 337	>95%	222	>95%	90 ^g	60%	...	...
Haiti	2 500 ^p	Jan 08-Dec 08	5 500	2 700	8 500	46%	29%	92%	143 878	53%	1 752 ^g	32%	448	8%	...	...
Honduras	300	Jan 08-Dec 08	<1 000	<500	1 100	...	27%	94%	108 509	54%	125	18%	...	...	229	34%
Hungary	1	Jan 07-Dec 07	<100	<100	<100	...	2%	8%	8 357	8%	...	...	...	...	...	...
India	10 673	Jan 08-Dec 08	49 000	25 000	80 000	...	13%	42%	4 234 401	16%	10 577	22%	12 000 ^g	2%	...	...
Indonesia	165	Jan 08-Dec 08	2 300	1 100	3 800	...	4%	15%	5 335	<1%	165	7%	25 ^f	1%	...	...
Iran (Islamic Republic of)	52	Sep 07-Aug 08	<1 000	<500	1 500	...	3%	10%	158 ^q	<1%	24	2%	20	2%	7	1%
Iraq	0	Jan 08-Dec 08	...	...	...	...	...	...	1 550	...	0	...	0	...	...	...

Low- and middle-income countries ^a	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods ^b			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission ^c		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 cotrimoxazole 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	515	Jan 08-Dec 08	<500	<200	<1 000	...	70%	>95%	28 659	55%	605	>95%	...	...
Jordan	2	Jan 08-Dec 08	...	...	...	...	...	1	...	1	...	0	...	1
Kazakhstan	174	Jan 08-Dec 08	<200	<100	<200	...	>95%	>95%	359 158	>95%	181	>95%	148	>95%	
Kenya	59 601	Dec 08	110 000	53 000	160 000	56%	37%	>95%	973 244	65%	41 253	39%	2 091	2%	
Kiribati	0	Jan 08-Dec 08	...	...	...	...	...	423	...	...	...	...	...	...
Kyrgyzstan	15	Jan 08-Dec 08	<200	<100	<500	...	5%	19%	125 233	>95%	16	9%	27	15%	
Lao People's Democratic Republic	21	Jan 08-Dec 08	<200	<100	<500	...	8%	28%	1 171 ^f	1%	18	11%	17	10%	
Latvia	37	Jan 07-Dec 07	<100	<100	<100	...	56%	>95%	14 152	61%	...	...	...	...
Lebanon	...	Jan 08-Dec 08	<100	<100	<100	...	...	...	...	...	1	3%	...	...
Lesotho	8 056	Jan 08-Dec 08	14 000	8 600	19 000	57%	43%	94%	29 430	50%	6 861	49%	1 542	11%	
Liberia	381	Jan 08-Dec 08	2 700	1 300	4 100	14%	9%	29%	24 423	17%	235	9%	112 ^s	4%	
Libyan Arab Jamahiriya	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lithuania	11	Jan 08-Dec 08	<100	<100	<100	...	>95%	>95%	28 614	91%	11	>95%	...	10	
Madagascar	18	Jan 08-Dec 08	<1 000	0	2 000	...	1%	...	201 833	29%	11	1%	...	2 ^z	
Malawi	33 838 ^t	Jan 08-Dec 08	...	32 000	82 000	...	41%	>95%	405 694	68%	20 058	34%	21 841	37%	
Malaysia	189	Jan 08-Dec 08	1 100	<500	1 900	...	10%	39%	410 332	75%	185	17%	...	185	
Maldives	0	Jan 08-Dec 08	<100	<100	<100	...	0%	0%	3 267	57%	0	0%	0	0%	
Mali	1 115	Jan 08-Dec 08	4 300	2 100	6 700	...	17%	54%	67 090	12%	766	18%	4 507	>95%	
Marshall Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mauritania	45	Jan 08-Dec 08	<500	<200	<1 000	...	5%	29%	6 371	6%	15	3%	18 ^f	4%	
Mauritius	19	Jan 07-Dec 07	<200	<100	<500	...	8%	37%	...	...	...	...	...	...
Mexico	458	Jan 08-Dec 08	5 700	2 900	8 500	...	5%	16%	757 863	37%	58	1%	...	...
Micronesia (Federated States of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mongolia	0	Jan 08-Dec 08	<100	<100	<100	...	0%	0%	...	...	0	0%	0	0%
Montenegro	1	Jan 07-Dec 07	...	...	...	...	...	...	...	1 ^f	...	...	...	...
Morocco	56	Jan 08-Dec 08	<500	<200	<1 000	...	9%	33%	2 723	<1%	20	5%	19	5%	
Mozambique	46 848	Jan 08-Dec 08	110 000	50 000	180 000	42%	26%	93%	523 009	60%	38 822	35%	...	...
Myanmar	1 377	Jan 08-Dec 08	5 200	2 100	10 000	...	14%	65%	178 722	18%	1 435	28%	265 ^l	5%	
Namibia	7 474	Jan 08-Dec 08	8 200	4 400	12 000	91%	63%	>95%	52 625	90%	8 270 ^v	>95%	...	1 334	
Nauru	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nepal	47	Jan 08-Dec 08	1 400	<1 000	2 100	...	2%	6%	43 733	6%	58	4%	57	4%	
Nicaragua	53	Jan 08-Dec 08	<100	<100	<100	...	65%	>95%	55 340	40%	53	>95%	49	>95%	

Low- and middle-income countries ^a	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods ^b			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission ^c			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 cotrimoxazole 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
Niger	1183	Jan 08-Dec 08	3 700	1 800	6 200	...	19%	67%	117 490	15%	201	5%	201	5%	...	...
Nigeria	19 804	Jan 08-Dec 08	210 000	110 000	300 000	10%	7%	18%	605 875	10%	13 883	7%	5 650	3%	...	...
Niue	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Oman	4	Jan 08-Dec 08	<100	<100	<100	...	11%	44%	...	...	4	21%	4	21%	4	21%
Pakistan	14	Jan 08-Dec 08	1 800	<1 000	3 700	...	<1%	2%	6 926	<1%	11	1%	1	0%	...	...
Palau	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Panama	71 ^w	Jan 07-Dec 07	<500	<100	<1 000	...	13%	>95%	...	...	154 ^x	70%	62 ^x	28%	...	...
Papua New Guinea	257	Jan 08-Dec 08	1 900	<1 000	2 900	13%	9%	28%	44 580	22%	99	5%	99	5%	0	0%
Paraguay	156	Jan 08-Dec 08	<500	<200	<1 000	...	29%	>95%	55 266	36%	121	38%	121	38%	2	1%
Peru	477	Jan 08-Dec 08	<1 000	<500	1 600	...	29%	>95%	425 480	70%	402	44%	...	...	...	...
Philippines	1	Jan 08-Dec 08	<200	<100	<500	...	<1%	1%	1 736	<1%	1	1%	1	1%	...	...
Poland	70	Jan 08-Dec 08	<200	<100	<500	...	25%	>95%	...	...	69	44%	...	44%	69	44%
Republic of Moldova	129	Jan 08-Dec 08	...	...	...	...	...	...	44 150	...	123	...	28	...	74	...
Romania	109	Jan 08-Dec 08	<200	<100	<500	...	32%	>95%	100 168	47%	161	88%	3	2%	...	...
Russian Federation	8 367	Jan 08-Dec 08	...	...	...	...	...	...	1 468 091	...	8 744	...	...	...	...	...
Rwanda	7 197	Jan 08-Dec 08	10 000	5 000	16 000	72%	45%	>95%	294 704	73%	5 686	57%	5 347	53%	2 790	28%
Saint Kitts and Nevis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Lucia	11	Jan 07-Dec 07	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Vincent and the Grenadines	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Samoa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sao Tome and Principe	22	Jan 08-Dec 08	...	...	...	...	...	...	6 281	...	11	...	11	...	...	...
Senegal	473	Jan 08-Dec 08	3 600	1 600	5 600	...	8%	29%	111 210	24%	299	8%	...	...	...	...
Serbia	2	Jan 08-Dec 08	<100	<100	<100	...	3%	12%	5 665	5%	1	3%	1	3%	1	3%
Seychelles	2	Jan 08-Dec 08	...	...	...	...	...	...	1 748	...	3	...	3	...	...	...
Sierra Leone	1 018	Jan 08-Dec 08	3 300	1 700	5 000	31%	20%	60%	91 212	41%	518	16%	363	11%	0	0%
Slovakia	0	Jan 08-Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Solomon Islands	0	Jan 08-Dec 08	...	...	...	...	...	...	41	...	1	...	0	...	...	...
Somalia	6	Jan 08-Dec 08	1 900	<1 000	3 100	...	<1%	1%	1 131	<1%	6	<1%	0	0%	...	...
South Africa	149 118	Jan 08-Dec 08	200 000	120 000	280 000	73%	53%	>95%	848 496	78%	119 395	59%	...	...	...	...
Sri Lanka	5	Jan 08-Dec 08	<100	<100	<200	...	5%	22%	12 239	3%	6	11%	5	9%	0	0%
Sudan	68 ^y	2007-2008	12 000	5 800	20 000	1%	<1%	1%	9 292 ^y	1%	21 ^y	...	14 ^z	0%	...	...
Suriname	35	Jan 06-Dec 06	<100	<100	<200	...	22%	>95%	7 156 ^s	73%	...	...	...	...	...	...

Low- and middle-income countries ^a	Number of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission	Period	Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission based on UNAIDS/WHO methods ^b			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission ^c			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	10 811	Jan 08-Dec 08	9 700	6 000	12 000	>95%	87%	>95%	27 313	78%	8 469	87%	8 238	85%	2 925	30%
Syrian Arab Republic	0	Jan 07-Dec 07	...	...	...	...	...	4 ^f	...	...	...	...	...	...	...	...
Tajikistan	21	Jan 08-Dec 08	...	...	...	...	...	40 171	...	16	1 ^f	...	1 ^f	...	1 ^f	...
Thailand	5 769	Oct 07-Sep 08	9 000	2 700	17 000	>95%	33%	>95%	797 047	82%	5 872	65%	...	...	...	...
The former Yugoslav Republic of Macedonia	0	Jan 08-Dec 08	...	...	...	...	...	...	...	...	0	...	0	...	0	...
Timor-Leste	1	Jan 08-Dec 08	...	...	...	...	...	71	...	1	1	...	...	...	...	...
Togo	1 127	Jan 08-Dec 08	6 300	3 100	9 800	18%	12%	37%	30 709	14%	1 162	19%	737	12%	...	...
Tonga	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tunisia	1	Jan 08-Dec 08	<100	<100	<100	...	2%	7%	...	...	1	3%	...	...	...	...
Turkey	4	Jan 06-Dec 06	...	...	...	...	...	2 070 ^g	<1%	4 ^g	...	...	...	...	...	...
Turkmenistan	0	Jan 06-Dec 06	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Tuvalu	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Uganda	41 598	Oct 07-Sep 08	82 000	44 000	120 000	50%	36%	95%	830 023	57%	13 914 ^h	17%	...	...	...	...
Ukraine	3 368	Jan 08-Dec 08	2 600	1 200	4 100	...	82%	>95%	552 250	>95%	3 683	>95%	2 817	>95%	1 473	57%
United Republic of Tanzania	70 944	Jan 08-Dec 08	...	40 000	130 000	...	53%	>95%	919 377	52%	41 347	48%	...	...	...	...
Uruguay	53	Jan 06-Dec 06	...	...	...	...	...	5 852	...	68 ^h	70 ^h	...	70 ^h	...	70 ^h	...
Uzbekistan	95	Jan 07-Dec 07	<500	<200	<1 000	...	17%	74%	58 063 ^f	10%	120 ^f	40%	...	...	...	...
Vanuatu	...	...	...	...	...	...	...	1 499 ^h	...	0	...	...	...	...	...	...
Venezuela (Bolivarian Republic of)	310	Jan 06-Dec 06	2 400	1 200	4 100	...	8%	27%	...	...	...	...	...	...	...	...
Viet Nam	1 354	Jan 08-Dec 08	3 300	1 600	5 100	...	27%	87%	351 625	24%	908	28%	...	...	...	...
Yemen	3	Jan 08-Dec 08	...	...	...	...	...	0	...	2	...	...	1	...	0	...
Zambia	41 286	Jan 08-Dec 08	70 000	38 000	96 000	59%	43%	>95%	364 331	67%	24 026	34%	19 040	27%	19 044	27%
Zimbabwe	18 756	Jan 08-Dec 08	53 000	29 000	73 000	36%	26%	64%	130 240	34%	13 575	26%	9 816	19%	...	...

a See the country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions.

b The needs estimates are based on the methods described in the explanatory notes to the annexes and in Box 5.1. The estimates for individual countries may differ according to the local methods used.

c The coverage estimates are based on the numbers of pregnant women living with HIV receiving antiretrovirals and the estimated unmet need for antiretrovirals (based on UNAIDS/WHO methods). The ranges in coverage estimates are based on plausibility bounds in the denominator: that is, low and high estimates of need. Point estimates and ranges are given for countries with a generalized epidemic, whereas only ranges are given for countries with a low-level or concentrated epidemic.

d The data are from the International Centre for Diarrhoeal Disease Research, Bangladesh prevention of parent-to-child transmission pilot site.

e Estimates of the number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis. Therefore, some countries have requested that only a range be published or no needs at all.

f The latest reported data are to December 2007.

g The latest reported data are to December 2006.

h The data correspond to women diagnosed in los Centros Departamentales de Vigilancia y Referencia de ITS.

i The data reported are incomplete.

j Co-trimoxazole prophylaxis is given to mothers upon delivery with instructions to be administered when the baby is two months old.

k Data are collected and compiled monthly from 333 counties.

l This strategy is in the beginning stages of implementation, and data are hardly collected in some places.

m The data are from the three antenatal care clinics based at the three tertiary-level hospitals (January 2008 – December 2008).

- n The data are based on the total number of women attending Colonial War Memorial Hospital, Lautoka Hospital and Labasa Hospital and who had their HIV tests done between January 2008 and December 2008.
- o The data are reported for the period January 2007 – November 2007.
- p The data are from the United States President's Emergency Plan for AIDS Relief and the Sogebank Foundation/World Bank (January 2008 – December 2008).
- q The latest reported data are to August 2007.
- r The data are from a survey done among pregnant women in three hospitals of Vientiane Capital between November 2007 and March 2008.
- s The latest reported data are to September 2007.
- t The 2008 reporting system for services for preventing mother-to-child transmission did not provide for combination antiretroviral regimen prophylaxis. However, through the 2008 National HIV Situation Analysis, data on combination regimens were collected from five health centres.
- u Data are not available due to lack of age-disaggregated data; however, co-trimoxazole prophylaxis is routinely provided to HIV-exposed newborns.
- v The number of infants receiving antiretrovirals for preventing mother-to-child transmission is slightly higher than number of women receiving antiretrovirals for preventing mother-to-child transmission because some women who deliver at home bring their children to facilities within 72 hours of birth and receive an infant dose of antiretroviral drug.
- w The data for Panama were reported from January 2007 to September 2007. The data were projected to a 12-month period based on the monthly value. The reported value was 53.
- x The data are from three of four paediatric care clinics.
- y The number comprises northern and southern Sudan.
- z The most recent data available are from WHO/UNAIDS/UNICEF. Towards universal access: scaling up priority HIV/AIDS interventions in the health sector. Progress report 2008.
- * The data may include double-counting. If a woman's CD4 count falls below the normal level (350 per mm³), she will be initiated on antiretroviral therapy, which means she will be double counted.
- ** HIV testing in labour and delivery is performed for women with unknown HIV status but is mixed with repeat HIV tests for women who tested earlier in the pregnancy.
- † The reported value may be an undercount due to a proportion of women who deliver at home and who received antiretroviral prophylaxis to take home from antenatal care facilities.
- ‡ Data were collected from Northern District Hospital, Viti Central Hospital, Leneakel Hospital, Lolowai Hospital and Norsup Hospital.

Annex 4. Estimated numbers of people (all ages combined) and children younger than 15 years receiving and needing antiretroviral therapy and antiretrovirals for preventing mother-to-child transmission and coverage percentages by WHO and UNICEF regions, 2008

WHO Regions	Number of people (all ages combined) receiving antiretroviral therapy, December 2008 [range] ^a	Estimated number of people needing antiretroviral therapy, 2008 [range] ^b	Antiretroviral therapy coverage, December 2008 [range] ^c	Number of children younger than 15 years receiving antiretroviral therapy, December 2008	Estimated number of children needing antiretroviral therapy, 2008 [range] ^d	Antiretroviral therapy coverage among children, December 2008 [range] ^e	Number of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2008	Estimated number of pregnant women with HIV needing antiretrovirals for preventing mother-to-child transmission, 2008 [range] ^f	Estimated percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2008 [range] ^g
African Region	2 924 000 [2 690 000-3 160 000]	6 700 000 [6 100 000-7 100 000]	44% [41-48%]	224 900	640 000 [500 000-770 000]	35% [29-45%]	576 800	1 280 000 [990 000-1 600 000]	45% [37-58%]
Region of the Americas	445 000 [405 000-485 000]	820 000 [750 000-870 000]	54% [51-60%]	16 000	21 000 [18 000-25 000]	76% [65-91%]	17 100	32 000 [24 000-41 000]	54% [42-71%]
Eastern Mediterranean Region	10 800 [9 400-12 200]	100 000 [82 000-120 000]	11% [9-13%]	<500	8 900 [5 300-14 000]	5% [3-8%]	<500	18 000 [11 000-28 000]	1% [1-2%]
European Region	85 500 [80 500-90 500]	370 000 [310 000-450 000]	23% [19-27%]	4 200	4 900 [2 700-7 500]	85% [56-95%]	12 600	13 400 [8 100-20 000]	94% [64-95%]
South-East Asia Region	443 000 [403 000-483 000]	1 100 000 [900 000-1 300 000]	40% [33-49%]	23 400	47 000 [32 000-65 000]	49% [35-72%]	18 100	65 000 [38 000-100 000]	28% [18-47%]
Western Pacific Region	122 000 [114 000-130 000]	400 000 [190 000-580 000]	31% [21-64%]	6 600	9 500 [5 600-14 000]	74% [49-95%]	3 600	15 600 [7 400-26 000]	23% [14-48%]
All low- and middle-income countries	4 030 000 [3 700 000-4 360 000]	9 500 000 [8 600 000-10 000 000]	42% [40-47%]	275 700	730 000 [580 000-880 000]	38% [31-47%]	628 400	1 400 000 [1 100 000-1 700 000]	45% [37-57%]
UNICEF Regions									
Africa^a	2 930 000 [2 690 000-3 170 000]	6 800 000 [6 200 000-7 100 000]	43% [41-48%]	225 300	650 000 [510 000-780 000]	35% [29-45%]	577 000	1 290 000 [1 000 000-1 600 000]	45% [37-57%]
Sub-Saharan Africa^a	2 926 000 [2 680 000-3 170 000]	6 800 000 [6 200 000-7 200 000]	43% [41-48%]	225 100	650 000 [510 000-780 000]	35% [29-44%]	576 900	1 300 000 [1 000 000-1 600 000]	45% [37-57%]
Eastern and Southern Africa	2 393 000 [2 200 000-2 590 000]	4 900 000 [4 500 000-5 300 000]	48% [45-53%]	195 100	440 000 [340 000-540 000]	44% [36-57%]	516 400	900 000 [680 000-1 100 000]	58% [47-66%]
Western and Central Africa	530 000 [484 000-576 000]	1 800 000 [1 500 000-1 900 000]	30% [28-35%]	29 800	200 000 [140 000-260 000]	15% [11-22%]	60 300	380 000 [260 000-510 000]	16% [12-23%]
North Africa and the Middle East	10 600 [9 300-11 900]	92 000 [73 000-120 000]	12% [9-14%]	<500	7 600 [4 100-12 000]	6% [4-11%]	<500	15 000 [8 300-24 000]	2% [1-3%]
Latin America and the Caribbean	445 000 [405 000-485 000]	820 000 [750 000-870 000]	54% [51-60%]	16 100	21 000 [18 000-25 000]	76% [65-91%]	17 100	32 000 [24 000-41 000]	54% [42-71%]
Asia	566 000 [519 000-613 000]	1 500 000 [1 200 000-1 800 000]	37% [31-48%]	30 000	57 000 [41 000-77 000]	53% [39-74%]	21 700	82 000 [52 000-120 000]	26% [17-42%]
East Asia and Pacific	328 000 [305 000-351 000]	750 000 [500 000-960 000]	44% [34-66%]	16 600	26 000 [20 000-34 000]	65% [49-82%]	10 900	30 000 [18 000-46 000]	37% [23-61%]
South Asia	238 000 [214 000-263 000]	760 000 [610 000-960 000]	31% [25-39%]	13 400	31 000 [18 000-48 000]	43% [28-76%]	10 800	52 000 [28 000-86 000]	21% [13-38%]
Central and Eastern Europe and the Commonwealth of Independent States^a	80 500 [76 000-85 000]	360 000 [300 000-430 000]	23% [19-27%]	4 100	4 900 [2 700-7 500]	82% [54-95%]	12 500	13 200 [7 900-19 000]	95% [65-95%]
All low- and middle-income countries	4 025 000 [3 695 000-4 355 000]	9 500 000 [8 600 000-10 000 000]	42% [40-47%]	275 700	730 000 [580 000-880 000]	38% [31-47%]	628 400	1 400 000 [1 100 000-1 700 000]	45% [37-57%]

Note: some groups do not add up to the total due to rounding.

a For an explanation of the methods used, see the explanatory notes for annexes.

b The coverage estimate is based on the unrounded 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.

c Africa includes all countries in the Eastern and Southern Africa region; all countries in the West and Central Africa region and the following countries in the Middle East and North Africa region: Algeria, Djibouti, Egypt, Libyan Arab Jamahiriya, Morocco, Sudan and Tunisia.

d UNICEF includes values from Djibouti and Sudan in the total for sub-Saharan Africa, while the values for these countries are excluded in the subregions in Africa.

e 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 (Plurinational State of)	Lower middle income	Concentrated	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

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO 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
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*	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

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Kyrgyzstan	Low income	Concentrated	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
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
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	Oceania	Oceania	East Asia and the Pacific	Western Pacific Region

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO 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
Poland	Upper middle income	Concentrated	Europe and Central Asia	Western and Central Europe	Industrialized countries	European Region
Republic of 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
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	Low	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	Low	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 ^b	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

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO 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
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 WHO classifies Djibouti under Eastern Mediterranean Region. UNICEF classifies Djibouti both under Middle East and North Africa and sub-Saharan Africa.

b For the analysis throughout the report, values for Sudan have been included in Middle East and North Africa based on UNAIDS classification, while UNICEF classifies Sudan both under Middle East and North Africa, and sub-Saharan Africa.

LIST OF INDICATORS IN THE WHO, UNICEF AND UNAIDS ANNUAL REPORTING FORM FOR MONITORING THE HEALTH SECTOR RESPONSE TO HIV/AIDS, 2009

General country information

- #1 Number of administrative units in the country
- #2 Number of health facilities
- #3 Number of health facilities that offer antiretroviral therapy

A Testing and counselling

- #A1 Percentage of health facilities that provide HIV testing and counselling services
- #A2 Number of individuals aged 15 and over who received HIV testing and counselling and know their results
- #A3 Percentage of women and men aged 15–49 who received an HIV test in the last 12 months and who know their results
- #A4 Proportion of sexually active young women and men aged 15–24 who received an HIV test in the last 12 months and who know their results
- #A5 Percentage of most-at-risk populations who received an HIV test in the last 12 months and who know their results
- #A6 Percentage of people 15–49 years who know their HIV status

B Prevention in health care settings

- #B1 Percentage of health care facilities where all therapeutic injections are given with new, disposable, single-use injection equipment
- #B2 Percentage of health facilities with post-exposure prophylaxis (PEP) services available on site

C Prevention of sexual transmission of HIV and prevention of transmission through injecting drug use

- #C1 Number of needle and syringe programme sites per 1000 injecting drug users
- #C2 Number of opioid substitution therapy sites per 1000 injecting drug users
- #C3 Number of syringes/needles distributed per injecting drug user per year by needle and syringe programmes
- #C4a Percentage of injecting drug users reached with HIV prevention programmes in the last 12 months
- #C4b Percentage of sex workers reached with HIV prevention programmes in the last 12 months
- #C4c Percentage of men who have sex with men reached with HIV prevention programmes in the last 12 months
- #C5a Percentage of injecting drug users reporting the use of sterile injecting equipment the last time they injected
- #C5b Percentage of injecting drug users reporting the use of a condom the last time they had sexual intercourse
- #C5c Percentage of female and male sex workers reporting the use of a condom with their most recent client
- #C5d Percentage of men reporting the use of a condom the last time they had anal sex with a male partner
- #C6a Percentage of injecting drug users who are HIV-infected
- #C6b Percentage of sex workers who are HIV-infected
- #C6c Percentage of men who have sex with men who are HIV-infected

D Care

- #D1 Percentage of adults and children enrolled in HIV care and eligible for co-trimoxazole prophylaxis currently receiving co-trimoxazole prophylaxis

E HIV/TB

- #E1 Percentage of estimated HIV-positive incident TB cases that received treatment for TB and HIV
- #E2 Percentage of adults and children newly enrolled in HIV care given treatment for latent TB infection (isoniazid preventive therapy)
- #E3 Percentage of adults and children enrolled in HIV care who had TB status assessed and recorded during their last visit

F Sexually transmitted infections

- #F1 Number of targeted service delivery points for sex workers where sexually transmitted infection services are provided per 1000 sex workers
- #F2 Proportion of women accessing antenatal care services who are tested for syphilis in the last 12 months
- #F3 Prevalence of syphilis among sex workers
- #F4 Prevalence of syphilis among men who have sex with men
- #F5 Prevalence of syphilis among antenatal care attendees

G Antiretroviral therapy

- #G1 Percentage of health facilities that offer antiretroviral therapy
- #G2 Percentage of adults and children with advanced HIV infection receiving antiretroviral therapy
- #G3a Percentage of adults and children with HIV known to be on treatment 12 months after initiation of antiretroviral therapy
- #G3b Percentage of adults and children with HIV known to be on treatment 24 months after initiation of antiretroviral therapy
- #G3c Percentage of adults and children with HIV known to be on treatment 36 months after initiation of antiretroviral therapy
- #G3d Percentage of adults and children with HIV known to be on treatment 48 months after initiation of antiretroviral therapy
- #G4 Percentage of patients initiating antiretroviral therapy at the site during a selected period who are taking an appropriate first-line regimen 12 months later

H Health systems

- #H1 Percentage of health facilities dispensing antiretrovirals that have experienced a stock-out of at least one required antiretroviral in the last 12 months
- #H2 Percentage of facilities providing antiretroviral therapy using CD4 monitoring in line with national guidelines/policies, on site or through referral

I Women and children

- #I1 Number of antenatal care attendees
- #I2 Number of facilities providing antenatal care services
- #I3 Percentage of facilities providing antenatal care services that also provide CD4 testing on site or have a system for collecting and transporting blood samples for CD4 testing for pregnant women
- #I4 Number of facilities providing antenatal care services that also provide HIV testing and counselling for pregnant women
- #I5 Percentage of health facilities providing antenatal care services that offer both HIV testing and antiretrovirals for the prevention of mother-to-child transmission on site
- #I6 Percentage of health facilities that offer paediatric antiretroviral therapy (i.e. prescribe and/or provide clinical follow-up)
- #I7 Percentage of health facilities that provide virological testing services (e.g. polymerase chain reaction (PCR)) for infant diagnosis on site or through dried blood spots (DBS)
- #I8 Percentage of pregnant women who were tested for HIV and received their results – during pregnancy, during labour and delivery and during the postpartum period (<72 hours), including those with previously known HIV status
- #I9 Percentage of male partners of pregnant women attending antenatal care who know their HIV status
- #I10 Percentage of HIV-infected pregnant women who received antiretrovirals to reduce the risk of mother-to-child transmission
- #I11 Percentage of HIV-infected pregnant women assessed for antiretroviral therapy eligibility through either clinical staging or CD4 testing
- #I12 Percentage of HIV-infected pregnant women receiving antiretroviral therapy for their own health
- #I13 Percentage of infants born to HIV-infected women receiving any antiretroviral prophylaxis for prevention of mother-to-child transmission
- #I14 Percentage of infants born to HIV-infected women started on co-trimoxazole prophylaxis within two months of birth
- #I15 Percentage of infants born to HIV-infected women who received an HIV test within 12 months
- #I16 Distribution of feeding practices (exclusive breastfeeding, replacement feeding, mixed feeding/other) for infants born to HIV-infected women at 3 months
- #I17 Percentage of HIV-infected children aged 0-14 years who are currently receiving antiretroviral therapy

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.

WHO, UNICEF and UNAIDS collected the data presented in these annexes through the annual reporting form for monitoring the health sector response to HIV/AIDS (1) (see section 1.2 in Chapter 1).

The reporting form was sent to countries in January 2009. 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. Data was sent to regional offices and to WHO and UNICEF Headquarters between March and May 2009.

In addition, an international data reconciliation meeting was organized in May 2009 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. 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 being 15 years and older and children being younger than 15 years). Countries for which the disaggregation included private sector data have been footnoted. Data on the number of adults receiving antiretroviral therapy are available for 137 countries and data on the number of children receiving antiretroviral therapy are available for 142 countries. Overall, 127 countries provided breakdowns by age group for 2008. Data disaggregated by sex were available for 111 countries, of which 95 were related to 2008.

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 2008 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 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 2008 is derived through two processes: projections to the end of the year for countries that did not report data for December 2008 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, 133 countries provided data for December 2008 and hence no projections were necessary. Three countries provided updates for September 2008 or later, and hence projections of 1-3 months were made to December 2008. Together these 136 countries represent 99.7% of the total estimated number of people receiving antiretroviral therapy as of December 2008 in low- and middle-income countries. For 10 countries, data were available only for 2007 and, for 3 countries, only for 2006. Projections were made for 11 of these 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 adequately data on people who initiate treatment for the first time, people who discontinue treatment, people lost to follow-up and deaths.

Uncertainty may also arise because of the difficulty in measuring the extent of treatment provision in the for-profit and not-for-profit private sector. Some people receive treatment through nongovernmental organizations and/or private clinics that do not report through official channels in some countries. 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 2008. 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 (2). 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 2007 as more recent reported treatment data for December 2007 became available through the publication of the previous progress report (3) The updated global number of people receiving antiretroviral therapy at the end of 2007 is therefore 2 970 000 [2 680 000–3 260 000] instead of 2 990 000 [2 700 000–3 280 000] as previously published.

Estimating treatment needs and coverage

This report does not present the estimated need and coverage for adults by country. Treatment needs are 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 4.2). WHO treatment guidelines are currently being revised, including thresholds for initiating treatment. If these recommendations are revised, the treatment need for adults could change substantially. As a result, estimated need by country would increase and coverage by country would decrease. Estimated need and coverage country will be published in the next progress report, based on new clinical parameters.

Annex 2 reports on country estimated treatment needs and coverage for children younger than 15 years by country in 2008.

Paediatric treatment needs are estimated using standard UNAIDS/WHO methods (4), including uncertainty ranges (see box 5.1).

According to WHO guidelines, all children with HIV younger than one year of age need antiretroviral therapy. After the age of one year, the children needing treatment are defined as the children living with HIV who have moderate to severe disease (5). The number of children needing antiretroviral therapy in a given year is based primarily on the number of infants newly infected with HIV and their survival to the time when they need antiretroviral therapy. The number of infants newly infected with HIV is a function of the HIV prevalence among pregnant women and the estimated rate of mother-to-child transmission according to antiretroviral regimen coverage and infant feeding practices.

The estimates of antiretroviral therapy coverage for children presented in Annex 2 were calculated by dividing the number of children receiving antiretroviral therapy as of December 2008 by the number of children estimated to need treatment in 2008 (based on UNAIDS/WHO methods). Ranges around the levels of coverage are based on the uncertainty ranges around the estimates of need (6).

Explanatory notes for Annex 3

Prevention of mother-to-child transmission

Annex 3 provides data on indicators collected through the WHO, UNICEF and UNAIDS annual reporting form for monitoring the health sector response to HIV/AIDS (1).

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.

A total of 123 countries reported data in 2008. These 123 countries accounted for 97% of the 124 million women who gave birth in low- and middle-income countries in 2008 and nearly all (99.8%) of the estimated 1.4 million pregnant women living with HIV in low- and middle-income countries. All of these women are in need of effective interventions to prevent mother-to-child transmission of HIV, including antiretroviral treatment or prophylaxis for preventing transmission of the virus to their children. Data analyzed in this chapter is based on the 123 low- and middle-income countries that reported data on women and children.

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 antiretrovirals 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) (4). 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.

The 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. The 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.

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 (6).

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 low-level, concentrated and generalized based on the following principles and numerical proxies:

Low-level

Principle: Although HIV infection may have existed for many years, it has never spread to significant levels in any sub-population. Recorded infection is largely confined to individuals with higher risk behaviour: e.g. sex workers, drug injectors, men having sex with other men. This epidemic state suggests that networks of risk are rather diffuse (with low levels of partner exchange or sharing of drug injecting equipment), or that the virus has been introduced only very recently.

Numerical proxy: HIV prevalence has not consistently exceeded five percent in any defined sub-population.

Concentrated

Principle: HIV has spread rapidly in a defined sub-population, but is not well-established in the general population. This epidemic state suggests active networks of risk within the sub-population. The future course of the epidemic is determined by the frequency and nature of links between highly infected sub-populations and the general population.

Numerical proxy: HIV prevalence consistently over five percent in at least one defined subpopulation. HIV prevalence below one percent in pregnant women in urban areas.

Generalized

Principle: In generalized epidemics, HIV is firmly established in the general population. Although sub-populations at high risk may continue to contribute disproportionately to the spread of HIV, sexual networking in the general population is sufficient to sustain an epidemic independent of sub-populations at higher risk of infection.

Numerical proxy: HIV prevalence consistently over one percent in pregnant women.

This classification is currently under review by the UNAIDS Reference Group on Estimates, Modelling and Projections.

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.¹ 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.

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¹ 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.