5. SCALING UP HIV SERVICES FOR WOMEN AND CHILDREN

Key findings

■ National political commitments to expand HIV prevention, treatment and care services for women and children have intensified in recent years. In 2008, 70 low- and middle-income countries had established a national scale-up plan with population-based targets to prevent mother-to-child transmission of HIV; up from 34 in 2005. Similarly, 54 low- and middle-income countries had national plans incorporating population-based targets to scale up paediatric HIV services in 2008, as compared with 19 in 2005.

■ HIV testing and counselling among pregnant women is increasing with the expansion of provider-initiated approaches in health care settings. In 2008, 21% of pregnant women giving birth in low- and middle-income countries received an HIV test, up from 15% in 2007. In sub-Saharan Africa, the corresponding percentage increased from 17% to 28%, with specially high rates of increase in countries in Eastern and Southern Africa.

■ The percentage of HIV-positive pregnant women who received antiretrovirals to prevent HIV transmission to their children increased from 35% [29–44%] in 2007 to 45% [37–57%] in 2008. Within sub-Saharan Africa, countries in Eastern and Southern Africa reported substantial progress, reaching a coverage of 58% [47–76%] in 2008. The coverage of infant antiretroviral prophylaxis also increased, reaching 32% in 2008, up from 20% in 2007.

■ More low- and middle-income countries provided data on the distribution of antiretroviral drug regimens received by HIV-positive pregnant women in 2008 than in previous years and provide evidence of a shift towards the use of more efficacious regimens. In 97 reporting countries, around 31% of women receiving antiretrovirals to prevent mother-to-child transmission were given a single-dose regimen, as compared to 49% in 2007.

■ Around one-third (34%) of pregnant women who tested positive for HIV were assessed, either clinically or by CD4 cell count, for eligibility to receive antiretroviral therapy for their own health in 2008. The percentage of those who were assessed using a CD4 cell count increased from 12% in 2007 to 24% in 2008.

■ HIV-positive mothers need to balance competing risks associated with different infant feeding options. Data on infant feeding practices of women living with HIV are limited; however 12 population-based surveys in sub-Saharan Africa undertaken between 2003 and 2006 indicate that 31% of HIV-positive women and 38% of HIV-negative women exclusively breastfed their infants up to six months of age.

■ Rates of early virological testing of HIV-exposed infants remain low. In 41 reporting countries, only 15% of children born to HIV-positive mothers received an HIV test within the first two months of life. Better follow-up of known HIV-exposed infants is needed to identify HIV infection and provide the necessary care and treatment.

■ The number of health facilities providing paediatric antiretroviral therapy in low- and middle-income countries increased by around 80% from 2007 to 2008. The number of children receiving antiretroviral therapy increased from 198 000 in 2007 to about 275 700 in 2008, reaching 38% [31–47%] of the 730 000 [580 000–880 000] children estimated to be in need of antiretroviral therapy in low- and middle-income countries. Increased efforts are needed to expand access to HIV care and treatment services for children. Also in 2008, only 8% of infants born to pregnant women with HIV initiated co-trimoxazole by two months of age.
5.1. Overview

5.1.1. HIV among women and children

With continuously increasing numbers of women, infants and children living with HIV every year, the HIV epidemic continues to dramatically affect their health, livelihood and survival across regions. The estimated number of women living with HIV increased from 14.1 million in 2001 to 15.5 million by 2007 (1). In sub-Saharan Africa, women now account for almost 60% of the adults living with HIV, although in other regions women continue to represent less than half of all people living with HIV. About 40% of the people living with HIV in South-East Asia are women and 30% in Latin America and the Caribbean, East Asia and Europe and Central Asia. Globally, the percentage of adult women (15 years and older) among people living with HIV has remained stable at 50% for the past 10 years (1).

HIV is the leading cause of mortality among women of reproductive age worldwide (2). HIV can affect mortality both directly and indirectly; one way HIV compromises the underlying cause of death is by worsening pregnancy outcomes. A study from Zimbabwe found that HIV accounted for 27% of reported maternal deaths in 2006 (3). A five-year audit of maternal mortality at one of the largest public hospitals in Johannesburg, South Africa from 2003 to 2007 showed that women living with HIV accounted for 27% of reported maternal deaths in 2006 (4). In sub-Saharan Africa, women accounted for 27% of reported maternal deaths in 2006 (5). Although HIV is not a direct cause of HIV, it is a leading cause of maternal mortality (6). HIV can affect mortality both directly and indirectly; one way HIV compromises the underlying cause of death is by worsening pregnancy outcomes. In 2009, based on new data and parameters, the previous 2007 estimate of the number of pregnant women needing antiretrovirals to prevent mother-to-child transmission has been revised downward to 1.4 million [1.1 million – 1.7 million]. The corresponding coverage of antiretrovirals to prevent mother-to-child transmission according to antiretroviral regimen coverage and infant feeding practices. HIV disease progression and the survival of children with and without co-trimoxazole prophylaxis and antiretroviral therapy are applied to account for deaths among children living with HIV. (7). The number of children newly infected with HIV is a function of the HIV prevalence among pregnant women and the estimated rate of mother-to-child transmission according to antiretroviral regimen coverage and infant feeding practices. HIV disease progression and the survival of children with and without co-trimoxazole prophylaxis and antiretroviral therapy are applied to account for deaths among children living with HIV.

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

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

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

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

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

Estimating the number of children needing antiretroviral therapy

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

Pregnant women living with HIV may receive the following five categories of antiretroviral regimen for preventing mother-to-child transmission: (a) single, dual and triple prophylactic antiretroviral regimen; (b) antiretroviral therapy. Additional transmission can occur after birth through breastfeeding, and different monthly probabilities of HIV transmission are applied for the following infant feeding practices: exclusive breastfeeding, replacement feeding and mixed feeding.

Guidelines on antiretrovirals to prevent the mother-to-child transmission of HIV and for antiretroviral therapy for children will be reviewed at the end of 2009 in light of new evidence. This may lead to changes in the estimation assumptions and methods. The collection of better data may also allow the model parameters to be better adjusted to reflect the programmatic impact of interventions to prevent mother-to-child transmission on the number of children newly infected with HIV.
to 2007 documented that maternal deaths were six times higher among women living with HIV than among HIV-negative mothers (4). The combined effect of maternal morbidity and death also has devastating effects on children’s health, well-being and survival.

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

The number of children younger than 15 years living with HIV also increased from 1.6 million [1.4 million–2.1 million] in 2001 to 2.0 million [1.9 million–2.3 million] in 2007, although the number of newly infected children has been declining since 2003 (1), probably due to the global stabilization of HIV prevalence among women and increasing coverage of programmes to prevent mother-to-child transmission. In 2007, children accounted for 6% of all people living with HIV, 17% of the people newly infected and 14% of all HIV-related mortality worldwide.

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

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

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

<table>
<thead>
<tr>
<th>Rank by number of pregnant women living with HIV</th>
<th>Country</th>
<th>Estimated number of pregnant women in need of antiretrovirals in 2008 (range)</th>
<th>% of the total in low- and middle-income countries</th>
<th>Estimated number of children in need of antiretroviral therapy in 2008 (range)</th>
<th>% of the total in low- and middle-income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nigeria</td>
<td>200 000 [110 000–300 000]</td>
<td>15%</td>
<td>110 000 [57 000–160 000]</td>
<td>15%</td>
</tr>
<tr>
<td>2</td>
<td>South Africa</td>
<td>200 000 [120 000–280 000]</td>
<td>14%</td>
<td>94 000 [33 000–150 000]</td>
<td>13%</td>
</tr>
<tr>
<td>3</td>
<td>Mozambique</td>
<td>110 000 [50 000–160 000]</td>
<td>8%</td>
<td>45 000 [24 000–67 000]</td>
<td>6%</td>
</tr>
<tr>
<td>4</td>
<td>Kenya</td>
<td>110 000 [53 000–160 000]</td>
<td>8%</td>
<td>49 000 [25 000–71 000]</td>
<td>7%</td>
</tr>
<tr>
<td>5</td>
<td>United Republic of Tanzania*</td>
<td>40 000 [10 000–150 000]</td>
<td>6%</td>
<td>20 000 [10 000–30 000]</td>
<td>5%</td>
</tr>
<tr>
<td>6</td>
<td>Uganda</td>
<td>82 000 [44 000–120 000]</td>
<td>6%</td>
<td>42 000 [22 000–60 000]</td>
<td>6%</td>
</tr>
<tr>
<td>7</td>
<td>Zambia</td>
<td>70 000 [38 000–96 000]</td>
<td>5%</td>
<td>34 000 [18 000–47 000]</td>
<td>5%</td>
</tr>
<tr>
<td>8</td>
<td>Malawi*</td>
<td>42 000 [20 000–82 000]</td>
<td>4%</td>
<td>[17 000–41 000]</td>
<td>4%</td>
</tr>
<tr>
<td>9</td>
<td>Zimbabwe</td>
<td>53 000 [29 000–75 000]</td>
<td>4%</td>
<td>37 000 [22 000–50 000]</td>
<td>5%</td>
</tr>
<tr>
<td>10</td>
<td>India</td>
<td>49 000 [25 000–80 000]</td>
<td>4%</td>
<td>30 000 [16 000–46 000]</td>
<td>4%</td>
</tr>
<tr>
<td>11</td>
<td>Ethiopia</td>
<td>36 000 [18 000–54 000]</td>
<td>3%</td>
<td>23 000 [12 000–31 000]</td>
<td>3%</td>
</tr>
<tr>
<td>12</td>
<td>Cameroon</td>
<td>36 000 [19 000–52 000]</td>
<td>3%</td>
<td>18 000 [10 000–26 000]</td>
<td>2%</td>
</tr>
<tr>
<td>13</td>
<td>Democratic Republic of the Congo</td>
<td>32 000 [17 000–48 000]</td>
<td>2%</td>
<td>16 000 [9 000–21 000]</td>
<td>2%</td>
</tr>
<tr>
<td>14</td>
<td>Côte d’Ivoire</td>
<td>22 000 [11 000–34 000]</td>
<td>2%</td>
<td>14 000 [6 000–21 000]</td>
<td>2%</td>
</tr>
<tr>
<td>15</td>
<td>Burundi</td>
<td>16 000 [7 200–24 000]</td>
<td>1%</td>
<td>8 000 [4 000–10 000]</td>
<td>1%</td>
</tr>
<tr>
<td>16</td>
<td>Angola</td>
<td>16 000 [8 000–24 000]</td>
<td>1%</td>
<td>7 400 [3 900–10 000]</td>
<td>1%</td>
</tr>
<tr>
<td>17</td>
<td>Chad</td>
<td>15 000 [7 700–21 000]</td>
<td>1%</td>
<td>7 300 [3 700–10 000]</td>
<td>1%</td>
</tr>
<tr>
<td>18</td>
<td>Lesotho</td>
<td>14 000 [6 800–19 000]</td>
<td>1%</td>
<td>7 300 [4 000–9 000]</td>
<td>1%</td>
</tr>
<tr>
<td>19</td>
<td>Ghana</td>
<td>13 000 [6 400–19 000]</td>
<td>1%</td>
<td>5 900 [2 600–9 200]</td>
<td>1%</td>
</tr>
<tr>
<td>20</td>
<td>Botswana</td>
<td>12 000 [7 000–16 000]</td>
<td>1%</td>
<td>7 900 [4 900–10 000]</td>
<td>1%</td>
</tr>
</tbody>
</table>

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

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

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

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

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

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

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

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

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

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

With support from WHO and UNICEF, several countries in the Caribbean region are currently developing and starting to implement plans to roll out the initiative at country level. At the regional level, the initiative is coordinated by a technical working group consisting of regional experts and representatives of key partners in the HIV response.
5.1.3. Tracking progress towards international commitments for national scale-up of services to prevent mother-to-child transmission and achieve an HIV-free generation

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

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

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

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

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

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

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

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

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

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

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

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

5.1.4 HIV interventions for women and children

The global and country-level response to the mother-to-child-transmission of HIV is based on a comprehensive approach recommended by the United Nations that includes the following four strategic elements, also known as the four prongs (28):

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

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

5.1.5 National scale-up plans

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

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

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1 For example, estimates have been revised for the number of pregnant women (9) and the number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission (see Box 5.1), affecting the coverage of pregnant women receiving an HIV test and the coverage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, which were published in previous WHO/UNICEF/UNAIDS reports.
Fig. 5.1. Number of low- and middle-income countries with national scale-up plans including population-based targets for preventing mother-to-child transmission and for HIV care and treatment for children, by region, 2008

<table>
<thead>
<tr>
<th>Region</th>
<th>Countries reporting a plan for scaling up the prevention of mother-to-child transmission, with population-based targets</th>
<th>Countries reporting a plan for scaling up HIV treatment, care and support for children, with population-based targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>North Africa and the Middle East</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>East, South and South-East Asia</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Data for 2008, n = 123

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

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

5.2 Primary prevention of HIV infection among women of childbearing age

Primary prevention of HIV infection among women of childbearing age, including preventing HIV acquisition through sexual transmission or through the use of infected needles, is one of the most cost-effective ways to prevent HIV infections among children (21). In most resource-limited countries, programmes to prevent the mother-to-child transmission of HIV, delivered in the context of maternal, newborn and child health services, represent the main gateway to primary prevention of HIV among women of childbearing age and to HIV prevention, treatment, care and support services (17).

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

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

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

Active involvement of male partners is critical to address issues related to stigma, discrimination, domestic violence and, more importantly, to support the uptake of available services to prevent mother-to-child transmission. Data show that, in mature, generalized HIV epidemics, a large proportion of new HIV infections occur within HIV-discordant couples (29). The Partners HSV-2 Study, the
Fig. 5.2. Percentage of women and men aged 15–49 years with comprehensive knowledge* of HIV in countries with recent population-based surveys (2007–2008)

- Low-level and concentrated epidemics
- Generalized epidemics

* Comprehensive knowledge is defined as those who correctly identify the two major ways of preventing the sexual transmission of HIV (using condoms and limiting sex to one faithful, uninfected partner), who reject the two most common local misconceptions about HIV transmission, and who know that a healthy-looking person can transmit HIV.


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

first large HIV-1 prevention trial in Eastern and Southern Africa involving HIV-1 discordant couples, found that almost half (49%) of couples across all study sites and among all couples with one HIV-1-infected partner were HIV-1 discordant (38). This has direct implications for preventing mother-to-child transmission of HIV due to the high risk of incident infection among pregnant and lactating women and the related high risk of mother-to-child transmission.

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

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

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

Scaling up HIV prevention within maternal and child health services is also hampered by several systemic bottlenecks and social factors, including financial fees related to the services and transport, shortage of skilled health care providers, lack of basic health care commodities at the health facilities and inadequate support from male partners. In many settings, fear of being identified as HIV-positive or fears of rejection and abandonment prevent many women from learning their HIV status, adopting preventive behaviour or accessing health services. The involvement of communities, including male partners, families and communities, is essential to expand women’s uptake of prevention services and to address sociocultural barriers related to stigma, discrimination and domestic violence (Box 5.5).

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

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

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

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

### 5.3 Preventing unintended pregnancies among women living with HIV

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

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

Studies from generalized epidemic settings in sub-Saharan Africa suggest that the rates of unintended pregnancy among women living with HIV may be higher than in the general population. Studies from Côte d’Ivoire, South Africa and Uganda have reported rates of unintended pregnancy that range from 51% to more than 90% in various populations of women living with HIV (45–47). A cross-sectional study among 459 women and men living with HIV in Cape Town, South Africa (48) provided some information on the fertility needs of people living with HIV. The study found that 57% of men and 45% of women reported being open to the possibility of having a child. Among women enrolled in HIV treatment, about 11% of women reported having been pregnant after initiating treatment; all these pregnancies were reported as unintentional, and only half these women had accessed a programme to prevent mother-to-child transmission during the pregnancy. The study also found that one third of women and two thirds of men expressed desire for an opportunity to discuss fertility intentions with a health care provider. Such findings reaffirm the importance of strengthening links between HIV treatment and sexual and reproductive health services and a critical need for better integrating family planning services with services to prevent the mother-to-child transmission of HIV, by expanding family planning services to settings such as antiretroviral therapy clinics and by integrating HIV interventions into family planning services.

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

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

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

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

### 5.4.1 HIV testing and counselling among pregnant women

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

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

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

By the end of 2008, 68 of 123 reporting countries (55%) were implementing provider-initiated testing and counselling with informed consent in at least 25% of facilities providing antenatal care. Thirty-seven countries (30%) had implemented the policy in more than 75% of their antenatal care facilities, including 5 of 21 reporting countries (24%) in Latin America and the Caribbean and 25 of 46 reporting countries (54%) in sub-Saharan Africa. Sixty-four low- and middle-income countries (52%) indicated that they provide rapid HIV testing with the same-day return of results in at least 25% of facilities providing antenatal care in 2008. Thirty-eight countries (31%) had implemented this service in at least 75% of their antenatal facilities, including 25 countries in sub-Saharan Africa.

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

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

In Latin America and the Caribbean, 54% of pregnant women received an HIV test during their pregnancy in 2008 versus 40% in 2007. Coverage rates are lower in East, South and South-East Asia: from 8% in 2007 to 12% in 2008. Such low coverage rates are probably due to the lack of policies promoting the routine offer of an HIV test to all pregnant women in settings with low-level and concentrated HIV epidemics. In North Africa and the Middle East, less than 1% of pregnant women received an HIV test during pregnancy in 2008.

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

Nineteen low- and middle-income countries reported coverage rates of HIV testing and counselling among pregnant women exceeding 80% in 2008. These include 3 countries from sub-Saharan Africa (Botswana, Namibia...
Fig. 5.5. Percentage of pregnant women who received an HIV test in low- and middle-income countries by region, 2004–2008

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

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

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

Innovative approaches to service delivery have also been instrumental in accelerating scale-up. For instance, the annual national HIV testing week has not only helped to increase access to and uptake of HIV testing services but has also helped to alleviate stigma and discrimination, thereby increasing acceptance of HIV testing at routine service delivery points. Malawi has also improved the supply chain management system that has led to consistent availability of essential commodities and strengthened the monitoring and evaluation system with high-quality data collection and reporting.
and Sao Tome and Principe), 5 from Latin America and the Caribbean (Argentina, Belize, Costa Rica, Cuba and Guyana), 10 from Europe and Central Asia (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Lithuania, Republic of Moldova, Russian Federation and Ukraine) and one from East, South and South-East Asia (Thailand).

Testing male partners for HIV in the context of preventing mother-to-child transmission remains a challenge in most low- and middle-income countries. In 2008, 57 countries documented the number of male partners of pregnant women attending antenatal care who received an HIV test. The proportion of pregnant women attending antenatal care whose male partners were tested for HIV was 5% in 2008 versus 2% in 2007 (570,000 male partners tested in these countries in 2008 versus 360,000 partners tested in 2007). Rwanda had a notable achievement: the proportion of pregnant women attending antenatal care whose sexual partners were tested for HIV increased from 65% in 2007 to 77% in 2008.

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

Coverage of antiretrovirals among pregnant women living with HIV

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

Fig. 5.7. Percentage of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission of HIV in low- and middle-income countries by region, 2004–2008

The bar indicates the uncertainty range around the estimate.

Source: Data reported by countries to WHO, UNICEF and UNAIDS in response to the annual reporting form for monitoring the health sector response to HIV/AIDS, 2009.
Box 5.7. Expanding access to antiretrovirals to prevent the mother-to-child transmission of HIV in Côte d’Ivoire

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

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

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

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

<table>
<thead>
<tr>
<th>Geographical region</th>
<th>Number of pregnant women with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2008</th>
<th>Estimated number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission, 2008 (range)</th>
<th>Estimated percentage of pregnant women living with HIV receiving antiretrovirals for preventing mother-to-child transmission, 2008 (range)</th>
<th>Percentage of the estimated number of HIV-positive pregnant women needing antiretrovirals for preventing mother-to-child transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>576 800</td>
<td>1 280 000 [990 000-1 600 000]</td>
<td>45% [37-58%]</td>
<td>91%</td>
</tr>
<tr>
<td>Eastern and Southern Africa</td>
<td>536 500</td>
<td>900 000 [680 000-1 100 000]</td>
<td>58% [47-76%]</td>
<td>64%</td>
</tr>
<tr>
<td>Western and Central Africa</td>
<td>60 300</td>
<td>380 000 [260 000-50 000]</td>
<td>16% [12-23%]</td>
<td>23%</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>17 100</td>
<td>32 000 [24 000-41 000]</td>
<td>54% [42-71%]</td>
<td>2%</td>
</tr>
<tr>
<td>Latin America</td>
<td>13 000</td>
<td>24 000 [18 000-31 000]</td>
<td>54% [42-71%]</td>
<td>2%</td>
</tr>
<tr>
<td>Caribbean</td>
<td>4100</td>
<td>7 900 [4 700-9 000]</td>
<td>52% [36-80%]</td>
<td>7%</td>
</tr>
<tr>
<td>East, South and South-East Asia</td>
<td>21 700</td>
<td>85 000 [54 000-130 000]</td>
<td>25% [17-40%]</td>
<td>6%</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>12 600</td>
<td>13 400 [9 100-20 000]</td>
<td>94% [64-95%]</td>
<td>7%</td>
</tr>
<tr>
<td>North Africa and the Middle East</td>
<td>&lt;200</td>
<td>13 400 [6 500-12 000]</td>
<td>9% [1-2%]</td>
<td>1%</td>
</tr>
<tr>
<td>All low- and middle-income countries</td>
<td>628 400</td>
<td>1 400 000 [1 100 000-1 700 000]</td>
<td>45% [37-57%]</td>
<td>100%</td>
</tr>
</tbody>
</table>

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

* Annex 3 provides country-specific data.

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

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

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100
In sub-Saharan Africa, coverage of antiretrovirals for preventing mother-to-child transmission of HIV reached 45% [37-58%] in 2008. Eastern and Southern Africa made substantial progress, with coverage increasing from 46% [37-60%] in 2007 to 58% [47-76%] in 2008. Coverage in Western and Central Africa, which increased from 11% [8-16%] in 2007 to 16% [12-23%] in 2008, was lower than the coverage in Eastern and Southern Africa but largely influenced by the results in two countries, the Democratic Republic of the Congo and Nigeria, which bear the most significant HIV disease burden in the region.

Countries in Europe and Central Asia maintained high coverage levels, with 94% [64% to >95%] of pregnant women living with HIV receiving antiretrovirals. Coverage in Latin America increased from 47% [36-63%] in 2007 to 54% [42-73%] in 2008. Notable progress was observed in the Caribbean, where 52% [36-87%] of pregnant women living with HIV received antiretrovirals versus 29% [20-48%] in 2007. In East, South and South-East Asia, only 25% [17-40%] of pregnant women living with HIV received antiretrovirals for preventing mother-to-child transmission of HIV. Coverage rates were lower in North Africa and the Middle East, where about 1% of pregnant women living with HIV received an antiretroviral regimen for preventing vertical transmission of HIV infection (Table 5.2).

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

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

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

![Percentage of pregnant women living with HIV receiving antiretrovirals to prevent the mother-to-child transmission of HIV in 20 countries with the highest HIV disease burden among pregnant women (in descending order), 2008](image-url)

- **The bar indicates the uncertainty range around the estimate.**
- **No point estimate is available for the number of pregnant women living with HIV needing antiretrovirals for the United Republic of Tanzania and Malawi. The estimate is currently being reviewed and will be adjusted, as appropriate, based on ongoing data collection and analysis.**
The efficacy of antiretrovirals in preventing the mother-to-child transmission of HIV varies with the type of drug combinations used and the duration of the regimens. Since 2006, an increasing number of countries have shifted away from providing single-dose nevirapine regimens towards the use of more efficacious regimens, with combinations of two or three antiretroviral drugs.

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

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

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

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

![Map showing coverage of antiretrovirals for PMTCT, 2008](image)

Coverage of ARVs for PMTCT, 2008
- >80%
- 50-79%
- 20-49%
- 10-19%
- <10%
- Data not available/high-income country

1 "At least" 30% because a portion of the uncategorized regimen is a single-dose regimen.
Achieving the United Nations General Assembly Special Session on HIV/AIDS target of reaching 80% of pregnant women living with HIV with antiretrovirals to prevent mother-to-child transmission requires that at least 1.1 million of the estimated 1.4 million pregnant women living with HIV need to have access to this intervention. This defines the overall gap in the global response – at least half a million additional pregnant women living with HIV need to be reached by antiretrovirals in low- and middle-income countries to achieve the target in addition to the 628 400 mothers who had access to this intervention in 2008.

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

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

1 The listed countries other than Botswana, Namibia and Swaziland have a low-level or concentrated epidemic, and greater uncertainty exists for the estimates of the number of women needing antiretrovirals for preventing mother-to-child transmission. In addition, Belarus, Bhutan, Georgia, Guyana, Jamaica, Kazakhstan, Latvia, Lithuania, Nicaragua and the Republic of Moldova have a low estimated number of women needing antiretrovirals to prevent mother-to-child transmission (less than 500), and data for these countries should be interpreted cautiously. Estimates of the number of pregnant women living with HIV needing antiretrovirals for preventing mother-to-child transmission in Brazil are currently being reviewed, but these countries have reached the targets of the United Nations General Assembly Special Session on HIV/AIDS according to preliminary estimates.
Fig. 5.12. Contribution of the 20 countries with the largest numbers of women needing antiretrovirals for preventing the mother-to-child transmission of HIV to the global gap to reach 80% of those in need, 2008

- Nigeria: 30%
- Mozambique: 9%
- India: 6%
- Kenya: 5%
- Uganda: 5%
- Democratic Republic of the Congo: 5%
- Zimbabwe: 5%
- Ethiopia: 5%
- Cameroon: 4%
- Zambia: 3%
- Other low- and middle-income countries: 9%

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

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

- All low- and middle-income countries: 20% (2008), 32% (2007)
- Sub-Saharan Africa: 21% (2008), 39% (2007)
  - Eastern and Southern Africa: 2% (2008), 32% (2007)
  - Western and Central Africa: 10% (2008), 27% (2007)
- Latin America and the Caribbean: 54% (2008)
- Europe and Central Asia: 95% (2008)
- East, South and South-East Asia: 25% (2008)
Democratic Republic of the Congo, Ethiopia, Kenya, Uganda and Zimbabwe by 5%. Rapid scale-up in these countries is clearly crucial to achieving the goal of HIV-free generations in the future.

**Antiretroviral prophylaxis among infants born to mothers living with HIV**

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

Coverage in Europe and Central Asia is very high: close to 100%. In Latin America and the Caribbean, more than half the children in need (54%) had access to this intervention in 2008, up from 32% in 2007. In sub-Saharan Africa, Eastern and Southern Africa substantially increased coverage from 27% in 2007 to 40% in 2008. Western and Central Africa almost doubled the number of HIV-exposed children who benefited from antiretrovirals for preventing mother-to-child transmission; however, coverage in this subregion remains very low (10%). Coverage was also low in East, South and South-East Asia, reaching only 25% in 2008. Coverage in North Africa and the Middle East was about 1% (Fig. 5.13).

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

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

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

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

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

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

Despite years of experience, services to support mothers living with HIV in making safer infant-feeding decisions remain inadequate in many countries: HIV counselling during antenatal care may be insufficient or infrequent; health workers may not always provide women with information on alternative options according to their individual circumstances (31); support for good infant-feeding practices may be minimal at child health clinics;
and HIV testing of HIV-exposed infants at six weeks of age (for the purpose of early infant diagnosis) may be mistakenly used as a time to revise feeding practices. In these circumstances, the practices of feeding HIV-exposed infants generally do not optimize their chances of healthy survival free of HIV infection (Box 5.9).

The rates of exclusive breastfeeding among infants younger than six months of age continue to increase worldwide, especially in sub-Saharan Africa (up from 24% to 32% between 1996 and 2006) (52). Population-based surveys collect information on infant-feeding practices, but not many surveys provide disaggregated data by maternal HIV status. A recent analysis of 12 population-based surveys between 2003 and 2006 in sub-Saharan Africa showed that 31% of women living with HIV and 38% of HIV-negative women exclusively breastfed their infants up to six months of age (53).

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

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

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

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

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

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

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

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

Between April 2007 and October 2008, 28,060 cord blood specimens were collected across 43 randomly identified centres (in Cameroon, Côte d’Ivoire, South Africa and Zambia) of which 12%, or 3,250, were HIV-positive. Of these, 2,996 had complete data available on file. Cumulatively, coverage as defined by the study was only 50% with confirmed mother and infant nevirapine ingestion. The reasons for non-coverage were multiple. Sixteen per cent of women not covered were not offered an HIV test. A further 6% declined it. Thirteen per cent did not receive their HIV-positive test result, and 7% did not receive nevirapine for preventing mother-to-child transmission. In 27% of the cases, the mother did not adhere to the treatment prescribed, and 14% of infants were not dosed. Higher coverage was positively associated with the age of the mother and with the number of antenatal care visits. Failed maternal adherence (the absence of cord blood nevirapine in women documented to have received nevirapine) was more likely among women who were prescribed zidovudine and single-dose nevirapine than among women who received only nevirapine.

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

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

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

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

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

- Proportion of mothers who had ever tested for HIV: 98.5%
- Proportion of mothers who tested for HIV in the last pregnancy: 89.2%
- Mothers who self-reported being HIV-positive: 40.2%
- Among mothers who reported enrolling in the programme for preventing mother-to-child transmission (n = 3,212):
  - % receiving single-dose nevirapine only: 9%
  - % receiving zidovudine and single-dose nevirapine: 74%
  - % receiving antiretroviral therapy: 13%
  - % receiving nothing: 3%
- Proportion of infants with antibodies present (= maternal HIV prevalence): 40.4%
- Proportion of all infants - HIV DNA positive (= infant HIV prevalence): 2.8%
- Proportion of HIV-exposed infants - HIV DNA positive (= vertical transmission rate) - all: 7.0%

A similar surveillance exercise was previously performed in 2004-2005 but with a smaller sample (n = 2,437) at a time when only single-dose nevirapine was available. The six-week vertical transmission rate was 21% versus 7% in 2008-2009. The dramatic reduction in transmission can
be attributed to three factors: the vast majority of women had tested during pregnancy and knew their HIV status; about 13% of women living with HIV were receiving antiretroviral therapy; just three months after zidovudine was introduced to the clinical protocol in South Africa, antenatal care services had switched from single-dose nevirapine to the more efficacious regimen such that 74% of pregnant women living with HIV reported having received the two drugs.

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

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

5.5 Treatment, care and support for children living with HIV

5.5.1 Infant diagnosis

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

HIV testing is required to reliably identify HIV infection among infants and children and initiate care and treatment interventions in a timely manner. Standard HIV antibody testing (either rapid or laboratory based) identifies the antibodies produced in response to HIV infection. However, among HIV-exposed infants, maternal HIV antibodies are passively transferred to the infant during pregnancy and may persist during the first year of life (and exceptionally beyond), creating difficulty in interpreting positive HIV antibody test results in infants during this time. HIV infection in the first year of life is therefore most reliably diagnosed by virological tests, by detecting the presence of components of the HIV virus itself, usually nucleic acid (HIV DNA or HIV RNA) or viral antigens.

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

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

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

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

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

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

The use of dried blood spots enables blood samples to be collected in remote locations and allows countries with a limited number of specialized laboratories to expand access to virological testing. However, the operationalization of diagnostic protocols is often challenged by lack of technical competencies, underdeveloped laboratory capacity and weak systems for transporting blood specimens and results.
Box 5.12. Scaling up early infant diagnosis in Namibia

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

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

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

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

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

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

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

![Average age of infants at their first HIV DNA test in Namibia in weeks, 2006–2008](source: Ministry of Health and Social Services, Namibia)

Rapid and widespread scale-up of early infant diagnosis in Namibia has contributed to high coverage of treatment for infants needing antiretroviral therapy: 7622 children were receiving antiretroviral therapy as of March 2009, representing more than 95% coverage. The downward trend in the rate of positive diagnosis since services for early infant diagnosis were rolled out is also encouraging, and, with the introduction of combination antiretroviral prophylaxis for preventing mother-to-child transmission and continued scale-up of HIV services for women and children, as well as the decline in antenatal HIV seroprevalence, the number of HIV DNA samples testing positive is expected to decline further.
studies demonstrate the effectiveness of co-trimoxazole in preventing pneumocystis pneumonia (Pneumocystis jiroveci pneumonia) and other infections among infants living with HIV (62).

In 2006, WHO released guidance on the use of co-trimoxazole preventive therapy for children, adolescents and adults (83) recommending that all HIV-exposed children born to mothers living with HIV start co-trimoxazole preventive treatment at 4–6 weeks after birth and continue until HIV infection has been excluded and the infant is no longer at risk of acquiring HIV through breastfeeding. The development and implementation of national policies and recommendations specific to the use of co-trimoxazole prophylaxis for infants and children exposed to or living with HIV, consistent with WHO recommendations, has started to improve the coverage and uptake of this important intervention.

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

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

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

5.5.3 Antiretroviral therapy for children

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

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

As of December 2008, about 275 700 children younger than 15 years were receiving antiretroviral therapy in low- and middle-income countries, up from 198 000 in 2007, 127 300 in 2006 and 75 000 in 2005 (Table 5.3, Fig. 5.16). These children represent an estimated 38% of all children younger than 15 years estimated to need antiretroviral therapy worldwide. Overall, the number of children receiving antiretroviral therapy in low- and middle-income countries increased by 39% between 2007 and 2008 and by more than 3.5-fold between 2005 and 2008.

Regional coverage of antiretroviral therapy for children varies from 6% (4–12%) in North Africa and the Middle East to 85% (56% to >95%) in Europe and Central Asia (Table 5.3). All regions saw notable progress in the number of children younger than 15 years receiving treatment in 2008 versus 2007, except for Latin America, where coverage was already as high as 82% (70% to >95%).

Eastern and Southern Africa achieved particularly substantial progress: 224 900 children received antiretroviral therapy in 2008, representing coverage of 44% (36–57%) versus 132 500 (30% [25–39%]) in 2007. Progress in Western and Central Africa was much more limited, increasing from 25 500 children receiving antiretroviral therapy in 2007 (13% [10–19%]) to 29 800 (15% [11–22%]) in 2008. In East, South and South-East Asia, 30 000 children were receiving treatment in 2008 (52% [38–73%]) versus 20 800 in 2007 (36% [26–52%]).

Factors contributing to the expanded uptake of antiretroviral therapy for children include sustained global advocacy, enhanced national commitment, increased availability of antiretroviral products and reduced prices of drug formulations for children (section 4.1.8).
### Table 5.3. Estimated number of children younger than 15 years receiving antiretroviral therapy, children needing antiretroviral therapy and percentage coverage in low- and middle-income countries according to region, December 2008

<table>
<thead>
<tr>
<th>Geographical region</th>
<th>Reported number of children (0–14 years) receiving antiretroviral therapy, December 2008</th>
<th>Estimated number of children needing antiretroviral therapy, 2008 (range)</th>
<th>Antiretroviral therapy coverage among children, December 2008 (range)</th>
<th>Percentage of total need</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>224 900</td>
<td>640 000</td>
<td>35% [29-45%]</td>
<td>88%</td>
</tr>
<tr>
<td>Eastern and Southern Africa</td>
<td>195 100</td>
<td>440 000</td>
<td>44% [36-57%]</td>
<td>61%</td>
</tr>
<tr>
<td>Western and Central Africa</td>
<td>29 800</td>
<td>200 000</td>
<td>15% [11-22%]</td>
<td>27%</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>16 100</td>
<td>21 000 [18 000-25 000]</td>
<td>76% [65-91%]</td>
<td>3%</td>
</tr>
<tr>
<td>Latin America</td>
<td>13 700</td>
<td>17 000 [14 000-20 000]</td>
<td>82% [70-95%]</td>
<td>2%</td>
</tr>
<tr>
<td>Caribbean</td>
<td>2 500</td>
<td>4 600 [3 400-6 800]</td>
<td>55% [43-72%]</td>
<td>1%</td>
</tr>
<tr>
<td>East, South and South-East Asia</td>
<td>30 000</td>
<td>58 000 [41 000-78 000]</td>
<td>52% [38-77%]</td>
<td>8%</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>4 200</td>
<td>4 900 [2 700-7 500]</td>
<td>85% [56-99%]</td>
<td>1%</td>
</tr>
<tr>
<td>North Africa and the Middle East</td>
<td>400</td>
<td>6 700 [3 400-11 000]</td>
<td>6% [4-12%]</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>275 700</strong></td>
<td><strong>750 000 [580 000-880 000]</strong></td>
<td><strong>38% [31-47%]</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

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

* For an explanation of the methods used, see the explanatory notes to Annex 1 and 2.

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

### Fig. 5.16. Percentage of children receiving antiretroviral therapy in low- and middle-income countries, 2005–2008

The bar indicates the uncertainty range around the estimate.
However, although substantial progress has been made towards achieving universal access to antiretroviral therapy for children, two thirds of children living with HIV who need antiretroviral therapy globally are still not receiving treatment. In addition, the number of infants and children newly placed on antiretroviral therapy is still not keeping pace with the numbers of infants newly infected as a result of failure to prevent new infections. Additional investment in material and programmatic support, including greater uptake of services for early infant diagnosis of HIV infection, is needed to further increase the initiation of antiretroviral therapy for children living with HIV. Countries also need to begin preparing more intensively for the increasing number of children who need to receive second-line antiretroviral regimens and the associated programmatic challenges.

5.6 Providing a continuum of care for women and children

To be effective, evidence-based preventive, treatment and care interventions for pregnant women living with HIV, mothers and their children must be provided within a continuum of care. However the data suggest that several critical gaps continued along this continuum at the end of 2008.

- The proportion of pregnant women attending antenatal care services for at least one visit is high (77%) (28), but the coverage (21%) of HIV testing and counselling among pregnant women is relatively lower.
- The low number of pregnant women identified with HIV who are assessed for their eligibility to receive antiretroviral therapy for their own health (34%) is higher than those who actually receive antiretroviral therapy for their need.
- The third critical gap lies in providing antiretrovirals to prevent mother-to-child transmission to mother-baby pairs. Only 32% of infants born to mothers living with HIV in 2008 received antiretrovirals versus 45% of mothers who received antiretrovirals for preventing mother-to-child transmission.
- Finally, the data show a significant gap between the number of children born to mothers living with HIV who received antiretroviral prophylaxis (32%) and those that continued into the critical services for early infant diagnosis (15%) and co-trimoxazole prophylaxis (8%).

To maximize the effectiveness of programmes for preventing mother-to-child transmission of HIV, integrated packages of services must be systematically targeted at the facility level, and systems should be developed to track and improve performance at every step of the cascade through follow-up mechanisms and links to the essential treatment, care and support services.
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