INCREASING ACCESS TO PREVENTION OF MOTHER-TO-CHILD TRANSMISSION SERVICES

TECHNICAL REPORT

AIDSTAR-One
AIDS SUPPORT AND TECHNICAL ASSISTANCE RESOURCES

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CONTENTS

ACRONYMS

3TC	lamivudine
AFASS	acceptable, feasible, affordable, sustainable, and safe
ANC	antenatal care
ART	antiretroviral therapy
ARV	antiretroviral
AZT	zidovudine
CDC	Centers for Disease Control and Prevention
CGHD	Center for Global Health and Development
CHAI	Clinton HIV/AIDS Initiative
CHW	community health worker
CVCT	couples voluntary counseling and testing
DBS	dried blood spot
DNA	deoxyribonucleic acid
EBF	exclusive breastfeeding
EID	early infant diagnosis
FBO	faith-based organization
FP	family planning
FSG	family support group
HAART	highly active antiretroviral therapy
HTC	HIV testing and counseling
ICAP	International Center for AIDS Care and Treatment Programs
ICOMP	International Council on Management of Population Programs
IEC	information, education, and communication
IYCN	Infant and Young Child Nutrition
MNCH	maternal, newborn, and child health
MOH	Ministry of Health
MTCT	mother-to-child transmission
NSA	network support agent
NVP	nevirapine

PCR	polymerase chain reaction
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PITC	provider-initiated testing and counseling
PLWH	people living with HIV
PMTCT	prevention of mother-to-child transmission
RH	reproductive health
SMS	short message system
TBA	traditional birth attendant
UNAIDS	Joint U.N. Programme on HIV/AIDS
UNFPA	U.N. Population Fund
UNICEF	U.N. Children's Fund
USAID	U.S. Agency for International Development
VCT	voluntary counseling and testing
WHO	World Health Organization

BACKGROUND

Mother-to-child transmission (MTCT) of HIV accounts for 90 percent of HIV infections among children. The Joint U.N. Programme on HIV/AIDS (UNAIDS) estimates that 2.1 million children under 15 years of age were living with HIV and 430,000 children were newly infected in 2008. In the same year, 280,000 children died of AIDS-related causes (World Health Organization [WHO] 2010a). While adults living with HIV can remain asymptomatic for years, approximately half of all infants living with HIV will die before their second birthday if they are not treated (WHO 2010a).

In light of these statistics, prevention of mother-to-child transmission (PMTCT) has received substantial attention in the fight against HIV. Timely initiation of PMTCT can reduce transmission rates in low-income countries from 35 percent to less than 5 percent (WHO 2010a). Many governments in developing countries are taking steps to implement the four-pronged approach to PMTCT recommended by WHO as a way to provide comprehensive maternal and child health care (see Box 1). Governments are also seeking to operationalize new WHO guidance recommending earlier provision of antiretroviral therapy (ART) and antiretroviral (ARV) prophylaxis for women living with HIV and their unborn or newborn infants.

Programs in low-resource settings, where the health care system is often weak, face numerous barriers to accessible PMTCT services and have difficulty meeting the increased demand implied by global recommendations. Yet there are examples of innovative approaches that have increased access to and utilization of PMTCT services. This report covers each step of the PMTCT continuum and outlines what PMTCT services are recommended at each stage according to WHO recommendations, describes major barriers, and lists country-based approaches that programs have taken to address them. The document also describes strategies for providing PMTCT while addressing systemic barriers to access, including examples of emerging and proven practices and their effect on PMTCT outcomes.

Box 1. PMTCT in the Maternal Care Continuum

PMTCT is meant to protect and meet the needs of women and infants throughout and beyond the maternal period. WHO recommends the following four-pronged approach to PMTCT:

1. Primary prevention of HIV infection among women of childbearing age.
2. Prevention of unintended pregnancies among women living with HIV.
3. Prevention of HIV transmission from a woman living with HIV to her infant.
4. Provision of appropriate treatment, care, and support to mothers living with HIV and their children and families.

(WHO 2010a)

IMPROVING COVERAGE, ACCESS, AND UTILIZATION AT EACH STEP ALONG THE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION CONTINUUM

In 2009, WHO released updated PMTCT recommendations to include the following changes (WHO 2009a):

Enhanced emphasis on CD4 testing for all pregnant women to urgently identify those in need of treatment for their own health with the added benefit of PMTCT.

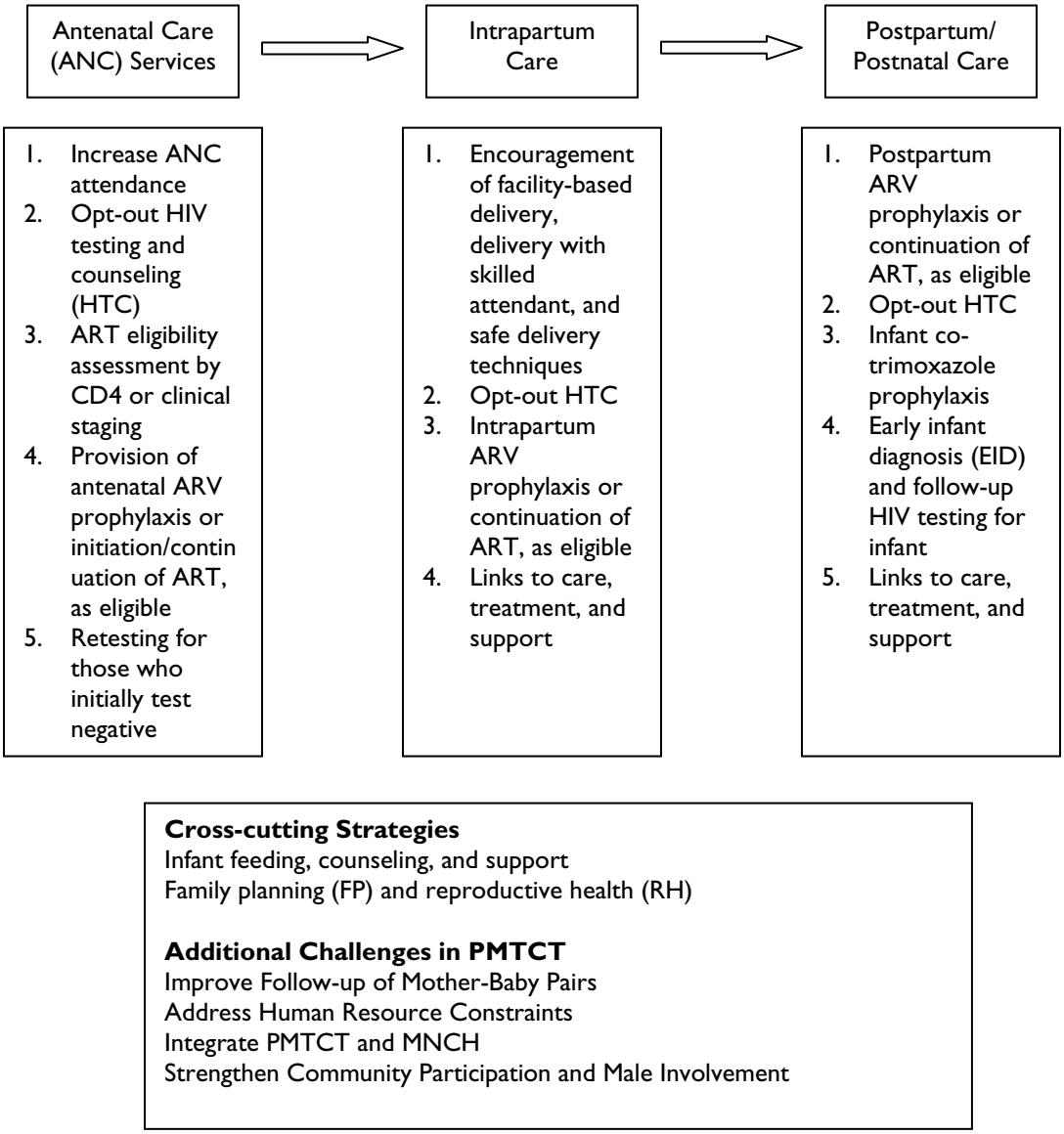
Earlier ART for a larger group of pregnant women living with HIV to benefit both the health of the mother and prevent HIV transmission to her child during pregnancy.

Longer provision of ARV prophylaxis for pregnant women living with HIV with relatively strong immune systems who do not need ART for their own health. This would reduce the risk of HIV transmission from mother to child.

Provision of ARVs to the mother or child to reduce the risk of HIV transmission during the breastfeeding period. For the first time, there is enough evidence for WHO to recommend ARVs while breastfeeding.

Following these recommendations can protect women and their children from HIV, but the resources and costs required place further pressures on systems that are already stressed. This paper discusses the many services needed throughout the PMTCT and infant care continuum, as shown in Figure 1. Meeting these needs in low-income settings requires programs to addresses a range of general and specific challenges. Those general to the health care system include infrastructure weaknesses, understaffing, and lack of training or skills among available providers. PMTCT-specific challenges include a lack of community awareness of PMTCT, limited human resources, distance from communities to PMTCT services, and poor integration of PMTCT with maternal, newborn, and child health (MNCH) programs (Reynolds et al. 2006).

Figure 1. PMTCT in the Maternal and Infant Care Continuum



ANTENATAL PREVENTION OF MOTHER-TO-CHILD TRANSMISSION SERVICES

INCREASE ANTENATAL CARE ATTENDANCE

Antenatal care (ANC) is the entry point for PMTCT and a critical period in maternal care that is often neglected. Though WHO recommends that women living with HIV begin ARV prophylaxis at 14 weeks gestation, many women do not seek care until the third trimester or until delivery, missing opportunities to initiate prophylaxis early. Women's perceptions of service quality can contribute to such delays: a study in rural Kenya found that while most pregnant women (90 percent) attended ANC at least once, those with poor perceptions of services were 1.5 times more likely to wait until

the third trimester (Van Eijk et al. 2006). Other barriers to ANC uptake include distance to facilities and user fees (Delvaux et al. 2008). Proximity to a health center may determine whether and how often a woman chooses to attend ANC services (Gage and Guirlène Calixte 2006).

A combined strategy of improving the quality of ANC services, introducing comprehensive PMTCT services, and increasing utilization can substantially increase PMTCT coverage. Strategies include the following:

- *Improving care through PMTCT integration.* At five facilities in Côte d'Ivoire, an intervention to introduce comprehensive PMTCT services within maternal care led to significant improvements in the quality of ANC, delivery, and postpartum care (Delvaux et al. 2008).
- *Ensuring continuity of care.* To increase women's use of ANC services, some programs seek to ensure that one provider delivers all the maternity care that a woman receives. The continuous and supportive relationship between the pregnant woman and a consistent service provider increases the likelihood of the woman returning for subsequent visits (Israel and Kroeger 2003).
- *Enhancing the role of CHWs.* CHWs can play an important role in increasing ANC utilization and ongoing attendance by identifying and referring pregnant women to services. They can provide supportive functions throughout and beyond the maternal cycle, assisting with birth planning and referring women to community programs for home-based care, nutrition, psychosocial support, and income-generating activities. Programs can develop procedures to promote interaction and communication between CHWs and facilities, such as tear-off sections on referral forms, for reporting back to the referrer about subsequent treatment, diagnoses, and follow-up visits (Israel and Kroeger 2003).

The emphasis on PMTCT poses a challenge, but has already yielded benefits: In many countries, the influx of new resources to establish PMTCT services has led to improvements in ANC, including the development of national policies and enhanced standards of care (Delvaux et al. 2008).

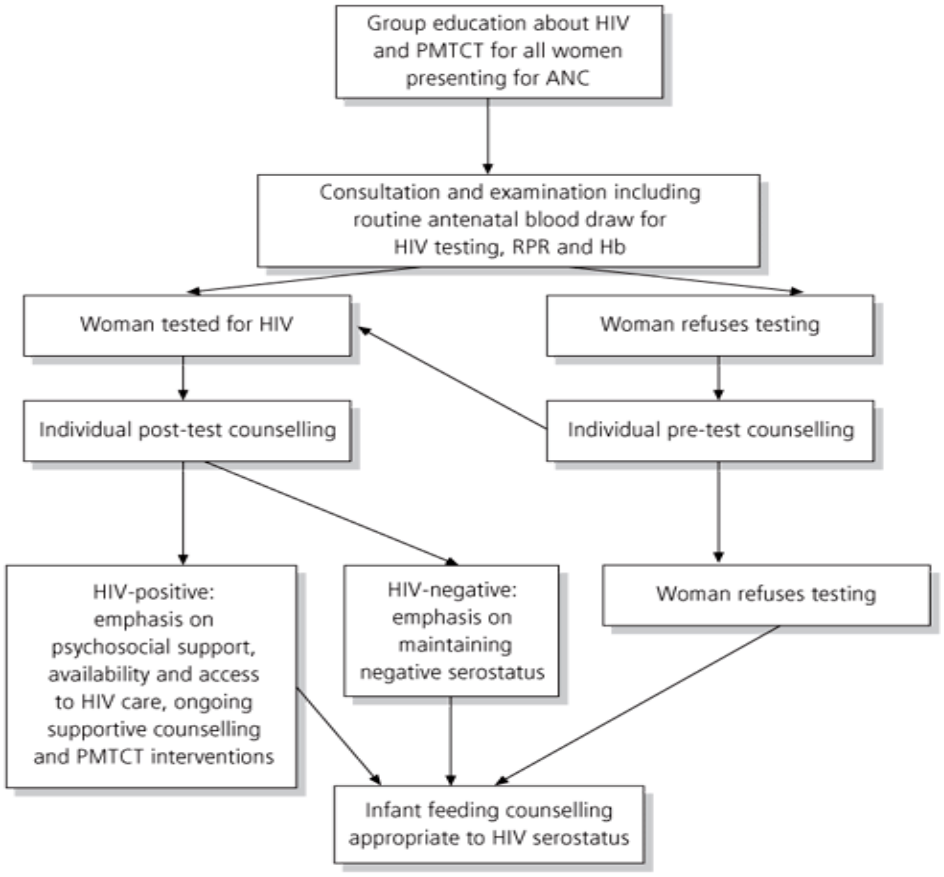
OPT-OUT HIV TESTING AND COUNSELING

HIV testing and counseling (HTC) for pregnant women with unknown HIV status is ideally performed during the first ANC visit. In recent years, programs have shifted from voluntary counseling and testing (VCT) to opt-out testing and counseling, also known as routine testing or PITC. Opt-out testing follows the model of most routine medical tests, where the clinician regularly offers the test to patients and explains the need for the test and the course of action for positive results. The test is performed unless the patient objects (Centers for Disease Control and Prevention [CDC] 2001). According to WHO, PITC contributed to an increase in testing uptake among pregnant women in sub-Saharan Africa from 17 percent to 28 percent from 2007 to 2008 (WHO 2010a).

Although the CDC recommended opt-out testing in 2001, ANC clinics in low-income countries began implementing this testing only recently (CDC 2001; Creek et al. 2007). Lack of knowledge, both among clients and providers, remains a barrier to consistent testing. Stigma is also a factor: A study in Kenya found that anticipated stigma, most notably from male partners and family members, is an important factor in whether pregnant women decide to get an HIV test (Molzan Turan et al. 2008). Examples of approaches for increasing acceptance of testing include the following:

- *Effective counseling.* Counseling is integral to any method of HIV testing. When performed within ANC clinics, counseling should include discussion of the continuum of PMTCT care so that women know what to expect if results are positive. Figure 2 was adapted from the Botswana opt-out testing program for a similar program in Zimbabwe (Chandisarewa et al. 2007; Creek et al. 2007).
- *Bringing HTC to the community.* Zambia's mobile HTC is a strategy for extending HTC into remote areas. National guidelines direct PMTCT and VCT programs to offer the rapid HIV test in an appropriate place that offers clients privacy. Once testing has occurred, the health care provider enters the results in a laboratory HIV test register, which is kept confidential (National AIDS Council and Zambia Ministry of Health [MOH] 2009). Those who test positive should be referred for CD4 and receive counseling for disclosure and partner notification.
- *Task-shifting.* This strategy addresses the shortage of skilled health workers by delegating clinical care functions to less specialized health workers or community members. These workers are trained to provide this service so that more specialized staff can focus on other tasks (Morris et al. 2009). More information on task-shifting can be found in the section "Address Human Resource Constraints."

Figure 2. Routine HTC Algorithm



ANC, antenatal care; Hb, haemoglobin; PMTCT, prevention of mother-to-child transmission of HIV; RPR, rapid plasma reagin.

(Chandisarewa et al. 2007; Creek et al. 2007)

High-level support for routine HTC is essential for ensuring broad coverage. Box 2 describes an approach in Botswana, where investment in routine testing led to significant improvements in service uptake.

Box 2. Routine Opt-Out HIV Testing in ANC, Botswana

Background: Botswana's HIV prevalence is one of the highest in the world. In 1999, Africa's first national PMTCT program began in Botswana, but HIV test acceptance remained low. Unlike many high-prevalence countries, more than 95 percent of pregnant women in Botswana attend at least one ANC visit and deliver in a hospital (Government of Botswana Central Statistics Office 1992–2002). Furthermore, the government is stable and has provided extensive resources to fight HIV.

Intervention: The president of Botswana stated that beginning in 2004, HIV testing in facilities would be "routine but not compulsory."

Methods:

- Health workers were trained to provide group education and to recommend HIV testing during routine ANC services.
- Staff reviewed the essential content of post-test counseling for women.
- Referral systems were strengthened to ensure that all women living with HIV were evaluated for ART.
- Women living with HIV received handouts, including instructions on being evaluated for ART.
- Staff received a counseling flow chart (see Figure 1) with the new testing system.

Results:

- The proportion of ANC clients who accepted testing increased from 76 percent to 95 percent.
- The switch to rapid HIV tests ensured that nearly all women received their results, compared to 72 percent to 82 percent with the enzyme-linked immunosorbent assay test.
- Seventy-five percent of pregnant women living with HIV received ART.
- Botswana has the highest PMTCT program uptake of any national program in Africa.

(Creek et al. 2007)

ANTIRETROVIRAL THERAPY ELIGIBILITY ASSESSMENT BY CD4 OR CLINICAL STAGING

Studies have shown that higher viral loads lead to increased rates of vertical (mother-to-child) and horizontal transmission (Gray et al. 2001; Thea et al. 1997). Uninfected infants born to mothers living with HIV who had cluster of differentiation 4 (CD4) counts less than 350 cells/mm^3 were almost three times more likely to die and more than twice as likely to become hospitalized in their first four months, compared to uninfected infants born to mothers living with HIV who had higher CD4 counts (Kuhn et al. 2005). Evidence of improved outcomes for both mothers and children through CD4 count monitoring have led HIV treatment and PMTCT program implementers to look for innovative ways to address the many challenges associated with CD4 testing.

WHO recommends the provision of lifelong ART for all pregnant women with a CD4 count less than or equal to 350 cells/mm^3 or stage 3 or 4 clinical disease (WHO 2010b). When a woman is diagnosed with HIV at an ANC clinic, she should immediately receive a CD4 test, preferably within

the ANC clinic and only by referral if absolutely necessary, to determine whether she is eligible for lifelong ART. However, there are many barriers to CD4 testing including an insufficient number of laboratories, minimally trained staff, slow turnaround time for results, and poor linkages between testing and treatment sites (Gilles et al. 2009). In some instances, pregnant women receive positive test results and are instructed to go to another facility that is farther away to receive their CD4 test on a specific day. Following the CD4 test, women will likely need to return to the original clinic to discuss treatment eligibility. Each of these steps creates an opportunity for loss to follow-up.

Improving client-provider interactions can increase service uptake. Service providers in Malawi found that women were more likely to accept CD4 testing if they were provided accurate and comprehensive counseling and had positive interactions with facility staff (Gilles et al. 2009). Another strategy is the use of mobile health initiatives. In addition, several companies are manufacturing point-of-care diagnostics to facilitate rapid access to CD4 tests and other laboratory studies. Box 3 provides an example of one such program in Uganda.

Box 3. Portable Blood Testing in Uganda

Background: Bwindi Community Hospital is located at the edge of Uganda's Impenetrable Forest, one of the most inaccessible parts of the country, making transportation to the hospital difficult for most people in the area. HIV prevalence is 10 percent among adults in the hospital's catchment area, although only half have been tested. The nearest laboratory that does CD4 testing is six hours away with minimal public transportation, and it takes two to three weeks to receive results.

Intervention: PointCare donated a portable blood testing device, PointCare NOW, which takes eight minutes to produce a complete blood count, including CD4 numbers and percentages and hemoglobin levels. It was created specifically for use in remote, resource-limited areas and is made to withstand high temperatures and frequent transport on rough terrain. The machine is far cheaper to run than traditional instruments and is powered with a battery pack.

Methods:

- Bwindi Community Hospital sends its HIV team into the surrounding area three days each week for mobile HIV education, testing, and treatment services.
- Patients are charged a small fee for the blood test, which is about 10 percent of the total cost for each test.

Results:

- PointCare NOW has shortened decision-making time because results are immediately available to the clinician.
- Bwindi Community Hospital has provided high-quality HIV care to 1,548 patients in six locations with biannual monitoring of CD4 counts for most patients in the last year.

(Gill 2009)

PROVISION OF ANTENATAL ANTIRETROVIRAL PROPHYLAXIS OR CONTINUATION OF ANTIRETROVIRAL THERAPY

Prophylaxis

WHO recommends that countries choose one of two options (see Table 1) for pregnant women who are living with HIV but have CD4 levels above 350 cells/mm^3 and are thus not eligible for lifelong ART (WHO 2010b).

Table 1. Prophylaxis for ART-ineligible Pregnant Women

Option A: Antepartum twice-daily zidovudine (AZT) starting from as early as 14 weeks of gestation and continued during pregnancy. At onset of labor, single-dose nevirapine (NVP) and initiation of twice-daily AZT + lamivudine (3TC) for seven days postpartum.
Option B: Triple ARV prophylaxis starting from as early as 14 weeks of gestation and continued until delivery, or, if breastfeeding, continued until 1 week after all infant exposure to breast milk has ended. Recommended regimens include: AZT + 3TC + lopinavir *or* AZT + 3TC + abacavir *or* AZT + 3TC + efavirenz (EFV) *or* Tenofovir + 3TC (or emtricitabine) + EFV

Women should begin Option A or Option B at 14 weeks gestation, or as soon as possible thereafter. Early initiation reduces the risk of transmission in utero. Also, this point of contact with the pregnant woman offers opportunities for long-term care (WHO 2010b).

One barrier to accessing prophylaxis at birth is the common practice of delivering outside of a facility with no skilled birth attendant. Prophylaxis provision at the onset of labor has been primarily facility-based, though recognition of the limited coverage this offers has inspired some innovations. Strategies include the following:

- *Building capacity among traditional birth attendants (TBAs).* A study on adherence to NVP in a rural PMTCT program in Malawi concluded that TBAs could play a crucial role in efforts to increase maternal and infant adherence to NVP. TBAs can be trained to administer prophylaxis and recognize obstetric emergencies that require immediate transport to a facility (Kasenga, Hurtig, and Emmelin 2007).
- *Routinely providing prophylaxis for use at home.* Currently, some health care workers send pregnant women who are living with HIV home from ANC visits with prophylaxis, understanding that it is unlikely that they will return for delivery.
- *Improving packaging for prophylaxis drugs.* Women who receive prophylaxis packages do not always use them when delivering at home. For example, a study in Lusaka, Zambia, found that 32 percent of women living with HIV did not have evidence of NVP dosing in their core blood specimens, although many received dosing at ANC for self-administration (Guay et al. 1999; Stringer et al. 2005). Easier-to-use self-administration packages may have the most significant impact on increasing coverage of self-administered prophylaxis. An example is the Mother-Baby Pack, recently developed by the U.N. Children's Fund (UNICEF) and WHO, which provides antenatal, delivery, and post-delivery doses with picture instructions on how to take the

medicines (Gaestel 2010). UNICEF is due to begin the roll-out of the Mother-Baby Pack in Cameroon, Kenya, Zambia, and Lesotho in late 2010.

Treatment

WHO recommends that women with CD4 levels at or below 350 cells/mm^3 should receive lifelong ART. The updated WHO guidance for PMTCT recommends initiating ART earlier (as soon as the mother's need is identified regardless of gestational age) and at higher CD4 count (350 cells/mm^3 rather than 200 cells/mm^3) than previous guidance (WHO 2009b). However, these expanded eligibility criteria increase demands on services that are already struggling to provide ART to those who are eligible.

The updated guidance also adds costs, but WHO expects these to be offset by reduced MTCT and HIV-related morbidity. A CDC cost-effectiveness study comparing updated to previous prophylaxis recommendations in 15 resource-limited countries found that while the new guidance increases the cost per infection averted relative to previous recommendations, Options A and B averted approximately twice as many infections as previous recommendations and also achieved twice as many life-years gained (Auld et al. 2010).

As demand for specific drugs increase, UNITAID, in partnership with the Clinton HIV/AIDS Initiative (CHAI), works to leverage price reductions and expedite availability of ART drugs. Other initiatives are expanding pediatric and second-line treatment and reducing drug prices for both (UNITAID 2010). The example in Box 4 provides a comprehensive strategy for meeting the increased need for lifelong ART among pregnant women.

Box 4. Lifelong ART for PMTCT Clients in Rural Primary Health Care Clinics, KwaZulu-Natal, South Africa

Background: The initiation of lifelong ART for PMTCT clients encountered major challenges, including staff shortages, nonintegrated services, long waiting lists, and difficulty identifying eligible clients.

Intervention: Uthungulu District developed a plan for four ART outreach teams to provide support at primary health care facilities throughout the district to initiate lifelong ART for eligible PMTCT clients.

Methods:

- Outreach teams include a doctor, two nurses, a pharmacy assistant, a nutrition assistant, a lay counselor, and a data collector.
- Each team serves a group of primary health care facilities and provides daily HIV care and treatment.
- Eligible clients receive ART readiness counseling before beginning ART.
- The ART outreach teams hold weekly meetings to discuss challenges and topics of interest.
- At monthly meetings, ART outreach teams meet with district management, the primary health care clinic manager, and hospital representatives to provide feedback and address challenges.

Results:

- Over 97 percent of pregnant women received HIV testing since July 2009.
- The number of pregnant women initiated on lifelong ART doubled from 2007 to 2009.
- Rates for perinatal HIV transmission rates dropped from 23 percent to 4.5 percent in 2009.

(Department of Health South Africa, no date [b])

INTRAPARTUM AND POSTPARTUM PREVENTION OF MOTHER-TO-CHILD TRANSMISSION SERVICES

ENCOURAGEMENT OF FACILITY-BASED DELIVERY, DELIVERY WITH A SKILLED BIRTH ATTENDANT, AND SAFE DELIVERY TECHNIQUES

Millennium Development Goal 5 (a 75 percent reduction in the maternal mortality ratio by 2015) prioritizes skilled attendance during delivery (U.N. Millennium Project 2006). This goal addresses the high rates of maternal mortality, infant mortality, and HIV that many low-income countries face. Safe delivery techniques (see Box 5) not only improve outcomes in maternal and infant survival from obstetric complications, but also increase access to intrapartum ARV prophylaxis, reducing the risk of MTCT. However, factors such as transportation, costs, perceptions of low-quality services, and in many countries, sociocultural norms that favor home delivery impede access to facility-based deliveries (Parkhurst and Ssengooba 2009). For example, less than half of women in sub-Saharan Africa deliver in a facility or with a skilled birth attendant (UNICEF 2009).

Strategies for increasing access to skilled attendance are still emerging, but include the following:

- *Maternity waiting homes.* These are residential sites, located within or near qualified medical facilities, where high-risk women can stay until their deliveries (WHO 1996).
- *Working with CHWS.* CHWs trained in PMTCT can help families develop birth plans that include skilled birth attendants. CHWs can also organize an emergency transportation system for intrapartum complications. These systems are more cost-effective and sustainable when they are available for all community emergencies and are supported by the entire community, and are especially important in communities with high HIV rates (Israel and Kroeger 2003).
- *Offering incentives.* Programs may also consider removing fees, offering gift incentives (i.e., insecticide-treated nets), and providing transportation subsidies.

Box 5. Safe Delivery Techniques

Safe delivery techniques include:

- Continuous labor support
- Infection prevention
- Monitoring of vital signs
- Monitoring labor with a partograph
- Minimizing vaginal exams
- Treating signs of infection
- Avoiding early rupture of the amniotic sac
- Minimizing episiotomies
- Proper cord care.

Women living with HIV may be offered elective cesarean sections when appropriate staff and equipment are available. Provision of ARVs to mothers living with HIV and exposed infants, immediate newborn care for infants, and postpartum care for mothers are additional safe delivery techniques that improve mother-baby care outcomes.

(Israel and Kroeger 2003)

OPT-OUT INTRAPARTUM HIV TESTING AND COUNSELING

Labor and delivery are sometimes the first opportunity to offer testing. A study in Cameroon found that younger and nulliparous women were more likely than older and parous women to accept HIV testing in the delivery room. HIV prevalence among women tested postpartum in this study was 10.1 percent, compared to 6 percent among pregnant women in Cameroon, highlighting the importance of intrapartum testing.

Women's principal reason for refusing testing in this study was fear of discrimination or stigma (Kongnyuy et al. 2009; National AIDS Control Committee, Cameroon 2005; National Institute of Statistics and ORC Macro 2004). Staff shortages, such as on nights and weekends, can also reduce the likelihood that providers offer testing (Homsy et al. 2006). However, intrapartum testing offers a vital opportunity to prevent infant infection and set the stage for further skilled care. Strategies to increase HTC acceptance during delivery include the following:

- *Psychosocial support.* The Cameroon study addressed psychosocial implications of diagnosis during labor and delivery using midwives trained in counseling techniques who provided psychosocial support throughout labor for women who tested as living with HIV (Kongnyuy et al. 2009). There was also a laboratory technician on duty 24 hours a day so that testing was always available.
- *HTC as outreach to male partners.* A study in rural Uganda that implemented opt-out intrapartum HTC found that it resulted in substantially higher rates of partner testing compared to ANC visits. During the 10-month study period, 25 percent of women with unknown status came to the maternity ward with their partners, and 98 percent of these men accepted testing. HTC acceptance was also high (97 percent) among male partners attending ANC visits; however, fewer than 3 percent of women came to visits with their partners. HTC among women without HIV status documentation within the maternity ward increased from 42 percent to 91 percent in the first seven months of the opt-out program (Homsy et al. 2006). This study shows the potential of intrapartum HTC to extend HTC and participation in PMTCT to men and couples.

INTRAPARTUM AND POSTPARTUM ANTIRETROVIRAL PROPHYLAXIS OR CONTINUATION OF ANTIRETROVIRAL THERAPY

Women currently on ART or those identified as needing ART during pregnancy or breastfeeding should initiate/continue their medications for their own health with the added benefit of PMTCT. For women not yet eligible for ART for their own health, current WHO guidelines recommend the two options outlined in Table 2 for intrapartum and postpartum PMTCT prophylaxis (WHO 2009b).

Table 2. Intrapartum and Postpartum Prophylaxis for ART-ineligible Women and Infants Exposed to HIV

Mothers	Infants
Option A: • Single-dose NVP at onset of labor • Zidovudine (AZT) + lamivudine (3TC) during labor and delivery and seven days postpartum (can be omitted if mother receives less than four weeks AZT during pregnancy).	**Breastfeeding:** • Daily administration of NVP from birth through one week after breastfeeding ends. **Non-breastfeeding:** • Daily administration of AZT or NVP from birth through six weeks of age.
Option B: • Continuation of triple ARV prophylaxis until delivery or, if breastfeeding, until one week after breastfeeding ends.	**Breastfeeding:** • Daily administration of NVP from birth through six weeks of age. **Non-breastfeeding:** • Daily administration of AZT or NVP from birth through six weeks of age.

ARV drugs for treatment or prophylaxis should be available continuously in labor and maternity wards.

Women on Option A should continue with twice daily zidovudine + lamivudine for 7 days postpartum. Those on Option B should continue on triple ARV prophylaxis until delivery or, if breastfeeding, until one week after breastfeeding ends (WHO 2009b). Women who are eligible for ART will continue the treatment postpartum. Infant drug regimens are linked to the mother's drug regimen. Infants of women taking ARVs for their own health should take daily NVP or twice-daily AZT for six weeks, regardless of infant feeding practice. Infants of mothers on Option A who are breastfeeding should take daily NVP through one week after breastfeeding ends, and those who are not breastfeeding should have daily AZT or NVP through six weeks of age. Infants of women on Option B who are breastfeeding should have daily NVP through six weeks, and those who are replacement feeding should have daily AZT or NVP through six weeks. WHO's *PMTCT Strategic Vision for 2010–2015* emphasizes the critical importance of strengthening linkages between PMTCT and HIV care and treatment services for women, their children, and other family members in order to support ongoing care, including lifelong ART for women postpartum, as indicated (WHO 2010a). Linkages to ongoing ART care should start as soon as a woman is deemed eligible.

PMTCT programs should serve as a gateway to family-based HIV care and treatment, but linkages are often poor and many eligible women stop ART after delivery, with health consequences for themselves and their infants. One obstacle is that HIV clinics often operate as stand-alone services, offering services separately from postpartum and pediatric appointments, making service provision a challenge. A study of linkages between PMTCT and HIV care and treatment in 14 resource-limited countries reported that only 1,388 (1.4 percent) of 98,304 pregnant women living with HIV were on ART, and that most of these women did not receive screenings or ARVs at the PMTCT clinic (Ginsburg et al. 2007). Approaches for improving linkages to long-term care include the following:

- *Adding postnatal PMTCT services.* A hospital in South Africa addressed a 50 percent post-delivery retention rate by creating a postnatal clinic to follow-up mother-baby PMTCT pairs for 18 months post-delivery. Mothers and babies continued attending the same clinic, with the same staff, but attended on a different day than ANC. Service utilization increased, with many more

patients continuing care and graduating at the end of 18 months with positive health outcomes (Department of Health South Africa, no date [a]).

- *Providing all services at one facility.* "One-stop shopping" is a strategy to make ART initiation and follow-up easier for women who may otherwise have to attend separate clinics for ANC, ART, and eventually pediatric visits. Training ANC clinicians in HIV care and treatment is another strategy that helps link women to lifelong care (Ginsburg et al. 2007).

Integrating PMTCT services within MNCH programs can also improve access to PMTCT. Box 6 describes an integrated approach.

Box 6. MTCT-Plus, International Center for AIDS Care and Treatment Programs (ICAP), Lesotho

Background: Prior to ICAP's support of PMTCT programs in Lesotho, highly active antiretroviral therapy (HAART) for pregnant women living with HIV was located in overcrowded ART clinics. Eligible women had to visit the hospital frequently to attend MNCH and ART visits separately, enduring long wait times at both. Loss to follow-up was high as a result.

Intervention: MTCT-Plus was implemented at ICAP-supported sites. This comprehensive program uses PMTCT as an entry point to provide ongoing, comprehensive HIV care to women and their families. ART for pregnant women was transferred from the ART clinic to MNCH visits.

Methods:

- Routine HIV testing was implemented within MNCH programs.
- ART-eligible pregnant women are prioritized for treatment and receive standard pre-HAART and ongoing palliative care (including tuberculosis/HIV services).
- Women ineligible for HAART receive ARV prophylaxis.
- Comprehensive MNCH services include safe labor, delivery, postpartum services, and infant feeding counseling.
- A PMTCT and ART technical working group was established.

Results:

- MTCT rates among infants at six weeks decreased from 20.3 percent in 2006 to 7.5 percent in 2009 in ICAP Lesotho sites.
- The cumulative number of pregnant women living with HIV initiated on ART increased from 13 prior to 2006 to 1,432 by September 2009.

(ICAP 2009)

POSTPARTUM OPT-OUT HIV TESTING AND COUNSELING

While programs should emphasize testing earlier in the PMTCT continuum, postpartum HTC can improve maternal health and reduce MTCT in breastfeeding infants and future pregnancies. For women who have not attended ANC clinics or delivered in a facility, the postpartum period may be the first opportunity for HTC. Additionally, if a woman has refused HTC in the past or has been newly exposed to HIV, the opt-out model indicates routine testing at each entry point for those with undocumented HIV status. A study in India concluded that while earlier (intrapartum) HTC is ideal, women may be mentally and physically stronger after childbirth is behind them and may better understand and, therefore, accept HTC (Bharucha et al. 2005).

INFANT CO-TRIMOXAZOLE PROPHYLAXIS

Co-trimoxazole is a safe and inexpensive (costing USD$0.03 per day per child) component of the PMTCT continuum that provides prophylaxis against opportunistic infections such as pneumonia and diarrheal diseases, and may be the only treatment option when ART is not easily available (WHO and UNICEF 2009). This drug is highly effective in reducing morbidity and mortality among people living with HIV (PLWH), including children and infants. A randomized controlled trial in Zambia found that co-trimoxazole reduced mortality by half and significantly decreased hospital admissions among children living with HIV (Chintu et al. 2004).

WHO and UNICEF recommend that all infants exposed to HIV start co-trimoxazole between four and six weeks of age. Although UNICEF and UNAIDS set a target of providing ART, co-trimoxazole, or both to 80 percent of children in need by 2010, only 14 percent of infants in need received co-trimoxazole in 2009 (WHO 2010f). Numerous systemic factors act as barriers to achieving this goal, including weak links among PMTCT, ART, and MNCH services; inadequate logistics and staff training; gaps in routine HIV assessments for children; and limited national-level guidance on co-trimoxazole access (Chintu et al. 2004). Approaches that have helped governments to remove these barriers and increase access to ART and co-trimoxazole include the following:

- Encouraging governments to adopt supportive policies, set national targets, and develop budgeted national plans for scaling up co-trimoxazole
- Integrating prophylaxis into HIV and other child health services and decentralizing delivery to the lowest appropriate and feasible level of the health care system (Chintu et al. 2004)
- Enhancing identification of exposed and infected infants by using various entry points such as child health cards, PITC, and immunizations to promote early initiation of co-trimoxazole
- Improving national- and district-level supply chain management systems to prevent drug stockouts
- Engaging those in the community (parents, caregivers, CHWs, and home-based care programs) to identify infants who have been exposed to HIV and refer those infants for testing
- Improving monitoring and evaluation systems (Chintu et al. 2004).

EARLY INFANT DIAGNOSIS AND FOLLOW-UP HIV TESTING FOR INFANTS

Early infant diagnosis (EID) is the virologic testing of infants to determine HIV status. Rapid HIV antibody tests used for adults often detect passively transferred maternal antibodies in infants younger than 18 months of age, making results unreliable. WHO recommends that infants exposed to HIV undergo virologic testing at four to six weeks of age, and updated guidance recommends immediate ART initiation for all children living with HIV who are younger than 24 months of age, irrespective of clinical or immunological stage (WHO 2010d). EID programs should include a counseling component where safe infant feeding is discussed in addition to linkages to care and treatment if results are positive. Children who test negative to HIV also require retesting if breastfeeding continues after the negative diagnosis or if there is another exposure.

Deoxyribonucleic acid (DNA) polymerase chain reaction (PCR) is the virologic test most commonly used for EID in low-income countries. Dried blood spot (DBS) tests are obtained from infants by a heel stick with a sterile single-use lancet. The blood is collected on filter paper, which is inexpensive

and conducive to preparation, storage, and transportation in resource-constrained settings (WHO 2010c). DBS testing has proven effective with a sensitivity of 100 percent and a specificity of 99.6 percent. However, systemic problems such as limited laboratory capacity and transportation bottlenecks lead to long turnaround times and create barriers to continued treatment. A 2008 EID evaluation in Zambia found that if results were not ready when a caregiver returned to the site, they would wait until the next scheduled appointment or not return at all. Inadequate samples are rejected at the lab, and half of children with rejected tests in Zambia were never retested (CHAI 2008).

Accurate diagnosis of a child though EID requires the coordination of several systems and people (i.e., caregivers, health care workers, and laboratory technicians). Some strategies that have been identified in capacity building for EID include:

- *Implementing multilevel training.* This capacity building effort entails training various types of health workers, including nurses and lay counselors, on DBS collection, use of job aids, and reporting tools such as laboratory forms.
- *Improving transport.* An efficient transport system can decrease turnaround time and get results to caregivers sooner. Transportation strategies include using existing transport systems, such as courier services or buses, to deliver samples between locations (i.e., collection site to hub, hub to laboratory, laboratory back to hub) and establishing clear communication systems, such as logbooks, at each level to improve sample tracking and prevent delays as samples move between sites (CHAI 2008).
- *Integrating EID within pediatric services.* This option can increase uptake without increasing opportunity costs for caregivers. A study in KwaZulu-Natal, South Africa, found that providing EID during immunization visits is an acceptable and feasible method of infant testing (Rollins et al. 2009). Inpatient testing can also be integrated: An intervention in Lusaka, Zambia, implemented routine HIV testing within the inpatient pediatric department and found a prevalence of 29.2 percent among those tested (3,373 of 11,571; Kankasa et al. 2009). The high prevalence found in this study underscores the potential to diagnose large numbers of children living with HIV within inpatient wards.
- *Integrating child health information and HIV information.* Including HIV exposure status and PMTCT services received on child health cards can be an effective way to monitor children exposed to HIV, especially when they may be receiving services at more than one facility.
- *Using alternative tracking and return mechanisms.* Using communication tools such as short message system (SMS) technology or texting, fax, or email can speed the turnaround of test results.
- *Monitoring EID sites.* MOHs can regularly monitor sites to ensure quality. Samples should be checked at the first post-collection site (i.e., the district hub) to catch those that will likely be rejected before they reach the laboratory, potentially expediting retesting, and avoiding using resources on invalid samples (CHAI 2008).

Box 7 describes a strategy to improve access to EID and infant prophylaxis.

Box 7. Palliative Care and Support: EID and Co-trimoxazole, Center for Global Health and Development (CGHD), Zambia

Background: HIV prevalence is high among pregnant women in Zambia (12 percent overall and up to 19 percent among women aged 30 to 34) (Central Statistical Office, MOH, and Tropical Diseases Research Centre 2009); thus early diagnosis and referral for treatment is an essential part of pediatric care. EID with PCR became available in Zambia in 2006, though it has faced such systemic challenges as having only three laboratories capable of processing results. The CGHD focuses on reinforcing Zambia's EID infrastructure and developing EID systems for scale-up and efficient health care delivery.

Intervention: CGHD provides technical assistance to help facilities strengthen EID and co-trimoxazole provision for infants who have been exposed to HIV in accordance with national guidelines. They are currently piloting an automated DNA PCR SMS results service to decrease turnaround time for EID results, delivering results directly to the health care facilities via SMS.

Methods:

- Providing regular support and monitoring of the DBS collection and transportation system.
- Supporting the ongoing development and implementation of the EID supply chain management system.
- Helping facilities track missing DNA PCR laboratory results.
- Creating systems for referring infants living with HIV to ART facilities.
- Sensitizing and mobilizing communities by presenting community dramas, obtaining support from local chiefs, and providing EID awareness messages at annual ceremonies.

Results:

- During the reporting period, 220 health care workers were trained in DNA PCR testing and the collection, packaging, and transportation of DBS samples.
- The health care workers ordered and distributed co-trimoxazole to both the district pharmacies and the facilities.
- A total of 3,865 exposed infants received co-trimoxazole prophylaxis by two months of age.
- Zambia is now a model country for EID scale-up and delivery based on the rapid expansion of the program.

(CGHD 2010)

LINKS TO CARE, TREATMENT, AND SUPPORT

If EID results are positive and a child is eligible to initiate ART based on national guidelines, the referral process should begin immediately to stem the rapid progression of the virus in children. WHO recommends ARV initiation for all children living with HIV younger than 24 months of age, irrespective of WHO clinical stage or CD4 percent (WHO 2010d). Where resources are scarce, infants living with HIV who are younger than 12 months of age should receive priority. It is crucial to assess a child's social environment and the presence of at least one (preferably two) supportive caregiver(s) who understands HIV and ART and can provide medication management. Other important considerations are the availability of psychosocial support and adequate nutrition (WHO 2010d).

The absence of integrated, comprehensive care for mother-baby pairs has created barriers to treatment for both mothers and infants as they navigate separate health care systems. Inconsistent referral systems hinder pediatric ART initiation, as a child may be diagnosed with HIV but is never enrolled in an ART program. Barriers identified by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) include the lack of providers with adequate skills in pediatric HIV treatment, the high cost of pediatric ARV regimens, regulatory registration barriers for regimens, and inadequate pediatric dosing information (PEPFAR 2009).

Adherence is an ongoing challenge in pediatric care and treatment and is complicated by side effects, dietary restrictions, and frequent dosing, which can often be mitigated by supportive caregivers (WHO 2010d). Strategies for improving adherence include the following:

- *Integrating maternal, child, and HIV services.* Bringing together PMTCT, ART, and MNCH services can improve the linkages between testing and treatment. Ideally, on receiving the news of a positive DBS result, the caregiver will take the infant directly to the appropriate clinic to enroll in the pediatric ART program (WHO 2006b). Locating ART and testing services within the same complex will expedite treatment initiation.
- *Integrating information on child health cards.*
- *Defining policies on pediatric treatment.* National pediatric treatment policies can help to define referral systems from pediatric HIV testing to treatment. However, facilities (whether providing testing, treatment, or both) should also have standard operating procedures for these referrals. Pediatric regimens should be as child-friendly as possible, without compromising the efficacy of the medications. Reducing the number of pills and doses and improving the taste of medications may help adherence (WHO 2010d).

CROSS-CUTTING STRATEGIES FOR IMPROVING ACCESS TO AND UTILIZATION OF PREVENTION OF MOTHER-TO-CHILD TRANSMISSION SERVICES

INFANT FEEDING AND COUNSELING SUPPORT

One of the central principles of the WHO *2010 Guidelines on HIV and Infant Feeding* is balancing HIV prevention with protection from other causes of child mortality (WHO 2010e). WHO advises that national authorities advocate a single infant-feeding practice based on local conditions, including the socioeconomic and cultural contexts of the populations served, quality and availability of health services, local epidemiology, and the leading causes of child undernutrition and mortality (WHO 2010e). Program planners must also consider the availability of ART and ARV prophylaxis for mothers and infants living with HIV. Where breastfeeding is the recommended infant feeding practice, countries should emphasize exclusive breastfeeding (EBF) for the first six months of life, because mixed feeding during this period has been shown to increase MTCT (Kuhn et al. 2007). WHO guidelines advise that replacement feeding should only be used if it is acceptable, feasible, affordable, sustainable, and safe (AFASS). In situations where ART is not immediately available, WHO recommends that mothers living with HIV should still receive counseling on EBF for a greater chance of HIV-free survival for their infant (WHO 2010e).

Major messages in the WHO *2010 Guidelines on HIV and Infant Feeding* for countries that opt for breastfeeding are the following (WHO 2010e):

- Mothers known to be living with HIV (and those infants who are not living with HIV or are of unknown HIV status) should practice EBF for the first six months of life, introducing appropriate complementary foods thereafter, and continue breastfeeding for the first 12 months of life.

- If infants and young children are known to be living with HIV, mothers are strongly encouraged to exclusively breastfeed for the first six months of life and continue breastfeeding in accordance with recommendations for the general population, that is, up to two years of age or beyond.

Despite current evidence that EBF contributes to HIV-free survival of children who have been exposed to HIV, women remain uncertain about the safety of breastfeeding. Until current evidence came to light, women living with HIV were encouraged to use replacement feeding, and support for EBF initiatives waned in some high-prevalence countries (Swartzendruber and Msamanga 2002).

Ambiguity around EBF remains an issue among counselors who sometimes inadvertently counsel mothers with inaccurate safe-feeding messages (Young et al. 2010). Furthermore, international consensus often has little effect on local beliefs about breastfeeding. Some cultures in high-prevalence countries believe that EBF is insufficient for nutrition, and that the early introduction of complementary foods is beneficial to infants (Desmond et al. 2008). Improving infant feeding practices could benefit from several interventions, as follows:

- *Providing feeding counseling beyond pregnancy.* Infant feeding for mothers living with HIV is best discussed during the antenatal period, but close, supportive follow-up is necessary during the postpartum period to ensure that the mother conducts the chosen infant-feeding method correctly. Clinic-based, home-based, and peer counseling have all been shown to significantly improve EBF prevalence (Baek et al. 2007; Desmond et al. 2008).
- *Issuing standardized national guidance.* Infant-feeding messages must be standardized to reflect national guidelines so that counselors can perform their jobs with confidence and build trust with mothers. Family and community support is critical.

Box 8 describes a strategy to improve infant feeding practices in Zambia.

Box 8. U.S. Agency for International Development's (USAID) Infant and Young Child Nutrition (IYCN) Project, Zambia

Background: Health providers often incorrectly counsel mothers living with HIV to stop breastfeeding at six weeks of age if the baby tests negative for HIV. Families are not always able to provide safe replacement feeding, which causes many of these babies to become seriously ill from malnutrition and infections.

Intervention: The IYCN Project, in partnership with the Zambian MOH, led a six-day workshop on infant feeding, attended by health care workers and community volunteers.

Methods:

- The workshop highlights the importance of EBF for the infant's first six months to minimize the risk of HIV infection from mixed feeding practices.
- Facilitators emphasize AFASS criteria for replacement feeding.
- Workshop participants subsequently use information from the workshop when counseling new mothers living with HIV on recommended infant feeding practices.
- The IYCN Project also seeks to increase the availability of nutrient-rich foods for mothers living with HIV and their children.

Results:

- Health care workers and volunteers can provide accurate, evidence-based infant-feeding information to mothers living with HIV in the Kanyama Compound in Zambia.

- Infant-feeding messages have been streamlined so that health care workers and volunteers can counsel mothers with confidence and mothers have more trust in the message.
- Dissemination of correct infant-feeding information is expected to lead to healthier infants with significantly less malnutrition.

Workshop materials are available at http://www.iycn.org/resources-alphabetical.php#zambiainfant.

(USAID/IYCN 2009)

FAMILY PLANNING

The second component of WHO's four-pronged approach—preventing unintended pregnancies among women living with HIV—is a critical but often neglected element of HIV prevention. According to USAID, 60 percent of new HIV infections in Africa occur among women of childbearing age, 25 percent of whom prefer not to become pregnant but lack access to contraception (USAID 2006). Several studies have found evidence that the provision of family planning (FP) services within high-prevalence countries can avert more HIV infections in children than ARV-PMTCT (single-dose NVP); Hladik et al. 2009; Reynolds et al. 2006). USAID reported that providing FP services within PMTCT programs is more cost-effective than increasing ARV coverage, averting HIV infection in almost 30 percent more infants (USAID 2006). Linking FP and PMTCT can also decrease the potential number of children orphaned by HIV, avert unintended pregnancies among women with compromised health due to HIV, and promote child spacing, which reduces maternal and child mortality (USAID 2006).

Providers should discuss FP during ANC visits, even early in gestation, because many women do not return for a second visit. Dual protection (concurrent protection against pregnancy and HIV or other sexually transmitted infections) and provision of condoms should be a routine part of FP counseling during these visits. In countries where abortion is legal, women wishing to terminate their pregnancies should be made aware of their options (Israel and Kroeger 2003).

Some clients, providers, and policymakers express concerns about FP/PMTCT integration, citing the scarcity of qualified personnel, space, and supplies. Where ART programs are still new, providers often worry that the addition of FP will disrupt current services (Asiimwe et al. 2005). Vertical programs and separate funding mechanisms at the national level may also restrict the provision of FP. Finally, women living with HIV have many reasons for refusing FP use, from fear of disclosing their serostatus to worries that side effects of various FP methods will harm their already compromised health. There are many myths and fears associated with modern FP methods, such as adverse effects on the womb, overbleeding, and anger from sexual partners (Asiimwe et al. 2005). Strategies to address these barriers may include some of the following approaches:

- *Education and outreach.* Although many PLWH have some knowledge of FP, misconceptions continue to inhibit uptake. Developing messages specifically aimed at dispelling misconceptions and disseminating them through posters, radio programs, and community-based providers will sensitize communities to the integration of these services.
- *Training and multilevel advocacy.* The International Council on Management of Population Programs (ICOMP) worked with nongovernmental organizations to help strengthen their capacity to scale-up integration of FP into PMTCT services in Ethiopia, Uganda, and Zambia. One strategy was providing a workshop for program managers where they were trained on the framework for integration and created an action plan for integrating FP/PMTCT services and the subsequent

scale-up in other facilities. Advocacy for integration is ongoing with stakeholders at community, district, and national levels by keeping them informed of project outcomes. The combination of these activities led to enthusiasm among service providers to integrated services because of their increased skills and knowledge. FP services also became more widely available, with increased hours and strengthened linkages between facilities to fill in gaps in FP provision (ICOMP 2010).

- *Developing national guidelines.* At the country level, WHO recommends the implementation of revised guidelines to include the emphasis on sexual and reproductive health (RH) services, including FP for women living with HIV (WHO 2010a).

ADDITIONAL CHALLENGES IN PREVENTION OF MOTHER-TO-CHILD TRANSMISSION

IMPROVE FOLLOW-UP OF MOTHER-BABY PAIRS

Given the complexity of the PMTCT continuum, keeping mother-baby pairs in care and treatment is critical to reducing MTCT. Cumulative loss to follow-up rates in sub-Saharan African PMTCT programs range from 28 percent in ANC to 70 percent four months postpartum and 81 percent six months postpartum (Manzi et al. 2005; Painter et al. 2004; Sherman et al. 2004). A study in Malawi cited fear of husbands' reactions and poor coordination between pediatric and adult HIV services as reasons for dropout (Chinkonde, Sundby, and Martinson 2009), while research in Uganda reported that support from spouses and easy access to services encouraged adherence (Nassali et al. 2009).

Successful implementation of postpartum PMTCT interventions depends on the follow-up of mother-baby pairs identified during ANC, delivery, and post-delivery. Promising strategies include the following:

- *Providing continuous support for mothers.* Many programs that focus on providing psychosocial support for pregnant women and mothers throughout the PMTCT continuum have shown increased retention rates (Kansiime, Ssemafuma, and Rwekikomo 2009). Individual, group, or family counseling can help to empower women to make healthy, informed decisions for themselves and their children. Many countries use peer support approaches to improve follow-up (see Box 9). Partner support has been associated with retention in PMTCT care, and women have identified spouses as a main influence in HIV care decision making (Chinkonde, Sundby, and Martinson 2009).
- *Planning for continuous care.* Following a facility delivery, women should be

Box 9. Community-based Support for PMTCT in Uganda

The Northern Uganda Malaria, AIDS and Tuberculosis Program utilized network support agents (NSAs) in mother-baby pair follow-up. NSAs are PLWH who have received specific training to track mothers living with HIV identified at health facilities. NSAs link mothers living with HIV to family support groups (FSGs). Under the supervision of health workers, mothers living with HIV and their partners meet regularly in peer groups to share experiences and discuss concerns. Mothers and their partners and children are followed monthly in the FSGs and linked to comprehensive HIV care for further follow-up, treatment, and support.

Currently, 320 women living with HIV and 100 male partners attend FSGs at 46 PMTCT sites, and 80 children have received EID. In addition to providing vital social support, NSAs perform a major role in reducing the burden on health workers and in increasing enrollment and retention in PMTCT programs.

(Kansiime, Ssemafuma, and Rwekikomo 2009)

assessed and counseled prior to discharge. A specific appointment should be made for an early postpartum visit (Mazia et al. 2009). For those women who deliver outside of a facility, the mobilization of TBAs and home-based care organizations can be used for postpartum referrals.

- *Facilitating monitoring and tracking for women living with HIV*. Including unique HIV identifiers on mother and child health cards provides a way for health providers to monitor HIV status and services and tests received, even between facilities. Some countries have adopted electronic medical record systems, such as SmartCare in Zambia. These systems have potential to reduce loss to follow-up through improved facility organization and patient tracking; however, utilization and efficacy vary by site.

Facilitating a smooth transition from ANC to ongoing mother-baby care, ideally in the same facility and with the same providers, has increased retention of mother-baby pairs (Department of Health South Africa, no date [a]).

ADDRESS HUMAN RESOURCE CONSTRAINTS

Human resource constraints at all levels of HIV care are well documented in low-income countries. Chronic challenges to overburdened health care systems, including staff shortages, inadequate training, and weaknesses in infrastructure and logistical support, worsened as the epidemic spread. ANC and MNCH staff are overburdened by the additional demands of PMTCT. Morbidity and mortality related to HIV has debilitated some of the work force in high HIV-prevalence countries. The devastating economic effects of HIV on these countries has limited job opportunities and perpetuated the brain drain.

Programs have developed innovative approaches to meet the challenge of providing PMTCT. These include the following:

- *Improving support for providers.* Improving supervision and providing technical assistance and mentorship have helped health workers to better meet the needs of their patients and experience improved job satisfaction as a result.

- *Task-shifting.* Programs have used various forms of task-shifting to increase the number of HIV patients served without compromising quality of service (Morris et al. 2009). A task-shifting model in Lusaka, Zambia, evaluated clinical care, provided training in areas of weak performance, and instituted a clinic exchange program to improve clinical quality (Morris et al. 2009). An on-site mentorship, conducted as part of a national task-shifting initiative, enabled nurses in Rwanda to deliver the multi-drug ARV regimen for PMTCT (ICAP 2008).

- *Using worker retention tools.* WHO developed an HIV and health work force plan called "Treat, Train, Retain." The plan is comprised of the following elements: a package of HIV treatment, prevention, care, and support services for health workers in countries affected by HIV ("Treat"); measures to empower health workers to deliver universal access to HIV care and treatment ("Train"); and strategies to keep health workers in the public health system and reduce the migration of health workers by including monetary and other incentives and strategies to improve working conditions and pay ("Retain") (WHO 2006c).

Other strategies include involving TBAs, utilizing the mothers2mothers approach with mentor mothers, and compensating mothers who have successfully completed PMTCT when they serve as expert patients (Baek et al. 2007; Kironde, Lukwago, and Ssenyonga 2003). Also, HIV health

workers can take advantage of their own support groups to share challenges and prevent burnout (Baek et al. 2007).

INTEGRATE PREVENTION OF MOTHER-TO-CHILD TRANSMISSION WITHIN MATERNAL, NEWBORN, AND CHILD HEALTH AND REPRODUCTIVE HEALTH

WHO describes integration of HIV within MNCH services in terms of reorganizing health systems to ensure delivery of a set of essential interventions to prevent and treat HIV within the continuum of care for women, infants, children, and families (WHO 2006b). Such integration makes sense in low-income countries, where there is considerable overlap between women requiring PMTCT and MNCH services. Countries with high rates of HIV and PMTCT also have high rates of maternal and neonatal morbidity and mortality. There is also overlap between services included in the PMTCT continuum and those offered in MNCH; the combination of these services is called *the essential package of care*. The guiding principle of the integrated approach is the provision of an ongoing, family-centered continuum of care involving community participation (Israel and Kroeger 2003). Integrating PMTCT with MNCH and RH serves to maximize facility visits for mothers and children through the restructuring of health care services to be more efficient with less duplication. Integration of these services is especially important in light of the "feminization" of HIV (that is, women's increased susceptibility to HIV based on biological and social vulnerabilities) and high rates of MTCT (Israel and Kroeger 2003). Integrated services have the potential to improve efficiency, save money, and improve quality of care (Lule 2004). Stand-alone, vertical PMTCT programs are less effective than those integrated and coordinated with MNCH and RH programs (WHO 2010a).

National attempts at integration encountered many barriers having to do with human resources, community perceptions of care, weak referral systems, and quality of care, among others. Individual countries faced specific challenges—reorganization of infrastructure for Mozambique; community perceptions of quality of care in Uganda; and clients' fear of disclosing their status in Tanzania (Israel and Kroeger 2003).

Strategies for integrating services must link HIV interventions at each level and stage of MNCH services while addressing local conditions and needs (see Box 10). Promising approaches include the following:

- *Use toolkits.* WHO recommends that countries create integration toolkits based on country experiences, challenges, and best practices. Toolkits should include tools for planning, implementation, training, and monitoring and evaluation (Israel and Kroeger 2003).
- *Ensure cooperation from national leadership.* National policies and political commitment are also important to the success of integration and may require advocacy by program managers. Tanzania used a district network approach whereby health centers and dispensaries provide HTC, PMTCT, and referral services to decrease the burden on hospitals and strengthen primary health centers. PMTCT interventions are delivered within MNCH services, reducing loss to follow-up and facilitating a family-centered approach to care. Prior to start-up, facilities work on procurement and management of supplies, laboratory upgrades, community mobilization, tracking systems, and linkages between sites (Israel and Kroeger 2003).

- *Use existing logistical support.* UNICEF recommends that integrated programs use the national health commodity supply chain and join with other HIV service departments within facilities in the procurement of medications (UNICEF 2008).
- *Integrate and standardize record systems.* Patient tracking systems and medical records should also be integrated to include all health information, including that which is HIV-related.

Box 10. Integrating Quality Postnatal Care with PMTCT in Swaziland

Swaziland, with an HIV prevalence of 39 percent among pregnant women and high neonatal and maternal mortality, developed an integrated program to improve postnatal HIV care and follow-up. A total of 137 providers were trained to deliver a package of care consisting of:

- Immediate care after birth
- Daily assessment during hospital stay
- Assessment and counseling, and a scheduled postnatal visit, at discharge
- Postnatal visits at one, four, and six weeks
- Counseling on MNCH, FP, preventive care at home, and HIV.

There was a 20-fold increase in postnatal clinic attendance within the first three days. Pre- and post-intervention assessments showed significant improvements in providers' performance in examining mothers, providing FP, counseling on maternal and newborn danger signs and HIV/sexually transmitted infections, and providing follow-up care.

(Mazia et al. 2009)

STRENGTHEN COMMUNITY PARTICIPATION AND MALE INVOLVEMENT

WHO has stated its commitment to the promotion of community participation in the prevention of MTCT, with a focus on CHWs and male partners (WHO 2010a). Community involvement in PMTCT often bridges the gap between sociocultural norms and facility-based care. CHWs play an important role in sensitizing communities to the importance of facility-based PMTCT services, while also linking community members to home-based care, support groups, and community- and faith-based programs. These entities often support PLWH in ways that facility-based PMTCT programs cannot, including the provision of basic necessities such as food, shelter, clean water, and first aid (Israel and Kroeger 2003).

While male involvement in PMTCT has been limited, the role that men play in adherence and decision making is substantial. Because ANC is often a family's entry point into HIV services, the burden of disclosure falls on the woman. Counselors should be aware that fears of abuse and abandonment may influence women's PMTCT decisions (Israel and Kroeger 2003). Men have become increasingly involved in PMTCT in some countries, notably Botswana and Zambia. The relatively high rate of pregnant women disclosing their positive HIV status to male partners in these countries allows men to be involved in treatment and infant-feeding decisions (WHO 2010a). In many other countries, however, fear of stigma keeps women living with HIV from disclosing their status to partners or to the community. Men often do not attend PMTCT services because they are too busy, have no interest, fear HIV test results, or encounter negative provider attitudes (Peacock

2010; Theuring et al. 2009). However, evidence shows that some men understand the importance of PMTCT services and are eager to participate, but often feel they lack skills and information.

Community-based and peer-based programs also have significant weaknesses in many settings. A study on community-based approaches to PMTCT in Kenya identified some critical challenges that limited the scope of women reached: CHWs, mostly widowed and unemployed, did not receive enough money to support their families and therefore spent much of their time participating in income-generating activities instead of fulfilling their roles as PMTCT promoters. This is a reality of program reliance on volunteers or underpaid staff in low-income countries. Additionally, although peer counselors living with HIV were purposely recruited to provide community-based support, many did not disclose their status to the pregnant women they were seeing, defeating the intention behind this type of peer counseling (Kaai et al. 2007).

A variety of approaches have increased community or male involvement in PMTCT:

- *Conducting outreach that fits local norms.* Community beliefs and practices regarding HIV are important considerations in PMTCT program design and implementation. Some key factors are preferences in health care providers and delivery methods. Communities can build their own approaches to supporting PMTCT through sensitization of stakeholders, such as political leaders, religious leaders, health officials, and women's organizations, by PMTCT program leaders (Israel and Kroeger 2003). In some instances, leaders publicize their HIV testing to reduce stigma (Alcorn 2009). Involving well-respected community health providers, such as traditional healers and birth attendants, as members of PMTCT teams can improve relationships between communities and facilities and enhance women's comfort level with facility-based care (Israel and Kroeger 2003). Strong links between community-based workers and facilities enhance continuity of care, helping women to access and follow-up with PMTCT services.

- *Using existing community structures.* Community-based organizations and faith-based organizations (FBOs) play an important role in prevention and support and can complement services received in facilities (Israel and Kroeger 2003). Formalizing these links should involve a two-way referral system in which CHWs refer women to facilities, and facilities refer women back to CHWs with information on support needs. CHWs are then able to refer women to various types of community support, such as support groups and FBOs, based on their needs.

- *Using PLWH as positive examples.* Publicizing examples of positive living is another way to break down stigma within communities. Community members living with HIV can set examples of positive living by being open about their status and leading fulfilling lives while adhering to HIV care and treatment. Promotion through posters in clinics and other public spaces is a popular means of message dissemination.

- *Encouraging couples counseling.* Couples VCT (CVCT) is an approach to increasing male involvement. CVCT helps the couple to share responsibility and ownership and can also be an entry point for male involvement in PMTCT, while taking the burden of partner disclosure off of women (USAID 2005).

- *Developing information, education, and communication (IEC) strategies.* IEC is critical given that men frequently cite lack of information as a rationale for not participating in PMTCT services. IEC should specifically focus on the necessity for male partner participation. One strategy that has increased partner attendance is handing out personal invitation letters from health facility staff for women at ANC to give to their partners (see Box 11). Offering services after working hours or on weekends may help to solve the issue of men being too busy and may also cut down on

wait times (Theuring et al. 2009). Guidelines to mainstream male involvement on a national or regional level may mitigate some of the institutional barriers identified by men.

Box 11. Increasing Men's Participation in PMTCT in Rwanda

In Rwanda, IntraHealth and the MOH sought to increase rates of HIV testing among the sexual partners of women living with HIV. At 10 sites, the sexual partners of ANC clients were invited to attend prenatal visits and receive counseling and testing, and to be involved in normally women-centered services, such as prenatal counseling. Simultaneously, a community-provider partnership approach challenged the attitudes and behaviors of men, which compromised their own health and that of their female partners and children.

Following the intervention, partner involvement increased dramatically. At one site, partner testing increased from 10 percent to 88 percent, and most partners at that site now attend ANC clinics. Rates for women's counseling and testing were also high—99 percent at one site—and 95 percent of women who received counseling accepted an HIV test.

(USAID 2005)

CONCLUSION

There has been remarkable progress in PMTCT in the last decade. However, the complexity of PMTCT services has left many countries struggling to keep up with international guidelines. Innovative approaches focused on improved service delivery through methods such as psychosocial support and health worker capacity building have proven successful for many programs. The examples highlighted throughout this report serve as a snapshot of programs that successfully incorporated evidence-based approaches. Most of these programs have extensive material available online for reference.

For PMTCT programs to achieve their goals, the coverage, access, and utilization of all PMTCT interventions must be improved by addressing barriers at the individual, community, provider, facility, health system, and national levels. A number of specific strategies have been developed to enhance each step of the PMTCT continuum. During the antenatal period, HTC and CD4 testing need to be more accessible. Effective systems to ensure that ARVs are given to mothers living with HIV before, during, and after birth are essential. Safe delivery is critical to ensure that transmission does not occur during delivery and that ARVs are given as recommended by WHO. Postpartum and postnatal interventions, including safe infant feeding, EID, and co-trimoxazole prophylaxis for infants exposed to HIV, must reach more mothers and infants.

Cross-cutting strategies that can improve PMTCT include strengthening the follow-up of mother-baby pairs, addressing human resource constraints, integrating PMTCT within MNCH and RH programs, and strengthening community participation and male involvement. Addressing these cross-cutting issues can lead to simultaneous improvements in multiple areas of PMTCT. From interventions focused on individuals to those aimed at national policies, each plays an important role in expanding coverage, access, and utilization of PMTCT services.

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