

# ON THE FAST-TRACK TO AN AIDS FREE GENERATION

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THE INCREDIBLE JOURNEY OF THE GLOBAL PLAN TOWARDS  
THE ELIMINATION OF NEW HIV INFECTIONS AMONG  
CHILDREN BY 2015 AND KEEPING THEIR MOTHERS ALIVE



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“PROGRESS ACHIEVED THROUGH THE GLOBAL PLAN IS EVIDENCE THAT WHEN WE COME TOGETHER THE WORLD CAN ENSURE CHILDREN ARE BORN HIV FREE AND THAT THEIR MOTHERS’ HEALTH IS PROTECTED. WE HAVE MADE EXTRAORDINARY GAINS AND WE MUST CONTINUE UNTIL WE ACHIEVE OUR GOAL OF ENDING PAEDIATRIC AIDS AND NEW INFECTIONS AMONG WOMEN.”

MICHEL SIDIBÉ

“UNDER THE GLOBAL PLAN, THANKS TO THE COURAGE AND CONVICTION OF MANY PARTNERS, NEW HIV INFECTIONS AMONG CHILDREN WERE REDUCED BY 60 PERCENT IN 21 OF THE HIGHEST BURDEN COUNTRIES IN SUB-SAHARAN AFRICA, AND 6 COUNTRIES CUT NEW INFECTIONS AMONG CHILDREN BY 75 PERCENT OR MORE. OUR WORK FOR CHILDREN, ADOLESCENTS, AND YOUNG WOMEN IS FAR FROM DONE, BUT THIS IS A TREMENDOUS ACCOMPLISHMENT.”

AMBASSADOR DEBORAH L. BIRX

## FOREWORD

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Today, 60% fewer children are newly infected with HIV annually than were just six years ago in the 21 Global Plan countries in sub-Saharan Africa. Across these countries, 1.2 million new HIV infections among children have been averted since 2009, the baseline year for the *Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive* (Global Plan), and over two million more pregnant women have started receiving life-saving antiretroviral therapy.

But this is much more than a statistic. It means that 1.2 million more children have had an HIV-free start—a better chance to survive, thrive and fulfil their dreams. But the impact goes even further and deeper. The powerful ripples of hope and healing that these children have sent through their families, communities and countries transcend mere quantification.

When the Global Plan was launched in 2011, much of this progress seemed unimaginable. Today, far fewer children are acquiring HIV, many more pregnant women are accessing services and staying healthy, and the opportunity to eliminate new HIV infections among children and keep their mothers alive is truly in sight.

Of the 21 Global Plan countries in sub-Saharan Africa, seven of them have reduced new HIV infections among children by more than 70% since 2009 (Uganda, 86%; South Africa and Burundi, 84%; Swaziland, 80%; Namibia, 79%; Mozambique, 75%; and Malawi, 71%).

Yet, there is vital unfinished business, and no time to waste. In a number of countries (Angola, Côte d'Ivoire and Nigeria), progress has been far slower, with less than a 40% reduction over this same time period. Every year, 110 000 children are still being newly infected with HIV in the 21 Global Plan priority countries in sub-Saharan Africa. More than half of new paediatric HIV infections occur during the breastfeeding period. Alarming numbers of girls and women are still being infected. Many women do not have access to the family planning services they need. And testing and treatment coverage among children remains too low.

The progress achieved under the Global Plan is worthy of celebration. It amounts to one of the greatest public health achievements of recent times, which has taken all partners, pulling together, to accomplish. But our work is not yet finished, and we must act with urgency and focus to reach our ultimate goals—controlling and then, finally, ending the AIDS epidemic by 2030.



MICHEL SIDIBÉ

UNAIDS Executive Director



AMBASSADOR DEBORAH L. BIRX

United States Global AIDS Coordinator and Special Representative for Global Health Diplomacy United States Department of State

# EXECUTIVE SUMMARY

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*The Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive* (Global Plan) was launched in June 2011. It prioritizes the 22 countries<sup>1</sup> that, in 2009, accounted for 90% of the global number of pregnant women living with HIV who were in need of services to prevent mother-to-child transmission of HIV. This report summarizes the history and development of the Global Plan, its achievements in reaching ambitious goals, lessons learned and directions for future progress to end new HIV infections among children.

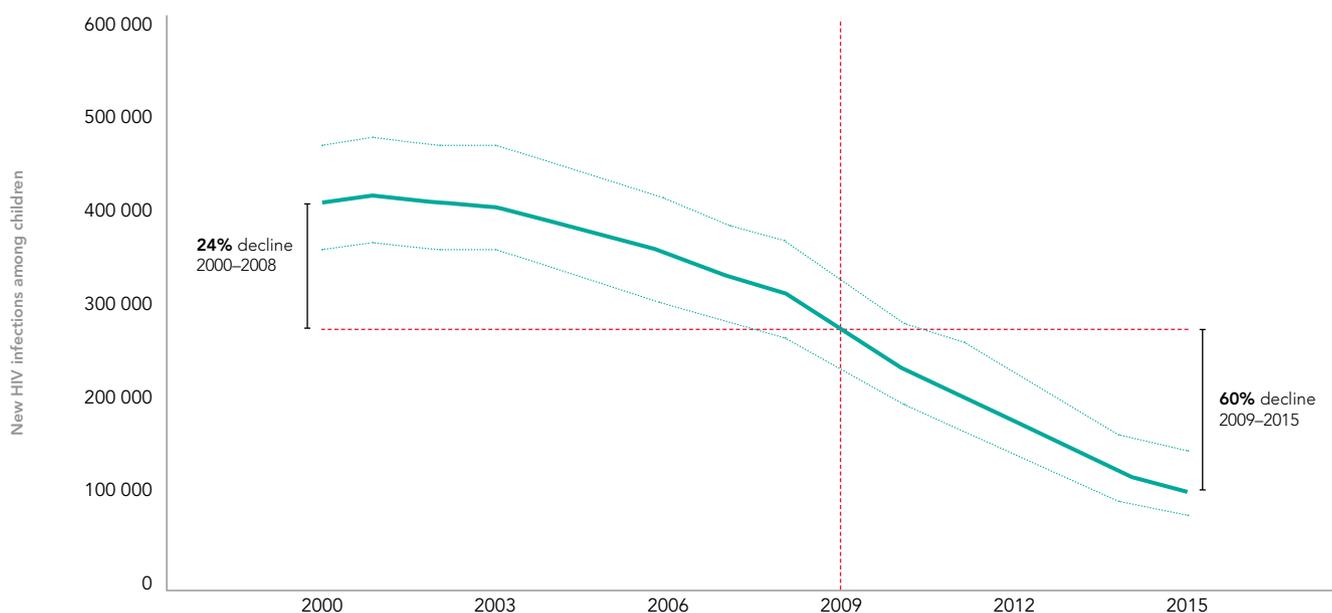
One of the two goals of the Global Plan is to reduce new HIV infections among children by 90% from the baseline in 2009 (the benchmark year against which progress is measured). At the end of 2015, Global Plan countries had reduced new infections among children by 60% (compared to a reduction of only 24% between 2000 and 2008), indicating that the years since the launch of the Global Plan have seen the rate of decline almost triple. Collectively, countries have reduced new HIV infections to 110 000 [78 000–150 000] in 2015, from 270 000 [230 000–330 000] in 2009. At 41 000 [28 000–57 000], Nigeria has the largest number of newly infected children, a number equivalent to the next eight countries combined. Without Nigeria, the remaining 20 countries have reduced new HIV infections among children by 69%.

Uganda has made the greatest progress reducing new infections by 86%; this was followed by South Africa and Burundi (84% each), Swaziland (80%), Namibia (79%), Mozambique (75%), Malawi (71%), the United Republic of Tanzania and Zambia (69% each), the Democratic Republic of the Congo (66%), Zimbabwe (65%), Botswana (63%) and Kenya (55%). Botswana, Burundi, Namibia and Swaziland had fewer than 1000 new infections in 2015, small enough numbers that, with concerted efforts, could be reduced dramatically. A number of countries, however, have made slower progress, including Angola, Côte d'Ivoire and Nigeria. These countries have registered less than a 40% reduction in new HIV infections among children since 2009, notably below the 60% average across the other priority countries.

Among the 21 countries, 1.2 million new HIV infections among children were averted since 2009. This number represents countless empowered mothers living with HIV who know that they have successfully protected their child. It represents thousands of families and communities who now have HIV-free children. And it represents resources that would have otherwise been spent on treatment that can be used for other family needs. Most of the progress in prevention of mother-to-child transmission of HIV has only been in the last five years—of the 1.4 million paediatric infections averted since 2000 through the provision of

1. Angola, Botswana, Burundi, Cameroon, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, India, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, South Africa, Uganda, United Republic of Tanzania, Swaziland, Zambia and Zimbabwe. India has been excluded from this analysis as data for this country were not available over the Global Plan period. In addition at the time of the report, data for Ethiopia were not finalized and therefore draft values were used to calculate values for the priority countries but country-specific data for Ethiopia are not presented.

## Number of new HIV infections among children in 21 Global Plan priority countries, 2000-2015



Source: UNAIDS 2016 estimates.

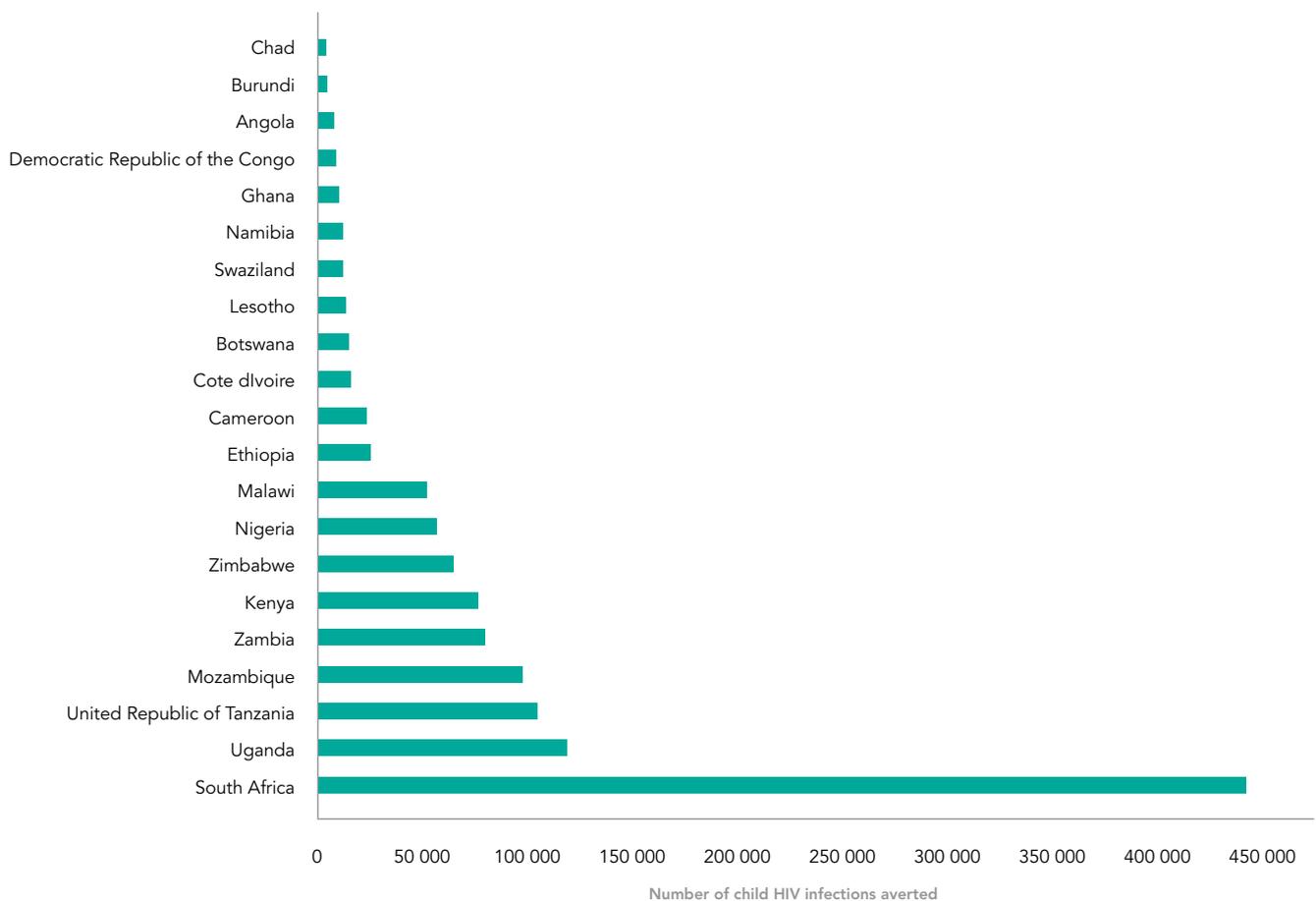
## Percentage decline in new HIV infections among children, 2009–2015

>66% decline	33%–66% decline	<33% decline
<ul style="list-style-type: none"> <li>▪ Burundi (84%)</li> <li>▪ Malawi (71%)</li> <li>▪ Mozambique (75%)</li> <li>▪ Namibia (79%)</li> <li>▪ South Africa (84%)</li> <li>▪ Swaziland (80%)</li> <li>▪ Uganda (86%)</li> <li>▪ United Republic of Tanzania (69%)</li> <li>▪ Zambia (69%)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Botswana (63%)</li> <li>▪ Cameroon (49%)</li> <li>▪ Chad (49%)</li> <li>▪ Côte d'Ivoire (36%)</li> <li>▪ Democratic Republic of the Congo (66%)</li> <li>▪ Ghana (46%)</li> <li>▪ Kenya (55%)</li> <li>▪ Lesotho (44%)</li> <li>▪ Zimbabwe (65%)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Angola (24%)</li> <li>▪ Nigeria (21%)</li> </ul>

antiretroviral medicines to pregnant women living with HIV, 88% were prevented between 2009 and 2015. These estimates only include infections averted due to the provision of antiretroviral medicine to pregnant women living with HIV; they do not reflect infections averted due to primary HIV prevention and preventing unintended pregnancies among women living with HIV.

The proportion of pregnant women living with HIV who received antiretroviral medicines (excluding the less efficacious single-dose nevirapine) for the prevention of mother-to-child transmission has more than doubled in the 21 priority countries, from a baseline of 36% [32–41%] in 2009 to 80% [71–90%] in 2015. Countries provided antiretroviral medicines to an additional 34 200 pregnant women living with HIV in 2015 compared to 2014. In 2015, six of the priority countries (Botswana, Mozambique, Namibia, South Africa, Swaziland and Uganda) met the Global Plan goal of ensuring that 90% or more of pregnant women living

### Number of HIV infections averted among children by country, 2009–2015

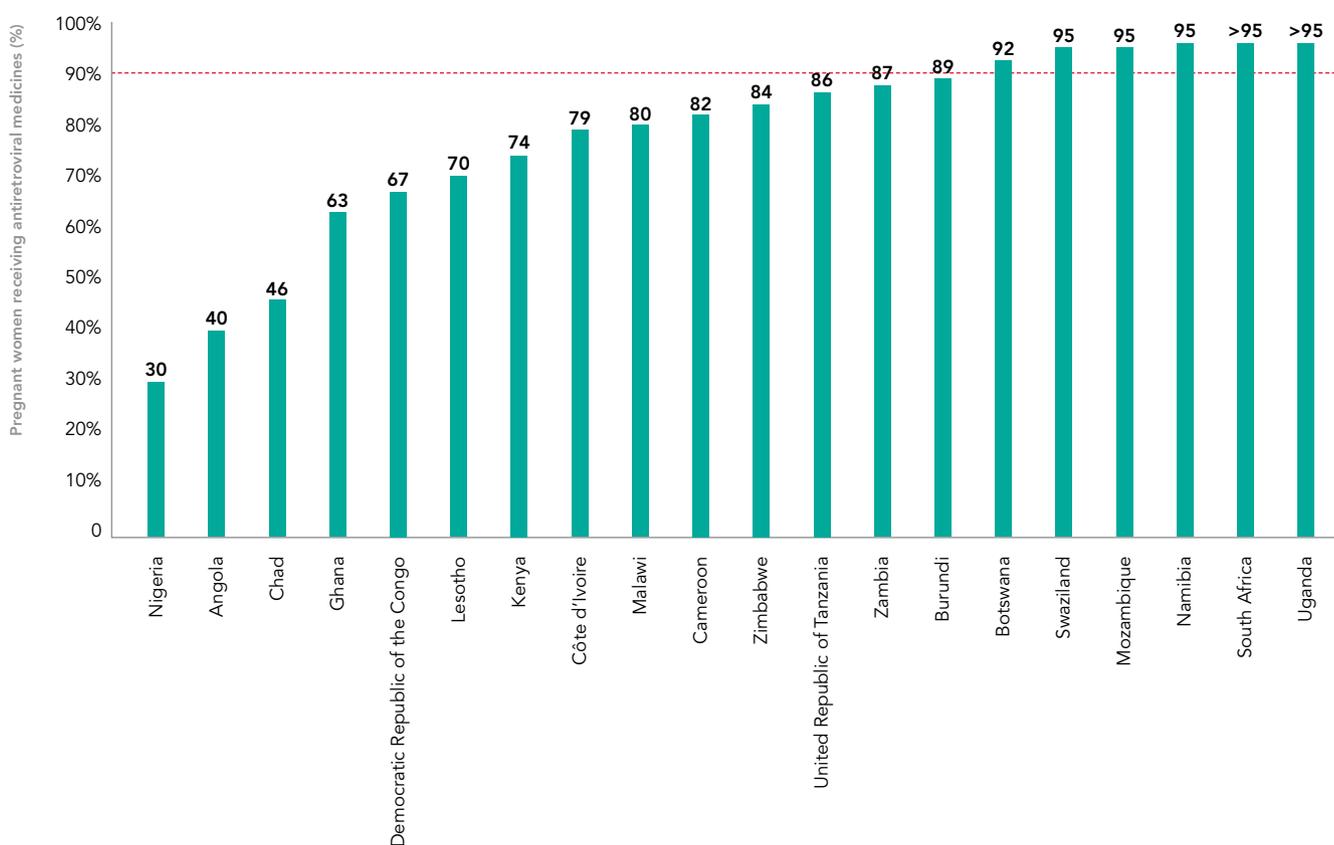


Source: UNAIDS 2016 estimates.

with HIV receive antiretroviral medicines. Six additional countries provided antiretroviral medicines to over 80% of pregnant women living with HIV: Burundi 89% [74–>95%], Zambia 87% [81–94%], the United Republic of Tanzania 86% [69–89%], Zimbabwe 84% [77–92%], Cameroon 82% [74–92%] and Malawi 80% [72–88%]. These coverage levels reflect tremendous progress in just six years.

The 80% [71–90%] coverage of antiretroviral medicines represents essentially a minimal increase from 77% [69–87%] in 2014. However, it masks significant differences in the quality of the regimen—now fully 93% of pregnant women accessing these medicines for prevention of mother-to-child transmission of HIV were actually accessing life-long antiretroviral therapy, in accordance to the 2015 World Health Organization (WHO) guidelines, compared to 73% in 2014. Advances in knowledge about HIV transmission during pregnancy and breastfeeding

### Percentage of pregnant women living with HIV receiving antiretroviral medicines (either prophylaxis or lifelong therapy) to prevent mother-to-child transmission by country, 2015



Source: UNAIDS 2016 estimates.

indicate that lifelong antiretroviral therapy, particularly when commenced before conception, is more effective than previously thought, and lowers the risk of transmission during pregnancy and delivery to infants to 0.2% (instead of 0.5% assumed in the past) (1). In other words, countries that are following the 2015 WHO guidelines and therefore offering lifelong antiretroviral treatment (i.e. Option B+) and not time-limited prophylaxis to pregnant women (Option A or Option B), are using more effective regimens to safeguard maternal health and prevent HIV transmission to the infant among mothers that have repeat pregnancies. Consequently, among the Global Plan priority countries, AIDS-related deaths among women of reproductive age have declined by 43% between 2009 and 2015.<sup>2</sup>

As of the end of 2015, all the priority countries, except Nigeria, are following the WHO guidelines and offering lifelong HIV treatment to pregnant and breastfeeding women. Nigeria is piloting this approach in selected regions.

Another target of the Global Plan is to reduce the final mother-to-child transmission rate to 5% or less among breastfeeding women, and to 2% or less among non-breastfeeding women. Together, the 21 Global Plan priority countries have reduced this rate from 22.4% [19.8–25.4%] in 2009 to a remarkable 8.9% [8.0–10.0%] in 2015, just four percentage points shy of the Global Plan milestone. Four countries have actually achieved the milestone—South Africa at 2% [1.9–2.2%], Uganda at 2.9% [2.6–3.2%], Swaziland at 3.3% [3.0–3.5%] and Namibia at 4.1% [3.7–4.5%]. Botswana, the only non-breastfeeding Global Plan priority country, has a transmission rate of 2.6% [2.4–2.7%], just above the Global Plan goal threshold of 2%. Several other countries where breastfeeding is common also are close to reaching the goal, including Zambia (5.8% [5.4–6.3%]), Mozambique (6.2% [4.9–8.0%]), Burundi (6.7% [5.6–9.0%]), Zimbabwe (7.2% [6.6–8.0%]), the United Republic of Tanzania (7.6% [6.0–7.7%]), Kenya (8.3% [7.2–9.8%]) and Malawi (8.7% [7.8–9.5%]).

The data suggest that adherence and loss to follow-up, particularly during breastfeeding, continues to leave infants vulnerable to acquiring HIV: in 2015, the rate of mother-to-child transmission at six weeks was 4.7% [4.2–5.3%] among the 21 countries, but this rose to 8.9% [8.0–10.0%] at the end of breastfeeding. In these countries, therefore, reduced adherence and retention during the breastfeeding period results in as many new paediatric HIV infections as during pregnancy, labour and delivery. This indicates a need for more concerted and systematic efforts to maintain women in care, and to enable good adherence to HIV treatment until the risk of HIV transmission to the baby fully ends. Many country programmes have emphasized providing antiretroviral medicines during pregnancy and delivery, but they have not placed as much effort on the postnatal period and especially ensuring adherence to antiretroviral therapy during this period. In addition, there is need to develop better methods to measure adherence, especially at the national level.

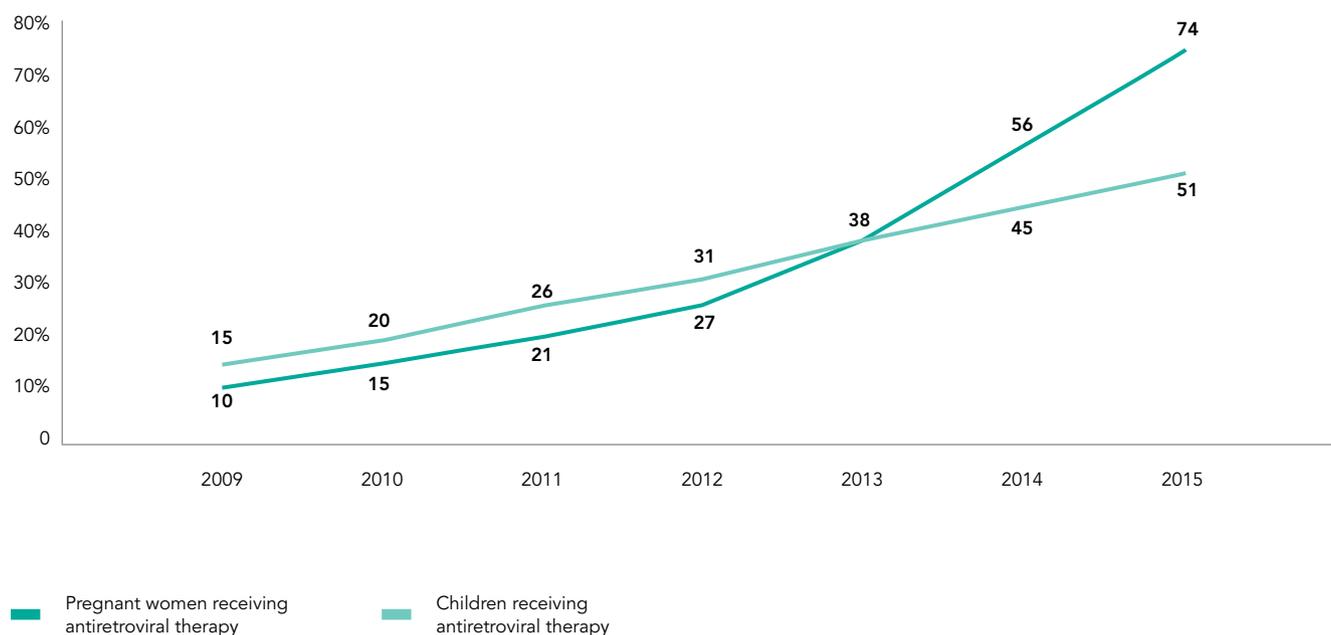
At the same time, countries need to accelerate efforts to reduce new infections among women. The Global Plan aspired to reduce new HIV infections among women of reproductive age by 50%, but the decline has only been 5%. Between 2009 and 2015 inclusive, there were a total of 4.5 million [3.8 million–5.4 million] newly infected women of reproductive age in the 21 Global plan priority countries. At 1.2 million [1.1 million–1.4 million], South Africa added the largest number of new infections among women between

2. In 2015, WHO and United Nations partners made a methodological change in how maternal mortality was estimated. The most recent report (2015) suggests that there were 4700 maternal deaths in 2015, but does not provide a trend analysis of these deaths. For this reason, this report uses deaths among women of reproductive ages.

2009 and 2015, followed by Nigeria (770,000 [550,000–1.1 million]), Uganda (350,000 [270,000–460,000]), Mozambique (340,000 [240,000–460,000]), and Kenya (290,000 [210,000–400,000]). The risk of mother-to-child transmission of HIV is higher among women who are not on antiretroviral therapy, but is particularly higher among newly infected women who are not yet diagnosed and on treatment, due to the high incident viremia. It is important to intensify prevention efforts to reduce the incidence of HIV among women of childbearing age and to identify new HIV infections among women, which may occur at different points of pregnancy and breastfeeding. It is also important to recognize and respond to HIV seronegative women whose partners are living with HIV, so that counselling and dual protection with condoms and other combination prevention strategies can be offered to reduce their risk of acquiring HIV infection. Without partner testing, it is not possible to identify pregnant or breastfeeding HIV-negative women who are in discordant relationships and therefore at risk of acquiring HIV. In addition, policies around repeat HIV testing through this period of risk have been taken up by some countries, but they are still in their infancy.

Fewer HIV infections among children have meant fewer AIDS-related child deaths. Since 2000, the number of AIDS-related deaths among children under the age of five has fallen by 62%, driven partly by reductions of 60% (or more) in 13 of the 21 priority countries in sub-Saharan Africa during the same period. There has also been a stall in paediatric HIV

Percentage of pregnant women and children (aged 0–14 years) living with HIV who are receiving lifelong antiretroviral therapy, 21 Global Plan priority countries, 2009–2015



Source: UNAIDS 2016 estimates.

diagnosis in 2015, compared to 2014. Of an estimated 1.2 million [1.1–1.4 million] HIV-exposed infants among the 21 priority countries, 51% [46–57%] received a virologic test to determine their HIV status within the first two months of life, as recommended by WHO. This is approximately the same coverage that was provided in 2014.

Countries were more successful in increasing access to antiretroviral therapy among children—of the 1.4 million [1.2 million–1.7 million] children under 15 years of age living with HIV in the 21 countries in 2015, 51% [44–59%] received antiretroviral therapy, compared to 15% [13–17%] in 2009. The number of children accessing antiretroviral medicines has more than doubled, from 275 700 in 2009 to 727 000 in 2015. However, in 2015, 49% of children who needed treatment were still not accessing it. This gap must be addressed urgently, since half of the children living with HIV will die before their second birthday if they do not receive treatment. Because virtually all Global Plan priority countries are accelerating HIV treatment for mothers, this momentum also should provide an opportunity to incorporate the roll-out of paediatric diagnosis and treatment, enabling sites that provide testing and treatment for adults to provide the same for children. In addition, efforts to find children who may have been missed should be strengthened, for example through proactive provider-initiated counselling and testing of children of patients on antiretroviral therapy, children in paediatric wards, children receiving immunization, children in nutrition programmes as well as children in programmes for orphans and other vulnerable children.

While the Global Plan prioritizes the 21 countries described in this report, it encompasses all low- and middle-income countries, and they have also seen intensified scale-up of services to eliminate new HIV infections among children and keep their mothers alive, both in low-prevalence regions and concentrated epidemic areas. One key development occurred in June 2015, when Cuba became the first country to be validated by WHO as having met the global criteria for eliminating mother-to-child transmission of HIV and congenital syphilis as a public health problem (2). Now several countries are in advanced stages of applying for validation. In addition, WHO is establishing a criterion for pre-validation, to acknowledge significant progress in high-burden countries towards ending new infections among children.

This is the final report of the Global Plan. It shows that countries truly transformed themselves to address this public health challenge. They did so by mobilizing at all levels—political, financial and community—while at the same time innovating and intensifying their efforts. The Global Plan inspired its own social movements at the community level, at the national level and at the global level, a movement that brought together partnerships between governments, donors, women living with HIV, industry and other stakeholders who recognized the unprecedented opportunity it presented. And while its overall goal of reducing new HIV infections among children by 90% was not met, the 60% reduction is laudable. Moreover, many countries came close, with seven having reduced new infections by 70% or more, and 14 having reduced them by 50% or more. It is estimated that there are now 110 000 [78 000–150 000] newly infected children in the 21 countries in 2015, down from 270 000 [230 000–330 000] in 2009. The risk of mother-to-child transmission of HIV used to be 22.4% [19.8–25.4%] in 2009; it is now only 8.9% [8–10%]. An estimated 1.2 million children have been saved from HIV since 2009 in these countries and hundreds of thousands of families have been spared the trauma of having a child born with HIV.

The next phase of the Global Plan will build on the last one, embedded in the UNAIDS Fast-Track approach to end AIDS by 2030. It will be launched in 2016 and will accelerate efforts in the next five years, so as to build enough momentum to reach the 2030 target. It will intensify efforts to further reduce new HIV infections among children, adolescents and young women, and increase access to paediatric treatment. Given the unprecedented achievements of countries in just the last five short years, there is every belief that they will accomplish even more in the next five, and deliver an AIDS-free generation.

# THE INCREDIBLE JOURNEY

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THE GLOBAL PLAN TOWARDS THE ELIMINATION OF NEW HIV INFECTIONS  
AMONG CHILDREN BY 2015 AND KEEPING THEIR MOTHERS ALIVE



INDIA

SOUTH AFRICA

UGANDA

TANZANIA

THE GLOBAL PLAN HAS GALVANIZED ACTION ALL OVER THE WORLD TO ENABLE WOMEN AND



CAMBODIA

KENYA

MOZAMBIQUE

NIGERIA

CHILDREN TO PROTECT THEMSELVES FROM HIV AND ACCESS HIV TREATMENT WHEN NEEDED.

# INTRODUCTION

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## 1.1 A TREMENDOUS ACHIEVEMENT

The world has made tremendous progress in preventing mother-to-child transmission of HIV in the five years since the launch of the *Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive* (Global Plan) in 2011(3).

- The number of new paediatric HIV infections has been reduced by 60% since 2009 (the baseline year for the Global Plan) in the 21 priority countries. Three countries—Uganda, South Africa and Burundi—have reduced new infections by 86%, 84% and 84%, respectively.
- The final risk of HIV transmission to children used to be as high as 40% without intervention. In four countries, that risk has been cut to less than 5% among breastfeeding women, and eight others have reduced it to below 10%.
- 80% [71–90%] of pregnant or breastfeeding women living with HIV accessed antiretroviral medicines to prevent HIV transmission; among these, 93% are accessing lifelong antiretroviral therapy, which benefits their own health.
- An estimated 85 other countries are within reach of eliminating new HIV infections among children and have very low numbers of mother-to-child transmission of HIV.
- Efforts to provide diagnosis and treatment of HIV-exposed infants have improved. Half the children living with HIV (51% [44–59%]) are now accessing treatment, compared to 15% [13–17%] in 2009.

It adds up to one of the great public health achievements of recent times.

Programmes expanded, services were integrated, new ways of delivering those services were introduced and improved antiretroviral regimens were used to keep children safe from HIV and maintain maternal health. Countries are now using these tools effectively—to such an extent that the 60% decline in the number of new HIV infections among children between 2009 and 2015 was more than double the decline in the entire previous decade (4).

The scale-up of prevention of mother-to-child transmission of HIV services has also had a major impact on women's lives in these countries. When the Global Plan began, concerns for the health and lives of mothers living with HIV were somewhat eclipsed by the focus on preventing their infants from acquiring HIV. In addition, there were limited treatment and diagnostic options for children living with HIV. Within two years, scientific progress enabled maternal health to move centre-stage, and enabled greater focus on children living with HIV as well. Providing HIV-positive mothers with lifelong antiretroviral therapy in accordance with WHO guidelines is now under way in virtually all the Global Plan priority

countries. Mothers living with HIV are now beginning treatment earlier, before their immune system is damaged, and remaining on treatment for life. HIV-exposed children are also getting better diagnosis and treatment services, even though much more work is needed to bring equity between maternal and paediatric care. With the rollout of Option B+ and now test and treat, increasingly women living with HIV are already on treatment prior to their second or third pregnancies, further optimizing infant outcomes.

## **A great convergence**

Part of the Global Plan's success stemmed from the way in which it converged with other ambitious global initiatives to improve maternal and child health, but without duplicating them. Its focus on preventing and treating HIV infection was specific, yet its impact would resonate widely. The Global Plan's main targets supported key Millennium Development Goals (MDGs), three of which related to directly improving maternal and child health: MDG 4 (reducing child mortality), MDG 5 (improving maternal health) and MDG 6 (halt and reverse the spread of HIV). The Global Plan also supported the *Global strategy for women and children's health*, which the Every Women, Every Child movement had launched in September 2010 (5). With AIDS-related illnesses the leading cause of death among women of reproductive age worldwide (6), the importance of addressing HIV demanded urgent attention.

At the same time, the African Union had put in place a number of important complementary instruments that would strengthen the implementation platform of the Global Plan. The Maputo Declaration and its Plan of Action, endorsed by Ministers of Health from 48 African countries in 2006, stressed the importance of sexual and reproductive health (7). The Global Plan also drew from the African Union's Campaign for Accelerated Reduction of Maternal Mortality in Africa (CARMMA), through which the Maputo Plan of Action was to be implemented (8).

Key building blocks underpin the success of the Global Plan. One was high-level political commitment of national and global leaders to ending new HIV infections among children. Strong partnerships bringing technical agencies, bilateral donors, private and philanthropic sectors, faith-based organizations, and civil society and women living with HIV together in common cause have been at the heart of progress. Clear and focused goals and accountability for results have contributed to momentum and development of concrete action plans, fostering innovations and new approaches to service delivery.

But there is vital unfinished business. The scale of the challenge to eliminate HIV transmission to children was a bar set high to reduce new infections by 90%, and reduce the number of mothers dying from AIDS-related causes by 50%. Yet the momentum generated by the Global Plan is so great that those goals can now be achieved in just a few more years. It will require renewing political commitment, further strengthening the capacities and platforms that countries have built, strengthening health systems and using proven new technologies and approaches to zero in on those areas where efforts are still faltering. For example, over half of new paediatric HIV infections occur during the breastfeeding period because not enough mothers living with HIV are being retained in care and on antiretroviral therapy, which protects against transmission. Too many women and girls are continuing to be infected, and many seroconvert during pregnancy or breastfeeding. Testing and treatment coverage among children also remains too low.

These areas are highlighted in the 2016 Political Declaration on Ending AIDS (9), which strongly reiterates the commitment to eliminate new HIV infections among children and protect their mothers' health and well-being. The Political Declaration calls for greater coverage of early infant diagnosis, quicker progress towards elimination of HIV among children and the use of innovative systems that track and provide comprehensive services to mother–infant pairs along the entire continuum of care to improve linkage to treatment. It also calls for increasing and improving treatment adherence support, immediate and life-long treatment for pregnant and breastfeeding women living with HIV and engaging male partners in prevention and treatment services.

Unprecedented opportunities are available. If countries use them to build on the progress made and to close remaining gaps, they could catapult towards the goal of ending the AIDS epidemic by 2030. The 2030 Agenda for Sustainable Development is a vital platform for this renewed push to eliminate HIV infections among children and protect mothers' lives—and for accelerating unifying actions to end the AIDS epidemic. The Sustainable Development Goals feature numerous opportunities for fresh, collaborative, and sustainable efforts. Sustainable Development Goal 3 (ensure healthy lives and promote well-being of all at all ages) includes specific targets that provide numerous opportunities for the health sector's joint efforts that can lead to the sustainable end of the AIDS epidemic. In addition, the United Nations Secretary-General's new Global Strategy for Women's, Children's and Adolescents' Health will galvanize global efforts to significantly reduce the number of maternal, adolescent, newborn and under-five child deaths.

## 1.2 THE NEED FOR A GLOBAL PLAN

The Global Plan's timing was an important factor in its success. An all-out drive to eliminate HIV infections among children and protect the lives of mothers needed a strong foundation of biomedical tools, scientific evidence, funding and technical support. Effective antiretroviral medicines for preventing mother-to-child transmission of HIV were in use since 2000, but not widely available where the epidemic was taking its greatest toll. High medicine prices, impractical paediatric diagnostics and operational difficulties contributed to limiting the scale of effective programmes in most low- and middle-income countries.

After the United Nations General Assembly Special Session on HIV/AIDS in 2001, efforts to step up the prevention of mother-to-child transmission of HIV increased steadily. In the same year, the IATT reframed its focus to address prevention of HIV transmission in pregnant women, mothers and children, and shortly after proposed the 4-prong approach for prevention of mother-to-child transmission of HIV. The United States of America launched the International Mother and Child HIV Prevention Initiative in 2002, which expanded dramatically with the 2003 launch of the United States President's Emergency Plan for AIDS Relief (PEPFAR). PEPFAR set an ambitious goal of reaching 80% of pregnant women in the countries most affected by HIV with PEPFAR programmes. Improved antiretroviral medicines were being developed. When used in high-income countries, those medicines led to remarkably low rates of mother-to-child transmission of HIV. In the field, however, projects in low- and middle-income countries were revealing the kinds of implementation barriers that were impeding progress. Training and staffing constraints were a common challenge. Pregnant women were generally willing to take an HIV test, but it was difficult to

effectively link them to treatment and care services. However a 2003 evaluation of UNICEF-supported pilot prevention of mother-to-child transmission of HIV projects in maternal and child health settings found they were feasible and acceptable (10).

By 2005, only about 16% [14–18%] of pregnant women living with HIV globally were accessing any antiretroviral medicines for prevention of mother-to-child transmission (11). Around the same time, however, several developments added impetus to the prevention of mother-to-child transmission of HIV, opening new opportunities for progress. Antiretroviral medicine prices were falling, making large-scale provision of these medicines more realistic. In 2006, a new initiative—UNITAID—also began to fund the supply of paediatric antiretroviral medicines and diagnostics to governments. By the end of 2006, 71 countries around the world were implementing national prevention of mother-to-child transmission programmes and about half of them had national scale-up plans (12).

Soon, study findings were showing that a combination of antiretroviral medicines was especially effective in preventing mother-to-child transmission of HIV, and in 2010 WHO updated its antiretroviral guidelines accordingly. Greater availability of rapid, point-of-care HIV tests was boosting the prevention of mother-to-child transmission of HIV. In the same year, PEPFAR introduced plans to accelerate prevention of mother-to-child transmission in six African countries<sup>3</sup> with high burdens of HIV, with an emphasis on removing blockages in the provision of services. Meanwhile the scale-up of antiretroviral therapy for people living with HIV was gathering momentum. New service delivery methods were extending the capacity of health facilities, and productive linkages between clinics and communities were being built. It was becoming increasingly obvious that a big enough global effort could eliminate mother-to-child transmission of HIV everywhere.

### **The call for elimination: creating the Global Plan**

With the evidence of effective therapies and advances in delivering services, a call for achieving a vision of elimination of mother-to-child HIV transmission was put forward by UNAIDS Executive Director Michel Sidibé, with political leaders and implementing partners joining hands. What was missing was a comprehensive and inspiring plan, with clear targets and accountability mechanisms, that could be used to invigorate political commitment across the world, mobilize greater resources and support a decisive drive to eliminate new HIV infections among children. A Global Plan for eliminating new HIV infections among children by 2015 and keeping their mothers alive would fill that gap. A Global Task Team, co-chaired by UNAIDS and PEPFAR, took on the task of drafting such a plan. The Global Task Team was comprised of a consortium of stakeholders from 25 countries and 30 civil society groups, private sector partners, networks of people living with HIV and international organizations. Preparatory work began in 2010. The Global Task Team examined the feasibility of potential goals and targets, developed a business case for the plan and outlined its main components. The Global Plan would support three of the Millennium Development Goals (MDGs 4, 5 and 6), as well as the United Nations Secretary-General's Global Strategy for Women's and Children's Health to significantly reduce the number of maternal, newborn and under-five child deaths.

3. Malawi, Mozambique, Nigeria, South Africa, the United Republic of Tanzania and Zambia.

Launched at the United Nations in June 2011 during the High-Level Meeting on HIV and AIDS, the *Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive* (Global Plan) headlined two ambitious aspirational global goals:

- **Goal 1:** reduce the number of new childhood HIV infections by 90%.
- **Goal 2:** reduce the number of mothers dying from AIDS-related causes by 50%.

Guiding the Global Plan was a set of principles that called for placing women living with HIV at the centre of the response, ensuring country ownership and leveraging synergies, linkages and integration with current HIV and maternal/child health programmes for improved sustainability. They also stressed the importance of shared responsibility and accountability. The Global Plan encompassed all low- and middle-income countries, but particularly prioritized the 22 countries that, in 2009, were home to 90% of pregnant women living with HIV, namely: Angola, Botswana, Burundi, Cameroon, Chad, Côte d'Ivoire, the Democratic Republic of the Congo, Ethiopia, Ghana, India,<sup>4</sup> Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, South Africa, Uganda, the United Republic of Tanzania, Swaziland, Zambia and Zimbabwe. It would use 2009 as the baseline year against which to measure progress.

### 1.3 A TRUE AND TESTED PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV APPROACH

The Global Plan called for a set of systematic actions and improvements, to build on the four-pronged prevention of mother-to-child transmission of HIV framework that had been developed by the United Nations and implementing partners in the early 2000s (13,14).

- **Prong 1:** prevention of HIV among women of reproductive age, especially within services related to reproductive health, such as antenatal care, postpartum and postnatal care and other health and HIV service delivery points, including working with community structures.
- **Prong 2:** provision of counselling, support, and contraceptives, to women living with HIV to help them avoid unintended pregnancies.
- **Prong 3:** for pregnant women living with HIV, ensure access to the antiretroviral medicines needed to prevent HIV infection from being passed on to their babies during pregnancy, delivery and breastfeeding.
- **Prong 4:** ongoing HIV treatment, care and support for women and children living with HIV and their families.

The plan outlined a range of reinforcing actions that would be taken at various levels. At the global level, the Global Steering Group would oversee and support the Global Plan process and hold key stakeholders accountable. Leaders would promote commitment to the Global Plan and help mobilize resources from development partners to fund implementation. The Global Steering Group would work with the Interagency Task Team for the Prevention and Treatment of HIV among Pregnant Women, Mothers and Children (IATT) to facilitate the rapid provision of technical assistance and capacity-building support to countries, and push for more affordable and simplified HIV treatment and prophylactic regimens and delivery mechanisms.

4. India later was dropped from the progress reports, due to data challenges. Therefore the progress reports cover 21 countries.

At the country level, national leaders would build awareness and political commitment, and mobilize the necessary resources. They would also promote stronger integration of prevention of mother-to-child HIV transmission programmes with maternal, newborn and child health programmes, and with family planning services. The removal of legal and policy barriers to equitable scale up was also their responsibility, along with leading the development of comprehensive, prioritized and costed national plans, in line with broader national HIV and maternal, newborn and child health strategies. A national steering group would oversee the development and implementation of key activities, including assessments of and updates of existing national policies and plans, harmonizing the activities of various stakeholders and ensuring that the “Three Ones” principles were applied<sup>5</sup>. The minister of health or his/her high-level designee would chair this steering group, with participation from key stakeholders, including women living with HIV, and representatives of other relevant ministries.

Processes for harmonizing policies, sharing best practices among countries and coordinating technical support were to be developed and promoted mainly at the regional level, with an emphasis on promoting South–South exchanges of best practices. Communities would help increase community awareness, define minimum standards and assist in identifying and removing barriers to service access, including by reducing stigma and discrimination. Stakeholders were to be a priority, with efforts focusing especially on marshalling and supporting community resources, including midwives, mentor mothers and other women living with HIV, peer educators and community health workers.

At the global and country levels, the IATT was reconfigured to support country-led implementation of the Global Plan with PEPFAR support. It was charged with supporting the review and updating of national plans in the 22 priority countries, as well as identifying major bottlenecks hindering scale up of elimination of mother-to-child transmission of HIV programmes. It mobilized the expertise of numerous partners at the global level through thematic technical working groups and has worked to support the provision of normative and operational guidance, technical support and document best practice models all in support of accelerating policy reform and implementation progress within countries. It tracked progress towards the Global Plan goals and targets via an up-to-date web-based “dashboard” that complemented annual reporting.

#### 1.4 HOW ACCOUNTABILITY WAS BUILT

The creation of a strong and comprehensive accountability framework was a core component of the Global Plan, beginning with political leadership of Global Plan countries, matched with a robust reporting mechanism for measuring progress against core indicators. Throughout the implementation of the Global Plan, ministerial meetings were convened to review and report on progress and actions in each of 21 focus countries. This emphasis on high-level leadership reinforced continuing commitment to prevention of mother-to-child transmission of HIV. Periodic stocktaking meetings of National Global Steering Group Focal Points, IATT technical agencies, networks of women living with HIV and other stakeholders were also held to build on successful strategies and further accelerate action plans.

5. The “Three Ones” were formulated in 2004 by countries and comprise of: one agreed HIV action framework, which provides the basis for coordinating the work of all partners; one national AIDS coordinating authority, with a broad-based, multisectoral mandate; and one agreed country-level system for monitoring and evaluation. The “Three Ones” emerged through a preparatory process initiated by UNAIDS, working in collaboration with the World Bank and the Global Fund to Fight AIDS, Tuberculosis and Malaria. The “Three Ones” would help enable donor and recipient countries to work together more effectively; they will also help to increase country-level coordination and to enhance efficiency in the use of resources devoted to AIDS responses. <http://www.unsceb.org/content/box-22-%E2%80%9Cthree-ones%E2%80%9D-0>

The progress of countries towards reaching the goals of the Global Plan was documented annually through published Progress Reports. WHO and UNICEF developed the Global Monitoring Framework and Strategy for the Elimination of New Child Infections by 2015, which provided specific information on the indicators and measurement methodologies for tracking the progress made (see Table 1). The Global Steering Group, in collaboration with the IATT, oversaw the overall reporting and assessment of progress against the two global goals and set of accompanying targets.

**Global goal 1: Reduce the number of new childhood HIV infections by 90%.**

Progress towards this goal would reflect the combined effects of the reduction of HIV transmission from mother to child (Prong 3), the reduction of HIV incidence in women of reproductive age (Prong 1), and the effects of increased use of family planning services for women living with HIV (Prong 2).

**Global goal 2: Reduce the number of HIV-related maternal deaths by 50%.**

This would reflect progress in delivering a broad package of HIV and maternal, newborn and child health services (mainly Prongs 3 and 4). The data for this indicator were obtained from the WHO-led consortium that calculates global estimates biennially (15). However, in 2013, there were methodological changes in how the indicator was calculated. Therefore the Global Steering Group opted to use AIDS deaths among women of reproductive age which more appropriately estimates the survival of mothers living with HIV.

**Subgoal:** To reduce AIDS-related infant deaths by >50%<sup>6</sup>; This would reflect focused services to children, including ensuring that all children diagnosed with HIV receive antiretroviral therapy, and that those exposed to HIV receive cotrimoxazole as well as antiretroviral prophylaxis.

Each of the prongs featured at least one subordinate target (Table 1).

Table 1

**Targets for each of the four prongs in the *Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive***

Prong 1 target	Prong 2 target	Prong 3 target	Prong 4 target
<ul style="list-style-type: none"> <li>Reduce HIV incidence among women and their partners by 50%.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce unmet need for family planning among women to zero (MDG goal).</li> </ul>	<ul style="list-style-type: none"> <li>Reduce mother-to-child transmission rate to 5% or less among breastfeeding women, and 2% or less among non-breastfeeding women;</li> <li>90% of mothers receive perinatal antiretroviral therapy or prophylaxis;</li> <li>90% of breastfeeding infant-mother pairs receive antiretroviral therapy or prophylaxis.</li> </ul>	<ul style="list-style-type: none"> <li>Provide life-long antiretroviral therapy to 90% of pregnant women in need of antiretroviral therapy for their own health.</li> <li>Provide life-long antiretroviral therapy to all children living with HIV</li> </ul>

6. The Global Plan M&E framework interpreted this as "Reduce under-5 deaths due to HIV by > 50%", and this is what is provided in the data

Several other indicators would also be tracked, including coverage of early infant diagnosis, infant cotrimoxazole prophylaxis and the number of paediatric infections averted.

Monitoring systems had to be created or upgraded for collecting the essential data that would support accountability and inform programme planning, implementation and course correction. The ability to follow a mother and her child for their health care needs bridged maternal child health and HIV treatment systems, and highlighted the importance of ensuring continuity of care.

Global Plan monitoring and evaluation specialists have always aspired that accountability could be based on real, robust and reliable country programme data, instead of relying on statistical models. But while country data systems have improved during the implementation of the Global Plan, they do not provide all the inputs necessary to assess programme impact. Moreover, many programme outcomes are dependent on factors such as fertility, transmission rates, antiretroviral regimen mix and adherence levels, variables that are difficult to measure routinely and comparably across sites. Therefore models are still essential for assessing impact of the Global Plan.

### 1.5 PUTTING IT ALL TO WORK: THE MAIN ACTIVITIES OF THE GLOBAL PLAN

The Global Plan's success depended on whether countries could achieve wide enough coverage with a package of HIV and other health services for mothers and their infants. Doing that in a comprehensive and sustained way required a series of enabling and supporting actions.

#### **Enabling and supporting activities**

A first step was to bring national guidelines and plans up to date. The IATT supported countries to develop national and subnational elimination of mother-to-child transmission of HIV plans in line with Global Plan goals. A bottleneck analysis methodology developed by UNICEF was used in many countries to identify key sub-national areas of focus and barriers to prevention of mother-to-child transmission of HIV-related interventions that required resolution in order to achieve elimination of mother-to-child transmission of HIV goals. Countries reviewed and revised their national guidelines on treatment of pregnant women living with HIV, treatment of children, and prevention of mother-to-child transmission of HIV, as WHO guidelines evolved to reflect improved science and evidence. They examined the readiness of their health care structures to meet the ambitious goals that were set. They worked to strengthen integration of prevention of mother-to-child transmission of HIV services into maternal and child health services. All this served as a basis for the finalization of national elimination of mother-to-child transmission of HIV plans in the context of the country's maternal and child health framework. The plans were then costed so they could form the basis for mobilizing resources.

Led by the IATT's Finance and Economic Working Group, countries carried out expenditure analyses and identified financing gaps in their action plans. Efforts to leverage and mobilize additional investments were mounted, including domestically, though the reliance on international funding proved difficult to overcome in most Global Plan priority countries. Countries re-examined what they could do with what they had—for example, in Malawi, a Global Fund review showed that while use of antiretroviral therapy was progressing at a desired pace, prevention of mother-to-child transmission of HIV

programmes were lagging far behind. This prompted a review of the programme and led to greater financial focus for prevention of mother-to-child transmission of HIV. In addition the development of investment cases for a Treat All approach in prevention of mother-to-child transmission of HIV programmes provided substantive basis for countries to adopt Option B+ as national policy.

Carrying those initiatives forward required high-profile support from global and national leaders vital for building awareness and political commitment—from the international stage to the communities and clinics where activities were being implemented. Under the leadership of UNAIDS and PEPFAR, global partners organized themselves towards a coordinated response. Leaders from United Nations heads of agencies, executive directors of development organizations, chairpersons of global boards and private sector organizations, and other high-level influencers, came together to forge in the same direction. In response to the need to expedite the development and delivery of better paediatric HIV medicines formulation for children, UNITAID, DNDi, and the Medicines Patent Pool established a new collaborative, Paediatric HIV Treatment Initiative (PHTI) (16). Another example was the Positive Action for Children's Fund which was launched to strengthen community engagement in support of the Global Plan (17). In addition, the African Union adopted the goals of the Global Plan and promoted them through its instruments with heads of state, ministers, regional bodies, and other structures.

The Organisation of African First Ladies against HIV/AIDS became an active supporter of the Global Plan and almost every African first lady participated in activities related to the Global Plan. The First Lady of Kenya, Margaret Kenyatta, ran marathons to raise funds for mobile maternal and child health clinics and to raise awareness of mother-to-child transmission. The First Lady of Uganda, Janet Kataha Museveni, travelled her country to promote treatment adherence and defuse stigma. The First Lady of Burundi Denise Nkurunziza has been mobilizing men through various entry points in order to encourage couple counselling and testing for prevention of mother-to-child transmission of HIV. The First Lady of Ghana, Nana Lordina Dramani Mahama has led a campaign advocating for male involvement and community ownership for successful prevention of mother-to-child HIV transmission. The First Lady of Côte d'Ivoire, Dominique Ouattara, has championed both elimination of mother-to-child transmission and the need for paediatric treatment in her country and across the region, visiting clinics, using media outreach, convening meetings and supporting catalytic projects. And the First Lady of Malawi Gertrude Maseko has made it her mission to ensure that all children living with HIV can get the treatment they need.

Marshalling sufficient human resources was a challenge everywhere. Fortunately, experiences in the scale-up of HIV treatment were confirming the effectiveness and feasibility of new service delivery models to relieve some of the strain on health systems. Most of those methods, including task-shifting and decentralization, could be put to use in programmes for eliminating mother-to-child transmission of HIV as well. Within a year of the Global Plan's launch, the IATT was supporting countries in conducting policy reviews to decentralize and task-shift essential HIV activities to the primary care and community levels. Some countries also used policy and regulatory reforms to overcome shortages of qualified health professionals. In Malawi and South Africa, inadequate supplies of doctors to meet the needs for expansion of treatment spurred the training of nurses to initiate antiretroviral treatment and adoption of task shifting policies. Trained community health workers in Zambia and

Ethiopia provided follow up of patients and families, serving as a bridge between clinics and communities. In Swaziland, NIMART was introduced in 2009, with nurses receiving a two-week training before they were certified. While this enabled adult patients to access treatment more efficiently, unfortunately it did not help children as the nurses were not trained in paediatric management. Thus there is need for task shifting to empower providers to manage paediatric patients (18).

However, lacking at first in many places was functional integration between HIV services for pregnant women and services for maternal, newborn and child health, and family planning. Countries that made the most progress tended to be the ones that integrated or linked those services most successfully, such as Swaziland, where prevention of mother-to-child transmission of HIV was already under the department of reproductive health. They made HIV services part of the basic work of maternal, newborn and child health services, especially in settings with a high prevalence of HIV. They also linked the provision of family planning more closely into HIV programmes for women living with HIV. But countries moved quickly—by 2012, about 70% of countries worldwide reported that they were integrating HIV testing, counselling and antiretroviral medicines provision within antenatal care services to prevent mother-to-child transmission of HIV (19). Some countries also linked HIV testing with child immunization services, and offered it in paediatric in-patient wards and as part of nutrition support programmes and community childcare services (20, 21). To respond to lagging integration for child survival, the ‘Double Dividend’ conceptual framework was launched in 2013 to accelerate among other things, identification of opportunities or points of convergence for integrating paediatric HIV testing and treatment into existing maternal, newborn and child health services.

Countries identified the technical support and capacity building they needed to advance these goals. Technical assistance was provided within the context of an operational support plan developed by the IATT, co-convened by WHO and UNICEF with PEPFAR support, together with regional and country partners. Regional strategies for providing South–South technical assistance and support for capacity building were developed and rolled out in southern and eastern Africa and in western Africa.

Pressure was maintained to achieve further reductions in the prices of antiretroviral medicines and diagnostic equipment. Procurement and supply chains for essential medicines and diagnostics were strengthened, a process that dovetailed with improvements introduced as part of the scale up of national antiretroviral therapy programmes. Countries also sought to strengthen their laboratory systems and, especially, introduce point-of-care testing capacity more widely. New monitoring methods and tools were developed for measuring stepwise progress towards the Global Plan’s targets. International partners supported countries in using the tools to track programme performance. Many of these mechanisms were up and running by mid-2012 and they informed the first Global Plan Progress Report, which was published in that year. Some countries—Uganda and Kenya among them—set up virtually real-time tracking mechanisms to identify where implementation of the Global Plan was lagging.

### **The main activities “on the ground”**

Ultimately, the impact of the Global Plan depended on whether countries could provide a core set of high-quality HIV interventions on a wide enough scale based on the four prongs of prevention of mother-to-child transmission of HIV:

## **Help women and girls avoid HIV**

Few countries mounted special activities dedicated to support the Global Plan target of reducing HIV incidence in women aged 15–49 years by 50% (prong 1). The mainstay prevention programmes continued, with great expectations also placed on the preventive impact of the HIV treatment programmes that were being scaled up. Countries tried to implement various activities such as providing prevention counselling and support to women who test negative at the antenatal clinic, promoting partner testing in order to identify serodiscordance, and helping reduce incidence among adolescent girls and young women.

## **Help women and girls living with HIV avoid unintended pregnancies**

The Global Plan shared with the Millennium Development Goals the important goal of reducing to zero the unmet need for family planning (prong 2). This would enable women living with HIV to prevent unintended pregnancies. Globally, it was estimated that about 12% of women living with HIV did not have access to an effective method of contraception when the Global Plan was launched. That percentage had changed little in the preceding two decades (22), a trend that unfortunately continued after 2011. Actions taken in some priority countries (notably Ethiopia, Malawi, Swaziland and Zimbabwe) did lead to noticeable improvements in the provision of family planning services for couples (23, 24).

For example, Ethiopia has accelerated family planning services and all women have access to free family planning services from any health facility. It is a key part of the Ethiopian Health Extension Programme package, supported by funds from UNFPA. Other parts of the programme include expanded maternal and child health services such as adolescent reproductive health care, vaccinations and nutritional counselling (25).

## **Ensure HIV testing and access to antiretroviral medicines for pregnant women living with HIV**

### **Diagnosing HIV in pregnant women**

A first, indispensable step towards the target of reaching 90% of pregnant, HIV-positive women with antiretroviral medicines was to diagnose those women. HIV testing during antenatal care is the major source of women's knowledge about their HIV status, especially in low-income countries, where women often do not learn they have HIV until they are pregnant and tested as part of their maternal health care. Many of the Global Plan priority countries substantially increased testing coverage among pregnant women, mainly by making HIV testing and counselling part of the basic package of services for antenatal care (as recommended in WHO's 2013 Consolidated ARV guidelines) (26). Widespread HIV testing campaigns and new testing methods (including community-based testing) contributed to those increases. As implementation of the Global Plan progressed, it became evident that significant numbers of women were acquiring HIV later in pregnancy or post-partum, during breastfeeding, with a higher risk of transmission since they were not detected and treated. These seroconversions also highlighted the need to expand HIV testing interventions to include retesting women later in pregnancy or after giving birth, especially in high-burden countries. This is now the recommendation in South Africa (27).

## Providing antiretroviral medicines and other HIV services to pregnant or breastfeeding women living with HIV

A core target of the Global Plan was to provide antiretroviral medicines to at least 90% of the pregnant and breastfeeding women living with HIV in the Global Plan priority countries by the end of 2015. Remarkable progress on this front was achieved by integrating and linking HIV services with antenatal care and other maternal and child health services, introducing innovations that bridged staffing constraints with task shifting, swiftly adopting the latest WHO recommendations, improving the antiretroviral regimens mothers received, and by involving communities more closely in providing and monitoring services.

A hallmark of success was the leveraging of community expertise and assets, especially networks and support groups of women living with HIV, to boost outreach activities and service delivery. Mentor mothers and other women living with HIV played especially important roles in providing counselling and supporting treatment adherence. Community organizations were most effective when these groups received adequate support from the formal health system and when their capabilities and expertise were recognized.

Biomedical advances also boosted the Global Plan's impact. The phase out of single-dose nevirapine prophylaxis (which WHO had not recommended since 2006) gathered momentum, and greater numbers of countries adopted more effective regimens for women and expanded prophylaxis for their infants. This further enhanced the benefits of the increased service coverage that countries were achieving. Perhaps the biggest game-changer was the recommendation to provide lifelong, triple-medicine antiretroviral therapy to all pregnant and breastfeeding women diagnosed with HIV, regardless of disease or immunological status. This change enabled more women to begin treatment early without need for CD4 count, thereby maximizing the benefits. Malawi took the lead with this approach, known as Option B+ (28), which proved so successful that WHO incorporated it into its global guidelines for antiretroviral prophylaxis and antiretroviral therapy in 2013. By end-2015, all priority countries except Nigeria had commenced rollout of Option B+, and 12 have already achieved—or are close to achieving—full national implementation. And Nigeria has also agreed to adopt the WHO guidelines and implement “test and start” going beyond Option B+ to treat all women regardless of pregnancy status, and is already conducting pilots in selected areas.

### **Diagnosing infants living with HIV and providing them with treatment**

With incomplete coverage of testing, diagnosis and treatment services for women living with HIV, significant numbers of children have been at risk for acquiring HIV infection. Without early treatment about 30% of children infected during pregnancy or delivery die within the first year of life (29, 30). It is therefore essential that children born to mothers living with HIV are tested for HIV and, if results are positive, are put on treatment as soon as possible. One of the challenges has been technical, as definitively confirming that an HIV-exposed infant has acquired the infection requires a virologic test, which not many countries were providing, especially outside large cities. Parents and caregivers often also failed to bring their children back for evaluation.

Efforts to decentralize infant testing and place testing capabilities in community-level health facilities—in combination with stronger traditional laboratory systems—increased, and donor

organizations increased funding to support those efforts. In Kenya, the Ministry of Health expanded infant diagnosis by adopting best practices from other countries. It set up high-throughput laboratories (four molecular laboratories were established) and a more efficient system for transporting blood samples. By using dried blood spots as the preferred sample type for early infant diagnosis, Kenya increased testing coverage from less than 10% in 2007 to over 40% by the end of 2012 (31). But bottlenecks still exist—in Uganda, Kiyaga et al reviewed 24 sites covering 4221 HIV-exposed children and examined the extent to which health care workers were adhering to the EID algorithm. Results showed poor adherence to the protocol, which led to large losses to follow-up among caregivers. Factors aggravating the losses included delays in dispatching the results back to caregivers, lack of a patient follow-up mechanism to link to care, and poor patient counselling (32).

The provision of treatment to children diagnosed with HIV infection has improved over the years, but so far coverage has lagged behind that of adults. In response, Global Plan priority countries have been accelerating their efforts to increase paediatric treatment by training health care providers, enhancing testing activities in high venues such as malnutrition clinics and sick child wards, mobilizing communities, decentralizing access and strengthening health systems. The implementation of the Global Plan also occurred at a dynamic time when WHO was rapidly updating its treatment guidelines and recommendations on age cut-offs. In 2010, WHO recommended prompt treatment of children less than two years immediately after HIV diagnosis, regardless of symptoms. WHO further revised this recommendation to age five years in 2013, and then revised them again in 2015 with the recommendation that all children living with HIV receive treatment under the strategy “Treat All”. There has also been rapid expansion of knowledge about HIV disease progression and the role of reservoirs, and the importance of early and prompt treatment before the virus establishes itself.

On the technical side, the IATT has prepared an optimal formulary list to guide decisions and streamline procurement of paediatric medicines at the country level. Manufacturers are developing simpler and better-tolerated regimens for children that do not require refrigeration. There was a breakthrough in May 2015, when the United States Food and Drug Administration (FDA) gave tentative approval for lopinavir/ritonavir (LPV/r) oral pellets. These pellets come packaged in a small capsule that is easily opened, allowing them to be sprinkled over a child’s food—or in the case of a smaller infant—placed directly into the mouth or over expressed breast milk. LPV/r previously was only available in tablet form that could not be broken or a liquid that required refrigeration and had an unpleasant taste, making it extremely difficult to administer to infants. Raltegravir was approved for treatment in infants four weeks or older and is the first new class of medicines in a decade. Because HIV is more aggressive in children than adults, immediate treatment of all HIV-positive children is a high priority.

### **Innovations that sped up progress**

#### **Validation of elimination of mother-to-child transmission of HIV**

Ambitious as the Global Plan’s goals and targets were, some countries (especially in the Americas and Caribbean) set their sights even higher—aiming at eliminating both new paediatric HIV infections and congenital syphilis. In 2014, WHO together with UNICEF, UNFPA and UNAIDS developed a standardized protocol and a set of impact criteria to define elimination:

- For HIV, fewer than 50 infants acquiring HIV infection per 100 000 live births and a transmission rate of either less than 5% in breastfeeding women or less than 2% in non-breastfeeding women.
- For syphilis, fewer than 50 cases of congenital syphilis per 100 000 live births.

In addition, specific levels of service delivery coverage had to be achieved:

- Antenatal care coverage (at least one visit) of at least 95%.
- Coverage of HIV and/or syphilis testing of pregnant women of at least 95%.
- Antiretroviral therapy coverage of pregnant women living with HIV of at least 95%.
- Treatment coverage of syphilis-seropositive pregnant women of at least 95%.

In June 2015, Cuba became the first country to receive validation that it had eliminated mother-to-child transmission of HIV and congenital syphilis as a public health problem. Cuba introduced its prevention of mother-to-child transmission programme in 1997, within a health-care system that is universal and free of charge. In 2014, Cuba reported fewer than 100 pregnant women were living with HIV, almost all of whom received antiretroviral medicines to prevent mother-to-child transmission. Several other countries worldwide are also now preparing for validation. According to UNAIDS, at least 85 countries globally have fewer than 50 new child infections per year.

### **Option B+ became a game-changer**

For many countries, the simplicity of Option B+ was a game-changer in efforts to prevent new HIV infections among children and keep their mothers alive. The Option B+ regimen offers all pregnant or breastfeeding women living with HIV lifelong antiretroviral therapy, rather than relying on laboratory testing to determine eligibility for treatment versus time-limited prophylaxis. Pioneered in Malawi, the approach proved so successful that it was soon taken up in global guidelines issued by WHO (33). A year after Option B+ was introduced in Malawi, the number of pregnant or breastfeeding women living with HIV on antiretroviral therapy increased by 700% (34). By removing the delays and hurdles involved in determining whether an HIV-positive mother was eligible for antiretroviral therapy, Option B+ made service delivery a lot simpler and easier. Greater numbers of women living with HIV could now start treatment earlier. This early treatment helps them to remain healthy, protects their next pregnancy and reduces the risk of them transmitting HIV to their partners.

### **Barriers to service access were removed**

The countries that achieved the most success were the ones that managed to overcome—or at least circumvent—barriers that impeded the wide-scale provision of high-quality services. Removing user fees was one such step. Kenya, for example, eliminated maternity fees in order to encourage women to give birth in health facilities. The percentage of births assisted by a skilled birth attendant increased in the last five years, from 44% in 2008–2009 to 62% in 2014, which improved care for mothers and their newborns (35). Decentralization and integrating HIV services for pregnant and breastfeeding women and their infants into broader maternal and child health service platforms has been another vital element for success. This brought services closer to communities, especially in remote areas, and simplified the steps women

had to follow along the cascade of services for preventing mother-to-child transmission of HIV and protecting their own health. Clinics and communities were linked more effectively, which relieved some of the strain on formal health facilities. Community leaders and stakeholders were increasingly consulted on Global Plan activities, from village chiefs and opinion leaders to faith leaders and small support groups of women living with HIV. Community health workers were trained and enlisted in providing basic services, strengthening referral systems and supporting mothers and their families. In Ethiopia, for example, decentralized care was transferred to a cadre of 35 000 health extension workers who provided information and services to communities (36).

Telecommunication tools were also put to innovative use. Several African countries began using mobile phone messaging services to help retain women in the cascade of elimination of mother-to-child transmission services. In Malawi, Cameroon and South Africa mobile communication is now used to remind women to attend clinic appointments. In Nigeria, cell phone companies send out messages supporting prevention of mother-to-child transmission of HIV and encouraging women and families to access services. Countries are also adopting electronic results reporting systems using GPRS, SMS and smartphones to reduce turnaround time from infant testing to receipt of results.

## PROGRESS TO DATE

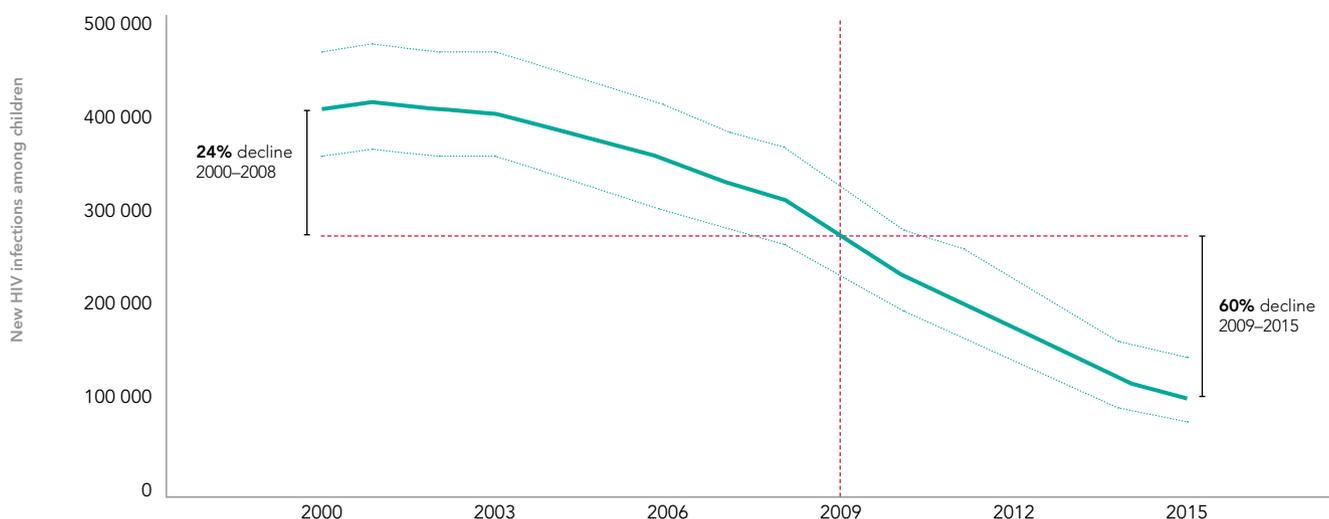
The most recent data provided on country performance in 2015 is based on country reported data and country-developed models using Spectrum software (see “A note on measurement” at the end of the report). Over the course of the Global Plan implementation, data on India’s response were not available, so the report covers 21 countries. In addition, data from Ethiopia were not finalized at the time of publication and thus country-specific estimates are not presented in this report, although draft values are included in the aggregated results.

### FEWER CHILDREN ARE ACQUIRING HIV

Since 2009, there has been a 60% decline in new HIV infections among children in the 21 Global Plan priority countries, a reduction from 270 000 [230 000–330 000] in 2009 to 110 000 [78 000–150 000] in 2015 (see Figure 1). The number of new HIV infections among children declined by 24% between 2000 and 2008, and by 60% between 2009 and 2015.

The overall impact of programmes to prevent mother-to-child transmission is increasing over time. Among the 1.4 million HIV infections among children that have been prevented in the 21 priority countries since 2000 by the provision of antiretroviral medicines, 1.2 million (88%) were prevented between 2009 and 2015. This includes 330 000 infections averted in South Africa, 120 000 in Uganda and 110 000 in United Republic of Tanzania (see Figure 2).

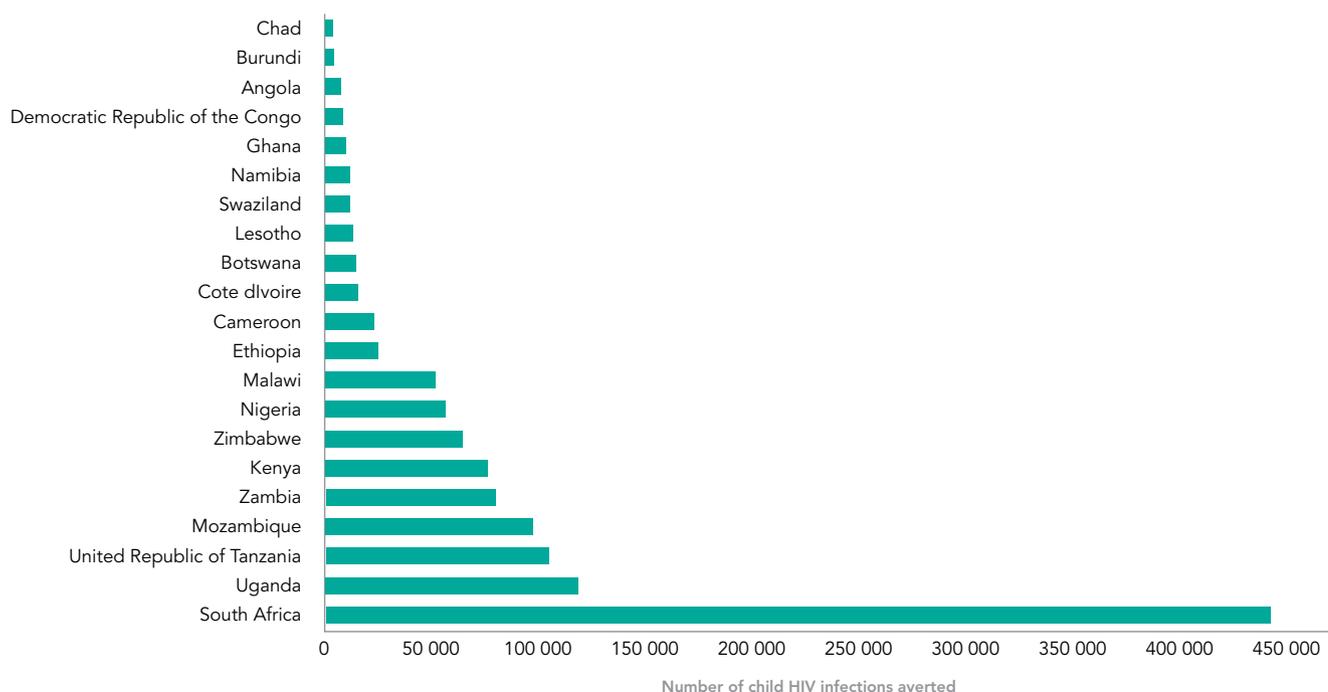
Figure 1  
Number of new HIV infections among children in 21 Global Plan priority countries, 2000-2015



Source: UNAIDS 2016 estimates.

Figure 2

## Number of HIV infections averted among children by country, 2009–2015



Source: UNAIDS 2016 estimates.

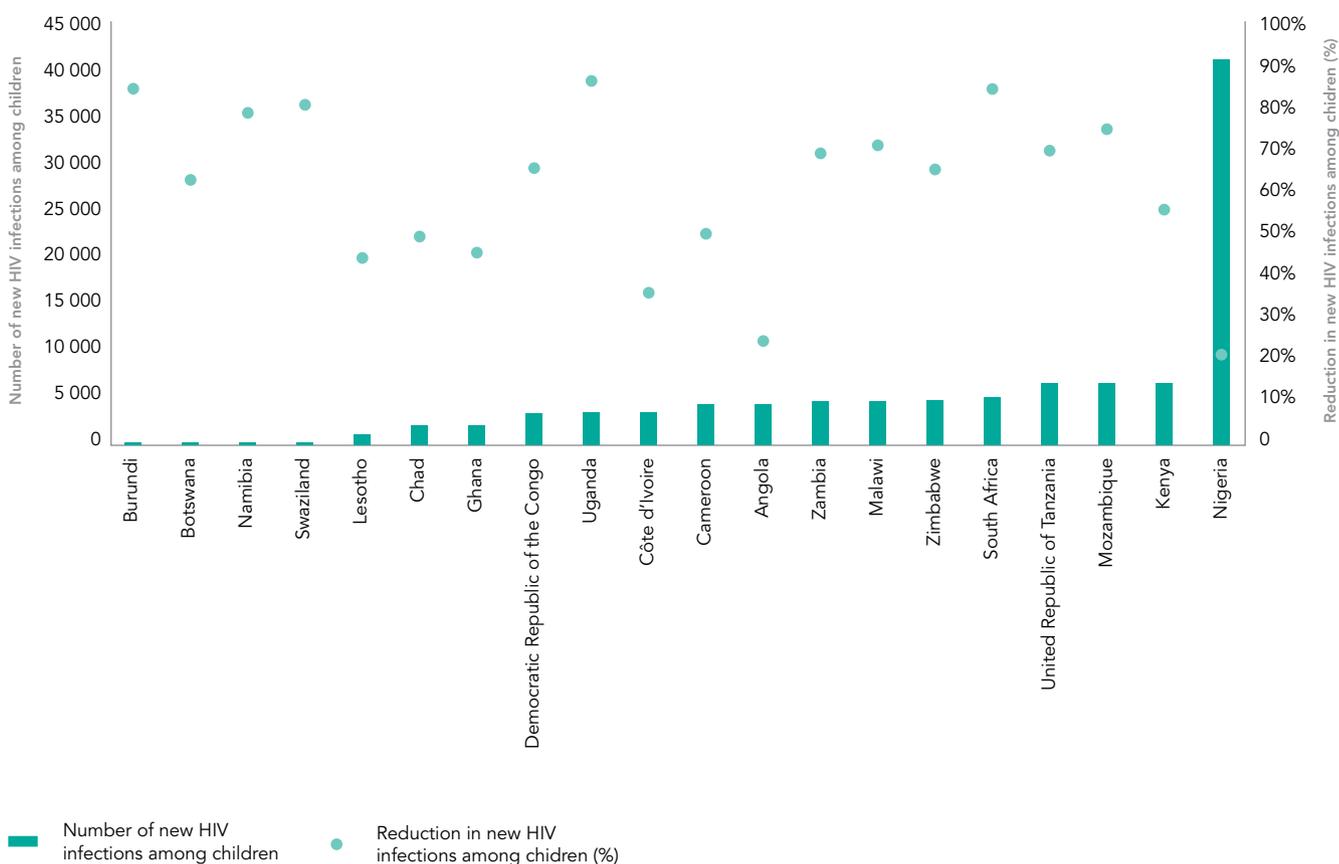
This continued and steady decline in new HIV infections among children is encouraging, but fell short of the Global Plan target of a 90% reduction by 2015. Four countries have reduced new infections by 80% or more: Uganda at 86%, and South Africa and Burundi both at 84%, and Swaziland at 80%. Three others have seen a decline of over 70%: Namibia at 79%, Mozambique at 75%, and Malawi at 71% (see Figure 3 and Table 2). A number of countries have also registered reductions of over 50%, including the United Republic of Tanzania and Zambia (69% each), the Democratic Republic of the Congo (66%), Zimbabwe (65%), Botswana (63%), and Kenya (55%). The case of Botswana deserves special mention—the country already had high rates of antiretroviral coverage to prevent HIV transmission before the commencement of the Global Plan, so the scope of its progress has been limited by its previously established success. Even then, Botswana has reduced new infections by 63%.

A number of countries that had been making slow progress have now registered impressive results including Democratic Republic of the Congo (66%), and Chad and Cameroon (49% each). These countries have visibly accelerated their efforts over the last several years, concentrating their efforts in high epidemic regions. They have mobilized their political leadership at the levels of the president and the first lady, with

members of parliament, with local leadership and with women living with HIV. They have raised the profile of prevention of mother-to-child transmission of HIV, trained health care providers and decentralized services. They are rolling out Option B+, and are working closely with implementers and donors to optimize their resources.

At the same time, some countries still face significant challenges. This includes Nigeria, which has the second largest HIV epidemic in the world and has the largest number of new HIV infections among children each year. The country was home to one third of all new HIV infections among children in the priority countries in 2015, with an estimated 41 000 [28 000–57 000]. This is roughly equivalent to the next eight countries combined. There has only been a 21% decline in new paediatric HIV infections in Nigeria since 2009. When the data are re-analysed without Nigeria, the remaining 20 countries have reduced new HIV infections among children by two thirds (69%).

Figure 3  
**Number of new HIV infections among children in 2015 and percentage reduction in new HIV infections since 2009 by country**



Source: UNAIDS 2016 estimates.

Table 2

## Percentage decline in new HIV infections among children, 2009–2015

>66% decline	33%–66% decline	<33% decline
<ul style="list-style-type: none"> <li>▪ Burundi (84%)</li> <li>▪ Malawi (71%)</li> <li>▪ Mozambique (75%)</li> <li>▪ Namibia (79%)</li> <li>▪ South Africa (84%)</li> <li>▪ Swaziland (80%)</li> <li>▪ Uganda (86%)</li> <li>▪ United Republic of Tanzania (69%)</li> <li>▪ Zambia (69%)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Botswana (63%)</li> <li>▪ Cameroon (49%)</li> <li>▪ Chad (49%)</li> <li>▪ Côte d'Ivoire (36%)</li> <li>▪ Democratic Republic of the Congo (66%)</li> <li>▪ Ghana (46%)</li> <li>▪ Kenya (55%)</li> <li>▪ Lesotho (44%)</li> <li>▪ Zimbabwe (65%)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Angola (24%)</li> <li>▪ Nigeria (21%)</li> </ul>

#### PREGNANT WOMEN LIVING WITH HIV ARE ACCESSING SERVICES, BUT IMPORTANT GAPS REMAIN

The proportion of pregnant women living with HIV who received antiretroviral medicines (excluding the less efficacious single-dose nevirapine) for the prevention of mother-to-child transmission has more than doubled in the 21 priority countries, from a baseline of 36% [32–40%] in 2009 to 80% [71–90%] in 2015. In 2015, six of the priority countries (Botswana, Mozambique, Namibia, South Africa, Swaziland and Uganda) met the Global Plan goal of ensuring that 90% or more of pregnant women living with HIV receive antiretroviral medicines (see Figure 4). Six additional countries provided antiretroviral medicines to over 80% of pregnant women living with HIV: Burundi 89% [74–95%], Zambia 87% [81–94%], the United Republic of Tanzania 86% [69–89%], Zimbabwe 84% [77–92%], Cameroon 82% [74–92%], and Malawi 80% [72–88%].

Countries are also providing more efficacious regimens to pregnant women, adopting the 2015 WHO Consolidated Guidelines on the Use of the Antiretroviral Drugs for Treating and Preventing HIV Infection (37). WHO now recommends that all persons, including pregnant women and children living with HIV, be offered immediate and lifelong treatment regardless of disease or immunological status. With regards to infant diagnosis and treatment, the most recent WHO Guidelines recommend that HIV-exposed infants be tested for HIV by the time they are six to eight weeks of age, again at the end of breastfeeding, and at any intervening point they present with illness. In the wake of revised guidance on infant diagnosis, some countries are exploring innovative strategies such as birth testing and use of point of care EID assays. At present most of these are pilot programmes, but South Africa has modified their testing algorithm and now promotes testing at birth and at 10 weeks of life in an attempt to identify more infected infants and improve linkage to early treatment.

Figure 4

Percentage of pregnant women living with HIV receiving antiretroviral medicines (either prophylaxis or lifelong therapy) to prevent mother-to-child transmission by country, 2015



Source: UNAIDS 2016 estimates.

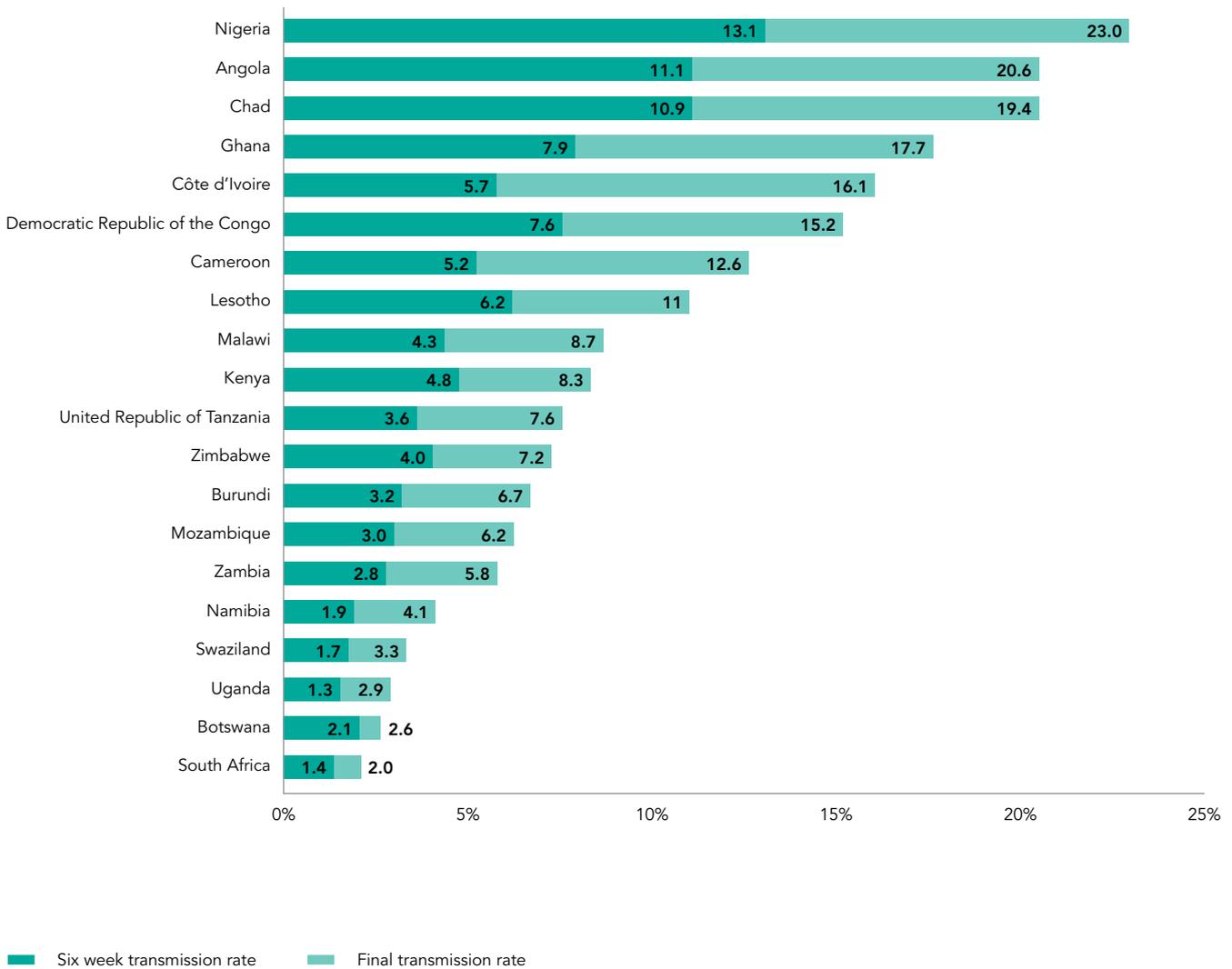
MOTHER-TO-CHILD TRANSMISSION OF HIV RATES HAVE DECLINED

The risk of HIV transmission from an untreated mother living with HIV to her child ranges from approximately 15% to 45%, depending upon the presence and duration of breastfeeding (38). One of the targets of the Global Plan is to reduce this rate to 5% or less among breastfeeding women, and 2% or less among non-breastfeeding women. In 2009, prior to the launch of the Global Plan, the overall transmission rate (including during the breastfeeding period) was 22.4% [19.8–25.4%] in 21 priority countries. By 2015, it had been reduced to 8.9% [8.0–10.0%], a drop of 60% (see Figure 5).

It is also noteworthy that the 6-week transmission rate among the countries was only 4.7% [4.2–5.3%] in 2015, compared to 11.4% [10.1–12.9%] in 2009. This means that at six weeks, just 4.7% of HIV-exposed infants were starting life with HIV in 2015, demonstrating the quality prevention of mother-to-child transmission of HIV interventions countries are now implementing, and the support mothers get during pregnancy. It shows that countries have the capacity to provide highly effective programmes during pregnancy. Where the same support is given to breastfeeding mothers (e.g. better adherence support), countries have demonstrated that they could reduce postnatal transmissions just as significantly.

Figure 5

### Six-week and final mother-to-child transmission rates by country, 2015



Source: UNAIDS 2016 estimates.

Several countries have now met the Global Plan milestone of reducing mother-to-child transmission to 5% or less among breastfeeding women—South Africa (2% [1.9–2.2%]), Uganda (2.9% [2.6–3.2%]), Swaziland (3.3% [3.0–3.5%]), and Namibia (4.1% [3.7–4.5%]). In addition, Botswana—where non-breastfeeding is the official policy for infants born to mothers living with HIV—is close to achieving this target with a 2.6% [2.4–2.7%] final transmission rate. Seven additional countries—including Burundi, Kenya, Malawi, Mozambique, the United Republic of Tanzania, Zambia and Zimbabwe—had

final transmission rates of less than 10% in 2015. But several continue to have elevated transmission rates, with the highest being Nigeria (23.0% [17.8–30.1%]), Angola (20.6% [14.7–28.8%]) and Chad (19.4% [15.0–24.8%]). As more countries expand services for pregnant and breastfeeding women and increase lifelong HIV treatment coverage, transmission rates are likely to continue to decline. Achieving and maintaining low transmission rates requires universal coverage across the prevention of mother-to-child transmission cascade, including high antenatal attendance, high HIV testing and counselling rates, antiretroviral therapy coverage over 90%, systems that support lifelong adherence to antiretroviral therapy and retention for mothers in the postpartum period, as well as active provider-initiated prevention of HIV infection among pregnant and breastfeeding women.

#### NEED FOR PREVENTION OF MOTHER-TO-CHILD TRANSMISSION REMAINS HIGH DUE TO ONGOING INFECTIONS AMONG WOMEN

The total number of women requiring prevention of mother-to-child transmission of HIV services each year in the 21 priority countries remains high, estimated as 1.2 million [1.1 million–1.4 million] in 2015. Preventing new HIV infections among women of childbearing age not only promotes their good health, but it is an important step in eliminating mother-to-child transmission of HIV. The Global Plan aimed to reduce the number of recent infections among these women in priority countries by 50% between 2009 and 2015. However, the data show that only marginal progress has been made towards achieving this goal. In 2009, 650 000 [570 000–750 000] women of childbearing age acquired HIV; this declined to 620 000 [520 000–740 000] in 2015, a reduction of only 5%. Between 2009 and 2015 inclusive, a total of 4.5 million (3.8 million–5.4 million) women of childbearing age in the 21 reporting countries were newly infected with HIV. This population of women will need to be diagnosed and provided with services to prevent mother-to-child transmission if they decide to have children.

Furthermore, some of these infections may be occurring in women who are already pregnant or breastfeeding, but most programmes in these countries do not have systems in place to retest pregnant and breastfeeding women who were previously HIV-negative. The risk of mother-to-child transmission of HIV is higher among women who are not on antiretroviral therapy, but particularly higher among newly infected women who are not yet diagnosed and on treatment, due to the very high viremia associated with new HIV infection. It is also important to identify discordant partners of HIV seronegative women, so that counselling and dual protection with condoms and use of other combination prevention strategies can be offered to reduce their risk of acquiring HIV infection. Provider-initiated couple counselling and disclosure can facilitate communication during this sensitive time. In addition, countries need to strengthen policies on repeat HIV testing during pregnancy and breastfeeding, and communicate these both to health care providers and to communities.

Additionally, due to increasing access to antiretroviral therapy, a larger number of women are living healthy lives with HIV and are able to have children, as is their right. Continued investment in services to prevent new HIV infections among children and keep their mothers alive, assuring access to antiretroviral medicines, is therefore needed, as more

women living with HIV are added to the pool of those who need services.

Some countries have made progress in lowering new HIV infections among women and girls. For instance, Burundi estimates a 39% reduction in new HIV infections among women between 2009 and 2015, and Malawi, the United Republic of Tanzania, Ghana, Mozambique, the Democratic Republic of the Congo, Swaziland, Uganda and Botswana estimate reductions of 20–30% over the same period. Recently, multifaceted prevention in adolescent girls and young women has gained increased attention, which should lead to greater reductions in new infections going forward.

#### SIGNIFICANT UNMET NEED FOR FAMILY PLANNING REMAINS

All women, including women living with HIV, should have the opportunity to plan their pregnancies and have children when they want and when their health has been optimized. This is particularly important for adolescent girls, who are at a greater risk for pregnancy-related complications. Family planning remains a core pillar of the four-pronged approach to comprehensive programming to prevent mother-to-child transmission. Providing appropriate counselling, support and contraceptives to women living with HIV in order to meet their family planning goals will optimize health outcomes for women and reduce the number of infants who are exposed to or infected by HIV. Moreover, spacing of pregnancies is beneficial to the health of both women and their children.

The Global Plan aimed to eliminate unmet need for family planning among all women in the priority countries (including women living with HIV), thereby ensuring that all women who desire contraception have access to it. The most recent population-based surveys, however, show that while some countries (notably Malawi, Swaziland and Zimbabwe) have made noticeable improvements in their efforts to provide family planning services, 11 of the 21 priority countries do not meet the need for family planning among for 20% or more of married women (Figure 6).

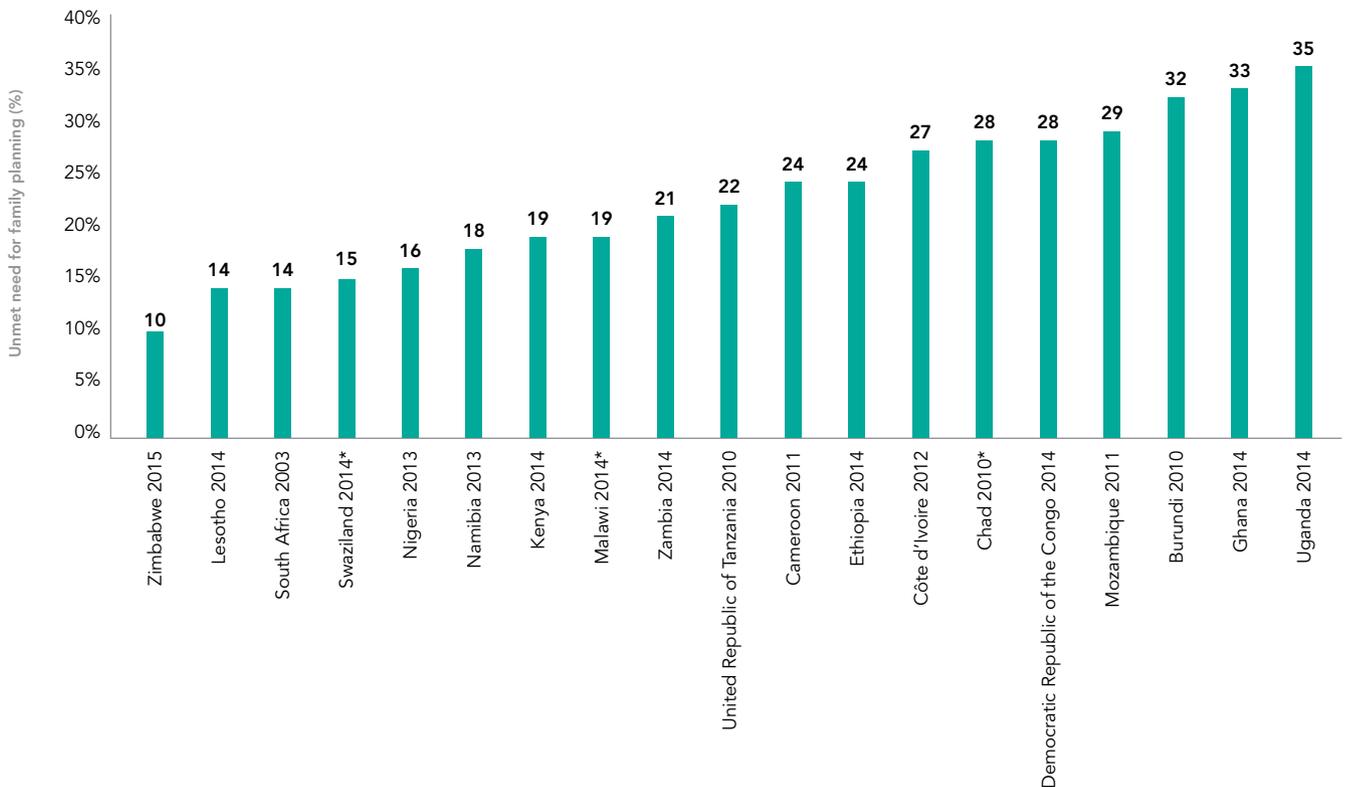
The effects of this limited response, coupled with high HIV prevalence in general, contribute to the stable numbers of women living with HIV who are pregnant in the 21 countries and in need of services to prevent mother-to-child transmission. Greater efforts are needed to hasten progress on the first two prongs of the Global Plan: primary HIV prevention for women and reducing the unmet need for family planning services.

Data assessing unmet need for family planning is compiled from household surveys, which are conducted every three to five years (depending on the country). Some of the data reported in this report were collected as long as five years ago (or earlier). Hence, it is necessary to develop additional ways to measure the unmet need for family planning to provide more real-time information about the fertility desires of women.

It is important to note that the results presented here are not specific to women living with HIV. Survey data frequently are not available by HIV status, or the numbers of women living with HIV in the survey may be too small to provide reliable measures of unmet need for family planning in that specific population.

Figure 6

## Percentage of currently married women with an unmet need for family planning, most recent household surveys, 2003–2015



\*Denotes that the survey was a Multiple Indicator Cluster Survey (MICS), MICS are based on a slightly different definition of unmet need for family planning

Source: Household surveys, 2003–2015.

### EFFORTS TO KEEP MOTHERS ALIVE AND HEALTHY ARE SHOWING RESULTS

HIV is still the leading cause of death worldwide for women of reproductive age (39), and the Global Plan aspired to halve AIDS-related maternal mortality in the priority countries. Pregnant women living with HIV are also at greater risk of dying from pregnancy-related complications than women who are not living with HIV, perhaps because pregnancy increases the risk of concomitant infections or because the risk of other obstetric complications may be increased in HIV-infected women. In 2015, WHO estimates that globally an estimated 4700 maternal deaths were indirectly caused by AIDS (40). However there have been methodological changes in how these estimates have been calculated over the years making annual estimates incomparable and not able to provide trend estimates.

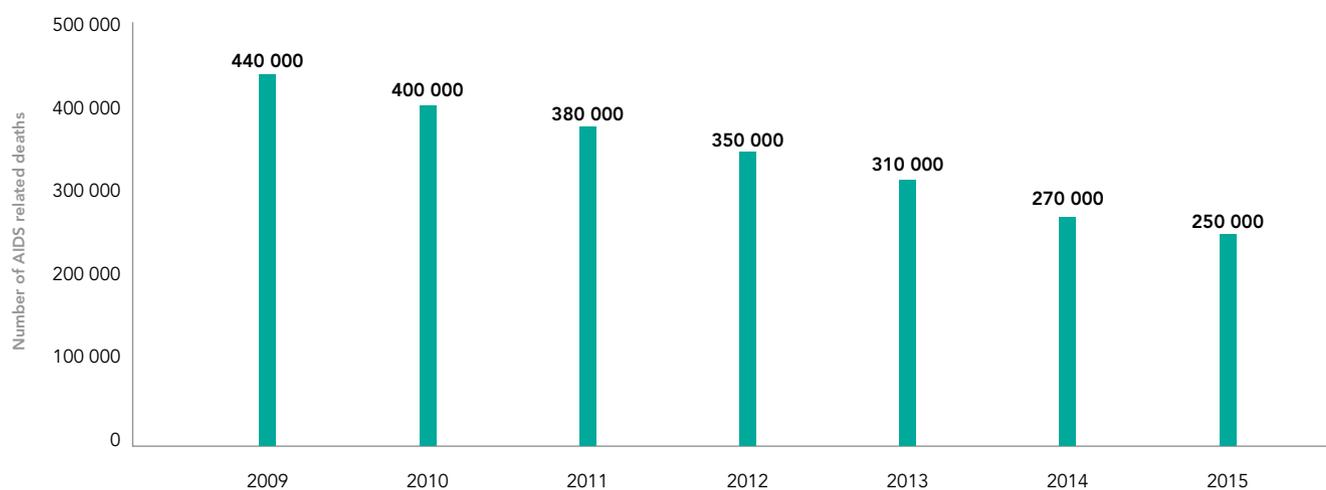
Because of these changes, the Global Plan Progress Report also examined trends in deaths among women of reproductive age over the years. The results show that between 2009 and 2015, there has been a 46% decline in the number of AIDS-related deaths among women of reproductive age in the 21 priority countries largely due to greater access to treatment (see Figure 7). At the same time, there has been a significant increase in the proportion of pregnant women living with HIV who are accessing lifelong antiretroviral treatment (see Figure 9), rising from 10% (9–12%) in 2009 to 74% (66–83%) in 2015.

A key factor in the progress towards improving the health of pregnant and breastfeeding women has been expanded access to treatment in the form of Option B+. This life-saving approach has enabled women to begin treatment early, before their immune system is too damaged. The most recent WHO recommendations now support all persons beginning lifelong treatment when an HIV diagnosis is confirmed (41). Ensuring that women of reproductive age who are living with HIV are identified early, initiated on lifelong antiretroviral therapy, treated for opportunistic infections and tuberculosis as needed, and provided with safe perinatal care and delivery will help to further decrease mortality.

Research, however, show that drop-out rates are high, particularly for women who start antiretroviral therapy to prevent mother-to-child transmission compared to those who have begun treatment for their own health. To address this, stronger programmes to support women and retain them in care are needed to maximize the benefits of antiretroviral therapy.

Figure 7

### AIDS-related deaths among women of reproductive age (15–49 years), 21 Global Plan Priority countries, 2009–2015



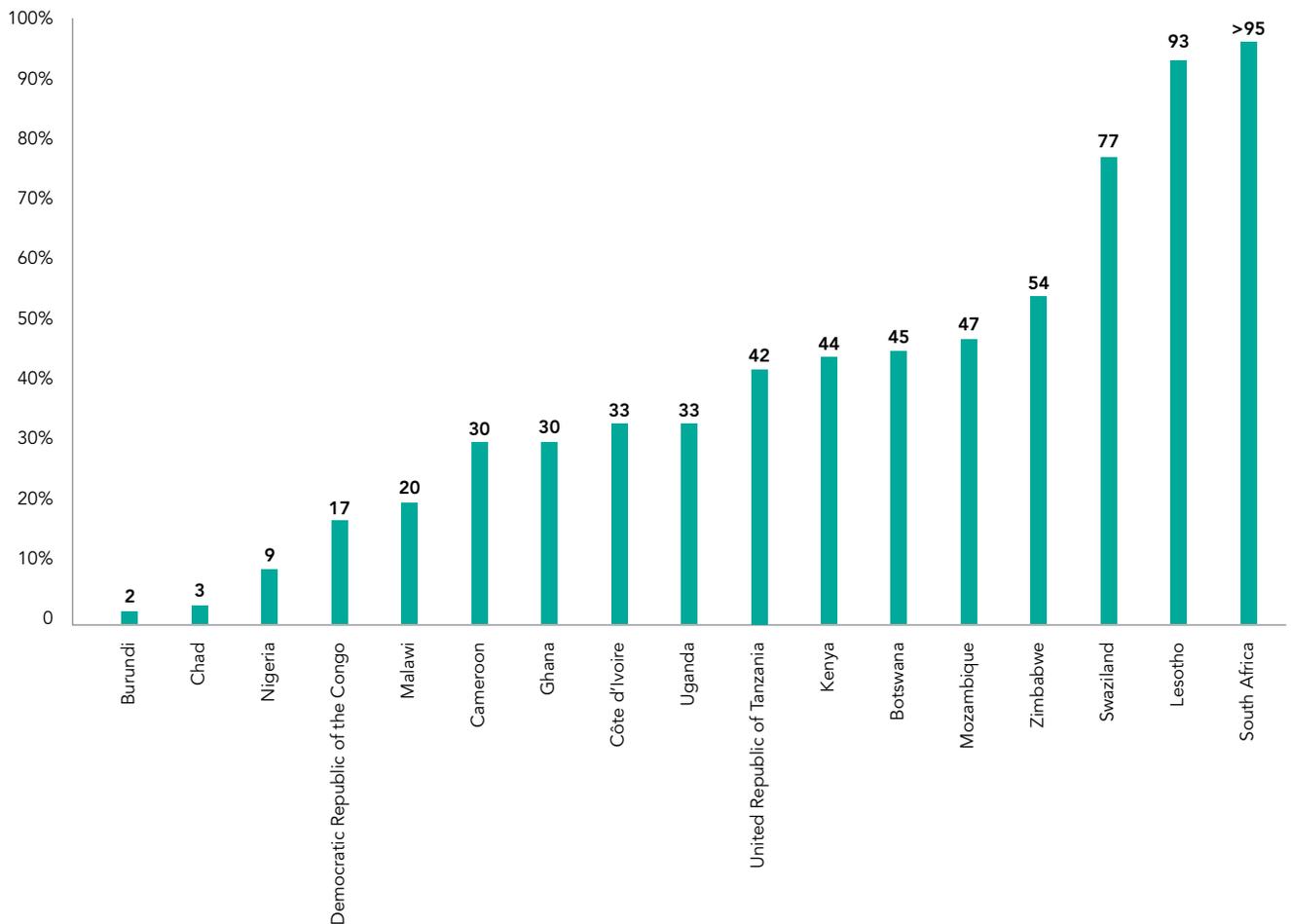
Source: UNAIDS 2016 estimates.

## LIMITED PROGRESS IN INFANT DIAGNOSIS

WHO recommends that infants exposed to HIV be tested at the first postnatal visit—usually when they reach four to six weeks of age—or at the earliest opportunity thereafter, and that those who are infected start treatment immediately (42). Infants infected in utero or during labour and delivery have a poorer prognosis compared to those infected during breastfeeding, and they require urgent antiretroviral therapy to prevent early mortality. However, identifying those infants using the common antibody HIV test is a challenge due to the presence of maternal HIV antibodies, which may persist for as long as 18 months in a child’s bloodstream. HIV infection can only be definitively confirmed in those infants using a virologic test.

Figure 8

Percentage of infants born to women living with HIV receiving a virological test within the first two months by country, 2015



Source: UNAIDS, UNICEF and WHO Global AIDS progress reporting 2016

In many countries, the virologic test which performed on dried blood spot (DBS) specimens collected at service delivery sites and then transported and tested in large centralized laboratories has helped decentralize testing beyond cities. However, this often leads to long waiting periods before the results are returned to the facility and caregiver, leading to high rates of loss to follow-up, delayed initiation of antiretroviral therapy or even failure to start on treatment at all. Innovative point-of-care virologic tests have the potential to decentralize testing and markedly reduce the time taken for results to be available. It is necessary, however, to increase both the availability and affordability of these tests, and to strategize their optimal use to complement centralized laboratory testing. Efforts to decentralize infant testing and place testing capabilities in small health facilities—in combination with stronger traditional laboratory systems—are still under way, and some donor organizations are providing funding to make this a reality. Encouraging results are soon to be available from countries like Malawi and Mozambique who have piloted decentralized deployed point-of-care testing for HIV exposed infants. The cost of virologic testing for early infant diagnosis also has decreased and sample transport networks have been improved (43, 44).

Figure 8 shows that coverage of EID remains low. Only four countries—Lesotho, South Africa, Swaziland, and Zimbabwe—provided EID to over half the HIV-exposed infants. For all the other countries, the majority of infants were tested after the time period recommended by WHO, if tested at all.

#### TREATMENT PROGRAMMES STILL LEAVE CHILDREN BEHIND

Infants and young children who acquire HIV have an exceptionally high risk of morbidity and mortality, and half will die before their second birthday if they do not receive treatment. The 2015 *WHO Consolidated guidelines* promote simplicity and efficacy in paediatric treatment in order to save more lives and improve clinical outcomes. The *Guidelines* also recommend that antiretroviral therapy be initiated in all children diagnosed with HIV, before the immune system is too damaged.

UNAIDS estimates for the number of children in need of antiretroviral therapy are based on a denominator of all children under the age of 15 years living with HIV. Among the 21 priority countries, the number of children accessing antiretroviral therapy has more than doubled, from 280 000 in 2009 to 730 000 in 2015; 51% [44–59%] of children living with HIV were accessing HIV treatment in 2015 (see Figure 9). Although this represents a large increase from the 15% [13–17%] baseline in 2009, children were less likely to receive treatment than pregnant women (51% (13–17%) compared to 74 (66–83%). Six priority countries—Botswana, Kenya, Namibia, South Africa, Swaziland and Zimbabwe—are providing treatment to more than 70% of children living with HIV; six additional countries provide HIV treatment to over 50% of children living with HIV. Several other countries including Angola, Chad, Cameroon, Côte d'Ivoire, the Democratic Republic of the Congo, and Nigeria have a longer distance to go to increase children's access to treatment.

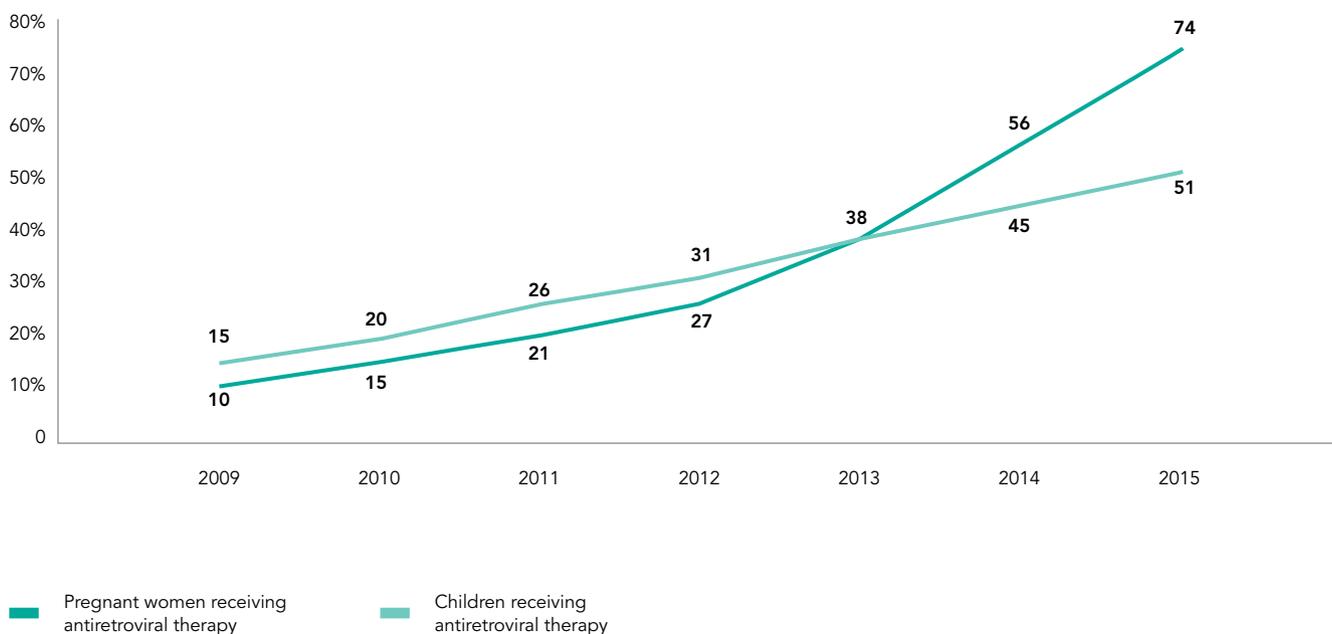
There is an urgent need to accelerate treatment for children in all priority countries. Many countries have rapidly rolled out treatment for women with the introduction of

Option B+ and the same acceleration approach is needed to close the coverage gap for children. This approach includes providing appropriate and simple diagnostic services, training providers at all levels of the health system in the management of children with HIV (including routine and frequent paediatric provider-initiated testing and counselling throughout the breastfeeding period), and aligning clinic visits to support retention in care and adherence for mother-baby pairs.

Low treatment coverage for children living with HIV is related to other factors in addition to the challenges encountered while ascertaining diagnosis. These include the limited range of suitable child-friendly formulations of antiretroviral medicines, low rates of paediatric HIV case-finding, poor linkage to care and treatment, and the relative paucity of providers trained in prescribing antiretroviral therapy for children. There are fewer age-appropriate antiretroviral formulations available for use, especially among the youngest infants. Treatment costs for young children also are higher than for adults—in part because the recommendations call for the use of boosted protease inhibitors in first-line treatments in order to optimize outcomes for children.

Figure 9

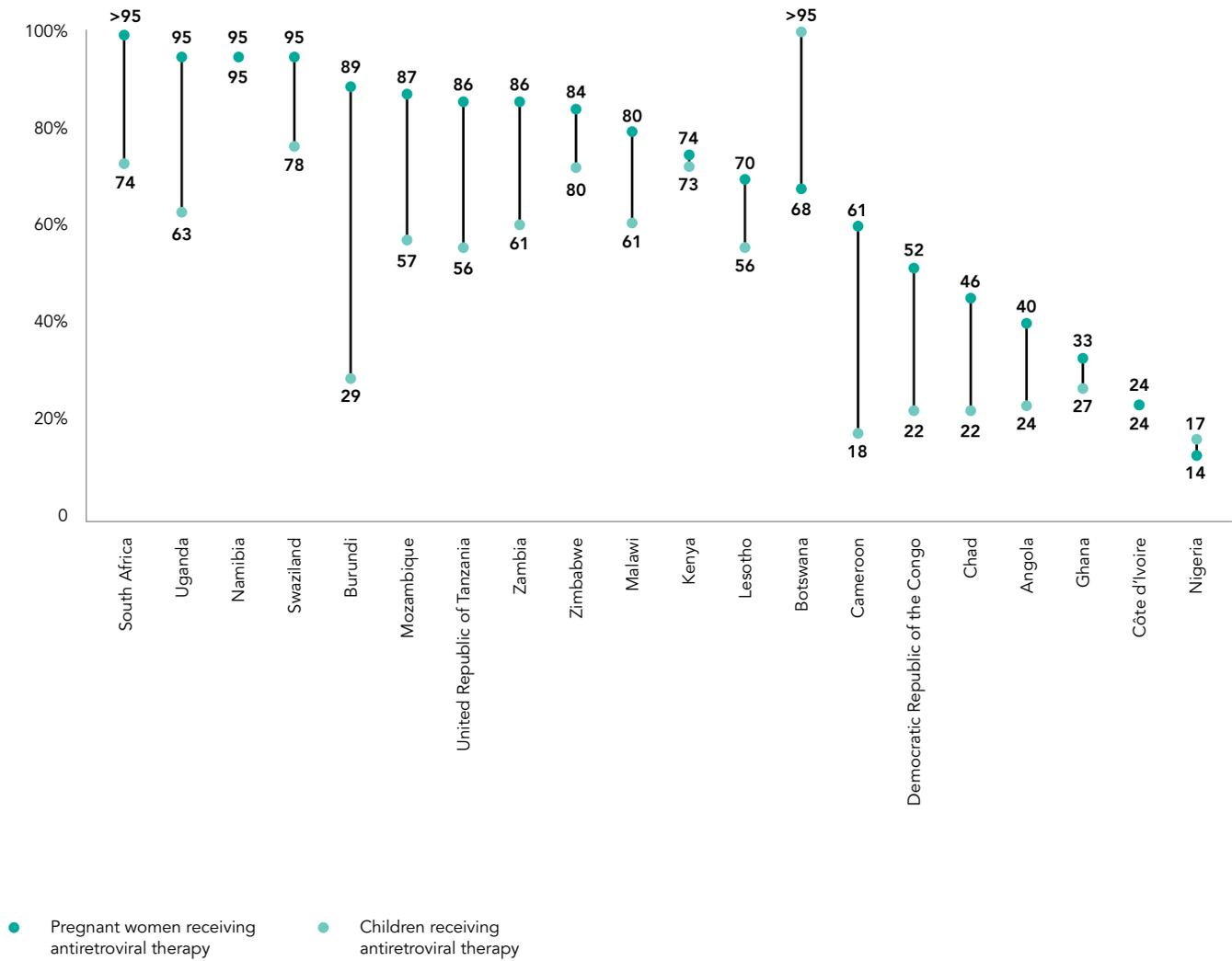
Percentage of pregnant women and children (aged 0–14 years) living with HIV who are receiving lifelong antiretroviral therapy, 21 Global Plan priority countries, 2009–2015



Source: UNAIDS 2016 estimates.

Figure 10

Percentage of pregnant women and children (aged 0–14 years) living with HIV who are receiving lifelong antiretroviral therapy by country, 2015



Source: UNAIDS 2016 estimates.

# CONCLUSIONS

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## WHAT THE GLOBAL PLAN SHOWED THE WORLD

The Global Plan showed that when strong enough political commitment and resources are marshalled around an ambitious but clear strategy, unlikely success can be achieved. Around the world, the Global Plan boosted the political visibility of paediatric AIDS and highlighted the needs of women who are at risk for HIV infection or live with HIV, and it kept the prospect of an AIDS-free generation centre-stage. The impact in the lives of women, children and their communities has been massive. Rapid expansion of services to prevent mother-to-child HIV transmission contributed significantly to global efforts to reduce mortality in children under the age of five. Interventions to protect the lives of mothers have helped reduce maternal mortality.

When the Global Plan was launched, the elimination of mother-to-child transmission of HIV was barely seen as a realistic target in low- or middle-income countries. Yet Cuba in June 2015 became the first such country to reach that milestone. Many more countries are poised to repeat Cuba's feat. Data from 17 countries and territories in the Americas indicate that they may have eliminated mother-to-child transmission of HIV and syphilis, according to the Pan American Health Organization (PAHO) (45). UNAIDS estimates that as many as 85 countries already had fewer than 50 new infections annually among children in 2015, making them potential candidates for eliminating new HIV infections among children. Among the Global Plan priority countries, a small group has fewer than 1000 new paediatric HIV infections (Botswana, Burundi, Namibia and Swaziland), and with concerted effort, could reduce them further. Several Global Plan priority countries such as South Africa, Botswana, Burundi, Namibia and Uganda may be on the brink of qualifying for the new WHO category of pre-elimination, which means that they may meet criteria for reducing its mother-to-child transmission rate to less than 5%, and are providing antenatal care, testing, and treatment to over 90% of pregnant women nationally.

The Global Plan's two headline goals were ambitious in scope and scale. A few countries came within touching distance, but most have built such strong momentum that they could reach those goals within a few more years—if political commitment is sustained, resources are available and new opportunities are seized.

### **Global Goal: Reduce the number of HIV-related maternal deaths by 50%**

The Global Plan added impetus and focus to countries' efforts to transform the delivery of health services for women and children. In the 21 priority countries, the number of AIDS-related deaths among women of reproductive age fell by 46% between 2009 and 2015. That achievement was due in large part to the significant increase in the proportion of pregnant women living with HIV accessing lifelong antiretroviral therapy, from 10% (9–12%) in 2009 to 74% (66–73%) in 2015, with 93% of these accessing lifelong antiretroviral therapy (46).

**Global Goal: Reduce the number of new childhood HIV infections by 90%**

Efforts to protect children against HIV received their biggest boost ever. The number of new HIV infections among children fell by 55% globally and by 60% in the 21 Global Plan priority countries between 2009 and 2015. If Nigeria were excluded from the analysis, the reduction in new HIV infections among the remaining 20 countries would be 69%. Fully 90% of the 1.3 million paediatric HIV infections averted since 2000 in the priority countries through the provision of antiretroviral medicines to pregnant women were averted since 2009.

Collectively, countries made remarkable progress. The number of HIV infections among children in Uganda was reduced by 86%, just four points shy of the Global Plan goal of 90% reduction in new infections. Uganda has cut down its mother-to-child transmission rate from 28.7% [25.7–32.0%] in 2009 to 2.9% [2.6–3.2%] in 2015. It has reduced the number of new HIV infections among children from 25 000 [22 000–29 000] in 2009 to 3500 [<2000–6500] in 2015. South Africa, which has the world's biggest HIV epidemic, reduced new HIV infections among children by 84% between 2009 and 2015, from 32 000 (24 000–41 000) to 5000 (4500–7900) with the final transmission rate dropping from 11.6% (10.4–12.6%) to 2.0% (1.9–2.2%). These are countries with some of the world's largest HIV epidemics and they have been able to dramatically reduce the numbers to levels that were unthinkable just a decade ago.

**Global sub-goal: Reduce paediatric deaths by 50%**

The Global Plan was launched at a time when options for children living with HIV were minimal and while progress has been made, children still have fewer options than adults. In 2015, only half the children living with HIV were accessing life-long antiretroviral therapy, compared to 74% [66–83%] of pregnant and breastfeeding women. The Global Plan contributed momentum as the data highlighted the inadequacy of treatment availability to children, and the need for better testing and linkages for newly diagnosed children.

In just five years, countries implementing the Global Plan showed that:

- **Strong commitment and country ownership are indispensable** Ownership at country level was a priority. The Global Plan provided a solid framework for action, and supportive and facilitating mechanisms were set up—but it was up to countries to tailor their strategies to their own specific contexts and conditions. Countries marshalled the political leadership they needed to drive implementation of the Global Plan, they reviewed and updated their national plans, mobilized funding, piloted innovative new approaches, and collected and reported the data that made accountability possible. They quickly adopted the WHO guidelines, which were also simplifying service delivery and removing diagnostic hurdles and delays, making services more accessible. At the time of the launch of the Global Plan, South Africa was just emerging from a period of significant AIDS challenges but showed the world what it can do in just five short years. It turned its paediatric epidemic from having the highest number of new infections among children to now having fewer new infections than many countries with much smaller populations. In Swaziland, programmes strengthened their approach to integration, allowing practitioners to address all the four prongs of prevention of mother-to-child transmission of HIV, and this has been quite successful. And in Burundi, political leadership and ownership of the national elimination of mother-to-child transmission of HIV plan, combined with persistent efforts by the First Lady to consolidate the commitment of

religious leaders, and parliamentarians and local district leadership raised and sustained the profile of prevention of mother-to-child transmission of HIV. And in the Democratic Republic of the Congo, the fact that key meetings of prevention of mother-to-child transmission of HIV are chaired by the head of state himself, or by the Prime Minister, has send important signals on the importance of this effort.

- **Partnerships are essential** Building and capitalizing on partnerships—at all levels—were central principles of the Global Plan. At the global level, partnerships helped steer the respective strengths of organizations towards supporting a set of shared goals. At country level, partnerships enabled nongovernmental organizations and other civil society entities to contribute to a common initiative, with shared targets and approaches. Partnerships also enabled better technical support to countries. The effective IATT collaboration of prevention of mother-to-child transmission of HIV implementers, led by WHO and UNICEF, provided a crucial forum to exchange ideas and foster South–South learning. At the country level, the partnerships within the technical working groups also enabled stakeholders to work towards the same goals. Partnerships with the private sector such as Born Free Africa, and with faith-based organization organizations such as Caritas Internationalis, enabled further innovation and wider reach. In Zimbabwe, the Children’s Investment Fund Foundation has partnered with government and the Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) to provide comprehensive services for prevention of mother-to-child transmission of HIV and paediatric treatment in nearly 80% of the country. Positive Action for Children’s Fund was launched in 2009 to align with the Global Plan, with a commitment of £50 million (US\$ 73 million) over ten years. Each partner brought their assets and optimized the impact of the collective effort. Political partnerships provided platforms on which the Global Plan leveraged strategic capital—for example collaboration with OAFLA and the African Union enabled countries to reach the highest leaders who would then amplify Global Plan efforts.
- **Countries can find solutions to obstinate challenges** Malawi devised and implemented a simplified approach, Option B+, to enable pregnant and breastfeeding women to begin lifelong HIV treatment early, before their immune system is too damaged, protecting their health as well as reducing transmission risk for future pregnancies. Option B+ released the brakes on the country’s programme for eliminating mother-to-child transmission of HIV. In so doing, Malawi informed the WHO guidelines and changed the global approach. Now all Global Plan focus countries have adopted Option B+ or moved forward to test and treat, with the exception of Nigeria which is now piloting it. There were solutions to the challenges of testing infants. EGPAF, UNICEF and UNITAID are rolling out point of care diagnosis assays in several countries that will further decentralize services and bring testing, counseling and care closer to people. There were improvements in the collection and management of DBS for infant diagnosis, as countries developed ways to expedite collection of samples and return results to the caregiver. There were also improvements in laboratory management information systems (LMIS), which facilitated communication and utilization of data for decision-making. Countries innovated in the use of transportation systems through motor bikes, through public transport systems or through commercial logistics systems. Mobile telephone technologies are being used to help retain mothers in care and to support their adherence to antiretroviral therapy. At clinics, simple solutions such as streamlining patient flows are reducing waiting times.

Some countries are now offering appointments and prescriptions every three months rather than every month to help relieve the strain both on clinics and nursing staff, and on mothers.

The Global Plan also encouraged countries to team up and solve problems together. After hearing about the programme management dashboard being used by South Africa, a group of programme managers from Zimbabwe have already contacted their South African counterparts and are discussing how the programme is organized. Due to linguistic commonalities, Brazil strengthened its collaboration with Angola and Mozambique to help accelerate their programmes, while Ethiopia supported the community engagement efforts of Namibia (including the deployment of cadres of health extension workers) and South Sudan (47).

- **Quality and coverage of key HIV services can be increased rapidly and reach everywhere** In 2015, four out of five of pregnant women living with HIV in the priority countries had access to effective antiretroviral medicines to reduce the risk of HIV transmission to their children. Globally, coverage was 77% (69–86%), up from the 36% (32–40%) coverage of effective antiretroviral medicines (excluding single-dose nevirapine) for prevention of mother-to-child transmission in 2009. At the same time, the quality of regimens has improved—while 51% of pregnant women accessing antiretroviral medicines in 2009 were accessing the most effective regimens, this had risen to nearly 93% in 2015.

In addition to improving quality of services, countries also expanded their reach, taking them into communities and decentralizing them from hospitals to clinics and other local health facilities. That was accelerated by shifting certain tasks away from highly specialized health-care professionals to trained nurses so they could be performed much more widely. The number of sites providing services for eliminating mother-to-child transmission of HIV multiplied, making the services more accessible to millions of people (48). Importantly, these approaches were not treated as “magic bullets” but required systemic changes. Therefore countries adopted durable approaches such as task shifting and decentralization, supporting them with stronger training, regular supervision, strengthened supply chains and better utilization of data. However, there remains a need to strengthen services for children, with an emphasis on age-specific responses—for example programmes to meet the needs of older pre-pubescent children compared to those under five. In addition, there is need to pay greater attention to children in vulnerable situations (orphans, children with disability, key populations such as homeless children, and those in humanitarian crises).

- **Community mobilization changes everything** The Global Plan showcased the impact of community mobilization on the HIV response. Services and other interventions were transformed, in both quality and reach, when communities were actively involved. Members of communities became engaged in new ways, both extending the last mile of bringing services into communities, and with mobilization of opinion leaders and also support groups for women living with HIV. Ethiopia, for example, assembled a 35 000-strong Women’s Development Army that supports the delivery of decentralized health care by providing information and services to communities (49). In South Africa, thousands of community health workers have helped take elimination of mother-to-child transmission of HIV and antiretroviral therapy services into remote communities.

More than half the countries in sub-Saharan Africa now use community health workers to provide and support key HIV services such as elimination of mother-to-child transmission of HIV and antiretroviral therapy.

Networks of women living with HIV also boosted utilization of prevention of mother-to-child transmission of HIV services and antenatal care, by educating women about their reproductive rights, by encouraging them to seek care and HIV testing, and by providing support to women living with a new diagnosis of HIV (50, 51).

However, the Global Plan could have done a better job of engaging male partners and fathers as parents who also desire healthy children and healthy families. At every step of the elimination of mother-to-child transmission of HIV “cascade”, greater engagement of men would improve results. The number of new infections in women, for example, cannot be reduced significantly without successfully engaging men in testing and treatment to prevent HIV transmission. Similarly, the gaps in family planning are unlikely to be met without greater involvement of men. The perception of reproductive health as being primarily the domain of women needs to change, and there should be more emphasis on promoting and facilitating couples testing. Preventing infection among pregnant and breastfeeding women—a major driver of mother-to-child transmission—is not possible without partner testing to identify HIV-negative women who are in discordant relationships

- **When resources are available, success follows** Adequate funding support was pivotal to the success of the Global Plan. Globally, a little under US\$19.2 billion was available for the HIV response in low and middle income countries in 2014, more than half of it sourced domestically (52). PEPFAR and the Global Fund to fight AIDS, Tuberculosis and Malaria in particular provided vital funding support for Global Plan implementation. Development assistance for maternal, newborn and child health programmes also increased significantly over the past decade (53). Countries also devised ways to make the money go further. Focusing interventions where the need and potential impact is greatest has helped maximize available resources, as did further reductions in the prices of antiretroviral regimens and HIV diagnostics.
- **Accountability was essential** Setting clear goals and targets proved very important, as did the development of a valid set of indicators and a method for measuring progress. Country-level data has improved in quality and detail, and have made it possible to track and monitor programme performance all along the elimination of mother-to-child transmission of HIV “cascade”. Countries were able to keep track of programme performances, publicize successful practices, identify weaknesses and tweak strategies. The fact that the Global Plan generates an annual accountability report and holds vigorous discussions with stakeholders also enabled candid assessment of bottlenecks, and development of solutions. The inclusion of women living with HIV has added the important dimension of remembering the reasons for the Global Plan, and for ensuring that it stays true to its principle of women at the center.
- **Clear normative guidance clarifies choices** The regular updating of normative guidance by the World Health Organization was important to help shift country programmes towards the most effective, evidence-based interventions. Global and regional partners disseminated the guidance widely, which accelerated uptake—and seen in the rapid adoption of Option B+ after it was incorporated into WHO’s recommendations. As countries have made policy decisions to adopt new guidelines, the availability of technical support to work through operational issues has been key to facilitating their implementation.

## WHERE WE GO FROM HERE

The bold and ambitious goals of the Global Plan have brought the world close to realizing the vision of ending new HIV infections among children, once a dream now poised to become a reality. The lessons of the last five years have shown what can be accomplished with commitment, resources and determination, and it is those same drivers that are needed to reach the goal of ending paediatric AIDS.

### **Keep elimination of mother-to-child transmission of HIV high on the political agenda, and secure funding for longer-term planning.**

First, keeping this challenge high on the political agenda is essential. Ending new HIV infections among children, and ensuring that mothers AND their children who acquire HIV receive treatment, must remain a global priority. We must make this commitment to women and children everywhere. The 2016-2021 UNAIDS strategy endorses the comprehensive Fast-Track approach to accelerate progress in the next five years into 2020, in order to acquire the momentum to end AIDS by 2030. The Global Plan priority countries have now put in motion, many of the key actions to catapult them to the next stage. While each country will need its own tailor-made approach, they can all Fast-Track services, strengthen accountability, update policies, and promote innovation.

Second, it is essential to ensure adequate funding. Success into 2020 for children and mothers will require front-loading and increasing financial investments—from governments, international donors and private sector—in order to protect the gains made, and end new paediatric infections as a public health problem in the next five years.

### **Go into a targeted campaign mode to address diagnosis and treatment for children.**

A targeted campaign to close the treatment gap is needed. The Global Plan has revealed that mothers are more likely to receive treatment than children. Given that without treatment, half the children living with HIV will die before their second birthdays, identifying infected children is a matter of global urgency. An accelerated and focussed campaign, implemented over the next two years, could narrow this gap. As these children enter adolescence, their treatment needs will evolve. A key first step will be to greatly reduce the age at which children begin treatment—now an average of four years. A campaign-mode approach will enable countries to assess their approaches to paediatric diagnosis and treatment, home in on solutions, and move with the same momentum that has already led to the sharp reductions in new infections among children.

It is essential to find the children who have been missed and who are living with HIV, and to ensure they receive life-saving treatment. Concerted action is needed to scale up case finding and immediate access to treatment, beginning with early infant diagnosis to ensure the youngest do not die early in life. Heightened awareness of HIV at all points where children come in contact with the health care system can facilitate early recognition of children exposed to or living with HIV. Because many children living with HIV may be outside health institutions, efforts to reach them, for example in programmes for orphans and other vulnerable children, nutrition programmes, and schools, should be scaled up.

### **Strengthen service delivery and support full implementation of Option B+.**

All women, especially those of childbearing age, should know their HIV status and receive treatment for their own health if they are diagnosed with HIV (Option B+), in accordance to the WHO guidelines. This treatment also provides protection against HIV transmission to their sexual partners and in their future pregnancy should they choose to bear children. Provider-initiated screening for HIV should become a routine element of antenatal and postnatal care, and is of greatest importance where there is a known backdrop of HIV prevalence in the community.

Strengthening early and routine access to antenatal care and supporting diagnosed women to live positively can save the lives of both a mother and child. Experience has shown that greater integration of care, with stronger links between prenatal care and follow up care for mother and baby including early infant diagnosis, is needed to ensure a healthy future. A renewed commitment to making sure systems are in place to follow and support women to remain on antiretroviral treatment throughout the period of breastfeeding is critical to eliminating transmission. To end new infections among children, it is important to remember the human face, and to combat stigma and discrimination in the community and in the clinic that can turn women away from seeking the care they need.

### **Stop new HIV infections among girls and women and rejuvenate family planning.**

To stop the cycle of new HIV infections among children a commitment to primary prevention of HIV infection among girls and women must be renewed and strengthened. The Global Plan has contributed to increasing access to treatment for women, but has lagged behind in reducing the number of new infections among women of childbearing age. Many women acquire HIV during pregnancy and breastfeeding, a time that jeopardizes their own health and also increases risk of HIV transmission to children due to the high viremia. Provider-initiated advice can help women who test negative during antenatal care remain negative. It can also enable discussions of partner testing in order to identify discordant men. Helping women and girls avoid HIV is a task we must not fail, and which will require strong country leadership and local action to ensure women have the rights and protection to live free of HIV. Equally it is essential to empower women living with HIV to avoid unintended pregnancies, through counselling and appropriate provision of contraceptives. Only then will we be finally on the road to ending the AIDS epidemic among children while at the same time, safeguarding the health of mothers.

The Global Plan represented the commitments of governments, international organizations, implementing partners, civil society, women living with HIV and other stakeholders to achieve the vision and broad goals of ending new HIV infections among children and keeping their mothers alive. Now the world is tantalizing close to reaching the goal of elimination of mother-to-child HIV transmission and reaching the prize of ending paediatric AIDS. It must protect these gains, while moving urgently forward to the 2020 ambitions.

# APPENDICES

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## A NOTE ON MEASUREMENT

The data used to report on the Global Plan primarily come from two sources: Programme (service delivery) data submitted by countries through the Global AIDS Response Progress Reporting mechanism and country-produced HIV estimates modelled using Spectrum software. To understand the data presented in the progress reports, it is important to understand the limitations and strengths of these data sources. Scrutinizing them allows countries to determine how they need to improve both their monitoring and follow-up systems to better respond to the call to eliminate mother-to-child transmission.

### **Programme data**

The programme data required for the Global Plan Progress Reporting mechanism includes the number of women accessing antiretroviral medicines during pregnancy and breastfeeding, the regimen provided, whether cotrimoxazole was provided, whether children living with HIV received antiretroviral therapy and whether HIV-exposed infants received early infant diagnosis.

All countries have systems that count the number of women who come in for antenatal care services. Within antenatal care, nurses complete registers on whether women are tested for HIV and the results of the test (or whether the woman already has been diagnosed as HIV-positive). In most countries, the antenatal care register is still a paper-based ledger from which the clinics aggregate data and send them to the district for submission to the national level. Further information is collected within a register specific to the antiretroviral regimen that women are provided. Few of the Global Plan priority countries have comprehensive registers that follow the mother–infant pair after delivery to measure adherence during breastfeeding or the duration of breastfeeding.

Based on these systems, countries report on the number of women accessing antiretroviral medicines during pregnancy and delivery. Many countries, however, are not able to identify women who might have moved during the pregnancy and who were subsequently retested or reinitiated on antiretroviral medicines at a new clinic, resulting in women being counted twice. Similarly, women who miscarry are potentially not removed from the registers of programmes to prevent mother-to-child transmission. In recent years, countries have made improvements to their reporting systems, which has resulted in fluctuations in the reported numbers of women accessing antiretroviral medicines (due to changes in the accuracy of the reporting). Countries such as Kenya, Malawi and Zimbabwe have conducted comprehensive reviews to correct data from previous years and provide a more accurate measure of annual changes. Many other countries however, have been unable to correct data because of a lack of unique identifiers that would identify women who appear twice in the monitoring system.

The data on what happens to mother–infant pairs after delivery is weaker than the data available from antenatal care. As a result, the estimates of antiretroviral medicine coverage during breastfeeding are often rough estimates, and consistent monitoring systems have not been put in place to follow mother–infant pairs longitudinally after the delivery. A concerted effort to address this issue has been a focus for partners in the Interagency Task Team monitoring and evaluation working group. Data on retention will also be valuable for understanding impact if antiretroviral therapy programmes collect and report data on retention separately for breastfeeding women. This will be an important improvement to the data previously requested on postnatal prophylaxis under Options A and B.

A number of efforts are underway to improve the quality of data captured by the monitoring and evaluation systems of countries. Attention is now focused on supporting countries to develop longitudinal follow-up clinic registers to improve retention and adherence to treatment for mother–baby pairs. This will also enable assessment of the impact of programmes to prevent new HIV infections among children and keep their mothers alive using empirical data and the validation of modelled HIV estimates.

### **Modelling data**

UNAIDS and partners support countries to estimate the impact of HIV on their populations each year. The programme data on women accessing antiretroviral medicine and the regimens received are included in models of the HIV epidemic in individual countries. The models use country-specific information on the demographics of the country—including age-specific fertility rates over time, HIV prevalence from antenatal clinics and household surveys, and numbers of people accessing antiretroviral therapy—to calculate these estimates. A number of assumptions inform the models, including the probability of transmission from mother to child given the mother’s antiretroviral regimen and her CD4 level.

The country models are created using Spectrum software by estimates teams in each country. The members of the estimates teams vary by country, but they primarily include national experts from the ministry of health or the AIDS coordinating body, as well as programme managers, survey and census specialists, and development partners. Every year, the country teams update the files with the latest programme data and any additional surveillance data to inform the trends in the epidemic. The software and assumptions informing the calculations also are improved every year. In the estimates produced in 2016 (referred to as the 2016 estimates), a number of improvements were made to the models which will change the indicators related to prevention of mother-to-child transmission of HIV.

The most important changes in 2016 are related to the estimated transmission to children. The UNAIDS Reference Group on Estimates, Modeling and Projections commissioned a study to update the probability of transmission to the child for different antiretroviral regimens. This was an update to a 2012 study on the same topic. The updated transmission probabilities were significantly lower for women who seroconverted during pregnancy reducing the overall number of children ever infected with HIV.

In addition the new model used newly available data on the age at which children were started on antiretroviral therapy. This improved the estimates of survival among children living with HIV. This change also reduced the estimated number of children living with HIV.

As a result of these two changes the number of children living with HIV is smaller than it was in previous rounds of estimates. Coverage of antiretroviral therapy is thus closer to adult coverage in recent years and historically.

### **Using the estimates and trend analysis**

In light of the improvements to the data and assumptions used to create the estimates each year (also called a “round”), users of the data should not compare results from one round to the next. Instead, a full historical set of best estimates is created for each round, allowing for a comparison of trends over time from within the same round. For more information on the process for creating national HIV estimates, please go to [www.unaids.org](http://www.unaids.org).

### **Measuring impact**

One of the outputs of the software is the estimated population-level mother-to-child transmission rate. The population-level rate implies that it includes all pregnant women in the country and is not limited to the women who are attending antenatal clinics and enrolled in programmes to prevent mother-to-child transmission. In addition, it estimates all HIV-positive pregnant women and not just those who are diagnosed.

A population-level measure is difficult to capture through standard programme data since some women do not attend clinics, while the status of other women is not known. Two countries have made progress in overcoming this measurement challenge by conducting surveys of mother–infant pairs who are attending immunization clinics. Although these measures only capture early transmission and not potential breastfeeding transmission, they are still useful for understanding the impact of programmes to prevent mother-to-child transmission. These direct measures of mother-to-child transmission should be adapted by other countries to improve measures of programme impact.

- In South Africa, an evaluation of the programme to prevent new HIV infections among children and keep their mothers alive was conducted by measuring HIV prevalence among mother–infant pairs during immunization. The six-week transmission rate in 2013 was measured to be 3.5% [2.9–4.1%] (54). This compares well to the estimated 2.8% [2.6–3.1%] transmission rate at six weeks in 2013 from the model.
- Zimbabwe collected data from a sample of 9000 mother–infant pairs attending immunization clinics in five of its ten provinces in 2013. The HIV status of mothers and their children were determined to measure the transmission rate between 9 and 18 months of age. The study also used verbal autopsy to capture mothers or infants who died between the birth and the time of measure. The study estimated that 8.8% of exposed children were infected by the age of 9–18 months. This value does not reflect the final transmission rate, since the median duration of breastfeeding in Zimbabwe is 18 months. A number of the children will have been tested closer to 9 months of age. Assuming the risk of transmission among women accessing antiretroviral therapy is approximately 0.13% per month, a rough calculation suggests that the additional exposure of 10–15 months would result in an additional 1–2% transmission. This result supports the modeled estimate 9.8% [8.9–10.9%] final transmission rate presented in this report.

Similar efforts need to be supported in all priority countries.

## ABBREVIATIONS

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AIDS	acquired immunodeficiency syndrome
AZT	zidovudine
CD4	T-lymphocyte cell bearing CD4 receptor
DBS	dried blood spot
DHS	Demographic and Health Survey
EID	early infant diagnosis
FDA	United States Food and Drug Administration
GARPR	Global AIDS Response Progress Reporting
GTT	global task team
HCT	HIV counselling and testing
HIV	human immunodeficiency virus
LPV/r	lopinavir/ritonavir
MICS	Multiple Indicator Cluster Survey
MTCT	mother-to-child transmission (of HIV)
NIMART	Nurse Initiated and Managed Anti-Retroviral Treatment
PEPFAR	United States President's Emergency Plan for AIDS Relief
PITC	provider-initiated testing and counselling
RRI	Rapid Response Initiative
TB	tuberculosis
TFR	total fertility rate
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNITAID	United Nations International Drug Purchase Facility
WHO	World Health Organization

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