

# TOWARDS UNIVERSAL ACCESS

Scaling up priority HIV/AIDS interventions  
in the health sector

Progress Report **2010**



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## FOREWORD

This year's report on HIV/AIDS interventions in the health sector presents strong evidence of progress in the global effort to fight HIV/AIDS, but it also makes clear how much work remains to be done.

In 2009, countries, partners and communities succeeded in scaling up access to HIV prevention, treatment and care.

Important gains have been made towards the goal of eliminating mother-to-child transmission of HIV by 2015. Over half of all pregnant women living with HIV in low- and middle-income countries received antiretrovirals to prevent HIV from being transmitted to their babies, and more children living with HIV are benefiting from treatment and care programmes. Community-driven, rights-based prevention programmes have contributed to lowering the number of HIV infections. WHO's revised guidelines for antiretroviral therapy now recommend initiation of therapy at an earlier stage of disease and, once fully implemented, these changes will help to further reduce the morbidity and mortality due to HIV.

These advances are all cause for encouragement. Nevertheless, this report also demonstrates that, on a global scale, targets for universal access to HIV prevention, treatment and care will not be met by 2010.

Only one third of people in need have access to antiretroviral therapy, coverage of prevention interventions is still insufficient, and most people living with HIV remain unaware of their serostatus. Stigma, discrimination and social marginalization continue to be experienced daily by people who are the most affected by HIV and hardest to reach in many countries, including people living with HIV, sex workers, injecting drug users, men who have sex with men, transgender people, prisoners and migrants.

At the same time, the financial crisis and resulting economic recession have prompted some countries to reassess their commitments to HIV programmes. Reduced funding for HIV services not only risks undoing the gains of the past years, but also greatly jeopardizes the achievement of other Millennium Development Goals, especially those related to maternal and child health.

While the global HIV response may have exposed the shortcomings of current health systems, it has also driven more concerted action towards addressing broader systemic issues, including human resource capacity, physical infrastructure, supply chains, health financing and information systems.

As many countries have shown, the ongoing scale-up of HIV programmes can be successfully leveraged to tackle long-standing systemic bottlenecks that have prevented other health outcomes from being achieved. We must also strategically integrate HIV/AIDS interventions into national health services, strategies and plans, including those for sexual, reproductive, maternal and child health, tuberculosis, sexually transmitted infections and harm reduction.

Special approaches remain necessary to address the particular circumstances and needs of those populations at greater risk for HIV infection. Rights-based national strategies must include special efforts to reach the poorest and those who are socially excluded. Programmes must be designed and delivered in ways that ensure equity in access, including for children and women. Only such a combined commitment to programme planning and delivery, built upon a solid primary health-



care framework, can fully capture synergies between interventions, ensure programmatic sustainability, and maximize coverage and impact.

Although there is considerable room for improvement, HIV programmes have had a positive impact on other disease outcomes and on social and economic development more broadly. The implication for public policy is clear: while the response to other global health priorities must be further strengthened, this must happen in addition to, not instead of, a continued and increasing commitment to HIV. Only by working together can we turn the tide of the epidemic.

We have the knowledge and ability to achieve universal access and reverse the epidemic. Let us turn the challenges faced by the global HIV response into an opportunity to renew our efforts and deliver on our collective commitments.

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## EXECUTIVE SUMMARY

The HIV epidemic remains a major global public health challenge, with a total of 33.4 million people living with HIV worldwide. In 2008 alone, 2.7 million people were newly infected with HIV.

Since 2006, when United Nations Member States committed to scaling up services and interventions towards the goal of universal access to HIV prevention, treatment, care and support by 2010, the WHO, UNICEF and UNAIDS Secretariat has sought to monitor key components of the health sector response to the HIV epidemic worldwide. This report, the fourth annual progress report published since 2006, assesses the situation at the end of 2009, one year before the universal access target. It compiles information from 183 of the 192 United Nations Member States, comprising 144 low- and middle-income countries and 39 high-income countries, on the status of the global health sector response to HIV, progress made and remaining challenges to achieving universal access.

The year 2009 saw continuing progress in expanding access to HIV testing, prevention, treatment and care in low- and middle-income countries. Some countries have already attained universal access (defined as coverage of at least 80% of the population in need) to antiretroviral therapy and/or interventions to prevent mother-to-child transmission. For a good number of countries, universal access is within clear reach by the end of 2010. Despite these encouraging findings, global targets for HIV prevention, treatment, care and support are unlikely to be achieved in 2010. This has important implications for a range of Millennium Development Goals (MDGs) beyond those specifically related to HIV (MDG 6), such as MDGs 4 and 5, with targets related to child and maternal health.

After years of considerable increases in international assistance, funding remained essentially flat over the current period. In the context of a global financial crisis, this report underscores the urgency of continuing to mobilize support by countries, donors and global agencies in order to respond to the HIV epidemic and contribute to achieving the MDGs.

### HIV testing and counselling

In 2009, more countries adopted policies on provider-initiated testing and counselling, and the number of facilities providing HIV testing and counselling continued to increase. As of December 2009, over two thirds of countries in sub-Saharan Africa and Latin America and the Caribbean had introduced policies supporting provider-initiated testing and counselling.

There was also an increase in the number of HIV tests performed globally. One hundred countries reported a total of 67 million people tested in 2009. In the 82 countries for which comparable data are available for 2008 and 2009, the median number of tests performed per 1000 population increased from 41 to 50 respectively.

However, knowledge of HIV status remained inadequate. According to 10 recent national population-based surveys in sub-Saharan Africa, the median percentage of people living with HIV who know their HIV status is below 40%. In addition, testing and counselling programmes are not always tailored to local contexts, and considerable gaps remain between testing and counselling needs and existing practices.

### Key indicators of progress in low- and middle-income countries in 2008 and 2009<sup>a</sup>

	December 2008	December 2009
Number of adults and children receiving antiretroviral therapy	4 053 000	5 254 000
Antiretroviral therapy coverage among adults and children:		
Based on 2010 WHO guidelines (treatment initiation at CD4 cell count <350 cells/mm <sup>3</sup> )	28% [26-31%]	36% [33-39%]
Based on 2006 WHO guidelines (treatment initiation at CD4 cell count <200 cells/mm <sup>3</sup> )	42% [38-48%]	52% [47-58%]
Antiretroviral therapy coverage among children less than 15 years of age	22% [16-34%]	28% [21-43%]
Percentage of pregnant women living with HIV receiving antiretroviral drugs to prevent mother-to-child transmission	45% [37-57%]	53% [40-79%]

<sup>a</sup> See box on Updated guidance on antiretroviral therapy and its implications for needs estimates.

## Health sector interventions for HIV prevention

More low- and middle-income countries reported conducting surveillance for HIV among selected population groups at higher risk for HIV infection, such as injecting drug users, sex workers and men who have sex with men. Nevertheless, most countries were still unable to provide data on the coverage of HIV prevention programmes<sup>1</sup> among these population groups, and the quality and representativeness of the reported data are sometimes limited.

In 2009, among 27 low- and middle-income reporting countries, the median percentage of injecting drug users reached with HIV prevention programmes in the 12 months preceding the surveys was 32%. Of 92 countries that reported information on harm reduction policies for injecting drug users, 36 reported having needle and syringe programmes, and 33 offered opioid substitution therapy. In all the reporting countries, the number of syringes distributed per injecting drug user per year is below the internationally recommended target of 200 syringes per injecting drug user per year.

Among 21 reporting countries, the median percentage of men who have sex with men reached with HIV prevention programmes in the 12 months preceding the surveys was 57%. In the case of sex workers, the median percentage was 58% among 38 reporting countries.

<sup>1</sup> Based on UNGASS indicators; see Tables 3.4 p. (injecting drug users), 3.6 p. (men who have sex with men), 3.7 p. (sex workers)

### Updated guidance on antiretroviral therapy and its implications for needs estimates

In 2009 and 2010, WHO issued revised guidelines and recommendations on (i) antiretroviral therapy for adults and adolescents, including pregnant women, (ii) antiretroviral drugs for treating pregnant women and preventing HIV infection in infants, (iii) antiretroviral therapy for HIV infection in infants and children, and (iv) HIV and infant-feeding.

WHO's updated guidelines on antiretroviral therapy for adults and adolescents, including pregnant women, now recommend that antiretroviral therapy be initiated when CD4 cell counts reach or drop below 350 cells/mm<sup>3</sup>, regardless of whether or not patients have clinical symptoms (see boxes 4.1 and 4.2). Although this change has increased the number of people estimated to be in need of antiretroviral therapy at the end of 2009 from 10.1 million to 14.6 million [13.5–15.8 million], it is expected that, in the medium term, the higher initial investments required to conform to these guidelines will be fully compensated for by fewer hospitalizations and lower morbidity and mortality rates. As of December 2009, 29 countries had already incorporated the new WHO recommendations on eligibility criterion for initiating antiretroviral therapy into their national treatment guidelines.

Multiple legal and sociocultural barriers continue to prevent or discourage injecting drug users, men who have sex with men, transgender people and sex workers from accessing and using health-care services. Addressing these issues requires removing punitive laws that criminalize their behaviours, and creating enabling environments to reduce stigma and discrimination and protect human rights.

Some progress was made in developing and implementing additional prevention tools and technologies. As of January 2010, over 133 000 male circumcisions had been performed in six Sub-Saharan countries reporting on service delivery.

The availability and safety of blood and blood products for transfusion remains an area of concern in low- and middle-income countries. Only 48% of blood donations in low-income countries were screened in a quality-assured manner, compared to 99% and 85% in high- and middle-income countries, respectively.

## Treatment and care for people living with HIV

At the end of 2009, 5.25 million people were reported to be receiving antiretroviral therapy in low- and middle-income countries. This represents an increase of over 1.2 million people from December 2008, the largest increase in one year. Sub-Saharan Africa had the greatest increase in the absolute number of people receiving treatment in 2009, from 2 950 000 in December 2008 to 3 911 000 a year later.

Based on the new criterion for treatment initiation (CD4 cell count of or below 350 cells/mm<sup>3</sup>), antiretroviral therapy coverage increased from 28% [26–31%] in December 2008 to 36% [33–39%] at the end of 2009. Under the previous criterion for treatment initiation (CD4 count of or below 200 cells/mm<sup>3</sup>), global coverage would have reached 52% [47–58%] in 2009.

Eight low- and middle-income countries (Botswana, Cambodia, Croatia, Cuba, Guyana, Oman, Romania and Rwanda) had already achieved universal access to antiretroviral treatment by December 2009 (treatment coverage of at least 80% of patients in need).

At 39%, antiretroviral therapy coverage was higher among women, compared with 31% among men.

Available country cohort data on the proportion of patients retained on antiretroviral therapy over time show that most patient attrition occurs within the first year of treatment initiation and that retention rates tend to stabilize thereafter. In 2009, the average retention rate at 12 months across low- and middle-income countries was 82%, and was approximately the same among men and women. Reported



retention trends in 2009 were similar to those observed in 2008. However, many programmes were still technically and operationally unable to provide data on patient retention, especially over longer periods. It is essential that partners and countries step up efforts to strengthen patient and cohort monitoring systems to capture, process and use longitudinal retention data.

As of mid-2010, 28 countries had implemented surveys to classify transmitted HIV drug resistance. Among 15 WHO quality-assured surveys, transmitted HIV drug resistance was classified as low (<5%) by 13 countries, and moderate (between 5% and 15%) by two.

HIV-related tuberculosis (TB) remains a serious challenge for the health sector's response to HIV. In 2008, of the 9.4 million incident TB cases worldwide, an estimated 1.4 million were among people living with HIV. Although the rate of HIV testing and counselling for TB patients is increasing, it remains inadequate. Almost 22% of people with notified TB knew their HIV status in 2008, up from 16% in 2007 and 3.2% in 2004. Antiretroviral therapy coverage among people living with HIV and TB was low, and implementation of the *Three I's for HIV/TB* – intensified TB case finding among HIV patients, isoniazid preventive therapy and TB infection control – remained insufficient.

### Updated guidance on prevention of mother-to-child-transmission and paediatric treatment

The 2010 revised guidelines on prevention of mother-to-child transmission of HIV propose major changes to more effective antiretroviral drug interventions. This includes earlier antiretroviral therapy (ART) for a larger group of HIV-positive pregnant women (CD4  $\leq$  350 or stage 3 or 4 disease) to benefit both the health of the mother and prevent HIV transmission to her child during pregnancy and breastfeeding. For women who do not require ART the guidelines recommend two options for antiretroviral prophylaxis, to be chosen at country level taking into account feasibility and implementation issues (see Box 5.3). In addition, the revised guidelines now recommend the provision of antiretroviral drugs to the mother or child to reduce the risk of HIV transmission during breastfeeding in settings where it is judged to be the safest infant-feeding option (see Box 5.3 and Box 5.4). Updated paediatric antiretroviral therapy guidelines now advise that all HIV-positive children less than 24 months of age be started on antiretroviral therapy, and that children more than 24 months of age be initiated on treatment depending on age-specific CD4 cell count thresholds (see Box 5.6). These revisions should significantly lower vertical transmission rates, increase HIV-free survival, and improve the quality of life and survival of infants and children living with HIV. Additional technical and financial support is needed, however, to enable countries to fully implement the revised recommendations in a timely and effective manner.

### HIV services for women and children

Access to services for preventing mother-to-child transmission of HIV expanded further in 2009. An estimated 26% of all pregnant women in low- and middle-income countries received an HIV test in 2009, up from 21% in 2008. However, this figure is still low, largely due to inadequate coverage of HIV testing in East, South and South-East Asia (17%) where 55% of pregnant women live.

An estimated 53% [40–79%] of pregnant women living with HIV received antiretroviral drugs to reduce the risk of transmitting HIV to their infants, up from 45% [37–57%] in 2008. In sub-Saharan Africa, which has around 91% of the 1.4 million pregnant women in need of antiretroviral drugs for preventing mother-to-child transmission, the coverage is 54% [40–84%] in 2009.

The efficacy of antiretroviral drugs in preventing mother-to-child transmission of HIV varies with the type of drug combination used and the duration of the regimen. Among pregnant women who have access to antiretroviral drugs for preventing mother-to-child transmission, the proportion receiving single-dose nevirapine decreased from 49% to 30% between 2007 and 2009, whereas the percentage of women receiving more efficacious regimens increased from 33% to 54% during the same time period.

Approximately 51% of pregnant women who tested positive for HIV were assessed for their eligibility to receive antiretroviral therapy for their own health, up from 34% in 2008.

About 356 400 children less than 15 years of age were receiving antiretroviral therapy at the end of 2009, up from 275 300 at the end of 2008, an increase of 29% in one year. These children represented an estimated 28% [21–43%] of all children less than 15 years estimated to need antiretroviral therapy in low- and middle-income countries, up from 22% [16–34%] in 2008 and 7% [5–11%] in 2005. Overall antiretroviral therapy coverage among children in low- and middle-income countries was lower than that among adults (37% [35–41%]). Moreover, in 54 reporting countries, only 15% [10–28%] of children born to HIV-positive mothers received an HIV test within the two first months of life.

Greater efforts are needed to scale up early testing of HIV-exposed infants, reduce the rate of loss to follow up among them in the postnatal period, and further integrate HIV interventions with services for maternal, newborn and child health.

Despite the limitations of the available information, there has never been so much evidence of the positive and growing impact of HIV-related investments in reducing



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new infections, averting deaths and ensuring that people living with HIV enjoy healthy lives. Yet, this evidence becomes available at a time when the global economic crisis of 2008–2009 has put the sustainability of many HIV programmes at risk. It is clear that without continued and strengthened financial and programmatic commitments, there is considerable danger that these achievements could be undone.

Addressing the challenges posed by the MDGs pertaining to HIV requires action along four main strategic directions: (i) expanding and optimizing the global HIV response, (ii) catalysing the impact of HIV programmes on other health outcomes, (iii) strengthening health systems for a sustainable and comprehensive response, and (iv) tackling the structural determinants of the response, including human rights violations. 🌐

# 1. INTRODUCTION

This report reviews the progress made in 2009 in scaling up access to selected health sector interventions for HIV prevention, treatment and care in low- and middle-income countries. It is the fourth in a series of annual progress reports published since 2006 by the World Health Organization (WHO), United Nations Children's Fund (UNICEF) and Joint United Nations Programme on HIV/AIDS (UNAIDS) in collaboration with international and national partners to monitor key components of the health sector response to the HIV epidemic worldwide.<sup>1</sup>

2010 is a landmark year for the global HIV response. At the 2006 United Nations General Assembly High-Level Meeting on AIDS, world leaders committed to scaling up services and interventions towards the goal of providing universal access to HIV prevention, treatment, care and support by the end of this year (1). Now, as countries and partners prepare to review universal access goals and targets in the months ahead, assessing progress is critical to identify areas where intensified action is needed to increase coverage and impact. This report will support this process in two ways. First, the accurate and up-to-date strategic information in the report will help countries to take stock of their achievements and identify programmatic bottlenecks, service delivery gaps and challenges. Second, the update of the global response will assist the international community in setting policy priorities, defining targets and designing relevant strategies to better support and enhance country responses.

The proximity of 2010 has served to rally and galvanize partners involved in the HIV response at all levels. Encouragingly, 2009 witnessed renewed commitment and resolve towards attainment of universal access and the Millennium Development Goals (MDGs). The launch of UNAIDS' Outcome Framework has helped focus attention on ten programmatic areas and a range of cross-cutting strategies in which progress must be rapidly accelerated (2). At the same time, the international community has also moved decisively towards agreeing to virtual elimination of mother-to-child transmission of HIV by 2015 (3). A new global health initiative, spearheaded by the United States Government, will support low- and middle-income countries to improve health outcomes and strengthen health systems,

including HIV services. New financial allocations have been agreed to by the Global Fund to Fight AIDS, Tuberculosis and Malaria. WHO's guidelines on antiretroviral therapy for adults and adolescents as well as children, now recommend initiation of therapy at an earlier stage of the disease, which should further reduce HIV-related mortality and morbidity as well as HIV transmission.

At the same time, the global HIV response has been buffeted by both the global financial crisis and changing public health and development priorities at national and international levels. These events have highlighted the need to enhance the impact of current investments by improving the efficiency, effectiveness and quality of programmes, strengthening linkages between programmes and building systems for a sustainable response.

This report shows that, among 144 low- and middle-income countries reporting programme data this year, eight had already achieved universal access to antiretroviral therapy at the end of 2009, providing treatment to at least 80% of patients in need. Furthermore, 15 countries had achieved the 80% target for coverage with antiretroviral prophylaxis to prevent mother to child transmission of HIV.

Although more countries may reach universal access goals by the end of 2010 as a result of ongoing efforts, global targets for HIV prevention, treatment, care and support are unlikely to be achieved. Importantly, this has implications not only for the HIV response, but also for all other MDGs, particularly MDGs 4 and 5, on child and maternal health. Indeed, as documented by recent research, a lower burden of HIV/AIDS has been associated with considerably greater progress towards the achievement of child mortality and tuberculosis (TB) goals than economic growth itself (4). In the absence of HIV, maternal mortality worldwide would have been lower by about 6% in 2008 (5) and a recent academic study (6) has estimated that up to 18% of pregnancy-related deaths may be due to HIV.

In spite of all the challenges and constraints, this report demonstrates that, with intensified and accelerated efforts, countries can achieve universal access. Health-care workers have been trained, critical infrastructure has been upgraded, and health systems are gradually being strengthened. Although much remains to be done and improved, millions of new HIV infections have already been averted and millions of people are alive today as a result of investments in HIV over the past few years.

<sup>1</sup> Two other important joint publications, to be released later in 2010, will complement the health sector-related information presented and discussed herein. *The Aids Today: 2010 UNAIDS Global Report* will discuss the current status of the epidemic and the multisectoral response at the global and national levels, and the *Stocktaking report on children and AIDS* will present additional critical data on the progress made and challenges in scaling up services for women, children and young people affected by the epidemic.

### Box 1.1. Global financing architecture for the HIV response

Globally, the major sources of financing for HIV programmes at the end of 2008 (the last year for which updated data are available) were domestic expenditures in the affected countries, which accounted for 52% of all investments, followed by direct bilateral cooperation (31%), multilateral institutions (12%) and the philanthropic sector (5%) (8).

After years of considerable increases in international assistance from high-income countries for the global HIV response, funding remained essentially flat over the 2008–2009 period. According to recent estimates, commitments from donor governments totalled US\$ 8.7 billion, the same as in 2008 (9). In comparison, it has been estimated that US\$ 26.7 billion would be necessary – from all sources, including domestic and international – for the global HIV response in low- and middle-income countries in 2010 (8).<sup>1</sup>

Global initiatives and multilateral institutions, including the Global Fund to Fight AIDS Tuberculosis and Malaria, the World Bank and, more recently, UNAIDS, continue to be important mechanisms for financing the scale-up of HIV interventions. Since its founding in 2002, the Global Fund has committed more than US\$ 11 billion to finance HIV-related programmes in 140 countries. In 2009, it approved its ninth round of funding, which allocated an additional US\$ 1.86 billion, to HIV proposals in 36 countries. The World Bank, in addition to its financing role, has ramped up significantly the provision of technical support to national partners. Since 1989, overall HIV-related commitments to all regions have totalled US\$ 4.2 billion (10). UNAIDS has also consolidated its role as a key contributor to scaling up access to medicines and diagnostics for HIV, malaria and TB. UNAIDS has raised over US\$ 1 billion since its launch in 2006 and, by December 2009, had committed over US\$ 565 million to four HIV/AIDS project areas in 51 countries (11).

Bilateral aid flows remain a major source of funding for HIV programmes in low- and middle-income countries. The United States, through the United States President's Emergency Plan for AIDS Relief (PEPFAR), is the largest individual provider of funding for the scale-up of HIV/AIDS services worldwide. Annual commitments channelled through its bilateral programmes rose from US\$ 1.65 billion in 2004 to US\$ 5.5 billion in 2009. For 2010, an additional US\$ 5.55 billion investment has been enacted.

In addition to bilateral and multilateral sources, private foundations, such as the Bill & Melinda Gates Foundation and the William J. Clinton Foundation, have also contributed significantly to the global AIDS response over the past several years, both financially and technically. 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 (8,12).

<sup>1</sup> This figure does not include the additional investments required to expand coverage of antiretroviral therapy to meet the new treatment eligibility criteria recommended by WHO (see chapter 4 for more details).

## 1.1. Data sources and methods

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. In order to avoid duplication and maximize data consistency, all indicators and the corresponding data collection processes have been designed to build on the monitoring framework of the Declaration of Commitment on HIV/AIDS of the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS (7). However, this report differs from its 2009 version in two main aspects. First, this year, countries were asked to report data on 35 indicators, compared to 46 in 2009 (see Annex 8). Second, not all 35 indicators are presented and discussed in this report, as a number of them will be compiled and published later this year in the *Aids Today: 2010 UNAIDS Global Report*. Data used in this report were reported by 39 high-income and 144 low- and middle-income countries. In addition, estimates of treatment needs and coverage in low- and middle-income countries have been substantially revised due to changes in the

recommended set of criteria for therapy initiation. WHO's 2010 antiretroviral therapy guidelines now recommend that all adults and adolescents, including pregnant women, with HIV infection and a CD4 count of or below 350 cells/mm<sup>3</sup> should be started on antiretroviral therapy, regardless of whether or not they have clinical symptoms. This change increased the number of people estimated to be in need of antiretroviral therapy at the end of 2009 from 10.1 million to 14.6 million [13.5 million–15.8 million] (see Box 4.2).

The data collected encompass the following programmatic areas: (i) HIV testing and counselling, (ii) prevention of sexual transmission of HIV and prevention of transmission through injecting drug use, (iii) management of sexually transmitted infections; (iv) coverage of antiretroviral therapy (v) coverage of collaborative HIV/TB services, (vi) stock-outs of antiretroviral drugs, and (vii) HIV interventions for women and children, including prevention of mother-to-child transmission. Policy-related questions were also asked to assess programmatic development. Response rates varied by indicator and are presented in the corresponding chapters.

### Box 1.2. Measuring progress towards universal access

In order to adequately gauge programmatic success, it is critical to properly agree on a standard set of definitions and concepts. Throughout this report, “access” is understood as 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 for achieving universal access.

*Coverage* is defined as the proportion of 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. Outcome and impact are the result of coverage, and depend on the efficiency and effectiveness of interventions.

This report also relies on 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), population-based surveys (such as the Demographic and Health Surveys) and recent scientific literature. Additional data- and methodology-related notes are included in each chapter, as appropriate.

## 1.2. Structure of the report

This report is structured as follows:

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

**Chapter 2** presents the global progress in expanding availability and uptake of HIV testing and counselling.

**Chapter 3** discusses progress in scaling up health sector interventions for HIV prevention, including for key populations at higher risk for 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 mother-to-child transmission of HIV.

**Chapter 6** identifies the main challenges and the way forward towards achieving international goals.

The statistical annexes provide country-specific data on facilities and services for testing and counselling and for sexually transmitted infections and on the global coverage of antiretroviral therapy and services to prevent mother-to-child transmission. Additional notes on data sources and methods are also provided. [🌐](#)

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## 2. HIV TESTING AND COUNSELLING

### Key findings

- *The number of countries providing data on HIV testing and counselling has increased slightly.* In 2009, 118 low- and middle-income countries reported data on the availability of HIV testing and counselling in health facilities compared to 111 in 2008. One hundred countries provided information on the uptake of these services in 2009, up from 98 in 2008.<sup>1</sup>
- *More countries adopted policies on provider-initiated testing and counselling.* As of December 2009, over two thirds of countries in sub-Saharan Africa, Latin America and the Caribbean had introduced policies supporting provider-initiated testing and counselling.
- *The number of facilities providing HIV testing and counselling continued to increase.* The reported number of health facilities providing HIV testing and counselling increased to 107 000 in 2009 (118 reporting countries), up from 78 000 in 2008 (111 countries). In 101 low- and middle-income countries reporting data in both 2008 and 2009, the median number of facilities per 100 000 population rose by 28% during this period, from 4.3 to 5.5.
- *The number of HIV tests performed increased globally.* One hundred countries reported a total of 67 million people tested in 2009. In the 82 countries for which comparable data are available, the median number of tests performed per 1000 population grew by almost 22% between 2008 and 2009, from 41 to 50.
- *Population surveys conducted in low- and middle-income countries show that (i) the proportion of people who report having ever had an HIV test is higher among women than men, and (ii) knowledge of HIV status remains inadequate: based on 10 population-based surveys conducted in 2007–2009, the median percentage of people living with HIV who know their status is estimated at below 40%.*
- *Testing and counselling programmes need to be better tailored to the local epidemiological contexts.* An effective response requires efforts to increase the uptake of services, especially among most-at-risk populations, while respecting human rights.

<sup>1</sup> 2008 and 2007 figures may differ from those published in previous Progress Reports due to updates or corrections submitted by countries.

Expanding the availability and use of HIV testing and counselling services is a critical step towards ensuring access to services and interventions for prevention, treatment and care of HIV. A timely diagnosis alone can ensure that antiretroviral therapy is initiated when its clinical benefits are greatest. Testing and counselling also present an opportunity to share information with clients and promote measures to reduce the risk of HIV infection and transmission. The World Health Organization (WHO), Joint United Nations Programme on HIV/AIDS (UNAIDS), and UNICEF support both *client-initiated HIV testing and counselling* (also known as voluntary counselling and testing), in which individuals actively seek HIV testing and counselling at a facility that offers these services, as well as *provider-initiated HIV testing and counselling* at health facilities, in which health-care providers recommend an HIV test (1).<sup>1</sup>

This chapter discusses national-level data regarding the availability and coverage of HIV testing and counselling among adults (see Box 2.1). Testing among pregnant women and in infants is discussed in Chapter 5. It is important to note that in high-prevalence settings, testing and counselling tend to be conducted principally among the general population, while in low-prevalence settings, testing and counselling tend to focus on populations at higher risk, such as injecting drug users, men who have sex with men and sex workers. The 2009 progress report *Towards universal access: scaling up priority HIV interventions*

*in the health sector* provided a summary of the information on populations at higher risk that was available at the time (2). Updated estimates should be available once the ongoing reporting process for the United Nations General Assembly Special Session (UNGASS) indicators is complete, as these indicators include a component on the percentage of people who were tested and received the results in the previous 12 months among specific populations. Other gaps in the information needed to describe the global situation of HIV testing include data on the types of testing conducted in different settings; the procurement, supply and management of test kits and laboratory materials; the costs of tests and the quality of services; in addition to a systematic assessment of how referral to treatment and care function after testing, and how prevention is enhanced. Addressing these gaps requires a mobilization of resources to collect and analyse strategic information over time.

Encouragingly, reported data point to a continuing expansion in both the availability and uptake of testing and counselling in 2009. A number of countries have recently launched initiatives to significantly accelerate access to HIV testing and counselling, the results of which should help move towards the achievement of universal access.

## 2.1. Policies and programmes for HIV testing and counselling

Reports by 119 countries show that there is increasing commitment on the part of countries and partners to policies that support the provision of HIV testing and diversify modes

<sup>1</sup> For everyone, irrespective of epidemic setting, whose clinical symptoms 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.

### Box 2.1. Methodological note

Data discussed in this chapter are based on two sets of sources. The first consists of reports sent by countries to WHO, UNAIDS and the United Nations Children's Fund (UNICEF) regarding policies, programmes and indicators based on information collected from health facilities. These data were compiled and verified where feasible, in collaboration with countries. However, given the lack of adequate strategic information systems in many countries, they are often not formally validated. It is also necessary to consider the limitations of aggregating data across countries, as definitions may not be standardized. In particular, it is not always clear whether test results are always returned, and whether counselling is consistently provided alongside testing. In addition, measurements often depend on how the services are organized, and on the types of facilities where testing is conducted. These range from laboratories to fully integrated testing, counselling and medical care facilities. Data on service availability and uptake may not cover all public, private and nongovernmental health facilities in a country, or may not include all service delivery points where HIV testing and counselling services are provided. In addition, calculations of aggregate measures, in particular regional medians, may rely on the subset of countries in a region that provide comparable data and hence may not be fully representative of their respective regions; specific numbers should hence be interpreted with caution.

The second source of data comprises national population surveys conducted in some low- and middle-income countries. These surveys are generally based on nationally representative samples and typically follow standardized methodologies that provide comparable data on respondents' reports of their use of particular HIV services, thus making it possible to estimate coverage for different population groups. Some surveys also draw blood from respondents who agree to be tested and can thus provide information on the HIV status among particular groups. The extent to which such surveys can provide estimates of knowledge of HIV status depends on the specific information that is asked of respondents, in particular, regarding their HIV status.

The estimates provided by these two sources of data may differ, particularly if country reports do not include information from all non-governmental facilities; population surveys would generally provide more accurate estimates of uptake.



of HIV testing, including through outreach programmes for voluntary counselling and testing and in health facilities, as recommended by WHO and UNAIDS (1). By December 2009, 58 countries, representing more than two-thirds of the countries in sub-Saharan Africa and Latin America/the Caribbean, had introduced policies that supported provider-initiated testing and counselling. In Eastern Europe/Central Asia, the Middle East/North Africa, and East, South and South-East Asia, the percentage of countries with policies for provider-initiated testing and counselling in 2009 stood at 52% (14 out of 27 countries), 40% (8 out of 20 countries) and 37% (15 out of 41 countries), respectively. Some countries have also implemented national campaigns (Box 2.2) to enhance access to HIV testing and counselling, and encourage service uptake.

While information on policies reflects efforts at the national level, adequate monitoring of programme implementation is essential to detect areas of possible disjunction between policies and practices, and to identify ways of improving service delivery. One such comprehensive review (Box 2.3) was conducted for countries of the Eastern Mediterranean Region of WHO. It provides a useful example of how this can be done and offers important lessons for optimal policy design and programme management.

## 2.2. Availability and uptake of HIV testing and counselling

A total of 118 low- and middle-income countries submitted data on the availability of HIV testing and counselling services in health facilities through this year's reporting process (Table 2.1 and Annex 1), a slight increase from the 111 who participated last year.<sup>1</sup> These 118 countries reported that testing and counselling services were provided by 107 000 health facilities. In 2006, 52 countries had reported 21 900 health facilities, a figure that grew in 2007 to 30 300 in 78 countries and in 2008 to 78 000 in 111 countries.

With respect to the uptake of testing and counselling, 100 countries provided data in 2009. On a regional basis, there was a slight decrease in the number of reporting countries from the Middle East and North Africa, but this was compensated for by an increase in the number of countries providing information from Latin America and the Caribbean. Country reports give the total numbers of people tested, but these figures do not correct for the fraction of people tested more than once in the course of the

<sup>1</sup> 2008 and 2007 figures may differ from those published in previous Progress Reports due to updates or corrections submitted by countries.

### Box 2.2. Expanding access to HIV testing and counselling through national testing campaigns

A number of countries have organized national campaigns to encourage HIV testing, increase knowledge of HIV status, and facilitate referral to treatment and prevention services. For example, since 2004, Burkina Faso has conducted annual testing campaigns for the general population as well as for specific groups such as students, sex workers and truck drivers. The involvement of local nongovernmental organizations under the umbrella of the PAMAC project (Programme d'Appui au Monde Associatif et Communautaire) has contributed to a rapid increase in the number of people tested, to more than one million in 2009 (3). Lesotho launched a "Know your status" campaign in 2004, which resulted in a fivefold increase in the number of tests performed over four years (4). Campaigns have also been conducted in Kenya, The United Republic of Tanzania and Malawi, and are planned in other countries, including Uganda.

South Africa has also just launched a new HIV testing and counselling campaign (5,6) as part of efforts to halve the rate of HIV infection and provide antiretroviral treatment to at least 80% of those who need it. It will be the largest-ever campaign in the world: it seeks to test 15 million people by June 2011 and plans to set up 500 HIV testing and counselling sites each quarter. Testing and counselling services will be offered in health facilities, during school campaigns and through outreach services such as mobile units. To meet this increased demand for health workers, the government has recruited retired nurses and other health workers back into service, and it now allows lay counsellors to provide testing and counselling services. A distinctive feature of this campaign is that HIV testing will be provided as part of a package of health services – including interventions for blood pressure, diabetes, anaemia, screening for sexually transmitted infection and tuberculosis (TB), and condom distribution – in line with South Africa's efforts to integrate HIV testing, referral, treatment and care.

In general, campaigns tend to elicit positive responses and result in a greater-than-expected increase in the number of people seeking to know their HIV status. However, it is critical to plan adequately in order to maximize the probability that the campaign will reach its intended audience, and to ensure that testing and counselling are linked with appropriate referral and treatment. The experience of Malawi with three consecutive annual one-week campaigns (2006–2008) illustrates the successes and challenges of national testing campaigns. The first campaign in 2006 generated a significantly positive response, and the number of people tested – over 96 000 – was nearly double the original target. By contrast, the campaign in 2008 fell considerably short of what had been planned (about 186 000 persons instead of 250 000). This has been attributed in part to the timing of the campaign, which coincided with the main farming season. Operational issues may have also contributed to this result: coverage was uneven and, in some districts, test kits were unavailable, funds were disbursed late, and the number of counsellors was insufficient (similar issues have been raised with respect to the campaign in Lesotho). Despite these challenges, an evaluation concluded that the campaigns in Malawi had been largely successful in rapidly scaling up testing and counselling, reaching large numbers in remote areas, identifying HIV-positive individuals and referring them for care and treatment. They were also instrumental in creating momentum for increased public support of HIV testing and counselling services and in making HIV testing a normal or routine part of health care (7).

year, which varies greatly among countries. Despite these limitations, the figures provide an indication of the uptake of testing and counselling. The total number of people tested reported in 2009, around 67 million, was 54% higher than the corresponding figure in 2008. Regional availability and uptake figures for 2009 are summarized in Table 2.1. (Country data are provided in Annex 1).

In order to more adequately monitor changes in availability and uptake over time, a ratio of facilities per 100 000 population and a ratio of tests per 1000 population have been computed and presented in Table 2.2. In order to analyze trends, these numbers are calculated only for the

countries that provided comparable data in both 2008 and 2009.

A total of 101 countries reported information on the number of testing facilities in both 2008 and in 2009. Among this group, the median number of facilities per 100 000 population increased by nearly 28% in a one-year period, from 4.3 to 5.5, with the steepest increase in Latin America and the Caribbean. In some countries, the changes are remarkable. In Kenya, Burkina Faso and Gabon, among others, the number of facilities providing testing and counselling services increased by over 50%. In Mali, it almost quadrupled, from 260 to 1091, and it rose

### Box 2.3. HIV testing and counselling policies and practices: a situation analysis of countries in the Eastern Mediterranean Region

A recently completed review (8) of policies and practices in the 22 countries of the Eastern Mediterranean Region highlights important progress made in scaling up HIV testing and counselling services, as well as the challenges for policies and programmes in low-prevalence settings. The review triangulated multiple data sources all countries of the region – published and unpublished articles, surveillance data, monitoring and evaluation reports – along with interviews of key informants and field observations in Egypt, Oman, Pakistan and Sudan.

The review identified important gaps between existing practices and actual testing and counselling needs. The number of health facilities providing HIV testing and counselling in each country was not proportional to the population size, nor was it associated with the type of epidemic – generalized, concentrated or low-level. Moreover, although key policy documents identified voluntary counselling and testing as a vital intervention, only 3% of those who were tested learned their HIV status through voluntary counselling and testing services. Provider-initiated testing and counselling was seldom implemented. Indeed, mandatory testing was the most prevalent approach, being primarily conducted on foreign residents, migrant workers and most-at-risk populations, such as sex workers, men who have sex with men and injecting drug users, usually upon arrest, or on admission to health facilities or prison.

There was also a gap between the efforts expended on testing and the identification of HIV-positive cases: whereas 59% of tests were conducted on migrant workers, these yielded only 13% of HIV-positive cases. Conversely, though only 4% and 8% of tests, respectively, were conducted on key populations at higher risk and among clients of relevant health services (sexually transmitted infection, TB and antenatal care), these yielded the largest proportions of HIV-positive cases (23% and 18%, respectively).

Despite these shortcomings, there are indications that HIV testing and counselling services are expanding and improving. Access to voluntary counselling and testing is increasing everywhere, and some countries have implemented provider-initiated testing and counselling in practice, even if it is not formally part of the established policy framework. Although successful models of voluntary counselling and testing for key populations at risk are lacking, some countries (Oman, Egypt, Morocco, Pakistan, Lebanon) have instituted outreach programmes in collaboration with nongovernmental organizations (NGOs). Iran has developed a comprehensive harm reduction programme, and Morocco, with substantial involvement of NGOs, has established HIV testing and counselling sites focusing primarily on men who have sex with men, sex workers and, more recently, injecting drug users.

**Table 2.1.** Number of facilities with HIV testing and counselling and number of people<sup>a</sup> aged 15–49 years who received HIV testing and counselling, by region (low- and middle-income countries), 2009

Region	Number of facilities providing HIV testing and counselling	Number of countries reporting	Number of people older than 15 years who received HIV testing and counselling	Number of countries reporting
Sub-Saharan Africa	31 218	44	39 918 738	45
Latin America and the Caribbean	26 913	26	5 387 886	18
East, South and South-East Asia	23 571	22	17 524 974	18
Europe and Central Asia	21 022	18	3 846 142	13
North Africa and Middle East	4 142	8	744 993	6
<b>Total</b>	<b>106 866</b>	<b>118</b>	<b>67 422 733</b>	<b>100</b>

a Based on the numbers of people tested as reported by countries, but without correcting for the unknown fraction of people who are tested more than once.

**Table 2.2.** Number of facilities that provide HIV testing per 100 000 population, and number of tests<sup>a</sup> per 1000 population, for countries with information on 2008 and 2009, by region

Region	Median number of facilities per 100 000 adult population (number of countries reporting)		Median number of tests per 1000 adult population (number of countries reporting)	
	2008	2009	2008	2009
Sub-Saharan Africa	5.9	8.4	58	66
	(n=41)		(n=40)	
Latin America and the Caribbean	7.8	16	49	63
	(n=17)		(n=10)	
East, South and South-East Asia	0.9	1.2	9.2	13
	(n=20)		(n=15)	
Europe and Central Asia	4.6	4.7	30	44
	(n=16)		(n=11)	
North Africa and Middle East	0.9	1.2	3.3	3.6
	(n=7)		(n=6)	
Median (all countries)	4.3	5.5	41	50

a Based on the numbers of people tested as reported by countries, but without correcting for the fraction of people who are tested more than once.

sevenfold in Malaysia, from 1095 to 7627. Some countries reported a decrease in the number of testing facilities in 2009 compared with 2008, though most decreases were small in both absolute and relative terms.

With respect to uptake of testing, the global trend was also positive. Among the 82 countries for which comparable data are available for 2008 and 2009, the median number of tests performed per 1000 population grew by almost 22% between 2008 and 2009, from 41 to 50 (Table 2.2). In the 40 countries of sub-Saharan Africa that provided comparable data in 2008 and 2009, the absolute number of tests performed increased by over 35% in the period and reached nearly over 32 million, bringing the regional median number of tests per 1000 population from 58 to 67. This improvement, however, hides important patterns. On the one hand, a number of countries in the region recorded notable gains, including Botswana, Central African Republic, Côte d'Ivoire, Ghana, Kenya, Mali, Namibia, Niger, Rwanda, Sierra Leone, Zambia, all of which saw the number of tests performed grow by 50% or more between 2008 and 2009. On the other hand, reported data suggest that testing uptake may have actually decreased in some countries, though such drops were typically modest. While it is not possible to ascertain the extent to which some of these changes over time may be related to changes in reporting, it is important to carefully monitor them. It is also worth noting that these statistics do not reflect the extent to which available testing services conform to guidelines on voluntary counselling and testing or provider-initiated testing and counselling (1).

Disparities in the availability and uptake of HIV testing and counselling remained very high within and across regions. Country data can be found in Annex 1.

### 2.3. Coverage of HIV testing and counselling

Data from national population surveys provide information on the extent to which individuals from different population groups use testing and counselling services. A growing number of countries are conducting national surveys, including Demographic and Health Surveys (DHS), which contain an HIV module where respondents report if they have been tested for HIV in the 12 months preceding the survey, and if they have ever been tested for HIV. Data from countries where recent national population surveys have been conducted (Table 2.3) show that a median of 12% of women and 7% of men report having had an HIV test in the 12 months preceding the surveys, while the median number of people who report having ever tested is 34% for women and 17% for men. As expected, there are considerable variations around these figures. For example, in some countries, such as Kenya, Sao Tome and Principe, and South Africa, as many as one quarter or more of women report having tested in the preceding 12 months, whereas comparable figures are much lower elsewhere. It is also worth highlighting that, consistently, fewer men than women report having tested, except in a few countries with a very low level of testing uptake overall. This gender gap most likely reflects the existence of programmes to test women during pregnancy in order to prevent the transmission of HIV from mother to child, and the absence of similar programmes to reach men (see Chapter 5).

Trends in the uptake of HIV testing and counselling can be assessed based on the results of successive surveys conducted in the same country over time. As summarized in Figure 2.1, in every country with available data, there were marked increases in HIV testing rates among both women and men between 2003 and 2009. In Mozambique, testing rates quadrupled among women and tripled among men, albeit from very low baseline numbers. A similar pattern was observed in the United Republic of Tanzania between 2003 and 2008, with other countries reporting figures that uniformly point to a substantial increase in the uptake of HIV testing and counselling in the past seven years.

Surveys that ask people about testing uptake and include a seroprevalence component provide an approximate indication of knowledge of HIV status among people living with HIV. The percentage of HIV-positive respondents who report that they have been tested for HIV provides an upper limit of the estimated number of people living with HIV who know their status. The accuracy of serostatus knowledge is lower than suggested

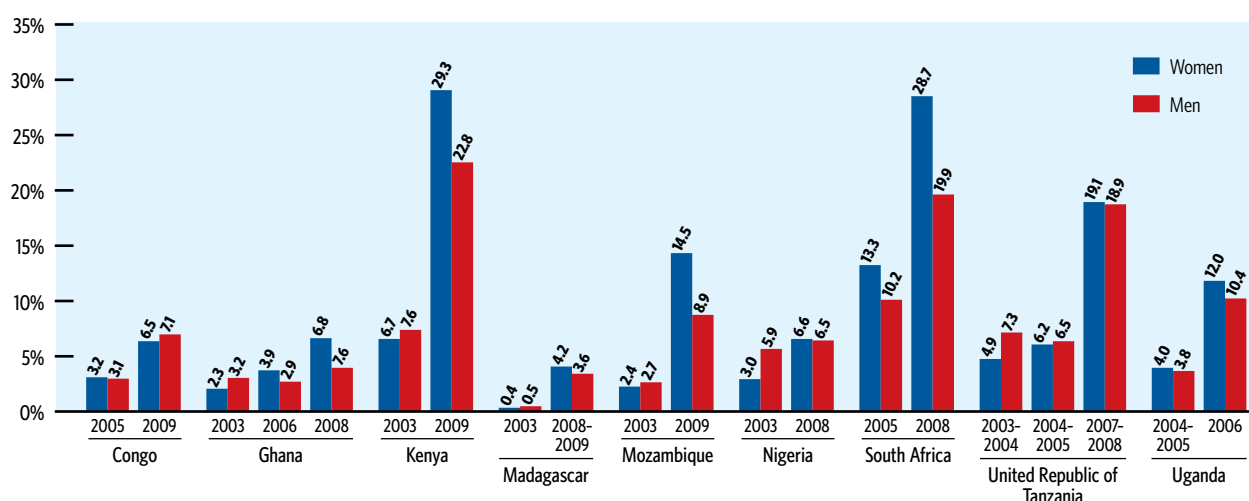
**Table 2.3.** Percentage of women and men aged 15–49 years who were tested for HIV and received their results in the 12 months preceding the survey, and those who were ever tested and received results, population-based surveys, 2007–2009

Country	Year	Percentage of people who received an HIV test and test result in the previous 12 months		Percentage of people who ever received an HIV test and test result	
		Women	Men	Women	Men
Bolivia (Plurinational State of)	2008	*	1.9	*	6.8
Congo	2009	6.5	7.1	22.5	17.7
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
Ghana	2008	6.8	4.1	16.9	12.4
Kenya	2009	29.3	22.8	56.5	40.4
Liberia	2007	1.6	2.3	3.2	4.9
Madagascar	2009	4.2	3.6	12.5	7.7
Mozambique	2009	14.5	8.9	33.6	17.2
Nigeria	2008	6.6	6.5	14.6	14
Philippines	2008	0.7	*	2.3	*
Sao Tome and Principe	2009	31.4	22.8	61.1	33.7
Sierra Leone	2008	4.1	3.4	9.4	7
South Africa	2008	28.7	19.9	56.7	43
Swaziland	2007	21.9	8.9	35.8	17.1
United Republic of Tanzania	2008	19.1	18.9	37.2	26.5
Ukraine	2007	12.3	7.2	45.4	21.4
Zambia	2007	18.5	11.7	35.3	19.8
<b>Median</b>		<b>12.3</b>	<b>7.2</b>	<b>33.6</b>	<b>17.2</b>

Source: Demographic and Health Surveys (9) and Shisana et al. (10).

\*In some countries, surveys are conducted on women and men separately, and statistics are not available for both sexes.

**Fig. 2.1.** Percentage of women and men who received an HIV test and test results in the 12 months preceding the survey in countries with repeat population surveys, 2003–2009



Source: Demographic and Health Surveys (9) and Shisana et al. (10,11).

by this percentage, because some people who have tested may have seroconverted after an earlier negative test. This is well documented in the 2007 Kenya AIDS Indicator Survey (KAIS) (12). KAIS is unique in that it interviewed 18 000 adults aged 15–64 years, tested blood samples for HIV, and linked serostatus to perceived HIV status. It found that among HIV-positive respondents, 56% reported they did not know their status either because they were not tested or because they did not receive the results; of the remaining 44% who thought that they knew their status, 28% mistakenly thought they were HIV-negative, and only 16% actually knew their HIV-positive status. This survey clearly documents the gap between perceived and actual HIV status. While the information available on other countries does not make it possible to calculate such an

exact estimate of knowledge of serostatus among people living with HIV, it is possible to make comparisons over time of the percentage of HIV-respondents people who report having been tested for HIV. Comparing information from multiple surveys over time is suggestive of possible trends, even though the sets of countries being compared are not the same. As shown in Table 2.4, for surveys conducted between 2007 and 2009, the median of HIV-positive people who were tested prior to the survey was 39%, up from 17% for surveys conducted in 2004–2006. There are, however, considerable variations among countries, and it is clear that despite considerable progress in the past few years, much remains to be done to increase the knowledge of serostatus among people living with HIV.

**Table 2.4. Percentage of people living with HIV who had ever received an HIV test and their test results: national population surveys, 2004–2009**

Country	Year of survey	Female (%)	Male (%)	Both sexes
United Republic of Tanzania	2003–2004	21.5	20.2	21
Cameroon	2004	26.1	23.9	25.3
Lesotho	2004	16.8	16.4	16.7
Malawi	2004	13.6	19.7	16.1
Uganda	2004–2005	23.5	15	20.5
Cambodia	2005	*	*	42.2
Cote d'Ivoire	2005	13.6	23.6	16.5
Ethiopia	2005	8.4	5.6	7.6
Guinea	2005	5.4	*	5.4
Haiti	2005	30.7	15.6	24.5
Rwanda	2005	40.8	32.3	38
India	2005–2006	6.8	12.8	10.3
Zimbabwe	2005–2006	26.3	19.3	23.7
Benin	2006	24.9	*	23.5
Mali	2006	13	*	12.9
Niger	2006	*	*	9.4
<b>2003–2006 median (n=16)</b>				<b>16.7</b>
Democratic Republic of the Congo	2007	8.7		10.7
Dominican Republic	2007	72.6		60.7
Liberia	2007	8	11.5	9.2
Swaziland	2007	44	28.8	38.7
Zambia	2007	45.4	28.3	38.4
United Republic of Tanzania	2007–2008	43.7	30.8	39
Sierra Leone	2008	20.2	*	19.8
Sao Tome and Principe	2008–2009	*	*	41
Congo	2009	35.2	21.1	30.9
Kenya**	2009	73.5	58.6	68.9
<b>2007–2009 median (n=10)</b>				<b>38.6</b>

Source: Demographic and Health Surveys (9).

\*In some countries, surveys are conducted on women and men separately, and statistics are not available for both sexes.

\*\*Figures for Kenya come from the 2009 Demographic and Health Survey, which was conducted two years later than the Kenya AIDS Indicator Survey cited above and used a different methodology.



## 2.4. Looking ahead

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The existence of national policies that increase access to testing and counselling through a range of approaches, including voluntary counselling and testing, provider-initiated testing and counselling, campaigns and outreach programmes, demonstrates the commitment of governments to increase knowledge of HIV status, and surveys provide indications of the rapid expansion of testing uptake among different population groups. However, the available evidence also raises a number of questions. These have to do with the potential mismatch between testing policies and local circumstances; how to adequately tailor interventions to different populations; how to optimally scale up programmes to provide high-quality services and support referral to prevention and treatment; the extent to which testing and counselling services actually help to identify people in need and link them with the appropriate prevention, care and treatment interventions; and the costs and benefits of different ways of scaling up testing.

Addressing these issues requires the mobilization of resources to gather evidence that will help improve programmes. In addition, a multifaceted approach to guidance for testing services is needed in order to tackle the many issues associated with testing for infants, children and adolescents, as highlighted in several policy and guidance documents produced by WHO, UNAIDS and UNICEF (13, 14). Guidance is also needed on the uptake of testing among populations at increased risk for acquiring HIV; and on the optimal frequency of testing and re-testing, including among general populations and pregnant women. Efforts are under way to provide such guidance (15).

Other urgent issues are being debated. One concerns the desirability of encouraging self-testing, particularly in light of evidence regarding the prevalence and patterns of self-testing among health workers (16,17). Another issue emerges from the observation of high levels of serodiscordance among couples in stable relationships, especially in sub-Saharan Africa (18,19), the considerable risks for HIV transmission that these levels represent, and how to support HIV testing and counselling for couples. Debates about stigma would benefit from information about how HIV tests and serostatus are perceived among different population groups, the motivations for, and consequences of, HIV testing, and whether scaling up testing contributes to mainstreaming HIV and reducing the stigma often associated with it. Some evidence on these issues is expected when the results of the MATCH (Multi-country African Testing and Counselling for HIV) study, which compares modes of testing (voluntary counselling and testing, provider-initiated testing and counselling, home-based or campaigns) across countries, become available.

Additional work is warranted to define standards of quality for testing and counselling in order to ensure that recommendations are implemented in a way that maximizes the well-being of those tested. WHO and partners are engaged in a consultation process to formulate recommendations that will inform practices in different settings, and to define indicators of quality to assess services and improve their performance within a human rights framework (20). [🔗](#)



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# 3. HEALTH SECTOR INTERVENTIONS FOR HIV PREVENTION

## Key findings

### I. Preventing HIV infection among populations at higher risk for HIV infection

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- *More countries reported conducting surveillance for HIV among selected populations at higher risk for HIV infection.* Of 149 low- and middle-income countries surveyed, 42 reported conducting surveillance for HIV among injecting drug users versus 41 countries in 2008. The number of countries that reported conducting HIV surveillance among men who have sex with men increased from 44 to 54, and among sex workers from 65 to 74.
- *The median percentage of injecting drug users reached with HIV prevention programmes in the 12 months preceding the surveys was 32% among 27 countries reporting data in 2009.*
- *Coverage of harm reduction programmes remained limited in 2009.* Among 92 reporting countries, 36 had needle and syringe programmes, and 33 offered opioid substitution therapy. In countries reporting needle and syringe programmes, the number of syringes distributed per injecting drug user per year was still below the internationally recommended level of 200 syringes per injecting drug user per year.
- *The median percentage of men who have sex with men reached with HIV prevention programmes in the 12 months preceding the surveys was 57% among 21 countries reporting data in 2009.* Regionally, median coverage in 2009 was highest at 63% in Europe and Central Asia.
- *The median percentage of sex workers reached with HIV prevention programmes in the 12 months preceding the surveys was 58% among 38 countries reporting data in 2009.* The highest median coverage of prevention programmes was 76%, observed in Latin America and the Caribbean.

### II. Selected HIV prevention interventions in the health sector

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- *Additional progress has been made in scaling up male circumcision programmes* in the 13 priority countries of sub-Saharan Africa. As of January 2010, over 133 000 male circumcisions had been done in six countries providing data on service delivery.
- *The global burden of sexually transmitted infections remains high* in most regions of the world. Early identification and treatment of sexually transmitted infections is a critical element in controlling HIV infection, especially among people with multiple sexual partners.
- *The availability and safety of blood and blood products for transfusion continues to be an issue of concern, especially in low-income countries.* While 99% and 85% of donations in high- and middle-income countries, respectively, were screened in a quality-assured manner in 2009, in low-income countries the comparable figure was 48%.

Home to two-thirds of the 33.4 million people living with HIV worldwide in 2008, sub-Saharan Africa has seen HIV epidemics with very high levels of HIV prevalence in the general population of many of its countries (1,2). Although the dominant mode of HIV spread in the Region remains through heterosexual transmission, data that have emerged over the past few years show that a considerable number of infections are also occurring, for instance, among men who have sex with men and injecting drug users (3–6). In most of the rest of the world, the epidemic affects predominantly specific groups at higher risk for HIV infection, such as sex workers, men who have sex with men, transgender persons and people who inject drugs (2–5).

Considerable progress has been made in the past ten years in increasing access to HIV treatment and prevention services in many countries. However, in 2008, the number of new infections (2.7 million) was still larger than the number of people started on treatment. This underlines the importance of further expanding prevention coverage and access to care and treatment, and of improving existing prevention interventions to ensure that they are effective, relevant and appropriate for the intended populations. Investing in new prevention approaches and technologies and in the evaluation of existing prevention methods is also key to identifying and prioritizing the most cost-effective interventions.

In 2010, it is increasingly becoming clear that prevention efforts are producing results in many countries with generalized epidemics. Encouraging declines in HIV prevalence have been reported among young people aged 15–24 years (7). In some countries reporting data on sexual behaviour as well, this fall in prevalence has taken place alongside increased condom use, increased age at sexual debut and a decrease in the number of young people reporting multiple sexual partners. Clearly, it is not possible to attribute these important downwards trends in HIV prevalence to specific prevention interventions; rather, it is likely that a wide range of factors have played a role. These include expanded access to information, education and communication programmes, HIV testing and counselling, condom availability, HIV education in schools and behaviour change interventions, and efforts to reduce stigma and discrimination as well as increase access to treatment. What is clear is that the interaction of these factors has helped shape national policy, societal norms and, increasingly, individual behaviour, with the result that fewer young people are becoming infected with HIV.

Countries with concentrated epidemics are becoming increasingly more strategic, and developing prevention policies that seek to mitigate risks where they are greatest (2). Indeed, through targeted prevention efforts, a number of countries with concentrated HIV epidemics have achieved

reductions in HIV transmission overall (2). Countries with generalized epidemics are also starting to implement prevention efforts for populations at higher risk for HIV, even where these populations were thought to not exist or to not be important in the HIV epidemic.

It is equally clear that consistency of effort and strategy are important. Decreasing trends in HIV prevalence call for continued investments to protect current achievements and ensure long-term impact.

Priority prevention interventions in the health sector include interventions meant for people regardless of HIV status (mostly unknown or presumed HIV-negative) and for people living with HIV (Box 3.1) (8). A set of specific interventions have been proposed to reduce the risk of HIV transmission among injecting drug users, men who have sex with men, transgender persons, sex workers and prisoners.

### **Box 3.1. Interventions for the prevention of HIV in the health sector (8)**

#### **1. Enabling people to know their HIV status**

- 1.1 Client-initiated HIV testing and counselling
- 1.2 Provider-initiated HIV testing and counselling
- 1.3 Blood donor HIV testing and
- 1.4 Laboratory services for HIV diagnosis

#### **2. Maximizing the health sector's contribution to HIV prevention**

- 2.1 Preventing the sexual transmission of HIV
  - 2.1.1 Promoting and supporting condom use
  - 2.1.2 Detecting and managing sexually transmitted infections
  - 2.1.3 Safer sex and risk reduction counselling
  - 2.1.4 Male circumcision
  - 2.1.5 Prevention among people living with HIV
  - 2.1.6 Interventions targeting most-at-risk populations
  - 2.1.7 Specific considerations for HIV prevention in young people
  - 2.1.8 Specific considerations for HIV prevention among vulnerable populations
  - 2.1.9 Non-occupational post-exposure prophylaxis
- 2.2 Interventions for injecting drug users
  - 2.2.1 Needle and syringe programmes
  - 2.2.2 Opioid substitution therapy
  - 2.2.3 Information, education and communication
- 2.3 Prevention of HIV in infants and young children
  - 2.3.1 Family planning, counselling and contraception
  - 2.3.2 Antiretroviral medicines to prevent HIV infection in infants
  - 2.3.3 Treatment, care and support for women living with HIV, their children and families
  - 2.3.4 Infant-feeding counselling and support
- 2.4 Prevention of HIV transmission in health settings
  - 2.4.1 Safe injections
  - 2.4.2 Safe waste disposal management
  - 2.4.3 Occupational health of health-care workers
  - 2.4.4 Occupational post-exposure prophylaxis
  - 2.4.5 Blood safety

New biomedical prevention technologies, such as microbicides, and pre-exposure prophylaxis with antiretroviral drugs and vaccines, may offer important future opportunities for the health sector to expand its contribution to HIV prevention. The role of antiretroviral therapy in preventing HIV infection is discussed in Chapter 4.

This chapter describes the progress made in selected thematic areas for which new data are available. It is divided in three main parts. Section 3.1 presents and discusses data collected through the 2010 universal access reporting process on coverage of prevention programmes among selected populations at higher risk for HIV infection (people who inject drugs, men who have sex with men and sex workers). Section 3.2 discusses selected health sector interventions for HIV prevention (male circumcision, prevention of sexually transmitted infections and blood safety). Section 3.3 provides a brief overview of new prevention technologies. Data on HIV testing and counselling are reported in Chapter 2. Data on prevention of mother-to-child of HIV are reported in Chapter 5.

This report does not seek to gauge the extent to which national responses are appropriate to the epidemiological situation as biological and behavioural data are not provided herein. The *Aids Today: 2010 UNAIDS Global Report* to be published in November 2010, will update global epidemiological estimates and provide additional information on HIV prevention interventions. It will also address critical structural barriers, such as stigma, discrimination, poverty and gender violence.

### 3.1. Preventing HIV infection among populations at higher risk for HIV infection

This section presents data on access to and coverage of HIV prevention programmes and interventions for injecting drug users, men who have sex with men and sex workers. Gender- or age-disaggregated data are not consistently available and are not provided herein.

Adequately conducting HIV surveillance and monitoring programmatic responses for these population groups, who are at higher risk for HIV infection through their behaviours, is complex (Box 3.2). Stigma, discrimination and laws that criminalize these behaviours make it difficult for such individuals in many countries to seek health care, and access preventive commodities to protect themselves.

Epidemiological surveillance among these populations is key to assessing the effectiveness and impact of HIV prevention programmes. In 2009, of 149 low- and middle-income countries surveyed, 42 reported conducting systematic surveillance for HIV among injecting drug users, one country more than a year earlier. With respect to men who have

#### Box 3.2. The status of HIV serosurveillance in low- and middle- income countries

Effective HIV prevention responses must be tailored to local contexts and must be based on thorough epidemiological analysis and behavioural data. This requires continued investments in the development and strengthening of national HIV surveillance systems. The main goal of an HIV surveillance system is to monitor trends over time in HIV prevalence, incidence, mortality and behaviours associated with HIV transmission, as well as to assess the population-level burden of HIV and how it is geographically distributed. Data produced by HIV surveillance systems and analysed in conjunction with data produced by programme monitoring on access to and coverage of prevention, care and treatment interventions are essential for assessing the economic, health and demographic impacts of the epidemic, monitoring the results of intervention efforts, estimating epidemiological trends, and improving HIV programming.

Since 2002, WHO has conducted regular assessments on the quality of HIV surveillance systems and produces a composite index that takes into account the main principles of sound surveillance: (i) frequency and timeliness of data collection, (ii) adequacy of the populations under surveillance; (iii) consistency of the locations and groups measured over time; and (iv) representativeness of the groups actually surveyed.

Critical HIV surveillance data include those from antenatal clinics, population-based surveys and surveys among populations at higher risk for HIV infection (such as sex workers, injecting drug users, men who have sex with men and transgender persons) both in generalized and low-level/concentrated epidemics. These data are essential to understand the epidemiological dynamics and identify the drivers of the epidemic.

Investments made in establishing and strengthening surveillance systems in resource-limited settings continue to yield valuable results (9). Overall, 35 countries were categorized as having fully functioning HIV surveillance systems in 2009, down from 40 in 2007 (9). A further 47 and 56 countries were identified, respectively, as having partially or poorly functioning systems. When judged by the number of national Demographic and Health Surveys conducted, the quality of HIV surveillance remained relatively stable in 2009 vis-à-vis 2007. Between 2001 and 2008, 38 countries conducted national population-based surveys with HIV testing, 12 of them in the past two years. Ten countries have already conducted at least two national surveys with HIV testing, providing evidence for a preliminary identification of trends.

Even though countries have increased the number of surveys and data regarding population groups at higher risk for HIV infection are more widely available, the lack of consistency in the utilization of surveillance methods and tools is one of the major factors that negatively affects the quality of systems in many countries and limits comparability. Further strengthening of surveillance systems remains, therefore, an important objective of HIV programmes in most low- and middle-income countries not only to improve the quality of surveillance, but also their capacity to translate information into actionable and rational health policy. Periodic review is needed to ensure that the HIV surveillance systems appropriately reflect the distinct needs of different epidemiological dynamics that exist across countries and regions. Greater consistency must be ensured in the methods and tools used as well as in the populations and geographical locations surveyed. Lastly, correctly assessing trends requires efforts to improve incidence measurement through epidemiological research, as prevalence rates are not always the optimal measure for longitudinal appraisals, since they are likely to increase due to the drop in mortality associated with the roll-out of ART.

sex with men, the number of countries reporting systematic surveillance among this population increased from 44 to 54 and, in the case of sex workers, from 65 to 74. Nearly all countries that reported conducting surveillance among most-at-risk populations are doing so at the recommended frequency of one to three years (Table 3.1). Only 35 of 149 countries reported conducting surveillance among all three populations. A number of countries have implemented HIV case reporting. Some countries with a highly generalized HIV epidemic focus on surveillance in antenatal clinics. This shows that a country's priorities for conducting HIV surveillance depend largely on

local epidemiological patterns. The surveillance data provided by countries and reported by UNAIDS and WHO in 2009 highlighted the need to further expand and strengthen data collection efforts at the country level (2).

### 3.1.1. People who inject drugs

WHO, the United Nations Office on Drugs and Crime (UNODC) and UNAIDS recommend a comprehensive package of nine interventions for HIV prevention, treatment and care among injecting drug users. These are: (1) needle and syringe programmes, (2) opioid substitution therapy

**Table 3.1. Number of low- and middle-income countries reporting HIV surveillance among key populations with the recommended periodicity<sup>a</sup>, by region, 2009**

Geographical region (number of countries surveyed)	Population group					
	Number of countries conducting HIV surveillance among sex workers	Number of countries with appropriate periodicity	Number of countries conducting HIV surveillance among injecting drug users	Number of countries with appropriate periodicity	Number of countries conducting HIV surveillance among men who have sex with men	Number of countries with appropriate periodicity
East, South and South-East Asia (n = 35)	19	14	14	11	15	13
Eastern Europe and Central Asia (n = 25)	14	14	17	16	16	16
Latin America and the Caribbean (n = 29)	17	11	5	3	13	9
North Africa and the Middle East (n = 13)	4	4	2	2	4	4
Sub-Saharan Africa (n = 47)	20	18	4	3	6	4
Total (n = 149)	74	61	42	35	54	46

<sup>a</sup> Appropriate periodicity is defined as conducting HIV surveillance every one to three years.

### Box 3.3. Methodological notes on the quality and interpretation of data

The data collated and discussed in this section on population groups at higher risk for acquiring HIV infection were reported directly by Member States to WHO, UNICEF and UNAIDS in 2010. While considerable effort is currently ongoing to improve data collection methods and processes, many of the data points provided by countries on the coverage and impact of interventions for groups at higher risk for HIV infection come from surveys with small sample sizes and some from sentinel sites whose methods and sample sizes are highly heterogeneous.

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. In general, capital cities and other large metropolitan areas have higher numbers of injecting drug users and men who have sex with men compared to other geographical regions within countries (2, 10). Moreover, higher proportions of sex workers are found in particular locations, such as border or mining areas and along transport routes (10). As a result, coverage estimates may not be based on nationally representative estimates and may not be comparable across countries.

Failure to report does not imply that services are not available, although this may be the case. The fact that a particular policy may be in place does not indicate the level, scope or quality of services available or actually delivered.

The analysis in this section does not include surveys conducted before 2007 and those based on sample sizes of less than 100 participants. Median figures are provided by region whenever five or more countries in the same region reported data. Certain indicators published in the 2009 *Towards universal access: scaling up priority HIV/AIDS interventions in the health sector* (11), such as recent condom or clean syringe use, are not presented in this year's version as they will be released in the updated *Aids Today: 2010 UNAIDS Global Report* in November 2010.

The number of countries reporting on indicators that require survey results and on questions regarding policy availability may differ. For example, whereas 48 countries provided HIV prevalence data for injecting drug users in 2009, only 39 indicated that they had a policy to conduct HIV surveillance among this population. This may be attributable: (i) to countries choosing to report or not report certain indicators; (ii) to HIV prevalence being derived from nongovernmental surveys (e.g. academic surveys), and (iii) to the implementation of ad hoc official surveys outside the scope of formalized routine surveillance systems.



(for people dependent on opioids) 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 and treatment of and vaccination for viral hepatitis, and (9) prevention, diagnosis and treatment of TB.

While the combination of interventions and their specific content depend on the particular context in which they are applied, access to sterile needles and opioid substitution therapy are key elements of any successful programme to reduce harm and HIV transmission associated with injecting drug use (12). Yet, in spite of their importance, data on the availability of needle and syringe programmes and opioid substitution therapy are sparse. Ninety-two low- and middle-income countries reported information on the existence of programmes and policies targeted at people who inject drugs (Table 3.2). Needle and syringe programmes and opioid substitution therapy were available in 36 and 33 countries, respectively. Over half of all reporting countries indicated providing targeted HIV testing and counselling, as well as antiretroviral therapy and treatment for sexually transmitted infections. Targeted condom programmes for injecting drug users and their partners were reported in 46 countries.

There were important regional variations in the availability of interventions for injecting drug users. In Europe and Central Asia, all reporting countries indicated providing needle and syringe programmes and opioid substitution therapy, whereas in Latin America and the Caribbean, North Africa and the Middle East, and in sub-Saharan Africa, most countries did not provide these two interventions. All reporting countries in Europe and Central Asia indicated having targeted antiretroviral therapy programmes for injecting drug users.

Forty-six countries provided data on HIV prevalence among injecting drug users (Table 3.3), with important variations: from close to 0% in Albania, Lebanon and elsewhere, to over 50% in Estonia and Indonesia. Young drug users, including those living on the streets, also constitute a group whose risk of contracting HIV is increasing in many parts of the world, including in Europe and Central Asia, where one third of new HIV infections are in the age group of 15–24 years (13,14).

Eight countries, including Estonia and Indonesia, reported having adopted all policies included in the package of recommended interventions. Among countries reporting prevalence data by injecting drug users, 27 and 25 indicated having available needle and syringe programmes and opioid substitution therapy, respectively. However, the adoption of these two interventions is still inadequate. Indeed, a number

**Table 3.2.** Number of low- and middle-income countries reporting the availability of interventions for the prevention, treatment and care of HIV among injecting drug users, 2009

Total number of countries surveyed <i>n</i> = 149	Needle and syringe programmes	Opioid substitution therapy	Other drug dependency treatment	HIV testing and counselling	Antiretroviral therapy	Sexually transmitted infection prevention and treatment	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 tuberculosis
Total number of countries reporting	91	92	91	92	92	91	91	92	91	91
Number of countries reporting this intervention	36	33	44	59	58	57	46	57	33	35
<b>East, South and South-East Asia</b>										
Yes	13	9	13	17	16	17	14	17	6	11
No	7	11	7	3	4	3	6	3	14	9
<b>Eastern Europe and Central Asia</b>										
Yes	19	19	17	18	19	17	17	18	14	11
No	0	0	1	1	0	2	1	1	4	7
<b>Latin America and the Caribbean</b>										
Yes	3	2	6	9	9	10	6	10	5	6
No	13	15	11	8	8	7	11	7	12	11
<b>North Africa and the Middle East</b>										
Yes	0	1	2	5	5	5	4	5	4	3
No	6	5	4	1	1	1	2	1	2	3
<b>Sub-Saharan Africa</b>										
Yes	1	2	6	10	9	8	5	7	4	4
No	29	28	24	20	21	22	25	23	26	26

**Table 3.3.** Availability of selected policies/interventions<sup>a</sup> for injecting drug users and HIV prevalence among them in 46 countries, 2009<sup>b</sup>

Country name	Number of interventions adopted as policy	Needle and syringe programmes	Opioid substitution therapy	Estimated percentage of injecting drug users living with HIV (%)
Afghanistan	8	Yes	No	7.1
Albania	8	Yes	Yes	0.0
Argentina	4	No	No	11.9
Azerbaijan	NR	-	-	10.3
Bangladesh	9	Yes	No	1.6
Belarus	10	Yes	Yes	13.7
Benin	2	No	Yes	4.2
Bosnia and Herzegovina	8	Yes	Yes	0.4
Brazil	9	Yes	No	5.9
Bulgaria	NR	-	-	7.5
Cambodia	6	Yes	No	24.4
China	10	Yes	Yes	9.3
Estonia	10	Yes	Yes	61.6
Georgia	NR	-	-	2.2
Guatemala	0	No	No	1.6
India	9	Yes	Yes	9.2
Indonesia	9	Yes	Yes	52.4
Iran (the Islamic Republic of)	NR	-	-	14.3
Kazakhstan	10	Yes	Yes	2.9
Kyrgyzstan	10	Yes	Yes	14.3
Latvia	6	Yes	Yes	22.6
Lebanon	8	No	No	0.0
Madagascar	6	No	No	1.8
Malaysia	NR	-	-	22.1
Maldives	6	No	Yes	0.0
Mauritius	9	Yes	Yes	47.3
Mexico	NR	-	-	5.0
Montenegro	9	Yes	Yes	0.0
Morocco	NR	-	-	2.1
Myanmar	9	Yes	Yes	36.3
Nepal	8	Yes	Yes	20.7
Nigeria	0	No	No	5.6
Pakistan	NR	-	-	20.8
Philippines	8	Yes	No	0.2
Republic of Moldova	6	Yes	Yes	16.4
Romania	8	Yes	Yes	1.1
Russian Federation	NR	-	-	15.6
Saint Lucia	NR	-	-	6.2
Serbia	10	Yes	Yes	4.8
Tajikistan	10	Yes	Yes	17.6
Thailand	9	Yes	Yes	38.7
The former Yugoslav Republic of Macedonia	9	Yes	Yes	0.8
Tunisia	6	No	Yes	3.1
Ukraine	NR	-	-	22.9
Uzbekistan	10	Yes	Yes	11.0
Viet Nam	7	Yes	Yes	18.4
<b>Total (Yes)</b>		<b>27</b>	<b>25</b>	
<b>Total (No)</b>		<b>8</b>	<b>10</b>	

a Interventions: (i) needle and syringe programmes, (ii) opioid substitution therapy (for opioid users) and (iii) other drug dependence treatments, (iv) HIV testing and counselling, (v) antiretroviral therapy, (vi) prevention and treatment of sexually transmitted infections, (vii) condom promotion for injecting drug users and their sexual partners, (viii) targeted information, education and communication, (ix) diagnosis and treatment of and vaccination for viral hepatitis and (x) prevention, diagnosis and treatment of tuberculosis.

Opioid substitution therapies and other drug dependence treatments are counted as two interventions in this table, bringing the total number of WHO-recommended interventions to ten.

b Only countries that reported HIV prevalence among injecting drug users.

NR: not reported.

of countries with a relatively high HIV prevalence reported having neither needle and syringe programmes nor opioid substitution therapy. It is also necessary to expand data collection and reporting efforts, as seven countries reported high HIV prevalence among injecting drug users but did not report their harm reduction policies.<sup>1</sup>

Twenty-eight countries reported on the number of syringes/needles and needle and syringe programmes per 1000 injecting drug users, and twenty-two reported on access to opioid substitution therapy (Table 3.4). Most of them were in Eastern Europe and Central Asia, and in East, South and South-East Asia. Among reporting countries, accessibility remains limited. The highest uptake levels were reported in Romania and Mauritius, with 3.5 and 3.9 needle and syringe programme sites per 1000 injecting drug users, respectively. Five countries reported more than 100 syringes per injecting drug user per year (Bangladesh, Viet Nam, Kazakhstan, Kyrgyzstan and Tajikistan), far below the internationally recommended target that is likely to have an effect on the HIV epidemic – of 200 syringes provided per injecting drug user per year (12).<sup>2</sup>

Twenty-seven countries provided data on the percentage of injecting drug users reached with HIV prevention programmes in the past 12 months.<sup>3</sup> The median coverage was 32%, with eight countries reporting levels higher than 50% (Table 3.4). Although encouraging, these figures should be considered along with data on availability and accessibility, as discussed above. No longitudinal comparisons could be made between 2008 and 2009 data due to the small number of reporting countries in 2008.

A global policy review by the International Harm Reduction Association (15) found that 93 countries and territories have

### Box 3.4. Providing tuberculosis services to injecting drug users in Tijuana, Mexico

Scaling up access to tuberculosis services and interventions among injecting drug users is also essential to maximize programme impact (27). In Tijuana, Mexico, a cohort of injecting drug users (recruited between 2006-2007) had a 67% baseline prevalence of *Mycobacterium tuberculosis* infection and 4.0% prevalence of HIV infection. At 18 months, skin testing for *Mycobacterium tuberculosis* was repeated for those with negative skin tests and 67 (52%) of the previously negative injecting drug users were found to be newly infected. Clearly, injecting drug users in Tijuana are at very high risk for new infection with *Mycobacterium tuberculosis* and previous studies have demonstrated that they have a high risk of subsequent progression from latent TB to active TB when coinfecting with HIV (28). These findings highlight the need for routine HIV and TB screening among injecting drug users. For those living with HIV, early provision of antiretroviral therapy and isoniazid preventive therapy helps to prevent TB and decrease HIV mortality. Injecting drug users living with HIV who are diagnosed with TB also need immediate antiretroviral therapy. Education of injecting drug users is also needed to promote awareness of TB and care-seeking when symptoms arise (29).

explicit policies supporting harm reduction.<sup>4</sup> Eighty-two reported some type of needle and syringe programmes and 70 provide opioid substitution therapy; 60 offer both interventions, around double the figures compiled from country reports through the current reporting process (16). Globally, antiretroviral therapy was available to four of every 100 injecting drug users, with a regional range of 1-89 per 100 injecting drug users (17).

Efforts to expand the availability and coverage of prevention programmes among injecting drug users are often stymied by punitive approaches to drug use. Indeed, 32 countries and territories still employ the death penalty for drug-related offences, which may include illicit drug use and/or possession, and at least 12 of them are known to have carried out an execution for drug-related offences in the past three years. The criminalization of drug use and the failure to recognize substance dependence as a serious health condition are important factors that prevent people who inject drugs from accessing essential HIV interventions (16).

WHO and UNODC recommend that psychosocially assisted pharmacological treatment should not be compulsory (18). Yet, recent analyses of compulsory treatment suggest that up to several hundred thousand injecting drug users are

1 Discrepancies between the number of countries reporting the availability of a particular intervention and the number of countries reporting uptake data for the same intervention suggest a number of reporting issues for harm reduction indicators. In the 2010 reporting cycle, whereas 32 and 30 low- and middle-income countries reported policies supporting needle and syringe programmes and opioid substitution therapy, respectively, only 25 and 20 countries reported the corresponding availability indicators for these programmes. It is worth noting that 27 additional countries reported a numerator for these indicators, suggesting the existence of supportive policies for needle and syringe programmes and opioid substitution therapy, though they did not report their formal existence.

2 Recommended targets for additional interventions can be found in the *Technical guide for countries to set targets for universal access to HIV prevention, treatment and care in injecting drug users* published by WHO, UNAIDS and UNODC in 2009 (12).

3 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 past 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 past 12 months, have you been given condoms (e.g. through an outreach service, drop-in centre or sexual health clinic)? (3) In the past 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 who replied "yes" to the three questions, and the denominator is the total number of respondents surveyed.

4 This discrepancy between figures compiled by the International Harm Reduction Association (IHRA) and data submitted by countries to WHO, UNAIDS and UNICEF is partially explained by the different scope of the respective surveys. Whereas the latter 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.

**Table 3.4.** Availability and coverage of harm reduction programmes for injecting drug users in reporting low- and middle-income countries, by region, 2007–2009

Country	Number of needle and syringe programme sites per 1000 injecting drug users	Number of opioid substitution therapy sites per 1000 injecting drug users	Syringes/needles distributed by needle and syringe programmes per injecting drug user per year	Injecting drug users reached with HIV prevention programmes in the past 12 months <sup>a</sup>		
				Number of respondents who replied "yes" to all three questions	Total number of respondents surveyed	Percentage of injecting drug users reached with HIV prevention programmes (%)
Number of countries reporting	28	22	27	27		
Median all reporting countries	1.4	0.4	44.4			32
<b>East, South and South-East Asia</b>						
Afghanistan	1.3		20.2	92	549	16.8
Bangladesh	2.7	0.0	161.4	20	1 196	1.7
Cambodia	1.0		51.0			
China	1.7	1.2	23.2	10 095	26 191	39.0
India	1.5	0.3	81.0	71	479	14.8
Indonesia	1.1	0.2	8.3	609	1 404	43.4
Malaysia	1.4	0.95	14.7	47	630	7.5
Myanmar	0.6	0.1	67.1	477	908	52.5
Nepal	1.5	0.1	53.2	... <sup>b</sup>	... <sup>b</sup>	56.9
Pakistan				1 512	2 979	50.8
Philippines	0.2		1.7	110	958	11.5
Viet Nam	1.5	0.04	124.4	465	3 021	15.4
Regional median	1.4	0.15	51.0			16.8
<b>Eastern Europe and Central Asia</b>						
Armenia	0.8	0.2	10.6			
Azerbaijan				17	1 000	1.7
Belarus	0.6	0.0	21.9	1 041	1 636	63.6
Bosnia and Herzegovina	0.9	0.6	12.8	95	261	32.1 <sup>c</sup>
Bulgaria				713	1 360	52.4
Georgia				129	1 127	11.4
Hungary	0.04					
Kazakhstan	1.4	0.0	164.9	2 913	4 860	59.9
Kyrgyzstan	1.8	0.7	100.4	346	900	38.4
Latvia	0.8	0.1	12.9			
Lithuania	2.3	0.9	26.2			
Republic of Moldova	0.8	0.3	64.4	42	328	7.4 <sup>c</sup>
Romania	3.5	0.7	95.8			
Russian Federation				56	411	13.6
Serbia		0.8	14.0	66	320	20.6
Tajikistan	1.9		111.0	861	1 355	63.5
The former Yugoslav Republic of Macedonia	1.5	1.1	50.0			
Ukraine	4.6	0.5	49.5	2 041	6 460	31.6
Uzbekistan	2.9		18.2	1 400	4 098	34.2
Regional median	1.5	0.55	37.9			32.1
<b>Latin America and the Caribbean</b>						
Brazil	1.07			1 349	3 415	39.5
Mexico	0.4	0.5	2.6	87	431	20.2
<b>Sub-Saharan Africa</b>						
Mauritius	3.9	1.6	44.4			
Nigeria				410	690	59.4

a 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 past 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 past 12 months, have you been given condoms (e.g. through an outreach service, drop-in centre or sexual health clinic)? (3) In the past 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 who replied "yes" to all three questions, and the denominator is the total number of respondents surveyed.

b Percentages for injecting drug users in Kathmandu are estimated using the respondent-driven sampling analysis tool (RDSAT), therefore the numerator and denominator cannot be referred.

c The percentage has been statistically adjusted, mostly by using the respondent-driven sampling method.



**Table 3.5. Countries with compulsory drug treatment and numbers treated**

Country	Nature of "compulsory treatment" provided	Number detained (12 months)	Number detained at a single point in time	Number in opioid substitution therapy at a single point in time	Number in unspecified drug treatment
Brunei Darussalam	1 mandatory drug rehabilitation facility	Not known (D)	Not known (D)	0 (D)	-
Cambodia	14 compulsory camps	1505-1719 (C)	Not known (C)	0 (A)	Not known (B)
China	700 compulsory detoxification settings, 300 re-education through labour camps	300 000 (D)	Not known (D)	94 973 (B)	Not known (C)
Iran (Islamic Republic of)	Temporary compulsory drug rehabilitation centres reported but number not known	Not known (A)	Not known (A)	108 000* (B)	231 101 (C)
Lao People's Democratic Republic	7 compulsory drug rehabilitation centres involving drug detoxification	Not known (B)	833 (B)	0 (A)	3500 (E)
Malaysia	28 compulsory drug treatment centres	Not known (A)	6848 (A)	4135 (C)-6538 (B)	1685 (F)
Myanmar	26 major and 40 minor compulsory treatment centres	1492 (E)	Not known (E)	500 (A)	Not known
Thailand	90 compulsory rehabilitation sites	40 680 (B)	Not known (B)	4150-4696* (B)	Not known (F)
Turkmenistan	1 compulsory detention site	6546 (D)	Not known (D)	0 (A)	16 513 (B)
Viet Nam	109 centres with entry via committal by family, the community, or arrest for drug possession	Not known (B)	> 60 000 (B)	1484 (A)	Not known (A)

Year of data: (A)=2009; (B)=2008; (C)=2007; (D)=2006; (E)=2005; (F)=2004; (G)=2003; (H)= 2002.

a Number of clients in 12-month period. Numbers of clients undergoing other forms of drug treatment are known underestimates; although multiple interventions were often reported, the number of clients in each form of treatment was rarely known.

Source: Reproduced and adapted with permission from Mathers BM et al.[webappendix 10] (16).

### Box 3.5. Introducing methadone maintenance therapy in Cambodia

Opioid substitution therapy is a key component of harm reduction programmes to control HIV and other bloodborne pathogens, and to treat opioid dependence. Methadone maintenance therapy is the most commonly used approach. By taking methadone, people who are dependent on heroin or other opioids can reduce or eliminate their heroin intake, thereby ending their injection behaviours and exposure to HIV through the sharing of contaminated needles/syringes and through unsafe sexual practices while under the influence of heroin or other opiates. Other benefits of opioid substitution therapy include normalization of lifestyle and improved social functioning.

Service delivery of opioid substitution therapy in Cambodia commenced on 1 July 2010 with 40 people. They were given daily doses of methadone within the first six weeks of the clinic's opening. Facilitated by WHO, the Secretariat-General of the National Authority for Combating Drugs and the Ministry of Health have developed a comprehensive treatment implementation plan that will provide methadone to 100 clients in the first year of this demonstration programme. The programme will also link those enrolled in methadone maintenance therapy with a range of other health services including the HIV/AIDS continuum of prevention, treatment and care, TB and mental health support.

The programme has been developed with the support of international partners including the Australian Agency for International Development (AusAID), Global Fund to Fight AIDS, Tuberculosis and Malaria and Swedish International Development Cooperation Agency (Sida). It has a focus on support for opioid-dependent women and links the methadone maintenance therapy clinic with socioeconomic development opportunities in the community through a range of nongovernmental organizations and private sector initiatives intended to assist individuals to withstand future pressures to relapse to opiate use again.

The provision of methadone is the first step in the development of a portfolio of evidence-based drug dependence treatment interventions by the Ministry of Health and its civil society partners in Cambodia.

administratively or legally detained in order to undergo treatment, and that opioid substitution therapy is made available only to a fraction of opioid-dependent detainees (Table 3.5) (19).

A number of policy issues must be addressed in order to maximize the benefits of HIV programmes for injecting drug users. An area where consistent risk is observed is unsafe sex among people who inject drugs and their partners. Data from 2006 to 2008 from selected cities in Asia show that large numbers of injecting drug users buy sex and that most of them do not use condoms (20). Consistent condom use with regular partners is low (Indonesia: 5–18%; India 0–18%, Chennai 21%) (10). A special study in Chennai, India in 2009 found an HIV prevalence of 2.5% among spouses of all injecting drug users, against a population background prevalence of 0.25%. Prevalence of HIV among injecting drug users was 10.3% (21).

The overlap between injecting drug use and sex work is less well studied. In Viet Nam, HIV infection among sex workers was highly correlated with injecting drug use: injecting sex workers were 3.5–31 times more likely to be HIV infected than non-injectors. Among street-based sex workers in Hai Phong, only 3% of sex workers without a history of injecting were HIV-infected compared to 55% of those who ever injected (22).

People who inject drugs continue to be underserved by treatment programmes in many countries, a critical gap that jeopardizes their well-being and the preventive outcomes of harm reduction strategies. It is necessary to achieve further integration of HIV prevention, treatment and care services into substance dependence programmes in order to ensure that injecting drug users have non-stigmatizing access to comprehensive HIV services, including antiretroviral therapy (23). Although some analyses have remarked on the difficulty of providing access to antiretroviral therapy to injecting drug users due to cost and availability issues, repeated studies show that antiretroviral therapy is equally effective in reducing viral load among injecting drug users as among the general population (24–26).

### 3.1.2. Men who have sex with men

Men who have sex with men continue to be disproportionately affected by the HIV epidemic. The essential HIV prevention measures for men who have sex with men include access to condoms and water-based lubricants, and consistent and proper use of condoms. High-quality HIV-related services must be made available, as well as specific and targeted information on prevention and risk reduction strategies designed to appeal to and meet the needs of men who have sex with men. In order to enhance programmatic effectiveness and impact, WHO, the United Nations Development Programme (UNDP) and UNAIDS,

among other stakeholders, are developing a comprehensive package of HIV prevention activities aimed at men who have sex with men, to be released in late 2010.<sup>1</sup>

Improving access to and uptake of prevention, treatment and care services among men who have sex with men demands that health sector interventions be supplemented by structural interventions to address stigma and discrimination. Criminalization of same-sex relations in many countries continues to impede interventions to prevent HIV transmission. Globally, over 80 countries criminalize same-sex relations between consenting adults, including 37 African countries (30,31). In these countries, adequate access to prevention services is often lacking and public health surveillance and monitoring are not performed.

#### Box 3.6. HIV infection among men who have sex with men in Africa

Until recently, only limited data were available on the dynamics of the HIV epidemic among men who have sex with men in Africa. However, research published in the past two years has shed considerable light on this area (3). Two recent studies addressing the situation of men who have sex with men in Uganda and in Kenya have raised additional important issues for optimal programme management in the region.

Uganda's generalized HIV epidemic is well described, including an adult male HIV prevalence in men of 5% (35), but data on the epidemic among men who have sex with men were often unavailable. In Kampala, a sample of 303 men who have sex with men aged 18 years or older reporting anal sex with another man in the past three months yielded an HIV prevalence rate of 13.7% (36). However, a considerable age gap was observed: among those aged 25 years or older, prevalence was considerably higher (22.4%) than among younger men who have sex with men aged between 18 and 24 years (3.9%). Knowledge of HIV risk was very poor and condom use across all types of partners was low. Moreover, different kinds of abuse were associated with HIV infection.

Prior studies documented an HIV prevalence of 21% in Mombasa among those men who have sex with men who were also sex workers (37). A subsequent study in this setting further highlighted the importance of not overlooking men who have sex with men in generalized epidemic settings in Africa. Eighty-three men who have sex with men who were also sex workers recorded 1014 partners, of whom 215 (17%) were female. Of 43 recent female partners, 35 (81%) were unmarried, and of eight (19%) married women, three were spouses of men who have sex with men who were also sex workers. One hundred forty-four women (67%) paid a sex worker who was man who had sex with men for sex, while 39 women (18%) were paid by a man who has sex with men and was also a sex worker. Although most sex partners of the latter are men, sex with local women is common, usually transactional and often unprotected. Interventions targeting risk reduction among men who have sex with men should be expanded to include their interactions with women. Under certain conditions, certain communities might benefit as well from interventions targeting female clients of sex workers who are men who have sex with men (37,38).

**Table 3.6. Coverage of HIV prevention programmes for men who have sex with men (2009),<sup>a</sup> and percentage of men who have sex with men living with HIV (2007–2009) in reporting low- and middle-income countries**

	Men who have sex with men (MSM) reached with HIV prevention programmes in the past 12 months <sup>b</sup>			MSM who tested positive for HIV		
	Number of respondents who replied "yes" to both questions	Total number of respondents surveyed	Percentage of men who have sex with men reached with HIV prevention programmes (%)	Number of men who have sex with men who tested positive for HIV	Total number of respondents surveyed, tested for HIV	Percentage of men who have sex with men who tested positive for HIV (%)
	2009			2007–2009		
Number of countries reporting	21			33		
Median all reporting countries			57			
<b>Europe and Central Asia</b>						
Azerbaijan				1	100	1.0
Belarus	345	407	85	4	146	2.7
Bulgaria				15	452	3.3
Georgia				5	140	3.6
Kazakhstan	600	880	68	3	880	0.3
Romania				15	344	4.4
Serbia	34	246	14	15	245	6.1
Ukraine	1 451	2 300	63	197	2 300	8.6
Uzbekistan	49	118	42	8	118	6.8
Regional median	...	...	63	...	...	...
<b>East, South and South-East Asia</b>						
Bangladesh				0	399	0.0
China	4 741	6 315	75	1 020	20 266	5.0
India <sup>c</sup>	95	524	18	1 067	14 623	7.3
Indonesia				39	746	5.2
Maldives				0	126	0.0
Mongolia	148	192	77	3	167	1.8
Myanmar	380	550	69	115	400	28.8
Nepal	309	400	77	15	400	3.8
Papua New Guinea	31	300	10	5	115	4.3
Philippines	1 278	4 367	29	45	4 542	1.0
Sri Lanka				2	411	0.5
Viet Nam	382	1 593	24	266	1 592	16.7
Regional median	...	...	49	...	...	...
<b>Latin America and the Caribbean</b>						
Bolivia				108	796	13.6
Brazil	1 351	3 617	37	420	3 340	12.6
Chile	269	471	57	95	469	20.3
Costa Rica	200	311	64	38	300	12.7
Cuba <sup>d</sup>	232 141	251 529	92	1 105	154 572	0.7
El Salvador	506	764	58 <sup>e</sup>	94	699	13.4
Guatemala				55	300	18.3
Honduras				37	588	6.3
Mexico	365	958	38	339	3 331	10.2
Regional median	...	...	58	...	...	...
<b>Middle East and North Africa</b>						
Tunisia	622	1 171	53	57	1 178	4.8
<b>Sub-Saharan Africa</b>						
Nigeria				109	810	13.5
Senegal				109	500	21.8
Togo	287	630	46			

a 2007–2008 coverage data are available online at <http://www.who.int/hiv/data/en>.

b 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. Survey respondents were asked the following questions: (1) Do you know where you can go if you wish to receive an HIV test?

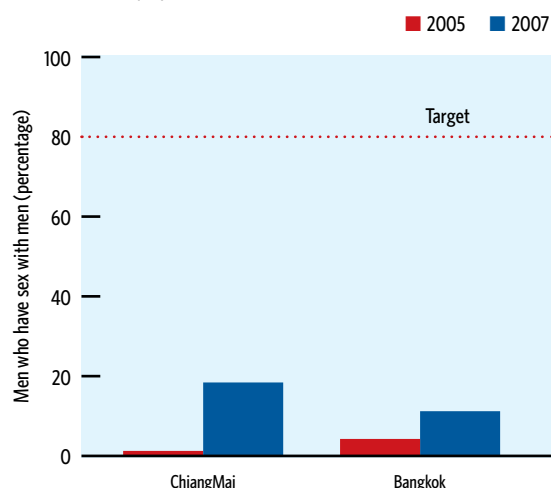
(2) In the past twelve months, have you been given condoms? (e.g. through an outreach service, drop-in centre or sexual health clinic). The numerator of the indicator is the number of respondents who replied "yes" to both questions, and the denominator is the total number of respondents surveyed.

c Ranges are excluded from median calculations.

d Is the cumulative total of respondents who were men who have sex with men in the period 2007–2009.

e The percentage has been statistically adjusted, mostly by using the respondent-driven sampling method.

**Fig. 3.1. Percentage of men who have sex with men reached by a minimum package of services in Bangkok and Chiang Mai, Thailand, 2005–2007 (10)**



Source: Thailand Ministry of Public Health – US CDC collaboration, WHO Regional Office for South-East Asia, 2009.

The negative impact on prevention efforts is clear: a recent study in Cameroon found that men who have sex with men who did not access prevention interventions were more likely to engage in unprotected anal intercourse, making them more vulnerable to HIV infection (32).

Young men who have sex with men are at high risk for HIV infection. In Thailand, for instance, the estimated HIV incidence among young men who have sex with men aged 15–22 years increased from 4.1% in 2003 to 6.4% in 2005 and 7.7% in 2007 (33). In addition, a study among 827 sexually active young men who have sex with men in three cities in Thailand reported recent inconsistent<sup>1</sup> condom use among them (46.7%), and among male sex workers (34.9%) and transgender persons (52.3%) (34). Despite evidence of high-risk behaviours, access to a minimal package of services for men who have sex with men remains low (Figure 3.1).

Twenty-one countries provided data on the percentage of men who have sex with men reached with HIV prevention programmes in the 12 months preceding the surveys, with an overall median of 57%.<sup>2</sup> Regionally, median coverage in 2009 was highest in Europe and Central Asia (63%), it reached 58% in Latin America and the Caribbean, and 49%

<sup>1</sup> Defined as not having always used a condom during anal intercourse with a man in the past three months.

<sup>2</sup> Several data points provided by countries on the coverage and impact of interventions for groups at higher risk for HIV infection come from surveys with small sample sizes and some from sentinel sites. As methods and sample sizes may differ considerably among surveys, reported data should be interpreted with caution. These issues highlight the need to invest further in additional data validation/verification and triangulation with data from HIV surveillance.

in East, South and South-East Asia (Table 3.6). Thirty-three countries reported HIV prevalence data based on samples surveyed between 2007 and 2009. Twelve countries reported HIV prevalence rates of between 10% and 20% among men who have sex with men and, in three countries, HIV prevalence rates among this population exceeded 20%.

Although the importance of HIV transmission among men who have sex with men in all geographical regions and epidemiological settings has been documented, national responses are still largely insufficient. This calls for the urgent scale up of the coverage and quality of targeted interventions across low- and middle-income countries, and continued advocacy to include men who have sex with men as a sentinel population in existing HIV programme monitoring systems.

### 3.1.3. Sex workers

Sex workers remain among the groups most heavily affected by the epidemic. Continued high levels of sexually transmitted infections and HIV among sex workers underline the importance of scaling up access to and uptake of interventions among this population and their clients (10, 39, 40). As such, effective interventions for sex workers must be an integral component of comprehensive HIV prevention strategies. There exists extensive global experience in HIV prevention among sex workers, and an essential package of proven effective interventions has been defined (8). High levels of condom use among sex workers and their clients in countries such as Benin, Thailand and Cambodia are likely to have contributed to the slowing of the HIV epidemic in these countries (10, 41).

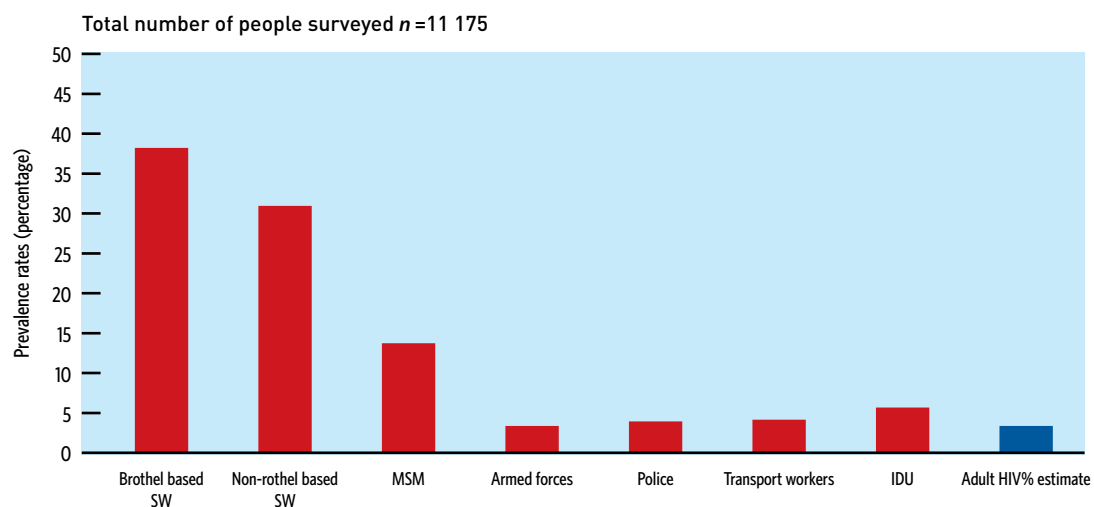
However, despite their effectiveness, most interventions among sex workers have had only a modest impact on HIV transmission dynamics in most countries simply because they are often implemented on a small or insufficient scale, preventing the majority of sex workers who need prevention services to adequately access them. Addressing this “prevention gap” is the major challenge to HIV prevention among sex workers (42).

Essential HIV prevention measures for sex workers include access to condoms and water-based lubricants, and ensuring consistent and proper use of condoms. High-quality HIV-related services must be made available as part of programmes aimed at improving coverage of interventions involving sex workers, brothel owners, public health officials, police and clinical service providers. In order to enhance programmatic effectiveness and impact, WHO, United Nations Population Fund (UNFPA) and UNAIDS, among other partners, are updating guidance on prevention and treatment of HIV and other sexually transmitted infections aimed at sex workers, to be released in early 2011.

### Box 3.7. HIV surveillance of key most-at-risk populations in Nigeria

In order to improve HIV programme planning for high-risk populations, in 2007, a behavioural survey was conducted in Nigeria among brothel- and non-brothel-based female sex workers, men who have sex with men, injecting drug users, transport workers, and men and women in the uniformed services (armed forces and the police). It was the first time that HIV testing was included in such surveys. The highest HIV prevalence levels, 37% and 30%, were found among brothel-based and non-brothel-based sex workers, respectively. HIV prevalence among those in the armed forces and transport workers was lower, at 3.1% and 3.7%, respectively, similar to the national adult HIV prevalence estimate of 3.1%.

**Fig. 3.2. HIV prevalence rates among specific population groups in Nigeria, 2007**



Sources:

1. Adebajo S et al.; Men's Study Nigeria. HIV and sexually transmitted infections among men who have sex with men (MSM) in Nigeria. In: AIDS 2008 – XVII International AIDS Conference, Mexico City, Mexico, 3–8 August 2008 [Abstract no. A-072 -0130-04898].
2. Integrated biological and behavioural surveillance survey (IBBSS). Nigeria, Federal Ministry of Health, 2007.

It is important to design and implement interventions aimed at reaching partners of sex workers with prevention programmes to facilitate both negotiated safer sex practices between client and worker, and to promote safer sex with other non-commercial sex partners. In a study conducted in Kampala, Uganda in 2009, 573 male partners of female sex workers were surveyed, of whom 461 (84%) were paying and 90 (16%) were non-paying partners. Average HIV prevalence among sex partners was 18.1% (paying: 17.9%, non-paying: 21.1%). HIV prevalence data among index female sex workers were not presented. Male sex partners of female sex workers were at substantially higher risk for HIV infection than adult men in the general population (43).

In 2009, 38 countries reported on the percentage of all sex workers reached with HIV prevention programmes in the 12 months preceding the surveys (Table 3.7). The median percentage of sex workers reached by HIV prevention programmes in survey samples was 58%,

with considerable regional variations. The highest median coverage of prevention programmes was 76%, observed in Latin America and the Caribbean, followed by 60% in Europe and Central Asia, 52% in sub-Saharan Africa, and 40% in East, South, and South-East Asia.

Fifty-seven countries reported on the percentage of sex workers who tested HIV-positive in samples surveyed between 2007 and 2009. The highest HIV prevalence rates among sex workers were observed in countries from sub-Saharan Africa, with large regional variations. In Burundi, Cote d'Ivoire, Guinea and Nigeria, reported HIV prevalence rates exceeded 30%, and in Benin, Chad, Gabon and Togo, they were between 20% and 30%.

These data clearly demonstrate the need to greatly expand efforts to improve surveillance activities among sex workers and to strengthen prevention efforts, including through the removal of punitive laws and the design of tailored interventions.

**Table 3.7.** Coverage of HIV prevention programmes for sex workers (2009),<sup>a</sup> and percentage of sex workers living with HIV (2007–2009), in reporting low- and middle-income countries

Number of countries requested to report ( <i>n</i> = 149)	Sex workers reached with HIV prevention programmes in the past 12 months <sup>b</sup>			Sex workers who tested positive for HIV		
	Number of respondents who replied "yes" to both questions	Total number of respondents surveyed	Percentage of sex workers reached with HIV prevention programmes (%)	Number of sex workers who tested positive for HIV	Total number of respondents surveyed, tested for HIV	Percentage of sex workers who tested positive for HIV (%)
	2009			2007-2009		
Number of countries reporting	38			57		
Median all reporting countries			58			...
<b>Europe and Central Asia</b>						
Azerbaijan				5	300	1.7
Belarus	389	453	86	11	173	6.4
Bulgaria	473	799	59	5	799	0.6
Georgia	107	160	67	3	154	1.9
Kazakhstan	1 984	2 249	88	30	2 249	1.3
Kyrgyzstan	420	689	61	11	689	1.6
Republic of Moldova	71	301	15 <sup>b</sup>	22	301	61 <sup>c</sup>
Montenegro				1	133	0.8
Romania	66	202	33	2	202	1.0
Russian Federation				34	750	4.5
Serbia				3	139	2.2
Tajikistan	331	647	51	18	647	2.8
Ukraine	1 920	3 248	59	433	3 284	13.2
Uzbekistan	903	2 601	71	57	2 601	2.2
Regional median	...	...	60	...	...	...
<b>Latin America and the Caribbean</b>						
Argentina				74	1 368	5.4
Bolivia (Plurinational State of)				27	6 993	0.4
Brazil	1 186	2 523	47	129	2 505	5.1
Colombia	993	4 714	21	75	4 817	1.6
Cuba <sup>d</sup>	80 083	82 838	97	158	54 537	0.3
Dominican Republic				62	1 300	4.8
El Salvador	643	789	77	46	848	41 <sup>b</sup>
Guatemala	482	520	93	3	298	1.0
Honduras				18	796	2.3
Mexico	1 069	1 793	60	97	5 690	1.7
Panama	194	255	76			
Regional median	...	...	76	...	...	...
<b>North Africa and the Middle East</b>						
Djibouti	70	79	89	16	79	20.3
Morocco				23	965	2.4
Sudan	...	...	2	3	328	0.9
Tunisia	268	700	38	3	700	0.4
<b>East, South and South-East Asia</b>						
Afghanistan	3	368	0.8	0	368	0.0
Bangladesh				13	5 197	0.3
Cambodia				...	2 229	14.7 <sup>b</sup>
China	45 984	61 903	74	357	61 919	0.6
India	82	264	31	2 098	42 434	4.9
Indonesia				528	5 187	10.2
Iran (the Islamic Republic of)						
Lao People's Democratic Republic	634	912	70	7	1 425	0.5
Malaysia	68	551	12	58	551	10.5
Maldives				0	102	0.0
Mongolia	618	835	74			
Myanmar				148	818	18.1



Nepal				11	500	2.2
Pakistan	441	4 446	10	104	4 446	2.3
Papua New Guinea	84	267	32	56	955	5.9
Philippines	5 071	9 208	55	23	9 476	0.2
Sri Lanka				0	1 032	0.0
Viet Nam	2 501	5 291	47	327	10 326	3.2
Regional median	...	...	40	...	...	...
<b>Sub-Saharan Africa</b>						
Angola	430	1 848	23			
Benin	592	1 050	56	250	1 013	24.7
Burkina Faso				55	616	8.9
Burundi				163	410	39.8
Chad	201	1 171	17	220	1 098	20.0
Comoros				0	100	0.0
Cote d'Ivoire				270	760	35.5
Democratic Republic of the Congo				325	2 271	14.3
Gabon	208	601	35	100	431	23.2
Ghana	16 742	34 990	48			
Guinea	90	101	89	33	101	32.7
Madagascar				12	2 288	0.5
Mauritania				11	144	7.6
Nigeria				700	2 140	32.7
Swaziland	143	143	100			
Togo				212	723	29.3
United Republic of Tanzania	237	349	68			
Regional median	...	...	52	...	...	...

a 2007–2008 coverage data are available online at <http://www.who.int/hiv/data/en>.

b A number of countries reported sex-specific, instead of general, data on prevention coverage among responding sex workers surveyed. Although this issue may limit cross-country comparability, it is reasonable to assume that most coverage reported for 2009 refers to surveys conducted among female sex workers. Six out of nine countries reporting coverage among sex workers of both sexes indicated higher coverage among men, mostly reported from targeted intervention sites. 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 past 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 who replied “yes” to both questions, and the denominator is the total number of respondents surveyed.

c The percentage has been statistically adjusted, mostly by using the respondent-driven sampling method.

d Figure refers to a period of 3 years.

## 3.2. Selected HIV prevention interventions in the health sector

This section focuses on selected prevention interventions delivered in health facilities and includes male circumcision, prevention and management of sexually transmitted infections, and blood safety.

### 3.2.1. Male circumcision

In countries with a high HIV prevalence and low rates of male circumcision, WHO and UNAIDS recommend that male circumcision be included as an additional health sector intervention to reduce the risk of heterosexual transmission of HIV to men (44).

Clinical trials from Kisumu, Kenya, Rakai District, Uganda and the South Africa Orange Farm Intervention Trial showed a 53%, 51% and 60% reduction, respectively, in HIV infection among men who were circumcised (45–47). Recent research data also demonstrate the benefits of male circumcision in relation to heterosexual transmission of HIV as well as protection against other sexually transmitted infections.

In a study conducted among African HIV-1 serodiscordant couples where the male was HIV-positive, it was observed that circumcision potentially reduced the risk of male-to-female transmission of HIV-1. In a randomized trial carried out in Uganda to assess the effects of male circumcision on high-risk human papillomavirus, male circumcision was found to reduce the incidence of multiple infections due to high-risk human papillomavirus in HIV-infected (48) and -uninfected men, and had a beneficial effect on clearance of high-risk<sup>1</sup> human papillomavirus in HIV-negative men (49). Researchers have also found that regardless of the status of infection with herpes simplex virus-2, male circumcision may lead to a reduction in genital ulcer disease (50).

Research has also been undertaken to better understand the implications of large-scale programme implementation. A recent analysis (51) estimated the overall cost and impact of rapidly scaling up male circumcision services in 14 countries in Eastern and Southern Africa with a view to reaching 80%

<sup>1</sup> High-risk human papillomavirus is confined to certain subtypes with a high risk for cervical cancer and genital warts.

of newborns and adult males aged 15–49 years by 2015. It concluded that such an approach would require overall investments of US\$ 4 billion, but could prevent more than four million adult HIV infections over 15 years (2009–2025) and result in cost savings of US\$ 20.2 billion over the same period.

In 2007, WHO and UNAIDS convened a meeting of experts, country managers, policy-makers and implementing partners. Thirteen countries (Botswana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, United Republic of Tanzania, Uganda, Zambia and Zimbabwe) were identified as priority countries for scale-up of male circumcision based on their epidemiological profiles (44). According to a recent assessment, countries have advanced further in expanding access to male circumcision (52). Robust national leadership within a strong partnership framework remains key to accelerating progress. The support of country champions – for example, traditional leaders and politicians in Botswana and Kenya – has been essential to improve uptake, as has been the implementation of partnerships involving national governments, donors and technical support agencies.

Situational analyses have now been conducted in all 13 priority countries. Appropriate policies and strategies on male circumcision are being developed in most of

them. In 2009, Zimbabwe launched its policy on male circumcision. In Lesotho, the policy has been approved and should soon be launched. Service delivery was expanded in Kenya from 41 to 230 districts, while in Namibia, Rwanda, South Africa, United Republic of Tanzania and Swaziland, priority districts and sites have been identified for scale-up. Quality assurance strategies, based on WHO's *Guide* (53) and *Toolkit* (54), are being implemented in Swaziland and Kenya. Monitoring and evaluation indicators are also being gradually introduced into routine data collection systems in Botswana and Kenya. Communication strategies are being developed in Kenya, Namibia and Swaziland. Training programmes have been implemented in almost all priority countries. Further research on male circumcision is either ongoing or planned by countries, focusing on behaviour, communications, community impact, costing, devices for male circumcision, monitoring and service delivery (52).

A recent survey (56) gathered data on the status of service delivery for male circumcision in six countries as of January 2010 (Table 3.8), where over 133 000 circumcisions had been done.

While considerable progress has been made in establishing policy and strategies, the lack of human resources remains an important constraint for country programming at all

### Box 3.8. Scaling up male circumcision in Kenya: the rapid results initiative (55)

In 2008, the Government of Kenya launched the Voluntary Medical Male Circumcision programme with the objective of circumcising 860 000 men over the four following years. However, with only 40 000 men circumcised between October 2008 and October 2009, a "rapid results initiative" was implemented in 11 districts of Nyanza province, which has the highest HIV prevalence and the lowest male circumcision rates in the country.

With the application of the Rapid Results Initiative strategy, 36 077 men were circumcised in 30 working days between November and December 2009. An average of 10 male circumcisions was done daily per team, and 39% of men received an HIV test as well. Of all male circumcisions, 55% were performed on adults older than 15 years, 22% for less 12 years old and 23% among 12–15-year-olds. The male circumcision package of care included counselling for male circumcision, provider-initiated HIV testing and counselling, clinical examination, management of sexually transmitted infections and other genitourinary conditions, surgical excision of foreskin using a forceps-guided method, post-operative care and follow up.

The Rapid Results Initiative demonstrated that it is possible to expand access to and uptake of male circumcision. The required investment using the Rapid Results Initiative approach, at US\$ 39 per circumcision, was 56% lower than the average recorded in the preceding 13 months. The Initiative also highlighted the importance of sustaining demand for services through continued social mobilization, as marked fluctuations interfered with the optimal allocation of staff and supplies, and reduced overall efficiency. Lower than expected rates of testing and follow up are also issues that must be addressed as male circumcision is further rolled out.

**Table 3.8. Update on male circumcision service delivery, selected countries, 2008–Jan 2010 (56)**

Country	Botswana	Kenya	South Africa	Swaziland	Zambia	Zimbabwe
Programme start date	Apr 2009	Sept 2008	Jan 2008	Jan 2008	July 2009	May 2009
Cumulative number of male circumcisions since programme implementation	4 326	90 396	14 253	5 122	16 801	3 000
Number of male circumcisions (Nov–Dec 09)	580	36 000	1 547	1 816	6 171	1 510

Source: Male circumcision for HIV prevention: progress in scale-up (56)



levels, as understaffing is a chronic issue in all the countries that are scaling up male circumcision. Current achievements notwithstanding, it is necessary to reinforce and strengthen national political support for male circumcision scale-up, reach out to traditional providers and community leaders to promote buy-in and uptake, and accelerate the pace of service delivery roll-out. As services are scaled up, it is critical to closely monitor the implications of male circumcision for women and mitigate against any adverse societal effects that might negatively impinge on their health.

### 3.2.2. Prevention and management of sexually transmitted infections

The rapid identification and treatment of sexually transmitted infections is a key element in controlling the spread of HIV, as sexually transmitted infections synergistically increase the risk of HIV transmission (57). Scientific evidence suggests that sexually transmitted infections increase HIV shedding in the genital tract of HIV-positive individuals (thereby boosting infectiousness) and disrupt mucosal barriers, leading to increased susceptibility to HIV in HIV-negative individuals.<sup>1</sup>

Various interventions for controlling sexually transmitted infections have proven effective, including the syndromic

management of genital ulcer disease and urethral discharge, testing pregnant women and individuals diagnosed with other sexually transmitted infections for syphilis, treating male partners of patients with trichomoniasis, providing brief counselling about risk reduction for HIV and sexually transmitted infections, and treating partners of patients with gonococcal, chlamydial and syphilis infections. These interventions have resulted in a decline in the prevalence of sexually transmitted infections such as chancroid, syphilis and gonorrhoea in many parts of the world. The control of sexually transmitted infections may have also contributed to the gradual decline in HIV prevalence in several low- and middle-income countries (58). The most recent global estimates of the incidence and prevalence of sexually transmitted infections are from 2005. Unfortunately, the global burden of sexually transmitted infections remains high in most regions of the world (Box 3.9) (59).

Services for sexually transmitted infections are a critical component of comprehensive HIV prevention programmes. In addition to addressing issues specific to sexually transmitted infections, they provide an opportunity to offer provider-initiated testing and counselling for HIV, and can serve as entry points to HIV care and treatment interventions. Data on sexually transmitted infections can also assist in interpreting the epidemiological patterns of HIV. For example, syphilis infection rates among antenatal care attendees can provide an early warning of changes in risk behaviour associated with HIV transmission in the general population. Acute sexually transmitted infections such as gonorrhoea and primary and secondary syphilis

<sup>1</sup> In low-level or concentrated HIV epidemics, particularly where the prevalence of sexually transmitted infections is high and their control is poor, treatment of curable sexually transmitted infections is likely to have a considerable impact on HIV incidence at the population level. In generalized HIV epidemics with a stable or declining prevalence of HIV infection, the effect of treatment of curable sexually transmitted infections on HIV incidence at the population level is not measurable.

#### Box 3.9. Global estimates of the incidence and prevalence of sexually transmitted infections caused by *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Treponema pallidum*, and *Trichomonas vaginalis*

In 2005, there were over 448 million new sexually transmitted infections: 101 million new cases of chlamydial infection, 88 million new cases of gonorrhoea, 11 million new cases of syphilis, and 248 million new cases of trichomoniasis (59).

WHO Region	Number of new infections in adult males and females between the ages of 15 and 49 years, 2005 (in millions)				
	<i>Chlamydia trachomatis</i>	<i>Neisseria gonorrhoeae</i>	<i>Treponema pallidum</i> (syphilis)	<i>Trichomonas vaginalis</i>	Total
African Region	10.0	17.5	3.4	78.8	109.7
Region of the Americas	22.4	9.5	2.4	54.9	89.2
Eastern Mediterranean Region	5.7	6.5	0.6	12.6	25.4
European Region	15.2	4.6	0.3	24.5	44.6
South-East Asia Region	6.6	22.7	2.9	38.6	70.8
Western Pacific Region	41.6	26.9	1.1	39.1	108.7
Total	101	88	11	248	448

At any point in 2005, there were 318 million prevalent cases of the four infections; some 98 million adults were infected with *Chlamydia trachomatis*, 31 million with *Neisseria gonorrhoeae*, 36 million with *Treponema pallidum*, and 153 million with *Trichomonas vaginalis*. These infections, however, are only four of the over 30 infections that can be transmitted sexually. Furthermore, it has been estimated that there were over 23.6 million new cases of herpes simplex virus-2 in 2003. Although these estimates are based on limited data from surveillance and special studies, they indicate that the global burden of sexually transmitted infections remains high. More accurate estimates require higher-quality data collection on sexually transmitted infections at the country and regional levels.

also serve as biomarkers of HIV and can indicate the effectiveness of programmes for sexually transmitted infections (Box 3.10). While broad-based services are well suited to address general population needs, in areas with high levels of stigma or legal barriers, dedicated services for groups at higher risk for HIV acquisition, such as sex workers and men who have sex with men, may need to be offered to ensure adequate levels of access to the necessary health interventions.

Two indicators related to sexually transmitted infection were part of the 2010 reporting process. Fifty-one and 77 of 193 Member States provided data, respectively, on the (i) number of targeted service delivery points for sex workers where sexually transmitted infection services are provided,

per 1000 sex workers, and (ii) on the prevalence of syphilis among antenatal care attendees (see Annex 2).

The overall median among reporting countries was 1.3 targeted clinics per 1000 sex workers in 2009, but this figure masks important regional variations. Availability of targeted clinics per 1000 sex workers was highest in sub-Saharan Africa and East, South and South-East Asia, with 2.0 targeted clinics per 1000 sex workers (Table 3.9). The lowest median figure, at 0.5, was found in Eastern Europe and Central Asia. While an important indicator of access, these data may underestimate true coverage, as sex workers may also receive services for sexually transmitted infections in non-targeted clinics.

### Box 3.10. Assessing the impact of HIV prevention interventions among female sex workers in Karnataka state, India: the Avahan Project

The Avahan Project is a large-scale HIV prevention programme focused on most-at-risk groups in the six Indian states with the highest HIV prevalence. Launched in 2003, the Project supports a diverse package of interventions that includes behaviour change communication to promote condom use, regular screening for sexually transmitted infections, establishment of dedicated sexual health services for sex workers and their partners, identification and syndromic case management of sexually transmitted infections, routine speculum examination, periodic presumptive treatment every three to six months for chlamydial infection and gonorrhoea, screening and treatment for syphilis, and HIV counselling and testing. Women found to be HIV-positive are provided support and counselling, and referred for care.

In order to assess the impact of these interventions on prevalence rates of HIV and sexually transmitted infections, condom use and programme coverage, baseline (7-19 months after programme initiation) and follow up (28-37 months after programme initiation) integrated biological and behavioural surveys were conducted among randomly selected female sex workers in five districts in Karnataka state between 2004 and 2009 (60). Among the 4712 sex workers who participated in the study, over 85% reported contact by a peer educator and having visited a project clinic for sexually transmitted infection. Comparing baseline and follow-up figures, the assessment found a statistically significant reduction in the prevalence rates of HIV, from 19.6% to 16.4%; high-titre syphilis, from 5.9% to 3.4%; and chlamydial infection and/or gonorrhoea, from 8.9% to 7.0%. Reported condom use with repeat clients increased, from 66.1% to 84.1%.

The Avahan HIV prevention programme combined sexual risk reduction strategies with improved access to sexual health services, resulting in important reductions in the prevalence rates of both HIV and sexually transmitted infections. It is an example of how it is possible to successfully integrate service provision for HIV and sexually transmitted infections to most-at-risk groups.

**Table 3.9. Number of targeted service delivery points for sex workers where services for sexually transmitted infection are provided, and prevalence of syphilis among antenatal care attendees<sup>a</sup>**

Region	Number of countries reporting <sup>b</sup>	Median number of targeted service delivery points for sex workers where services for sexually transmitted infection are provided (per 1000 sex workers)	Number of countries reporting <sup>b</sup>	Median prevalence of syphilis among antenatal care attendees
Eastern Europe and Central Asia	9	0.5	6	0.1%
East, South, and South-East Asia	15	1.7	17	0.5%
Latin America and Caribbean	13	1.2	18	0.5%
North Africa and the Middle East	2		4	
North America	0		0	
Sub-Saharan Africa	11	2.0	30	1.5%
Western and Central Europe	1		2	
Global total	51	1.5	77	0.7%

a Regional medians are not provided if fewer than five countries provided data.

b Number of countries requested to report: 193. See Annex 2 for country data.

The median reported prevalence of syphilis among antenatal care attendees was 0.7%, with a high of 1.5% in sub-Saharan Africa and a low of 0.1% in Eastern Europe and Central Asia. These averages, however, hide marked differences in prevalence rates across countries. For example, in Madagascar, syphilis prevalence was 7.7%, and Central African Republic, Chad, Fiji, Ghana, Grenada, Kiribati, Mozambique, Papua New Guinea, and Zambia all have prevalences above 5%.

It is not possible at this time to assess trends over time due to the lack of reporting of longitudinal data to WHO; yet, as the breadth and robustness of monitoring and evaluation systems improve and more countries contribute data, it is expected that future surveys will generate more and better-quality information on services and interventions for sexually transmitted infection.

### 3.2.3. Blood safety

The WHO Global Database on Blood Safety (GDBS) was established in 1998 to address global concerns about the availability, safety and accessibility of blood for transfusion. The objective of this activity is to collect and analyse data from all countries on blood and blood product safety as the basis for effective action to improve blood transfusion services globally. A questionnaire, which has been developed as a standardized tool for the collection of data, is sent to national health authorities for completion. The questionnaire is based on the WHO *Aide-mémoire for national health programmes: blood safety*, which covers the four major components of the integrated strategy for blood safety advocated by WHO (61).<sup>1</sup>

Data obtained through the questionnaire are supplemented by information collected by experts during on-site visits to ministries of health and blood transfusion services. As part of ongoing activities, and to supplement more comprehensive data collection using the standardized GDBS questionnaire, a list of blood safety indicators and a simplified data collection tool have been developed to collect information on 20 key quantitative indicators on blood safety. Blood safety indicators have been collected on an annual basis since 2006. The data collected through the GDBS questionnaire and the blood safety indicators are analysed and the reports are published on the WHO website (62). This is updated with the availability of the latest global data. The focus of the analysis is to provide information on the current status of blood transfusion services, assess country needs for improving blood safety, formulate strategic recommendations to countries, plan and implement activities, and evaluate progress.

<sup>1</sup> These include: (i) establishment of a nationally coordinated blood transfusion service, (ii) collection of blood only from voluntary non-remunerated blood donors from low-risk populations, (iii) testing of all donated blood, including screening for transfusion-transmissible infections, blood grouping and compatibility testing, and (iv) reduction in unnecessary transfusions through the effective clinical use of blood, including the use of simple alternatives to transfusion (crystalloids and colloids), wherever possible.

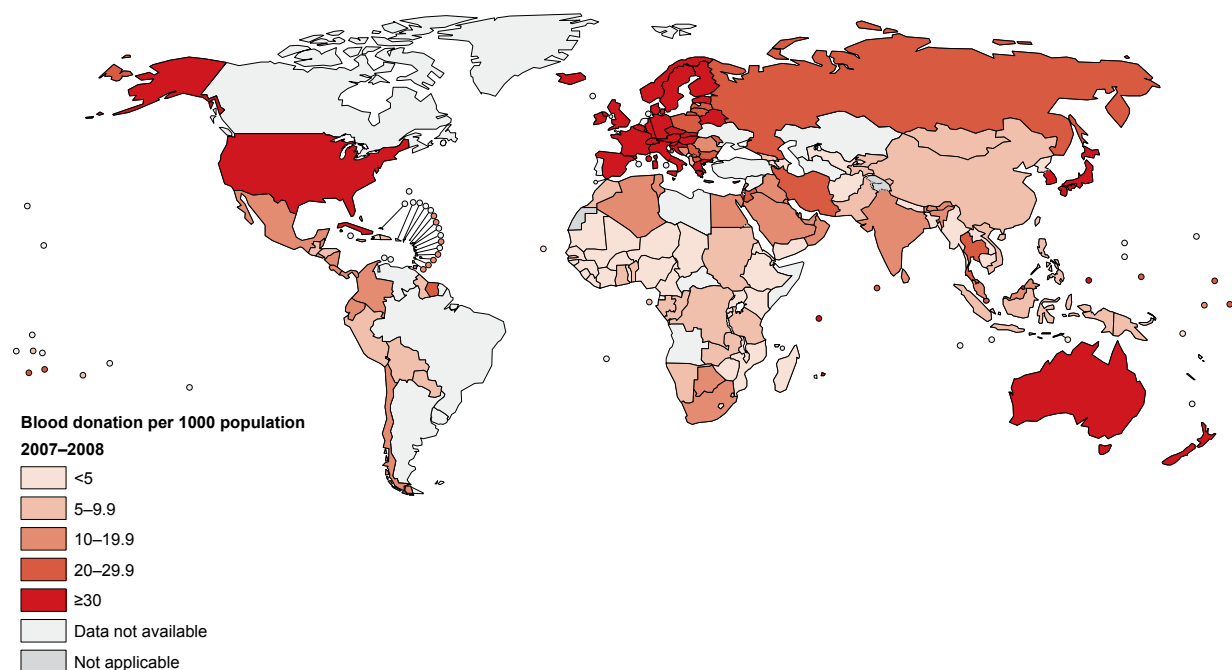
An estimated 93 million blood donations are given globally every year.<sup>2</sup> About half are collected in high-income countries and the remaining half in low- and middle-income countries. While important progress was made in the past decade in improving the supply of quality-assured blood and blood products worldwide, the availability and safety of blood supplies for transfusion remain issues of concern in multiple settings, especially in low-income countries. Blood shortages not only lead to serious health consequences such as death from postpartum haemorrhage but also contribute to an increased risk of HIV and hepatitis because an inadequate stock of blood forces a reliance on unsafe family or paid donors and increases pressure to issue blood without testing. Decreasing the incidence of HIV due to unsafe blood transfusion requires the implementation of 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.

The generally accepted minimum level of donation required to meet a country's most basic requirements for blood is estimated at 1% of the total population. These requirements are higher in countries with more advanced health-care systems. The availability of blood, as measured by the ratio of donations per 1000 population, varies widely and the lowest levels of availability are found in low- and middle-income countries. Indeed, blood donation rates are more than 13 times higher in developed countries than in developing countries: the mean number of donations per 1000 population is 45.4 (range 13.6–72.5) in high-income countries, 10.1 (range 1.6–63.2) in middle-income countries and 3.6 (range 0.4–5.0) in low-income countries.

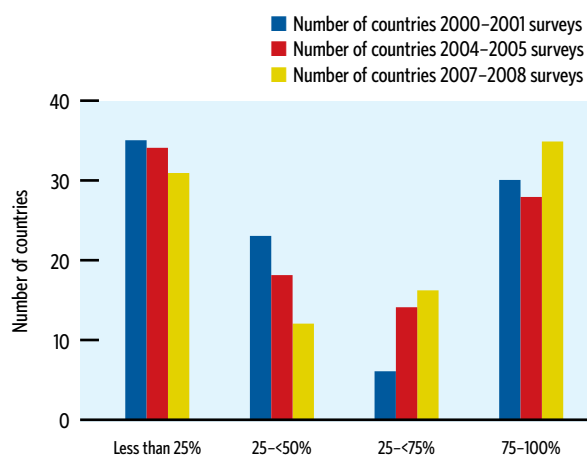
In 2007–08, 46 countries, including 42 low- and middle-income countries, reported a more than 10% increase in voluntary donations in comparison with the previous year's figures, while 15 reported a more than 10% drop during the same period. Among the 173 countries reporting data in 2007–08, 45 collected less than 25% of their blood supplies from voluntary non-remunerated blood donors and a sizeable amount of the blood supplies in these countries was still dependent on family/replacement and paid blood donors. Among 98 low- and middle-income countries for which comparable data are available from WHO surveys (62) conducted in 2000–01, 2004–05 and 2007–08, the number of countries reporting more than 50% of voluntary non-remunerated blood donations steadily increased.

<sup>2</sup> Based on data from the 2008 Global Database on Blood Safety (130 countries) and on 2007 data reported directly to WHO (43 countries). An annual survey is conducted by the WHO Blood Transfusion Safety Programme on 20 key quantitative blood safety indicators. More comprehensive data collection is done triennially, based on a set and subset of about 150 questions. The objectives are: to assess the global situation on blood safety; to obtain the best available information on blood transfusion services in each Member State; to identify problems and needs in order to provide appropriate technical support; to identify countries for priority assistance; and to monitor progress and trends in blood safety.

**Fig. 3.3.** Blood donations per 1000 population, 2007–2008



**Fig. 3.4.** Number of low- and middle-income countries, by proportion of voluntary unpaid blood donations, 2000–2008



Source: WHO surveys (62).

In order to protect the safety of blood supplies, blood donations should be screened in a quality-assured manner, which includes the use of standard operating procedures and participation in an external quality assessment scheme. Data provided by 115 countries on the percentage of blood

supplies screened in a quality-assured manner in 2007–2008 continued to show an important gap among countries: while 99% and 85% of donations in high-income and middle-income countries, respectively, were screened following these quality procedures, in low-income countries the comparable figure was markedly lower, at 48%. It is estimated that at least 2.88 millions donations – among which 2.76 million are in low- and middle-income countries – are not screened following quality assurance procedures. In addition, of 173 countries that provided data on screening for transfusion-transmissible infections – including HIV, hepatitis B, hepatitis C and syphilis – five high-income, 23 middle-income and 14 low-income countries reported being unable to screen all donated blood for one or more of these infections.

Irregular supply of test kits is one of the most commonly reported barriers that prevent many low- and middle-income countries from screening the blood they collect. Among 68 reporting low- and middle-income countries in 2008, eight indicated the occurrence of stock-out of test kits for transfusion-transmissible infections during the 12-month reporting period.

WHO recommends that all activities related to blood collection, testing, processing, storage and distribution should be coordinated at the national level through a

**Table 3.10. Global situation of donations screened in a quality-assured manner, 2007–2008**

Income group (number of countries reporting)	Total donations	% Donations screened for HIV in quality-assured manner	Donations not screened in quality-assured manner
High-income (34)	26 922 979	99.5%	124 866
Middle-income (52)	12 217 378	85.4%	1 786 622
Lower-income (29)	1 873 061	47.8%	977 331
<b>Total (115)</b>	<b>41 013 418</b>	<b>93.1%</b>	<b>2 888 819</b>

national blood policy supported by appropriate legislation to promote uniform implementation of standards and consistency in the quality and safety of blood and blood products (61). Of 94 low- and middle-income countries, 72 reported having a national blood policy. A further 67 had in place national strategic plans on blood safety, and 50 informed that they had initiated implementation of these. Among reporting countries, 48 indicated having specialized legislation on blood transfusion safety, and only 41 reported having a national mechanism for decision-making on blood transfusion safety.

While trends have generally been positive in the past 10 years, it is important to strengthen ongoing efforts to scale up the availability of safe blood supplies worldwide, especially in the worst-affected low- and middle-income countries. WHO has called all Member States to implement quality-assured screening of all donated blood by 2013 (63). In order to catalyse and build on current efforts, in June 2009, a Global Consultation on Voluntary Non-Remunerated Blood Donations was held in Melbourne, Australia, and participants agreed to work towards the goal of achieving 100% voluntary non-remunerated blood donations by 2020.

### 3.3. New HIV prevention technologies: microbicides and pre-exposure prophylaxis

Antiretroviral-based prevention strategies, including microbicides and pre-exposure prophylaxis, are promising new technologies that hold the potential to further expand the tools available for HIV prevention. For the first time, a tenofovir (TDF)-containing vaginal microbicide was found to have a statistically significant protective effect against HIV. Research conducted by a group from the Centre for the AIDS Programme of Research in South Africa (CAPRISA) at the University of KwaZulu-Natal, Family Health International and CONRAD presented encouraging results of the CAPRISA 004 trial of tenofovir gel during the XVIII International AIDS Conference in Vienna, Austria in July 2010.

The Phase IIb, double-blinded, randomized, placebo-controlled trial carried out in rural and urban South Africa

assessed the effectiveness of a 1% concentration of tenofovir gel for the prevention of HIV among sexually active HIV-negative women aged 18–40 years. The results of the trial demonstrated a 39% reduction in the risk of acquiring HIV among women using tenofovir gel after 30 months of use. Subgroup analysis in women who had higher adherence showed that they enjoyed greater protection from HIV than women with lower adherence; among those who had adherence levels higher than 80%, HIV risk was reduced by 54%. Women using the tenofovir-containing gel were also half as likely to acquire herpes simplex virus type 2 (HSV-2), the virus that causes genital herpes, an important secondary finding, particularly as HSV-2 is an important risk factor for acquiring HIV (64–66). While pivotal, this recent development highlights the need for further research on microbicides as well as additional studies, including sociobehavioural analyses, to validate the protective effect of tenofovir gel in other countries and populations. It is important to note that HIV incidence in the population of women receiving the effective gel was still very high, at more than 5% per year.

Pre-exposure prophylaxis is the use of an active antiretroviral agent by HIV-uninfected people to block the acquisition of infection. The potential efficacy of pre-exposure prophylaxis is currently being studied in numerous randomized controlled trials involving more than 20 000 people around the world. The agents being tested are typically tenofovir disoproxil fumarate (TDF) or TDF plus emtricitabine (FTC), taken as a daily oral prophylactic dose. Ongoing trials of daily pre-exposure prophylaxis address two key end-points: reduction in HIV acquisition among HIV-uninfected people using pre-exposure prophylaxis and the safety of the drugs in use. Two of these trials should release preliminary results in late 2010, with the remaining studies expected to publish conclusive data after 2012.

The prospect of large-scale implementation of pre-exposure prophylaxis raises a number of questions, including technical, financial and ethical issues. In order to address some of these issues and pave the way for rapid scale-up, should pre-exposure prophylaxis be found to be sufficiently effective in clinical trials, WHO, with support from the US National Institutes of Health, convened a multi-stakeholder consultation meeting in October 2009. Among the topics explored were the technical, financial and safety implications associated with providing a relatively expensive antiretroviral drug for daily use to people who are otherwise healthy, how often to re-test people on pre-exposure prophylaxis for HIV, how to cope with the greater demand for laboratory tests to monitor drug safety and adverse effects (e.g. renal and bone density tests), how to promote adherence to a daily prophylactic regimen, how best to leverage drug supply systems to ensure a consistent supply, whether and how to target certain groups for use of pre-exposure prophylaxis, how to monitor and address the eventual emergence of



### Box 3.11. Positive Health, Dignity and Prevention

Positive Health, Dignity and Prevention (PHDP)<sup>1</sup> focuses on improving and maintaining the health and well-being of partners, families and communities. This is in direct contrast to previous approaches to “positive prevention”, which could be construed as treating people living with HIV as vectors of transmission. By focusing on the journey experienced by people living with HIV from testing to support, care and treatment, PHDP positions the health and social needs, and experiences of, people living with HIV within a human rights framework. Training of health-care workers – both facility- and non-facility-based – in the principles and practical elements of PHDP and involvement of people living with HIV in the design, implementation, monitoring and evaluation of HIV prevention services are vital elements to strengthen the health-care sector response to HIV prevention (67).

For the National Empowerment Network of People Living with HIV/AIDS in Kenya (NEPHAK),<sup>2</sup> PHDP is an important framework, both for programmes at the grass-roots level, and for policy and advocacy at the national level.

At the district level, NEPHAK along with its partners Family Health International (FHI) and USAID has initiated the formation of mother’s clubs linked with health facilities to promote prevention of mother-to-child transmission of HIV, provide counselling services, and build the capacity of HIV-positive mothers and fathers and discordant couples to understand their role in preventing transmission. Under the same partnership, NEPHAK trains people living with HIV to work within health-care facilities as drug adherence counsellors, referring clients to available services within health-care facilities and the community. It is a member of the Technical Working Group on “Prevention with Positives” and assists the work of peer educators. It also supports Ambassadors of Hope, who reach out to communities and their support group members with anti-stigma messages on HIV and AIDS and tuberculosis, and help in the work of health-care facilities by facilitating transport to the services provided.

NEPHAK assisted the Government of Kenya in January 2010 in developing the third National HIV/AIDS Strategic Plan (NASP III) by securing the participation of people living with HIV and including of their views. In collaboration with the National AIDS and STI Control Programme (NASCOP) and other partners, NEPHAK recently unveiled guidelines on HIV prevention for and by people living with HIV.

NEPHAK, with the Global Network of People living with HIV/AIDS (GNP+), is documenting the experiences of people living with HIV and using this evidence to engage policy-makers, the media and community leaders in advocacy for a supportive social, political and legal environment for them.

As part of operationalizing PHDP, NEPHAK is advocating for people living with HIV to be supported in understanding their rights and responsibilities. At the same time, the capacity and understanding of health workers need to be broadened and attitudes changed so that they recognize and respect the rights of people living with HIV, including their right to sexual and reproductive health.

1 More information on Positive Health, Dignity and Prevention (PHDP) at [www.gnpplus.net](http://www.gnpplus.net)

2 More information on National Empowerment Network of People Living with HIV/AIDS in Kenya (NEPHAK) at [www.nephak.org](http://www.nephak.org).

antiretroviral resistance, how to avoid behavioural risk compensation among users of pre-exposure prophylaxis, and how to monitor the rate of acquisition of HIV infection among those using pre-exposure prophylaxis.

Working with UNAIDS and other key partners, WHO is exploring potential strategies for service delivery, early identification of programme bottlenecks and guideline development. WHO is also working to determine additional data and programme needs for development of guidance and support to the health sector to ensure that pre-exposure prophylaxis can be implemented safely and effectively if proven effective at a reasonable level.

### 3.4. Looking ahead

Considerable progress has been made over the past two decades in reducing the rate of new HIV infections worldwide. From a peak of around 3.5 million in 1996, the number of new infections per year has already fallen by a quarter (2). Encouraging declines in HIV prevalence among

young people aged 15–24 years have been reported in several countries with generalized epidemics (7). However, with 2.7 million new infections in 2008, including 430 000 in children, the HIV epidemic remains a major obstacle to the achievement of the Millennium Development Goals, including MDG4 on child mortality and MDG5 on maternal mortality.

This scenario calls for a redoubling of prevention efforts, and the health sector remains a key entry point for providing and delivering HIV prevention services including HIV testing and counselling (see Chapter 2). Importantly, continued investments in the development and strengthening of national HIV surveillance systems are required to monitor trends over time in HIV prevalence and incidence, mortality and behaviours associated with HIV transmission, as well as to assess the population-level burden of HIV.

Developing high-quality, evidence-based interventions demands carefully triangulating different data sources by country. Data produced by HIV surveillance systems and analysed in conjunction with data from programme monitoring



are essential to more adequately understand whether the scale, focus and approach of programmatic responses are appropriate. Additional modelling and costing of interventions, including their impact on overall epidemiological dynamics, are also called for. These are essential steps to enhance programme design and effectiveness, and to develop long-term, sustainable financing mechanisms.

The development of new strategies and technologies in recent years has expanded the toolkit of available prevention interventions. Accelerated efforts are now needed to expand access to and uptake of these interventions, including among those groups most vulnerable to HIV infection.

This entails scaling up, where appropriate, male circumcision services through an integrated, comprehensive prevention strategy, accompanied by appropriate training for health-care workers and the provision of accurate information on the limits of its protective effect. A growing body of evidence also clearly demonstrates that antiretroviral therapy has an important secondary prevention benefit. Scaling up HIV testing and counselling, periodic re-testing (68) and treatment to all those in need will amplify this preventive benefit and further reduce HIV incidence on a population-level basis (see Chapter 4).

A promising pipeline of new prevention technologies is also on the horizon. The proof of concept that second-generation microbicides containing antiretrovirals have a prevention benefit has raised hopes that a female-controlled prevention tool may soon be available. Additional confirmatory and exploratory research is now needed to convert preliminary findings into commercially available products, and to develop approaches to include them in existing prevention and treatment programmes.

In addition to health sector interventions, scaling up HIV prevention involves pulling together multiple disciplines and methods, and considering behavioural and structural approaches. Such a combination of prevention interventions requires action on both immediate personal risks and on the underlying drivers of the epidemic. It entails developing a multi-pronged strategy providing services and programmes for individuals as well as investment in

structural interventions, including legal reforms to outlaw discrimination against people living with HIV, and the promotion of safe and supportive environments based on human rights and reduction of vulnerability (69,70).

It is also essential to gather additional evidence on optimal HIV prevention strategies for other key populations at higher risk for HIV infection, including youth and serodiscordant couples, and to develop programmes that are tailored to their needs, and reflect prevailing behavioural and epidemiological patterns.

Focused attention must also be paid to populations and groups at higher risk for HIV infection, such as migrants, sex workers, injecting drug users, prisoners, and men who have sex with men and transgender people. Strengthened efforts are urgently called for to provide HIV prevention services and interventions at the scale and intensity needed to match their continued high risk for acquiring HIV infection. Moreover, increased advocacy is needed to include these populations in existing national HIV surveillance and health information systems.

The criminalization of HIV transmission, same-sex relations, sex work and drug use impedes the uptake of effective interventions to prevent HIV transmission among these groups, limits access to health services and makes them significantly less likely to seek life-saving treatment and care. The failure to recognize substance dependence as a serious health condition is another important factor that prevents injecting drug users from accessing essential HIV interventions. Compulsory drug treatment, although not recommended by WHO and UNODC, is still being pursued, and development partners should continue to work with countries to implement the global recommendations (78).

Addressing the needs of groups at higher risk for HIV infection requires strong actions to uphold their human rights and protect them from violence and exclusion. WHO and partners are updating specific guidance to comprehensively address the multiple individual and structural constraints that continue to hinder the uptake of effective prevention and treatment interventions by these groups. 🌐

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## 4. TREATMENT AND CARE FOR PEOPLE LIVING WITH HIV

### Key findings

- At the end of 2009, 5 254 000 people were receiving antiretroviral therapy in low- and middle-income countries, an increase of over 1.2 million people from December 2008. This represents a 30% rise from a year earlier and a 13-fold increase in six years. Sub-Saharan Africa had the greatest increase in the absolute number of people receiving treatment in 2009, from 2 950 000 to 3 911 000 in December 2008 to about 3 910 000 a year later.
- As of December 2009, eight low- and middle-income countries had already achieved universal access to antiretroviral therapy, defined as providing antiretroviral therapy to at least 80% of patients in need, and 21 additional countries had coverage rates higher than 50%.
- WHO now recommends that adults and adolescents initiate antiretroviral therapy at an earlier stage of disease. WHO's revised antiretroviral therapy guidelines recommend that all adults and adolescents, including pregnant women, with HIV infection and a CD4 count of or below 350 cells/mm<sup>3</sup> should be started on antiretroviral therapy, regardless of whether or not they have clinical symptoms. This change has increased the number of people estimated to be in need of antiretroviral therapy at the end of 2009, from 10.1 million to 14.6 million [13.5 million-15.8 million].
- As of December 2009, 45 countries had already incorporated into their national treatment guidelines the new WHO recommendations on eligibility criteria and regimen choice for adults and adolescents, and 33 had already started implementing stavudine (d4T) phase-out plans.
- Coverage of antiretroviral therapy in low- and middle-income countries rose further in 2009. Based on the new set of criteria for treatment initiation, coverage increased from 28% [26-31%] in December 2008 to 36% [33-39%] at the end of 2009. Under the previous criteria for treatment initiation (CD4 count at or below 200 cells/mm<sup>3</sup>), global coverage would have reached 52% [47-58%] in 2009.
- The number of children under 15 years of age receiving antiretroviral therapy increased by 29% between 2008 and 2009. About 356 400 children less than 15 years of age were receiving antiretroviral therapy at the end of 2009, up from 275 300 at the end of 2008. Children represented 6.8% of people receiving antiretroviral therapy and 8.7% of people in need.
- Among 95 reporting countries, antiretroviral therapy coverage was higher among women, estimated at 39%, compared to 31% among men.
- Data on the proportion of patients retained on antiretroviral therapy over time continued to show that most patient attrition occurs within the first year of initiation of therapy and that retention rates tend to stabilize thereafter. In 2009, the average retention rate at 12 months across low- and middle-income countries was 82%.
- More evidence is now available of the positive impact of antiretroviral therapy on HIV transmission, and additional research is ongoing to identify and assess policy and operational implications.
- Twenty-eight countries have completed surveys or are in the process of implementing them to classify the extent of transmitted HIV drug resistance. Quality assured results are available for 15 surveys. In 13 of these, transmitted HIV drug resistance was classified as low (<5%) and in two it was classified as moderate (between 5% and 15%).
- Further, but limited, reductions in the prices of first-line regimens occurred between 2008 and 2009. However, the price of second-line regimens remained considerably higher than that of first-line regimens. In 2009, the weighted median price of the six most widely used first-line regimens was US\$ 137 per person per year in low-income countries, US\$ 141 in lower-middle-income countries and US\$ 202 in upper-middle-income countries. For the most commonly used second-line regimens the weighted median per person per year was respectively US\$ 853, US\$ 1378 and US\$ 3638.
- In low- and middle-income countries outside of the Americas (59 reporting countries), 97.5% of adult patients were on first-line regimens and 2.4% were receiving a second-line regimen. In the Americas Region (17 reporting low- and middle-income countries), 84% of adults were receiving a first-line regimen, 9.7% were being treated with a second-line regimen and 6.3% were on salvage therapy.
- There has been progress in expanding HIV testing and counselling for tuberculosis (TB) patients over the past years. Almost 1.4 million TB patients knew their HIV status in 2008, accounting for 22% of notified cases compared to 16% in 2007 and 3.2% in 2004. However, antiretroviral therapy coverage among people living with HIV and TB was low, and implementation of the Three I's for HIV/TB – intensified TB case finding among HIV patients, isoniazid preventive therapy and TB infection control – remained insufficient.

In spite of the severe downturn experienced by the world economy in 2009, countries and partners involved in the global AIDS response continued to deliver solid achievements. An additional 1.2 million people were receiving life-saving antiretroviral therapy in low- and middle-income countries in 2009, bringing the total number of people on treatment in resource-limited settings to 5.25 million. This is a thirteen-fold increase from the approximately 400 000 patients recorded in December 2003. Furthermore, 2009 also witnessed a number of key technical developments that considerably altered the way antiretroviral therapy is implemented.

Accumulated evidence on the need to initiate antiretroviral therapy at an earlier stage of HIV infection and on the appropriateness of phasing out the use of stavudine (d4T) as a preferred option due to its well-documented long-term toxicities prompted WHO to update, through a broad consultative process, its antiretroviral treatment guidelines for adolescents and adults. Currently, all adolescents and adults, including pregnant women, with HIV infection and a CD4 count at or below 350 cells/mm<sup>3</sup> should be

started on antiretroviral therapy, regardless of whether they have clinical symptoms (Box 4.1). Moreover, people living with HIV and TB should initiate antiretroviral therapy irrespective of CD4 count. These changes are important steps towards lowering excess morbidity and mortality, improving clinical outcomes and strengthening overall programme effectiveness. Clear evidence also emerged on the positive impact that antiretroviral therapy has on the prevention of HIV transmission. Although more technical and financial resources will be needed to implement the revised WHO treatment guidelines, considerable cost savings are likely to be realized over the long term in terms of reduced hospitalizations, deaths and HIV transmission.

In addition to rapidly scaling up access to antiretroviral treatment for the proportion of patients who still do not have access, countries also face the challenge of sustaining and managing existing programmes. In this respect, in a context of global fiscal constraints, it is critical to enhance the efficiency and effectiveness of the global AIDS response, while closely monitoring the quality of service delivery to promote and ensure optimum adherence and retention levels.

#### Box 4.1. New WHO guidelines for antiretroviral therapy in resource-limited settings

In response to the emergence of new scientific evidence, in December 2009 WHO updated its antiretroviral therapy guidelines for adults and adolescents. According to the new guidelines, which were developed in consultation with multiple technical and implementing partners, all adolescents and adults, including pregnant women, with HIV infection and a CD4 count at or below 350 cells/mm<sup>3</sup> should be started on antiretroviral therapy, regardless of whether or not they have clinical symptoms. Those with severe or advanced clinical disease (WHO clinical stage 3 or 4) should start antiretroviral therapy irrespective of CD4 cell count. According to a recent WHO survey, several countries have already updated their national treatment guidelines to reflect this shift towards earlier initiation of antiretroviral therapy (see section 4.1.6).

Recommendations for first- and second-line treatments have also been updated. First-line therapy should consist of a non-nucleoside reverse transcriptase inhibitor (NNRTI) and two nucleoside reverse transcriptase inhibitors (NRTI), one of which should be zidovudine (AZT) or tenofovir (TDF). Countries should take steps to reduce the use of d4T in first-line regimens because of its well-recognized long-term toxicities. The new guidelines maintain the standard recommendation for second-line therapy, which should consist of a ritonavir (RTV)-boosted protease inhibitor plus two NRTIs, one of which should be AZT or TDF, based on what was used in the first-line regimen. Ritonavir-boosted atazanavir (ATZ) or lopinavir/ritonavir (LPV/r) are the preferred protease inhibitors. Patients coinfected with HIV and TB should be started on antiretroviral therapy as soon as possible after starting TB treatment, ideally within the first eight weeks, irrespective of the CD4 cell count. The same applies to patients with HIV and chronic active hepatitis B (Box 4.12) (1–7).

#### 4.1. Antiretroviral therapy

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

At the end of 2009, 5 254 000 people were receiving antiretroviral therapy, an increase of over 1.2 million<sup>1</sup> people from December 2008 (Table 4.1 and Figure 4.1).

As the region most affected by the epidemic, sub-Saharan Africa recorded the greatest increase in the absolute number of people receiving treatment in 2009, from 2 950 000 in December 2008 to about 3 911 000 a year later – a 33% increase. In Eastern Europe and Central Asia, the number of people on treatment rose by 34%. In December 2009, 114 000 people were receiving antiretroviral therapy versus 84 400 at the end of 2008. In all other regions, with the exception of Latin America, growth rates were reasonably homogeneous, at around 30% per year.

In Latin America, the increase in the number of people receiving antiretroviral therapy in 2009 vis-à-vis 2008 was relatively more modest, about 6%. This is explained by the fact that most large countries in the region have already achieved relatively high levels of coverage.

<sup>1</sup> This figure is likely to underestimate the exact number of people who initiated antiretroviral therapy in 2009 as some have died or discontinued antiretroviral therapy since initiation. The total number of people starting antiretroviral therapy in a year is not reported by countries; rather, only the number of patients alive and on antiretroviral therapy at the end of the reporting period is provided.

**Table 4.1.** Number of adults and children (combined) receiving and needing antiretroviral therapy, and percentage coverage in low- and middle-income countries by region, December 2008 to December 2009<sup>a</sup>

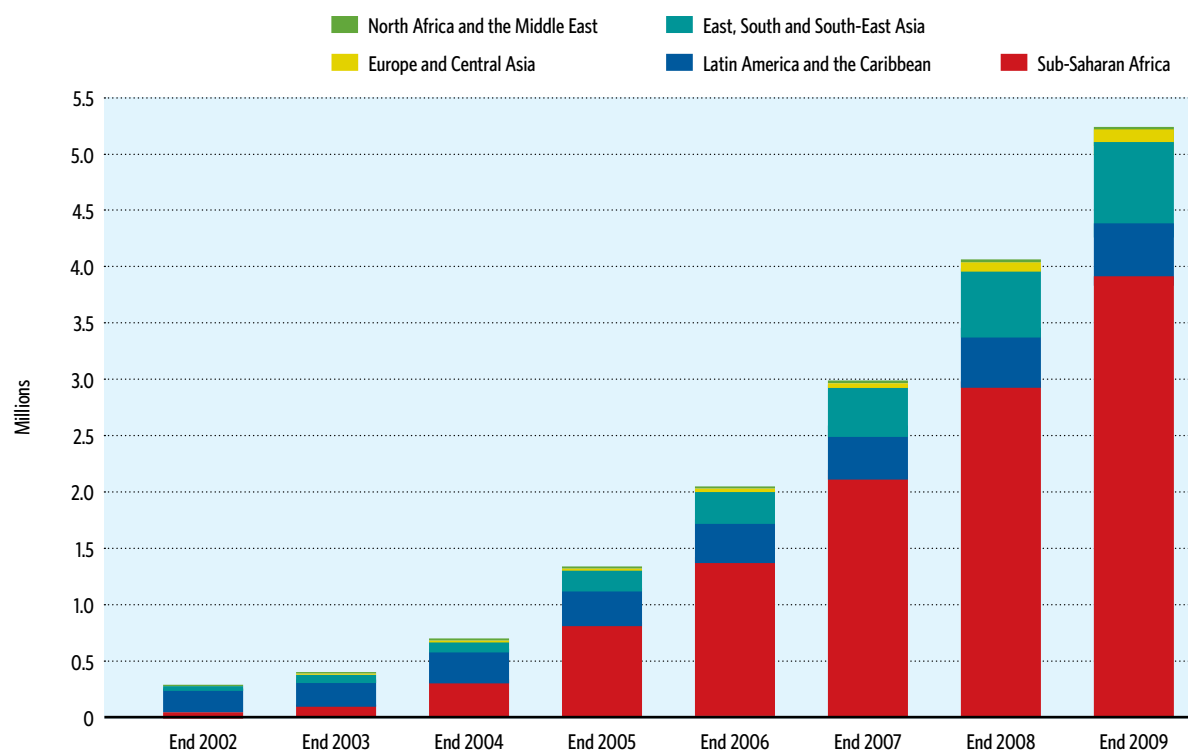
Geographical region	As of December 2009			As of December 2008		
	Number of people receiving antiretroviral therapy	Estimated number of people needing antiretroviral therapy, based on WHO 2010 guidelines [range] <sup>a</sup>	Antiretroviral therapy coverage, based on WHO 2010 guidelines [range] <sup>b</sup>	Number of people receiving antiretroviral therapy	Estimated number of people needing antiretroviral therapy, based on WHO 2010 guidelines [range] <sup>a</sup>	Antiretroviral therapy coverage, based on WHO 2010 guidelines [range] <sup>b</sup>
Sub-Saharan Africa	3 911 000	10 600 000 [9 700 000–11 500 000]	37% [34–40%]	2 950 000	10 400 000 [9 500 000–11 300 000]	28% [26–31%]
Eastern and Southern Africa	3 203 000	7 700 000 [7 200 000–8 300 000]	41% [38–45%]	2 416 000	7 600 000 [7 000 000–8 100 000]	32% [30–34%]
Western and Central Africa	709 000	2 900 000 [2 500 000–3 200 000]	25% [22–28%]	533 000	2 800 000 [2 500 000–3 200 000]	19% [17–22%]
Latin America and the Caribbean	478 000	950 000 [810 000–1 000 000]	50% [46–59%]	439 000	910 000 [790 000–1 000 000]	48% [44–56%]
Latin America	425 000	840 000 [700 000–940 000]	51% [45–61%]	400 000	810 000 [680 000–900 000]	49% [45–59%]
Caribbean	52 400	110 000 [95 000–120 000]	48% [42–55%]	39 900	110 000 [93 000–120 000]	37% [33–43%]
East, South and South-East Asia	739 000	2 400 000 [2 000 000–2 900 000]	31% [26–36%]	571 000	2 300 000 [2 000 000–2 900 000]	25% [20–29%]
Europe and Central Asia	114 000	610 000 [550 000–710 000]	19% [16–21%]	84 400	570 000 [510 000–660 000]	15% [13–17%]
North Africa and the Middle East	12 000	100 000 [88 000–120 000]	11% [10–14%]	9 100	91 000 [75 000–110 000]	10% [9–12%]
<b>Total</b>	<b>5 254 000</b>	<b>14 600 000</b> <b>[13 500 000–15 800 000]</b>	<b>36%</b> <b>[33–39%]</b>	<b>4 053 000</b>	<b>14 300 000</b> <b>[13 200 000–15 400 000]</b>	<b>28%</b> <b>[26–31%]</b>

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

a See Box 4.2 for further information on the methods for estimating the need for and coverage of antiretroviral therapy in 2008 and 2009.

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, 2002–2009



Twenty countries accounted for over 83% of the total number of patients receiving antiretroviral therapy in low- and middle-income countries in 2009, most of them in sub-Saharan Africa (Table 4.2). Home to the greatest absolute number of people living with HIV, South Africa now provides antiretroviral therapy to 18% of all patients treated worldwide. Zimbabwe recorded the highest increase in enrolment, where the number of people on treatment increased by almost 50% between December 2008 and December 2009. Despite continued progress, however, treatment in many of these countries remained well below the estimated needs (Table 4.2).

The number of people receiving antiretroviral therapy in high-income countries is at least 700 000, including about

385 000 in Europe and 300 000 in North America and the Caribbean, and 15 500 in Asia, Oceania and the Middle East. Worldwide, the total number of people accessing antiretroviral therapy in both low- and middle-income countries and high-income countries at the end of 2009 is estimated to be around 6 million.

The Global Fund to Fight AIDS, Tuberculosis and Malaria and the United States President's Emergency Plan for AIDS Relief (PEPFAR) remained the two major international sources of funding for antiretroviral therapy programmes in low- and middle-income countries in 2009. As of December 2009, Global Fund-supported programmes provided treatment to 2.5 million people, and programmes financed by PEPFAR supported antiretroviral therapy for 2.4 million people (8).

#### Box 4.2. Methods for estimating the need for and coverage of antiretroviral therapy among adults

Antiretroviral therapy coverage measures the proportion of people on antiretroviral therapy, as reported by national programmes, in relation to the estimated number of people in need of antiretroviral therapy. Therefore, figures used as denominators are estimates generated using a standardized statistical model (see below) based on, among other variables, the set of WHO-recommended criteria for antiretroviral therapy initiation (11). Considering the change in treatment guidelines adopted in 2010 (Box 4.1), coverage figures published in previous reports should not be compared to those reported herein.

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 (12). 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 influenced by a number of factors and are estimated using a software package called Spectrum (13). The tool takes into consideration the national epidemiological data and some key assumptions that include the adult HIV prevalence over time, the average survival of people living with HIV with and without antiretroviral therapy, and the average time between HIV seroconversion and eligibility for antiretroviral therapy. Country estimates of treatment need are the sum of the estimated need among adults and among children less than 15 years of age.<sup>1</sup>

Country estimates of the need for antiretroviral treatment, and the corresponding regional and global estimates, are updated every two years based on the most recent epidemiological information and updated estimation methods.

##### *Implications for global estimates of treatment and resource needs*

WHO's recommendation to change the CD4 cell count threshold for initiation of antiretroviral therapy from 200 cells/mm<sup>3</sup> to 350 cells/mm<sup>3</sup> increased by 45% the number of people estimated to be in need of antiretroviral therapy in low- and middle-income countries in 2009, from 10.1 million to 14.6 million. While such an expansion in the number of eligible patients may increase the initial investments required to provide universal access to antiretroviral therapy in resource-limited settings, this expense is likely to be compensated for in the medium term by savings related to fewer hospitalizations, and lower morbidity and mortality rates. The effect of antiretroviral therapy on reducing HIV transmission may also improve the economic advantages of expanding access to antiretroviral therapy. A recent study estimated that, in South Africa, while adopting the revised criteria for treatment initiation would imply an immediate increase in investment needs, these would be fully offset by savings by 2014 and, over five years, overall programme costs would actually drop by about US\$ 470 million.<sup>2</sup>

While it is critical to implement the necessary expansions in programme capacity to incorporate the additional number of patients now eligible for treatment, it is also necessary to improve the approach to HIV treatment and care if the global response is to be sustained in the long run. The Treatment 2.0 Initiative, launched by WHO and UNAIDS, seeks to comprehensively maximize the value of antiretroviral therapy through the development of simpler, less resistance-prone combination treatment regimens, cheaper and simplified diagnostic tools, and a low-cost community-led approach to service delivery.

<sup>1</sup> For estimation methods regarding the number of children in need of antiretroviral therapy, see Box 5.6, Chapter 5.

<sup>2</sup> Kahn JG et al. Expanding ART for treatment and prevention of HIV in South Africa: estimated cost and cost-effectiveness 2011–2050 (unpublished data). Scenarios are based on an ART coverage rate of 90%.



**Table 4.2.** Number of people receiving antiretroviral therapy and percentage coverage in twenty low- and middle-income countries with the highest number of people receiving antiretroviral therapy in December 2009, progress between 2008 and 2009 in these countries

Country	Number of people receiving antiretroviral therapy in December 2008	Number of people receiving antiretroviral therapy in December 2009	Antiretroviral therapy coverage in 2009 [range] based on 2006 WHO guidelines	Antiretroviral therapy coverage in 2009 [range] based on 2010 WHO guidelines	Percentage increase, 2008-2009
South Africa	730 183	971 556	56% [48%-65%]	37% [35%-39%]	33%
Kenya	250 576	336 980	65% [55%-79%]	48% [42%-55%]	34%
India	234 581	320 074	41% [36%-46%]	26% [23%-28%]	36%
Nigeria	238 659	302 973	31% [25%-38%]	21% [18%-25%]	27%
Zambia	219 576	283 863	85% [72%->95%]	64% [56%-75%]	29%
Zimbabwe	148 144	218 589	49% [42%-57%]	34% [30%-38%]	48%
Thailand	185 086	216 118	76% [62%-95%]	61% [50%-78%]	17%
Uganda	153 718	200 413	53% [44%-67%]	39% [33%-46%]	30%
United Republic of Tanzania	154 468	199 413	44% [36%-53%]	30% [27%-34%]	29%
Malawi	147 497	198 846	63% [53%-77%]	46% [40%-53%]	35%
Brazil	194 984	... <sup>a</sup>	...[65%->95%] <sup>b</sup>	... [50%-89%] <sup>b</sup>	...
Ethiopia	132 379	176 632	... [58%-86%] <sup>b</sup>	... [45%-62%] <sup>b</sup>	33%
Mozambique	128 330	170 198	45% [36%-55%]	30% [26%-34%]	33%
Botswana	117 045	145 190	>95% [94%->95%]	83% [77%-97%]	24%
Rwanda	63 149	76 726	>95% [87%->95%]	88% [74%->95%]	21%
Cameroon	59 960	76 228	41% [34%-51%]	28% [25%-33%]	27%
Russian Federation	54 900	75 900	... [27%-42%] <sup>b</sup>	...[16%-24%] <sup>b</sup>	38%
Côte d'Ivoire	51 820	72 011	39% [33%-47%]	28% [24%-32%]	39%
Namibia	59 376	70 498	>95% [82%->95%]	76% [62%-92%]	19%
China	48 254	65 481	... [31%-67%] <sup>b</sup>	... [19%-38%] <sup>b</sup>	36%

a. No 2009 data are available for Brazil.

b. Estimates of the number of people needing antiretroviral therapy are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis. Therefore, coverage can only be presented as a range.

However, about 1.3 million people were receiving treatment through programmes jointly financed by the two initiatives; hence, together they supported programmes that provided treatment to approximately 3.7 million people at the end of 2009 (9,10).

Coverage of antiretroviral therapy in low- and middle-income countries continued to increase in 2009 and reached 36% [33-39%] of the 14.6 million [13.7 million-15.8 million] people estimated to be in need at the end of 2009 (Table 4.3). This revised estimate of total needs is based on the 2010 WHO guidelines for initiating antiretroviral therapy in patients with CD4 counts at or below 350 cells/mm<sup>3</sup> (Boxes 4.1 and 4.2). In 2008, coverage under the same criteria was 28% [26-31%]. Although the trend remained clearly

positive, under the 2006 guidelines, global coverage would have reached 52% [47-58%] at the end of 2009.

As was the case in previous years, Latin America and the Caribbean (accounting for 6% of estimated treatment needs in low- and middle-income countries but for 9% of the total number of people receiving treatment) had an average coverage of 50% [46-59%], the highest regional level in 2009 (Table 4.1). This is due to the relatively longer duration of antiretroviral therapy programmes in some of the region's largest countries.

In sub-Saharan Africa, antiretroviral therapy coverage reached 37% [34-40%] in 2009. The region accounted for 72% of the estimated treatment need in low- and middle-

**Table 4.3.** Estimated percentage coverage with antiretroviral therapy in low- and middle-income countries by region, based on WHO 2010 and 2006 guidelines, December 2008 and December 2009<sup>a</sup>

Geographical region	Antiretroviral therapy coverage, based on WHO guidelines 2010 (treatment initiation at CD4 count of <350 cells/mm <sup>3</sup> ), December 2009 [range] <sup>b</sup>	Antiretroviral therapy coverage, based on WHO guidelines 2006 (treatment initiation at CD4 count of <200 cells/mm <sup>3</sup> ), December 2009 [range] <sup>b</sup>	Antiretroviral therapy coverage, based on WHO guidelines 2010 (treatment initiation at CD4 count of <350 cells/mm <sup>3</sup> ), December 2008 [range] <sup>b</sup>	Antiretroviral therapy coverage, based on WHO guidelines 2006 (treatment initiation at CD4 count of <200 cells/mm <sup>3</sup> ), December 2008 [range] <sup>b</sup>
Sub-Saharan Africa	37% (34%-40%)	53% (47%-61%)	28% (26%-31%)	42% (37%-48%)
Eastern and Southern Africa	41% (38%-45%)	59% (53%-67%)	32% (30%-34%)	47% (42%-53%)
Western and Central Africa	25% (22%-28%)	36% (30%-44%)	19% (17%-22%)	28% (23%-35%)
Latin America and the Caribbean	50% (46%-59%)	67% (61%-78%)	48% (44%-56%)	65% (60%-76%)
Latin America	51% (45%-61%)	67% (61%-79%)	49% (45%-59%)	66% (61%-78%)
Caribbean	48% (42%-55%)	67% (58%-80%)	37% (33%-43%)	54% (46%-65%)
East, South and South-East Asia	31% (26%-36%)	47% (39%-56%)	25% (20%-29%)	38% (31%-46%)
Europe and Central Asia	19% (16%-21%)	31% (26%-36%)	15% (13%-17%)	25% (21%-30%)
North Africa and the Middle East	11% (10%-14%)	18% (15%-23%)	10% (9%-12%)	16% (13%-21%)
<b>Total</b>	<b>36% (33%-39%)</b>	<b>52% (47%-58%)</b>	<b>28% (26%-31%)</b>	<b>42% (38%-48%)</b>

a For an explanation of the methods used, see the explanatory notes for Annex 1 and Box 4.2.

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

**Table 4.4.** Low- and middle-income countries with an estimated ART coverage of 50-80% and 80% or higher as of December 2009<sup>a</sup>

Countries with 50-80% antiretroviral therapy coverage (n = 21)	Countries with 80% or higher antiretroviral therapy coverage (n = 8)
Argentina	Botswana
Benin	Cambodia
Brazil	Croatia <sup>b</sup>
Chile	Cuba
Costa Rica	Guyana
El Salvador	Oman <sup>b</sup>
Ethiopia	Romania
Georgia <sup>b</sup>	Rwanda
Lao People's Democratic Republic	
Mali	
Mexico	
Namibia	
Papua New Guinea	
Senegal	
Slovakia <sup>b</sup>	
Suriname	
Swaziland	
Thailand	
Tunisia <sup>b</sup>	
Turkey	
Zambia	

a Coverage estimates are calculated based on the new 2010 WHO guidelines of treatment initiation at a CD4 count < 350 cells/mm<sup>3</sup>.

b Countries with an estimated antiretroviral therapy need of less than 1000 people. Data for these countries should be interpreted cautiously due to the impact of ranges of uncertainty around these estimates on coverage.

income countries, and 74% of the total number of people receiving treatment at the end of 2009. However, important intraregional differences in coverage were observed: whereas 41% [38-45%] of those in need had access to antiretroviral therapy in Eastern and Southern Africa, in

West and Central Africa antiretroviral therapy coverage stood at 25% [22-28%]. The lower coverage level observed in Western and Central Africa is partially explained by the fact that Nigeria, while accounting for 50% of the treatment need in the subregion, had an estimated coverage of 21%, thus affecting the group estimate.

Coverage in 2009 improved across all the other regions as well, but was lowest in East, South and South-East Asia with 31% [26-36%], Eastern Europe and Central Asia, with 19% [16-21%], and North Africa and the Middle East, where only 11% [10-14%] of the regional antiretroviral therapy needs were met. In these regions, a number of countries face HIV epidemics that are concentrated among harder-to-reach and most-at-risk populations who, in addition to having only limited access to treatment and care services, face programmes predominantly oriented towards the needs of the general population.

Based on WHO's 2010 treatment guidelines, at the end of 2009, eight low- and middle-income countries (Botswana, Cambodia, Croatia, Cuba, Guyana, Oman, Romania, Rwanda) had already achieved universal access to antiretroviral treatment, commonly understood as providing antiretroviral treatment to at least 80% of patients in need (Table 4.4). Twenty-one other countries had coverage rates higher than 50%. Under previous CD4 count criteria for antiretroviral therapy initiation (2006 WHO guidelines), nine other countries would have also reached universal access to antiretroviral therapy in 2009 (Argentina, Chile, Costa



Rica, Georgia, Lao People's Democratic Republic, Namibia, Swaziland, Turkey and Zambia).

#### 4.1.2. Access to antiretroviral therapy among women and children

A total of 143 countries reported data disaggregated for adults and children. About 356 400 children less than 15 years of age were receiving antiretroviral therapy at the end of 2009, up from 275 300 at the end of 2008, or a 29% year-on-year increase (Chapter 5 provides an in-depth analysis on paediatric treatment). Children represented 6.8% of people receiving antiretroviral therapy and 8.7% of people in need.

Overall antiretroviral therapy coverage among children was lower than among adults in low- and middle-income countries. Of the 1 270 000 [830 000–1 700 000] children estimated to be in need of antiretroviral therapy, only 28% [21–43%] had access to treatment, versus 37% of adults [35–41%]. This is due to the fact that sub-Saharan

Africa accounts for 89% of paediatric needs but has an estimated coverage rate of 26% (Table 4.5). Indeed, in Latin America and the Caribbean, East, South and South-East Asia, and in Eastern Europe and Central Asia, coverage among children is higher than among adults.

Data disaggregated by sex on the number of people receiving and needing antiretroviral therapy are available from 95 low- and middle-income countries, representing 88% of the 5.25 million people receiving treatment in 2009.<sup>1</sup> Women represented 58% of people on antiretroviral therapy and 53% of those in need. Overall, antiretroviral therapy coverage was higher among women, estimated at 39%, compared with 31% among men. However, this pattern was not observed in all regions (Table 4.6).

1 Some countries provided disaggregated data only for a proportion of all people receiving antiretroviral therapy in the country. For those countries with incomplete datasets, treatment data by sex were obtained by applying male/female ratios from existing data to the numbers of people on treatment. Similarly, for 15 countries that were able to supply data by sex in 2008 but not in 2009, available male/female ratios from 2008 were applied to 2009 data.

**Table 4.5. Number of children less than 15 years receiving and estimated to need antiretroviral therapy, and percentage coverage among children and adults in low- and middle-income countries,<sup>a</sup> by region, December 2009**

Geographical region	Number of children (0-14 years) receiving antiretroviral therapy, December 2009	Estimated number of children needing antiretroviral therapy, 2009 [range] <sup>b</sup>	Antiretroviral therapy coverage among children, December 2009 [range] <sup>c</sup>	Antiretroviral therapy coverage among adults, December 2009 [range] <sup>b</sup>
Sub-Saharan Africa	296 000	1 140 000 [710 000–1 500 000]	26% [19–42%]	38% [36–42%]
Eastern and Southern Africa	254 900	790 000 [530 000–1 000 000]	32% [25–48%]	42% [40–46%]
Western and Central Africa	41 000	350 000 [180 000–510 000]	12% [8–22%]	27% [25–30%]
Latin America and the Caribbean	18 600	32 200 [23 000–42 000]	58% [45–80%]	50% [46–67%]
Latin America	16 300	24 100 [19 000–31 000]	68% [52–87%]	50% [45–69%]
Caribbean	2 400	8 100 [4 100–12 000]	29% [19–57%]	50% [45–59%]
East, South and South-East Asia	36 500	83 400 [61 000–140 000]	44% [27–59%]	30% [26–36%]
Europe and Central Asia	4 800	9 700 [5 700–15 000]	49% [31–58%]	18% [16–21%]
North Africa and the Middle East	560	10 000 [5 200–15 000]	6% [4–11%]	12% [11–16%]
<b>Total</b>	<b>356 400</b>	<b>1 270 000 [830 000–1 700 000]</b>	<b>28% [21–43%]</b>	<b>37% [35–41%]</b>

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 and Box 4.2.

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

c Based on 2010 WHO guidelines of treatment initiation at a CD4 count of <350 cells/mm<sup>3</sup>.

**Table 4.6.** Comparison of number of men and women receiving and estimated to need antiretroviral therapy and percentage coverage, by region, December 2009<sup>a</sup>

Geographical region	Men			Women		
	Coverage <sup>b</sup>	Number receiving ART	Number in need	Coverage <sup>b</sup>	Number receiving ART	Number in need
Sub-Saharan Africa	32%	1 353 200	4 200 000	40%	2 321 000	5 800 000
Eastern and Southern Africa	37%	1 120 800	3 000 000	44%	1 882 000	4 200 000
Western and Central Africa	20%	232 400	1 100 000	29%	439 000	1 500 000
Latin America and the Caribbean	49%	276 200	570 000	55%	163 000	300 000
Latin America	49%	261 300	540 000	57%	147 000	260 000
Caribbean	55%	14 900	27 000	45%	16 000	36 000
East, South and South-East Asia	22%	284 300	1 300 000	28%	191 400	690 000
Europe and Central Asia	16%	20 600	130 000	16%	15 000	97 000
North Africa and the Middle East	11%	5 000	47 000	9%	4 300	50 000
<b>Total</b>	<b>31%</b>	<b>1 940 000</b>	<b>6 200 000</b>	<b>39%</b>	<b>2 690 000</b>	<b>6 900 000</b>

a Based on 95 countries reporting disaggregated data by sex.

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

### Box 4.3. Uninterrupted supplies of drugs for antiretroviral therapy: a major challenge for accessibility to and retention on antiretroviral therapy

Drug stock-outs remain an issue of concern in low- and middle-income countries. The proportion of countries experiencing stock-outs of drugs for antiretroviral therapy remained stable in 2009 vis-à-vis previous years. Of the 94 countries reporting information this year, 36 (38%) reported at least one or more stock-out of antiretroviral drugs in health facilities in 2009, compared to 31 out of 90 countries (34%) in 2008 and 25 out of 66 countries (38%) in 2007.

Ensuring an uninterrupted supply of antiretroviral drugs is critical to minimize the emergence of HIV drug resistance, protect the health and well-being of patients, and ultimately reach universal access goals. As such, greater efforts must be made to identify and address bottlenecks in drug procurement and management, particularly in the context of an expected increase both in the number of people on treatment and complexity of drug regimens, as more patients move from first- to second- and third-line antiretroviral regimens. Robust and up-to-date information systems are a critical element in this regard, as only rigorous pharmacy monitoring at the site level allows stocks to be adequately managed. Equally relevant is the proper documentation and follow up of patient cohorts over time, thus reinforcing monitoring of the antiretroviral therapy programme.

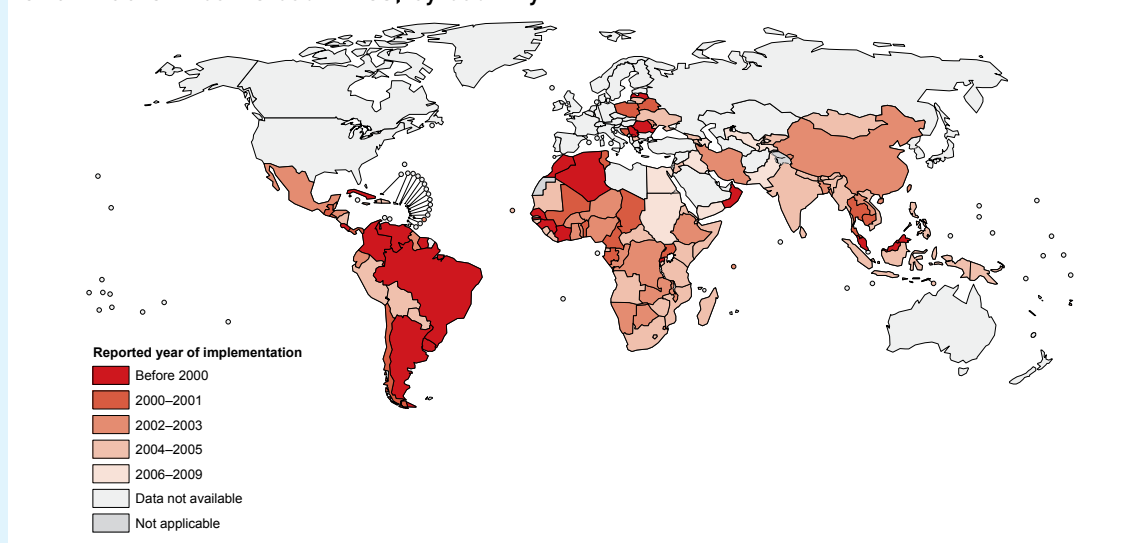
Improved partner coordination at the country level under strong governmental leadership is key to ensure the responsiveness and integrity of supply systems for antiretroviral drugs. Once potential stock-outs are identified, governments and other implementing partners, through close collaboration and information sharing, must assess district or province stock levels and reallocate them as needed. In Rwanda, the Coordinated Procurement and Distribution System for antiretrovirals and drugs for opportunistic infections brings together government officials, donors, national institutions and international organizations. It has succeeded in reducing stock-outs and drug expiry by ensuring that, once potential antiretroviral stock-outs are identified, a partner can step in and fill any gaps as needed. When the stock-out is a national issue and concerns all districts, an internationally agreed approach is to place an emergency order from partners who have buffer stocks in their warehouses at regional (Johannesburg, Nairobi, Accra) or headquarter levels and explore which options would respond more rapidly to the urgent country need.

#### Box 4.4. Maturity of national antiretroviral therapy programmes

A total of 118 low- and middle-income countries provided data on the year of launch of national antiretroviral therapy programmes.<sup>1</sup> In 81% of cases, antiretroviral therapy programmes have been in place for more than five years. This figure includes a subgroup of 22 countries where antiretroviral therapy programmes were introduced more than 10 years ago.

A regional breakdown reveals that in Latin America and the Caribbean, 96% of reporting countries have antiretroviral therapy programmes that have been in place for at least five years. The corresponding figures are 89% in sub-Saharan Africa, 71% in East and South-East Asia, 56% in North Africa and the Middle East, and 65% in Eastern Europe and Central Asia. Among those countries with the highest burden of HIV, programmes have been in place for at least five years in Nigeria (year of initiation: 2002), Ethiopia (2003), Zambia (2003), India (2004), Kenya (2004) and South Africa (2004).

**Fig. 4.2 Starting year of implementation of antiretroviral therapy programmes in low- and middle-income countries, by country**



<sup>1</sup> Data on the starting year of implementation of antiretroviral therapy programmes in low- and middle income countries were obtained from the reporting form of the universal access report, relevant country websites and regional offices.

#### 4.1.3. Availability of antiretroviral therapy

The number and distribution of health facilities providing antiretroviral therapy are important indicators of the scale-up of and access to treatment services. In 2009, 116 low- and middle-income countries reported a total of 18 600 health facilities providing antiretroviral therapy. Of these facilities, 80% were in the public sector and 11% in the private sector (9% were unspecified).

Ninety-nine countries provided data for both 2008 and 2009. In these countries, the reported number of health facilities providing antiretroviral therapy increased from 11 833 to 16 134, or a 36% increase in one year. It increased by 26% in sub-Saharan Africa (from 5778 to 7302 in 39 countries); 5% in Latin America and the Caribbean (from 1847 to 1948 in 17 countries); 64% in East, South and South-East Asia (from 3660 to 6013 in 20 countries) and 69% in Eastern Europe and Central Asia (from 458 to 776 in 16 countries). In North Africa and the Middle East, the number of facilities providing antiretroviral therapy went up from 90

in 2008 to 95 in 2009 across seven reporting countries, an increase of 6%.

The average number of people receiving antiretroviral therapy per health facility increased from 260 in 2008 to 274 in 2009. Health facilities in sub-Saharan Africa continue to treat more people per site than in the rest of the world, with an average of 452 people per health facility providing antiretroviral therapy versus 157 in Latin America and the Caribbean, 123 in East, South and South-East Asia, 33 in Eastern Europe and Central Asia, and 63 in North Africa and the Middle East.

#### 4.1.4. Outcomes and impact of scaling up antiretroviral therapy

##### 4.1.4a. Outcomes at the programme level: retention on antiretroviral therapy

Antiretroviral therapy is a lifelong intervention. As such, it requires a robust framework to adequately monitor and

**Table 4.7.** Number of countries reporting on retention on antiretroviral therapy among 149 low- and middle- income countries, 2008 and 2009

	2008		2009	
	Number of countries reporting	Number of patients assessed	Number of countries reporting	Number of patients assessed
Retention at 12 months	61	297 408	115	519 890
Retention at 24 months	42	132 427	66	284 017
Retention at 36 months	30	52 572	56	184 679
Retention at 48 months	22	25 643	46	106 696

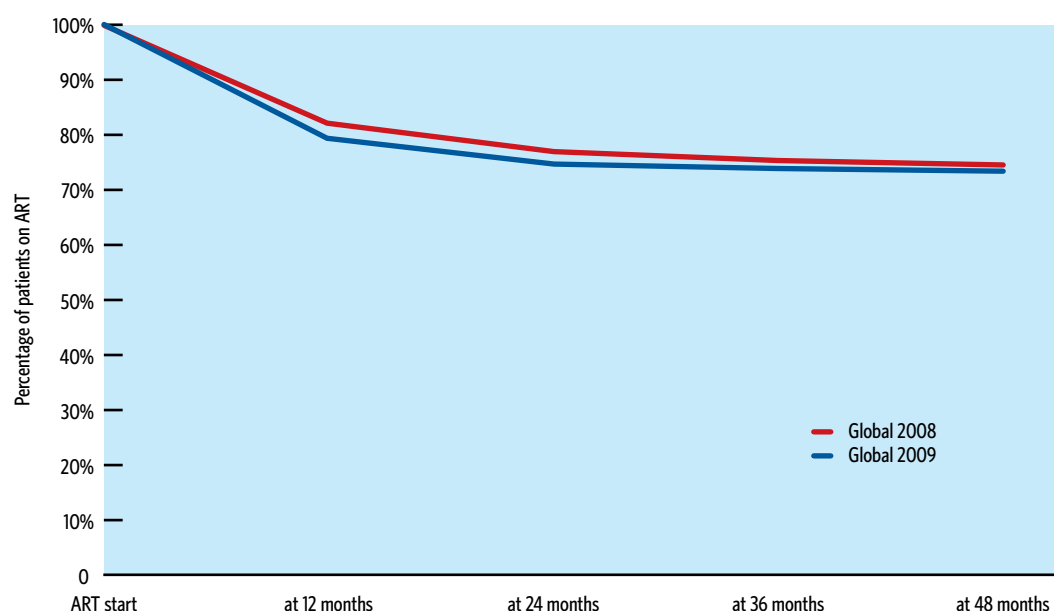
evaluate processes, outcomes and long-term impact, both at the individual and at the population level. Measuring patient retention, or the percentage of adults and children with HIV who continue to receive treatment after initiating antiretroviral therapy (excluding patients who died, were lost to follow up or stopped treatment among those who had started), provides programme managers with critical information to monitor systemic progress, identify bottlenecks and implement timely programmatic changes whenever necessary.

Countries have continued to improve the monitoring and reporting of programme retention on antiretroviral therapy. As summarized in Table 4.7, the rate of reporting for the

#### Box 4.5. Retention of patients on antiretroviral therapy: tracking trends at the global level, 2008 and 2009

For each time-point (12, 24, 36 and 48 months), countries were requested to report the number of patients initiated on antiretroviral therapy and still on treatment (the numerator) as well as the total number of patients initiated on antiretroviral therapy during each period (the denominator). For each time-point, numerators and denominators were then aggregated to produce global estimates. Figure 4.3 shows these estimates for 2008 and 2009. While a direct comparison of retention levels between the two years may not be appropriate, as reporting periods are not always clearly specified and reported data may not reflect the most recent available information, trends detected in 2009 are clearly consistent with those observed in 2008 – a fact that is especially relevant given the increase in the number of reporting countries and patients assessed.

**Fig. 4.3.** Retention on antiretroviral therapy up to 48 months, 2008 and 2009



While progress has been made in documenting retention on antiretroviral therapy over time across countries and regions, this is an area where numerous challenges remain to be addressed (15). Many programmes are still technically and operationally unable to provide retention data, especially for longer periods. Retention rates may be overestimated when calculated exclusively on survival information, without taking into account patients lost to follow up or those stopping treatment, while improper record-keeping of patients transferred out to another clinic may underestimate true rates. Also, when reported, country data may not be representative of the full programme when derived from a non-random selection of sites. Indeed, reporting programmes and sites are likely to be better organized and may exhibit stronger performance than those not providing any information, further affecting the representativeness of reported figures. Finally, reported data may not exactly reflect outcomes in 2009 but cumulative outcomes or outcomes during a previous period. All these factors may contribute to the important variation in reported results across countries.

indicators on retention on antiretroviral therapy almost doubled both in terms of the number of countries reporting and the number of patients assessed for outcomes.

Among 47 countries in sub-Saharan Africa, 37, 23, 20 and 15 countries reported retention rates on antiretroviral therapy at 12, 24, 36 and 48 months, respectively.

Reported data for each time-point were aggregated to produce global estimates. Data on the proportion of patients retained on antiretroviral therapy over time continue to show that most patient attrition – or discontinuation of antiretroviral therapy – occurs within the first year and that retention rates tend to stabilize thereafter. In 2009, the average global retention rate at 12 months was 82.0% (interquartile range: 77–93%). It dropped to 76.9% (interquartile range: 70–87%) at 24 months and remained stable at 75% (interquartile range: 63–81%) and 74.5% (interquartile range: 57–82%) at 36 and 48 months, respectively. Interquartile ranges showed the important variation in reported retention rates across countries (Box 4.5).

These figures are consistent with those from an updated meta-analysis of 39 cohorts from sub-Saharan Africa (14). Retention was estimated at between 70% and 77% at 24 months, and 65–72% at 36 months. The authors noticed that the rate of retention at 24 months was higher than their previous estimate. Such an improved performance could reflect a change in the criteria for initiation of antiretroviral therapy, as higher CD4 cell counts at enrolment have been associated with lower mortality and improved treatment outcomes.

A total of 61 countries reported disaggregated retention data at 12 months by sex and 53 countries provided similarly disaggregated data by age (children younger than 15 years and adolescents/adults older than 15 years). Globally, retention at 12 months was found to be almost the same among women and men, averaging 81% and 82%, respectively. Among children, average retention rates, at 73%, were slightly lower than among adolescents/adults, which stood at 82%.

Whereas it is critical to improve retention on antiretroviral therapy and long-term programmatic performance (16), more attention must be devoted to the attrition of patients in HIV care before initiation of antiretroviral therapy and how it may negatively affect the performance of antiretroviral therapy programmes. Patients who tested HIV-positive and enrolled in HIV care may not all start antiretroviral therapy or, more worryingly, may start late after reaching eligibility levels. Among 44 844 patients enrolled in care between May 2004 and December 2007 in South Africa, 22 083 were or became eligible for antiretroviral therapy. However, while 68% of them were receiving antiretrovirals after two years,

26% had died before starting treatment and 6% were alive and untreated. The delay between eligibility for and start of antiretroviral therapy was reduced from a median of 122 days in 2004 to 78 days in 2007.<sup>1</sup> A few similar studies are available but all showed confluent results, calling for a need to better understand and reduce pre-antiretroviral therapy attrition and mortality (17–20).

As monitoring systems and cohort studies typically focus on outcomes in patients who are known to have started treatment, this “unseen mortality”<sup>1</sup> often remains unreported or underreported. It is critical to step up efforts to better manage waiting lists and closely monitor any delays in initiation of antiretroviral therapy once a patient is deemed eligible, particularly as guidelines worldwide adopt a higher CD4 cell count criterion for initiation of antiretroviral therapy.

#### 4.1.4b. Impact of antiretroviral therapy programmes

The magnitude of the toll the epidemic exacts on people and societies is such that appropriately measuring and understanding how HIV care and treatment impact on population mortality is crucial. In addition, as programmes mature, monitoring their impact on mortality, morbidity and quality of life is equally essential to evaluate overall programme effectiveness and efficiency, key elements to ensure the continued political commitment necessary to sustain a lifelong intervention.

Issues related to the absence of or delay in the generation of vital statistics in many low- and middle-income countries explain most of the current difficulties in assessing the impact of antiretroviral therapy on mortality at the population level. Vital or civil registration systems are weak in many low- and middle-income countries, especially in countries with a high HIV burden, rendering the appropriate measurement of AIDS-related mortality particularly challenging. While few comprehensive studies are available on the matter, a systematic analysis of worldwide mortality among adults aged 15–59 years from 1970 to 2010 showed that mortality increased substantially in sub-Saharan Africa starting in the late 1980s (in fact, it more than doubled in the southern region) and began to decline since 2005, a trend that coincides with an increase in access to antiretroviral treatment (21,22). In South Africa, a recent study based on demographic surveillance data in KwaZulu Natal correlated the decline in mortality in the region, particularly among young adults, with the decline in HIV-related mortality (Box 4.6). Moreover, there is a growing body of scientific evidence that points to the important role antiretroviral therapy can play in the prevention of HIV transmission (Box 4.7).

<sup>1</sup> Outcomes in patients waiting for antiretroviral treatment in the Free State Province, South Africa: prospective linkage study. (Ingile S et al., personal communication, 2010).

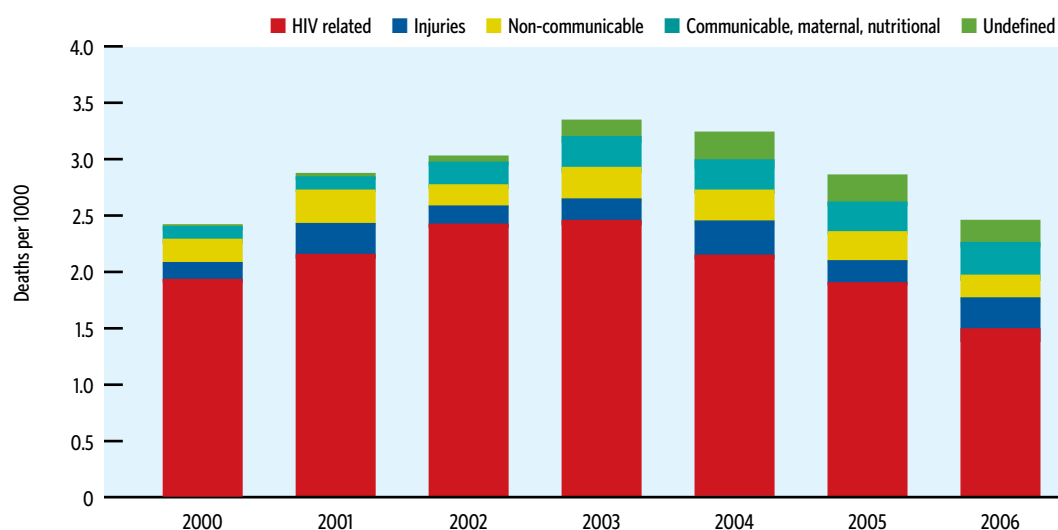
#### Box 4.6. Reduction in AIDS-related mortality in KwaZulu Natal, South Africa

WHO and UNAIDS have launched a series of country consultations to better assess the impact of antiretroviral therapy programmes, in particular, on population mortality. In South Africa, it was conducted in partnership with StatsSA (Statistics South Africa) and the national Department of Health. The best available data are identified with a special emphasis on identifying group-level correlations between mortality and antiretroviral therapy programme data. However, causes of death are often inaccurately recorded and trends in mortality can seldom be directly correlated with changes in AIDS-related mortality.

In KwaZulu Natal, provincial statistics showed an increase in mortality up to 2003 and a stabilization thereafter, which coincided with the introduction and roll-out of the antiretroviral therapy programme. These trends in mortality were particularly marked in the 25–34 years' age group.<sup>1</sup>

A demographic surveillance programme in the district of Umbkhanyakude in KwaZulu Natal correlated the decline in mortality in the age group of 25–49 years with the decline in HIV-related mortality. Verbal autopsies were conducted for all 7930 deaths observed between 2000 and 2006. The reduction in HIV-related mortality was estimated at 22% in men and 29% in women between 2002–03 and 2005–06 (28).

**Fig. 4.4. Cause-specific standardized mortality ratios for adults aged 25–49 years, KwaZulu-Natal, South Africa, 2000–2006**



Source: Herbst et al. (28)

While research on the impact of scale-up of antiretroviral therapy on population mortality is still limited, it is expected that more data will become available as programmes mature and demographic surveillance and HIV cohort monitoring systems are better integrated.

<sup>1</sup> Collaborative project StatSA, DoH, UNAIDS, WHO – preliminary analysis (Stoneburner R, personal communication, 2010).



### Box 4.7. Impact of antiretroviral therapy on HIV prevention

As the strongest predictor of HIV transmission risk in epidemiologic studies is the level of HIV in blood, a significant drop in the amount of virus is essential to interrupt or drastically reduce transmission. Indeed, research has shown that viral load predicts the risk of sexual transmission of HIV-1, and that transmission from persons with levels of less than 1500 copies of HIV-1 RNA per millilitre is rare (29). A 2009 meta-analysis that included 11 cohorts (5021 heterosexual couples) found only a minimal risk of sexual transmission while on antiretroviral therapy for HIV-1 concentrations less than 400 copies/ml (30). A recent randomized controlled study of genital herpes simplex virus treatment among long-term, HIV-serodiscordant heterosexual couples in Africa found a 92% reduction in transmission if the HIV-positive partner was on antiretroviral therapy. Prevention of maternal-to-child transmission offers further proof of concept that antiretroviral therapy interrupts HIV transmission. There is also growing evidence of the impact of antiretroviral therapy on community-level HIV transmission. In British Columbia, a decrease in community plasma HIV RNA concentrations and HIV incidence among injecting drug users was associated with antiretroviral therapy use (32). In San Francisco, between 2004 and 2008, ecological correlations show that the number of HIV diagnoses fell by 45%, the average viral load among the HIV-positive population by 40%, and actual HIV incidence by one third between 2006 and 2008 (33,34).

Theoretical models have been used as well to estimate the impact of antiretroviral therapy on the incidence of and mortality from HIV. A model published in 2008 focused on a generalized HIV epidemic setting largely driven by heterosexual sex. Using data from Malawi, South Africa, Uganda and elsewhere, the model showed a 95% reduction in HIV incidence over 10 years with a strategy that combined universal voluntary HIV testing and counselling followed by immediate enrolment in antiretroviral therapy of all people who tested positive (12). It was premised on earlier analyses suggesting that rapid scale-up of conventional antiretroviral therapy approaches could meaningfully reduce mortality (35) and have a considerable impact on HIV incidence (36,37). The potential impact of such a “test and treat” strategy has also been modelled for Washington, D.C., where it could potentially decrease the number of new HIV infections by as much as 26% over ten years (38). The implementation of a similar approach in San Francisco could cut the number of new infections by 91% (39). Among the factors to consider in “test and treat” approaches are the risk of HIV drug resistance (see section 4.1.6), the need to maximize adherence, how to adequately deal with the acute phase of HIV infection and the need to develop strategies to address a potential increase in sexual risk-taking integrating the values and principles of Positive Health, Dignity and Prevention into the various policy and programmatic elements of the HIV/AIDS response (see Box 3.11).

WHO convened two international consultations in November 2009 to clarify research priorities, explore feasibility and acceptability issues, and review the human rights and ethical considerations of expanding antiretroviral therapy for prevention purposes. The consultations involved a wide array of specialists, including researchers, clinicians, prevention experts, human rights specialists, ethicists, organizations of people living with HIV, national programme managers and community groups.<sup>1</sup> WHO and partners are currently engaged with stakeholders on further analysis of the impact of antiretroviral therapy on tuberculosis (TB), the relative importance of drug resistance and other assumptions, the effect of combining pre-exposure prophylaxis and “test and treat” approaches, the impact on prevention of mother-to-child transmission and an in-depth examination of the costs and benefits of expanding access to antiretroviral therapy. WHO will work with key stakeholders to help set the research agenda and to periodically review the evidence as it becomes available.

1 The presentations, list of participants and outcomes of the meetings are available at <http://www.who.int/hiv/events/artprevention/>.

In addition to the impact of antiretroviral therapy programmes on mortality and HIV transmission, investing in the scale-up of antiretroviral therapy has also tangibly benefited other health services and access to care in general in multiple ways. Indeed, the impact of antiretroviral therapy on reducing morbidity and use of hospital services has been documented in high-income countries (23). Antiretroviral therapy has been associated with a reduction in the burden of care placed on often overwhelmed health systems, particularly on inpatient care services, and with a decrease in mortality among health workers in countries highly affected by the epidemic (24). There is evidence as well that capacity put in place to enable the roll-out of antiretroviral therapy programmes, such as drug supply management, has had a broader positive impact on other health services (25–27).

#### 4.1.5. 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 HIV’s high mutation rate, viral recombination, and the need for sustained, lifelong treatment. Because HIV drug resistance has the potential to undermine the dramatic gains that antiretroviral therapy has had in reducing the morbidity and mortality among HIV-positive patients, it is necessary to monitor HIV drug resistance and factors related to its evolution. Treatment programmes should also be adjusted, if necessary, to maintain the effectiveness of first- and second-line regimens.

HIV drug resistance may be acquired or transmitted. A recent review of studies conducted in sub-Saharan Africa

#### Box 4.8. Establishing an HIV drug resistance early warning system in Namibia

Based on 2008 antenatal serosurveillance data, an estimated 17.8% of Namibians aged 15–49 years are infected with HIV-1 (42). The epidemic is predominantly spread via heterosexual contact, and prevalence estimates vary by region, with up to 31% infected with HIV-1 in the most heavily affected areas in the north (43). In December 2009, 70 500 patients were reported to be on antiretroviral therapy, a coverage estimated at 76% based on WHO 2010 guidelines.

In 2009, Namibia's Ministry of Health and Social Services implemented an early warning system to monitor HIV drug resistance (44,45). Five indicators were selected: (i) *antiretroviral therapy prescribing practices*, (ii) *patients lost to follow up at 12 months*, (iii) *patient retention on a first-line antiretroviral therapy regimen at 12 months*, (iv) *on-time antiretroviral drug pick-up*, and (v) *continuity of antiretroviral drug supply*. An assessment of the available medical and pharmacy records demonstrated that existing record-keeping methods supported the monitoring of only three of the initial five selected indicators. Monitoring of the three indicators was then piloted in nine antiretroviral therapy sites. Results revealed that most sites achieved the targets and levels deemed appropriate for each indicator: 100% of patients were initiated on appropriate first-line antiretroviral therapy regimens across all nine sites; eight sites maintained the proportion of patients lost to follow up at under 20% 12 months after treatment initiation, and six sites had 0% of patients switched to a second-line regimen within the first 12 months of antiretroviral therapy (in the remaining three sites the proportion was less than 1%). The pilot uncovered, however, that although the overall proportion of patients lost to follow up at 12 months met recommended targets, 20.8% of patients had a mean treatment interruption of 2.3 months within the first 12 months of treatment, placing them at increased risk for treatment failure and development of HIV drug resistance.<sup>1</sup> The initial implementation of the early warning system uncovered the need to further strengthen antiretroviral therapy record systems to enable the eventual monitoring of all five selected indicators in subsequent years. The results also highlighted the need to reinforce defaulter tracking mechanisms to enhance long-term patient retention, optimize the quality of patient care and minimize drug resistance.

<sup>1</sup> Inadequate systems to trace patient transfers to other antiretroviral therapy sites may cause treatment interruption rates to be overestimated.

and India found, as expected, a high frequency of resistance mutations among patients failing first-line therapy and with detectable viral loads, ranging from 47% to 93% for non-nucleoside reverse transcriptase inhibitors (NNRTIs) and from 32% to 60% for thymidine analog nucleoside reverse transcriptase inhibitors (NRTIs) (40). On the other hand, most reports from low- and middle-income countries have described low rates of transmitted resistance. Studies conducted in Africa found NNRTI resistance rates between 0% and 5.6% and NRTI resistance rates between 0% and 3.7%. Transmitted protease inhibitor mutations were rare (41). However, considerable variations in study designs, including a range of sample sizes, drug regimens, previous exposure to antiretroviral drugs and duration of follow-up, limit the comparability of these study results.

To improve surveillance of HIV drug resistance with standardized approaches, WHO, in collaboration with HIVResNet, an international network of experts, countries and institutions, have developed a global strategy for the prevention and assessment of HIV drug resistance. WHO recommends that countries develop a national strategy for the prevention and assessment of HIV drug resistance based on three key assessments: (1) routine monitoring of HIV drug resistance “early warning indicators”, (2) surveys to monitor the emergence of HIV drug resistance and related programmatic factors in populations receiving antiretroviral therapy, and (3) surveys to assess transmitted HIV drug resistance in recently infected populations. As of mid-2010, over 60 countries had implemented one or more elements of the HIV drug resistance prevention and assessment strategy. To facilitate implementation of country plans,

WHO supports the accreditation of national, regional and specialized HIV drug resistance testing laboratories; as of December 2009, 24 HIV drug resistance testing laboratories had been accredited.

##### 4.1.5a. HIV drug resistance – early warning indicators

Research shows that various programme and site factors are closely associated with the emergence of HIV drug resistance, and their proper monitoring can serve as early warning indicators to support appropriate programme management. WHO has developed six core and two optional early warning indicators, each with an associated target, and recommends their annual monitoring in all or a large number of representative sites.

As of December 2009, 45 countries had implemented early warning indicators, up from 14 in 2008.

##### 4.1.5b. Surveys to monitor the emergence of HIV drug resistance and associated programmatic factors in populations

Standardized surveys, performed at sentinel sites providing adult or paediatric antiretroviral therapy, are also important instruments to assess the emergence and prevention of HIV drug resistance in populations receiving first-line antiretroviral therapy (6). Surveys to monitor HIV drug resistance identify factors that can be addressed by making adjustments at the site or programme level to minimize the emergence of preventable drug resistance. Performed regularly at representative sites, the surveys are designed to be integrated easily into countries' routine HIV-related monitoring and evaluation activities, and can substantially

#### Box 4.9. Using sentinel surveys to monitor the emergence of HIV drug resistance in Burundi

Between 2002 and 2009, the number of patients receiving antiretroviral therapy in Burundi increased from 600 to 17 661. In 2007 and 2008, Burundi conducted a survey to monitor the prevention and emergence of HIV drug resistance and associated programme factors, following the WHO generic protocol (46) at two large urban antiretroviral therapy sites in Bujumbura. In total, 121 and 129 adult patients consecutively initiating first-line antiretroviral therapy were enrolled at each site, respectively. Following WHO's protocol, it is recommended that at least 70% of patients should achieve HIV drug resistance prevention (as defined by viral load suppression of less than 1000 copies/ml) 12 months after initiation of antiretroviral therapy. At site A, 83.6% achieved prevention of HIV drug resistance, and of those with detectable virus, HIV drug resistance was detected in 3%. At site B, 81% achieved prevention of HIV drug resistance; of those with detectable virus, HIV drug resistance was detected in 5%. Importantly, at each site, 13% and 14% of patients, respectively, were classified as having "possible HIV drug resistance" because they had been lost to follow up, had stopped antiretroviral therapy before 12 months or had had a detectable viral load 12 months after the start of therapy. Survey results suggest the need to reinforce programmes to support adherence to antiretroviral therapy as well as tracking systems to minimize the number of patients lost to follow up.

strengthen their evidence base for optimal selection of national antiretroviral therapy regimens. As of December 2009, 15 countries had implemented surveys to monitor the emergence of HIV drug resistance and associated programmatic factors in one or more sites, up from six countries in 2008.

#### 4.1.5c. Surveys to assess transmitted HIV drug resistance

The WHO HIV drug resistance threshold survey methodology was developed for the surveillance of transmitted HIV drug resistance in resource-limited settings (47,48). As transmitted drug-resistant HIV is expected to develop first in cities or health districts where antiretroviral therapy has been widely available for several years, WHO recommends that countries prioritize these areas when rolling out activities for surveillance of resistance. The methodology's eligibility criteria for selecting sites and individuals have been designed to minimize the inclusion of antiretroviral therapy-experienced individuals and/or chronically infected individuals, and defines three categories for transmitted HIV drug resistance: low (level less than 5%), moderate (between 5 and 15%) and high (more than 15%). The results of these surveys, combined with results from other key assessments, provide critical information relevant to prevention of and planning for antiretroviral therapy and drug resistance. At the end of 2009, 29 countries had implemented surveys to assess transmitted HIV drug resistance, up from 21 countries in

2008. Twenty-eight countries have completed surveys or are in the process of implementing them to classify the extent of transmitted HIV drug resistance. Quality assured results are available for 15 surveys. In 13 of these, transmitted HIV drug resistance was classified as low level and, in two (in Burkina Faso and Cameroon), it was classified as moderate level.

A survey conducted for the first time in Burkina Faso showed moderate levels of transmitted HIV drug resistance among a sample of HIV-positive women in their first pregnancy (Box 4.10). This calls for stepping up surveillance for and monitoring of HIV drug resistance to ensure that underlying programmatic bottlenecks can be addressed in a timely manner.

#### Box 4.10. Assessing transmitted HIV drug resistance in Ouagadougou, Burkina Faso

Between May 2008 and June 2009, Burkina Faso implemented the WHO methodology to classify transmitted HIV drug resistance in recently infected individuals (47). Specimens for HIV drug resistance testing were obtained from 52 consecutively diagnosed HIV-positive women attending antenatal care sites in Ouagadougou. All the women (aged 15-24 years) were pregnant for the first time, with no previous history of a diagnostic test for syphilis. In this population of young, HIV-positive pregnant women in Ouagadougou, the prevalence of transmitted HIV drug resistance was found to be between 5% and 15% for both NRTIs and NNRTIs, and thus classified as moderate according to the WHO methodology. Following WHO recommendations, Burkina Faso reviewed its treatment programme and launched an investigation into potential problems with continuous access to services, drug supply and drug quality. In addition, it also strengthened its adherence support programmes among populations receiving antiretroviral therapy. The survey should be repeated regularly to assess the level of transmitted HIV drug resistance in this population and in different geographical regions of the country.

#### 4.1.6. Antiretroviral drug regimen

In 2010, the WHO AIDS Medicines and Diagnostics Service (AMDS) conducted the fourth 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 the ministries of health of 86 countries from all six WHO Regions (a list of countries is available at <http://www.who.int/hiv/amds/en/>) with the highest number of people receiving antiretroviral therapy as of December 2009. Seventy-six countries responded, reporting a total of 4 940 000 patients on antiretroviral therapy, representing 94.3% of the estimated 5 240 000 million people receiving antiretroviral therapy in resource-limited countries as of December 2009.

**Table 4.8. Antiretroviral use, per drug and regimen, across low- and middle-income countries, 2009**

Antiretroviral medicines <sup>a</sup>		59 low- and middle- income countries excluding countries from the Americas region)		17 countries in the Americas region	
		Proportion of first-line combinations containing the drug (%)	Proportion of second-line combinations containing the drug (%)	Proportion of first-line combinations containing the drug (%)	Proportion of second-line combinations containing the drug (%)
nRTI	3TC	94.2	31.6	91.1	75.0
	d4T	59.7	3.0	2.3	30.3
	AZT	32.1	47.2	71.3	27.8
	TDF	7.7	32.4	21.4	17.3
	ABC	0.4	22.3	4.0	14.0
	ddI	0.3	48.1	0.8	17.3
	FTC	5.4	15.5	7.9	2.6
NNRTI	NVP	60.7	1.1	12.4	5.1
	EFV	38.5	1.6	50.2	20.1
	ETV	0.0	0.0	0.0	0.0
Protease Inhibitors	LPV	0.4	92.7	20.9	37.9
	NFV	0.0	0.3	0.0	0.1
	IDV	0.1	0.9	0.0	5.9
	SQV	0.0	0.3	3.0	1.9
	ATV	0.0	0.0	12.3	17.7
	FPV	0.0	0.0	0.1	2.9

<sup>a</sup> Regimens may contain more than one drug of the same class.

An initial analysis revealed that the 17 reporting countries from the Americas region (376 000 patients) presented a pattern of use of antiretrovirals that was notably different from the one observed in the remaining 59 low- and middle-income countries which participated in the survey (4 564 000 patients). In order to account for such differences, the results are presented separately by subgroup.

In the group of 59 low- and middle-income countries, 92.4% (4 218 000) of patients receiving antiretroviral therapy were adults. Of these, 97.5% were on first-line regimens, with 99.1% receiving treatment regimens in line with the 2006 WHO treatment guidelines. Of the patients, 59.7% were on a stavudine (d4T)-containing combination, 32.1% received a zidovudine (AZT)-based regimen and 7.7% used a tenofovir (TDF)-based combination (Table 4.8 and Figure 4.5).

In the same group of countries, only 2.4% (100 400 patients) of adults were on second-line regimens, with 87.2% of them receiving regimens in line with the 2006 WHO treatment guidelines. Ritonavir-boosted lopinavir (LPV/r) was the predominant protease inhibitor, used by 92.7% of patients receiving a second-line regimen. Importantly, though, 5.8% of adult patients on a second-line treatment followed a regimen that was not in accordance with WHO's normative guidance because they did not include a protease inhibitor (Figure 4.5). Only 1400 patients, or 0.01%, were reported to use salvage therapy.

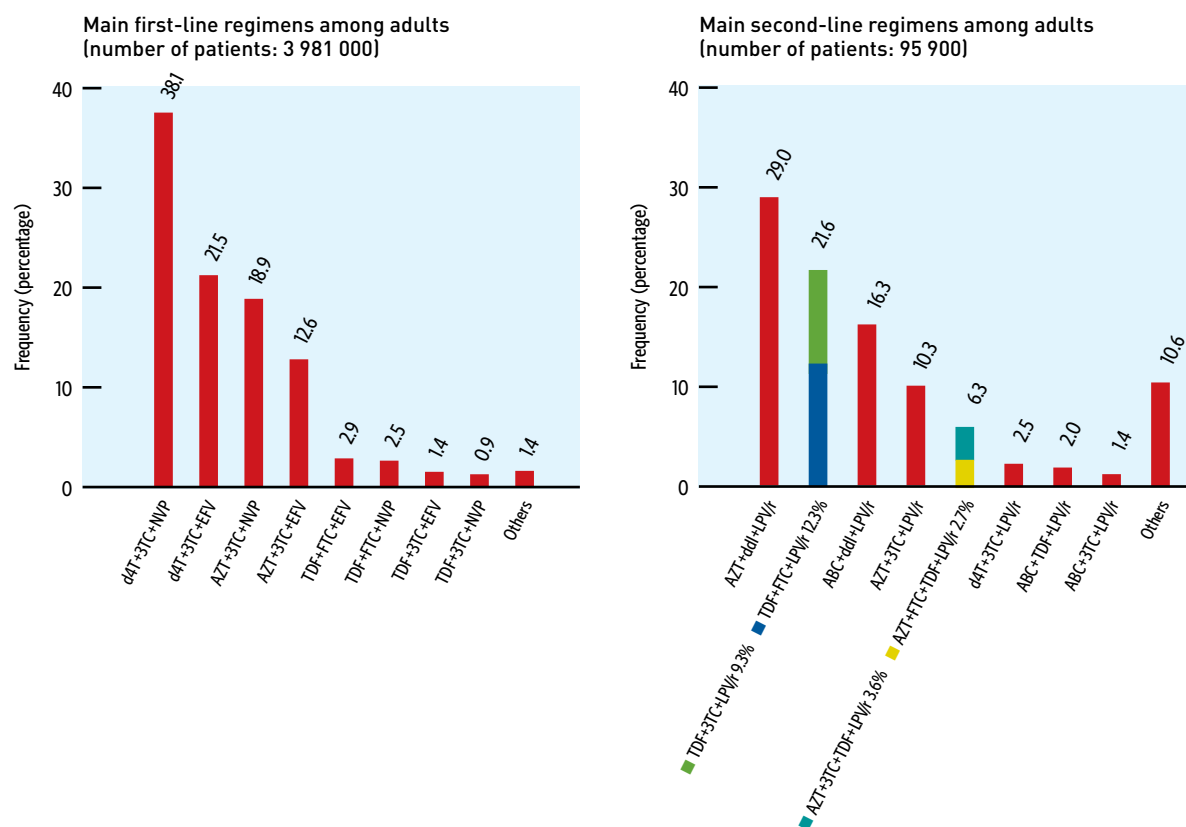
In the 17 low- and middle-income countries of the Americas, patterns of antiretroviral use were noticeably

different (Figure 4.6). Adults also comprised the majority (364 000 or 96.9%) of people receiving antiretroviral therapy. Countries reported a majority of adults on first-line regimens (84.0%) with extensive use of a zidovudine-containing regimen (71.3%). Interestingly, though, an important proportion of adult patients on first-line treatment reported the use of a protease inhibitor (36.3%), and only a small number received either stavudine or nevirapine (2.3% and 12.4%, respectively).

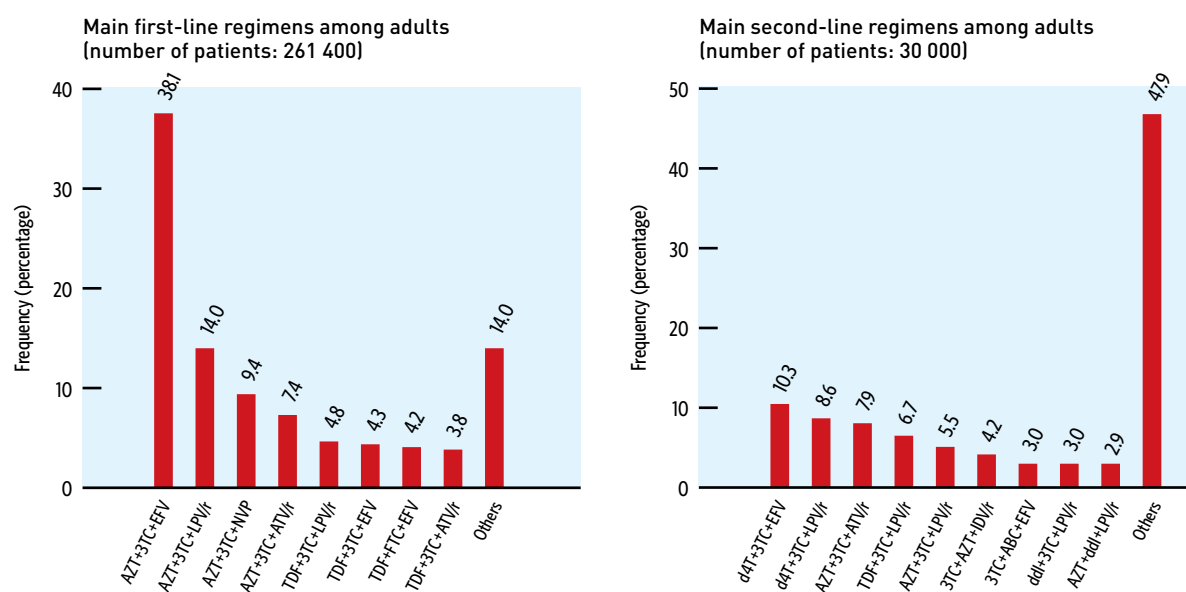
Countries in the Americas also reported a higher rate of use of second-line (9.7%) and salvage regimens (6.3%) among adults, and the availability and use of a wider variety of protease inhibitors. Of the 6.3% (20 100) of adult patients on salvage therapy, most were on a quadritherapy. A few patients reported the use of more recent antiretroviral drugs, such as darunavir and raltegravir (used, respectively, by 0.7% and 0.6% of all patients).

Differences in the use of antiretroviral therapy were also observed between the two country groupings with respect to the treatment of children (Figures 4.7 and 4.8). In the group of 59 low- and middle-income countries, children represented 7.8% of people receiving antiretroviral therapy, and most (96.9%) were on first-line regimens (328 000 patients). Reported data showed that while 97.3% of first-line regimens followed the 2008 revision of the WHO treatment guidelines, this proportion, at 59.8%, was much lower for second-line combinations. It is worth noting that 14.6% of children received a second-line regimen without a protease inhibitor, contrary to the WHO treatment

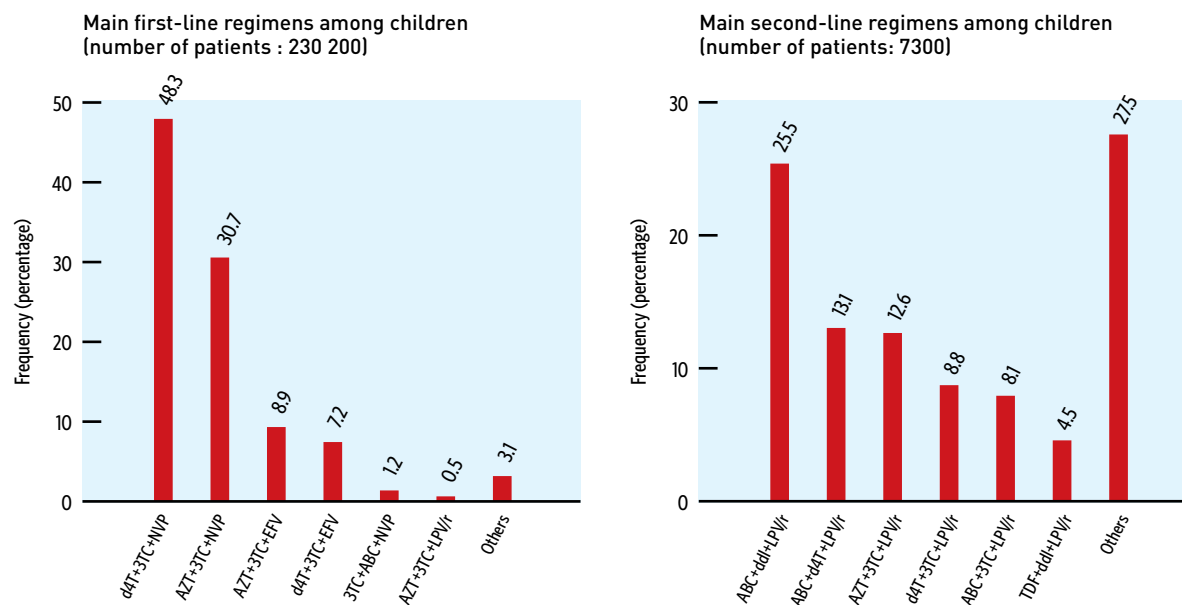
**Fig. 4.5.** Composition and frequency of use of first- and second-line antiretroviral therapy regimens among adults in 59 low- and middle-income countries, excluding countries from the Americas Region, December 2009



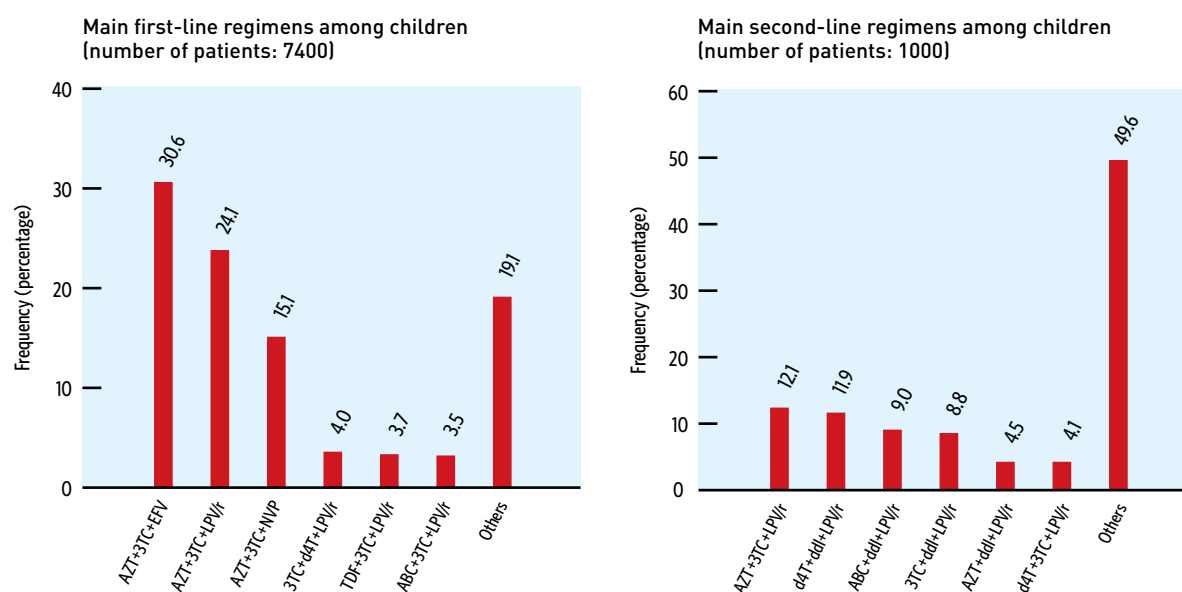
**Fig. 4.6.** Composition and frequency of use of first- and second-line antiretroviral regimens among adults in 17 low- and middle-income countries of the Americas Region, December 2009



**Fig. 4.7.** Composition and frequency of use of first-line and second-line antiretroviral therapy regimens among children in 59 low- and middle-income countries, excluding countries from the Americas Region, December 2009



**Fig. 4.8.** Composition and frequency of use of first-line and second-line antiretroviral therapy regimens among children in 17 countries from the Americas Region, December 2009





guidelines. In the Americas Region, children represented 3.1% (11 700 patients) of the reported patient population on antiretroviral therapy, with a higher proportion of children on second-line regimens (11.7%).

A subset of 17 countries participated in all four consecutive surveys on use of antiretroviral drugs conducted between 2006 and 2009.<sup>1</sup> By December 2009, these 17 countries represented 49.1% (2 575 000) of the total 5 240 000 patients receiving antiretroviral therapy. In this subgroup, the use of stavudine in first-line combinations decreased from 67% in 2006 to 51.5% in 2009. On the other hand, the use of tenofovir increased and comprised 10.9% of first-line combinations, up from less than 1% in 2006 (Figure 4.9). Data on second-line regimens showed a reverse trend in tenofovir use, with a decrease in 2009 compared with 2008 (42.6% in 2009 and 56.5% in 2008).

The 2009 survey also demonstrates that an important number of low- and middle-income countries have already incorporated into their national treatment guidelines the new WHO recommendations on eligibility criteria and regimen choice for adults and adolescents (Box 4.1). In a subset of 54 countries that provided detailed information on national

treatment guidelines as of December 2009, 45<sup>2</sup> have already recommended initiation of antiretroviral therapy for patients with CD4 counts at or below 350 cells/mm<sup>3</sup> and 33<sup>3</sup> are actively shifting from stavudine-based to zidovudine- or tenofovir-containing regimens.

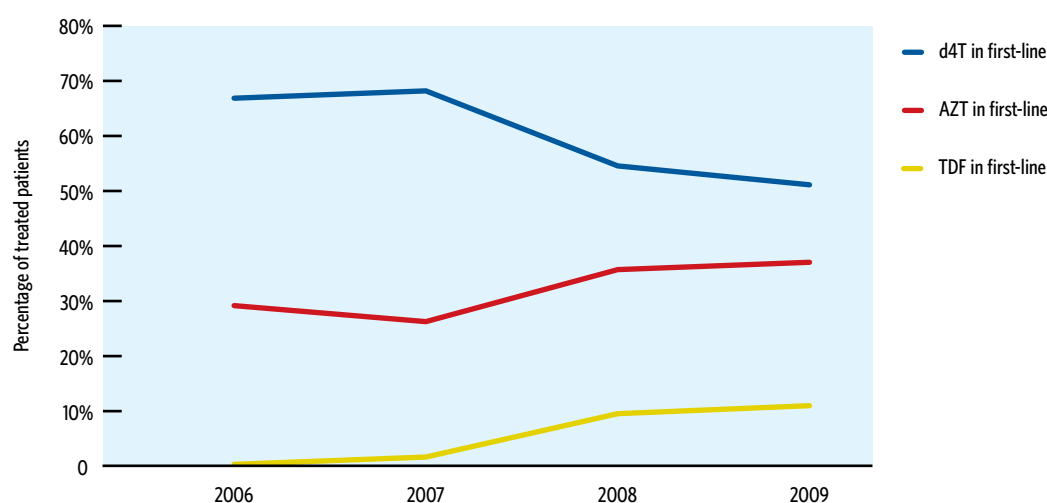
It remains critical to appropriately monitor actual antiretroviral use in order to adequately identify eventual discrepancies between guidelines and clinical practice, which can endanger patients' lives and undermine programme outcomes. This is particularly true as many countries face increased fiscal constraints and must cope with the double challenge of replacing stavudine with more expensive compounds while increasing the number of patients on treatment under the newly adopted set of eligibility criteria.

1 The 17 countries are Burkina Faso, Burundi, Cambodia, Cameroon, Côte d'Ivoire, Ethiopia, India, Kenya, Lesotho, Namibia, Nigeria, Rwanda, Swaziland, the United Republic of Tanzania, Uganda, Zambia and Zimbabwe.

2 Forty-five countries adopted this recommendation for all patients: Angola, Benin, Burkina Faso, Cameroon, Central African Republic, Cape Verde, Chad, China, Congo, Côte d'Ivoire, Eritrea, Gabon, Gambia, Ghana, Guinea, Indonesia, Iran, Kenya, Lesotho, Malawi, Mali, Morocco, Moldova, Namibia, Nigeria, Pakistan, Papua New Guinea, Saudi Arabia, Sierra Leone, Rwanda, Romania, Sao Tome, Seychelles, Senegal, Sudan, Swaziland, Tanzania, Togo, Ukraine, Viet Nam, Zambia and Zimbabwe. Three countries adopted the recommendation pertaining to pregnant women: Botswana, South Africa and the Democratic Republic of Congo.

3 Stavudine phase-out has already started in 33 countries: Angola, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, China, Comoros, Côte d'Ivoire, Congo, Djibouti, Eritrea, Ethiopia, Ghana, Indonesia (tenofovir), Kenya, Lesotho, Liberia, Madagascar, Morocco, Moldova, Mozambique (zidovudine), Namibia, Rwanda, Senegal, Seychelles, South Africa, Sudan, Togo, Uganda, Ukraine. Five other countries either have or are developing a stavudine phase-out plan.

**Fig. 4.9. Proportions of patients receiving stavudine (d4T), zidovudine (AZT) or tenofovir (TDF) in first-line regimens in 17 reporting countries, 2006–2009**



### Box 4.11. Pharmacovigilance

As HIV/AIDS treatment programmes are scaled up in low- and middle-income countries, adverse events linked with the use of antiretroviral medicines may compromise patients' well-being and safety. These include problems of toxicity, intolerance, drug-drug interactions, and adverse events linked with co-morbidities such as TB, hepatitis and malaria.

Pharmacovigilance is critically important to optimize patient adherence to treatment and treatment outcomes, and to ensure programme effectiveness. In the context of antiretroviral therapy, pharmacovigilance activities are also important for programmatic decision-making to regularly update national treatment, care and prevention guidelines, and to inform the initial selection, forecasting, procurement and distribution of antiretroviral drugs.

WHO recommends the development of national pharmacovigilance programmes for antiretroviral drugs. These programmes should focus on treatment monitoring and post-marketing surveillance based on passive and active methods, cohort event monitoring, pregnancy registries and special studies. In treatment sites, services providers should be trained and enabled to prevent, detect and assess adverse effects or other antiretroviral drug-related problems. Pharmacovigilance programmes should also contribute to create a "culture of safety" based on good communication of information about the benefits, harms and risks of drugs to practitioners, patients and the public.

A WHO Pharmacovigilance project for antiretroviral medicines funded by the Bill and Melinda Gates Foundation is based on the following major components: consensus on definitions, methods and tools, capacity building, research agenda and coordination and information-sharing.

In partnership with the Global Fund to fight AIDS, Tuberculosis and Malaria (Global Fund), WHO has developed a strategy based on best practices to stimulate the inclusion of pharmacovigilance in Global Fund proposals and pharmaceutical plans, as well as to identify and field-test effective pharmacovigilance processes and tools. These documents and tools are available online at <http://www.who.int/hiv/topics/pharmacovigilance/en/>

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WHO. *Clinical management of adverse events linked to antiretroviral medicines*. Geneva, WHO, 2010 (in press).

### 4.1.7. Antiretroviral drug price

The Global Price Reporting Mechanism (GPRM) for antiretroviral drugs, established in 2004, provides information on the transaction prices of antiretroviral drugs purchased in 123 countries, including 43 low-income, 48 lower-middle-income and 32 upper-middle-income countries.

Reported data show that prices of the six most used first-line regimens recommended by WHO in low- and middle-income countries have decreased between 1% and 36% between 2008 and 2009, contributing to wider treatment availability (Figure 4.10).<sup>1</sup> Regionally, prices tend to be lower in sub-Saharan African than in other regions. Average prices paid for second-line regimens remain relatively high in all regions (with some exceptions in certain low-income countries), where few or no prequalified generic alternatives are available.

#### 4.1.7a. Prices of first-line regimens in low-income countries<sup>2</sup>

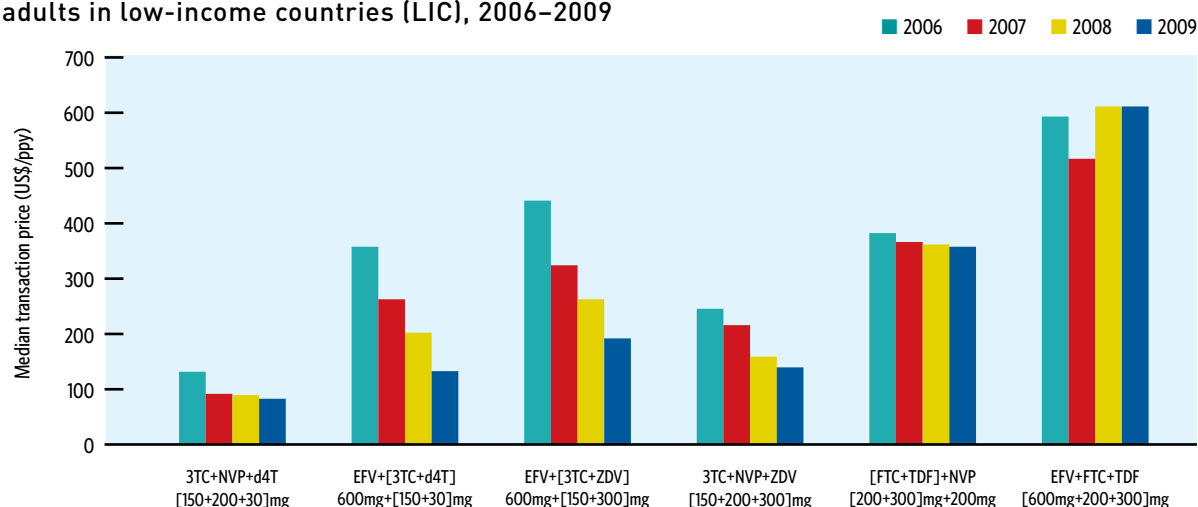
The median price paid for first-line treatments in low-income countries in 2009 ranged from US\$ 81 per person per year for the fixed-dose combination of d4T+3TC + NVP (the most widely used combination) to US\$ 613 for the most expensive fixed-dose combination of TDF+FTC+EFV (Figure 4.10). The weighted median<sup>3</sup> price of the six most widely used first-line regimens (representing 96% of prescribed first-line treatments in low-income countries) was US\$ 137 per person per year in 2009, 3% lower than the average median price in 2008. Although modest, this drop occurred in spite of the wider adoption of more expensive tenofovir-based regimens. The decline in drug prices between 2006 and 2009 (54%) can be attributed to the sustained scaling up of treatment programmes, the growing transaction volumes

<sup>2</sup> Countries with a gross national income per capita of US\$ 975 or less

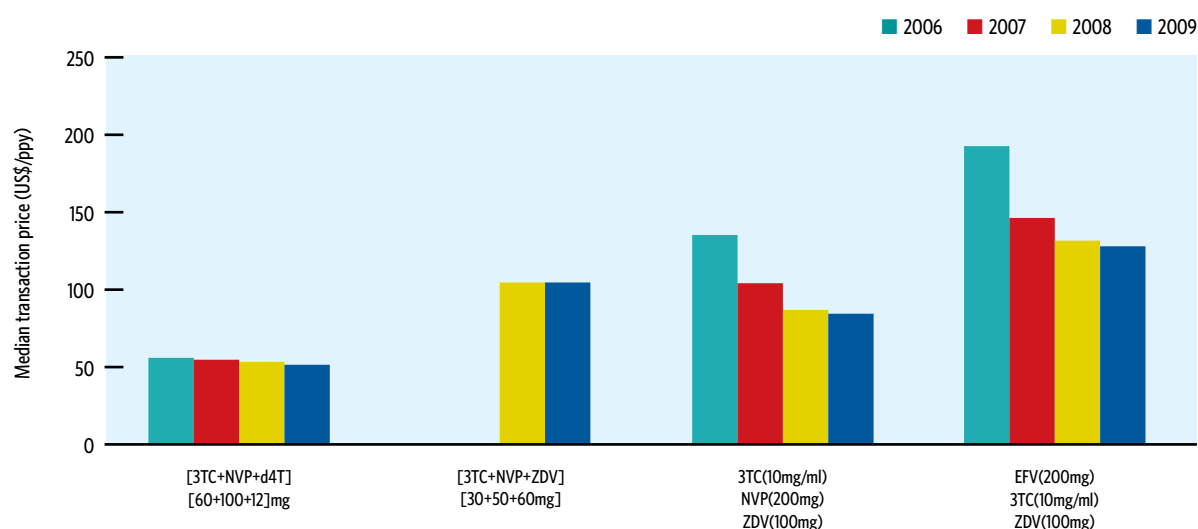
<sup>3</sup> The weighted median price is the sum of individual regimen median price weighted/multiplied by the percentage of patients in the general population using that specific regimen.

<sup>1</sup> Additional figures with data on lower-middle- and upper-middle-income countries are available online at <http://www.who.int/hiv/data/en/>.

**Fig. 4.10.** Median annual cost (in US dollars) of first-line antiretroviral drug regimens for adults in low-income countries (LIC), 2006–2009



**Fig. 4.11.** Median annual cost (in US dollars) of first-line antiretroviral drug regimens for children (weighing 10 kg or more) in low-income countries (LIC), 2006–2009



and predictability of demand, the competition between a growing number of products prequalified by WHO and the favourable pricing policies by pharmaceutical companies.

In 2009, the combination of d4T+3TC+NVP replaced AZT+3TC+NVP as the most commonly prescribed formulation for children (weighing 10 kg or more). Its average price declined from US\$ 57 per person per year in 2006 to US\$ 52 in 2009. Average prices of other combinations continued to fall as well (Figure 4.11). Such price decreases can be attributed to economies of scale associated with a larger market for paediatric formulations, successful negotiations with major generic manufacturers and development of fixed-dose combination formulations for children.

#### 4.1.7b. Prices of first-line regimens in lower-middle-income countries<sup>1</sup>

Median prices in 2009 ranged from US\$ 76 per person per year for the least expensive regimen of d4T+3TC+NVP, to US\$ 667 per person per year for the most expensive regimen of TDF+FTC+EFV. In the same year, the weighted median price of the six most widely used combinations in first-line regimens was US\$ 141 per person per year, a decrease of 13% from the previous year's price.

The most commonly used combination among children (weighing 10 kg or more) was d4T+3TC+NVP and its price fell from US\$ 70 per person per year in 2006 to US\$ 55 in 2009.

<sup>1</sup> Countries with a gross national income per capita of between US\$976 and US\$ 3855

#### 4.1.7c. Prices of first-line regimens in upper-middle-income countries<sup>1</sup>

In 2009, in upper-middle-income countries, median prices ranged from US\$ 88 per person per year for the least expensive regimen of d4T+3TC + NVP to US\$ 635 per person per year for TDF+FTC+NVP.<sup>2</sup> In the same year, the weighted average median price of the six most widely used combinations in first-line regimens was US\$ 202 per person per year. This represents a 21% increase from the median price observed in 2008, a fact partially explained by the inclusion of more expensive TDF-containing regimens in first-line therapy.

In 2009, only AZT-based regimens were reported for children's formulations (weighing 10 kg or more). The price of the most frequently used combination, AZT+3TC+NVP, reached US\$ 177, a decline of 16% since 2006.

#### 4.1.7d. Prices of second-line regimens in low- and middle-income countries

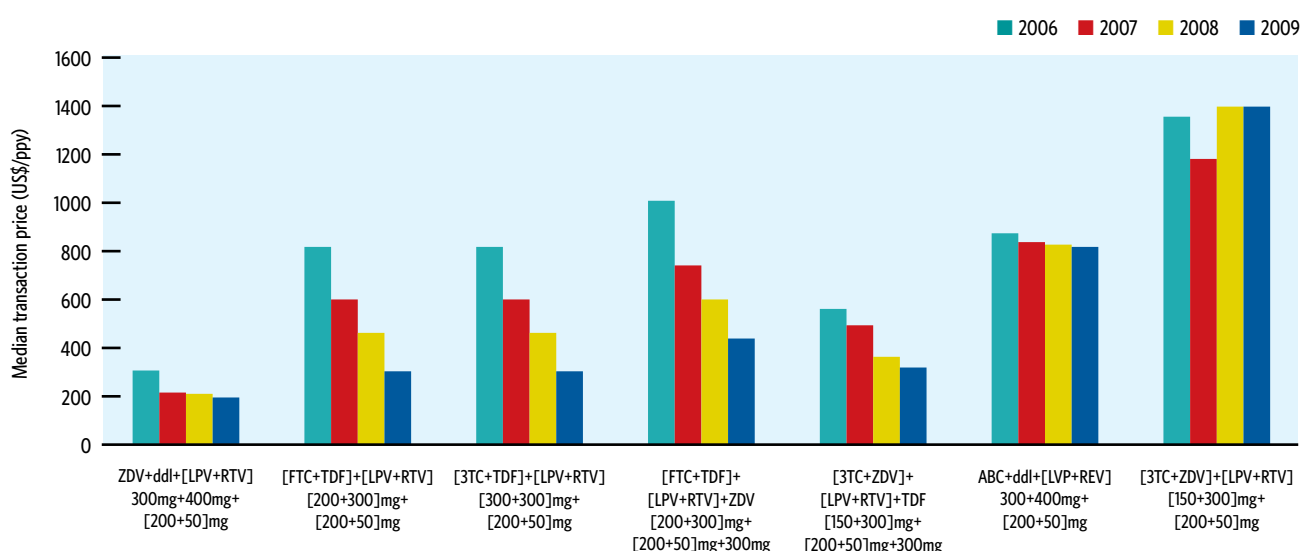
Prices paid for second-line regimens also declined in 2009, but remained more expensive than first-line regimens

across low-income (Figure 4.12), lower-middle-income and upper-middle-income countries. In 2009, the median cost of the most commonly used second-line regimen of ZDV+ddl+LPV/r was US\$ 853 per person per year in low-income countries, US\$ 1378 in lower-middle-income countries and US\$ 3638 in upper-middle-income countries. The median cost of [FTC +TDF] + LPV/r, the second most commonly used second-line regimen, was US\$ 819 per person per year in low-income countries, US\$ 1392 in lower-middle-income countries and US\$ 3551 in upper-middle-income countries. Actual prices paid for second-line regimens vary greatly between countries. The decline in the prices of second-line drugs between 2006 and 2009 can be attributed to the prequalification of generic alternatives for abacavir (ABC), LPV/r and TDF, the patent expiry of ddl, scaling up of treatment programmes and new pricing policies by pharmaceutical companies, which increased competition between WHO-prequalified products. However, 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.

1 Countries with a gross national income per capita of between US\$ 3856 and US\$ 11 905

2 Most expensive combination for which sufficient transaction data are available

**Fig. 4.12. Median annual cost (in US dollars) of second-line antiretroviral drug regimens for adults in low-income countries (LIC), 2006–2009**



### Box 4.12. Scaling up the response to viral hepatitis

Greater attention must be devoted to addressing coinfection of HIV with viral hepatitis, especially hepatitis B and hepatitis C. With the expansion of antiretroviral therapy since 2003, many coinfecting patients have been able to access antiretroviral therapy to treat HIV. However, treatment for viral hepatitis has not been scaled up concomitantly, leaving many people living with HIV and viral hepatitis exposed to the complications of hepatitis B and C infections, including fatal liver disease.

The revised WHO antiretroviral therapy guidelines for adults and adolescents recommend that antiretroviral therapy be initiated, irrespective of WHO disease stage or CD4 cell count, in all patients with HIV/hepatitis B coinfection and chronic active hepatitis B<sup>1</sup> when treatment is indicated for hepatitis B. The revised guidelines recommend tenofovir (TDF)- and lamivudine (3TC)- (or emtricitabine)-containing antiretroviral regimens in all HIV/hepatitis B coinfecting individuals needing treatment. In case of failure of antiretroviral therapy, TDF and 3TC (or emtricitabine) should be continued for activity against hepatitis B virus and the second-line regimen should include other drugs with anti-HIV activity. Hepatitis C can be effectively treated with a combination therapy of pegylated interferon and ribavirin. Treatment for hepatitis C infection can lead to clearance of the virus, thus avoiding longer-term liver damage. Treatment, however, requires enhanced laboratory capacity for diagnosis and monitoring of treatment effectiveness.

Resolution WHA63.18, adopted at the 63rd World Health Assembly in May 2010, recognized viral hepatitis as a public health issue and called for the implementation of comprehensive responses. It also called upon all Member States to improve epidemiological surveillance systems and to strengthen laboratory capacity, where necessary, in order to generate reliable information for guiding prevention and control measures (49).

<sup>1</sup> The current diagnosis of chronic active hepatitis in well-resourced settings is based on histological parameters obtained by liver biopsy and/or the availability of hepatitis B virus DNA testing, neither of which is usually available in resource-limited settings. A global definition of chronic active hepatitis in the context of resource-limited settings based on clinical signs and simpler laboratory parameters is under discussion.

## 4.2. Collaborative TB/HIV activities

HIV-related TB remains a serious challenge for the health sector's response to HIV. Recent data show that, of the 9.4 million incident TB cases worldwide in 2008, an estimated 1.4 million were among people living with HIV. Around 520 000 deaths from TB occurred among people living with HIV, equivalent to 26% of the estimated 2 million deaths from HIV and 29% of the 1.8 million deaths from TB in that year (50). The risk for TB is 20–37 times higher in people living with HIV than in the general population, depending on the prevalence of HIV in the population (51).

Sub-Saharan Africa continues to account for the majority of people living with HIV and TB in the world. In 2008, around 78% of estimated HIV-positive TB cases were in this region, of which around one quarter was living in South Africa. The South-East Asia Region, mainly India, accounts for 13% of the remaining cases.

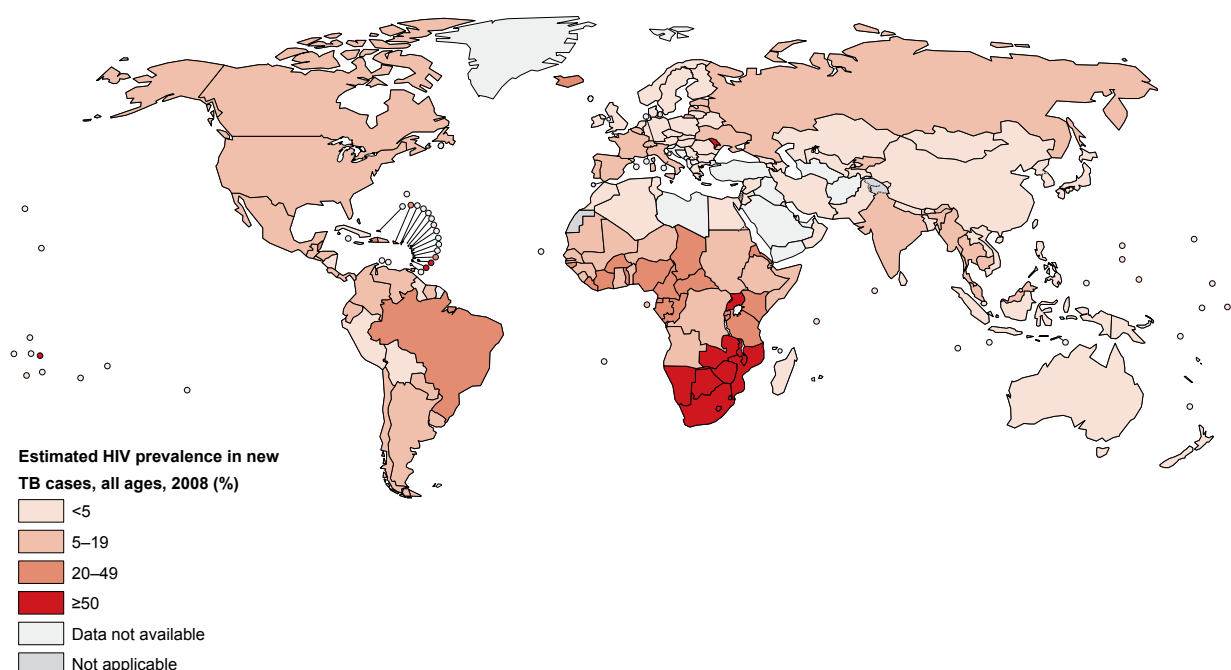
Data on drug-resistant forms of TB show that of, the 9.4 million incident TB cases in 2008, an estimated 440 000 were cases of multidrug-resistant TB. The region of Eastern Europe and Central Asia is especially severely affected. In addition, 58 countries and territories reported at least one case of extensively drug-resistant TB in 2008. People living with HIV may be at higher risk for drug-resistant forms of TB due to difficulties and delays in diagnosis, lack of access to antiretroviral therapy and complications of concomitant treatment with TB and antiretroviral therapy, poor implementation of isoniazid preventive therapy, and

inadequate TB infection control measures, with increased mortality and greatly reduced survival time (52–56).

Collaborative activities between national TB and HIV programmes are essential to prevent, diagnose and treat TB among people with HIV and HIV among those with TB. These 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, 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, TB prevention with isoniazid preventive therapy and/or antiretroviral therapy, and infection control for TB).

Different models for the delivery of integrated HIV and TB services have been implemented in several countries with promising results. In India, for example, TB and HIV services are provided separately with strengthened cross-referral. Provision of HIV testing in TB clinics and TB screening for inpatients in medical wards and HIV-positive outpatients has been used in Rwanda, while integrated models with “one-stop service” for TB patients with HIV have been reported in South Africa. Each model, however, has advantages and disadvantages and is highly dependent on contextual issues and policy choices. Nevertheless, irrespective of the model chosen, earlier access to HIV testing and counselling, antiretroviral therapy and TB preventive or curative treatment is key to prevent excess morbidity and mortality from TB.

**Fig. 4.13.** Estimated HIV prevalence among new TB cases, 2008



#### Box 4.13. Towards effective integrated services for HIV and TB in Ethiopia

In Ethiopia, the implementation of collaborative TB/HIV activities started in nine sites in 2004. The establishment of the TB/HIV Technical Working Group in 2007 accelerated the expansion of implementation to reach 848 sites in 2009 (57). HIV/AIDS and TB care and treatment are provided in separate clinics located in close proximity. TB clinics offer HIV-related services, mainly the provision of provider-initiated HIV testing and counselling, post-test counselling and referral to the HIV care unit which, in turn, offers co-trimoxazole prophylaxis, other drugs for opportunistic infections and antiretroviral therapy. The number of TB patients with known HIV status has increased rapidly from 20 723 in 2007, to 56 040 in 2009, or more than doubled over a three-year period (58). Co-trimoxazole preventive therapy and antiretroviral therapy were provided to 11 098 and 7516 HIV-positive TB patients, respectively, in 2009 compared to 4529 and 2658, respectively, in 2007. It is estimated that currently 95% of TB patients are tested for HIV and that almost all health staff working with TB or HIV/AIDS have been trained in TB/HIV collaborative activities.

In spite of continued progress, several programmatic challenges still need to be addressed to further scale up the implementation of integrated TB and HIV activities. Greater emphasis must be placed on improving the coordination among TB/HIV entities at the regional level, training TB health-care workers on antiretroviral therapy and chronic care, ensuring the continuous availability of TB/HIV guidelines, making available instruction manuals and information materials at all clinics, initiating antiretroviral therapy and HIV care services at TB clinics, and implementing a robust monitoring and evaluation framework for TB and HIV collaborative activities. Engagement with communities in designing, delivering and evaluating HIV/TB-related activities must be further strengthened to ensure maximum programme effectiveness.

#### 4.2.1. Decreasing the burden of HIV among people with TB and their community<sup>1</sup>

HIV counselling and testing is recommended for everyone presenting with signs and symptoms of TB and people with confirmed TB. There has been progress in expanding HIV testing and counselling for TB patients over the past years. Almost 1.4 million TB patients knew their HIV status in 2008 (22% of notified cases compared to 16% in 2007 and 3.2% in 2004). In 2008, the rate of HIV testing among TB patients was 45% in Africa, more than a tenfold increase since 2004 (Figure 4.14), and reached 79% in the WHO European Region.

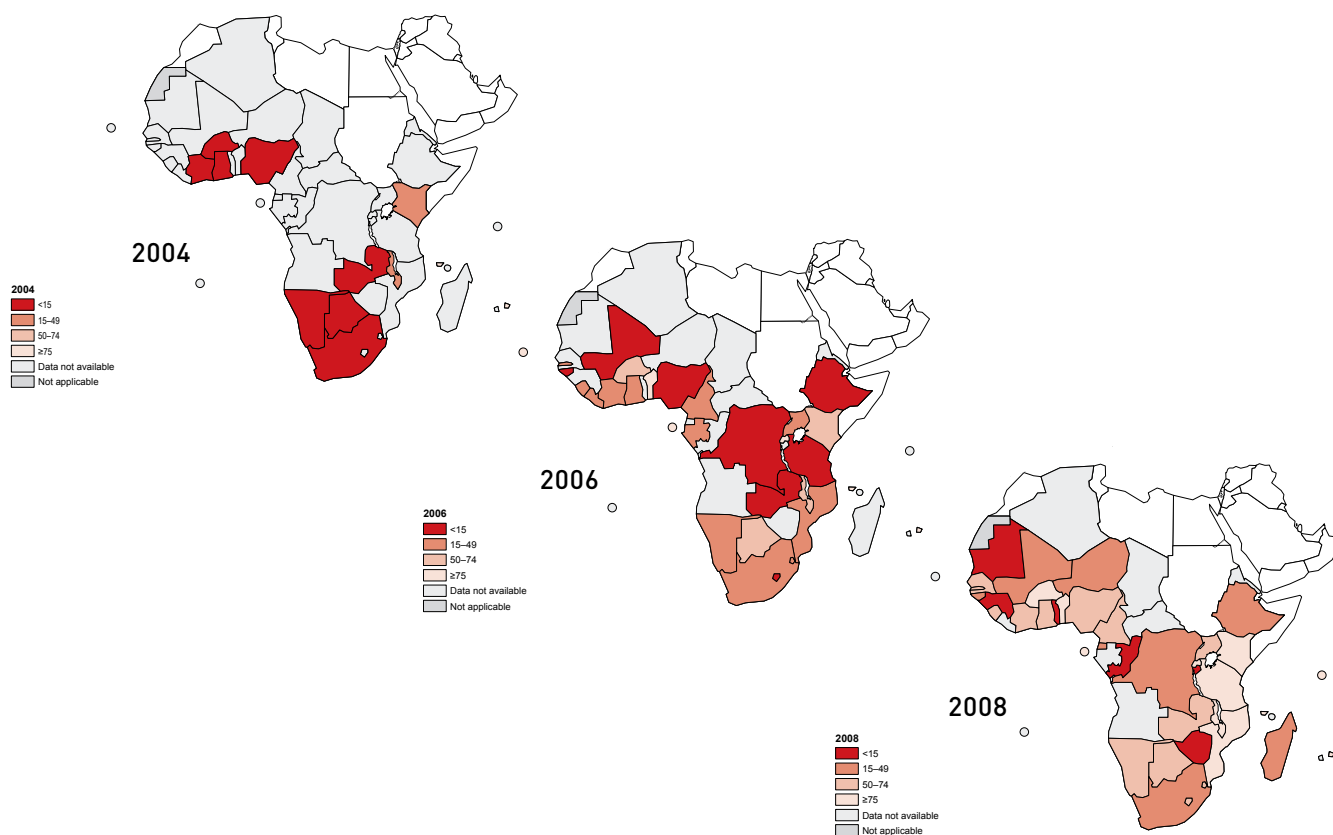
Co-trimoxazole has been proven to reduce morbidity and mortality among people living with HIV and TB. In 2008, among coinfecting patients knowing their HIV-positive status, around 230 000 patients (71%) were receiving it. Based on data reported by countries, coverage estimates have remained stable over the past few years (77% in 2006, 67% in 2007).

Antiretroviral therapy is a priority life-saving intervention for people living with HIV. Among people living with HIV diagnosed with TB, WHO recommends that antiretroviral therapy be started as soon as possible after starting TB treatment, regardless of the immunological stage (Box 4.1). 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

<sup>1</sup> This section draws largely from *Global Tuberculosis Control: a short update to the 2009 report*, WHO, 2010. Additional references used are cited where relevant.



**Fig. 4.14. Rates of HIV testing among TB patients WHO African Region, 2004–2008**



#### Box 4.14. Impact of antiretroviral therapy on TB incidence and TB treatment outcomes

Scientific evidence increasingly supports the fact that antiretroviral therapy can reduce the incidence of, and morbidity and mortality from, TB. Antiretroviral therapy has been shown to reduce TB incidence by up to 90% at the individual level (59) and by 60% at the population level (60).

##### *Impact of antiretroviral therapy on the incidence of TB*

A clinical trial conducted in Haiti, comparing early (CD4 counts at or below 350 cells/mm<sup>3</sup>) versus standard (CD4 counts at or below 200 cells/mm<sup>3</sup>) initiation of antiretroviral therapy showed that early initiation, in addition to an important positive impact on survival, decreased the incidence of TB by approximately 50% (61). In Brazil, between 1995 and 2001, rates of recurrent TB, either due to reinfection or reactivation, were halved after the introduction of antiretroviral therapy (62). The use of highly active antiretroviral therapy has also been associated with more rapid conversion of smears and cultures (63).

A mathematical model has investigated the short- and long-term impacts of antiretroviral therapy on the incidence of TB. Once universal access is achieved, the incidence of HIV-related TB should fall by 50%, provided people start antiretroviral therapy within five years of seroconversion.<sup>1</sup>

##### *Impact of antiretroviral therapy on the outcomes of TB treatment*

Scientific evidence also indicates that antiretroviral therapy can appreciably reduce TB-related morbidity and mortality in people living with HIV. Observational studies conducted both in resource-limited and high-income settings have shown that antiretroviral therapy is associated with significant reductions in mortality risk from TB of between 54% and 95% on an adjusted basis (64).

Observational studies have shown an important correlation between early initiation of antiretroviral therapy during TB treatment and lower mortality rates (65–71). These studies have concluded that the risk of death was reduced when antiretroviral therapy was started as early as possible during the course of TB treatment compared to delayed initiation of antiretroviral therapy. In response to such developments, WHO now recommends antiretroviral therapy for everyone living with HIV and diagnosed with TB, irrespective of immunological status, and as soon as possible after starting TB treatment.

<sup>1</sup> Williams B, personal communication, 2010

in 2006, to 125 000 people in 77 reporting countries in 2008 and 173 000 in 101 countries in 2009. Of these, 141 000 people were in sub-Saharan Africa, 14 000 in East, South and South-East Asia, 8500 in Latin America and the Caribbean, 8100 in Eastern Europe and Central Asia, and 1000 in North Africa and the Middle East. They represented 17% of the estimated TB/HIV cases in these reporting countries, a figure considerably lower than the estimated coverage of antiretroviral therapy for all HIV patients in low- and middle-income countries. Given the increasing evidence of access to testing for TB patients, and better linkages between TB and HIV services, this gap may reflect the weaknesses of reporting access to care among TB/HIV patients. However, this might also reflect poorer access to antiretroviral therapy for TB patients. Indeed, data from eight countries that accounted for 18% of the estimated global burden of HIV-positive TB cases in 2007 showed that there are more than five decentralized TB treatment centres for every facility providing antiretroviral therapy (51).

#### 4.2.2. Decreasing the burden of TB among people with HIV

Decreasing the burden of TB among people with HIV relies on the *Three I's for HIV/TB* strategy: isoniazid preventive treatment, prevention of TB with intensified case finding, and infection control for TB (Box 4.15). The poor implementation of the *Three I's for HIV/TB* strategy remains a major concern for the control of these dual epidemics. In 2009, 43% of reporting countries (48 out of 112) indicated that isoniazid preventive treatment was a part of their package of interventions for people living with HIV; 60% reported having implemented intensified case finding for TB prevention and 51% had a TB infection control policy.

It remains critical for managers of HIV and TB programmes to work closely together and with affected communities to scale up and ensure that people living with HIV have access

to the *Three I's for HIV/TB* as part of universal access to high-quality comprehensive prevention, care and treatment of HIV infection and TB (64).

### 4.3. Looking ahead

As of December 2009, 1.2 million additional people were on antiretroviral therapy, the largest year-on-year increase on record. Yet, revised treatment guidelines for antiretroviral therapy in adults and adolescents, which now recommend therapy to be initiated at an earlier stage of disease, increased the number of eligible patients in low- and middle-income countries by 45%, from 10.1 million to 14.6 million. This means that, in spite of continued progress, with less than 3 months to December 2010, only 36% of patients in need of antiretroviral therapy in low- and middle-income countries currently have access to it.

While achieving universal access may now require higher upfront investments, these are likely to be more than compensated in the medium term by savings as morbidity and mortality rates fall and costs associated with hospitalizations and palliative care drop. Such positive dynamics underscore the need to accelerate efforts to scale up access to treatment and care interventions.

In addition to accelerated efforts, new models are necessary to enhance the efficiency and effectiveness of service delivery, including antiretroviral treatment provision, and expand coverage and increase the impact of HIV interventions in general.

More must be done to strategically integrate HIV/AIDS interventions into national health services, strategies and plans, including those for sexual, reproductive, maternal and child health, tuberculosis, sexual transmitted infections

#### Box 4.15. The *Three I's for HIV/TB* guidelines

The revised draft of the "WHO guidelines for intensified case finding and isoniazid preventive therapy for tuberculosis for people living with HIV in resource-constrained settings" recommends the use of a simplified screening algorithm that includes four clinical symptoms – current cough, fever, weight loss, night sweats – to identify those eligible for either isoniazid preventive treatment or further diagnostic work-up for TB and other conditions. While chest radiography is no longer mandatory before starting isoniazid preventive treatment, the guidelines do support its use when feasible to increase the sensitivity of the screening. Building on the 1998 UNAIDS/WHO isoniazid preventive treatment policy, the new guidelines strongly recommend at least six months of isoniazid preventive treatment for children and adults, including pregnant women, people receiving antiretroviral therapy and for those who have successfully completed TB treatment. In addition, a 36-month course of isoniazid preventive treatment is now conditionally recommended in high HIV- and TB-prevalent settings. The revised guidelines emphasize that a tuberculin skin test is not a requirement for initiating isoniazid preventive treatment for people living with HIV. However, where feasible, tuberculin skin testing can assist in identifying those who would benefit most from isoniazid preventive treatment. The revised guidelines also emphasize isoniazid preventive treatment as a core component of HIV prevention and care services, and recommend that TB prevention be considered as a central responsibility of AIDS programmes and HIV service providers. The re-conceptualized guidelines no longer discuss isoniazid preventive treatment as an isolated intervention for people living with HIV, but recommend it as part of a broader TB prevention package along with infection control for TB, intensified TB case finding and the provision of antiretroviral therapy.

and harm reduction. At the same time, special approaches remain necessary to address the particular circumstances and needs of those groups usually not reached through standard service delivery channels, including populations at greater risk of HIV infection.

Multiple programmatic bottlenecks along the continuum of care, from treatment initiation to long-term therapy maintenance, still hinder effective responses in many low- and middle-income countries and threaten their sustainability. The Treatment 2.0 Initiative, launched by WHO and UNAIDS, seeks to address them through a holistic perspective aimed at raising the quality of services delivered and dramatically reducing the cost of interventions.


Timely initiation of antiretroviral therapy – often an issue because people do not know their HIV status and because of underlying stigma and discrimination – is necessary to avoid the high mortality rates observed in the first year after adults and children initiate treatment. Expanding access to HIV testing and counselling services, including through provider-initiated approaches, must continue to be a priority to ensure timely diagnosis of HIV infection.

Greater attention must also be paid to the quality of services and interventions, as only high-quality treatment programmes can sustain appropriate levels of retention and adherence to antiretroviral therapy. 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 accelerate the shift from first- to more expensive, and often unavailable, second-line regimens at an unnecessarily early stage.

Despite reductions in drug prices over the past ten years, overall costs of antiretroviral therapy programmes have continued to rise, as more patients initiate antiretroviral therapy and more need to move from first- to second-line combinations, whose prices are still higher than entry-level

regimens. Therefore, additional efforts are necessary to reduce their prices and increase their availability in low- and middle-income countries. Nevertheless, although increasing drug affordability is important, potential gains are now highest in the area of reducing non-drug-related costs of providing treatment, such as inpatient care and staff-related expenses.

While current regimens can successfully lower morbidity and mortality among people receiving treatment, their long-term toxicities can still negatively affect critical treatment outcomes. In addition, treatment monitoring often requires highly specialized equipment and laboratory technicians. Dramatic acceleration of access to treatment thus requires the development of simpler, less toxic and less resistance-prone treatment regimens, as well as cheaper and simplified diagnostic and monitoring tools. Ensuring that all people in need have access to treatment will also maximize the preventive effect of antiretroviral therapy. Indeed, it is estimated that this could result in an annual reduction in new HIV infections of up to one third. Moreover, optimizing HIV treatment coverage can yield other important health prevention benefits, including much lower rates of tuberculosis among people living with HIV.

These novel approaches will only be successfully designed and implemented with substantially strengthened community mobilization and involvement in programme management and service delivery. In addition, greater community participation is key to improving treatment access and adherence. Indeed, community-based approaches that build trust, protect human rights and provide opportunities for socialization directly improve the ability of people to use HIV services and access antiretroviral therapy. This is particularly essential for those groups who are most marginalized and discriminated against, including migrants, injecting drug users, sex workers and men who have sex with men. 

#### Box 4.16. Reducing stigma and discrimination in health-care facilities in Ghana (72)

HIV-related stigma has been identified as one of the principal obstacles to HIV prevention and scaling up testing and treatment worldwide. Fear of stigma, also known as “anticipated stigma”, falls more heavily in vulnerable populations, such as women, key affected groups and the poor, who are often at greater risk for HIV acquisition (73,74). Unfortunately, populations most in need of access to HIV services are often those with the highest levels of fear about the stigma they might experience in health facilities (73).

Recent research has identified three main drivers of HIV stigma, which are consistent across contexts (75): (i) lack of awareness and knowledge of HIV-related stigma and discrimination, (ii) fear of acquiring HIV through everyday contact with infected people, and (iii) linking people living with HIV with behaviours considered improper or immoral.

Studies show that interventions aimed at decreasing stigma in health facilities can change health workers’ attitudes and behaviours towards people living with HIV. The underlying drivers of HIV-related stigma may be addressed by creating awareness of what stigma is and the benefits of reducing it, fostering motivation for change, addressing fears and misconceptions about HIV transmission, discussing “taboo” topics such as gender, violence, sexuality and injecting drug use, and providing skills to challenge stigma and change behaviour (76,77).

In mid-2006, Quality Health Partners (QHP), in partnership with the Strengthening HIV/AIDS Response Partnerships (SHARP) project, the Ghana Sustainable Change Project and the National AIDS Control Programme (NACP), launched the high-impact package of HIV and AIDS interventions (HIP) initiative to complement the national scale-up of comprehensive HIV services. At the same time, it aimed to address the issue of stigma and improve facility-community linkages.

In relation to stigma, HIP includes: 1) training in stigma reduction and infection prevention for clinical and non-clinical health workers (tailored to each group); 2) training in infection prevention for family or friends who are caregivers of clients; and 3) action plans for client-oriented, provider-efficient services to address facility-specific stigma-related issues (e.g. to improve privacy, confidentiality and client-provider interaction).

In 2008–09, a rapid appraisal of six of 25 QHP-supported hospitals implementing HIP and their clients was undertaken to measure the prevalence of stigma and discriminatory attitudes and practices among staff, and the effectiveness of the HIP training in mitigating them. Although the study was not a complete impact evaluation, a number of notable results emerged.

- The majority of clients and health workers reported declines in the major drivers of stigma, especially a reduction in the fear of casual transmission and of moralizing attitudes, though clients’ fears of indirect disclosure remained.
- Clients reported that though HIV-related stigma had declined in other units of the hospital, it still negatively impacted upon the quality of care.
- “Anticipated” HIV stigma by health workers did not appear to be an obstacle for the majority of most-at-risk populations using testing, treatment and care services.
- The HIP interventions reportedly increased health workers’ willingness to care for HIV-positive people.
- Both health workers and clients reported a decline in discriminatory practices towards people living with HIV.

A number of recommendations resulted from the appraisal. First, it is necessary to maintain and strengthen, with the necessary budget allocations, the training content and activities aimed at reducing stigma and discrimination, while incorporating more follow-up activities and refresher trainings to enhance retention of the material and its implementation. The appraisal also suggested the need to prioritize issues that groups at higher risk for HIV infection (including men who have sex with men, sex workers and injecting drug users) identify as primary obstacles to the uptake of health prevention and care services, such as lack of adequate protection of client confidentiality. The appraisal also drew attention to the importance of strengthening linkages between stigma reduction activities targeting health facilities and those targeting communities, as health workers’ behaviour in the workplace may be negatively influenced by discriminatory attitudes and perceptions carried over from the communities they live in.

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## 5. SCALING UP HIV SERVICES FOR WOMEN AND CHILDREN

### Key findings

- *The proportion of pregnant women who received an HIV test increased slightly.* An estimated 26% of the estimated 125 million pregnant women<sup>1</sup> in low- and middle-income countries received an HIV test in 2009, up from 21% in 2008 and 7% in 2005. In the Eastern and Southern Africa region, the proportion of pregnant women who received an HIV test increased from 43% in 2008 up to 50% in 2009.
- Approximately 51% of pregnant women testing positive were reported to have been assessed for eligibility to receive antiretroviral therapy for their own health.
- *Over half of the 1.4 million pregnant women living with HIV are estimated to have received antiretroviral drugs to prevent transmission of HIV to their infants.* An estimated 53% [40–79%] of pregnant women living with HIV received antiretrovirals to reduce the risk of transmitting HIV to their infants, up from 45% [37–57%] in 2008 and 15% [12–18%] in 2005. A large proportion continued to receive the less efficacious single-dose nevirapine regimen.
- *Slightly more infants received antiretroviral prophylaxis to prevent acquisition of HIV from their mothers.* Thirty-five per cent [26–53%] of infants in need received antiretroviral prophylaxis for prevention of mother-to-child transmission in 2009, up from 32% [26–40%] in 2008.
- *Among infants and children exposed to HIV, access to early testing, care and treatment is insufficient.* In 2009, in 54 reporting countries, only 15% [10–28%] of children born to HIV-positive mothers received an HIV test within the two first two months of life.
- *The proportion of children in need who received antiretroviral therapy rose further in 2009.* The number of children below the age of 15 years on antiretroviral therapy rose from 275 300 in 2008 to 356 400 in 2009. This represents an estimated coverage of 28% [21–43%] of children in need of antiretroviral therapy, up from 22% [16–34%] in 2008, based on updated treatment needs.

<sup>1</sup> Pregnant women were proxied by the estimated number of births.

Source: United Nations, Department of Economic and Social Affairs, Population Division (2009). World Population Prospects: The 2008 Revision, CD-ROM Edition.

## Introduction

In July 2010, WHO released updated guidelines on antiretrovirals for treating pregnant women living with HIV and preventing HIV infection in infants, infant-feeding in the context of maternal HIV, and antiretroviral therapy for HIV in infants and children (1). These new guidelines call for an earlier start and longer duration of antiretrovirals in women and children, which would require strategies and increased capacity to assess eligibility for antiretroviral therapy and undertake long-term monitoring, including of adherence to antiretrovirals. Scaling up interventions to reach more women and children in need also demands integrating, where appropriate, HIV interventions within routine maternal, child and other health services.

Successful implementation of the revised 2010 WHO guidelines will contribute to improving the health and survival of mothers living with HIV and children exposed to HIV and, ultimately, to the realization of Millennium Development Goals (MDGs) 4 and 5, as well as the goal

of eliminating mother-to-child transmission of HIV by 2015 (Box 5.1). This is a unique opportunity to harness the necessary political and financial resources to achieve an HIV-free generation.

In 2008,<sup>1</sup> an estimated 15.7 million women aged 15 years and above were living with HIV globally, of whom 12 million were in sub-Saharan Africa (6). The number of children less than 15 years of age living with HIV was 2.1 million, with an estimated 430 000 children below 15 years becoming newly infected. In sub-Saharan Africa, women accounted for approximately 60% of estimated HIV infections. In 2008, of all new infections among children, 91% occurred in this region (6).

More than 90% of children living with HIV are infected through mother-to-child transmission during pregnancy, around the time of birth or through breastfeeding (7). Children may also be infected with HIV through transfusion

<sup>1</sup> 2009 estimates are not yet available, and will be published in the forthcoming *AIDS Today: UNAIDS Global Report*.

### Box 5.1. International targets for mother-to-child transmission of HIV

In June 2001, Heads of State and Representatives of Governments adopted the Declaration of Commitment on HIV/AIDS at the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS. Countries committed that by 2005, they would reduce by 20% and, by 2010, by 50%, the number of infants infected with HIV by ensuring that “80% of pregnant women in antenatal care receive HIV information, counselling and other HIV prevention services; increasing the availability of and providing access for HIV-infected women and babies to effective treatment to reduce mother-to-child transmission of HIV, as well as through effective interventions for HIV-infected women, including voluntary and confidential testing and counselling, access to treatment, especially antiretroviral therapy and, where appropriate, breast-milk substitutes and the provision of a continuum of care” (2).

In June 2006, a Political Declaration on HIV/AIDS was adopted at the United Nations General Assembly High-Level Meeting on AIDS, reaffirming the commitment of all Member States to fully implement the 2001 UNGASS Declaration as well as the MDGs, and to work towards universal access to HIV prevention, treatment, care and support (3).

In 2007, the Inter-Agency Task Team (IATT) on Prevention of HIV Infection in Pregnant Women, Mothers and their Children issued a *Guidance on global scale-up of prevention of mother-to-child transmission of HIV*, with recommended target coverage levels of at least 80% for key interventions at the national level (4).

Since then, several multilateral and bilateral agencies have prioritized the reduction of mother-to-child transmission of HIV, and have called for its effective elimination by 2015. In 2009, WHO released its *PMTCT strategic vision 2010–2015* to prevent mother-to-child transmission and improve maternal, newborn, and child health and survival in the context of HIV, to reach the UNGASS targets and MDGs (5). The Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria is reviewing and reprogramming existing grants to support increased coverage and quality of programmes to prevent mother-to-child transmission.

The UNAIDS Secretariat and its cosponsors have recently developed a Business Case towards the virtual elimination of mother-to-child-transmission of HIV (defined as less than 5% transmission of HIV from mother to child at a population level or 90% reduction of infections among young children by 2015, from a baseline of 2009). In order to spearhead action and facilitate progress in monitoring, three results, to be achieved by 2011, have been proposed; in 10 of the 22 countries with the greatest number of HIV-positive pregnant women:

1. to achieve at least 80% coverage with effective antiretrovirals for preventing mother-to-child transmission,
2. to provide antiretroviral coverage to at least 50% of HIV-positive pregnant women eligible for treatment for their own health.
3. Reduce by 50% the current unmet need for family planning among all women.

WHO, UNAIDS and UNICEF will organize a meeting in October 2010 with country representatives and international partners to further define “elimination” targets and discuss how they can be measured and supported.

with HIV-contaminated blood, injections with contaminated needles, and through early sexual debut and abuse. Effectively addressing mother-to-child transmission of HIV requires a comprehensive approach that includes the following four strategic components (8):

- 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.

This approach provides a continuum of interventions and care for women, children and their families which begins before pregnancy, continues through pregnancy, labour, delivery and postpartum, and subsequently as part of routine or specialized chronic care services for the mother, child and family after the child is born. In scaling up their national programmes, countries must ensure that all four components of the comprehensive approach are delivered to women and children in need.

This chapter focuses on components 3 (preventing HIV transmission from women living with HIV to their infants) and 4 (providing appropriate treatment, care and support to mothers living with HIV and their children and families), where new data have been reported by countries which allow for a comprehensive update of programmatic progress between 2008 and 2009. Other programmatic components are essential as well but routine reporting is complex: cross-country comparisons on component 1 require data collected from household surveys, which are updated only every few years; data on component 2 are currently still very limited. In this context, there is a need to place more emphasis on efforts to strengthen data collection in these areas.

Overall, 25 countries in sub-Saharan Africa and East, South and South-East Asia accounted for 91% of the 1.4 million pregnant women needing antiretrovirals to prevent vertical transmission (Table 5.1). The same countries are also home to 91% of the children less than 15 years in need of antiretroviral therapy.

### Box 5.2. Monitoring progress in preventing mother-to-child transmission and improving data quality

Programmes for preventing mother-to-child transmission are difficult to monitor at the national level for several reasons: (i) they comprise a cascade of multiple interventions; (ii) the interventions often occur across various service delivery points (for instance, they can be delivered in facilities providing antenatal care, labour and delivery services, child health services or HIV care and treatment services); and (iii) 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 pregnancy, including on final transmission and survival outcomes.

In some countries, a considerable number of women deliver at home and many services are provided by the private sector. Mechanisms to collect and report data from these sources are not always available. Furthermore, the key intervention – provision of antiretrovirals to a pregnant woman living with HIV and to the exposed infant 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 taken is often unknown. This may bias estimates of how the intervention affects HIV transmission from mother to child.

Double counting across multiple service delivery points is also a common issue when countries compile national statistics related to preventing mother-to-child transmission of HIV. For example, in settings in which the same pregnant woman living with HIV may receive antiretrovirals in antenatal care, in a maternity ward during labour and delivery, or in HIV care sites, double counting may happen if data are aggregated across all service delivery points. In addition, patient registers may be incomplete, and the lack of robust data systems may lead to inaccurate aggregation, recording and reporting from the facilities to the subnational and national levels. Some countries have been 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. In other countries, HIV in pregnant women and children are rare events, and they are not captured properly in national surveillance systems. Countries are aware of these issues and are making efforts to improve their monitoring systems, and make necessary adjustments to the data reported for this report. This chapter attempts to summarize the available data.

WHO, UNICEF and the monitoring and evaluation working group of the IATT on prevention of HIV infection among pregnant women, mothers and their children, have developed a comprehensive guide for monitoring and evaluating interventions for prevention of mother-to-child transmission. Entitled *Monitoring and evaluating the prevention of mother-to-child transmission of HIV: a guide for national programmes* (9), this guide addresses the implementation of national monitoring and evaluation systems, including the issue of double-counting, and recommends core national indicators which are in line with WHO's latest guidelines on antiretrovirals for the prevention of mother-to-child transmission in women and infants, and paediatric antiretroviral therapy, described in Boxes 5.3 and 5.6, respectively.



**Table 5.1.** Twenty-five 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 the corresponding number of children in need of antiretroviral therapy, 2009

Rank	Country	Estimated number of pregnant women in need of antiretrovirals in 2009 [range]	% of the total in low- and middle-income countries <sup>a</sup>	Estimated number of children in need of antiretroviral therapy in 2009 [range]	% of the total in low- and middle-income countries <sup>a</sup>
1	South Africa	210 000 [120 000–290 000]	15.6	160 000 [92 000–210 000]	12.5
2	Nigeria	210 000 [110 000–300 000]	15.0	180 000 [94 000–270 000]	14.5
3	Mozambique	97 000 [53 000–130 000]	7.1	66 000 [36 000–93 000]	5.2
4	Uganda	88 000 [48 000–130 000]	6.4	76 000 [41 000–110 000]	6.0
5	United Republic of Tanzania	84 000 [45 000–120 000]	6.1	75 000 [38 000–110 000]	5.9
6	Kenya	81 000 [41 000–120 000]	5.9	89 000 [48 000–130 000]	7.0
7	Zambia	68 000 [37 000–94 000]	5.0	59 000 [32 000–82 000]	4.7
8	Malawi	57 000 [31 000–83 000]	4.2	61 000 [34 000–84 000]	4.8
9	Zimbabwe	50 000 [28 000–69 000]	3.6	71 000 [43 000–95 000]	5.6
10	India	43 000 [23 000–65 000]	3.1	<sup>b</sup> [30 000–76 000]	4.1
11	Democratic Republic of the Congo	<sup>b</sup> [20 000–54 000]	2.6	<sup>b</sup> [17 000–46 000]	2.4
12	Cameroon	34 000 [18 000–50 000]	2.5	28 000 [15 000–41 000]	2.2
13	Ethiopia	<sup>b</sup> [17 000–51 000]	2.4	<sup>b</sup> [27 000–74 000]	3.9
14	Côte d'Ivoire	20 000 [10 000–31 000]	1.5	29 000 [14 000–42 000]	2.3
15	Chad	16 000 [8 300–29 000]	1.2	12 000 [6 600–19 000]	1.0
16	Angola	16 000 [8 400–25 000]	1.2	12 000 [6 300–18 000]	0.9
17	Burundi	15 000 [8 400–21 000]	1.1	14 000 [8 500–20 000]	1.1
18	Sudan	14 000 [7 300–22 000]	1.0	8 700 [4 400–13 000]	0.7
19	Lesotho	14 000 [8 400–18 000]	1.0	13 000 [7 800–18 000]	1.1
20	Ghana	13 000 [6 900–20 000]	1.0	13 000 [6 700–20 000]	1.0
21	Botswana	13 000 [6 900–17 000]	0.9	9 400 [8 200–11 000]	0.7
22	Rwanda	11 000 [5 400–16 000]	0.8	11 000 [7 000–17 000]	0.9
23	Swaziland	9 300 [5 700–12 000]	0.7	6 800 [4 400–9 000]	0.5
24	Namibia	7 700 [4 100–11 000]	0.6	9 200 [7 300–13 000]	0.7
25	Burkina Faso	6 500 [3 500–11 000]	0.5	8 000 [3 900–12 000]	0.6

a. Calculations are based on unrounded estimated numbers of pregnant women and children needing antiretroviral therapy.

b. No point estimate is provided as the estimated number of pregnant women living with HIV in need of antiretrovirals and/or the estimated number of children living with HIV in need of antiretroviral therapy are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis.

## 5.1. Preventing vertical transmission of HIV from mother to child

### 5.1.1. HIV testing and counselling among pregnant women

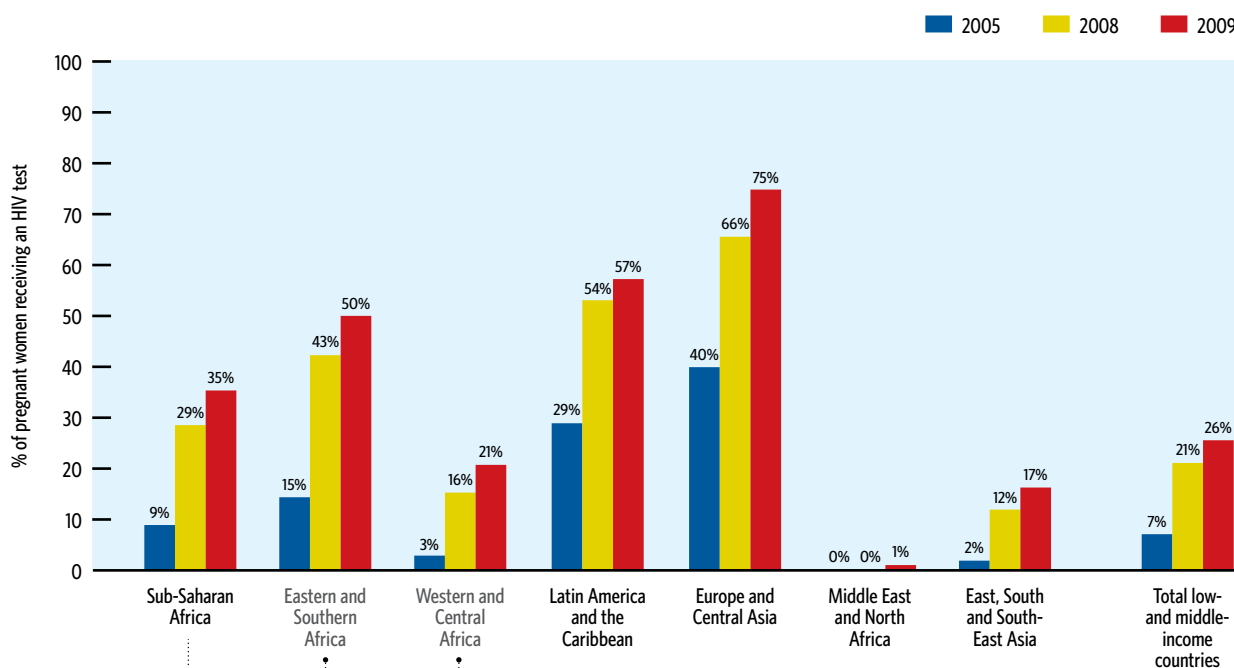
Expanding HIV testing and counselling among pregnant women is critical for identifying those in need of follow-up care and increasing coverage of subsequent interventions to reduce the risk of mother-to-child transmission of HIV. In 2009, an estimated 26% of the estimated 125 million pregnant women in low- and middle-income countries received an HIV test, up from 21% in 2008, and 7% in 2005.

As in previous years, important regional differences were observed in 2009 with respect to the proportion of women receiving HIV testing and counselling. Coverage of HIV testing and counselling among pregnant women remained highest in Europe and Central Asia, at 75%, followed by Latin America and the Caribbean at 57%, and sub-Saharan Africa, at 35%.

In East, South and South-East Asia, representing 55% of the estimated 125 million pregnant women in 2009, the coverage of HIV testing and counselling among pregnant women was much lower (17%). It was close to zero in the Middle East and North Africa.



**Fig. 5.1.** Percentage of pregnant women who received an HIV test in low- and middle-income countries by region, 2005, 2008, 2009



Steady progress was made within sub-Saharan Africa in 2009. In Eastern and Southern Africa, the region with the highest HIV prevalence, HIV testing and counselling among pregnant women reached over 50%, an increase from 43% in 2008. In Western and Central Africa, coverage increased from 16% to 21% between 2008 and 2009.

In the 25 countries with the highest burden of HIV among pregnant women, testing and counselling coverage varied substantially as well (Table 5.2). Seven countries provided HIV tests to less than one third of pregnant women: Nigeria (13%), the Democratic Republic of the Congo (9%), India (21%), Ethiopia (16%), Chad (6%), Angola (26%) and Sudan (3%). In these countries, considerably greater investments are needed to increase HIV testing and counselling among pregnant women in order to effectively prevent mother-to-child transmission of HIV and to enrol eligible women living with HIV in appropriate care and treatment. Four countries reported providing HIV testing and counselling to over 80% of pregnant women in their countries: South Africa (>95%), Zambia (>95%), Botswana (93%) and Namibia (88%).

Although the number of pregnant women receiving at least one HIV test during pregnancy has increased in some settings, more attention must be given to re-testing pregnant women in late pregnancy to identify HIV-negative women who might have seroconverted, as well as conducting HIV testing of their partners in generalized epidemic settings.

**Table 5.2.** Coverage of HIV testing and counselling among pregnant women in the top 25 high-burden countries ranked by the estimated number of pregnant women living with HIV, 2009<sup>a</sup>

Rank	Country	2009
1	South Africa	>95%
2	Nigeria	13%
3	Mozambique	77%
4	Uganda	64%
5	United Republic of Tanzania	66%
6	Kenya	63%
7	Zambia	>95%
8	Malawi	52%
9	Zimbabwe	46%
10	India	21%
11	Democratic Republic of the Congo	9%
12	Cameroon	41%
13	Ethiopia	16%
14	Côte d'Ivoire	47%
15	Chad	6%
16	Angola	26%
17	Burundi	40%
18	Sudan	3%
19	Lesotho	50%
20	Ghana	51%
21	Botswana	93%
22	Rwanda	71%
23	Swaziland	73%
24	Namibia	88%
25	Burkina Faso	42%

<sup>a</sup> Countries with the highest estimated numbers of pregnant women living with HIV in need of antiretrovirals to prevent mother-to-child transmission of HIV.

In settings with generalized epidemics, all pregnant women should be tested as early as possible in each pregnancy, with the health provider recommending testing as a part of routine antenatal care (provider-initiated testing and counselling). Because of the high incidence of HIV reported during the antenatal period (seroconversion during pregnancy) in generalized epidemics, women who test HIV negative in their first or second trimesters of pregnancy should be re-tested in their third trimester of pregnancy. If a woman does not return for testing during her third trimester, she should be recommended to test at labour or, if that is not possible, immediately after delivery (10).

A number of countries with concentrated or low-level epidemics, which are scaling up national prevention of mother-to-child transmission programmes, have implemented provider-initiated testing and counselling as well as re-testing during pregnancy for all pregnant women. Decisions on whether to make provider-initiated testing and counselling a part of antenatal and delivery care (either nationally or regionally) in low-level and concentrated epidemics must be based on an assessment of local resources, and the epidemiological and social contexts.

Even if testing coverage is over 50% in about half of the 25 countries with the largest number of pregnant women living with HIV, global testing coverage remains below 30%, partly because some large countries, including some with concentrated or low-level epidemics, do not test all pregnant

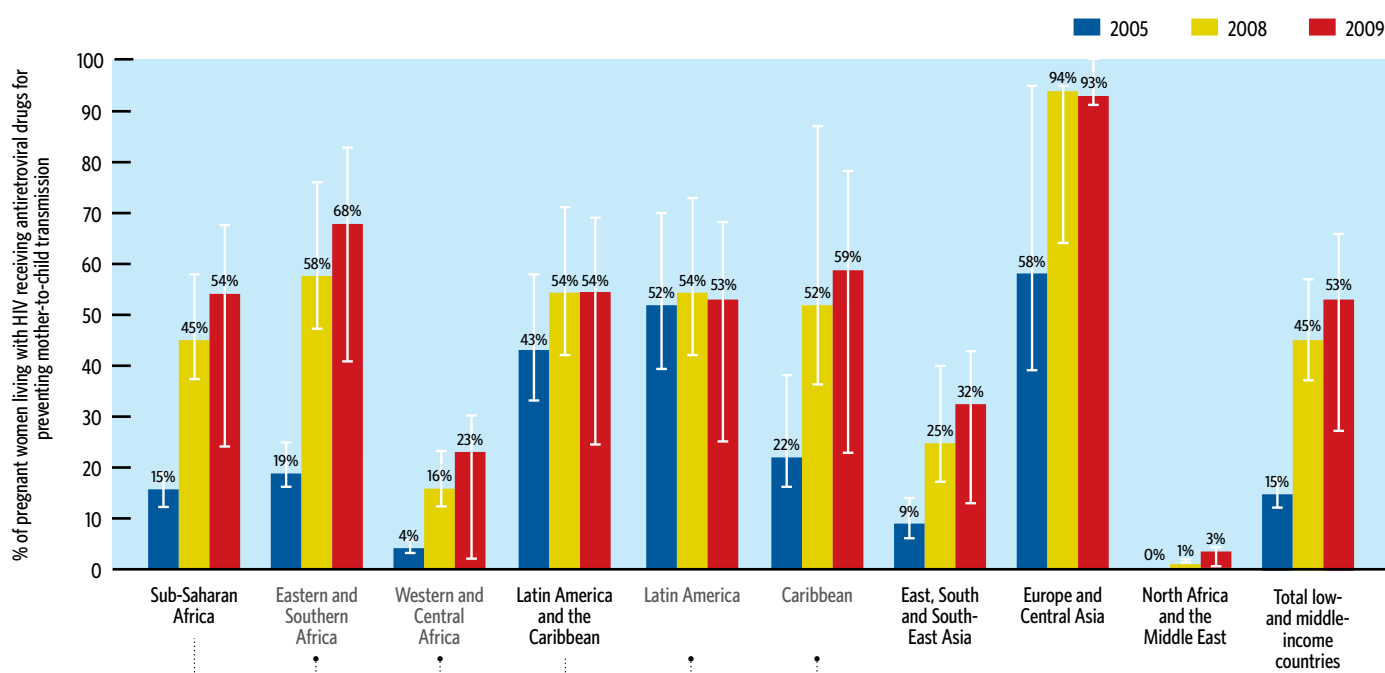
women for HIV. For example, the majority of countries in the East, South and South-East Asia region have low and concentrated epidemics, with HIV infections occurring among men who have sex with men, injecting drug users, sex workers and their clients. In these cases, HIV testing may not necessarily be targeted at pregnant women. Many countries in Asia have also opted to prioritize selected cities, regions and districts.

The benefits of testing heterosexual couples have also been highlighted by research, which showed rates of serodiscordance of over 50% among women and their partners attending antenatal clinics (11). While this is only one example, testing couples together facilitates mutual disclosure, can increase uptake of and adherence to antiretroviral interventions for prevention of mother-to-child transmission (12) and links to care, and can increase the preventive benefits of testing.

### 5.1.2. Antiretrovirals to prevent mother-to-child transmission of HIV

In 2009, 53% [40–79%] of pregnant women living with HIV in low and middle-income countries (727 600 of 1.4 million) received antiretrovirals to reduce the risk of HIV transmission to their infants, including antiretroviral therapy for their own health. This represents an increase in coverage of antiretrovirals for the prevention of mother-to-child transmission from 45% [37–57%] in 2008 and 15% [12–18%] in 2005 (Figure 5.2).

**Fig. 5.2. Percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission of HIV in low- and middle-income countries by region, 2005, 2008 and 2009**



I The bar indicates the uncertainty range around the estimate.

Coverage was highest in Eastern Europe and Central Asia, where nearly all pregnant women in need received antiretrovirals to prevent mother-to-child transmission (Table 5.3). Coverage remained lower in East, South and South-East Asia, and in North Africa and the Middle East, although progress was made in both regions, with coverage rates increasing, respectively, from 25% [17–40%] to 32% [22–52%], and from 1% [1–2%] to 3% [2–6%] between 2008 and 2009 (Figure 5.2).

In sub-Saharan Africa, coverage of antiretrovirals for preventing mother-to-child transmission reached 54% [40–84%], from 45% [37–58%] in 2008. However, there were considerable differences between subregions: whereas 68% [53–95%] of pregnant women in need received antiretrovirals for preventing mother-to-child transmission in Eastern and Southern Africa, in West and Central Africa the comparable figure was 23% [16–44%].

In Latin America and the Caribbean, coverage of antiretrovirals for preventing mother-to-child transmission stood at 54% [39–83%] in 2009, similar to the 54% [42–71%] estimated for 2008. Within the region, coverage also varied considerably, with some countries reaching rates close to or above 80%, with little incremental increases expected, and others with lower and stagnant coverage of antiretrovirals for preventing mother-to-child transmission. With growing political support for prevention of mother-to-child transmission, an important push is now being made to virtually eliminate mother-to-child transmission in the region by 2015. Specific, time-bound plans are currently being developed and reviewed by countries to support this goal, as well as the goal of elimination of congenital syphilis.

Figure 5.3 shows the 25 countries estimated to have the largest numbers of women needing antiretrovirals to reduce mother-to-child transmission and the estimated

### Box 5.3. 2010 WHO guidelines on antiretrovirals to treat HIV in pregnant women and prevent HIV infection in infants (7)

The revised 2010 WHO guidelines for prevention of mother-to-child transmission of HIV are based on two key approaches: (i) lifelong antiretroviral therapy for those pregnant women in need of treatment for their own health, which is also safe and highly effective in reducing mother-to-child transmission; and (ii) new options for antiretroviral prophylaxis to prevent mother-to-child transmission during pregnancy, delivery and breastfeeding for those who do not require treatment. A major change is that prophylaxis is now recommended during breastfeeding, in settings where breastfeeding is judged to be the safest infant-feeding option (see Box 5.4).

HIV-positive pregnant women should undergo immunological (CD4 testing) and clinical assessment to determine eligibility for antiretroviral therapy. As with all HIV-infected adults, initiation of antiretroviral therapy is now recommended for all HIV-infected pregnant women with CD4 counts at or below 350 cells/mm<sup>3</sup>, irrespective of WHO clinical staging, and in all pregnant women in WHO clinical stage 3 or 4, irrespective of CD4 cell count. Early treatment, beginning during pregnancy, will help improve the mother's health and provide optimal prevention of transmission during the perinatal period and while breastfeeding.

For pregnant women living with HIV who do not need antiretroviral therapy for their own health, WHO recommends two equally efficacious options to reduce transmission during the perinatal period and while breastfeeding. The two options have different advantages and disadvantages; the preferred option should be decided at country level after considering local capacity as well as feasibility and implementation issues. Each of the two prophylaxis options includes a maternal regimen beginning as early as 14 weeks of pregnancy, and continued during the antenatal and intrapartum periods. After delivery, the mother or infant will continue taking drugs for a variable amount of time depending on whether the country chooses option A or B, and whether the mother is breastfeeding or not.

For option A, zidovudine, starting from as early as 14 weeks of pregnancy, is given to the mother during the antenatal period. A single dose of nevirapine and lamivudine is added during labour, and zidovudine and lamivudine are continued for 7 days after delivery as a "tail" to decrease the risk of nevirapine resistance. If the infant is breastfed, the baby will receive nevirapine syrup from birth until one week after all exposure to breast milk has ended. If the baby is on replacement feeding, it will only get either nevirapine or zidovudine from birth until 4–6 weeks of age.

For option B, a prophylaxis regimen consisting of three antiretrovirals is provided to the mother during pregnancy, labour and after delivery until one week after all exposure to breast milk has ended. Infants born to mothers on option B will receive either nevirapine or zidovudine from birth until 4–6 weeks of age, regardless of their feeding method. WHO recommends four possible triple prophylaxis regimens for option B, with the choice of regimen to be made at country level.

These revised recommendations emphasize the need to have a unified approach to preventing mother-to-child transmission throughout pregnancy, labour and delivery, postpartum and during the breastfeeding period, if breastfeeding is chosen as the safest infant-feeding option in resource-limited settings. Successful implementation will require integration and coordination with HIV care and antiretroviral therapy programmes, integration of interventions for prevention of mother-to-child transmission as a basic part of maternal and child health care, and strengthened postpartum follow up of both mothers and infants. Currently, one of the main barriers to implementing this strategy is the proper identification of women in need of lifelong antiretroviral therapy (access to CD4 testing).

**Table 5.3.** Estimated number of women living with HIV needing and receiving antiretrovirals for PMTCT in low- and middle-income countries, 2009<sup>a</sup>

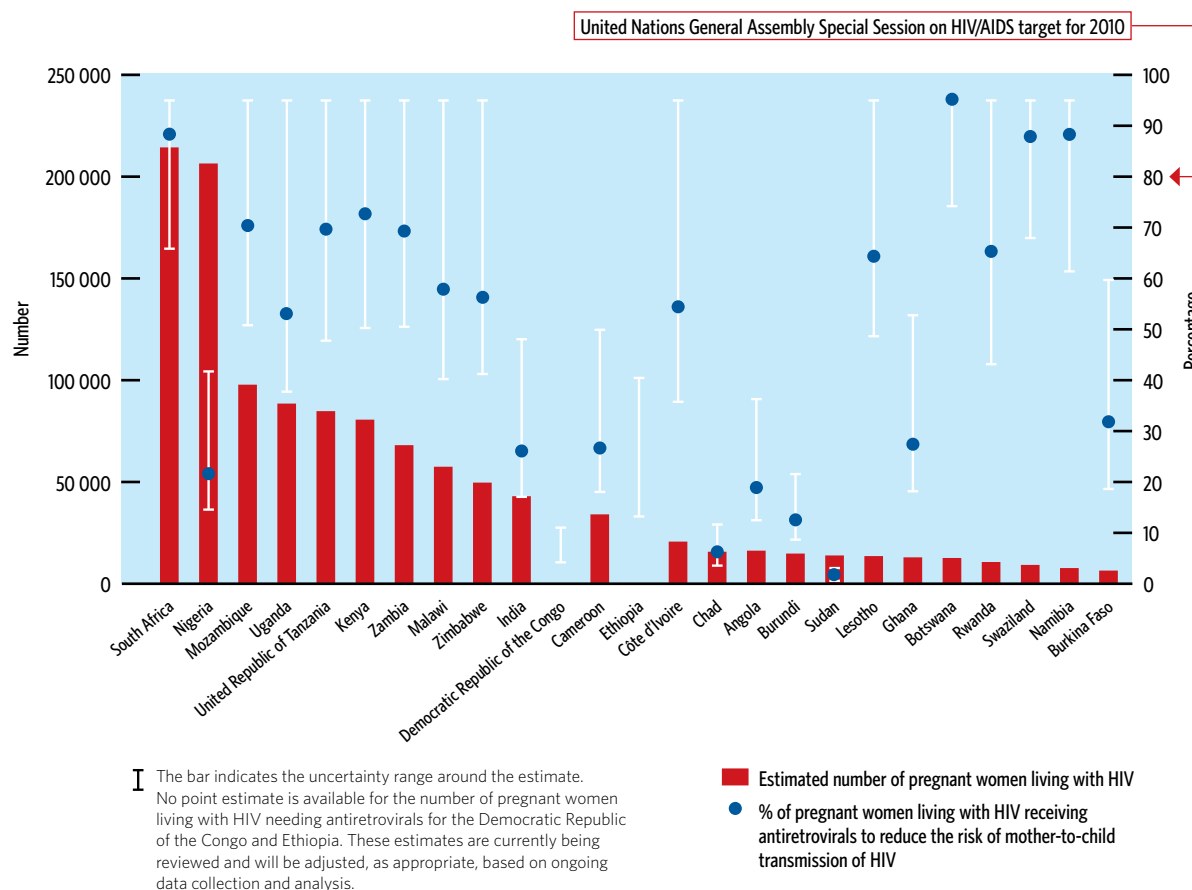
Geographical region	Number of pregnant women living with HIV receiving antiretrovirals for PMTCT	Estimated number of pregnant women living with HIV in need of antiretrovirals for PMTCT	Estimated coverage
Sub-Saharan Africa	672 800	1 240 000 [800 000-1 700 000]	54% [40%-84%]
Eastern and Southern Africa	584 700	860 000 [600 000-1 100 000]	68% [53%-95%]
Western and Central Africa	88 100	380 000 [200 000-560 000]	23% [16%-44%]
Latin America and the Caribbean	16 200	29 900 [19 000-41 000]	54% [39%-83%]
Latin America	11 800	22 400 [15 000-32 000]	53% [37%-81%]
Caribbean	4 400	7 400 [3 900-11 000]	59% [39%-95%]
East, South and South-East Asia	23 800	73 800 [46 000-110 000]	32% [22%-52%]
Europe and Central Asia	14 300	15 300 [7 900-23 000]	93% [63%-95%]
North Africa and the Middle East	500	15 700 [8 300-24 000]	3% [2%-6%]
<b>All low and middle income</b>	<b>727 600</b>	<b>1 380 000 [920 000-1 800 000]</b>	<b>53% [40%-79%]</b>

Note: some numbers do not add up to rounding.

a Annex 5 provides country-specific data.

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

**Fig. 5.3.** Percentage of pregnant women living with HIV receiving antiretrovirals to prevent mother-to-child transmission of HIV in 25 countries with the highest HIV disease burden among pregnant women, in descending order, 2009



coverage with antiretrovirals for preventing mother-to-child transmission in 2009.

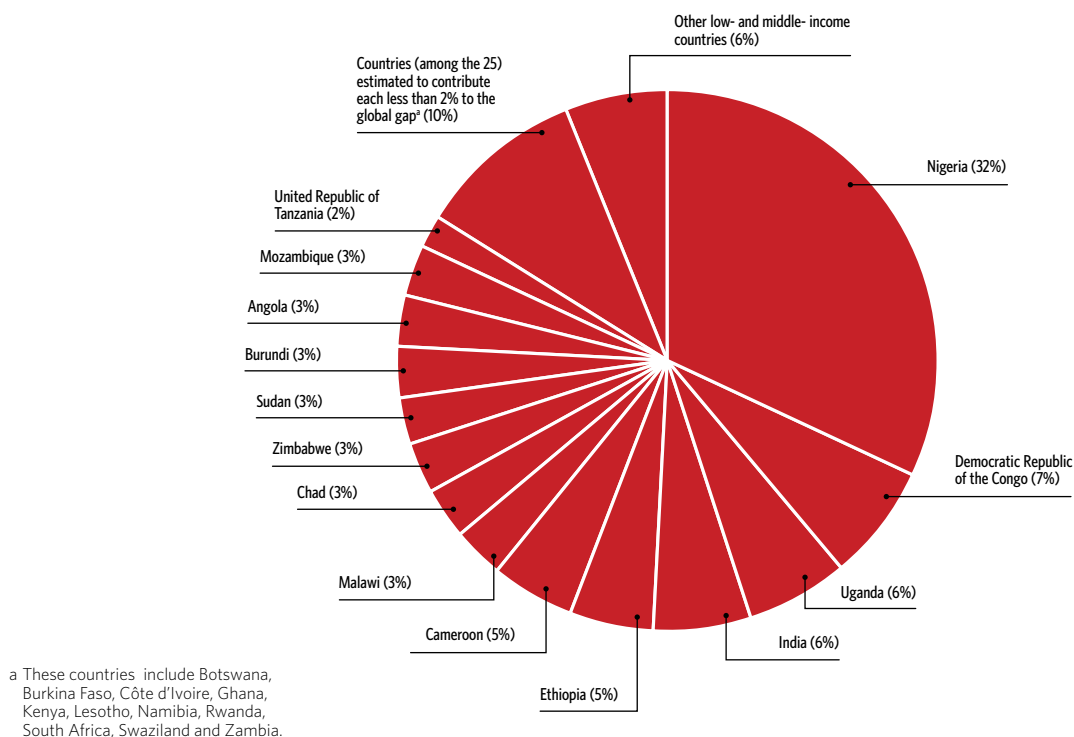
In 11 of the 25 countries, less than 50% of pregnant women in need received any antiretroviral intervention to prevent HIV transmission from mother to child. However, four countries – Botswana, Namibia, Swaziland and South Africa (the country with the largest number of pregnant women living with HIV) – have already reached the target set at the United Nations General Assembly Special Session (UNGASS) on HIV/AIDS of providing 80% of pregnant women in need with antiretrovirals for reducing the risk of mother-to-child transmission of HIV. In addition, 11 other low- and middle-income countries (Argentina, Belarus, Brazil, Ecuador, Guyana, Jamaica, Malaysia, Romania, Russian Federation, Thailand and Ukraine)<sup>1</sup> have also reached the 80% coverage

target of antiretrovirals for prevention of mother-to-child transmission (see Annex 5 for more country details).

These 25 countries with higher needs also collectively contributed to about 94% of the global gap in reaching the UNGASS target of 80% coverage with antiretrovirals to reduce mother-to-child transmission. The global gap is the difference between the current number of pregnant women in need who have access to antiretrovirals for preventing mother-to-child transmission and the estimated number who must be reached to achieve the UNGASS goal. Figure 5.4 shows the percentage distribution of the contribution of each country to closing this global gap. Four countries – Nigeria, Democratic Republic of Congo, Ethiopia and India – account for half of the gap (50%), with Nigeria alone accounting for almost one third (32%).

<sup>1</sup> Countries with at least 100 pregnant women in need of antiretroviral drugs for preventing mother-to-child-transmission.

**Fig. 5.4. Contribution of the 25 countries with the largest number of women needing antiretrovirals for preventing mother-to-child transmission of HIV to the global gap in reaching 80% of those in need, 2009**



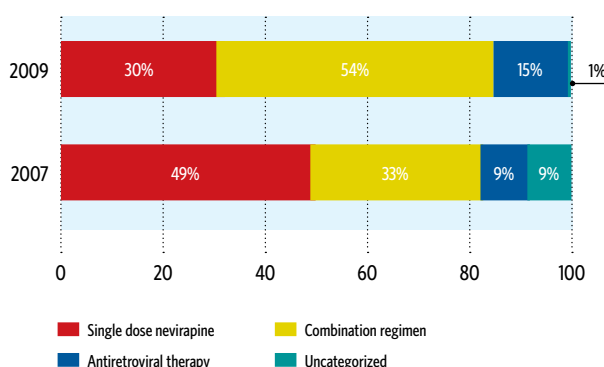
### Assessing the eligibility of pregnant women living with HIV to receive antiretroviral therapy for their own health

When a pregnant woman is identified as living with HIV, the clinical stage of her 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 should only receive antiretroviral prophylaxis to prevent mother-to-child transmission (Box 5.3). In 2009, an estimated 51% 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, up from 34% in 2008. About 37% were assessed through CD4 count, up from 24% reported in 2008. In the 49 countries reporting data in both 2008 and 2009, the proportion of pregnant women identified with HIV assessed for ART eligibility by CD4 cell count increased from 14% to 31%.

### Antiretroviral regimens

The efficacy of antiretrovirals in preventing mother-to-child transmission of HIV varies with the type of drug combination used and the duration of the regimen. It is recommended that pregnant women living with HIV and their exposed infants receive more efficacious regimens as opposed to single-dose nevirapine, and that all women needing antiretroviral therapy for their own health should receive it.

**Fig. 5.5. Percentage distribution of various antiretroviral regimens provided to pregnant women in low- and middle-income countries in 2007 (59 countries) and 2009 (86 countries)**



With the new 2010 guidelines, antiretroviral prophylaxis is now recommended during breastfeeding (Box 5.4) in settings where breastfeeding is judged to be the safest infant-feeding option. In these countries, special efforts are needed to monitor antiretroviral coverage during the breastfeeding period.

Analysing the global distribution of various antiretroviral regimens used for preventing mother-to-child transmission

### Box 5.4. Infant-feeding in the context of HIV (15)

The 2010 WHO revised guidelines on HIV and infant-feeding build on the updated recommendations on antiretroviral therapy for HIV infection in adults, adolescents and children, and the use of antiretrovirals for treating pregnant women and preventing HIV infection in infants. While the guidelines reinforce the principles and recommendations established in earlier versions such as feeding of infants already known to be HIV-infected and protecting and promoting optimal infant-feeding practices in the general population, two major revisions were adopted.

National health authorities should decide whether health services will principally counsel and support mothers known to be HIV-infected to either (i) breastfeed and receive antiretroviral interventions or (ii) avoid all breastfeeding. The choice between these strategies should be governed by which is most likely to result in HIV-free survival of HIV-exposed infants attending public health facilities. National authorities should make their decision based on national epidemiological trends, the state of coverage of prevention of mother-to-child transmission and antiretroviral therapy services, and the main causes of maternal and child undernutrition and mortality. This is a marked change from other approaches whereby health workers are expected to counsel HIV-infected pregnant women and mothers, and to individually determine which infant-feeding practice would be most appropriate for their particular circumstance. The strength of the evidence that antiretroviral interventions significantly reduce the risk of HIV transmission through breast milk and thereby improve the chance of HIV-exposed infants surviving while remaining HIV-uninfected has changed the way in which public health policy and approaches can be considered.

In addition, in settings where national authorities decide to promote breastfeeding while providing antiretroviral interventions, WHO strongly recommends that mothers known to be HIV-infected should exclusively breastfeed their infants for the first six months and continue to breastfeed up to 12 months while introducing complementary foods when the infant is six months old. Breastfeeding should then stop only when a nutritionally adequate and safe diet without breast milk can be provided. This approach enables infants of mothers living with HIV to benefit from the protection that breastfeeding offers against the serious morbidity and mortality normally associated with the use of commercial formula milk in unsafe settings, in spite of their low risk for HIV transmission. It also enables public health systems to better plan and provide services, since recommendations will be similar at the national level.

Many countries, especially those in Eastern and Southern Africa, have already decided to recommend breastfeeding of infants to HIV-infected mothers and to provide an antiretroviral intervention to prevent HIV transmission. International partners have been working with national teams to consider how these decisions should be implemented at the district health facility level and to project costs for future budgets.



remains difficult as many countries still do not possess fully functional national monitoring mechanisms to accurately report drug regimens used by HIV-positive pregnant women.

In 2009, 86 out of 120 (72%) countries reporting on the number of pregnant women living with HIV who received antiretrovirals to prevent mother-to-child transmission were able to provide disaggregated data on the distribution of antiretroviral regimens given to pregnant women. These countries covered around 70% of the total number of women receiving antiretrovirals to reduce the risk of mother-to-child transmission in 2009.

In 2007, 59 countries reported disaggregated data on antiretroviral regimens provided to HIV-positive pregnant women. In 2008, the number of countries reporting disaggregated regimen categories was 96, but one third of antiretroviral regimens provided to women living with HIV were reported as uncategorized. In 2009, the proportion of uncategorized regimens decreased substantially. Thus, comparisons focus on 2007 and 2009 data, years in which the proportion of uncategorized regimens was lowest.

The proportion of women receiving more efficacious regimens and antiretroviral therapy for their own health increased between 2007 and 2009 (Figure 5.5). In this period, the percentage of women receiving single-dose nevirapine decreased from 49% to 30%, whereas the percentage of women receiving more efficacious regimens increased from 33% to 54%, and the proportion of women receiving antiretroviral therapy for their own health increased from 9% to 15%.

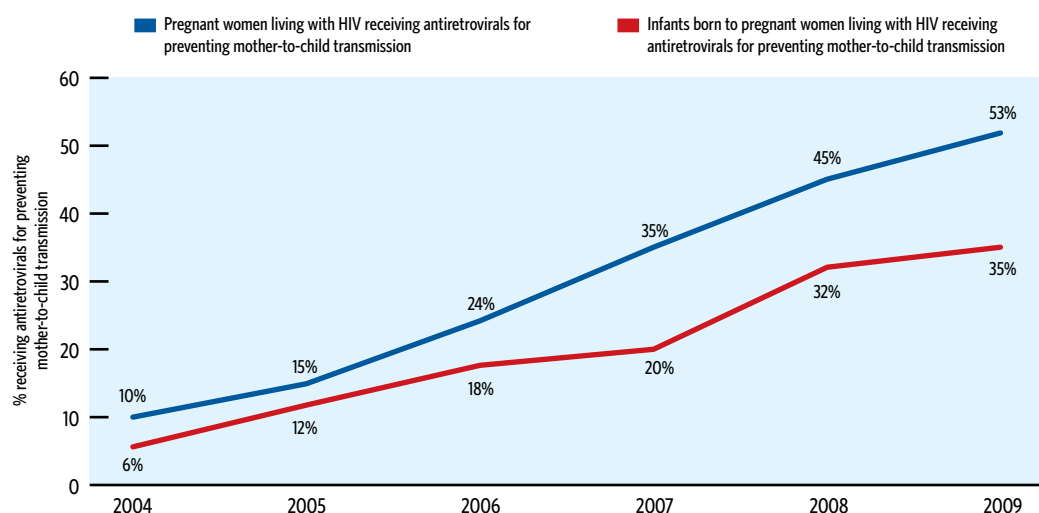
Currently there is no global estimate of the proportion of HIV-positive pregnant women needing antiretroviral therapy for their own health; however a recent analysis of around 6000 women attending clinics in 9 countries<sup>(13)</sup> found 48% of women eligible for ART based on new WHO guidelines, and other studies have reported around 40%<sup>(14)</sup> and even 68%<sup>(16)</sup> of women as eligible, suggesting that the majority of women in need are not accessing antiretroviral therapy.

### 5.1.3. Antiretroviral prophylaxis for infants born to mothers living with HIV

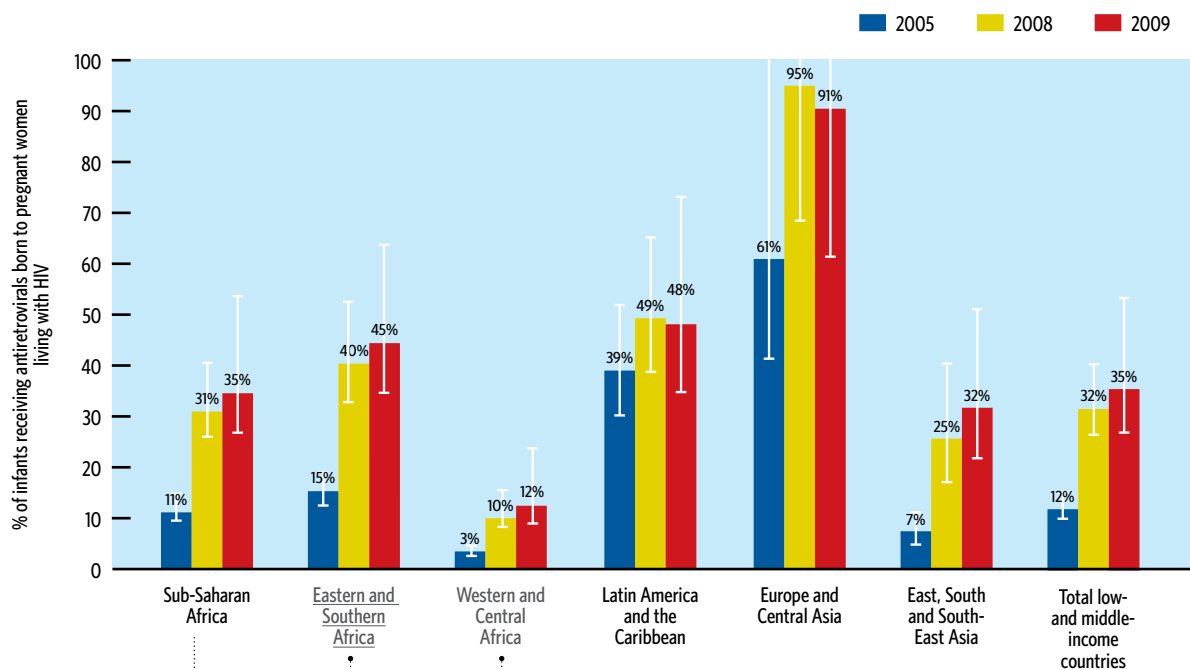
The 2010 WHO guidelines recommend that all infants born to HIV-positive mothers should receive antiretroviral prophylaxis<sup>(1)</sup>. Coverage slightly increased between 2008 and 2009, from 32% [26–53%] to 35% [26–53%] of the estimated 1.4 million infants born to mothers living with HIV. However, the gap between the uptake of infant and maternal antiretroviral regimens seems to have widened further (Figure 5.6).

Coverage rates varied widely between regions but remained relatively steady in 2009 (Figure 5.7). About a third of infants in sub-Saharan Africa were reached with antiretroviral prophylaxis (31% [26–40%] in 2008 and 35% [26–54%] in 2009). In Eastern and Southern Africa, 45% [35–64%] of infants received antiretroviral prophylaxis in 2009, while in West and Central Africa, only 12% [8–23%] did. In Latin America, almost half of children (48% [35–74%]) were given antiretroviral prophylaxis. In East, South, and South-East Asia, the region with the highest increase in coverage, it increased from 25% [17–40%] in 2008 to 32% [22–51%] in 2009.

**Fig. 5.6. Percentage of pregnant women living with HIV and infants born to them who received antiretrovirals for preventing mother-to-child transmission, 2004–2009**



**Fig. 5.7. Percentage of infants born to pregnant women living with HIV who received antiretroviral prophylaxis for preventing mother-to-child transmission, 2005, 2008 and 2009**



I The bar indicates the uncertainty range around the estimate.

## 5.2. Treatment, care and support for women living with HIV and their children

If a mother and her infant receive appropriate interventions for preventing mother-to-child transmission of HIV, including more efficacious antiretroviral regimens, children, even when carrying the virus, can live into adulthood if they can access treatment early (17). Although HIV care and treatment services for HIV-exposed and -infected children are rapidly expanding in resource-limited settings, they are still inadequate and relatively fewer treatment services are available than those for adults. Of the 1 270 000 [830 000–1 700 000] children estimated to be in need of antiretroviral therapy, only 28% [21–43%] had access to treatment, versus 37% of adults [35–41%] (see Chapter 4 for more details).

### 5.2.1. Infant diagnosis

Early diagnosis of HIV infection is critical to ensure optimal treatment outcomes among children. If properly diagnosed and then provided with treatment early, HIV-infected infants and children can survive to adolescence and adulthood. While progress has been made in identifying infants who become HIV-infected through mother-to-child transmission, many children living with HIV still go undiagnosed. Without diagnosis and effective treatment, one third of HIV-positive

infants will die before the age of one year and almost half by their second year of life.

WHO's revised treatment guidelines recommend that infants, if HIV-exposed, should be tested by four to six weeks of age using virological assays and those found positive should be started on antiretroviral therapy immediately upon diagnosis (22).

Access to early infant diagnosis is very limited. In 2009, 6% [5–10%] of infants were reported to have been tested for HIV within the first two months of birth in low- and middle-income countries. However, the data may underestimate this coverage as only 54 countries reported data on this indicator in 2009, up from 41 in 2008. In those 54 countries, representing 43% of the total number of pregnant women living with HIV, around 85 800 infants, or 15% [10–28%] of the estimated number of infants born to pregnant women living with HIV were reported to have received early infant HIV testing.

Greater efforts are needed to scale up early testing of HIV-exposed infants. Priority actions should include building technical competencies, developing laboratory capacity, and strengthening systems for transporting blood specimens and results, as well as scaling up routine offers of testing

### Box 5.5. Integrating HIV prevention, care and treatment interventions within maternal and child health services

Maternal and child health services, in addition to sexual and reproductive health programmes, provide critical platforms and infrastructure for effective and sustainable delivery of HIV interventions. The WHO IMAI/IMPAC (Integrated Management of Adult and Adolescent Illness/Integrated management of Pregnancy and Childbirth) clinical course for integrated prevention of mother-to-child transmission services guides health workers to integrate HIV prevention, care and treatment into maternal and child health services. In 2009, international trainings were organized for health workers from more than 30 countries.

A number of countries have decentralized HIV prevention, care and treatment to primary health centres (18,19). South Africa, for example, is currently decentralizing HIV prevention, care and antiretroviral therapy services to primary health centres, with nurses initiating and managing antiretroviral therapy, with a mentoring and referral back-up from the district hospital team.

Zambia is also moving towards decentralized and integrated service delivery. In order to improve service uptake, the prevention of mother-to-child transmission partnership of Zambia employed multiple strategies, including integration of services for prevention of mother-to-child transmission into outreach sites and maternal and child health public facilities. Other strategies include task-shifting to involve lay providers and people living with HIV in service delivery, training health workers to provide comprehensive prevention of mother-to-child transmission services, improving referral for CD4 counts, and promoting partner involvement (20). The integration of antiretroviral therapy into existing public sector maternal and child health clinics in Lusaka district doubled the proportion of eligible women initiating antiretroviral therapy (21).

in generalized epidemics to more sites where mothers and children access care, and improving cross-service referrals.

In addition, it is critical to reduce the rate of loss to follow up among HIV-exposed infants in the postnatal period, as many infants, even when tested, still do not receive their results or are ever enrolled on antiretroviral therapy when they test positive. Substantial investments must be made in health clinics and communities to improve data collection and service delivery along the continuum of care so that children who test positive are enrolled on treatment in a timely fashion. There is also a need to better understand and address the challenges faced by mothers to continue seeking health services for their infants, as well as for themselves.

#### 5.2.2. Co-trimoxazole prophylaxis in HIV-exposed children

An essential component of the care and treatment package for children living with HIV is the provision of co-trimoxazole prophylaxis, 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. The use of co-trimoxazole prophylaxis increases the chances of survival of HIV-infected infants until antiretroviral therapy can be initiated. This is especially important in resource-constrained settings where there is limited access to effective services for prevention of mother-to-child transmission and antiretroviral therapy. WHO guidelines released in 2006 recommend that all HIV-exposed children born to HIV-positive mothers start co-trimoxazole prophylaxis between four and six weeks of age and continue until HIV infection has been excluded and the infant is no longer at risk of acquiring HIV through breastfeeding (23).

In 2009, 72 countries provided information on the number of infants born to pregnant women with HIV initiated on co-trimoxazole prophylaxis by two months of age, up from 67 countries in 2008. Even though several countries have developed and put in place policies to support access to co-trimoxazole prophylaxis for infants and children, only 14% [10–20%] of infants in need received co-trimoxazole in 2009, compared with 8% [6–10%] in 2008. Coverage in sub-Saharan Africa continued to expand, particularly in Eastern and Southern Africa, the subregion most affected by HIV, where coverage doubled from 9% [7–11%] in 2008 to 18% [14–26%] in 2009.

Forty-three countries reported data on co-trimoxazole coverage in both 2008 and 2009. In these countries, which accounted for about 50% of all HIV-positive pregnant women needing antiretrovirals in low- and middle-income countries, the reported proportion of infants receiving co-trimoxazole within two months of birth increased slightly to 18% in 2009 from 15% in 2008.

Expanding access to co-trimoxazole prophylaxis requires a set of interrelated interventions, including the development of stronger linkages between HIV testing and treatment, and the establishment of mechanisms to identify and follow up HIV-exposed infants at and after birth. In addition, health workers must be trained to consider HIV infection in infants at birth and at all clinic or health encounters, and delivery must be decentralized to the lowest appropriate, feasible and effective level of the health-care system. A consistent supply of co-trimoxazole must be available for infants, and monitoring and evaluation systems need to be strengthened to support the provision of co-trimoxazole prophylaxis to HIV-exposed or HIV-infected children (23).

### 5.2.3. Antiretroviral therapy for children

While the best strategy for preventing paediatric HIV-related mortality is the expansion of effective programmes for prevention of mother-to-child transmission to prevent new infant infections, many HIV-related deaths among infected children could be avoided through early HIV diagnosis and timely provision of effective care and treatment. In order to maximize the survival and well-being of children living with HIV, in 2010 WHO released updated treatment guidelines (24), markedly altering the recommended set of criteria for initiation of antiretroviral therapy in children (Box 5.6).

As of December 2009, data reported by countries show that almost 356 400 children were receiving antiretroviral therapy in low- and middle-income countries, up from 275 300 in 2008 and 75 000 in 2005, an increase of almost 30% in the past year. These children represent an estimated 28% [21–43%] of all children less than 15 years estimated to be in need of antiretroviral therapy in low- and middle-income countries, up from 22% [16–34%] in 2008 and 7% [5–11%] in 2005, using the new treatment criteria retrospectively.

Between 2008 and 2009, all regions experienced increases in the number of children in need of antiretroviral therapy and receiving it. Regional coverage varied, ranging from 6% [4–11%] in the Middle East and North Africa to 68% [52–87%] in Latin America (Figure 5.8).

In sub-Saharan Africa, the region with the highest burden of children in need, 296 000 (26% [19–42%]) of children were receiving antiretroviral therapy as of December 2009, up from 224 100 (20% [15–32%]) in 2008. Eastern and

Southern Africa had the highest number of children receiving antiretroviral therapy at 254 900 (32% [25–48%]), up from 194 600 (25% [19–37%]) in 2008. In Swaziland, Namibia and Botswana, coverage among children was 70% or higher. In West and Central Africa, 41 000 (12% [8–22%]) children were on antiretroviral therapy, up from 29 500 (8% [6–16%]) in 2008. Only Benin and Gambia reached over 40% of children in need with antiretroviral therapy.

Latin America and the Caribbean reported 18 600 (58% [45–80%]) children on antiretroviral therapy in 2009, up from 17 300 (54% [42–76%]) in 2008. Differences were observed between the Latin America and the Caribbean subregions. In Latin America, the reported number of children accessing antiretroviral therapy was 16 300 (68% [52–87%]), up from 15 400 (65% [50–84%]) in 2008. In the Caribbean, coverage increased, from 2000 (24% [16–48%]) in 2008 to 2400 (29% [19–57%]) in 2009.

East, South and South-East Asia reported 36 500 (44% [27–59%]) children on antiretroviral therapy in 2009, up from 29 300 (37% [21–50%]) in 2008. Thailand, Cambodia and Malaysia reached coverage rates of 80% or more.

Between 2008 and 2009, modest improvements were achieved in 25 high-burden countries accounting for 91% of children in need of antiretroviral therapy (Figure 5.9). The lowest coverage was found in Sudan at 2.2%, up from 1.8% in 2008, while the highest coverage was seen in Botswana at 90%, up from 78% a year earlier. The largest increases were observed in Cote d'Ivoire, Ghana, Zimbabwe and Angola, where the number of children receiving antiretroviral therapy rose by over 60% between 2008 and 2009.

#### Box 5.6. 2010 WHO revised paediatric antiretroviral therapy guidelines

In July 2010, WHO released new paediatric antiretroviral therapy guidelines, which are now harmonized with the treatment guidelines adopted for adults, pregnant women, and prevention of mother-to-child transmission. The major changes introduced in this version relate to the recommended criteria for treatment initiation. Now, it is recommended that all HIV-positive children less than 24 months of age be started on antiretroviral therapy. Overall recommendations on when to start antiretroviral therapy in infants and children are as follows:

1. for all HIV-infected infants diagnosed in the first year of life, irrespective of CD4 count or WHO clinical stage;
2. for all HIV-infected children less than two years of age irrespective of CD4 count or WHO clinical stage;
3. for all HIV-infected children between 24 and 59 months of age with a CD4 count of  $M750 \text{ cells/mm}^3$  or %CD4+  $M25\%$ , whichever is lower, irrespective of WHO clinical stage;
4. for all HIV-infected children more than 5 years of age with a CD4 count of  $M350 \text{ cells/mm}^3$  (as in adults), irrespective of WHO clinical stage;
5. for all HIV-infected children in WHO HIV clinical stages 3 and 4, irrespective of CD4 count;
6. for any child less than 18 months of age who has been given a presumptive clinical diagnosis of HIV infection.

In addition to new criteria for treatment initiation, the updated treatment guidelines include recommendations and guidance on (i) earlier, more accurate diagnosis of HIV, (ii) simplified antiretroviral drug regimens for use in first-line and second-line therapy, (iii) expected signs and symptoms in the first six months of therapy, (iv) promoting attention to nutrition for children on antiretroviral therapy, (v) more strategic monitoring for the efficacy and toxicity of antiretrovirals, and (vi) strengthening adherence. The new guidelines are part of WHO's commitment to achieve universal access to the prevention, care and treatment of HIV infection in infants and children.

**Table 5.4.** Estimated number of children living with HIV younger than 15 years receiving antiretroviral therapy, children needing antiretroviral therapy and percentage coverage in low- and middle-income countries according to region, December 2009<sup>a</sup>

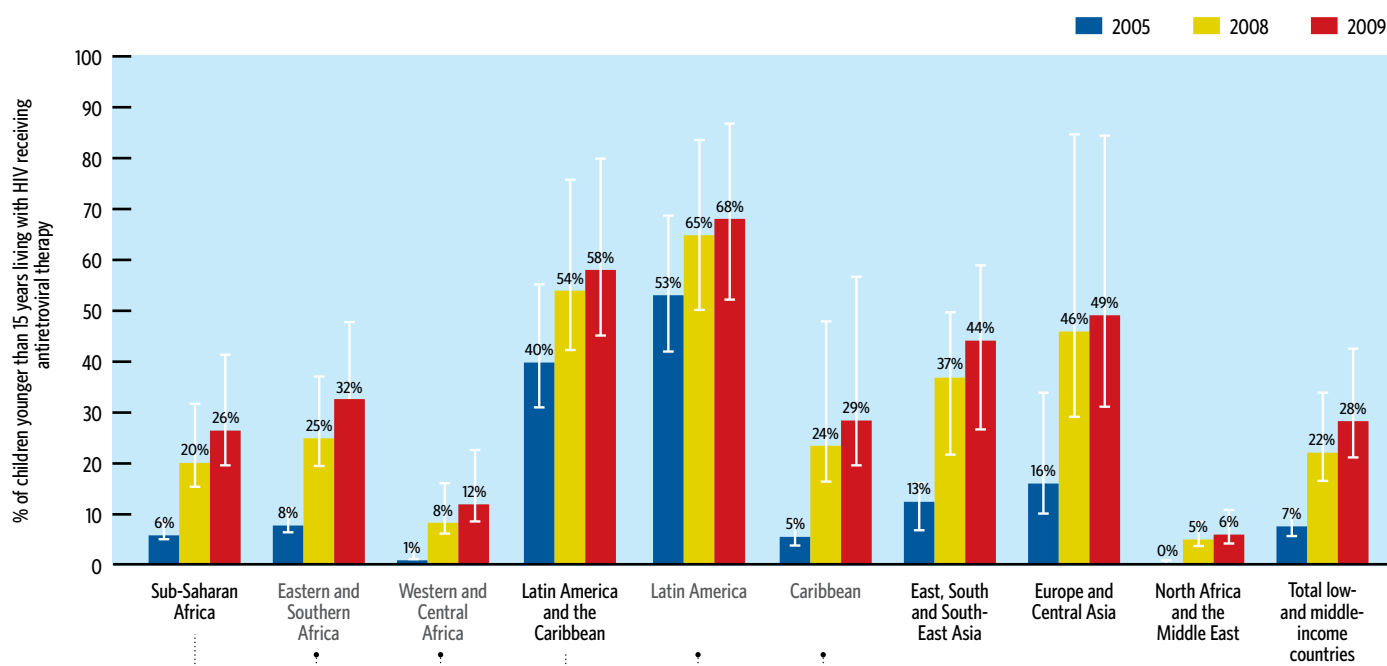
Geographical region	Reported number of children (0-14 years) living with HIV receiving antiretroviral therapy, December 2009	Estimated number of children living with HIV needing antiretroviral therapy, 2009 [range] <sup>a</sup>	Antiretroviral therapy coverage among children living with HIV, December 2009 [range] <sup>b</sup>
Sub-Saharan Africa	296 000	1 140 000 [710 000-1 500 000]	26% [19-42%]
Eastern and Southern Africa	254 900	790 000 [530 000-1 000 000]	32% [25-48%]
Western and Central Africa	41 000	350 000 [180 000- 510 000]	12% [8-22%]
Latin America and the Caribbean	18 600	32 200 [23 000-42 000]	58% [45-80%]
Latin America	16 300	24 100 [19 000-31 000]	68% [52-87%]
Caribbean	2 400	8 100 [4 100-12 000]	29% [19-57%]
East, South and South-East Asia	36 500	83 400 [61 000-140 000]	44% [27-59%]
Europe and Central Asia	4 800	9 700 [5 700-15 000]	49% [31-58%]
North Africa and the Middle East	560	10 000 [5 200-15 000]	6% [4-11%]
<b>All low and middle income</b>	<b>356 400</b>	<b>1 270 000 [830 000-1 700 000]</b>	<b>28% [21-43%]</b>

Note: some numbers do not add up to rounding.

a For an explanation of the methods used, see the explanatory notes to Annex 4.

b The coverage estimate is based on the estimated unrounded number of children receiving and needing antiretroviral therapy.

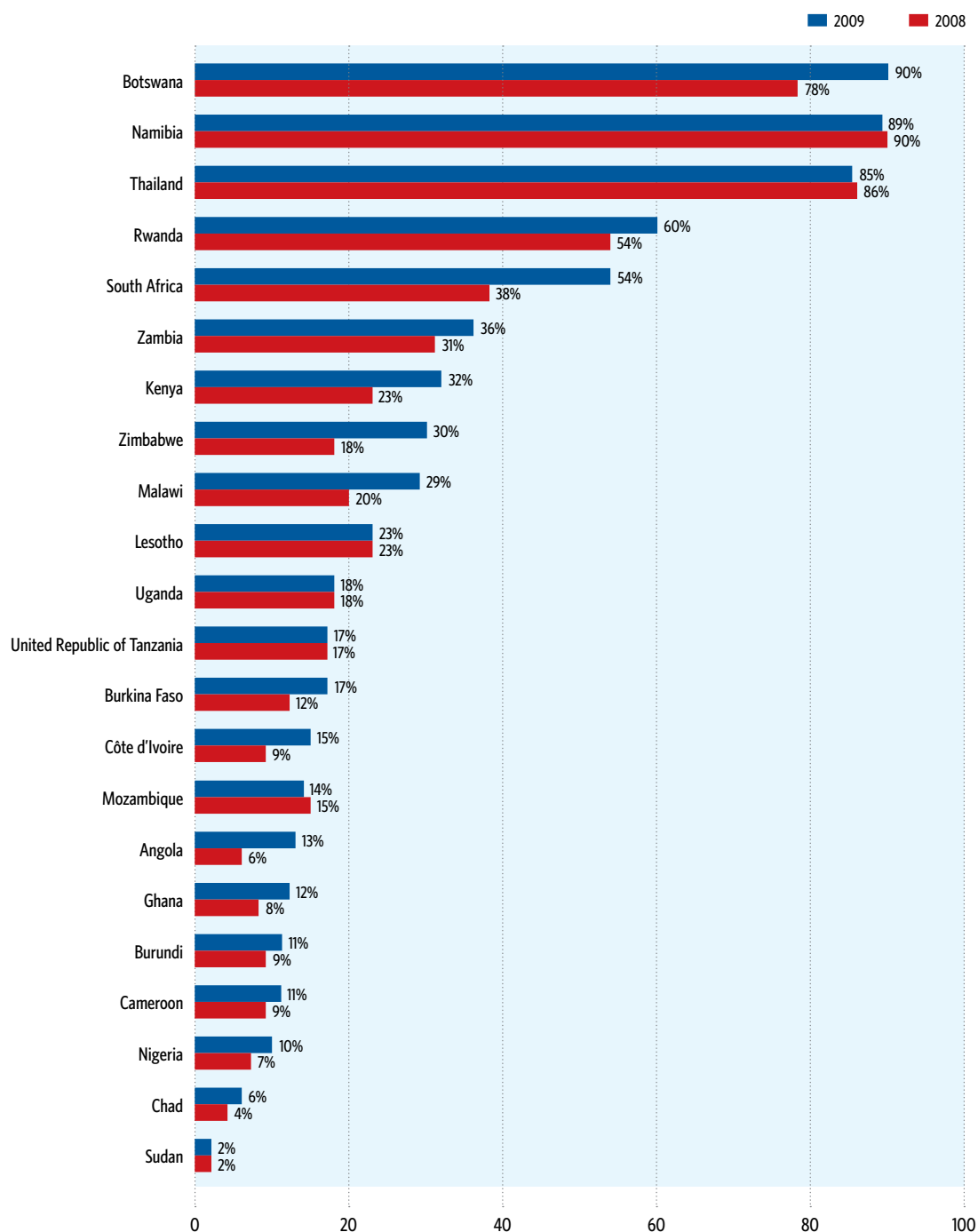
**Fig. 5.8.** Percentage of children living with HIV receiving antiretroviral therapy in low- and middle-income countries, 2005, 2008 and 2009



I The bar indicates the uncertainty range around the estimate.

Note: Data have been retroactively revised according to the revised methodology (see Box 5.7).

**Fig. 5.9.** Percentage of children living with HIV receiving antiretroviral therapy in 25 high-burden countries, 2008–2009<sup>a</sup>



Note: Data have been retroactively revised according to the revised methodology (see Box 5.6).

a The Democratic Republic of the Congo, Ethiopia and India, belong to the list of 25 countries with the highest need for antiretroviral therapy among children living with HIV, but no coverage can be provided at this stage as their need estimates are currently being reviewed.



### Box 5.7. Improving need and coverage estimates of antiretroviral therapy among children

The estimated proportion of children (ages 0-14 years) who received antiretroviral therapy in 2009 is 28%, lower than the estimated 2008 coverage (38%) published previously. This change in estimated coverage is not related to a decrease in the number of children in need of antiretroviral therapy receiving treatment, which actually increased, but is due to changes both in the estimation methodology and in the criteria for treatment eligibility that resulted in a substantial increase in the estimated number of children in need of antiretroviral therapy.

The definition of paediatric antiretroviral therapy coverage is the number of children on antiretroviral therapy collected from patient monitoring systems divided by the number of children estimated to be in need of treatment calculated using Spectrum. Spectrum is a computer package which estimates the impact of the HIV epidemic. Based on national HIV prevalence and incidence data, as well as the demographic characteristics of a country, Spectrum can estimate the number of children in need of antiretroviral therapy, among other variables. In December 2009, the UNAIDS Reference Group on HIV Estimates, Modelling and Projections convened a meeting to update and review the assumptions used in Spectrum to estimate the number of children living with HIV and the number of children in need of antiretroviral therapy (25).

Upon a review of the literature and available evidence, three key changes were made to the assumptions used in Spectrum to estimate paediatric needs:

*1. More accurate survival curves:* recent research revised the survival parameters using data from 12 sub-Saharan Africa sites, which included information on the timing of infection (26). Timing of infection is important because children infected during pregnancy and birth have considerably shorter survival times than children infected during breastfeeding (27). Based on these observations, two new survival curves were estimated, replicating the expected survival of children infected perinatally and those infected through breastfeeding. These revised survival curves point to a longer life expectancy than those previously in use, thereby increasing the number of children living with HIV in need of treatment.

*2. Improvements in determining progression from infection to treatment need:* parameters used in Spectrum related to disease progression patterns among infants were originally derived from the HIV Paediatric Prognostic Markers Collaborative Study (HPPMCS), which took place predominantly in high-income countries before antiretroviral therapy was available. New, improved information on disease progression marginally increased the estimated number of children in need of antiretroviral therapy (28).

*3. Revised WHO treatment guidelines for infants and children (Box 5.6).* The default settings in Spectrum have been updated to reflect the anticipated changes in treatment eligibility criteria included in the revised guidelines.

In sum, the use of regimen-specific HIV transmission rates, identification and updating of different survival curves according to the mode of infection, and the change in the eligibility criteria for antiretroviral therapy initiation in children have substantially increased the estimated number of children in need of antiretroviral therapy, consequently affecting antiretroviral therapy coverage rates. In light of these changes, 2009 coverage rates should not be compared with coverage figures published in previous versions of this annual progress report. Nevertheless, all estimates of paediatric antiretroviral therapy need for previous years have been back-calculated for this year's report.

At the end of 2009, 14 countries had reached more than 80% coverage of antiretroviral therapy for children: Argentina, Botswana, Brazil, Cambodia, Guyana, Jamaica, Kazakhstan, Malaysia, Namibia, Panama, Paraguay, Thailand, Ukraine, Uruguay<sup>1</sup> (see Annex 5).

Although progress is being made in expanding children's access to antiretroviral therapy, less than one third of children in need received it in 2009. With the new treatment guidelines, it is estimated that more children will be placed on therapy, and additional financial resources will be needed to cover the associated costs, and the requisite drug regimens will be more complex to implement. It is also essential that countries devise and reinforce advocacy plans and policies to ensure that stock-outs do not occur. Moreover, scaling up services will require large-scale planning, coordination, training of health-care workers and provision of information/

education materials. Adequate planning and management at all levels are also critical to ensure that these changes are appropriately incorporated into national policy and practice.

### 5.3. Outcomes and impact of interventions for prevention of mother-to-child transmission of HIV

Most countries are currently scaling up services and interventions to prevent mother-to-child transmission of HIV. Assessing the outcome and impact of programmes for the prevention of mother-to-child transmission on paediatric HIV infections averted, maternal health and survival, and child health and survival is essential for programme management and for monitoring progress towards MDGs 4, 5 and 6. However, systematically evaluating prevention of mother-to-child transmission programmes at the national level remains difficult. While the efficacy of various interventions to reduce the risk of mother-to-child

<sup>1</sup> Countries with at least an estimated 100 children in need of antiretroviral therapy.

transmission has been demonstrated in research settings, their national impact when operationalized within various health system constraints and implemented in different contexts under a range of service delivery scenarios remains largely undocumented. HIV-positive pregnant women can be provided with antiretrovirals to reduce the risk of mother-to-child transmission but the duration of and adherence to the antiretrovirals provided is often unknown nationally. Loss to follow up also negatively affects the accurate tracking of maternal and child outcomes at the national level. Improved methods to measure child mortality associated with HIV are needed. WHO, UNICEF and partners are working on guidance to measure the impact of prevention of mother-to-child transmission programmes which will hopefully facilitate better assessments of achieved impact in future reports.

Global assessments on the impact of prevention of mother-to-child transmission programmes are based on limited data and models assuming transmission efficacy parameters from clinical trials and limited programme settings, which may overestimate the actual impact and achievement of these programmes and international goals. Using the 2009 distribution of antiretroviral regimens, and a set of assumptions used to project the impact of prevention of mother-to-child transmission (29), in low- and middle-income countries, mother-to-child transmission has declined from approximately 34%, assuming that no interventions were provided to prevent mother-to-child transmission, to 21% (assuming a median breastfeeding period of 12 months). If the new WHO guidelines are implemented for 90% of women, and assuming the same breastfeeding practices, it would be possible to achieve around a 10% transmission rate in sub-Saharan Africa.

WHO, UNICEF, UNAIDS and partners are also planning a multistakeholder consultation on key issues to move towards eliminating mother-to-child transmission by 2015. This meeting will discuss, among other topics, indicators, coverage targets and technical definitions to measure and monitor progress toward elimination. Achieving this goal will ultimately require interventions to be scaled up to very high coverage levels and full implementation of the new guidelines on antiretrovirals to reduce mother-to-child transmission. Joint efforts to work closely and strategically with maternal and child health programmes will also be critical to optimize synergies to impact on MDGs 4, 5, 6.

#### 5.4. Looking ahead

Substantial progress has been made in the past decade in preventing transmission of HIV from mother to child, and providing paediatric treatment and care. However, a number of programmatic and policy challenges must be addressed

if elimination of mother-to-child transmission and universal access to care and treatment for mothers and their children are to be achieved in low- and middle-income countries.

Further integration and improvement of linkages and referrals between HIV and maternal, newborn and child health services are essential to increase coverage levels and enhance the quality of interventions for prevention of mother-to-child transmission. This entails developing appropriate policies, equipping laboratories, providing both clinical and immunological assessment for HIV, and initiating antiretroviral therapy at services currently not providing these HIV interventions. In addition, it is also necessary to implement infant-feeding counselling, postpartum follow up and antiretrovirals to prevent transmission during breastfeeding, as well as follow up on HIV-exposed infants and their mothers with an integrated package of care and treatment. A linked approach based on a strong referral systems among health facilities, service delivery points and communities will be necessary to achieve universal coverage of prevention of mother-to-child transmission.

Over 80% of HIV transmissions occur in women with CD4 counts below 350 cells/mm<sup>3</sup>. Programmes must incorporate without delay CD4 screening as an integral part of prevention of mother-to-child transmission services. Additional efforts are needed (i) to allow CD4 screening to be performed at antenatal care services to ensure rapid identification of need and immediate initiation of treatment or follow up, and (ii) to replace single-dose nevirapine with more efficacious antiretroviral regimens for prevention of mother-to-child transmission, which must be readily available at all times. In order to ensure appropriate results, however, it is critical to monitor adherence to antiretrovirals during the breastfeeding period.

Eliminating mother-to-child transmission also requires the development of strategies to reach out to every woman and child, and address the specific needs of women, countering stigma and discrimination and the risk of violence in particular. Attention must be paid to ensuring that services are geographically located close to communities and clients in order to facilitate access and maximize coverage. Accelerating scale-up also requires a decentralized approach, in which national programmes transfer the planning and implementation of services to subnational levels and establish clear mechanisms for coordination, financing and accountability. By bringing management and decision-making closer to the end-users, decentralization considerably strengthens programmatic responsiveness and ensures that gaps in service delivery can more easily be identified and addressed in time.

Where coverage of interventions is limited, it is essential to develop effective mechanisms to engage communities as


partners in service delivery and establish better links between health facilities and local communities. It is also necessary to address socioeconomic factors that keep service utilization low, including financial barriers and user fees.

Early infant diagnosis must be scaled up and treatment initiated immediately during the postnatal period if universal access to paediatric treatment and care is to be achieved. Providing HIV services in maternal and child health clinics – the most common places where women and young children are seen – increases the likelihood that HIV-exposed and -infected children will receive both the HIV-related care and the routine child-survival interventions that are essential to their health.

Stronger follow-up systems are needed to monitor and ensure that identified needs are actually being met throughout the continuum of care. Even in places where early infant diagnosis is more widely available, many infants testing HIV-positive are not being started on antiretroviral therapy. Similarly, a considerable proportion of pregnant

women identified as being HIV-positive are also lost to follow up during the “cascade” of interventions required for effective prevention of HIV transmission to their infants.

A further challenge is to adequately implement WHO’s 2010 guidelines for treating pregnant women and preventing HIV infection in infants, especially in countries with weak health systems (1). Partners must step up efforts to assist countries in identifying the most appropriate option for antiretrovirals, taking into account local circumstances and preferences.

Finally, countries need to be supported to improve the quality, scope, completeness and reliability of data collected. This is essential for prevention of mother-to-child transmission, which incorporates a complex set of interlinked services that can be delivered at different entry points and facilities. Monitoring progress towards elimination of mother-to-child transmission and universal access needs the implementation of a robust information system that is able to identify gaps in service delivery and respond adequately. 

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## 6. BEYOND 2010

In 2009, low- and middle-income countries continued to make considerable progress in scaling up access to key health sector interventions, including HIV testing and counselling, antiretroviral therapy and prevention of mother-to-child transmission of HIV. An additional 1.2 million people started receiving life-saving antiretroviral therapy in 2009, bringing the total number of people on antiretroviral therapy in low- and middle-income countries to 5.25 million. In 2009, 53% of HIV-infected pregnant women received antiretroviral drugs to reduce the risk of HIV transmission to their children. Important new evidence has also emerged on the secondary benefits that antiretroviral therapy has in preventing HIV transmission. The combination of prevention, treatment and care interventions is already benefiting adults and children worldwide, as millions of lives have been saved and new infections averted.

Yet, a large proportion of people in need still do not have access to the required interventions. Although important progress has been made in preventing new HIV infections, 2.7 million people were newly infected in 2008. Despite a rapid increase in the uptake of HIV testing, a majority of people living with HIV do not know their status. As a result, most of them initiate therapy at a late stage of the disease. Coverage of prevention interventions among groups at higher risk for HIV infection remains less than 50% in many countries. Less than three months away from December 2010, universal access is a commitment not yet fulfilled in most low- and middle-income countries.

Paradoxically, while the global economic crisis of 2008–2009 has put the sustainability of many HIV programmes at risk, there has never been so much evidence of the positive and growing impact of HIV-related investments in cutting new infections, reducing deaths and ensuring that people living with HIV enjoy healthy lives. Without sustained and strengthened financial and programmatic commitments, there is a significant danger that these achievements may be undone.

Addressing these challenges requires action along four main strategic directions: (i) expanding and optimizing the global HIV response, (ii) catalysing the impact of HIV programmes on other health outcomes, (iii) strengthening health systems for a sustainable and comprehensive response, and (iv) tackling the structural determinants of the response, including human rights violations.

### Doing more, more strategically

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First and foremost, the hard-won gains of the past decade must be protected and enhanced. As we contemplate the

road towards 2015, optimizing HIV prevention, treatment and care outcomes must be a key priority. Enhancing the value for money of the global HIV response entails improving the quality of service delivery in order to increase retention in care and in antiretroviral therapy programmes, reduce early death and loss to follow up, improve adherence and optimally prolong the use of effective, lower-cost first-line regimens. It calls for better understanding of the epidemic, including the behaviours that drive it and the impact of various prevention interventions. It implies strengthening linkages and referrals between programmes. It demands the implementation of flexible systems that identify and correct implementation bottlenecks. Donors and development partners also have a vital role to play in this drive towards greater efficiency and effectiveness by securing lower transaction costs, greater harmonization of efforts and alignment with country priorities.

At the same time, it is clear that additional investments are called for in order to expand coverage of essential interventions. Low- and middle-income countries must substantially ramp up their domestic budget allocations to fund HIV services. In 2001, at a conference convened by the Organization of African Unity in Abuja, Nigeria, African States committed to allocate at least 15% of their annual budgets to the health sector (1). While progress has been made, national allocations must still grow on average by over 50% in order to meet the Abuja targets (2). Concurrently, high-income countries must reaffirm their collective commitment to universal access, as agreed to by leaders of the G8 in Gleneagles in 2005 and reaffirmed at the United Nations General Assembly in 2006 (3). It is important that bilateral and multilateral funders, development agencies and technical support providers be adequately resourced to support country HIV scale-up plans. In particular, ensuring the successful completion of the third replenishment of the Global Fund to Fight AIDS, Tuberculosis and Malaria will be critical to protect and enhance current achievements.

### Leveraging the global HIV response for broader health and development gains

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The sustainability and effectiveness of the global HIV response depend as well on whether and how it supports improvements in other health and development outcomes. As Ban Ki-moon, United Nations' Secretary-General, recently stated, universal access to HIV prevention, treatment, care and support represents, above all, an essential bridge towards achieving the full range of Millennium Development Goals (MDGs) (4). Indeed, slowing the rate of new HIV infections and decreasing HIV-related morbidity and mortality is vital

to advancing almost every global development goal. In sub-Saharan Africa, for example, HIV and tuberculosis account for over 25% of deaths among women of reproductive age. (5) Providing adequate care and treatment is thus vital to the achievement of MDG 5, on improving maternal health. Ensuring that the next generation of children is born HIV-free through effective prevention of mother-to-child transmission supports MDG 4, on the reduction of child mortality. As the scale-up of antiretroviral therapy continues, its impact on reducing HIV transmission among adults and children will increase accordingly. Antiretroviral therapy has already contributed to lowering both the incidence of and mortality from tuberculosis (see Box 4.14).

Successful HIV responses also enable broader development gains. HIV prevention and treatment allow people to live healthy, productive lives, enhancing labour output and decreasing household vulnerability to poverty and hunger. They also prevent children from becoming orphans, thus protecting their livelihoods and the generational transmission of human capital. They help maintain an adequate pool of schoolteachers, the backbone of quality primary education. They empower women by highlighting gender inequalities and promoting sexual and reproductive health and rights. Without accelerated efforts, universal access to treatment, prevention and care will not be achieved in most countries and this, in turn, will decrease the impact of development investments in general.

### **Towards integrated and strengthened health systems**

HIV programmes have helped strengthen national health systems by attracting vital new financial resources for health, building systemic capacity and introducing chronic disease management approaches for the first time in many resource-limited settings. For example, the integration of antiretroviral therapy into existing public sector maternal and child health clinics in Lusaka, Zambia, has already doubled the proportion of eligible women initiating treatment (see Box 5.4). However, more must be done to ensure that investments in the HIV response translate into broad-based health systems strengthening.

Integrating services, strategies and plans can improve not only equity, access and coverage, but may also enhance the quality and efficiency of care. In order to realize these synergies, HIV programmes must be implemented within a primary health-care framework capable of providing integrated services that address multiple patient needs

through a continuum of care. These include services for maternal and child health, harm reduction, and the management of tuberculosis, sexually transmitted infections and viral hepatitis. It is necessary to deepen the involvement of communities in programme management and service provision in order to ensure the adequacy of interventions delivered and maximize outreach and uptake.

### **Addressing structural barriers through a rights-based approach**

A comprehensive approach, which pursues both equity and efficacy, demands that all people in need be capable of accessing prevention, treatment and care, including populations and groups at higher risk for HIV infection, such as sex workers, injecting drug users, men who have sex with men, transgender persons, prisoners and migrants. Yet, even in 2010, discrimination and harassment continue to often push these groups to live on the margins of society beyond the reach of health services. Greater attention must be paid to how the interplay between law and social values may impede access to essential health services and compromise the effectiveness of HIV programmes. The criminalization of HIV transmission, same-sex relations, sex work and drug use impedes effective interventions to prevent HIV transmission among these groups and makes them significantly less likely to seek life-saving treatment and care. Many of these issues are compounded further by poverty and social marginalization (6).

Addressing the needs of groups at higher risk for HIV infection requires strong actions to uphold their human rights and protect them from violence and exclusion. Focused efforts are needed to remove punitive laws and create enabling legal environments that address human rights violations currently blocking effective AIDS responses. The engagement of affected communities and civil society in policy design, programme management and service delivery remains an essential component of successful responses.

The agenda of the global HIV response remains clearly unfinished. Every day, thousands are still being infected and dying due to lack of access to prevention, treatment and care. Although universal access may not be a global reality by the end of 2010, investments in the global HIV response are already paying off. The sooner high-quality services are scaled up, the larger will be the social and economic gains from fewer infections, lower mortality and having millions of people live longer and healthier lives. 🌐

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# Annex 1. Reported number of facilities with HIV testing and counselling and number of people older than 15 years who received HIV testing and counselling, low- and middle-income countries, 2009

Low- and middle-income countries <sup>a</sup>	Facilities with HIV testing and counselling, 2009		Number of people aged 15 years and over who received HIV testing and counselling, 2009 <sup>b</sup>		Reporting period
	Reported number <sup>c</sup>	Estimated number per 100 000 adult population	Reported number <sup>c</sup>	Estimated number per 1000 adult population	
Afghanistan	25	0.2	8 001	0.6	Jan 09-Dec 09
Albania	...	...	...	...	
Algeria	...	...	...	...	
Angola	285	3.3	...	...	
Argentina	7 856	38.7	...	...	
Armenia	150	9.2	70 955	43.7	Jan 09-Dec 09
Azerbaijan	...	...	...	...	
Bangladesh	105	0.1	26 369	0.3	Jan 09-Dec 09
Belarus	1 070	20.9	...	...	
Belize	43	26.3	23 802	145.5	Jan 09-Dec 09
Benin	126	3.0	280 982	67.0	Jan 09-Dec 09
Bhutan	34	8.8	...	...	
Bolivia (Plurinational State of)	250	5.1	210 021	42.5	Jan 09-Dec 09
Bosnia and Herzegovina	40	2.1	20 369	10.5	Jan 09-Dec 09
Botswana	666	62.7	330 159 <sup>d</sup>	311.0	Jan 09-Dec 09
Brazil	3 579	3.4	...	...	
Bulgaria	...	...	...	...	
Burkina Faso	1 267	17.4	602 961	82.6	Jan 09-Dec 09
Burundi	319	7.4	281 959	65.6	Jan 09-Dec 09
Cambodia	233	2.9	622 127	77.2	Jan 09-Dec 09
Cameroon	2 025	21.4	450 022	47.6	Jan 09-Dec 09
Cape Verde	205	76.5	25 075	93.5	Jan 09-Dec 09
Central African Republic	105	4.9	136 202	64.2	Jan 09-Dec 09
Chad	72	1.4	66 191	13.1	Jan 09-Dec 09
Chile	844	9.3	560 147	61.5	Jan 09-Dec 09
China	7 335	1.0	...	...	
Colombia	...	...	...	...	
Comoros	14	4.0	3 281	9.4	Jan 09-Dec 09
Congo	103	5.7	82 332	45.8	Jan 09-Dec 09
Cook Islands	...	...	...	...	
Costa Rica	1 106	43.3	...	...	
Côte d'Ivoire	550	5.5	727 290	72.5	Jan 09-Dec 09
Croatia	10	0.5	1 643	0.8	Jan 09-Dec 09
Cuba	378	6.2	1 888 065	310.7	Jan 09-Dec 09
Democratic People's Republic of Korea	...	...	...	...	
Democratic Republic of the Congo	538	1.8	392 491	17.7	Jan 09-Oct 09
Djibouti	28	6.1	14 154	31.1	Jan 09-Dec 09
Dominica	60	172.1	4 402	126.3	Jan 09-Dec 09
Dominican Republic	150	2.8	259 110	49.1	Jan 09-Dec 09
Ecuador	1 263	18.0	403 263	57.3	Jan 09-Dec 09
Egypt	...	...	...	...	
El Salvador	489	15.7	362 628	116.6	Jan 09-Dec 09

Low- and middle-income countries <sup>a</sup>	Facilities with HIV testing and counselling, 2009		Number of people aged 15 years and over who received HIV testing and counselling, 2009 <sup>b</sup>		Reporting period
	Reported number <sup>c</sup>	Estimated number per 100 000 adult population	Reported number <sup>c</sup>	Estimated number per 1000 adult population	
Equatorial Guinea	80	24.6	24 256	74.6	Jan 09-Dec 09
Eritrea	...	...	132 829	52.2	Jan 09-Dec 09
Ethiopia	1 823	4.7	6 630 647	172.3	Jan 09-Dec 09
Fiji	31	7.0	27 865	63.3	Jan 09-Dec 09
Gabon	119	15.8	33 550	44.5	Jan 09-Dec 09
Gambia	34	4.2	47 549	66.0	Jan 09-Oct 09
Georgia	...	...	...	...	
Ghana	808	6.7	1 253 312	104.4	Jan 09-Dec 09
Grenada	38	65.9	...	...	
Guatemala	230	3.5	243 644	37.3	Jan 09-Dec 09
Guinea	83	1.8	74 090	15.8	Jan 09-Dec 09
Guinea-Bissau	62	8.4	24 871	33.8	Jan 09-Dec 09
Guyana	168	42.7	99 837 <sup>e</sup>	253.8	Jan 09-Dec 09
Haiti	167	3.3	681 002	132.8	Jan 09-Dec 09
Honduras	700	18.5	199 006	52.5	Jan 09-Dec 09
Hungary	144	3.0	99 538	20.6	Jan 09-Dec 09
India	5 089	0.8	13 494 372	21.2	Jan 09-Dec 09
Indonesia	565	0.4	170 791 <sup>f</sup>	1.3	Jan 09-Dec 09
Iran (Islamic Republic of)	...	...	...	...	
Iraq	...	...	...	...	
Jamaica	343	24.3	...	...	
Jordan	12	0.3	271	0.1	Jan 09-Dec 09
Kazakhstan	3 801	43.9	1 498 858	173.1	Jan 09-Dec 09
Kenya	4 115	21.3	4 433 557	230.0	Jan 09-Dec 09
Kiribati	9	17.0	5 957	112.7	Jan 09-Dec 09
Kyrgyzstan	25	0.8	172 106	56.9	Jan 09-Dec 09
Lao People's Democratic Republic	110	3.4	40 962	12.7	Jan 09-Dec 09
Latvia	4 743	416.2	...	...	
Lebanon	19	0.8	...	...	
Lesotho	239	23.8	251 242	250.6	Jan 09-Dec 09
Liberia	114	6.1	80 295	43.0	Jan 09-Dec 09
Libyan Arab Jamahiriya	...	...	...	...	
Lithuania	758	45.2	...	...	
Madagascar	816	8.8	324 809	35.0	Jan 09-Dec 09
Malawi	728	10.7	1 449 645	213.7	Jan 09-Dec 09
Malaysia	7 627	51.3	662 062	44.6	Jan 09-Dec 09
Maldives	8	4.3	4 285	22.9	Jan 09-Dec 09
Mali	1 091	17.6	255 835	41.3	Jan 09-Dec 09
Marshall Islands	2	6.0	...	...	
Mauritania	...	...	9 498	5.7	Jan 09-Dec 09
Mauritius	193	27.1	33 744	47.4	Jan 09-Dec 09
Mexico	2 784	4.7	...	...	
Micronesia (Federated States of)	...	...	...	...	
Mongolia	57	3.5	9 015	5.5	Jan 09-Dec 09
Montenegro	8	2.6	738	2.4	Jan 09-Dec 09
Morocco	...	...	...	...	



# TOWARDS UNIVERSAL

Low- and middle-income countries <sup>a</sup>	Facilities with HIV testing and counselling, 2009		Number of people aged 15 years and over who received HIV testing and counselling, 2009 <sup>b</sup>		Reporting period
	Reported number <sup>c</sup>	Estimated number per 100 000 adult population	Reported number <sup>c</sup>	Estimated number per 1000 adult population	
Mozambique	356	3.4	1 201 942	114.4	Jan 09-Dec 09
Myanmar	350	1.2	270 301	9.6	Jan 09-Dec 09
Namibia	264	23.4	249 011	221.0	Jan 09-Dec 09
Nauru	...	...	...	...	
Nepal	179	1.2	125 400	8.3	Jan 09-Dec 09
Nicaragua	862	28.6	205 233	68.1	Jan 09-Dec 09
Niger	321	5.0	358 071	55.6	Jan 09-Dec 09
Nigeria	1 074	1.5	2 570 386	35.1	Jan 09-Dec 09
Niue	...	...	...	...	
Oman	61	3.7	605 755	368.0	Jan 09-Dec 09
Pakistan	13	0.0	11 439	0.1	Jan 09-Dec 09
Palau	...	...	...	...	
Panama	123	6.7	60 798	33.3	Jan 09-Dec 09
Papua New Guinea	177	5.2	159 005	46.9	Jan 09-Dec 09
Paraguay	143	4.4	159 607	49.0	Jan 09-Dec 09
Peru	5 096	32.6	...	...	
Philippines	82	0.2	10 110	0.2	Jan 09-Dec 09
Poland	2 645	13.7	25 452	1.3	Jan 09-Dec 09
Republic of Moldova	56	2.9	86 558	45.1	Jan 09-Dec 09
Romania	120	1.1	280 510	25.8	Jan 09-Dec 09
Russian Federation	...	...	...	...	
Rwanda	395	8.0	1 932 420	393.8	Jan 09-Dec 09
Saint Kitts and Nevis	...	...	...	...	
Saint Lucia	39	40.3	1 629	16.8	Jan 09-Dec 09
Saint Vincent and the Grenadines	40	66.6	6 416	106.9	Jan 09-Dec 09
Samoa	...	...	...	...	
Sao Tome and Principe	41	51.1	13 212	164.8	Jan 09-Dec 09
Senegal	532	8.8	352 197	58.3	Jan 09-Dec 09
Serbia	52	1.1	53 399	11.0	Jan 09-Dec 09
Seychelles	27	58.3	10 808	233.4	Jan 09-Dec 09
Sierra Leone	416	15.2	281 218	102.7	Jan 09-Dec 09
Slovakia	...	...	...	...	
Solomon Islands	...	...	...	...	
Somalia	19	0.5	10 057 <sup>g</sup>	2.4	Jan 09-Dec 09
South Africa	4 326	15.8	6 989 312	256.1	Jan 09-Dec 09
Sri Lanka	47	0.4	...	...	
Sudan	210 <sup>g</sup>	1.0	103 373 <sup>h</sup>	4.9	Jan 09-Dec 09
Suriname	59	21.2	19 276	69.3	Jan 09-Dec 09
Swaziland	170	28.5	149 755	251.3	Jan 09-Dec 09
Syrian Arab Republic	...	...	...	...	
Tajikistan	231	6.3	285 831	78.5	Jan 09-Dec 09
Thailand	1 014	2.7	1 099 657	29.3	Jan 09-Dec 09
The former Yugoslav Republic of Macedonia	14	1.3	...	...	
Timor-Leste	...	...	...	...	
Togo	225	6.9	166 887	51.1	Jan 09-Dec 09
Tonga	...	...	...	...	



Low- and middle-income countries <sup>a</sup>	Facilities with HIV testing and counselling, 2009		Number of people aged 15 years and over who received HIV testing and counselling, 2009 <sup>b</sup>		Reporting period
	Reported number <sup>c</sup>	Estimated number per 100 000 adult population	Reported number <sup>c</sup>	Estimated number per 1000 adult population	
Tunisia	2 430	40.9	13 915	2.3	Jan 09-Dec 09
Turkey	1 362	3.3	...	...	
Turkmenistan	...	...	...	...	
Tuvalu	...	...	...	...	
Uganda	1 215	8.5	2 363 468 <sup>i</sup>	165.1	Oct 08-Sep 09
Ukraine	2 002	8.5	...	...	
United Republic of Tanzania	2 134	10.6	1 970 324	98.3	Jan 09-Dec 09
Uruguay	...	...	...	...	
Uzbekistan	5 153	32.9	1 250 185	79.8	Jan 09-Dec 09
Vanuatu	...	...	...	...	
Venezuela (Bolivarian Republic of)	103	0.7	...	...	
Viet Nam	479	1.0	777 256	15.5	Jan 09-Dec 09
Yemen	20	0.2	7 525	0.7	Jan 09-Dec 09
Zambia	1 563	27.0	1 582 621	273.9	Jan 09-Dec 09
Zimbabwe	1 560	25.0	1 142 052	182.9	Jan 09-Dec 09

... Data not available or not applicable.

a See the country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions (Annex 7).

b This number should include all people aged 15 years and above who received HIV testing and counselling through any method or setting, including voluntary counselling and testing (VCT) and antenatal care (ANC) settings. Not all countries are able to report data from all settings.

c Some countries reported voluntary counselling and testing (VCT) and antenatal care (ANC) settings testing data separately; these data are combined here.

d Does not include data from all voluntary counselling and testing (VCT) networks, and routine health sector testing may include significant repeat testing.

e Includes all people under the age of under 15 years who were tested.

f Only partial reporting available.

g Only 80% reporting available.

h Separate reports were received from Sudan for 2008 and 2009: testing and counselling facilities; northern Sudan, 132 (2009), 149 (2008); southern Sudan, 78 (2009), 62 (2008); number of people who received testing and counselling: northern Sudan, 52 770 (2009), 30 924 (2008); southern Sudan, 50 502 (2009), 11 276 (2008).

i Includes all people over the age of four years who were tested.

**Annex 2. Reported number of targeted service delivery points for sex workers where sexually transmitted infection services are provided (per 1000 sex workers) and prevalence of syphilis among antenatal care clinic attendees, by country, 2009<sup>a</sup>**

Countries	Number of targeted service delivery points for sex workers where sexually transmitted infection services are provided (per 1000 sex workers)	Prevalence of syphilis among antenatal care clinic attendees
Number of countries reporting	51	77
Afghanistan	1.67	0.72%
Antigua and Barbuda	...	0.72%
Argentina	...	1.40%
Bangladesh	1.71	0.62%
Belarus	0.41	0.06%
Benin	2.79	0.28%
Bolivia (Plurinational State of)	0.60	...
Botswana	...	1.31%
Brazil	...	1.60%
Burkina Faso	0.83	2.13%
Burundi	...	1.37%
Cambodia	1.70	0.13%
Cameroon	...	0.56%
Central African Republic	...	5.88%
Chad	...	7.30%
Chile	2.83	0.15%
China	...	0.54%
Colombia	...	1.14%
Comoros	4.00	...
Costa Rica	0.14	...
Côte d'Ivoire	3.30	0.18%
Cuba	...	0.77%
Czech Republic	0.50	0.09%
Democratic Republic of the Congo	...	1.98%
Djibouti	2.00	0.45%
Dominica	...	0.42%
Dominican Republic	0.20	0.36%
Ecuador	2.50	...
El Salvador	6.19	0.29%
Estonia	0.50	...
Fiji	...	5.15%
Gabon	...	0.94%
Germany	0.88	0.34%
Ghana	...	6.15%
Grenada	...	5.25%
Guatemala	2.84	0.55%
Guinea	0.52	1.52%
Guyana	...	0.17%
Honduras	1.84	0.07%
Hungary	6.25	...
India	5.57	0.35%
Indonesia	1.31	1.17%
Jordan	5.00	0.00%
Kazakhstan	1.76	...
Kiribati	6.67	5.61%
Kyrgyzstan	1.60	0.08%
Lao People's Democratic Republic	16.23	0.76%
Lithuania	0.40	...
Madagascar	...	7.70%
Malawi	...	1.12%
Malaysia	0.12	0.07%
Maldives	...	0.00%
Mali	1.19	4.00%
Mauritius	0.00	0.15%
Mexico	...	0.27%
Mongolia	0.43	1.97%
Mozambique	...	6.93%
Myanmar	1.88	0.74%
Namibia	...	2.32%
Nepal	0.96	...
Nicaragua	0.25	0.45%
Niger	1.54	2.56%
Nigeria	...	1.50%
Oman	...	0.04%
Panama	1.00	...
Papua New Guinea	...	5.78%
Paraguay	...	3.43%
Peru	1.15	0.33%
Philippines	0.33	0.24%
Republic of Moldova	...	0.26%
Romania	...	1.62%
Rwanda	...	1.57%
Sao Tome and Principe	14.39	0.36%
Saudi Arabia	...	0.06%
Sierra Leone	...	0.36%

Countries	Number of targeted service delivery points for sex workers where sexually transmitted infection services are provided (per 1000 sex workers)	Prevalence of syphilis among antenatal care clinic attendees
South Africa	...	3.91%
Sri Lanka	1.15	0.02%
Sudan	...	3.49%
Swaziland	...	4.75%
United Republic of Tanzania	...	4.40%
Thailand	1.03	0.13%
The former Yugoslav Republic of Macedonia	0.33	...
Togo	2.00	1.10%
Trinidad and Tobago	0.10	1.67%
Tunisia	10.80	...
United Kingdom	...	0.17%
Uruguay	9.33	...
Uzbekistan	1.15	0.02%
Viet Nam	14.60	0.21%
Zambia	...	5.10%
Zimbabwe	...	0.59%

... Data not available or not applicable.

a Data are reported for 2009, but actual data collection period may vary. Data should be interpreted with caution as data may not be nationally representative, and methodology among countries varied (Annex 7).

### Annex 3. People (all age groups) receiving and needing antiretroviral therapy and coverage percentages, 2008–2009

Low- and middle-income countries <sup>a</sup>	Reported number of people receiving antiretroviral therapy, 2008 <sup>b,c</sup>	Month and year of report	Reported number of people receiving antiretroviral therapy, 2009 <sup>b,c</sup>	Month and year of report	Estimated number of people needing antiretroviral therapy based on WHO 2010 guidelines, 2009 <sup>d,e</sup>			Estimated antiretroviral therapy coverage based on WHO 2010 guidelines, 2009 <sup>d</sup>			Estimated number of people needing antiretroviral therapy based on WHO 2006 guidelines, 2009 <sup>d,e</sup>			Estimated antiretroviral therapy coverage based on WHO 2006 guidelines, 2009 <sup>d</sup>			Estimated number of people needing antiretroviral therapy based on country report, 2009 <sup>f</sup>
					Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Afghanistan	0	Dec 08	12	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...
Albania	110	Dec 08	114	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...
Algeria	1111	Dec 08	1526	Dec 09	6 000	4 500	8 000	25%	19%	34%	3 700	2 700	4 900	42%	31%	56%	...
Angola	14 139 <sup>f</sup>	Dec 08	20 640	Dec 09	86 000	65 000	110 000	24%	19%	32%	59 000	43 000	79 000	35%	26%	48%	84 250
Argentina	40 240 <sup>f</sup>	Dec 08	42 815	Dec 09	61 000	42 000	74 000	70%	58%	>95%	50 000	37 000	58 000	86%	74%	>95%	...
Armenia	100	Dec 08	179	Dec 09	<10 000	<10 000	<10 000	24%	20%	29%	<500	<500	<10 000	39%	32%	47%	352
Azerbaijan	159	Dec 08	238	Dec 09	1100	<10 000	1 400	21%	16%	29%	<10 000	<500	<10 000	36%	26%	51%	418
Bangladesh	283	Dec 08	353	Dec 09	1 500	<10 000	2 000	23%	17%	39%	<10 000	<500	1 200	40%	28%	71%	740
Belarus	1 249	Dec 08	1 776	Dec 09	6 000	4 700	7 800	29%	23%	37%	3 700	3 000	4 500	48%	40%	59%	2 852
Belize	630	Dec 08	855	Dec 09	2 100	1 800	2 500	40%	34%	47%	1 500	1 200	1 800	57%	49%	69%	1 394
Benin	12 078	Dec 08	15 401	Dec 09	29 000	24 000	34 000	53%	45%	64%	21 000	17 000	26 000	72%	59%	88%	20 396
Bhutan	30	Dec 08	...	...	<500	<200	<500	14%	10%	29%	<200	<100	<200	26%	16%	53%	...
Bolivia (Plurinational State of)	758 <sup>f</sup>	Dec 08	1 115	Dec 09	6 000	4 700	7 600	19%	15%	24%	3 900	3 100	5 000	28%	22%	36%	5 050
Bosnia and Herzegovina	33	Dec 08	38	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	50
Botswana	117 045	Dec 08	145 190	Dec 09	170 000	150 000	190 000	83%	77%	>95%	140 000	120 000	150 000	>95%	94%	>95%	161 706
Brazil	194 984 <sup>f</sup>	Dec 08	...	...	...	220 000	390 000	...	50%	89%	...	190 000	300 000	...	65%	>95%	...
Bulgaria	251	Dec 08	327	Dec 09	1 400	1 100	1 800	23%	18%	30%	<10 000	<10 000	1 100	38%	29%	50%	...
Burkina Faso	21 103	Dec 08	26 448	Dec 09	58 000	46 000	71 000	46%	37%	58%	44 000	34 000	55 000	60%	48%	77%	56 241
Burundi	14 343	Dec 08	17 661	Dec 09	91 000	79 000	100 000	19%	17%	22%	65 000	53 000	78 000	27%	23%	33%	57 438
Cambodia	31 999	Dec 08	37 315	Dec 09	40 000	28 000	55 000	94%	68%	>95%	33 000	24 000	44 000	>95%	86%	>95%	40 483
Cameroon	59 960	Dec 08	76 228	Dec 09	270 000	230 000	310 000	28%	25%	33%	190 000	150 000	220 000	41%	34%	51%	164 070
Cape Verde	360	Dec 08	611	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...
Central African Republic	10 551 <sup>f</sup>	Dec 08	14 474	Dec 09	74 000	64 000	85 000	19%	17%	23%	51 000	41 000	61 000	28%	24%	35%	40 334
Chad	17 900 <sup>f</sup>	Oct 08	32 288	Dec 09	90 000	73 000	110 000	36%	30%	44%	61 000	47 000	79 000	53%	41%	68%	66 000
Chile	10 904 <sup>f</sup>	Dec 08	12 762	Dec 09	20 000	17 000	24 000	63%	53%	76%	16 000	12 000	19 000	81%	68%	>95%	15 520
China	48 254	Dec 08	65 481	Dec 09	...	170 000	350 000	...	19%	38%	...	97 000	210 000	...	31%	67%	190 000
Colombia	17 551 <sup>f</sup>	Dec 08	16 302	Dec 09	95 000	79 000	120 000	17%	14%	21%	63 000	53 000	75 000	26%	22%	31%	22 924
Comoros	8	Dec 08	12	Dec 09	<100	<100	<100	18%	13%	24%	<100	<100	<100	29%	21%	40%	12

Low- and middle-income countries <sup>a</sup>	Reported number of people receiving antiretroviral therapy, 2008 <sup>b,c</sup>	Month and year of report	Reported number of people receiving antiretroviral therapy, 2009 <sup>b,c</sup>	Estimated number of people needing antiretroviral therapy based on WHO 2010 guidelines, 2009 <sup>a,d</sup>			Estimated antiretroviral therapy coverage based on WHO 2010 guidelines, 2009 <sup>a</sup>			Estimated number of people needing antiretroviral therapy based on WHO 2006 guidelines, 2009 <sup>a,d</sup>			Estimated antiretroviral therapy coverage based on WHO 2006 guidelines, 2009 <sup>a</sup>			Estimated number of people needing antiretroviral therapy based on country report, 2009 <sup>e</sup>
				Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Congo	9 400	Dec 08	7 998	35 000	30 000	41 000	23%	19%	27%	25 000	20 000	30 000	33%	26%	41%	...
Cook Islands	1	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Costa Rica	2 886 <sup>f</sup>	Dec 08	3 064	4 500	3 100	6 100	68%	50%	>95%	3 500	2 500	4 800	86%	64%	>95%	...
Côte d'Ivoire	51 820 <sup>f</sup>	Dec 08	72 011	260 000	220 000	300 000	28%	24%	32%	180 000	150 000	220 000	39%	33%	47%	164 000
Croatia	398	Dec 08	441	<1 000	<500	<1 000	80%	62%	>95%	<500	<500	<1 000	>95%	75%	>95%	...
Cuba	3 999	Dec 08	5 034	3 500	2 900	4 100	>95%	>95%	>95%	2 900	2 400	3 400	>95%	>95%	>95%	5 034
Democratic People's Republic of Korea	0	Dec 08	...	<1 000	<1 000	<1 000	0%	...	...	<500	<500	<1 000	0%	...	...	...
Democratic Republic of the Congo	24 645 <sup>f</sup>	Dec 08	34 967	...	170 000	240 000	...	14%	21%	...	110 000	180 000	...	20%	32%	283 055
Djibouti	816	Dec 08	913	6 400	4 700	8 200	14%	11%	20%	4 300	3 100	5 700	21%	16%	29%	4 235
Dominica	36 <sup>f</sup>	Dec 08	38	...	...	...	...	...	...	...	...	...	...	...	...	13
Dominican Republic	11 072 <sup>f</sup>	Dec 08	13 785	29 000	25 000	34 000	47%	41%	55%	22 000	18 000	25 000	64%	55%	77%	19 410
Ecuador	3 728	Dec 08	5 538	19 000	14 000	26 000	30%	21%	40%	12 000	9 500	17 000	45%	33%	58%	13 128
Egypt	291	Dec 08	359	3 300	1 600	3 000	11%	12%	22%	1 900	1 600	3 000	19%	12%	22%	1 500
El Salvador	7 104	Dec 08	8 348	16 000	10 000	22 000	53%	38%	84%	13 000	8 100	16 000	66%	51%	>95%	...
Equatorial Guinea	839	Dec 08	1 645	6 600	4 700	8 800	25%	19%	35%	4 300	2 800	6 000	39%	27%	58%	3 108
Eritrea	4 299 <sup>f</sup>	Dec 08	4 955	14 000	10 000	18 000	37%	28%	49%	9 700	7 300	13 000	51%	39%	68%	7 182
Ethiopia	132 379	Dec 08	176 632	...	280 000	390 000	...	45%	62%	...	200 000	30 000	...	58%	86%	336 160
Fiji	39	Dec 08	52	<200	<200	<500	30%	23%	40%	<200	<100	<200	52%	38%	73%	...
Gabon	7 773	Dec 08	9 976	21 000	16 000	26 000	47%	38%	61%	15 000	12 000	19 000	66%	53%	86%	14 258
Gambia	770	Dec 08	921	5 000	3 100	7 300	18%	13%	30%	3 300	2 000	5 000	28%	18%	45%	1 500
Georgia	498	Dec 08	655	1 000	<1 000	1 300	65%	51%	91%	<1 000	<500	<1 000	>95%	77%	>95%	686
Ghana	21 548 <sup>f</sup>	Dec 08	30 265	130 000	110 000	150 000	24%	21%	28%	85 000	69 000	100 000	36%	29%	44%	70 988
Grenada	46 <sup>f</sup>	Dec 08	54	...	...	...	...	...	...	...	...	...	...	...	...	59
Guatemala	9 694	Dec 08	10 362	24 000	18 000	31 000	44%	33%	59%	16 000	12 000	21 000	63%	48%	84%	14 966
Guinea	9 212	Dec 08	14 999	38 000	30 000	46 000	40%	32%	50%	27 000	20 000	35 000	56%	43%	74%	22 500
Guinea-Bissau	1 832 <sup>f</sup>	Dec 08	2 764	9 100	7 300	11 000	30%	25%	38%	6 000	4 700	7 600	46%	36%	59%	5 885
Guyana	2 473	Dec 08	2 832	2 900	1 700	4 200	>95%	68%	>95%	2 700	1 700	3 700	>95%	76%	>95%	3 390
Haiti	19 990 <sup>f</sup>	Dec 08	26 007	60 000	49 000	71 000	43%	37%	53%	43 000	34 000	52 000	61%	50%	76%	38 491
Honduras	6 288	Dec 08	7 075	21 000	16 000	27 000	33%	26%	44%	15 000	12 000	18 000	47%	38%	61%	13 356
Hungary	559 <sup>f</sup>	Dec 08	547	2 100	1 600	2 600	27%	21%	34%	1 600	1 200	2 000	35%	28%	44%	...

low- and middle-income countries <sup>a</sup>	Reported number of people receiving antiretroviral therapy, 2008 <sup>b,c</sup>	Month and year of report	Reported number of people receiving antiretroviral therapy, 2009 <sup>b,c</sup>	Month and year of report	Estimated number of people needing antiretroviral therapy based on WHO 2010 guidelines, 2009 <sup>a,d</sup>			Estimated antiretroviral therapy coverage based on WHO 2010 guidelines, 2009 <sup>a</sup>			Estimated number of people needing antiretroviral therapy based on WHO 2006 guidelines, 2009 <sup>a,e</sup>			Estimated antiretroviral therapy coverage based on WHO 2006 guidelines, 2009 <sup>a,d</sup>			Estimated number of people needing antiretroviral therapy based on country report, 2009 <sup>f</sup>
					Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
India	234 581 <sup>b</sup>	Dec 08	320 074 <sup>b</sup>	Dec 09	...	1 100 000	1 400 000	...	23%	28%	...	580 000	890 000	...	36%	55%	580 000
Indonesia	10 606 <sup>f</sup>	Dec 08	15 442	Nov 09	73 000	50 000	110 000	21%	14%	31%	45 000	26 000	64 000	34%	24%	58%	40 200
Iran (Islamic Republic of)	878	Sep 08	1 486	Jan 10	40 000	33 000	48 000	4%	3%	4%	23 000	18 000	29 000	6%	5%	8%	16 540
Iraq	4	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Jamaica	4 444 <sup>f</sup>	Dec 08	7 244	Dec 09	16 000	12 000	20 000	46%	36%	62%	11 000	8 500	13 000	67%	55%	85%	14 000
Jordan	58	Dec 08	63	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...
Kazakhstan	707	Dec 08	1 035	Jan 10	3 800	2 600	5 400	27%	19%	40%	2 300	1 600	3 300	45%	31%	66%	1 900
Kenya	250 576 <sup>f</sup>	Dec 08	336 980	Dec 09	710 000	610 000	800 000	48%	42%	55%	520 000	430 000	610 000	65%	55%	79%	555 000
Kiribati	6	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Kyrgyzstan	89	Dec 08	231	Jan 10	1 900	<1 000	2 700	12%	9%	24%	1 000	<1 000	1 600	22%	15%	46%	450
Lao People's Democratic Republic	1 009	Dec 08	1 345	Dec 09	2 000	1 200	2 800	67%	48%	>95%	1 300	<1 000	1 900	>95%	71%	>95%	1 461
Latvia	334	Dec 08	439	Dec 09	3 600	2 700	4 600	12%	9%	16%	2 100	1 600	2 800	21%	16%	28%	...
Lebanon	285 <sup>f</sup>	Dec 08	354	Dec 09	1 900	1 500	2 500	18%	14%	24%	1 200	<1 000	1 600	29%	22%	37%	1 171
Lesotho	45 262	Dec 08	61 736	Dec 09	130 000	110 000	140 000	48%	43%	54%	90 000	75 000	110 000	68%	58%	83%	122 818
Liberia	2 017 <sup>f</sup>	Dec 08	2 970	Dec 09	22 000	17 000	27 000	14%	11%	17%	15 000	11 000	19 000	20%	15%	27%	10 023
Libyan Arab Jamahiriya	1 000	Dec 07	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lithuania	127	Dec 08	145	Dec 09	<1 000	<500	<1 000	27%	21%	34%	<500	<500	<500	42%	32%	52%	274
Madagascar	162	Dec 08	214	Dec 09	10 000	8 300	12 000	2%	2%	3%	6 000	4 900	7 600	4%	3%	4%	5 000
Malawi	147 497 <sup>f</sup>	Dec 08	198 846	Dec 09	440 000	370 000	500 000	46%	40%	53%	310 000	260 000	370 000	63%	53%	77%	305 805
Malaysia	8 197	Dec 08	9 962	Mar 10	43 000	34 000	55 000	23%	18%	29%	26 000	22 000	31 000	38%	32%	44%	20 977
Maldives	2	Dec 08	3	Dec 09	<100	<100	<100	17%	14%	23%	<100	<100	<100	28%	22%	36%	71
Mali	16 475 <sup>f</sup>	Dec 08	21 100	Dec 09	42 000	34 000	51 000	50%	41%	61%	32 000	26 000	40 000	65%	53%	81%	31 410
Marshall Islands	4	Dec 08	4	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	8
Mauritania	1 072 <sup>f</sup>	Dec 08	1 401	Dec 09	5 700	4 700	6 900	25%	20%	30%	3 500	2 800	4 300	41%	33%	51%	2 790
Mauritius	491 <sup>f</sup>	Jan 08	652	Dec 09	2 900	2 200	3 800	22%	17%	30%	1 700	1 300	2 300	38%	28%	51%	1 587
Mexico	55 599 <sup>f</sup>	Dec 08	60 911	Dec 09	110 000	89 000	130 000	54%	46%	68%	86 000	69 000	98 000	71%	62%	88%	74 000
Micronesia (Federated States of)	2 <sup>f</sup>	Dec 08	5	Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	5
Mongolia	5	Dec 08	9	Dec 09	<200	<100	<200	8%	6%	15%	<100	<100	<100	15%	10%	31%	53
Montenegro	25	Dec 08	31	Mar 10	...	...	...	...	...	...	...	...	...	...	...	...	388
Morocco	2 207	Dec 08	2 647	Dec 09	9 800	7 500	13 000	27%	21%	35%	6 300	4 900	8 100	42%	33%	54%	5 266



Low- and middle-income countries <sup>a</sup>	Reported number of people receiving antiretroviral therapy, 2008 <sup>b,c</sup>	Month and year of report	Reported number of people receiving antiretroviral therapy, 2009 <sup>b,c</sup>	Estimated number of people needing antiretroviral therapy based on 2010 guidelines, 2009 <sup>a,d</sup>			Estimated antiretroviral therapy coverage based on WHO 2010 guidelines, 2009 <sup>a</sup>			Estimated number of people needing antiretroviral therapy based on WHO 2006 guidelines, 2009 <sup>a,d</sup>			Estimated antiretroviral therapy coverage based on WHO 2006 guidelines, 2009 <sup>a</sup>			Estimated number of people needing antiretroviral therapy based on country report, 2009 <sup>f</sup>
				Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Mozambique	128 330	Dec 08	170 198	570 000	500 000	650 000	30%	26%	34%	380 000	310 000	470 000	45%	36%	55%	445 672
Myanmar	15 191	Dec 08	21 138	120 000	98 000	140 000	18%	15%	22%	75 000	60 000	89 000	28%	24%	35%	74 058
Namibia	59 376	Dec 08	70 498	93 000	77 000	110 000	76%	62%	92%	70 000	56 000	86 000	>95%	82%	>95%	76 727
Nauru	0	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nepal	1992 <sup>f</sup>	Jul 08	3226	31 000	26 000	36 000	11%	9%	13%	19 000	16 000	23 000	17%	14%	21%	16 950
Nicaragua	744 <sup>f</sup>	Dec 08	1063	2 600	2 100	3 300	40%	32%	51%	1 700	1 400	2 200	62%	49%	79%	1 580
Niger	2 846	Dec 08	6 445	29 000	26 000	31 000	22%	21%	25%	19 000	15 000	23 000	33%	28%	42%	16 738
Nigeria	238 659	Dec 08	302 973	1 400 000	1 200 000	1 700 000	21%	18%	25%	990 000	790 000	1 200 000	31%	25%	38%	882 139
Niue	0	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Oman	412	Dec 08	486	<500	<500	<1 000	>95%	83%	>95%	<500	<200	<500	>95%	>95%	>95%	513
Pakistan	875 <sup>f</sup>	Dec 08	1 320	36 000	27 000	48 000	4%	3%	5%	21 000	16 000	27 000	6%	5%	8%	13 422
Palau	3	Dec 08	3	...	...	...	...	...	...	...	...	...	...	...	...	...
Panama	3 972 <sup>f</sup>	Dec 08	4 463	12 000	8 200	22 000	37%	21%	54%	8 400	6 100	14 000	53%	32%	73%	20 836
Papua New Guinea	5 195	Dec 08	6 751	13 000	10 000	16 000	52%	42%	65%	8 800	6 500	11 000	77%	59%	>95%	9 061
Paraguay	1 613	Dec 08	2 073	5 600	4 200	7 400	37%	28%	49%	3 600	2 900	4 500	57%	46%	70%	3 066
Peru	10 232 <sup>f</sup>	Dec 08	14 780	40 000	33 000	48 000	37%	31%	44%	26 000	22 000	31 000	57%	47%	67%	20 201
Philippines	532	Dec 08	750	2 000	1 000	2 800	37%	27%	75%	1 300	<1 000	1 800	60%	42%	>95%	919
Poland	3 822	Dec 08	4 329	20 000	14 000	27 000	22%	16%	31%	17 000	12 000	22 000	26%	19%	35%	5 000
Republic of Moldova	682	Dec 08	984	5 800	4 800	7 200	17%	14%	20%	3 500	2 900	4 400	28%	22%	34%	2 780
Romania	7 434	Dec 08	7 244	9 000	5 300	13 000	81%	55%	>95%	7 700	4 700	10 000	95%	71%	>95%	7 244
Russian Federation	54 900	Dec 08	75 900	...	320 000	460 000	...	16%	24%	...	...	180 000	...	27%	42%	79 116
Rwanda	63 149	Dec 08	76 726	88 000	71 000	100 000	88%	74%	>95%	72 000	55 000	88 000	>95%	87%	>95%	104 900
Saint Kitts and Nevis	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Lucia	85 <sup>f</sup>	Dec 08	124	...	...	...	...	...	...	...	...	...	...	...	...	134
Saint Vincent and the Grenadines	120 <sup>f</sup>	Dec 08	162	...	...	...	...	...	...	...	...	...	...	...	...	182
Samoa	8	Dec 08	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sao Tome and Principe	109	Dec 08	169	...	...	...	...	...	...	...	...	...	...	...	...	1 096
Senegal	9 252 <sup>f</sup>	Dec 08	12 249	24 000	20 000	28 000	51%	43%	62%	17 000	13 000	21 000	72%	58%	92%	16 198
Serbia	842	Dec 08	790	2 100	1 600	2 700	38%	30%	51%	1 400	1 100	1 800	55%	44%	75%	950
Seychelles	113	Dec 08	139	...	...	...	...	...	...	...	...	...	...	...	...	146

Low- and middle-income countries <sup>a</sup>	Reported number of people receiving antiretroviral therapy, 2008 <sup>b,c</sup>	Month and year of report	Reported number of people receiving antiretroviral therapy, 2009 <sup>b,c</sup>	Estimated number of people needing antiretroviral therapy based on WHO 2010 guidelines, 2009 <sup>d,e</sup>			Estimated antiretroviral therapy coverage based on WHO 2010 guidelines, 2009 <sup>d</sup>			Estimated number of people needing antiretroviral therapy based on WHO 2006 guidelines, 2009 <sup>d,f</sup>			Estimated number of people needing antiretroviral therapy based on country report, 2009 <sup>f</sup>
				Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Sierra Leone	1 950 <sup>1</sup>	Feb 09	3 660	20 000	16 000	24 000	18%	62%	23%	13 000	9 400	16 000	39%
Slovakia	97	Dec 08	...	<200	<200	<500	...	...	86%	<200	<100	<200	>95%
Solomon Islands	3 <sup>1</sup>	Dec 08	4	...	...	...	...	...	...	...	...	...	...
Somalia	413	Dec 08	578	10 000	7 300	13 000	6%	...	8%	6 300	4 200	8 700	14%
South Africa	730 183 <sup>1</sup>	Dec 08	971 556 <sup>1</sup>	2 600 000	2 500 000	2 800 000	37%	35%	39%	1 700 000	1 500 000	2 000 000	65%
Sri Lanka	142 <sup>1</sup>	Dec 08	207	1 100	<1 000	1 400	20%	15%	26%	<1 000	<500	<1 000	45%
Sudan	1 151 <sup>1</sup>	Dec 08	3 825 <sup>1</sup>	74 000	60 000	90 000	5%	4%	6%	46 000	34 000	61 000	11%
Suriname	858 <sup>1</sup>	Dec 08	996	1 900	1 400	2 600	53%	39%	72%	1 300	1 000	1 700	>95%
Swaziland	32 701	Dec 08	47 741	80 000	71 000	88 000	59%	53%	66%	56 000	47 000	65 000	>95%
Syrian Arab Republic	73 <sup>1</sup>	Dec 08	99	...	...	...	...	...	...	...	...	...	...
Tajikistan	138 <sup>1</sup>	Dec 08	322	3 000	2 300	3 900	11%	8%	14%	1 700	1 300	2 300	25%
Thailand	185 086 <sup>1</sup>	Sep 08	216 118	350 000	280 000	440 000	61%	50%	78%	290 000	230 000	350 000	95%
The former Yugoslav Republic of Macedonia	23	Dec 08	24	...	...	...	...	...	...	...	...	...	442
Timor-Leste	29	Dec 08	31	...	...	...	...	...	...	...	...	...	151
Togo	11 211	Dec 08	16 770	58 000	44 000	73 000	29%	23%	38%	40 000	29 000	51 000	57%
Tonga	2	Dec 08	...	...	...	...	...	...	...	...	...	...	...
Tunisia	326 <sup>1</sup>	Dec 08	412	<1 000	<1 000	1 000	53%	41%	72%	<1 000	<500	<1 000	>95%
Turkey	900	Dec 08	1 000	1 600	1 200	2 100	62%	48%	84%	1 100	<1 000	1 500	>95%
Turkmenistan	0	Dec 08	...	...	...	...	...	...	...	...	...	...	...
Tuvalu	1	Dec 08	1	...	...	...	...	...	...	...	...	...	1
Uganda	153 718	Sep 08	200 413	520 000	430 000	600 000	39%	33%	46%	380 000	300 000	450 000	67%
Ukraine	10 629 <sup>1</sup>	Dec 08	15 871	160 000	140 000	190 000	10%	9%	11%	99 000	85 000	110 000	19%
United Republic of Tanzania	154 468	Dec 08	199 413	660 000	580 000	750 000	30%	27%	34%	450 000	380 000	550 000	53%
Uruguay	...	...	2 510	5 100	4 300	6 100	49%	41%	59%	3 700	3 100	4 400	81%
Uzbekistan	1 200	Dec 08	1 753	...	...	...	...	...	...	...	...	...	2 850
Vanuatu	2	Dec 08	2	...	...	...	...	...	...	...	...	...	2
Venezuela (Bolivarian Republic of)	27 240 <sup>1</sup>	Dec 08	32 302	...	...	...	...	...	...	...	...	...	161 510
Viet Nam	25 597	Dec 08	37 995	110 000	84 000	150 000	34%	26%	45%	85 000	67 000	110 000	56%
Yemen	189	Dec 08	274	...	...	...	...	...	...	...	...	...	3 150
Zambia	219 576 <sup>1</sup>	Dec 08	283 863	440 000	380 000	510 000	64%	56%	75%	330 000	270 000	390 000	>95%
Zimbabwe	148 144 <sup>1</sup>	Dec 08	218 589	640 000	580 000	720 000	34%	30%	38%	450 000	390 000	520 000	57%

High-income countries <sup>a</sup>	Reported number of people receiving antiretroviral therapy, 2005-2008	Month and year of report	Reported number of people receiving antiretroviral therapy, 2009	Month and year of report	Reported number of people receiving antiretroviral therapy, 2005-2008	Month and year of report
Andorra	25	Dec 07	...	Dec 09	48	Dec 06
Antigua and Barbuda	148	Sep 07	98	Dec 09	...	Dec 09
Australia	9 933	Dec 07	...	Dec 09	344	Dec 08
Austria	2 250	Dec 08	1 800	Sep 09	65	Jun 07
Bahamas	1 244	Sep 07	1 506	Dec 09	45	Dec 05
Bahrain	...	...	...	...	7 919	Apr 07
Barbados	719	Dec 08	804	Dec 09	...	Jun 09
Belgium	6 928	Dec 07	...	...	900	Dec 05
Brunei Darussalam	10	Dec 08	15	Jan 10	12 366	Dec 08
Canada	27 000	Dec 08	...	Dec 09	...	Jan 09
Cyprus	151	Dec 07	187	Dec 09	...	...
Czech Republic	570	Jun 07	706	Oct 09	...	...
Denmark	3 000	Dec 08	3 000	Oct 09	865	Dec 08
Estonia	772	Dec 07	1 263	Dec 09	...	...
Finland	450	Aug 06	...	...	157	Jul 07
France	79 680	Dec 08	...	Dec 09	82 710	Dec 08
Germany	36 500	Dec 08	37 000	Jun 09	2 800	Dec 06
Greece	3 746	Dec 07	...	...	...	...
Iceland	100 <sup>k</sup>	<05	...	...	3 172	Dec 08
Ireland	1 600	Dec 05	...	...	59	Sep 07
Israel	2 876	Dec 08	...	...	39 556	Dec 07
Italy	95 000	Dec 08	...	...	268 000 <sup>k</sup>	<05
High-income countries <sup>a</sup>						
Japan					94	Mar 09
Kuwait					131	Dec 09
Luxembourg					434	Dec 09
Malta					100	Dec 09
Monaco					...	...
Netherlands					...	...
New Zealand					1 204	Jun 09
Norway					...	...
Portugal					18 107	Dec 09
Qatar					70	Jan 09
Republic of Korea					...	...
San Marino					...	...
Saudi Arabia					...	...
Singapore					...	...
Slovenia					...	...
Spain					79 500	Dec 09
Sweden					4 185	Dec 09
Switzerland					...	...
Trinidad and Tobago					2 639	Dec 09
United Arab Emirates					...	...
United Kingdom					39 704	Dec 09
United States of America					...	...

... Data not available or not applicable.

<sup>a</sup> See the country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions (Annex 7).

<sup>b</sup> Annex 4 provides antiretroviral therapy data by age and sex.

<sup>c</sup> Private sector data have been included in the total number of people on treatment, when available, but only South Africa and India have specified how many of the total number of people on treatment received it through private facilities.

<sup>d</sup> The needs estimates are based on the methods described in the explanatory notes and in boxes 4.1 and 4.2.

<sup>e</sup> The coverage estimates are based on the estimated unrounded numbers of people receiving antiretroviral therapy and the estimated unrounded need for antiretroviral therapy (based on UNAIDS/WHO methodology). The ranges in coverage estimates are based on plausibility bounds in the denominator: that is, low and high estimates of need.

<sup>f</sup> Updated 2008 value. See last year's annex ([http://www.who.int/entity/hiv/data/tuap2009\\_annex.xls](http://www.who.int/entity/hiv/data/tuap2009_annex.xls)).

<sup>g</sup> Estimates of the number of people needing antiretroviral therapy are currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis.

<sup>h</sup> By December 2009, the government reported that 285 074 people were receiving antiretroviral therapy through the public sector sites. A further estimated 35 000 people were treated in the unorganized private sector - the same figure as in 2008. Overall, an estimated 320 074 people were receiving antiretroviral therapy by the end of 2009, including those enrolled through private facilities.

<sup>i</sup> The number collected from public sector health facilities only is 919 923 and was provided by the Department of Health based on routine monitoring data. The majority of these facilities report people currently on treatment. The main AIDS Disease Management organisation, Aid for AIDS, reported that they had 51 633 patients on treatment in 2009, and the government estimated that this represents the majority of people on treatment in the private sector.

<sup>j</sup> Two separate reports were received for 2009 from Sudan: northern Sudan, 1829; southern Sudan, 1829. The figure of 1151 for 2008 applies to northern Sudan only.

<sup>k</sup> '<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 4. Reported number of people receiving antiretroviral therapy in low- and middle-income countries by sex and by age, and estimated number of children receiving and needing antiretroviral therapy and coverage percentages, 2009**

	Reported number of males and females receiving antiretroviral therapy					Reported number of adults and children receiving antiretroviral therapy					Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2009 <sup>b</sup>			Estimated antiretroviral therapy coverage among children, December 2009 <sup>c</sup>		
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Adults (+15)	% of total	Children (<15)	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Low- and middle-income countries <sup>a</sup>	Afghanistan	...		...		Dec 09	12	100%	0	0%	...			...		
	Albania	...		...		Dec 09	99	87%	15	13%	...			...		
	Algeria	762	51%	739	49%	Dec 09	1 429	94%	97	6%	...	<100	<500	...	36%	>95%
	Angola	2 444	31%	5 440	69%	Dec 09	19 092	93%	1 548	8%	12 000	6 300	18 000	13%	8%	25%
	Argentina	26 791	64%	15 250	36%	Dec 08 <sup>e</sup>	40 041	95%	2 000	5%	...	<500	<1 000	...	>95%	>95%
	Armenia	114	64%	65	36%	Dec 09	172	96%	7	4%	...	<100	<100	...	54%	>95%
	Azerbaijan	178	75%	60	25%	Dec 09	235	99%	3	1%	...	<100	<200	...	3%	9%
	Bangladesh	...		...		Dec 08 <sup>e</sup>	277	98%	6	2%	...	<100	<200	...	6%	16%
	Belarus	1 032	58%	744	42%	Dec 09	1 681	95%	95	5%	...	<100	<200	...	77%	>95%
	Belize	444	52%	411	48%	Dec 09	775	91%	80	9%	...	<200	<500	...	28%	66%
	Benin	6 468	42%	8 933	58%	Dec 09	14 266	93%	1 135	7%	2 700	1 500	4 100	41%	28%	77%
	Bhutan	14	47%	16	53%	Dec 08	29	97%	1	3%	...	<100	<100	...	8%	33%
	Bolivia (Plurinational State of)	721	65%	394	35%	Dec 09	1 065	96%	50	4%	...	<200	<1 000	...	8%	28%
	Bosnia and Herzegovina	26	70%	11	30%	Dec 09	37	97%	1	3%	...	...	...	...	...	...
	Botswana	56 566	39%	88 624	61%	Jan 09	136 700	94%	8 490	6%	9 400	8 200	11 000	90%	76%	>95%
	Brazil	106 769	57%	79 867	43%	Dec 08 <sup>d</sup>	178 697	96%	7 939	4%	...	8 200	12 000	...	65%	>95%
	Bulgaria	223	68%	104	32%	Dec 09	324	99%	3	1%	...	<100	<100	...	10%	33%
	Burkina Faso	8 609	33%	17 839	67%	Dec 09	25 094	95%	1 354	5%	8 000	3 900	12 000	17%	11%	35%
	Burundi	5 869	33%	11 792	67%	Dec 09	16 065	91%	1 596	9%	14 000	8 500	20 000	11%	8%	19%
	Cambodia	17 873	48%	19 442	52%	Dec 09	33 677	90%	3 638	10%	...	2 800	6 100	...	60%	>95%
Cameroon	25 196	33%	51 032	67%	Dec 09 <sup>e</sup>	73 114	96%	3 114	4%	28 000	15 000	41 000	11%	8%	20%	
Cape Verde	272	45%	339	55%	Dec 09	574	94%	37	6%	...	...	...	...	...	...	
Central African Republic	Dec 08 <sup>e</sup>	4 321	45%	5 229	55%	Dec 09	13 750	95%	724	5%	7 600	3 600	11 000	9%	6%	20%
Chad	Dec 09	11 888	37%	20 400	63%	Dec 09 <sup>d</sup>	31 514	98%	774	2%	12 000	6 600	19 000	6%	4%	12%
Chile	Dec 09	10 376	81%	2 386	19%	Dec 08 <sup>e</sup>	10 865	98%	186	2%	...	<500	<1 000	...	21%	59%

	Reported number of males and females receiving antiretroviral therapy				Reported number of adults and children receiving antiretroviral therapy				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2009 <sup>b</sup>				Estimated antiretroviral therapy coverage among children, December 2009 <sup>c</sup>				
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Adults (+15)	% of total	Children (<15)	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Low- and middle-income countries <sup>a</sup>	China	Dec 09 <sup>d</sup>	38 350	59%	26 659	41%	Dec 09	63 887	98%	1 594	2%	...	2 100	7 600	...	21%	74%
	Colombia	Dec 09	12 254	75%	4 043	25%		...		...		...	1 000	3 400	...		
	Comoros	Dec 09	6	50%	6	50%	Jan 09	11	92%	1	8%	...	<100	<100	...	14%	50%
	Congo	Dec 08 <sup>de</sup>	3 565	40%	5 347	60%	Dec 08 <sup>e</sup>	8 912	95%	488	5%	4 000	2 000	5 900	12%	8%	24%
	Cook Islands		...		...		Dec 08	1	100%	0	0%	...	...	...	...		
	Costa Rica		...		...		Dec 09	3 003	98%	61	2%	...	<100	<200	...	33%	>95%
	Côte d'Ivoire	Dec 09	21 603	30%	50 408	70%	Dec 09	67 662	94%	4 349	6%	29 000	14 000	42 000	15%	10%	30%
	Croatia	Dec 09	366	83%	75	17%	Dec 09	438	99%	3	1%	...	<100	<100	...	30%	>95%
	Cuba	Dec 09	4 027	80%	1 007	20%	Dec 09	5 014	100%	20	0%	...	<100	<100	...	22%	59%
	Democratic People's Republic of Korea		...		...			...		...		...	<100	<100	...		
	Democratic Republic of the Congo		...		...		Dec 08 <sup>e</sup>	20 470	83%	4 053	17%	...	17 000	46 000	...	9%	23%
	Djibouti	Dec 09	451	49%	462	51%	Dec 09	889	97%	24	3%	<1 000	<500	<1 000	4%	2%	8%
	Dominica	Dec 09 <sup>d</sup>	10	9%	1	9%	Dec 09	37	97%	1	3%	...	...	...	...		
	Dominican Republic		...		...		Dec 08 <sup>e</sup>	10 266	93%	782	7%	...	<1 000	2 900	...	27%	84%
Ecuador		...		...		Dec 09	5 131	93%	407	7%	...	<500	1 000	...	39%	>95%	
Egypt		...		...		Dec 09	332	92%	27	8%	...	<100	<500	...	12%	36%	
El Salvador	Dec 08 <sup>e</sup>	4 262	60%	2 842	40%	Dec 09	8 048	96%	300	4%	...	1 100	1 500	...	20%	28%	
Equatorial Guinea	Dec 08 <sup>e</sup>	235	28%	604	72%	Dec 09	1 618	98%	27	2%	<1 000	<500	1 500	3%	2%	7%	
Eritrea	Dec 09	2 153	43%	2 802	57%	Dec 09	4 631	93%	324	7%	1 500	<1 000	2 400	21%	14%	45%	
Ethiopia	Dec 09 <sup>d</sup>	90 527	45%	111 693	55%	Dec 09	166 640	94%	9 992	6%	...	27 000	74 000	...	14%	38%	
Fiji	Nov 09	25	48%	27	52%	Nov 09	51	98%	1	2%	...	<100	<100	...	20%	>95%	
Gabon	Dec 09	3 492	35%	6 484	65%	Dec 09	9 701	97%	275	3%	1 600	<1 000	2 500	17%	11%	34%	
Gambia		...		...		Dec 08 <sup>e</sup>	461	60%	309	40%	...	<500	1 300	...	25%	88%	
Georgia	Dec 09	468	71%	187	29%	Dec 09	627	96%	28	4%	...	<100	<100	...	62%	>95%	
Ghana	Dec 09 <sup>d</sup>	10 477	33%	20 954	67%	Dec 09	28 648	95%	1 617	5%	13 000	6 700	20 000	12%	8%	24%	
Grenada	Dec 09	27	53%	24	47%	Dec 09	51	94%	3	6%	...	...	...	...			
Guatemala	Dec 09	5 904	57%	4 458	43%	Dec 09	9 594	93%	768	7%	...	<1 000	2 500	...	31%	77%	
Guinea	Dec 09	5 850	39%	9 149	61%	Dec 09	14 325	96%	674	4%	4 400	2 100	6 900	15%	10%	32%	

	Reported number of males and females receiving antiretroviral therapy				Reported number of adults and children receiving antiretroviral therapy				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2009 <sup>a</sup>			Estimated antiretroviral therapy coverage among children, December 2009 <sup>b</sup>				
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Adults (+15)	% of total	Children (<15)	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Low- and middle-income countries <sup>a</sup>																
Guinea-Bissau	Dec 09	840	30%	1 924	70%	Dec 09	2 646	96%	118	4%	1 100	<1 000	1 700	10%	7%	21%
Guyana	Dec 08 <sup>c</sup>	1 113	45%	1 360	55%	Dec 08 <sup>c</sup>	2 308	93%	165	7%	...	<200	<500	...	73%	92%
Haiti	Dec 09	10 871	42%	15 136	58%	Dec 09	24 909	96%	1 098	4%	5 700	2 700	8 600	19%	13%	41%
Honduras	Dec 09	3 323	47%	3 752	53%	Dec 09	6 356	90%	719	10%	...	<1 000	1 800	...	40%	81%
Hungary	Dec 08 <sup>de</sup>	467	84%	86	16%	Dec 08 <sup>c</sup>	553	99%	6	1%	...	<100	<100	...	29%	>95%
India	Dec 09 <sup>d</sup>	168 598	59%	115 036	41%	Dec 09 <sup>c</sup>	302 122	94%	17 952	6%	...	30 000	76 000	...	24%	59%
Indonesia	Dec 08 <sup>c</sup>	7 934	75%	2 682	25%	Dec 08 <sup>c</sup>	10 260	97%	356	3%	...	<1 000	2 600	...	14%	48%
Iran (Islamic Republic of)	Jan 10	1 198	81%	288	19%	Jan 10	1 432	96%	54	4%	...	<500	1 300	...	4%	14%
Iraq	Dec 08	4	100%	0	0%	Dec 08	4	100%	0	0%	...	...	...	...	...	...
Jamaica		...		...		Dec 09	6 808	94%	436	6%	...	<500	<1 000	...	52%	>95%
Jordan	Dec 08 <sup>c</sup>	44	76%	14	24%	Dec 08 <sup>c</sup>	56	97%	2	3%	...	...	...	...	>95%	>95%
Kazakhstan	Jan 10	691	67%	344	33%	Jan 10	844	82%	191	18%	...	<100	<200	...	>95%	>95%
Kenya	Sep 09 <sup>de</sup>	107 401	36%	190 429	64%	Dec 09	308 610	92%	28 370	8%	89 000	48 000	130 000	32%	22%	59%
Kiribati		...		...		Dec 08	6	100%	0	0%	...	...	...	...	...	...
Kyrgyzstan	Jan 10	158	68%	73	32%	Jan 10	130	56%	101	44%	...	<100	<100	...	>95%	>95%
Lao People's Democratic Republic	Dec 09	722	54%	623	46%	Dec 09	1 250	93%	95	7%	...	<100	<500	...	36%	>95%
Latvia	Dec 08 <sup>c</sup>	240	72%	94	28%	Dec 09	413	94%	26	6%	...	<100	<100	...	34%	>95%
Lebanon		...		...		Dec 07 <sup>de</sup>	...	...	9	...	...	<100	<200	...	9%	28%
Lesotho	Dec 09	22 471	36%	39 265	64%	Dec 08 <sup>c</sup>	42 224	93%	3 038	7%	13 000	7 800	18 000	23%	17%	39%
Liberia	Dec 09	1 079		1 891		Dec 09 <sup>c</sup>	2 704	91%	266	9%	2 900	1 400	4 500	9%	6%	19%
Libyan Arab Jamahiriya		...		...			...		...		...	...	...	...		
Lithuania	Dec 09	113	78%	32	22%	Dec 09	143	99%	2	1%	...	<100	<100	...	20%	67%
Madagascar	Dec 09	106		108		Dec 09	209	98%	5	2%	...	<500	<1 000	...	1%	2%
Malawi		...		...		Dec 09	181 482	91%	17 364	9%	61 000	34 000	84 000	29%	21%	51%
Malaysia		...		...		Dec 08 <sup>c</sup>	7 696	94%	501	6%	...	<1 000	<1 000	...	88%	94%
Maldives	Dec 09	3	100%	0	0%	Dec 09	3	100%	0	0%	...	<100	<100	...	0%	0%
Mali	Dec 09	7 596	36%	13 504	64%	Dec 09	19 834	94%	1 266	6%	...	2 300	7 200	...	18%	55%
Marshall Islands	Dec 09	1	25%	3	75%	Dec 09	4	100%	0	0%	...	...	...	...	...	...



	Reported number of males and females receiving antiretroviral therapy				Reported number of adults and children receiving antiretroviral therapy				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2009 <sup>b</sup>				Estimated antiretroviral therapy coverage among children, December 2009 <sup>c</sup>			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Adults (+15)	% of total	Children (<15)	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Low- and middle-income countries <sup>a</sup>																
Mauritania	Dec 09	723	52%	678	48%	Dec 09	1 359	97%	42	3%	...	<200	<500	...	9%	28%
Mauritius		...		...			...		...		...	<100	<100	...		
Mexico	Dec 09	47 384	78%	13 527	22%	Dec 09	59 317	97%	1 594	3%	...	1 300	3 200	...	50%	>95%
Micronesia (Federated States of)	Dec 09	2	40%	3	60%	Dec 09	5	100%	0	0%	...	<100	<100	...		
Mongolia	Dec 09	1	11%	8	89%	Dec 09	9	100%	0	0%	...	<100	<100	...	0%	0%
Montenegro	Mar 10	26	84%	5	16%	Mar 10	30	97%	1	3%	...			...		
Morocco	Dec 09	1 372	52%	1 275	48%	Dec 09	2 502	95%	145	5%	...	<200	<500	...	29%	>95%
Mozambique	Sep 09 <sup>de</sup>	43 159	37%	72 854	63%	Dec 09	160 805	94%	9 393	6%	66 000	36 000	93 000	14%	10%	26%
Myanmar	Dec 09	11 987	57%	9 151	43%	Dec 09	19 603	93%	1 535	7%	...	1 900	4 900	...	32%	83%
Namibia	Sep 09 <sup>d</sup>	26 212	37%	44 365	63%	Sep 09	62 310	88%	8 188	12%	9 200	7 300	13 000	89%	65%	>95%
Nauru	Dec 08	0		0		Dec 08	0		0		...			...		
Nepal	Jul 09	1 928	60%	1 298	40%	Jul 09	3 048	94%	178	6%	...	<1000	2 600	...	7%	23%
Nicaragua	Dec 09	679	64%	384	36%	Dec 09	1 007	95%	56	5%	...	<100	<200	...	34%	79%
Niger	Dec 09	2 836	44%	3 609	56%	Dec 09	6 187	96%	258	4%	...	1 800	5 900	...	4%	15%
Nigeria	Dec 09	105 122	35%	197 851	65%	Dec 09	284 881	94%	18 092	6%	180 000	94 000	270 000	10%	7%	19%
Niue	Dec 08	0		0		Dec 08	0		0		...			...		
Oman	Dec 08 <sup>e</sup>	262	64%	150	36%	Dec 09	460	95%	26	5%	...	<100	<100	...	>95%	>95%
Pakistan	Dec 09	944	72%	376	28%	Dec 09	1 263	96%	57	4%	...	<1000	2 300	...	2%	8%
Palau	Dec 09	1	33%	2	67%	Dec 09	3	100%	0	0%	...			...		
Panama		...		...		Dec 09	4 207	94%	256	6%	...	<500	<500	...	79%	>95%
Papua New Guinea	Dec 09	2 936	43%	3 815	57%	Dec 09	6 324	94%	427	6%	1 700	<1000	2 600	26%	17%	49%
Paraguay	Dec 08 <sup>d</sup>	1 022	69%	461	31%	Dec 08 <sup>e</sup>	1 483	92%	130	8%	...	<200	<500	...	49%	>95%
Peru	Dec 09	10 346	70%	4 434	30%	Dec 09	14 263	97%	517	3%	...	<500	1 400	...	36%	>95%
Philippines	Dec 09	726	97%	24	3%	Dec 08 <sup>e</sup>	521	98%	11	2%	...	<100	<200	...	8%	30%
Poland	Dec 09	3 130	72%	1 199	28%	Dec 09	4 192	97%	137	3%	...	<100	<100	...	>95%	>95%
Republic of Moldova	Dec 09	571	58%	413	42%	Dec 09	950	97%	34	3%	...	<100	<100	...	45%	>95%
Romania	Dec 09	3 538	49%	3 706	51%	Dec 09	7 052	97%	192	3%	...	<500	<500	...	52%	71%
Russian Federation		...		...		Dec 08 <sup>e</sup>	52 902	96%	1 998	4%	...	3 400	12 000	...	17%	60%

	Reported number of males and females receiving antiretroviral therapy				Reported number of adults and children receiving antiretroviral therapy				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2009 <sup>b</sup>			Estimated antiretroviral therapy coverage among children, December 2009 <sup>c</sup>					
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Adults (+15)	% of total	Children (<15)	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	
Low- and middle-income countries <sup>a</sup>	Rwanda	Dec 09	29 795	39%	46 931	61%	Dec 09	70 047	91%	6 679	9%	11 000	7 000	17 000	60%	40%	>95%
	Saint Kitts and Nevis		...		...			...		...		...		...	...		
	Saint Lucia	Dec 09	59	48%	65	52%	Dec 09	121	98%	3	2%	...	...		...		
	Saint Vincent and the Grenadines	Dec 09	87	54%	75	46%	Dec 09	159	98%	3	2%	...	...		...		
	Samoa		...		...			...		...		...		...	...		
	Sao Tome and Principe	Dec 09	62	37%	107	63%	Dec 08 <sup>e</sup>	104	95%	5	5%	...	...		...		
	Senegal	Dec 09	4 427	36%	7 822	64%	Dec 09	11 455	94%	794	6%	...	1 600	4 300	...	18%	51%
	Serbia	Dec 09	598	76%	192	24%	Dec 09	779	99%	11	1%	...	<100	<100	...	55%	>95%
	Seychelles	Dec 09	78	56%	61	44%	Dec 09	130	94%	9	6%	...	...		...		
	Sierra Leone	Nov 08 <sup>de</sup>	1 542	37%	2 680	63%	Dec 09	3 423	94%	237	6%	1 700	<1 000	2 600	14%	9%	25%
	Slovakia	Dec 08	70	72%	27	28%	Dec 08	97	100%	0	0%	...	<100	<100	...	0%	0%
	Solomon Islands	Dec 09	1	25%	3	75%	Dec 09	4	100%	0	0%	...	...		...		
	Somalia		...		...		Dec 08 <sup>e</sup>	404	98%	9	2%	...	<1 000	1 900	...	0%	1%
	South Africa	Oct 09 <sup>d</sup>	349 967	35%	649 939	65%	Oct 09	885 286	91%	86 270	9%	160 000	92 000	210 000	54%	41%	94%
	Sri Lanka	Dec 09	120	58%	87	42%	Dec 09	196	95%	11	5%	...	<100	<100	...	34%	92%
	Sudan	Dec 09 <sup>de</sup>	1 141	57%	855	43%	Dec 09 <sup>de</sup>	...		188		8 700	4 400	13 000	2% <sup>h</sup>	1%	4%
	Suriname		...		...		Dec 08 <sup>e</sup>	778	91%	80	9%	...	<100	<200	...	74%	>95%
	Swaziland	Dec 09	17 300	37%	29 941	63%	Dec 09	42 469	90%	4 772	10%	6 800	4 400	9 000	70%	53%	>95%
	Syrian Arab Republic	Dec 09	66	67%	33	33%	Dec 09	91	92%	8	8%	...	...		...		
	Tajikistan	Dec 09	218	68%	104	32%	Dec 09	313	97%	9	3%	...	<100	<200	...	5%	21%
	Thailand		...		...		Sep 09	208 042	96%	8 076	4%	...	7 900	11 000	...	73%	>95%
	The former Yugoslav Republic of Macedonia	Dec 09	18	75%	6	25%	Dec 09	23	96%	1	4%	...	...		...		
	Timor-Leste	Dec 09	15	48%	16	52%	Dec 09	28	90%	3	10%	...	...		...		
	Togo	Dec 09	5 307	32%	11 403	68%	Dec 09	15 682	94%	1 028	6%	5 200	1 800	8 800	20%	12%	58%
	Tonga		...		...		Dec 08	2	100%	0	0%	...	<100	<100	...		
	Tunisia	Dec 09	262	64%	150	36%	Dec 09	400	97%	12	3%	...	<100	<100	...	35%	86%
	Turkey		...		...		Dec 07 <sup>de</sup>	...		9		...	<100	<100	...	10%	21%
	Turkmenistan		...		...			...		...		...					

	Reported number of males and females receiving antiretroviral therapy				Reported number of adults and children receiving antiretroviral therapy				Estimated number of children needing antiretroviral therapy based on UNAIDS/WHO methods, 2009 <sup>b</sup>				Estimated antiretroviral therapy coverage among children, December 2009 <sup>c</sup>			
	Month and year of report	Males	% of total	Females	% of total	Month and year of report	Adults (+15)	% of total	Children (<15)	% of total	Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate
Low- and middle-income countries <sup>a</sup>																
Tuvalu	Dec 09	1	100%	0	0%	Dec 09	1	100%	0	0%	...	...	...	...	...	...
Uganda	Sep 09 <sup>d</sup>	64 604	37%	110 763	63%	Sep 08	187 000	93%	13 413	7%	76 000	41 000	110 000	18%	12%	33%
Ukraine	Dec 09	8 356	53%	7 515	47%	Dec 09	14 151	89%	1 720	11%	...	1 500	2 500	...	69%	>95%
United Republic of Tanzania	Sep 09 <sup>d</sup>	70 558	36%	126 854	64%	Dec 08	186 591	94%	12 822	6%	75 000	38 000	110 000	17%	11%	34%
Uruguay		...		...		Dec 06	2 350	94%	160	6%	...	<100	<200	...	81%	>95%
Uzbekistan		...		...		Dec 07 <sup>d,e</sup>	...		225		...	<sup>f</sup>	...	...	...	
Vanuatu	Dec 09	0	0%	2	100%	Dec 09	1	50%	1	50%	...	...	...	...	...	
Venezuela (Bolivarian Republic of)	Dec 09	23 338	72%	8 964	28%	Dec 09	31 518	98%	784	2%	...	<sup>f</sup>	...	...	...	
Viet Nam	Sep 09 <sup>d,e</sup>	16 854	72%	6 558	28%	Dec 09	36 008	95%	1 987	5%	...	...	3 700	...	54%	>95%
Yemen	Dec 08 <sup>e</sup>	123	65%	66	35%	Dec 08 <sup>e</sup>	265	97%	9	3%	...	...	...	...	...	
Zambia	Dec 09	124 189	44%	159 674	56%	Dec 09	262 743	93%	21 120	7%	59 000	32 000	82 000	36%	26%	65%
Zimbabwe	Dec 08 <sup>d</sup>	49 701	37%	85 625	63%	Feb 10	197 068	90%	21 521	10%	71 000	43 000	95 000	30%	23%	50%

... Data not available or not applicable.

<sup>a</sup> See the country classification by income, level of the epidemic and geographical, UNAIDS, UNICEF and WHO regions (Annex 7).

<sup>b</sup> The needs estimates are based on the methods described in the explanatory notes to the annexes. The estimates for individual countries may differ according to the local methods used.

<sup>c</sup> 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 methodology).

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.

<sup>d</sup> The latest available breakdowns refer to partial or cumulative data sets and do not reflect national-level data. See Annex 3 for national-level data.

<sup>e</sup> The latest available breakdowns are not as recent as the latest reported national-level data. See Annex 3 for the latest reported national-level data.

<sup>f</sup> 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.

<sup>g</sup> Breakdowns by sex and age groups were only received for northern Sudan, therefore data should be interpreted cautiously.

**Annex 5. Preventing mother-to-child transmission of HIV in low- and middle-income countries, 2009**

Low- and middle-income countries <sup>a</sup>	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 <sup>b</sup>			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission <sup>c</sup>			Pregnant women tested for HIV		Infants born to women living with HIV receiving antiretrovirals for preventing mother-to-child transmission		Infants born to women living with HIV receiving co-trimoxazole prophylaxis within two months of birth		Infants born to women living with HIV receiving a virological test by two months of age	
			Estimate	Low estimate	High estimate	Estimate	Low estimate	High estimate	Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage	Reported number	Estimated coverage
Afghanistan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Albania	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Algeria	65	Jan 09-Dec 09	...	<200	<500	...	14%	59%	...	...	...	...	...	...	...	...
Angola	3 053	Jan 09-Dec 09	16 000	8 400	25 000	19%	12%	36%	203 463	26%	2 435	15%	2 435	15%	...	...
Argentina	2 039	Jan 08-Dec 08	...	<1 000	2 400	...	86%	>95%	598 123 <sup>d</sup>	87%	2 280 <sup>d</sup>	>95%	2 160 <sup>d</sup>	>95%	...	...
Armenia	13	Jan 09-Dec 09	...	<100	<100	...	65%	>95%	40 679	86%	9	75%	2	17%	0	0%
Azerbaijan	11	Jan 09-Dec 09	...	<100	<500	...	5%	17%	172 153 <sup>d</sup>	>95%	14 <sup>d</sup>	11%	13 <sup>d</sup>	10%	15 <sup>d</sup>	12%
Bangladesh	7	Jan 08-Dec 08	...	<100	<200	...	4%	13%	91	0%	12	12%	16	16%	...	...
Belarus	194	Jan 09-Dec 09	...	<100	<500	...	>95%	>95%	150 186 <sup>e</sup>	>95%	195	>95%	148	>95%	192	>95%
Belize	63	Jan 09-Dec 09	...	<200	<500	...	22%	61%	6 310	85%	51	26%	...	...	53	27%
Benin	1 703	Jan 09-Dec 09	3 700	1 900	5 800	46%	29%	92%	171 532 <sup>f</sup>	49%	1 473	39%	1 473	39%	327	9%
Bhutan	19	Jan 08-Dec 08	...	<100	<100	...	95%	>95%	...	...	13 <sup>d</sup>	>95%	7 <sup>d</sup>	58%	...	...
Bolivia (Plurinational State of)	105	Jan 09-Dec 09	...	<200	<500	...	22%	83%	73 369	28%	28 <sup>e</sup>	10%	27 <sup>d</sup>	10%	23 <sup>d</sup>	8%
Bosnia and Herzegovina	1	Jan 08-Dec 08	...	...	...	...	...	...	1 012	3%	0	...	0	...	0	...
Botswana	12 406	Jan 09-Dec 09	13 000	6 900	17 000	>95%	74%	>95%	44 386 <sup>h</sup>	93%	14 073 <sup>i</sup>	>95%	8 232 <sup>j</sup>	65%	...	...
Brazil	5 988	Jan 09-Dec 09	...	3 700	12 000	...	49%	>95%	2 381 280 <sup>d</sup>	79%	7 511 <sup>d</sup>	>95%	...	...	2 306 <sup>d</sup>	32%
Bulgaria	9	Jan 09-Dec 09	...	<100	<100	...	23%	82%	...	...	...	...	...	...	...	...
Burkina Faso	2 084	Jan 09-Dec 09	6 500	3 500	11 000	32%	19%	60%	310 583	42%	2 140	33%	1 815	28%	199	3%
Burundi	1 837	Jan 09-Dec 09	15 000	8 400	21 000	12%	9%	22%	113 033	40%	1 332	9%	1 332	9%	...	...
Cambodia	798	Jan 09-Dec 09	...	<1 000	3 000	...	26%	>95%	153 884	42%	730	45%	203 <sup>g</sup>	12%	...	...
Cameroon	9 092	Jan 09-Dec 09	34 000	18 000	50 000	27%	18%	50%	291 473	41%	8 378	25%	8 378	25%	8 940	26%
Cape Verde	61	Jan 09-Dec 09	...	...	...	...	...	...	8 500	71%	67	...	67	...	67	...
Central African Republic	2 157	Jan 09-Dec 09	6 300	3 200	9 500	34%	23%	67%	43 775	28%	1 380	22%	887	14%	40	1%
Chad	989	Jan 09-Dec 09	16 000	8 300	29 000	6%	3%	12%	32 119	6%	676	4%	676	4%	...	...
Chile	121	Jan 09-Dec 09	...	<500	<1 000	...	15%	55%	144 772	57%	...	...	...	...	...	...
China	1 554	Jan 09-Dec 09	...	2 600	11 000	...	14%	59%	3 741 337 <sup>k</sup>	20%	1 701	28%	...	...	...	...

Low- and middle-income countries <sup>a</sup>	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 <sup>b</sup>			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission <sup>c</sup>			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
Colombia	519	Jan 09-Dec 09	...	<1 000	3 900	...	13%	55%	353 764	39%	248	12%	...	...	83	4%
Comoros	1	Jan 09-Dec 09	...	<100	<100	...	10%	33%	1 034	5%	1	17%	1	17%	0	0%
Congo	441	Jan 09-Dec 09	3 800	1 900	5 600	12%	8%	23%	28 699	23%	615	16%	548	15%	444	12%
Cook Islands	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Costa Rica	31	Jan 08-Dec 08	...	<100	<200	...	17%	53%	...	...	38	33%	44	38%	44	38%
Côte d'Ivoire	11 064	Jan 09-Dec 09	20 000	10 000	31 000	54%	36%	>95%	342 698	47%	6 696	33%	...	...	...	...
Croatia	2	Jan 09-Dec 09	...	<100	<100	...	15%	67%	...	...	...	...	...	...	...	...
Cuba	50	Jan 09-Dec 09	...	<100	<200	...	39%	>95%	122 611 <sup>e</sup>	>95%	0	0%	1 <sup>s</sup>	1%	50	67%
Democratic People's Republic of Korea	...	...	...	<100	<100	...	...	...	...	...	...	...	...	...	...	...
Democratic Republic of the Congo	2 232	Jan 09-Dec 09	...	20 000	54 000	...	4%	11%	253 297	9%	2 232	6%	396	1%	...	...
Djibouti	63	Jan 09-Dec 09	<1 000	<500	1 000	10%	6%	21%	9 371	39%	36 <sup>d</sup>	6%	22	4%	...	...
Dominica	2	Jan 09-Dec 09	...	...	...	...	...	...	947	...	1	...	1	...	1	...
Dominican Republic	949	Jan 09-Dec 09	...	<1 000	3 000	...	32%	95%	114 046	51%	1133	59%	...	...	391 <sup>d</sup>	20%
Ecuador	477	Jan 09-Dec 09	...	<500	<1 000	...	48%	>95%	286 211 <sup>e</sup>	>95%	315	56%	...	...	5	1%
Egypt	11	Jan 09-Dec 09	...	<200	<500	...	3%	10%	1 750 <sup>s</sup>	0%	2 <sup>s</sup>	1%	...	...	5 <sup>s</sup>	3%
El Salvador	170	Jan 08-Dec 08	...	<500	<1 000	...	19%	71%	65 712	53%	216	42%	176	34%	...	...
Equatorial Guinea	365	Jan 09-Dec 09	1 400	<1 000	2 300	26%	16%	50%	16 228	63%	164	11%	...	...	...	...
Eritrea	464	Jan 09-Dec 09	1 400	<1 000	2 200	34%	21%	71%	46 544 <sup>d</sup>	25%	424 <sup>d</sup>	31%	225 <sup>d</sup>	17%	...	...
Ethiopia	6 721	Jan 09-Dec 09	...	17 000	51 000	...	13%	40%	488 554	16%	5 025	15%	1 076	3%	1 375	4%
Fiji	5	Jan 09-Nov 09	...	<100	<100	...	28%	>95%	9 041 <sup>d</sup>	52%	1 <sup>d</sup>	10%	2 <sup>d</sup>	20%	1 <sup>d</sup>	10%
Gabon	577	Jan 09-Dec 09	1 900	<1 000	2 900	30%	20%	60%	9 321	23%	312	16%	219 <sup>d</sup>	12%	...	...
Gambia	885	Jan 09-Sep 09	...	<1 000	2 000	...	43%	>95%	31 071	50%	230	20%	99	8%	...	...
Georgia	12	Jan 09-Dec 09	...	<100	<100	...	19%	86%	58 769 <sup>d</sup>	>95%	19 <sup>d</sup>	58%	19 <sup>d</sup>	58%	19 <sup>d</sup>	58%
Ghana	3 643	Jan 09-Dec 09	13 000	6 900	20 000	27%	18%	53%	388 254	51%	1 730 <sup>m</sup>	13%	...	...	...	...
Grenada	2	Jan 09-Dec 09	...	...	...	...	...	...	1 229	60%	2	...	2	...	0	...
Guatemala	440	Jan 09-Dec 09	...	<1 000	2 900	...	15%	56%	102 957	23%	159 <sup>d</sup>	9%	222 <sup>d</sup>	13%	...	...
Guinea	783	Jan 09-Dec 09	4 600	2 300	7 200	17%	11%	34%	39 893	10%	231 <sup>n</sup>	5%	801 <sup>n</sup>	17%	...	...
Guinea-Bissau	383	Jan 09-Dec 09	1 600	<1 000	2 400	24%	16%	49%	13 864 <sup>o</sup>	21%	143 <sup>d</sup>	9%	...	...	0	0%

Low- and middle-income countries <sup>a</sup>	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 <sup>b</sup>			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission <sup>c</sup>			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
Guyana	183	Jan 09-Dec 09	...	<100	<500	...	88%	>95%	14 283 <sup>e</sup>	>95%	206	>95%	97 <sup>p</sup>	98%	...	...
Haiti	2 960	Jan 09-Dec 09	5 000	2 600	7 500	60%	39%	>95%	154 835	57%	...	...	448 <sup>d</sup>	9%	...	...
Honduras	255	Jan 09-Dec 09	...	<500	1 300	...	20%	82%	103 562	51%	255	35%	...	...	309	42%
Hungary	5	Jan 09-Dec 09	...	<100	<100	...	14%	63%	8 357 <sup>d</sup>	8%	5	26%	5	26%	...	...
India	11 319	Jan 09-Dec 09	...	23 000	65 000	...	17%	48%	5 717 819	21%	11 593	27%	...	...	...	...
Indonesia	196	Jan 08-Dec 08	...	1 100	4 600	...	4%	17%	10 026	0%	165 <sup>d</sup>	6%	25 <sup>s</sup>	1%	...	...
Iran (Islamic Republic of)	25	Mar 08-Feb 09	...	<500	1 300	...	2%	7%	158 <sup>a</sup>	0%	24 <sup>d</sup>	3%	20 <sup>d</sup>	3%	7 <sup>d</sup>	1%
Iraq	0	Jan 08-Dec 08	...	...	...	...	...	...	1 550 <sup>d</sup>	0%	0 <sup>d</sup>	...	0 <sup>d</sup>	...	...	...
Jamaica	379	Jan 09-Dec 09	...	<200	<1 000	...	46%	>95%	28 659 <sup>d</sup>	55%	605 <sup>d</sup>	>95%	...	...	...	...
Jordan	0	Jan 09-Dec 09	...	...	...	...	...	...	0	0%	0	...	0	...	0	...
Kazakhstan	193	Jan 09-Dec 09	...	<200	<1 000	...	38%	>95%	434 548 <sup>e</sup>	>95%	198	68%	204	70%	188	64%
Kenya	58 591	Jan 09-Dec 09	81 000	41 000	120 000	73%	50%	>95%	961 990	63%	39 482	49%	4 043	5%	...	...
Kiribati	0	Jan 08-Dec 08	...	...	...	...	...	...	1 159	...	0	...	0	...	0	...
Kyrgyzstan	58	Jan 09-Dec 09	...	<100	<500	...	23%	>95%	171 480 <sup>e</sup>	>95%	60	51%	70	59%	0	...
Lao People's Democratic Republic	24	Jan 09-Dec 09	...	<200	<500	...	5%	20%	3 094	2%	18 <sup>d</sup>	7%	17 <sup>d</sup>	7%	...	...
Latvia	56	Jan 09-Dec 09	...	<100	<200	...	52%	>95%	20 608	88%	...	...	52	84%	...	...
Lebanon	...	...	...	<100	<100	...	0%	0%	...	...	0	0%	...	...	...	...
Lesotho	8 846	Jan 09-Dec 09	14 000	8 400	18 000	64%	48%	>95%	29 626	50%	4 240	31%	1 542 <sup>d</sup>	11%	4 621	33%
Liberia	377	Jan 09-Dec 09	2 400	1 100	3 700	16%	10%	33%	32 659	22%	194	8%	45 <sup>r</sup>	2%	109 <sup>r</sup>	5%
Libyan Arab Jamahiriya	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Lithuania	12	Jan 09-Dec 09	...	<100	<100	...	92%	>95%	30 057	95%	12	>95%	...	...	10	>95%
Madagascar	17	Jan 09-Dec 09	...	<500	1 100	...	1%	5%	140 261	20%	8	1%	...	...	...	...
Malawi	33 156	Jan 09-Dec 09	57 000	31 000	83 000	58%	40%	>95%	316 000	52%	23 773	41%	28 079	49%	...	...
Malaysia	300	Jan 09-Dec 09	...	<100	<1 000	...	55%	>95%	403 287 <sup>s</sup>	73%	163	54%	163	54%	163	54%
Maldives	0	Jan 09-Dec 09	...	<100	<100	...	0%	0%	3 911	67%	0	0%	0	0%	0	0%
Mali	1 710	Jan 09-Dec 09	...	2 100	6 700	...	26%	82%	86 814	16%	810	19%	722	17%	531	13%
Marshall Islands	1	Oct 08-Sep 09	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mauritania	68	Jan 09-Dec 09	...	<200	<1 000	...	12%	37%	6 371 <sup>d</sup>	6%	15 <sup>d</sup>	4%	18 <sup>s</sup>	5%	...	...



Low- and middle-income countries <sup>a</sup>	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 <sup>b</sup>			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission <sup>c</sup>			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
Mauritius	41	Jan 09-Dec 09	...	<100	<200	...	33%	>95%	15 026	83%	53	73%	48	66%	...	...
Mexico	124	Jan 09-Dec 09	...	1 500	4 500	...	3%	9%	757 863 <sup>d</sup>	37%	58 <sup>d</sup>	2%	...	...	...	...
Micronesia (Federated States of)	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Mongolia	1	Jan 09-Dec 09	...	<100	<100	...	10%	33%	...	...	1	17%	1	17%	1	17%
Montenegro	0	Jan 09-Dec 09	...	...	...	...	...	...	...	...	1 <sup>s</sup>	...	...	...	...	...
Morocco	90	Jan 09-Dec 09	...	<200	<1 000	...	13%	49%	2 723 <sup>d</sup>	0%	20 <sup>d</sup>	5%	19 <sup>d</sup>	5%	4 <sup>d</sup>	1%
Mozambique	68 248	Jan 09-Dec 09	97 000	53 000	130 000	70%	51%	>95%	672 020	77%	41 266	43%	...	...	...	...
Myanmar	2 398	Jan 09-Dec 09	...	1 800	5 600	...	43%	>95%	182 760	18%	1 697	46%	858	23%	...	...
Namibia	6 744	Apr 08-Mar 09	7 700	4 100	11 000	88%	61%	>95%	51 970	88%	7 120	93%	...	...	...	...
Nauru	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Nepal	56	Jul 08-Jun 09	...	<1 000	2 100	...	3%	10%	65 791	9%	89	7%	75	6%	10	1%
Nicaragua	91	Jan 09-Dec 09	...	<100	<500	...	45%	>95%	81 686	58%	81	63%	81	63%	81	63%
Niger	1 737	Jan 09-Dec 09	...	2 300	7 000	...	25%	74%	158 695	19%	708	15%	309	6%	...	...
Nigeria	44 723	Jan 09-Dec 09	210 000	110 000	300 000	22%	15%	42%	820 865	13%	15 905	8%	3 927 <sup>t</sup>	2%	6 101 <sup>r</sup>	3%
Niue	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Oman	9	Jan 09-Dec 09	...	<100	<100	...	29%	>95%	30 875	50%	4	21%	4	21%	4	21%
Pakistan	25	Jan 09-Dec 09	...	1 000	3 700	...	1%	2%	10 277	0%	16	1%	0	0%	15	1%
Palau	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Panama	118	Jan 09-Dec 09	...	<200	<1 000	...	19%	>95%	59 334	85%	154 <sup>du</sup>	56%	62 <sup>du</sup>	23%	...	...
Papua New Guinea	263	Jan 09-Dec 09	2 000	<1 000	3 000	13%	9%	27%	43 942	21%	251	13%	19	1%	...	...
Paraguay	148	Jan 09-Dec 09	...	<200	<500	...	38%	>95%	73 123	47%	148	62%	85	36%	...	...
Peru	550	Jan 09-Dec 09	...	<500	1 700	...	33%	>95%	599 012	99%	426	43%	...	...	...	...
Philippines	3	Jan 09-Dec 09	...	<100	<500	...	1%	4%	...	...	2	1%	3	2%	2	1%
Poland	81	Jan 09-Dec 09	...	<100	<500	...	27%	>95%	...	...	69	41%	69	41%	69	41%
Republic of Moldova	109	Jan 09-Dec 09	...	<100	<200	...	71%	>95%	45 557 <sup>e</sup>	>95%	118	>95%	33	37%	112	>95%
Romania	152	Jan 09-Dec 09	...	<100	<500	...	76%	>95%	100 589	47%	192	>95%	7	6%	192	>95%
Russian Federation	9 380	Jan 09-Dec 09	...	5 100	16 000	...	57%	>95%	1 468 091 <sup>du</sup>	95%	8 744 <sup>d</sup>	>95%	...	...	...	...
Rwanda	7 030	Jan 09-Dec 09	11 000	5 400	16 000	65%	43%	>95%	294 457	71%	6 684	62%	7 222	67%	5 646	52%

Low- and middle-income countries <sup>a</sup>	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 <sup>b</sup>			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission <sup>c</sup>			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
Saint Kitts and Nevis	1	Jan 09-Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Lucia	6	Jan 09-Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Saint Vincent and the Grenadines	14	Jan 09-Dec 09	...	...	...	...	...	...	2 635 <sup>e</sup>	>95%	15	>95%	14		14	
Samoa	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Sao Tome and Principe	11	Jan 09-Dec 09	...	...	...	...	...	...	6 475 <sup>e</sup>	>95%	17	>95%	17		...	
Senegal	917	Jan 09-Dec 09	...	2 000	5 900	...	16%	45%	166 830	35%	433	11%	...		339	9%
Serbia	2	Jan 08-Dec 08	...	<100	<100	...	3%	10%	5 665 <sup>d</sup>	5%	1	2%	0	0%	1	2%
Seychelles	12	Jan 09-Dec 09	...	...	...	...	...	...	1 650		7		7		0	
Sierra Leone	637	Jan 09-Dec 09	3 300	1 800	5 100	19%	12%	36%	99 256	44%	518 <sup>d</sup>	16%	363 <sup>d</sup>	11%	0 <sup>d</sup>	0%
Slovakia	2	Jan 09-Dec 09	...	<100	<100	...	50%	>95%	...	...	...	...	...	...	...	...
Solomon Islands	1	Jan 09-Dec 09	...	...	...	...	...	...	41 <sup>d</sup>	0%	1 <sup>d</sup>	0%	0 <sup>d</sup>		...	
Somalia	0	Jan 09-Dec 09	...	1 000	3 700	...	0%	0%	1131	0%	6	0%	0	0%	...	
South Africa	188 200	Jan 09-Dec 09	210 000	120 000	290 000	88%	66%	>95%	1 099 712 <sup>e</sup>	>95%	119 395 <sup>d</sup>	56%	43 394	20%	...	
Sri Lanka	4	Jan 09-Dec 09	...	<100	<100	...	9%	31%	13 475	4%	4	15%	4	15%	0	0%
Sudan	245	Jan 09-Dec 09	14 000	7 300	22 000	2%	1%	3%	33 127 <sup>z</sup>	3%	56 <sup>y</sup>	0%	34 <sup>z</sup>	0%	...	
Suriname	83	Jan 08-Dec 08	...	<100	<200	...	82%	>95%	8 885 <sup>d</sup>		91 <sup>d</sup>	>95%	...		9	16%
Swaziland	8 182	Jan 09-Dec 09	9 300	5 700	12 000	88%	68%	>95%	25 769	73%	7 655	82%	9 189	98%	...	
Syrian Arab Republic	2	Jan 09-Dec 09	...	...	...	...	...	...	4 <sup>s</sup>	0%	...		...		...	
Tajikistan	25	Jan 09-Dec 09	...	<100	<500	...	9%	36%	76 297	39%	19	12%	23	15%	1 <sup>s</sup>	1%
Thailand	5 457	Oct 08-Sep 09	...	4 900	8 300	...	66%	>95%	797 047	82%	5 722	88%	2 074	32%	...	
The former Yugoslav Republic of Macedonia	0	Jan 09-Dec 09	...	...	...	...	...	...	...	...	...	...	...	...	...	
Timor-Leste	1	Jan 08-Dec 08	...	...	...	...	...	...	71 <sup>d</sup>	0%	1 <sup>d</sup>		...		...	
Togo	1 451	Jan 09-Dec 09	5 600	2 200	9 400	26%	15%	67%	42 101	20%	1 508	27%	945	17%	614	11%
Tonga	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Tunisia	3	Jan 09-Dec 09	...	<100	<100	...	6%	25%	0		1	4%	0	0%	0	0%
Turkey	4	Jan 06-Dec 06	...	<100	<200	...	3%	13%	...		0		...		...	
Turkmenistan	...	...	...	...	...	...	...	...	...		...		...		...	
Tuvalu	...	...	...	...	...	...	...	...	...		...		...		...	

Low- and middle-income countries <sup>a</sup>	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 <sup>b</sup>			Estimated percentage of pregnant women living with HIV who received antiretrovirals for preventing mother-to-child transmission <sup>c</sup>			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
Uganda	46 948	Jan 09-Dec 09	88 000	48 000	130 000	53%	37%	>95%	968 157 <sup>d</sup>	64%	24 554	28%	...	...	5 607	6%
Ukraine	3 645	Jan 09-Dec 09	...	1 200	4 800	...	76%	>95%	555 535 <sup>e</sup>	>95%	3 840	>95%	3 021	>95%	2 033	69%
United Republic of Tanzania	58 833	Jan 09-Dec 09	84 000	45 000	120 000	70%	48%	>95%	1 194 172	66%	43 119	51%	8 348 <sup>f</sup>	10%	11 345	13%
Uruguay	70	Jan 08-Dec 08	...	<100	<500	...	31%	>95%	47 428 <sup>g</sup>	95%	...	...	...	...	...	...
Uzbekistan	304	Jan 09-Dec 09	...	...	...	...	...	...	414 346 <sup>h</sup>	74%	399	>95%	...	...	2	1%
Vanuatu	...	...	...	...	...	...	...	...	1 499 <sup>h</sup>	21%	0 <sup>d</sup>	...	...	...	...	...
Venezuela (Bolivarian Republic of)	233	Jan 09-Dec 09	...	...	...	...	...	...	...	...	274	11%	...	...	...	...
Viet Nam	1372	Jan 09-Dec 09	...	1 700	4 700	...	29%	79%	480 814 <sup>i</sup>	32%	1511	48%	944	30%	...	...
Yemen	13	Jan 09-Dec 09	...	...	...	...	...	...	4 211	0%	10	...	8	...	0	...
Zambia	47 175	Jan 09-Dec 09	68 000	37 000	94 000	69%	50%	>95%	532 484	97%	26 743	39%	25 139	37%	35 824	53%
Zimbabwe	28 208	Jan 09-Dec 09	50 000	28 000	69 000	56%	41%	>95%	175 223	46%	17 331	35%	13 852	28%	...	...

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 5.7. 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 unrounded 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 latest reported data are to December 2008.

e The reported number of pregnant women tested for HIV was higher than the estimated number of pregnant women, implying a coverage of >100%. Last year, coverage was already >95% in these countries, thus in the regional and global analysis, data are adjusted to represent the same coverage as last year.

f Data are from 323 out of 364 maternity hospitals with PMTCT services.

g The latest reported data are to December 2007.

h Number of tests were reported, as tests for women who tested more than once at ANC, labour/delivery and postpartum cannot be deduplicated.

i The data may include double-counting.

j The data cannot specify whether data reported were for infants within two months of birth, but the policy is for all infants to start co-trimoxazole at 6 weeks of age. Data suggest that around two-thirds of infants who started cotrimoxazole, started within two months of birth.

k Data are collected from 453 priority countries out of a total of 2860.

l 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 estimates at all.

m Data reported in 2009 is lower than reported value of 2 450 in 2008. This is due to transition from the old regimen of single-dose nevirapine to the new regimen of single-dose nevirapine at birth and Zidovudine and Lamivudine for 1 or 6 weeks as relevant, which were both still used in 2008. Now only the new regimen is used and is still being scaled up.

n Only partial data were collected.

o Data are based on the number of pregnant women having access to antenatal clinics/maternity hospitals who know their HIV status.

p Data are collected on a monthly data reporting form at 6 weeks, not at 2 months. Therefore, some infants may be lost to follow up.

q The latest data reported are to August 2007.

r Data may be under-reported.

s Only public data were reported, which represent about 70% of total ANC cases.

t Four out of 10 implementing partners reported for this indicator.

u The data are from three of four paediatric care clinics.



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- v A data value of 76 was reported. The data value was from one site only and for the period September–November 2009.
- w Russian Federation reported 4 827 215 pregnant women being tested for HIV. As the number of pregnant women tested likely reflects double or triple counting, 95% of the estimated number of births in Russia (1 545 359) was used as a proxy and most likely represents the total number of tests conducted among pregnant women.
- x Two separate reports were received from Sudan: Northern Sudan reported 19 986 for the period between January–December 2009; southern Sudan reported 13 141 to November 2009, giving a total of 33 127.
- y Two separate reports were received from Sudan: Northern Sudan reported 34 for the period between January–December 2009; southern Sudan reported 22 to November 2009, giving a total of 56.
- z Two separate reports were received from Sudan: Northern Sudan reported 34 for the period between January–December 2009; southern Sudan reported “no data” stating that services have just been initiated and co-trimoxazole was initially not part of the supplies for PMTCT. Data for southern Sudan are expected to be ready in next reporting period.
- \* The data are reported for the period July 2008–July 2009.
- \*\* Data are under-reported.
- \*\*\* In 2009, there was a substantial increase in the number of pregnant women tested for HIV, up from the last reported value of 58 063 in 2007. Previously, only those pregnant women with risky behaviour or those who had sexual partners with risky behaviour were recommended for VCT. Now all pregnant women are now recommended for VCT; however, only 77% of pregnant women were reached through VCT by the end of 2009.
- † Data were collected from Northern District Hospital, Via Central Hospital, Leneakei Hospital, Lolowa Hospital and Norsup Hospital.
- ‡ Data are based on total number tested and received results.

## Annex 6. 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, 2009

WHO Regions									
	Number of people (all ages combined) receiving antiretroviral therapy, December 2009	Estimated number of people needing antiretroviral therapy based on 2010 guidelines, 2009 [range] <sup>a</sup>	Antiretroviral therapy coverage, December 2009 [range] <sup>b</sup>	Number of children younger than 15 years receiving antiretroviral therapy, December 2009	Estimated number of children needing antiretroviral therapy, 2009 [range] <sup>c</sup>	Antiretroviral therapy coverage among children, December 2009 [range] <sup>d</sup>	Number of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2009	Estimated number of pregnant women with HIV needing antiretrovirals for preventing mother-to-child transmission, 2009 [range] <sup>e</sup>	Estimated percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2009 [range] <sup>e</sup>
<b>African Region</b>	3 912 000	10 600 000 [9 700 000-11 500 000]	37% [34-40%]	296 100	1 140 000 [710 000-1 500 000]	26% [19-42%]	672 900	1 240 000 [800 000-1 700 000]	54% [41-84%]
<b>Region of the Americas</b>	478 000	950 000 [810 000-1 000 000]	50% [46-59%]	18 600	32 200 [23 000-42 000]	58% [45-80%]	16 200	29 900 [19 000-41 000]	54% [39-83%]
<b>Eastern Mediterranean Region</b>	12 800	180 000 [160 000-210 000]	7% [6-8%]	570	13 300 [8 400-18 000]	4% [3-7%]	490	20 500 [13 000-29 000]	2% [2-4%]
<b>European Region</b>	115 000	610 000 [550 000-700 000]	19% [16-21%]	4 800	9 800 [5 700-15 000]	49% [31-84%]	14 300	15 300 [8 000-23 000]	93% [63%-95%]
<b>South-East Asia Region</b>	577 000	1 800 000 [1 500 000-2 300 000]	32% [25-39%]	28 100	67 500 [46 000-120 000]	42% [23-61%]	19 500	57 400 [31 000-94 000]	34% [21-62%]
<b>Western Pacific Region</b>	160 000	490 000 [400 000-570 000]	33% [28-40%]	8 300	13 600 [9 900-18 000]	61% [46-84%]	4 300	13 500 [8 400-19 000]	32% [22-51%]
<b>All low- and middle-income countries</b>	<b>5 254 000</b>	<b>14 600 000</b> [13 500 000-15 800 000]	<b>36%</b> [33-39%]	<b>356 400</b>	<b>1 270 000</b> [830 000-1 700 000]	<b>28%</b> [21-43%]	<b>777 600</b>	<b>1 380 000</b> [920 000-1 800 000]	<b>53%</b> [40-79%]
UNICEF Regions									
<b>Africa<sup>a</sup></b>	3 921 000	10 700 000 [9 800 000-11 600 000]	37% [34-40%]	296 500	1 150 000 [720 000-1 500 000]	26% [20-41%]	673 300	1 260 000 [810 000-1 700 000]	53% [40-83%]
<b>Sub-Saharan Africa<sup>a</sup></b>	3 916 000	10 700 000 [9 700 000-11 600 000]	37% [34-40%]	296 200	1 150 000 [720 000-1 500 000]	26% [20-41%]	673 100	1 260 000 [810 000-1 700 000]	53% [40-83%]
<b>Eastern and Southern Africa</b>	3 203 000	7 700 000 [7 200 000-8 300 000]	41% [38-45%]	254 900	790 000 [530 000-1 000 000]	32% [25-48%]	584 700	860 000 [600 000-1 100 000]	68% [53-95%]
<b>Western and Central Africa</b>	709 000	2 900 000 [2 500 000-3 200 000]	25% [22-28%]	41 000	350 000 [180 000-510 000]	12% [8-23%]	88 100	380 000 [200 000-560 000]	23% [16-44%]
<b>North Africa and the Middle East</b>	12 400	140 000 [120 000-160 000]	9% [8-10%]	600	10 800 [6 700-15 000]	5% [4-9%]	530	16 400 [9 600-23 000]	3% [2-5%]
<b>Latin America and the Caribbean</b>	478 000	950 000 [810 000-1 100 000]	50% [46-59%]	18 600	32 200 [23 000-42 000]	58% [44-81%]	16 200	29 900 [19 000-41 000]	54% [39-83%]
<b>Asia</b>	738 000	2 400 000 [2 000 000-2 900 000]	31% [26-37%]	36 400	82 700 [61 000-140 000]	44% [26-60%]	23 800	73 200 [45 000-110 000]	33% [22-52%]
<b>East Asia and Pacific</b>	412 000	1 000 000 [660 000-1 300 000]	40% [36-47%]	18 200	27 500 [21 000-33 000]	65% [55-87%]	12 400	26 200 [18 000-40 000]	47% [31-68%]
<b>South Asia</b>	325 000	1 300 000 [990 000-1 900 000]	25% [17-33%]	18 200	55 100 [36 000-110 000]	33% [17-51%]	11 400	46 800 [23 000-78 000]	24% [15-50%]
<b>Central and Eastern Europe and the Commonwealth of Independent States<sup>a</sup></b>	109 000	590 000 [530 000-680 000]	19% [16-21%]	4 600	9 700 [5 700-15 000]	46% [31-82%]	14 100	15 100 [7 600-22 000]	94% [63%-95%]
<b>All low- and middle-income countries</b>	<b>5 248 000</b>	<b>14 600 000</b> [13 500 000-15 700 000]	<b>36%</b> [33-39%]	<b>356 200</b>	<b>1 270 000</b> [830 000-1 700 000]	<b>28%</b> [21-43%]	<b>777 400</b>	<b>1 380 000</b> [920 000-1 800 000]	<b>53%</b> [40-79%]

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 of 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 for 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.

**Annex 7. 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	Central and South 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	Central and South 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	Central and South America	Latin America and Caribbean	Region of the Americas
Bosnia and Herzegovina	Lower-middle income	Low	Europe and Central Asia	Western and Central Europe	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Botswana	Uppermiddle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Brazil	Upper-middle income	Concentrated	Latin America and the Caribbean	Central and South America	Latin America and Caribbean	Region of the Americas
Bulgaria	Upper-middle income	Low	Europe and Central Asia	Western and Central Europe	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	Central and South 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	Central and South 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



Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Costa Rica	Upper-middle income	Concentrated	Latin America and the Caribbean	Central and South America	Latin America and Caribbean	Region of the Americas
Côte d'Ivoire	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	West and Central Africa	African Region
Croatia	Upper-middle income	Low	Europe and Central Asia	Western and Central Europe	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	Middle East and North Africa	Middle East and North 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	Central and South 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	Central and South 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	Central and South 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	Central and South 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	Central and South 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	Middle East and North Africa	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

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
Jamaica	Lower-middle income	Concentrated	Latin America and the Caribbean	Caribbean	Latin America and Caribbean	Region of the Americas
Jordan	Lower-middle income	Low	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Kazakhstan	Upper-middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Kenya	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Kiribati	Lower-middle income		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Kyrgyzstan	Low income	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	Western and Central Europe	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	Western and Central Europe	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	North 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	Central and South America	Latin America and Caribbean	Region of the Americas

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
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	Central and South 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
Paraguay	Lower-middle income	Concentrated	Latin America and the Caribbean	Central and South America	Latin America and Caribbean	Region of the Americas
Peru	Lower-middle income	Concentrated	Latin America and the Caribbean	Central and South 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	Western and Central Europe	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	Middle East and North Africa	Eastern and Southern Africa	Eastern Mediterranean Region
South Africa	Upper-middle income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Sri Lanka	Lower-middle income	Low	East, South and South-East Asia	South and South-East Asia	South Asia	South-East Asia Region
Sudan	Low income	Generalized	Middle East and North Africa	Middle East and North Africa	Middle East and North Africa	Eastern Mediterranean Region
Suriname	Lower-middle income	Concentrated	Latin America and the Caribbean	Central and South America	Latin America and Caribbean	Region of the Americas

Country	Classification of economy	Level of epidemic	Geographical region	UNAIDS region	UNICEF region	WHO region
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	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	Western and Central Europe	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Turkmenistan	Lower-middle income	Low	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
Tuvalu	Not a World Bank member		Oceania	Oceania	East Asia and the Pacific	Western Pacific Region
Uganda	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Ukraine	Lower-middle income	Concentrated	Europe and Central Asia	Eastern Europe and Central Asia	Central and Eastern Europe and the Commonwealth of Independent States	European Region
United Republic of Tanzania	Low income	Generalized	Sub-Saharan Africa	Sub-Saharan Africa	Eastern and Southern Africa	African Region
Uruguay	Upper-middle income	Concentrated	Latin America and the Caribbean	Central and South 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	Central and South 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 UNICEF classifies Djibouti both under Middle East and North Africa and sub-Saharan Africa. Unlike last year, for the analysis throughout the report, Djibouti is no longer classified as sub-Saharan Africa, but as Middle East and North 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.

## **Annex 8. List of indicators in the WHO, UNICEF and UNAIDS annual reporting form for monitoring the health sector response to HIV/Aids, 2010**

### **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
- #A5 Percentage of most-at-risk populations who received an HIV test in the last 12 months and who know their results

### **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

### **E HIV/TB**

- #E1 Percentage of estimated HIV-positive incident TB cases that received treatment for TB and HIV

### **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
- #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
- G3e Percentage of adults and children with HIV known to be on treatment 60 months after initiation of antiretroviral therapy

### **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

### **I Women and children**

- 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
- #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
  - 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

Footnotes:

# denotes UNGASS indicator

\* Indicators for prevention in health care settings (i.e. B1 and B2) and care (D1) were excluded for this year.



## EXPLANATORY NOTES

### Data collection and validation

Annex 1 presents country data on HIV testing and counselling.

Annex 2 presents country data on sexually transmitted infections.

Annexes 3 and 4 present country data related to antiretroviral therapy.

Annex 5 presents country data on interventions related to the prevention of mother-to-child transmission and interventions targeting children.

Annex 6 presents breakdowns, according to WHO and UNICEF regions, of key indicators on antiretroviral therapy coverage and coverage of antiretrovirals for prevention of mother-to-child transmission.

Annex 7 lists countries with epidemic and economic classifications.

Annex 8 lists the indicators collected for this report.

WHO, UNICEF and UNAIDS collected the data presented in these annexes through the annual reporting tool for monitoring the health sector response to HIV/AIDS (1) (see section 1.1 in Chapter 1).

The reporting tool was sent to countries in January 2010. 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 were sent by the countries to the regional offices, and to WHO and UNICEF headquarters between March and April 2010.

In addition, an international data reconciliation meeting was organized in April 2010 to review and cross-validate data reported to WHO, UNICEF, the UNAIDS Secretariat, the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the United States President's Emergency Plan for AIDS Relief. 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.

### Explanatory notes for Annex 1

Annex 1 presents country data on the scaling up of HIV testing and counselling services for 2008–2009 and provides country-specific data on the availability of HIV testing and counselling services in health facilities at the national level for adults in 111 (2008) and 118 (2009) low- and middle-income countries.

It also provides country-specific data on the uptake of HIV testing and counselling for adults in 100 low- and middle-income countries.

#### Number of health facilities with HIV testing and counselling services

The number of health facilities with HIV testing and counselling services is based on data summarized at the national or subnational level as reported by countries. Aggregated data should include facilities providing services in the private and nongovernmental organization (NGO) sectors and voluntary testing and counselling sites but this is not always possible in some countries. A total of 118 countries reported data in 2009.

#### Number of people $\geq 15$ years of age who received HIV testing and counselling and know the results

The number of adults who received HIV testing and counselling and know the results is collected from routine reports from all service points, which includes voluntary counselling and testing sites, clinics, hospitals and NGO outreach points. Data are compiled at the district or local level and finally at the national level. A total of 100 countries reported data in 2009.

## Explanatory Notes for Annex 2

Annex 2 provides country-specific data on:

- access to services for the control of sexually transmitted infections for sex workers who are at increased risk for acquiring and transmitting HIV, and
- syphilis infection among antenatal care attendees.

### Number of targeted service delivery points for sex workers where services for sexually transmitted infection are provided per 1000 sex workers

The number of targeted service delivery points for sex workers is derived from programme data on sexually transmitted infection service sites as reported by countries. Size estimations of sex workers are based on UNAIDS recommended methods (2). A total of 51 countries provided data in 2009.

### Prevalence of syphilis among antenatal care attendees

Data on the prevalence of syphilis among antenatal care attendees is taken from national programme records, seroprevalence surveys, Demographic and Health Surveys (DHS), or other.

## Explanatory notes for Annexes 3 and 4

Annexes 3 and 4 present country data on access to antiretroviral therapy.

Annex 3 provides country-specific data on access to antiretroviral therapy at the national level for all age groups in 149 low- and middle-income countries, of which 135 countries were able to report data for 2009. In addition, the report presents the most recent available data from high income countries. Data from the private sector have been provided as footnotes.

Annex 4 provides data on access to antiretroviral therapy disaggregated by sex and by age (*adults* – 15 years and older, and *children* – less than 15 years) for low- and middle-income countries. Data on the number of adults receiving antiretroviral therapy are available for 136 countries, and data on the number of children receiving antiretroviral therapy are available for 143 countries. Overall, 105 countries provided breakdowns by age group for 2009. Data disaggregated by sex were available for 119 countries.

### Number of people receiving antiretroviral therapy

The reported data on people currently receiving antiretroviral therapy, both in low- and middle-income countries and in high-income countries, 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, UNAIDS and UNICEF work with countries to obtain as many facility-specific data as possible on the numbers of people receiving treatment.

Of the 149 low- and middle-income countries, 126 countries provided data on access to antiretroviral therapy in December 2009 or later. These accounted for almost 70% of the people on treatment by the end of 2009. For 7 countries, including South Africa, data are available for September, October or November 2009. Together, these 133 countries represent 96% of the total estimated number of people receiving antiretroviral therapy at the end of 2009 in low- and middle-income countries.

Estimating the number of people receiving antiretroviral therapy involves some uncertainty for countries that have not yet established regular reporting systems which can capture accurate data on people who initiate treatment for the first time, those who discontinue treatment, are lost to follow up and those who die.

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 NGOs and/or private clinics that do not report through official channels in some countries. Private companies may have programmes to support the provision of antiretroviral therapy to workers with advanced HIV disease but do not report the data related to these programmes to the public health authorities in some cases.

### Estimating treatment need and coverage

Standard methods were used for estimating the size and course of the HIV epidemic, number of people living with HIV, new infections, mortality attributable to AIDS and treatment need (4,5). Treatment need is estimated using statistical modelling

methods that include all people who meet the criteria for initiating treatment, whether or not these people know their HIV status and their eligibility for antiretroviral therapy (Box 4.2). WHO treatment guidelines have been revised in 2009 including thresholds for initiating treatment (Box 4.1), thus changing considerably the number of people estimated to be in need of antiretroviral therapy in low- and middle-income countries in 2010.

The estimates of antiretroviral therapy coverage presented in Annex 3 were calculated by dividing the number of people receiving antiretroviral therapy at the end of 2009 by the number of people estimated to need treatment in 2009 (based on UNAIDS/WHO methods). Ranges around the levels of coverage are based on the uncertainty ranges around the estimates of need (6). Some countries have developed their own methods for estimating treatment need, which could differ from the estimates derived using UNAIDS/WHO methods. To analyse and compare antiretroviral therapy coverage across countries, the report uses standardized estimates of treatment need using UNAIDS/WHO methods. Annex 3 presents also country generated estimates of need based on individual country methods, but these data are not aggregated and are not used for calculating and analysing regional and global coverage.

Annex 4 reports on estimated treatment need and coverage of antiretroviral therapy for children less than 15 years by country in 2009.

The treatment needs of children are estimated using standard UNAIDS/WHO methods (4,5), including uncertainty ranges.

The 2010 WHO treatment guidelines recommend that all HIV-infected children below 24 months be provided with antiretroviral therapy regardless of CD4 counts (5). Additional recommendations are found in Box 5.6.

The estimates of antiretroviral therapy coverage for children presented in Annex 4 were calculated by dividing the number of children receiving antiretroviral therapy at the end of 2009 by the number of children estimated to need treatment in 2009 (based on UNAIDS/WHO methods). Ranges around the levels of coverage are based on the uncertainty ranges around the estimates of need (6).

The need estimates of some countries are currently under review and therefore these countries expressed a preference that their estimates not to be published (or only a range), but their estimates are nevertheless used to estimate the regional estimates and coverage.

## Explanatory notes for Annex 5

### Prevention of mother-to-child transmission

Annex 5 provides data on the indicators collected through the WHO, UNICEF and UNAIDS annual reporting form for monitoring the health sector response to HIV/AIDS (7).

### 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 countries.

A total of 120 countries reported data for 2009. These 120 countries accounted for nearly all (99.9%) of the estimated 1.4 million pregnant women living with HIV 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.

### 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, and 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 total number of pregnant women living with HIV who need antiretrovirals for preventing mother-to-child transmission in the country. Regular scientific updates have been provided on these tools (7).

Similar to the estimates on antiretroviral therapy need presented in Annex 3, Annex 5 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. The need estimates of some countries are currently under review and therefore these countries expressed a preference that their estimates not to be published (or only a range), but their estimates are nevertheless used to estimate the regional needs and coverage.

#### 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 in 2009 by the estimated number of pregnant women living with HIV who need antiretrovirals for preventing mother-to-child transmission in the country.

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 addition, Annex 5 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 prophylaxis 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 of birth.

### Explanatory notes for Annex 7

#### 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 (8).

Economies are classified as low-, middle- or high income according to the gross national income per capita in 2006, 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\$ 3896–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 subpopulation. Recorded infection is largely confined to individuals with high-risk behaviour, such as sex workers, people who inject drugs and men who have sex with 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.

##### Concentrated

*Principle.* HIV has spread rapidly in a defined subpopulation but is not well established in the general population. This epidemic state suggests active networks of risk within the subpopulation. The future course of the epidemic is determined by the frequency and nature of links between highly infected subpopulations and the general population.

## Generalized

*Principle.* In generalized epidemics, HIV is firmly established in the general population. Although subpopulations at high risk may continue to contribute disproportionately to the transmission of HIV, sexual networking in the general population is sufficient to sustain an epidemic independent of subpopulations at higher risk of infection.

## 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.<sup>1</sup> 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 ( $n = 46$ ); Latin America and the Caribbean ( $n = 29$ ); East, South and South-East Asia ( $n = 21$ ); Europe and Central Asia ( $n = 25$ ); and North Africa and the Middle East ( $n = 14$ ). 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 3 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 ( $n = 8$ ); North Africa and the Middle East ( $n = 14$ ); 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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<sup>1</sup> 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.