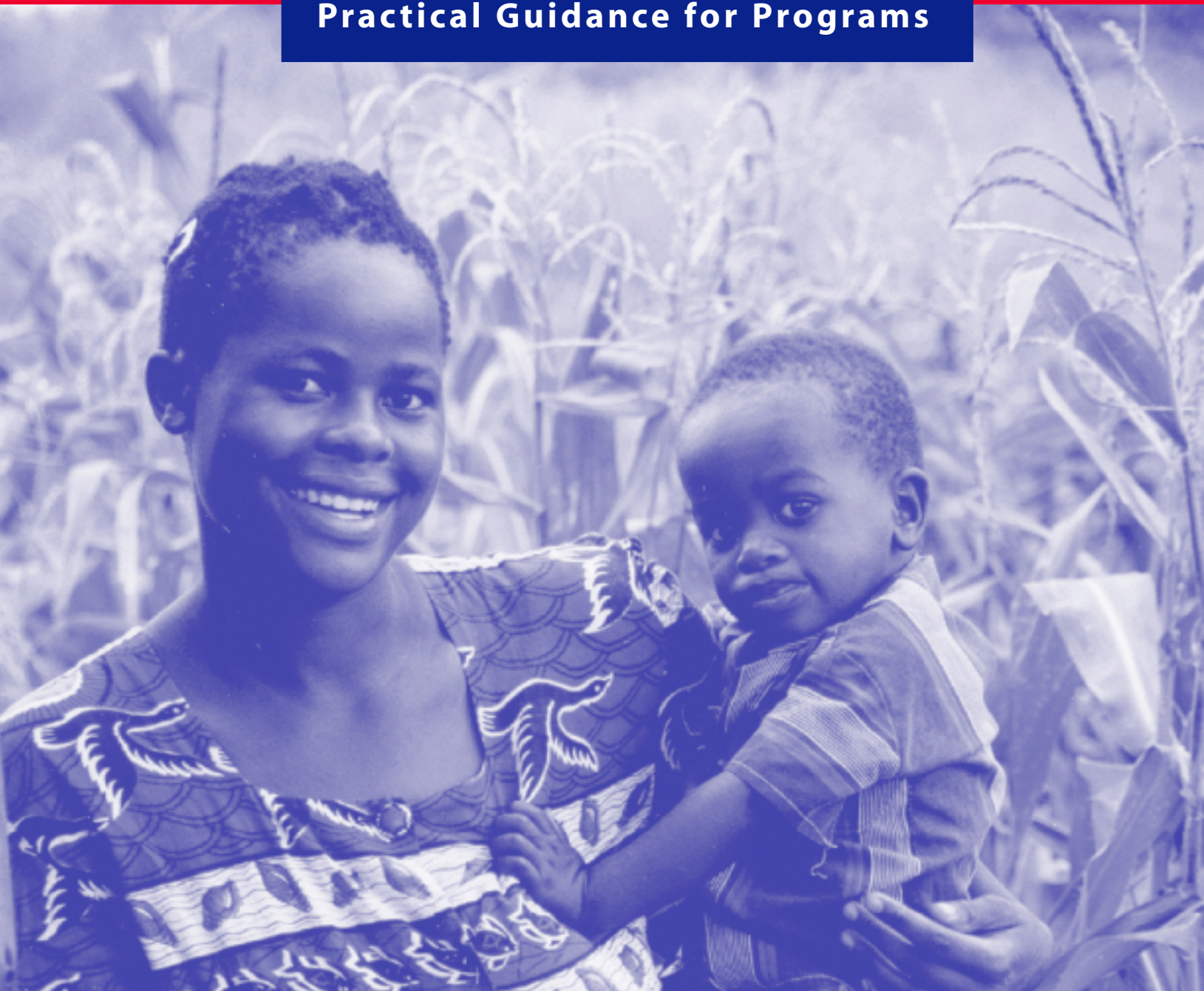


MTCT



PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV IN AFRICA

Practical Guidance for Programs



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PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV IN AFRICA: PRACTICAL GUIDANCE FOR PROGRAMS

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ACRONYMS

AIDS	acquired immunodeficiency syndrome
ANC	antenatal care
ARV	antiretroviral
AZT	azidothymadine (zidovudine or ZDV)
BCC	behavior change communication
BFHI	Baby Friendly Hospital Initiative
BMS	breastmilk substitutes
CSM	condom social marketing
HIV	human immunodeficiency virus
IMCI	Integrated Management of Childhood Illness
MCH	maternal and child health
MTCT	mother-to-child transmission
NVP	nevirapine
PTCT	parent-to-child transmission
STD	sexually transmitted disease
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCT	voluntary counseling and testing
WHA	World Health Assembly
WHO	World Health Organization
ZDV	zidovudine (azidothymadine or AZT)

EXECUTIVE SUMMARY

An alarming number of infants in Africa have already contracted HIV/AIDS from their HIV-infected mothers through mother-to-child transmission (MTCT).¹ At least half a million infants and children have already died from AIDS, undermining child survival gains made in earlier years through comprehensive child health programs.

Many governments and agencies in Africa recognize the severity of this problem, but lack clear guidance on how to address it. This paper is intended to summarize knowledge about MTCT and to provide guidance for program managers and policy makers on selecting and implementing MTCT prevention interventions.

MTCT can occur during pregnancy, during labor and delivery, and after birth, through breastfeeding. The best way to avoid MTCT is to prevent women of reproductive age from becoming HIV-infected. However, for the millions of African women who are already infected and for those who will become infected in the future (despite HIV/AIDS prevention efforts for adults), many direct or “core” interventions are now available to help protect their infants. Importantly, these interventions can be implemented through existing programs.

In addition to the obvious and compelling effect that MTCT prevention can have on saving children’s lives, many MTCT prevention interventions will also have much more broad-reaching effects on improving overall maternal and child health (MCH) through improving antenatal, delivery, and postpartum care.

Core MTCT prevention interventions described in this paper include:

- Comprehensive MCH (antenatal, postnatal, and child health) services
- Voluntary, confidential counseling and testing (VCT) services
- Counseling and support about safe infant feeding practices
- Optimal obstetrical practices
- Short-course antiretroviral (ARV) therapy for HIV-infected pregnant women
- Family planning counseling and services that are linked to VCT.

All of the core MTCT prevention interventions rely on the health system and communities to be able to implement them successfully, hence strengthening *MCH services* is critical. *VCT* is essential for identifying HIV-infected mothers who could benefit from the other core MTCT prevention interventions, HIV-negative mothers who can take steps to prevent becoming infected, and mothers in need of links to HIV care and support. Reducing post-natal transmission requires the capacity to inform women and families fully about *infant feeding* risks and options and to support them in their feeding decisions. Improving *obstetrical practices* is likely to be both feasible and affordable, but the potential impact of these improvements on MTCT prevention has not been quantified. *Short-course antiretroviral (ARV)* prophylaxis is the most effective intervention for reducing MTCT, but availability of ARV prophylaxis has been limited to date in Africa. Providing voluntary *family planning* counseling and services and linking family planning counseling with HIV/AIDS counseling

¹ Other medical terms for MTCT are vertical transmission or perinatal transmission. Recently, some organizations have begun referring to this transmission process as “parent-to-child transmission” (PTCT), to reflect the role of men in the overall chain of transmission.

can significantly reduce the number of unwanted pregnancies among HIV-infected mothers, many of which would result in HIV-infected infants.

These core interventions vary in their cost, potential impact, and ease of delivery. While none of these individual core interventions is 100 percent effective in preventing MTCT, when introduced in combination, their impact can be significant.

MTCT prevention is most effective when undertaken not as an isolated activity, but rather as part of the continuum of HIV/AIDS interventions which range from primary prevention to care and support for people living with HIV and AIDS. The care and support of women is of particular relevance to MTCT prevention and specific issues and activities which link the health and well-being of women to MTCT are described in this paper. Involvement of men in MTCT prevention is also important because men are a critical link in the HIV transmission chain, and because men can support the decisions women must make related to MTCT prevention.

All MTCT prevention packages require policy analysis, consideration of ethical issues and human rights, training and supervision, commodity procurement and logistics support, behavior change communication, social mobilization, community participation, operations research, and monitoring and evaluation. Because of these demands, interventions may need to be phased in over time.

Because of the impact that MTCT is having on infant and child morbidity and mortality in Africa, government, nongovernmental, and international organizations urgently need to step up support for MTCT prevention programs to slow the alarming increase in pediatric AIDS in Africa. The following actions are recommended to meet this challenge:

- Review existing programs for potential entry points for effective HIV/AIDS and MTCT prevention programming
- Engage in discussions with all stakeholders and partners to develop national strategies for MTCT prevention
- Increase support for primary prevention of HIV/AIDS
- Identify funding sources for MTCT interventions
- Support operations research in MTCT prevention
- Support improvement of the antenatal health infrastructure, which is a prerequisite to offering some core MTCT prevention interventions
- Offer support to families and communities affected by HIV/AIDS
- Periodically review MTCT prevention packages for continuing relevance and appropriateness, given the rapid changes in behavioral, biological, and pharmaceutical knowledge and advances.

Governments and donors today must recognize that MTCT prevention requires more than provision of drugs and commodities. Systems must be strengthened and communities must be prepared for these programs. Therefore, commitment to providing a *range* of core MTCT interventions is required to measurably reduce the incidence of pediatric HIV/AIDS in sub-Saharan Africa today and in the future.

I. INTRODUCTION

A. Purpose of the paper

Prevention of mother-to-child transmission (MTCT) of human immunodeficiency virus (HIV), also known as vertical, perinatal, or parent-to-child transmission, has become an important priority for many developing country governments and agencies in Africa. It is consistent not only with the broader goals of HIV/AIDS prevention, but also with commitments to improving child health and survival.

This paper summarizes current knowledge about MTCT and provides practical guidance for introducing interventions to prevent MTCT in Africa that are safe, affordable, feasible, culturally acceptable, sustainable, and effective in a variety of African settings. Further, this paper may also be used for policy dialogue and coordination of efforts among other partner agencies and NGOs at international, regional, and national levels.

B. Magnitude of the problem

Although there are some indications that HIV *incidence* may finally be stabilizing in some sub-Saharan African countries (UNAIDS, 2000a), HIV *prevalence* is still high and the epidemic continues to have a devastating effect. There are now eight countries in the region in which more than 15 percent of the adult population aged 15–49 is infected with HIV-1² and seven countries in which at least one adult in five is HIV-infected (UNAIDS, 2000b). Most of these adults will die less than 10 years after becoming infected. UNAIDS estimates that 2.4 million AIDS deaths occurred in sub-Saharan Africa in the year 2000 alone (UNAIDS, 2000a).

Infants and children in Africa are affected by HIV/AIDS in multiple ways. Those perhaps most *directly* affected are children who acquire HIV/AIDS through MTCT. They face severe morbidity and a near-certain childhood death where sophisticated and costly treatments are virtually nonexistent and even the availability of basic medicines to treat opportunistic infections is likely to be erratic.

In developed countries, MTCT rates have fallen to as low as two percent of births among HIV-infected mothers in recent years with the introduction of HIV counseling and testing, short-course zidovudine (ZDV or AZT) prophylaxis, elective Cesarean delivery, and the safe use of infant formula instead of breastfeeding (Mofenson and McIntyre, 2000). In Africa, however, where these interventions have generally not been available, and where prolonged breastfeeding is the norm, about 25–35 percent of HIV-infected mothers pass on HIV to their infants (Dabis et al, 2000a).

The severity of the MTCT problem in sub-Saharan Africa is due to high rates of HIV infection in women of reproductive age, a large total population of women of reproductive age, high birth rates, and the lack of effective MTCT prevention interventions. Rates of infection in women are high in sub-Saharan Africa and growing rapidly (see **Annex A** for country-specific rates).

² The predominant strain of HIV in Africa is HIV-1 and all references to HIV in this paper refer to HIV-1.

UNAIDS estimates indicate that about 25 million adults and children were living with HIV/AIDS in sub-Saharan Africa by the end of the year 2000, and that nearly four million adults and children were newly infected with HIV during that year (UNAIDS, 2000a). Between 300,000 and 610,000 AIDS-related deaths among children aged 0–14 occurred in the year 1999 alone (see **Annex B**). Infant mortality rates, reduced between 1981 and 1986, have now risen dramatically, largely due to AIDS (see **Annex C**). Almost all AIDS deaths in Africa in young children can be traced back to MTCT.

C. Mechanisms, timing, and risk factors

MTCT in Africa is a tragic result of a chain of events that most often involves an HIV-infected man infecting his female partner through unprotected sexual activity, and the partner infecting her next baby, and potentially several more babies, during the remainder of her reproductive life. To reflect the important role of men in this chain of transmission, some organizations have replaced the biologically precise terminology of “mother-to-child transmission” with the behaviorally sensitive term “parent-to-child transmission.”

Infants who acquire HIV infection from their mothers do so during pregnancy, during labor and delivery, or after birth through breastfeeding. The risk of infection is now thought to be 5 to 10 percent during pregnancy; 10 to 20 percent during labor and delivery; and 10 to 20 percent during breastfeeding (de Cock et al, 2000). Transmission can also occur after birth through contact with infected blood, blood products, or unsterile medical equipment, but this is thought to be relatively rare, even in Africa. Efforts to improve the safety of the blood supply, to avoid unnecessary delivery-related blood transfusions, and to improve infection control practices have probably further reduced the incidence of non-MTCT transmission in infants.

For more detailed information about various aspects of MTCT, see the suggested reading list in **Annex D**.

1. HIV transmission during pregnancy

In most HIV-infected women, HIV does *not* cross the placenta from mother to fetus and the placenta actually shields the fetus from HIV (Anderson, 1997). This protection from the placenta may break down, however, if: a) the mother has a viral, bacterial, or parasitic placental infection during pregnancy; b) the mother becomes HIV-infected herself during the pregnancy, and hence develops a very high level of the HIV virus for a short time; or c) the mother has severe immune deficiency associated with advanced AIDS. Thus, maternal conditions including untreated placental infections (particularly malaria), recent HIV infection, and advanced HIV disease have been cited as risk factors for MTCT (WHO, 1999). In addition, malnutrition during pregnancy may indirectly contribute to MTCT (Semba, 1997).

2. HIV transmission during labor and delivery

Infants of HIV-infected mothers are at great risk of becoming infected with HIV during childbirth. During this single event, between 10 and 20 percent will become infected if no steps are taken to prevent transmission. Most infants who acquire HIV during labor and

delivery do so by sucking, imbibing, or aspirating maternal blood or cervical secretions that contain HIV. The duration of membrane rupture (often deliberately performed to augment or induce labor), acute chorioamnionitis (resulting from untreated STDs or other infections), and invasive delivery techniques that increase the baby's contact with the mother's blood have been associated with higher risks of MTCT during labor and delivery (Anderson, 1997; WHO, 1999).

3. HIV transmission through breastfeeding

HIV is present in breastmilk, although the viral concentrations in breastmilk are significantly lower than those found in blood. On average, about 15 percent of babies born to HIV-infected mothers will become infected through sustained breastfeeding (24 months or more). Recent studies suggest that the risk of MTCT through breastfeeding depends on a number of factors. These include: a) the pattern of breastfeeding (babies who are exclusively breastfed may have a lower risk of becoming infected than those who also consume other liquids, milks, or solid foods in the first months of life) (Coutsoudis et al, 1999; Coutsoudis et al, 2001; Smith and Kuhn, 2000); b) breast health (mastitis, cracked and bloody nipples, and other indications of breast inflammation are associated with higher risks of transmission); c) breastfeeding duration; d) maternal viral load (which is higher with recent infection or advanced disease in the mother); e) maternal immune status; and f) maternal nutritional status. The risk of MTCT is believed to double (to about 30 percent) if the mother becomes infected with the virus while breastfeeding (Dunn et al, 1992).

D. HIV/AIDS among infants and children

MTCT has become a critical child health problem in Africa, contributing to severe child morbidity and significant child mortality, and undermining the impact of programs that have significantly reduced child mortality in previous decades.

Diagnosis of HIV/AIDS in infants can be done by laboratory tests, where available, or by observing symptoms of AIDS. HIV antibodies can be measured through a blood test, however, infants born to HIV-infected mothers still carry their mother's antibodies in the blood (even if the infants themselves are not infected) for 12 to 15 months. For this reason, standard HIV antibody tests cannot reliably confirm HIV-infection in infants younger than 12 to 15 months of age. The polymerase chain reaction (PCR) test, which *can* detect HIV much earlier in an infant's life, is prohibitively expensive for widespread use in most African settings.

The most common symptoms of pediatric AIDS seen by clinicians in Africa are growth failure, lymphadenopathy (enlarged lymph nodes), persistent diarrhea, pulmonary infections, chronic cough, and chronic fever. These symptoms may initially appear as common child health problems. However, in children with HIV infection, the symptoms respond slowly to standard treatments, if at all. Thus children with HIV/AIDS are a challenge for health providers and health care systems.

Recently, WHO updated its clinical approach to diagnosing symptomatic HIV infection in children living in settings where diagnostic testing is not available. New management guidelines are being integrated into protocols for the integrated management of childhood

illness (IMCI). According to the new guidelines (WHO, 2000a), children presenting any three of the following signs or conditions are suspected to have HIV infection:

- Two or more chest infections requiring antibiotics in the past two months
- One or more episodes of persistent diarrhea OR two or more episodes of acute diarrhea in the past two months
- A parent with tuberculosis
- Oral candidiasis (thrush)
- Enlarged lymph nodes in two or more sites (cervical, inguinal, axillary)
- Growth faltering (weight curve flat or falling for two consecutive months)
- Weight-for-age below the 3rd percentile (using international growth reference standards).

The IMCI guidelines recommend that health workers receive special training in how to treat children suspected of HIV infection in countries where over two percent of the adult population is HIV-infected. This includes managing children who do not respond to standard IMCI treatment protocols, have signs and symptoms of HIV infection, or have an epidemiologic history suggestive of HIV (WHO, 2000a; Lepage et al, 1998).

Disease progression in children who acquire HIV infection from their mothers is more rapid in Africa than in developed countries, probably because African children are exposed to early and multiple infections, have high rates of malnutrition and micronutrient deficiencies (Dray-Spira et al, 2000) and have limited access to health care. Recent studies have shown that at least one-third of HIV-infected children in developing countries die within the first year of life (Dabis et al, 2000b).

Four categories of preventive interventions have been suggested to reduce HIV-related morbidity and mortality in African children. These include drug prophylaxis (to prevent *Pneumocystis carinii* pneumonia, bacterial infectious complications, and tuberculosis); routine immunizations as recommended by the WHO Expanded Programme of Immunization and anti-pneumococcal immunization; micronutrient supplementation; and prevention and early treatment of malnutrition (Dray-Spira et al, 2000).

There is currently still no cure for (adult or) pediatric HIV/AIDS and many complex therapies used to treat symptoms of HIV/AIDS in industrialized countries are neither feasible nor affordable in Africa. However, palliative care is feasible, affordable and appropriate for persons living with HIV/AIDS. Palliative care is a philosophy of care which combines a range of therapies with efforts to achieve the best quality of life possible for patients who are suffering from life-threatening and ultimately incurable illnesses (UNAIDS, 2000c).

II. MTCT PREVENTION COMPONENTS

A. The prevention to care continuum

Efforts to prevent MTCT should relate to, and be considered within, the entire spectrum of HIV/AIDS primary prevention, care, and support activities, as shown in Table 1.

TABLE 1: MTCT AND THE PREVENTION TO CARE CONTINUUM

PRIMARY PREVENTION OF HIV/AIDS IN ADULTS:	CORE INTERVENTIONS FOR THE PREVENTION OF MTCT:	CARE AND SUPPORT:
• Promotion and provision of condoms • Behavior change communication (including education and involvement of partners, families, and communities; life-skills and other programs targeted to youth) • Prevention and treatment of sexually transmitted diseases • VCT	• Comprehensive MCH services (antenatal, postnatal, and child health) • VCT • Improved breastfeeding and alternative infant feeding counseling & practices • Optimal obstetric care • Short-course ARV prophylaxis • Family planning	• Postpartum care for mothers (including family planning) • Postpartum care for infants (including identification, treatment of, and palliative care for AIDS-related conditions) • Social support for families and communities affected by HIV/AIDS, especially orphans and vulnerable children • Support to carry out infant feeding decisions

The focus of this paper is on the *core* MTCT prevention interventions and how they can be introduced (as a whole or in parts) within broader HIV/AIDS prevention, child survival, reproductive health, family planning, and food security programs. *Core* MTCT interventions are those which *directly* prevent MTCT during pregnancy, labor and delivery, and during the postpartum period for women who are already HIV-infected. The core interventions listed in Table 1 are those that are known *today* to be the most effective for identifying HIV-infected women and for reducing the risk of HIV transmission during each of these periods. As research continues, it is likely that new interventions will be identified and validated for their technical merits. At the same time that these interventions are evaluated for effectiveness, there is a need for operational research to measure their coverage, cost, feasibility, acceptability, quality, and integration into broader HIV/AIDS and other health programs.

MTCT education, which is introduced as part of *primary prevention of HIV/AIDS in adults*, may even serve as a motivating force for avoidance of unsafe sexual behavior. This is particularly likely among young couples, given the high value African societies place on family and child rearing. Condom social marketing, family planning, behavior change communication (BCC),

and sexually transmitted disease (STD) prevention and treatment programs can be extremely effective in explaining MTCT and the risk that unprotected sex brings to babies.

Increasing understanding about the impact of HIV on pregnant and breastfeeding women, and about options for preventing MTCT, can contribute to a more open dialogue between men and women about safe sex and sexual behavior. MTCT must become a part of life-skills training for youth so that they learn early how to protect their future families from infection. Since young women have a particularly high risk of contracting HIV in many countries, there is an ever-increasing need to influence attitudes and norms surrounding MTCT, reduce stigma, and increase knowledge and skills among both boys and girls about how the disease is spread from parents to children. Finally, including MTCT prevention education at the community level is essential to foster an environment supportive of women who face difficult decisions related to MTCT and its prevention.

On the other end of the continuum, improving maternal health through offering comprehensive antenatal and postnatal *care and support* can also help reduce the risk of MTCT. It can improve overall health and nutrition, improve birth outcomes, reduce maternal mortality (which is associated with infant and child mortality), and reduce women's own risk of HIV infection by detecting and treating reproductive tract infections. For HIV-positive women, health care services can prevent and treat the opportunistic infections and other conditions that diminish their quality of life, shorten their survival time with AIDS, and impede their ability to care for their children.

The initiation of programs to provide health care, nutrition, and social support for people living with HIV/AIDS may actually increase demand for VCT and MTCT interventions, since women are assured of somewhere to turn to for help after learning that they are HIV-positive. Care and support programs can serve as entry points for MTCT prevention at the community level. Engaging the community in orphan care, in particular, can raise hope and lead to empowerment, which can increase receptivity to AIDS prevention messages (Williamson, 2000a). The additional humanitarian reasons for offering care and support, as well as examples of various approaches, are discussed in Section II.D.

Many existing development programs offer potential entry points for MTCT prevention. In addition to broader HIV/AIDS prevention programs, these include programs in health and child survival, reproductive health and family planning, nutrition and young child feeding, health sector strengthening and reform, and food security. The types of activities to be supported include policy analysis and updating, training and supervision, drug and test kit procurement and logistics, behavior change communications, social mobilization, operations research, and monitoring and evaluation.

The next section of this paper will focus on the *core* MTCT prevention interventions and steps for introducing them into HIV/AIDS and other programs.

B. Core interventions to prevent MTCT

Core interventions to prevent MTCT are described below. Current knowledge about the impact, safety, probable feasibility, and other related benefits of these core MTCT prevention interventions are summarized in the chart in **Annex E**.

1. **Comprehensive MCH services (antenatal, postnatal, and child health)**

For pregnant women to access any or all core interventions to prevent MTCT, they must be identified as being HIV-infected and have access to good quality health services during the antenatal period, during labor and delivery, and after the birth. A full antenatal service package should include: VCT; maternal tetanus toxoid immunization; STD screening and treatment; iron and folate supplementation; malaria preventive intermittent treatment; tuberculosis treatment where appropriate; basic obstetric care; and information on HIV prevention, infant feeding, and family planning (Dabis et al, 2000a). Recognition of danger signs and planning for transport if obstetrical emergencies arise are also recommended.

Improving MCH services has direct and indirect benefits for *all* mothers. For example:

- Reducing the incidence and severity of malaria, tuberculosis, reproductive tract and other infections will improve an HIV-infected woman's chances of avoiding or delaying conditions that will compromise her health and survival.
- Improving antenatal care will improve birth outcomes such as still births, low birth weight, preterm births, and infant mortality, regardless of the HIV status of the mother (Liljestrand, 1999).
- Malnutrition and HIV infection are inextricably linked. Improving HIV-infected mothers' nutritional status may help to slow the progression of HIV disease and prolong survival (Piwoz and Preble, 2000; Fawzi et al, 1998; Semba, 1997).

Maternal child health (MCH) clinics are an excellent entry point for delivering HIV/AIDS prevention education. However, MCH clinics do not typically reach men, and therefore outreach to men and communities is extremely important so that MTCT prevention is not the burden of women alone.

For pregnant women who do not know their HIV status, and for those who know they are HIV-negative, using condoms and avoiding unsafe sexual behavior during pregnancy can prevent HIV infection (as well as other STDs). By doing this, a woman also avoids the high levels of the HIV virus that emerge in the acute phase immediately post-infection and that are particularly risky for MTCT during pregnancy and breastfeeding.

BOX 1: ACTIVITIES FOR COMPREHENSIVE MCH SERVICES

- Support health management systems and systematic assessments of the quality and reach of MCH services
- Provide specific training to health workers in MTCT-related areas such as safe delivery techniques, essential antenatal care, appropriate contraception for HIV-infected women, choice and support of infant feeding method (including techniques for safer breastfeeding), etc.
- Foster links between family planning counseling and HIV/AIDS education, counseling, and testing
- Support HIV/AIDS education in MCH clinics
- Provide necessary MCH-related pharmaceuticals, supplies, equipment, and nutritional supplements
- Promote functional drug logistics management
- Invest in new methods of short-term health worker training that emphasize knowledge and competency acquisition
- Involve partner and family in antenatal care

2. ***Voluntary (and confidential) counseling and testing (VCT)***

Recent studies have shown that VCT is a cost-effective intervention for reducing HIV-related risk behavior, particularly when it serves at-risk couples (The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000; Sweat et al, 2000).

VCT services are necessary for MTCT prevention in order to identify women (and families) who may benefit from MTCT interventions. In the absence of VCT services, most women in Africa have no definitive way to know their HIV status until they themselves fall ill with identifiable symptoms of AIDS, or until they give birth to a baby who is diagnosed with, and dies from, HIV/AIDS. As a result, most MTCT interventions are closed to them. Short-course ARV prophylaxis for the prevention of MTCT, for example, is only given to women with confirmed HIV infection. Infant feeding counseling is most effective when it can take into account the actual HIV status of the mother.

For women identified as HIV-positive before or during pregnancy, test-related counseling can help a woman plan for her future and the future of her family. Such counseling can also help the HIV-positive woman access interventions to avoid MTCT, take special steps to maintain her health, assure that she does not infect her sexual partner, be linked with support groups and services, and make informed choices about her sexual behavior and future childbearing (UNAIDS, 1999). For HIV-negative women, counseling can reinforce the importance of safe sexual behavior and provide other information and support to help her to remain uninfected.

The stigma associated with HIV infection is still considerable in Africa, leading to resistance on the part of many women—and men—to being tested and counseled. For women who *do* access VCT services and are found to be HIV-infected, communicating information about

their sero-status to their sexual partners is difficult. To help overcome this, counselors in Kenya and Tanzania provided a safe environment in which partners could discuss their HIV status and sexual behavior with a counselor (The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000).

Studies suggest that fear of violence (physical beatings) and break-ups of relationships among women who are found to be HIV-infected is not uncommon (Maman et al, 2001; Gaillard et al, 2000; The Voluntary HIV-1 Counseling and Testing Efficacy Study Group, 2000). Sensitive counseling, community education, and involvement of partners in the VCT process can reduce, but not eliminate, the potential for these negative outcomes.

VCT services can be offered through stand-alone, community-based testing centers or they may be made available at health centers as part of MCH, family planning, and youth-friendly health programs. Some advantages to women of offering VCT services in MCH or antenatal settings include the following:

- Making VCT a *routine* MCH service (offered to every MCH client) can help reduce the stigma associated with both VCT and HIV infection.
- VCT offered at MCH clinics may be more acceptable to women compared to walk-in centers that serve both men and women.
- VCT services based in antenatal clinics can reach a high percentage of pregnant women.
- When women come for repeat visits to antenatal clinics, they can be given answers to different HIV-related questions at various stages of the pregnancy.
- Offering VCT within the health center will help to integrate HIV/AIDS programs with other forms of health care, such as treatment of STDs and other infections, nutrition support, and family planning.
- For women who are found to be HIV-positive, providing VCT at the health center can help to ensure that they are referred for other MTCT interventions (ARV prophylaxis, infant feeding counseling). For women who are found to be HIV-negative, safe sexual behavior (or primary prevention of HIV) can be reinforced.

Regardless of the VCT setting, it is important that VCT services reach men, since a woman's partner's HIV status is a critical part of the family's decision-making framework. Regardless of the male partner's HIV status, involving him in the HIV test-related counseling can help ensure that he is supportive of his partner's dilemmas and choices related to HIV, infant feeding, family planning, etc.

Experience to date with VCT in MTCT pilot programs has resulted in some lessons learned in making VCT acceptable to women and optimizing its impact:

- Systems must be in place to ensure the confidentiality of VCT services and the community's confidence in this confidentiality must be built. In some cases, the physical counseling environment must be improved through renovation of health facilities.
- Men and communities must be sensitized about MTCT and the availability of the VCT services and other MTCT interventions in order to create demand for VCT.
- Health workers must be properly trained in MTCT and feel comfortable themselves with the MTCT program in order to guide women to these services.
- HIV-positive women and men greatly value the support received through counseling programs. As a result, when VCT is introduced an increased demand will exist for properly trained counselors to provide continuous care and support to these individuals. These may be trained peer counselors (e.g., women or men who are HIV-positive) or other health and social workers.
- Peer counselors can help HIV-infected women make difficult decisions about infant feeding, care, and their futures.
- Operations research is needed to identify approaches for reaching pregnant women through other types of VCT services and for ensuring their timely referral to health systems that can provide further MTCT interventions.
- In all settings where VCT is offered, programs should target their prevention messages to women and their partners who are tested and found to be HIV-*negative* as well as those found to be HIV-*positive*. This is especially important in the context of MTCT because newly infected women have a two-fold greater risk of transmitting the virus to their infants (because of the high viral loads experienced at this time).

To guide program managers and service providers in the establishment of high-quality VCT services, including curricula for counseling and operational considerations such as staffing, costs, and types of laboratory tests, UNAIDS has produced a comprehensive guide (UNAIDS, 1999).

BOX 2: ACTIVITIES FOR VCT PROGRAMS

- Provide in-service training of health workers in MTCT, principles of integrated MTCT risk reduction, VCT, and management of women found to be HIV-positive and HIV-negative
- Train peer and professional HIV counselors in MTCT prevention and improved VCT techniques
- Review pre-service training curricula to incorporate MTCT and VCT issues
- Provide space for confidential counseling
- Ensure adequate supervision of VCT services using quality assurance methods
- Provide HIV rapid test kits, gloves, antiseptics, syringes, needles, vacutainers, lancets, and other lab consumables
- Train laboratory technicians and fund laboratory quality assurance
- Promote VCT awareness, education, and support in the community
- Conduct formative research on acceptability, demand creation, and consequences of VCT
- Make family planning counseling and referral for services available at VCT centers
- Link VCT services to other support services in the community through referral partnerships

3. **Support for safe infant feeding**

The dilemma of HIV transmission through breastfeeding has made safe infant feeding one of the most complex and emotional aspects of MTCT prevention because breastfeeding is one of the most important child survival and early childhood development interventions (Preble and Piwoz, 1998). Breastfeeding has many health, nutrition, birth spacing, emotional, and psychosocial benefits.

Infant feeding counseling, long recognized as important for *all* mothers, has become even more important with the emergence of HIV. In Africa, although nearly all women breastfeed and the duration of breastfeeding is often greater than 24 months, breastfeeding patterns are rarely optimal. For example, only 31 percent of children in sub-Saharan Africa experience the benefits of *exclusive* breastfeeding (UNICEF, 2000). Also, the introduction of water and watery gruels, which occurs early, often in the first month of life, endangers infants (Haggerty and Rutstein, 1999).

Understanding attitudes and practices related to breastfeeding and perceptions and stigma associated with *not* breastfeeding are critical for the development of appropriate interventions to reduce postnatal transmission of HIV. Many African cultures have historically stigmatized women who do not breastfeed as “bad mothers.” The emergence of HIV in Africa has enhanced this stigma, as described recently in studies in Botswana (Rantona et al, 2000); Cote d’Ivoire (Desclaux et al, 2000); Zambia (Luo et al, 2000; Piwoz et al, 1999); and Zimbabwe (Gottlieb et al, 2000). This stigma may increase as efforts to test and counsel women about HIV and infant feeding are put into place.

Suggestions for reducing the stigma associated with changes in infant feeding practices among HIV-infected women include: a) educating the male partner, extended family, and community (since infant feeding decisions are rarely made by the mother alone); b) educating health workers to understand better the views of women and their families; and c) undertaking and applying the results of formative research on HIV and infant feeding attitudes and practices.

In environments where replacement feeding³ is acceptable, feasible, affordable, sustainable and safe, avoidance of all breastfeeding by HIV-positive women is recommended from birth (WHO, 2000b). Unfortunately, in Africa, the majority of women do not know their HIV status and the risks of significantly increased morbidity and mortality from unsafe feeding practices have been well documented (Latham and Preble, 2000; Victora et al, 1987; WHO Collaborative Study Team, 1999). Furthermore, the conditions for safe replacement feeding—clean water, sterilized utensils, and a steady supply of commercial or home-prepared formula for meeting all the infant's nutritional needs—are rarely present in most poor African communities (Humphrey and Iliff, 2001).

In light of these conditions, United Nations agencies' policy on infant feeding and HIV is one of informed choice. It states that programs should provide HIV-positive women with information and support to empower them to make fully-informed decisions about how to feed their babies (UNAIDS, WHO and UNICEF, 1997). All mothers who choose to breastfeed, including HIV-positive ones, should be encouraged and supported to breastfeed exclusively (WHO, 2000b).

In 1998, the United Nations agencies published guidelines for HIV and infant feeding that outline various feeding options for HIV-infected women (UNAIDS/UNICEF/WHO, 1998). These options included commercial infant formula, home-prepared infant formula, expressed and heat-treated breast milk, and early cessation of breastfeeding.⁴ These guidelines clearly state that all women should have access to information about MTCT. While guidance on optimal breastfeeding should be given to all mothers, information on specific replacement feeding options should be provided only for women who know they are HIV-infected and can decide which option works best for them and their families. This targeting of replacement feeding advice is needed to ensure confidentiality and also to minimize the erosion of optimal breastfeeding practices in the *general* population.

Finally, implementation of the International Code of Marketing of Breastmilk Substitutes (BMS) becomes even more important in the context of HIV and infant feeding. Apart from helping to minimize the erosion of optimal breastfeeding for the majority of infants who will benefit from it, Code implementation protects artificially fed infants. It ensures that the choice of replacement feeding is made on the basis of non-commercial information, and that all products are clearly labelled to ensure that they will be prepared and given safely. Some countries have developed their own national codes and these should be adhered to and enforced in all MTCT activities that may potentially involve BMS. Countries that have not implemented the Code at the national level should be encouraged to do so. In settings where governments do decide to make BMS available (free or at subsidized

³ Replacement feeding refers to the process of feeding a child who is not receiving any breastmilk from birth to about two years of age with a diet that provides all the nutrients the child needs.

⁴ This means the rapid transition from exclusive breastfeeding to exclusive replacement feeding in the first six months of an infant's life.

prices) for the infants of HIV-infected mothers, WHO, UNICEF, and UNAIDS recommend that this be done in a manner that: is sustainable; does not create dependency on supplies that are reliant upon donor generosity; does not undermine breastfeeding for the majority of infants who would benefit; does not promote BMS to the general public or through the health care system; and assures individual infants of sufficient quantities (for at least six months) (UNAIDS/UNICEF/WHO, 1998). Furthermore, programs must put into place measures to ensure that mothers and other caregivers who use these products have the skills and resources needed to safely prepare and feed them to their infants.

Several lessons have already been learned from MTCT programs about how to support safe infant feeding:

- United Nations guidelines on HIV and infant feeding should be adapted to local settings. Formative research is recommended to identify locally appropriate replacement feeding options as well as strategies for making breastfeeding and other feeding practices safer in the population.
- Whereas VCT pre-test counseling may be conducted in groups or individually, post-test counseling about infant feeding for HIV-infected women must be conducted individually to ensure confidentiality and to help women make the best decisions about how to care for and safely feed their babies.
- To help their clients make *truly* informed choices about infant feeding, health workers need adequate training to be able to understand and explain complex information about the relative risks of different feeding methods, including the increased transmission risk associated with breastfeeding and the increased mortality risk associated with replacement feeding.
- In many settings, the decision not to breastfeed comes with personal risks, including the stigma or suspicion of being infected with HIV, which sometimes carries grave social, emotional, and even physical consequences. Therefore, individual counseling must cover not only the risks of morbidity and mortality for the infant but also the potential consequences for the mother.
- Efforts to support breastfeeding and appropriate young child feeding practices must be strengthened, especially where MTCT prevention programs are being implemented so that health workers feel comfortable counseling *all* women and not only those who know their HIV status. This is required to minimize confusion about HIV and breastfeeding and to avoid the erosion of breastfeeding in the general population. Consistent with this recommendation, the United Nations guidelines state that breastfeeding should still be promoted, protected, and supported for all women who do not know their HIV status and for those who are not infected. Baby Friendly Hospital Initiatives and national programs should be supported and expanded.

- All women who choose to breastfeed, including those who are HIV-infected, should be counseled to breastfeed exclusively. Those women who are HIV-negative or of unknown status should practice safe sex to avoid becoming infected with HIV while breastfeeding. (As noted earlier, the risk of HIV transmission through breastfeeding is believed to double immediately following the mother's infection.)
- To the extent possible, messages about infant feeding for HIV-infected women should be harmonized with those for the general population. This may be done by reviewing existing infant feeding guidelines and recommendations and adapting them for HIV-positive mothers who are either breastfeeding or practicing replacement feeding. For example, recommendations on the duration of exclusive breastfeeding should be similar for all breastfeeding mothers, but specific guidelines for counseling HIV-positive mothers about continued risks of HIV transmission with mixed feeding and early breastfeeding cessation can be added. Likewise, recommendations about appropriate foods and feeding practices after 6 months should be consistent for all mothers, but additional advice for feeding babies who are no longer breastfed should be developed. As noted previously, formative research should be carried out to develop and harmonize locally appropriate infant feeding guidelines and messages.
- Programs need to monitor media coverage of MTCT, including infant feeding issues, to ensure that coverage is accurate and does not create confusion about appropriate feeding practices. While this issue holds for all MTCT interventions, it is especially true for infant feeding because breastfeeding can be seen as both life-saving and potentially dangerous to mother and baby.
- Countries may decide to purchase infant formula and provide it free or at subsidized cost to HIV-infected women who choose not to breastfeed. Considerable care is needed to ensure that this product is used exclusively (i.e., women who choose to use infant formula should not breastfeed as well) and appropriately. Labeling should be in local languages, individualized instruction about safe use should be provided and monitored, and adequate supplies must be made available for the entire period when the product will be used. If the distribution of free or subsidized formula is not closely monitored, the negative consequences for the health, development, and nutrition of infants may be considerable. The International Code of Marketing of BMS is a useful guide.
- National breastfeeding policies must be reviewed and updated to ensure that language is accurate with respect to HIV and breastfeeding and is respectful of a woman's right to choose how to feed her baby. Health workers and others will need to be sensitized about and trained in these new policies.
- The International Code of Marketing of BMS should be translated into national legislation with adequate enforcement mechanisms in place.

Although additional research is needed to identify ways to reduce postnatal transmission of HIV among breastfeeding women, there are many activities that can be undertaken now to improve African women's and families' ability to provide optimal feeding for their infants. Some of these activities are summarized in Box 3.

BOX 3: ACTIVITIES FOR SAFE INFANT FEEDING

- Review and update national breastfeeding and related infant feeding policies
- Review the status of the National Code for the Marketing of Breastmilk Substitutes and support efforts to enforce it
- Support and expand Baby Friendly Hospital Initiatives and ensure that all infant feeding training includes updated information on MTCT
- Conduct formative research to adapt United Nations guidelines on infant feeding and HIV to local settings, and to ascertain locally available replacement feeding options
- Adapt IMCI and other feeding guidelines to local settings, as needed
- Support training on counseling about HIV and infant feeding options (using or adapting the WHO/UNICEF/UNAIDS training package)
- Strengthen training in lactation management
- Strengthen efforts to promote and support exclusive breastfeeding to 6 months for all breastfeeding mothers, including mother-to-mother support in the first months of life
- Strengthen nutrition and health support for mothers, especially HIV-infected mothers during breastfeeding, and provide skills training for HIV-infected mothers who choose replacement feeding
- Explore ways to make replacement feeding safer for HIV-infected mothers, including clean water, food hygiene, and sanitation improvement
- Review and update pre-service training curricula for nurses, midwives, nutritionists, social workers, and all other medical/health personnel regarding MTCT issues and breastfeeding
- Strengthen growth monitoring and promotion programs for early identification of growth faltering
- Monitor breastfeeding/infant feeding trends in areas of high HIV-seroprevalence
- Monitor media reporting on HIV, MTCT, and breastfeeding issues and disseminate appropriate information

4. ***Optimal obstetric practices***

Countries with high rates of MTCT are also likely to have them superimposed on existing high rates of infant and maternal mortality. Countries in sub-Saharan Africa still have some of the highest maternal mortality rates in the world. A woman's lifetime risk of dying during pregnancy or childbirth is greater than one in 10 in countries such as Mozambique, Mali, Niger, Ethiopia, and Burundi, and one in 20 or greater in countries such as Nigeria, Kenya, Malawi, Ghana, and Zambia (Save the Children, 2000). Infants whose mothers die from delivery-related complications have a significantly lower chance of survival themselves. Thus, improving obstetric care has broader benefits than just preventing MTCT.

One effective way to support safer delivery in general is to manage and support labor in a way that will help to keep it "normal." This may be done by following simple steps, such as encouraging mothers to walk, to stay well nourished and hydrated, and to have a safe delivery plan and a contingency plan for referral. Partographs, which record the progress of

labor and mother-baby vital signs, should be utilized routinely. Referrals should be made on the basis of this monitoring in order to prevent prolonged labor. Family support should be encouraged during labor, for its psychosocial benefits and because this support may reduce the need for invasive procedures such as artificial rupture of membranes and instrumental delivery (Madi et al, 1999; Kennell et al, 1991).

MTCT during the intrapartum period is believed to be due to the infant's exposure to infected blood and other fluids from the mother. Thus, great care needs to be taken to avoid practices that may facilitate this exposure, such as artificial rupture of membranes and episiotomy in cases where there is no obstetrical indication. These safer practices should be introduced as a routine part of the management of labor for *all* women in high HIV seroprevalence areas (WHO, 1999). However, these practices may be inconsistent with the training and practices of some African obstetricians and midwives, who may still be encouraging bed-rest rather than walking in labor, artificial rupture of membranes to hasten labor, and routine episiotomy for all primagravidas.

Handling of the newborn infant in the first hours after delivery should include thorough drying to minimize heat loss as well as to remove any remaining maternal blood and amniotic fluid. It is not necessary to bathe the baby before giving him or her to the mother, and skin-to-skin bonding should be encouraged regardless of whether a mother has chosen to breastfeed or not. Vigorous suctioning of the infant's mouth and pharynx right after delivery may risk creating trauma to the mucus membranes and should be avoided unless absolutely necessary. Umbilical cord cutting and care should be handled in a way that minimizes the infant's and the health provider's exposure to blood.

Provision of appropriate decontamination and antiseptic solutions, gloves, syringes, and other sterile equipment can help minimize risk of delivery-related HIV transmission, as well as the risk of occupational exposure—that is, health providers becoming HIV-infected through contact with HIV-infected clients' blood.

Although elective Cesarean section delivery does contribute to the prevention of MTCT in industrialized countries, the cost and lack of surgical facilities preclude this form of delivery for most women in resource-poor settings in Africa. In addition, Cesarean section delivery poses risks of complications of major abdominal surgery such as infection, hemorrhage, organ injury, and anesthesia complications.

Regarding other new interventions, disinfection of the birth canal during labor and delivery has been studied as a way to reduce MTCT, but results to date have not been encouraging (in mothers who had ruptured membranes for less than four hours) (Biggar et al, 1996). However, this practice may help to reduce neonatal and puerperal sepsis, irrespective of HIV status (Taha et al, 1997), and continued research on this and other obstetric practices is required.

In-service and pre-service training curricula in use currently should be reviewed for their appropriateness in the face of HIV and MTCT, and revised as needed. Life-saving skills training for midwives offers an ideal time to update practices that are detrimental to all mothers and can put them at greater risk for MTCT to their infants. Policies related to

routine, but non-essential, delivery procedures that may unnecessarily increase infant contact with maternal blood should be reviewed and revised.

Safe motherhood and reproductive health programs are advised to implement steps to reduce the risk of MTCT during delivery. The list below includes steps that programs can take to reduce MTCT through improved obstetric practices.

BOX 4: ACTIVITIES FOR OPTIMAL OBSTETRIC PRACTICES

- Train health workers in safe delivery techniques and life-saving skills for mothers and infants
- Provide safe delivery kits and essential obstetric drugs
- Provide a safe delivery infrastructure with a water source, good drainage, electricity, delivery beds covered with a waterproof material, antiseptics, gloves, and other materials required for a hygienic delivery environment
- Ensure a safe blood supply
- Provide community education about the importance of antenatal care and deliveries assisted by MTCT-trained attendants
- Review and update pre-service obstetrical curricula for appropriateness in the face of HIV and MTCT
- Review and update Safe Motherhood programs and policies for attention to HIV and MTCT
- Improve the capacity of health systems and providers to monitor and supervise obstetrical services and practices
- Monitor the status of research on innovative obstetrical practices that might reduce MTCT and update policies and programs as needed

5. Short-course antiretroviral (ARV) prophylaxis

It is important to differentiate between *long-term* ARV drug therapy used for *treating* HIV-infected adults and children, and *short-course* ARV drugs used for *preventing* MTCT. ARV drugs used for long-term treatment are, at present, prohibitively expensive for most people living with HIV/AIDS in Africa. These drugs may produce side effects with long-term use and they require frequent monitoring for toxicity and resistance. Most health systems in Africa do not yet have the systems and structures in place to ensure that these drugs are used safely to control HIV infection, although there are several new initiatives to improve drug access and safe use.

ARV drugs used for the prevention of MTCT, on the other hand, are much simpler to administer and are less costly because they are given in a small dose for a short duration. Several short-course ARV prophylaxis protocols have been proven efficacious and safe among breastfeeding, as well as non-breastfeeding, women (UNAIDS/WHO, 2000). A description of various protocols is found in **Annex F**.

The most common short-course ARV protocols are: a) administration of zidovudine (ZDV) to women from 36 weeks gestation through labor and delivery, with additional prophylactic ZDV to the mother after birth in some regimens; b) administration of ZDV and lamivudine

(3TC) to mother and baby during the antenatal, intrapartum, and postpartum periods; and c) administration of nevirapine (NVP) during labor and to the infant within 72 hours of birth.

Although their costs and complexity vary, each of these protocols has been shown to be safe and effective, reducing late pregnancy, delivery, and early postnatal HIV transmission by 40 to 50 percent (to between 7 and 14 percent MTCT by four to six weeks.)⁵ These drugs do not prevent late postnatal HIV transmission through breastfeeding, however, and an additional 8 to 10 percent of breastfeeding mothers receiving short-course ARVs will transmit HIV to their infant by 18 to 24 months (Wiktor et al, 2000; Gray, 2000; Owor et al, 2000).

The choice of an ARV regimen for use in a given setting must take into account feasibility, efficacy, and cost. Specific considerations include the proportion of women attending antenatal care; the timing and frequency of their antenatal visits; the availability and acceptability of antenatal VCT; the ability of ANC services to deliver the drugs to women; and the acceptability of ARV prophylaxis among infected women and families (WHO, 2000c).

Nevirapine is increasingly the ARV of choice for prevention of MTCT due to its comparatively low cost (approximately US\$4 for a mother/child pair) and ease of administration (single dose for mother and newborn). Recent offers by manufacturers to provide nevirapine (Viramune) free for developing countries for a limited period of time may ease the cost burden temporarily, once various operational issues are resolved. It is important to emphasize, however, that the cost of the drugs is only a part of the total cost of ARV use, and other program components, including VCT, infant feeding counseling, and monitoring and evaluation, must be supported as well.

BOX 5: ACTIVITIES FOR SHORT-COURSE ANTIRETROVIRAL PROPHYLAXIS

- Explore means to safeguard access to essential drugs
- Encourage inter-country bulk purchase of drugs and removal of import duties
- Support global efforts to negotiate reduced costs of the drugs and foster partnerships among organizations to purchase drugs collectively at lower cost
- Prepare essential drug programs to include short-course ARV drugs for prevention of MTCT and longer-course ARV drugs for treatment of AIDS
- Promote the local approval and licensing of MTCT prevention drugs and provide technical assistance, where needed
- Strengthen the MCH infrastructure to use the drugs when and if they do become available
- Conduct policy reviews and/or development related to ARV use for MTCT
- Develop and establish guidelines for enforcing legislation and policies related to ARVs
- Support supply and logistics aspects for management of ARV drug supplies
- Support training and other capacity development related to the use of ARVs for MTCT
- Support community mobilization efforts to increase acceptance of ARV prophylaxis for MTCT
- Conduct operations research in settings where ARVs are being used

⁵ However, these trials did not take into account whether or not study subjects were practicing exclusive breastfeeding vs. feeding the baby water or other fluids in addition to breastmilk.

6. ***Family planning counseling and services***

The increased infant and child mortality caused by HIV/AIDS has not reduced the unmet need for family planning services, which remains high in Africa, both for spacing and limiting the number of children. Rather, the rapid and extensive spread of HIV in Africa and the problem of MTCT have made the provision of family planning counseling and voluntary, safe, and effective methods of contraception even *more* critical. Despite an increasing demand for modern contraceptive methods and a desire for smaller families, the current average contraceptive prevalence rate for sub-Saharan Africa (regardless of HIV status) is only 17 percent (UNICEF, 2000).

Condoms have long been promoted to protect against STDs (including HIV), but they have not historically been thought to be the most effective contraceptive for preventing unwanted pregnancy. Other contraceptives are often indicated for family spacing and family size limitation (referred to as “the dual method approach”).

Making available safe and effective contraception and high-quality reproductive health counseling can help a woman practice safer sex, determine her future childbearing patterns on a more responsible and informed basis, and potentially reduce the numbers of HIV-infected births. Women who learn that they are HIV-infected may have a strong desire to avoid bearing additional children who may be born HIV-infected and will become orphaned at an early age. HIV-infected mothers who opt not to breastfeed miss the birth-spacing effect of lactational amenorrhea and have their own special needs for contraception to space or limit future births. Women also need to understand that since the risk of MTCT increases as the mother’s own infection progresses, the risk of MTCT may grow with subsequent pregnancies (UNAIDS, 1999).

Availability of effective interventions to prevent MTCT may affect the choices presented to an HIV-positive mother as well as her future reproductive decisions. VCT services provide an excellent opportunity to offer family planning counseling and referral while informing HIV-infected women and couples about the MTCT risks inherent in current and future pregnancies.

BOX 6: ACTIVITIES FOR FAMILY PLANNING COUNSELING AND SERVICES

- Train family planning workers in HIV/AIDS (and MTCT) and contraceptive issues related to HIV infection
- Establish referral links between VCT and family planning counseling services
- Promote the use of barrier methods for prevention of HIV and other STDs
- Diagnose and treat STDs (since they contribute to HIV transmission)
- Provide additional contraceptives, if necessary
- Conduct formative research on reproductive choice and decision-making in relation to HIV infection
- Strengthen family planning counseling and service provision in antenatal and postpartum services
- Promote voluntary family planning as an effective MTCT intervention for HIV-infected women
- Improve obstetric practices through Safe Motherhood programs

C. Primary prevention

Strengthening and scaling-up primary prevention of HIV/AIDS to keep men and women of reproductive age from becoming HIV-infected themselves must be a priority strategy for preventing MTCT worldwide. Primary prevention efforts have shown success in stabilizing or reducing HIV infection rates in countries such as Senegal, Uganda, and Thailand, where they were introduced early in the epidemic and there was strong political commitment, funding, and broad coverage. Considerably more is known now about lessons learned and best practices related to achieving primary prevention than in the early years of the epidemic.

Primary prevention at the community level traditionally relies on three major components and MTCT can become a part of each effort:

- **Promotion and provision of free, subsidized, and/or commercially marketed condoms.** Condoms are effective against HIV transmission when used correctly and consistently, but this is not always understood or accepted by people at risk. Condoms are not always available at high-risk sites such as brothels. Hence both promotion and provision are important. Programs to promote condom use for HIV prevention should emphasize their role in prevention of MTCT as well as prevention of HIV in sexually-active adults.
- **Behavior change communication (BCC) efforts.** BCC aims to reduce behaviors that place individuals at risk of becoming HIV-infected or spreading the virus to uninfected partners by providing accurate information about individual risks, modes of transmission of HIV, and effective means to avoid transmission. It also seeks to motivate individuals to use this information consistently and appropriately. BCC programs need to include information about MTCT in their strategies. These messages should include information about risks of MTCT during pregnancy, delivery, and through breastfeeding, and encouragement to see a VCT counselor or health provider for more information on how to prevent HIV/AIDS among infants and young children.
- **Prevention, diagnosis, and treatment of STDs.** STD prevention and treatment programs are important because the presence of untreated STDs is now known to increase the risk of transmitting and acquiring HIV. Men and women who are at risk or have contracted an STD are sexually active and therefore appropriate target audiences for information on MTCT risks and prevention. STD services should include information on the risk of MTCT, modes of transmission, and encouragement to see a VCT counselor or health provider for more information on how to prevent HIV/AIDS among infants and young children.

In addition to the three components described above, MTCT messages should be integrated into all HIV/AIDS education including life-skills curricula, adolescent outreach programs, programs to reach men, and school- and faith-based AIDS education programs.

BOX 7: ACTIVITIES FOR PRIMARY PREVENTION

- Develop social marketing programs for condoms and provide free, subsidized, and/or commercially-marketed condoms
- Promote condom quality assurance
- Provide training and technical assistance in BCC best practices
- Use BCC for primary prevention, including messages and materials development that target pregnant women and couples
- Identify and promote effective sexual negotiation skills
- Support printing, radio, or TV program development and air time
- Provide training in STD prevention, diagnosis, and treatment
- Provide STD treatment drugs
- Develop STD syndromic management guidelines
- Secure funding for surveys of community knowledge, attitudes, and practices related to HIV/AIDS
- Conduct activities to promote political will and support by community leaders
- Implement educational and outreach efforts aimed at community members, especially related to MTCT
- Support community-based VCT services

D. Postnatal HIV care and support

HIV care and social support for mothers and children affected by HIV/AIDS is clearly indicated for humanitarian reasons. However, there are also important links between care and support and MTCT prevention (see Section II.A). For example, without some assurance of adequate care, mothers may be less likely to accept VCT, and therefore would not be identified as eligible to receive additional MTCT prevention interventions.

Postnatal services may be ideal places to deliver two of the core MTCT interventions discussed previously: infant feeding support (see Section II.B.3) and family planning (see Section II.B.6).

Postnatal support for the infant feeding method of choice is essential to: a) help the mother overcome any difficulties she is having with her feeding choice; b) ensure that the chosen method is practiced safely and effectively to minimize MTCT through breastfeeding; and c) ensure that the health and nutritional benefits of her method of choice are achieved.

Reports from clinical trials and pilot programs in several African countries that have included donated free formula are suggesting that the majority of mothers are still choosing to breastfeed. Thus support for optimal and exclusive breastfeeding in the early postpartum period is more crucial than ever for all mothers. Recent studies have shown that home visits by community volunteers can increase the length of exclusive breastfeeding significantly (Haider et al, 2000; Morrow et al, 1999) and peer counseling and mother-to-mother support needs to be fostered.

For the mother, postnatal care can help preserve her own health and link her with health and social care and support services for herself and her family. Simple palliative care can ease fatigue, fever, and skin problems (UNAIDS, 2000c). Since many maternal deaths occur in the postpartum period, good postnatal care can help to ensure the survival of mothers, which is critical to the survival of their infants.

Regarding postnatal nutritional support, preliminary analysis of data from Kenya suggests that HIV-positive women who breastfeed may be at greater risk of weight loss and postpartum mortality than HIV-infected women who do not breastfeed (Nduati et al, 2000). While this finding requires further examination, it strongly suggests that programs to prevent MTCT should also provide nutrition and health support to HIV-infected women in the postpartum period, particularly those women who are breastfeeding their infants.

For the infant, early diagnosis of HIV in the infant (through laboratory tests or clinical algorithms) is critical. Interventions that can be offered postnatally in resource-poor settings to reduce morbidity and mortality related to pediatric HIV infection are discussed above in section I.D.

For both adults and children, malnutrition and HIV/AIDS are inextricably linked. Practical guidelines for the nutritional management of persons living with HIV/AIDS in Africa are now available (Piwoz and Preble, 2000). Such nutritional support may improve the quality of life of people living with HIV/AIDS when offered through postnatal and home-based care. Increasingly, direct food aid for needy families affected by HIV/AIDS is also being recommended.

BOX 8: ACTIVITIES FOR POSTNATAL HIV CARE AND SUPPORT

- Support postpartum family planning counseling as well as contraceptives
- Provide simple treatment drugs for complications of HIV and other routine health problems in mothers and infants
- Integrate pediatric HIV/AIDS diagnosis and care into IMCI curricula and training programs
- Train health workers in basic elements of palliative care
- Train health workers to support women to practice safely their infant feeding method of choice
- Protect and support optimal breastfeeding for mothers who choose to breastfeed
- Provide lab tests for diagnosis of HIV infection in infants
- Provide vaccines for immunization programs, micronutrient supplements, and training for nutritional management
- Assist women in accessing adequate protein, calories, and micronutrients to maintain their own health while breastfeeding
- Improve nutrition counseling and support (that may help slow disease progression and minimize opportunistic infections in HIV-infected mothers and children)

Social support, as well as health care, is also indicated for mothers and infants affected by HIV/AIDS. Many African children now live in communities where the AIDS epidemic has severely weakened the economic base and the social fabric through illness, death, and related losses in productivity. Some children have family members living with HIV/AIDS, causing psychological stress and economic hardship. Others have already lost their mother and/or father to the disease, making them orphans in an environment of limited social support. Even in settings where intensive MTCT prevention packages are introduced, and the total number of HIV-infected children is reduced, there will still be HIV-positive children born and orphans needing care and support, since none of the MTCT interventions are 100 percent effective.

A number of models of care, lessons learned, and best practices are now available that deal with care for those who are ill, improving nutrition, helping acquire basic medications, reducing stigma and psychological distress, keeping children in school, protecting children's legal rights, and compensating for lost adult labor and income (Williamson, 2000b). Despite these models, most agencies and donors have reached only a small fraction of vulnerable African children who suffer directly or indirectly from HIV/AIDS (Williamson, 2000a).

As noted earlier, for care and support services to be put to maximum use, referral links between VCT services and these services need to be established.

BOX 9: ACTIVITIES FOR SOCIAL SUPPORT

- Document and disseminate best practices in care and support
- Provide training and supplies for home-based care
- Provide supplies for community gardens and other agricultural programs
- Provide training in community-level economic development strategies (such as microfinance services)
- Foster community-based support for AIDS orphans
- Support projects to protect legal rights of persons living with HIV/AIDS
- Incorporate MTCT prevention education into vocational training, agricultural extension, school feeding, and other relevant programs reaching men and women in groups or in educational settings
- Link households affected with HIV/AIDS, which are participating in microfinance and other income generating programs, with MTCT services
- Target all lactating women for additional food intake

III. OPERATIONAL ISSUES

A. Assessing the situation

No pre-defined blueprint exists for introducing or scaling-up MTCT interventions within existing programs. Rather, countries must assess the situation to identify the starting points and the necessary actions at all levels. Below is a list of important issues to be assessed.

Epidemiologic

- The stage of the HIV/AIDS epidemic (the degree to which the epidemic has moved from initial high risk groups to the general population of women of reproductive age)
- The extent of the problem (the age and gender-specific infection rates; the overall number and proportion of HIV infections in infants; and the effect of MTCT on infant and child mortality)

Political

- Government political will and commitment to preventing MTCT
- The appropriateness of government and health system policies related to HIV/AIDS and MTCT and the degree to which these are monitoring and enforced
- The level of funding available for MTCT and supporting interventions
- Supportive laws and policies to protect HIV-infected persons from discrimination

Health and related systems

- The status of existing HIV and MTCT prevention activities
- The quality of health services and the health system's readiness to deliver MTCT interventions (including human resources/capacity, infrastructure, etc.)
- Existing health worker training through pre-service and in-service channels
- The availability, possible entry points, and existing or potential demand for voluntary and confidential testing and counseling for HIV
- Drug licensing and policies, supply, and logistics systems (for all essential MCH drugs, ARVs, and other drugs for HIV-affected women and children)
- Availability of ARV for prevention of MTCT and pilot experience with MTCT programs

- HIV test kit availability and quality-control for VCT
- Infant feeding policies and laws related to the marketing of breast milk substitutes
- Level of implementation of the Baby Friendly Hospital Initiative (BFHI)
- Availability, quality, and reach of family planning services
- Availability of safe water, hygiene and sanitation, and replacement feeding options

Community and family

- Community awareness, knowledge, and attitudes about HIV, MTCT, and VCT (perception of the problem, presence of stigma, attitudes about learning one's status, etc.)
- Male involvement in HIV prevention and MTCT programs and in care of children
- The existence of support groups and other services for people with HIV/AIDS

Health-related practices

- Attitudes toward family planning and family planning acceptance rates
- Common obstetrical practices by traditional birth attendants, midwives, obstetricians, etc.
- Prevalent infant feeding attitudes and practices.

B. Planning through dialogue

As with other development programs, it is essential to understand MTCT from the perspective of the community before designing large-scale MTCT prevention programs. In addition to conducting the general situation assessment, it is essential to conduct formative research to plan different activities, such as placing and promoting VCT services, developing strategies for enhancing the acceptability of ARVs, developing messages and materials for infant feeding counseling, and deciding on the types of training needed for health and lay workers involved in MTCT activities (Nyblade and Field, 2000; NFNC et al, 1999). Target groups for such studies include health workers, traditional birth attendants, women and their partners, community leaders, and other influential community members. Some tools for conducting formative research for MTCT components, such as VCT and infant feeding, already exist (SARA et al, 1999).

Training of health and community-based organization workers with regard to MTCT is likely to be a major component of all MTCT programs. Basic information on MTCT is lacking in most countries, creating confusion and misinformation on the ground.

During the planning and implementation stages of MTCT prevention programs, national (and district level) MTCT working groups are useful to coordinate and make technical decisions about various aspects of MTCT interventions. These groups can also advocate MTCT prevention and move the agenda forward.

C. Monitoring and evaluation

Since MTCT prevention is a relatively new area, operations research and careful monitoring and evaluation will be necessary to understand the costs, effectiveness, acceptability, and other characteristics of various packages of interventions, and to develop strong, evidence-based programming for MTCT prevention programs and policies in the future.

Four program indicators have already been recommended for use by National AIDS Control Programs to measure MTCT service provision (UNAIDS, 2000d; USAID, 2000). By necessity, these indicators measure service delivery rather than impact, due to the high cost and methodological complications of conducting HIV surveillance to assess changes in actual rates of vertical transmission. Additional indicators to monitor *all* the core MTCT interventions described in this paper, including antenatal service provision, intrapartum practices, family planning counseling as part of VCT, and infant feeding choices and patterns, should be developed and put into practice immediately.

The existing indicators are:

- *The percent of pregnant women who were counseled during antenatal care for their most recent pregnancy, accepted VCT, and received test results.* This broad measure of service provision recognizes the importance of knowing one's HIV status in order to access MTCT prevention interventions. Data are collected through general population surveys.
- *The proportion of public antenatal clinics that offer VCT services (by trained staff) or that refer clients for VCT services.* This indicates the extent to which the national program is able to scale up interventions that are often begun on a pilot basis. This indicator is measured through health facility surveys.
- *The percent of post-test counseling sessions (for women attending antenatal clinics) offering counseling and VCT that meet international standards for quality counseling.* This indicator is based on observation of post-test counseling sessions and is undertaken through health facility surveys.
- *The percent of women testing HIV-positive at selected antenatal clinics in the last year who are provided with a complete course of ARV therapy to prevent MTCT, according to national/international guidelines.* This is measured through reviews of client records and records of HIV test results. This percentage is likely to be extremely low in many countries because VCT services are currently scarce and ARV prophylaxis is still limited.

In addition to improving the coverage and range of services offered, improving the *quality* of service delivery is also critical. This applies to all aspects of MTCT care, including staff training, supervision, staff motivation, etc. Not only can attention to quality assurance/quality improvement facilitate the effective integration of MTCT prevention components, it will benefit the health of mothers and children overall.

D. Policy issues

The unique attributes and severity of the HIV/AIDS pandemic, as well as the variety of creative scientific and behavioral interventions available to address it, have challenged governments and organizations to review a range of existing policies and develop new policies in formerly unforeseen areas. MTCT policy dialogue can no longer be undertaken only at the level of scientists and national government, but requires the education and participation of communities, including people living with HIV/AIDS.

Primary prevention programs and, now, MTCT programs, must confront policy decisions related to the explicitness and reach of AIDS prevention messages of a highly personal and sexual nature, especially for young people. VCT programs, as noted previously, require specific policies to preserve and protect clients' confidentiality. The dilemma of HIV transmission through breastfeeding has required countries to review their national and local infant feeding guidelines and to assess policies related to the acquisition, marketing, and use of infant formula.

Regarding infant feeding, few countries in Africa have introduced the International Code of Marketing of Breastmilk Substitutes and other relevant World Health Assembly (WHA) resolutions into their national legislation. In addition, the Code is often poorly enforced and frequently misunderstood to oppose *all* BMS provision.

Regarding ARV, as MCH services begin to offer short-course ARV prophylaxis, they require new policies to ensure the safe and effective use of the drugs and to safeguard against improper drug distribution. New policies for health worker training and supervision are also needed.

IV. CONCLUSIONS AND RECOMMENDATIONS

The HIV/AIDS epidemic, and especially MTCT of HIV, is having a disastrous impact on infant and child morbidity and mortality in Africa, undermining child health and child survival successes experienced in the past decade. Knowledge about the natural history of MTCT is increasing, however, and several low-cost, effective MTCT prevention interventions are now available.

Government, nongovernmental, and international organizations urgently need to initiate support for MTCT prevention programs to slow the alarming increase in pediatric AIDS in Africa. The following actions are recommended to meet this challenge. African governments and interested stakeholders and partners must:

- Review existing programs for potential entry points for effective HIV/AIDS and MTCT prevention programming
- Engage in discussions with all stakeholders and partners to develop national strategies for MTCT prevention
- Increase support for primary prevention of HIV/AIDS (through condom promotion and provision, behavior change communication, and prevention and treatment of STDs)
- Identify opportunities to support MTCT interventions including VCT and related behavior change communications, improved antenatal and obstetric practices, infant feeding counseling and support, and short-course ARV use
- Support operational research in MTCT prevention
- Support improvement of the MCH infrastructure, which is a prerequisite to offering some of the core MTCT prevention interventions mentioned above
- Support activities for families and communities affected by HIV/AIDS
- Periodically review MTCT prevention packages for continuing relevance and appropriateness, given the rapid changes in behavioral, biological, and pharmaceutical knowledge and advances.

Governments and donors today must recognize that MTCT prevention requires more than provision of drugs and commodities. Systems must be strengthened and communities must be prepared for these programs. Therefore, commitment to providing the range of core MTCT interventions described in this paper is required to measurably reduce the incidence of maternal and pediatric HIV/AIDS in sub-Saharan Africa today.

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ANNEX A : HIV/AIDS IN WOMEN IN SUB-SAHARAN AFRICA

COUNTRY	EST. # OF WO. 15-49 LIVING WITH HIV/AIDS (END-1999)	HIV PREVELANCE RATE			
		Wo. aged 15-24		Wo. in ANC clinics in major urb. areas*	Wo. in ANC clinics outside major urb. areas*
		Low Est.	High Est.		
Angola	82,000	2.58	2.86	1.2	8.5
Benin	37,000	1.58	2.91	3.7	1.5
Botswana	150,000	32.55	36.07	43.0	30.0
Burkina Faso	180,000	4.07	7.51	7.4	4.3
Burundi	190,000	9.86	13.34	18.6	19.7
Cameroon	290,000	6.61	8.94	5.5	9.2
Cent. Af. Republic	130,000	11.96	16.18	12.8	12.2
Chad	49,000	2.55	3.51	6.2	4.7
Comoros	N/A	N/A	N/A	0	N/A
Congo	45,000	5.49	7.43	5.2	4
Cote d'Ivoire	400,000	6.68	12.33	10.6	10
Dem. Rep. of Congo	600,000	4.31	5.84	4.1	8.5
Djibouti	19,000	11.70	16.13	2.9	N/A
Equatorial Guinea	560	0.46	0.63	0.7	0.3
Eritrea	N/A	N/A	N/A	N/A	3
Ethiopia	1,600,000	9.98	13.75	17.6	9.2
Gabon	12,000	4.01	5.42	4.0	1.2
Gambia	6,600	1.52	2.82	1.0	2.4
Ghana	180,000	2.40	4.44	3.4	3.4
Guinea	29,000	1.01	1.86	1.5	1.4
Guinea-Bissau	7,300	1.74	3.22	2.7	N/A
Kenya	1,100,000	11.07	14.98	15.2	12.7
Lesotho	130,000	23.94	28.85	31.3	27.1
Liberia	21,000	1.51	2.78	4.0	10.1
Madagascar	5,800	0.12	0.14	0.0	0
Malawi	420,000	14.48	16.04	26.0	18.2
Mali	53,000	1.74	2.40	2.7	2.9
Mauritania	3,500	0.50	0.69	0.5	0
Mauritius	N/A	0.04	0.05	0	N/A
Mozambique	630,000	13.36	16.11	11.2	17.0
Namibia	85,000	18.78	20.82	25.9	15.0
Niger	34,000	1.26	1.73	1.3	4.7
Nigeria	1,400,000	4.35	5.89	4.5	4.9
Reunion	N/A	N/A	N/A	N/A	N/A
Rwanda	210,000	9.04	12.23	19	7.5
Senegal	40,000	1.12	2.07	0.5	0.5
Sierra Leone	36,000	2.05	3.79	2	N/A
Somalia	N/A	N/A	N/A	0	2.0
South Africa	2,300,000	22.51	27.13	19.2	21.3
Swaziland	67,000	25.88	31.19	30.3	31.5
Togo	66,000	3.89	7.18	6.8	4.6
Uganda	420,000	6.65	8.99	13.8	7.7
U. Rep. of Tanzania	670,000	6.85	9.27	13.7	18.6
Zambia	450,000	16.86	18.68	27	13.9
Zimbabwe	800,000	23.25	25.76	29.7	30.0
TOTAL	12,900,000	—	—	—	—

* = median

Source: Adapted from UNAIDS. *Report on the global HIV/AIDS epidemic*. Geneva. June, 2000.

ANNEX B: HIV/AIDS IN CHILDREN IN SUB-SAHARAN AFRICA

COUNTRY	EST. # CHILDREN (0-14) LIVING WITH HIV/AIDS (END-1999)	EST. # DEATHS IN CHILDREN (0-14) 1999	
		Low Estimate	High Estimate
Angola	7,900	2,400	4,400
Benin	3,000	1,000	1,600
Botswana	10,000	3,700	5,100
Burkina Faso	20,000	6,000	12,000
Burundi	19,000	3,000	18,000
Cameroon	22,000	7,000	16,000
Central African Republic	8,900	3,000	5,500
Chad	4,000	1,100	2,300
Comoros	...	...	...
Congo	4,000	870	2,600
Cote d'Ivoire	32,000	10,000	15,000
Dem. Republic of Congo	53,000	10,000	25,000
Djibouti	1,500	430	920
Equatorial Guinea	<100	<100	<100
Eritrea	...	...	...
Ethiopia	150,000	35,000	91,000
Gabon	780	220	460
Gambia	520	140	300
Ghana	14,000	2,600	7,700
Guinea	2,700	830	1,500
Guinea-Bissau	560	150	330
Kenya	78,000	27,000	41,000
Lesotho	8,200	2,300	4,900
Liberia	2,000	540	1,200
Madagascar	450	150	240
Malawi	40,000	12,000	22,000
Mali	5,000	1,400	3,000
Mauritania	260	<100	160
Mauritius	...	...	...
Mozambique	52,000	11,000	32,000
Namibia	6,600	2,300	3,500
Niger	3,300	920	2,000
Nigeria	120,000	41,000	64,000
Reunion	...	...	...
Rwanda	22,000	3,900	18,000
Senegal	3,300	1,100	1,700
Sierra Leone	3,300	910	2,000
Somalia	...	...	...
South Africa	95,000	36,000	74,000
Swaziland	3,800	1,300	2,000
Togo	6,300	2,100	3,300
Uganda	53,000	18,000	32,000
United Rep. of Tanzania	59,000	20,000	30,000
Zambia	40,000	14,000	24,000
Zimbabwe	56,000	19,000	38,000
TOTAL	1,000,000	300,000	610,000

Source: Adapted from UNAIDS. *Report on the global HIV/AIDS epidemic*. Geneva. June, 2000.

ANNEX C: INFANT AND CHILD MORTALITY RATES WITH AND WITHOUT AIDS IN SUB-SAHARAN AFRICAN COUNTRIES (1998 AND 2010)

COUNTRY	1998				2010			
	IMR		CMR		IMR		CMR	
	WITH AIDS	WITHOUT AIDS	WITH AIDS	WITHOUT AIDS	WITH AIDS	WITHOUT AIDS	WITH AIDS	WITHOUT AIDS
Botswana	59.3	36.4	121.1	57.4	55.2	26.3	119.5	38.3
Burkina Faso	109.2	101.1	179.1	156.5	86.6	73.7	144.7	108.7
Burundi	101.2	92.1	157.1	131.0	79.6	66.3	128.6	90.9
Cameroon	76.9	70.7	128.1	109.6	63.8	52.9	108.3	78.0
Central African Republic	105.7	97.7	162.6	140.2	79.8	71.6	122.7	99.1
Congo (Brazzaville)	102.7	94.0	166.3	142.5	77.5	67.3	125.9	97.1
Congo (Kinshasa)	101.6	97.1	152.7	139.3	77.0	70.4	116.2	97.3
Cote d'Ivoire	95.9	86.7	149.2	122.7	74.8	61.8	120.9	84.2
Ethiopia	125.7	115.4	197.6	169.2	112.4	95.4	183.4	136.7
Kenya	59.4	44.7	107.0	64.9	53.9	32.9	105.2	45.4
Lesotho	78.3	71.2	120.2	98.3	71.1	52.8	121.9	70.7
Malawi	133.8	117.9	231.6	190.3	113.1	88.4	202.6	136.0
Namibia	66.8	44.0	125.5	62.1	57.2	28.3	118.8	37.5
Nigeria	70.7	65.9	139.0	124.4	57.4	41.4	112.7	68.2
Rwanda	113.3	101.3	181.9	148.5	97.1	74.7	166.4	105.5
South Africa	52.0	43.3	95.5	69.7	50.7	32.3	99.5	48.5
Swaziland	103.4	83.8	168.1	114.4	85.3	58.6	152.2	77.5
Tanzania	96.9	89.2	160.1	137.8	77.8	65.2	131.3	95.8
Uganda	92.9	81.3	164.5	132.9	68.8	58.5	120.6	92.2
Zambia	92.6	72.0	181.2	125.7	81.7	58.4	160.7	96.9
Zimbabwe	61.8	35.9	123.4	50.5	53.7	24.0	115.6	31.8

Source: Adapted from Bureau of the Census. 1999. *HIV/AIDS in the developing world*. Report WP/98-2. Washington, DC: U.S. Government Printing Office.

Infant mortality rate (IMR): The number of deaths of infants under 1 year of age from a cohort of 1,000 live births.

Child mortality rate (CMR): The number of deaths of children under 5 years of age from a cohort of 1,000 live births.

ANNEX D: SUGGESTED READING LIST FOR MOTHER-TO-CHILD TRANSMISSION (MTCT) PREVENTION

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ANNEX E: CHARACTERISTICS OF CORE MTCT PREVENTION INTERVENTIONS

INTERVENTION	PROBABLE IMPACT ON PREVENTION OF MTCT	RELATED RISKS	PROBABLE FEASIBILITY	OTHER RELATED BENEFITS
Improving comprehensive MCH services	Essential for delivering effective MTCT prevention interventions	No risks assuming services are delivered appropriately	Feasibility depends on how extensive the necessary improvements are	Significant reduction of maternal and child morbidity and mortality
VCT	High if combined with all other interventions	Consequences of possible violations of confidentiality; psychological stress & stigma or violence against HIV+ women	The relative high cost (for training, staffing, supervision, lab support, etc.) diminishes feasibility	Enables early treatment, facilitates planning for future, promotes primary prevention
Support for safe infant feeding	Not yet precisely quantified, but theoretically high (depends on the quality of the counseling, and on feeding decisions and practices)	If infants are breastfed, there is a risk of HIV transmission. If infants are not breastfed, there are risks associated with unsafe preparation and use of replacement feeds/infant formula. These include increased malnutrition, morbidity, and mortality. A “spillover” effect is another potential risk of introducing replacement/formula feeding.	Safer breastfeeding is feasible if health workers are trained and women appear for ante- and postnatal care. Safer replacement feeding is less feasible, as it requires adequate funds for formula, safe water supply, mothers who receive full information and support for safe feeding, fuel, additional time, etc.	Improved infant health and survival if implemented properly
Improving obstetrical practices	Not yet precisely quantified, but theoretically high	Safety is high; no risks (except potentially from C-section, if provided)	Feasible if training and supervision of health workers, sterile equipment, and improved guidelines are provided	Benefits both HIV-positive and HIV-negative mothers and infants. Prevents occupational HIV transmission to birth attendants
Short-course ARV prophylaxis	High but diminishes, depending upon method & duration of breastfeeding	Results of clinical trials to date indicate safety is high and risks are few, if any	VCT and adequate MCH services are essential requirements	None known
Family planning counselling and services	Theoretically high	Possible side effects of contraceptives	Very feasible systems exist in most countries, but are sub-optimal and not linked with VCT	Improved maternal and child health

ANNEX F: TECHNICAL REVIEW: SHORT-COURSE ANTIRETROVIRAL DRUGS FOR THE PREVENTION OF MTCT

The first studies of the antiretroviral drug zidovudine (ZDV, also known as azidothymidine, AZT) for the prevention of MTCT were undertaken in the United States (Connor et al, 1994) and Thailand (Shaffer et al, 1999). These studies demonstrated impressive efficacy of ZDV in preventing MTCT, but the protocols for delivering the drugs were too complex for widespread African replication since they depend on early identification of pregnancy, good and early antenatal care, intravenous administration of the drug during labor, etc. ZDV is expensive, and the protocols relied upon women not breastfeeding (which is not the pattern in Africa, and which subjects infants to the high risks associated with artificial feeding in impoverished and unsanitary environments).

Five other protocols for administering various ARV drugs were later tested in Africa with regimens that were more appropriate for African settings. In Cote d'Ivoire and Burkina Faso (Wiktor et al, 1999; Dabis et al, 1999), two variations of a short-course ZDV regime were tested. In Tanzania, Uganda, and South Africa, a short course of ZDV was combined with the drug lamivudine (Saba, 1999). In Uganda, a single dose of nevirapine was given to both the mother at labor and to the infant during the first week of life. In the SAINT study in South Africa, the efficacy of short course nevirapine was compared with short course ZDV/3TC (Moodley, 2000). All the studies were carried out among breastfeeding women but no distinction regarding breastfeeding patterns was made in these studies (Piwoz, 2000).

The extent to which breastfeeding diminishes the efficacy of short-course ARV prophylaxis is still under review. Available studies suggest that, while delivery-related and early postnatal-related MTCT can be reduced by about 50 percent (from about 20 percent to about 10 percent), another 8 to 10 percent of HIV-infected women still pass the virus to their infants through continued breastfeeding (to 18 months or longer). This is in contrast to the 10 to 20 percent of women transmitting the virus during breastfeeding in settings where no ARV or other MTCT prevention interventions are used (see Section I.C.3). It is not yet clear whether the observed reduction in breastfeeding transmission is the result of lower early postnatal transmission, modified breastfeeding practices, or a combination of both conditions.

While the results of these ARV regimens are impressive, even among breastfeeding women, nevirapine has significant advantages in MTCT prevention programs. Nevirapine is considerably less expensive than other drugs; it is easier to administer; and it has, so far, been shown to be more efficacious in breastfeeding populations (Guay et al, 1999). The drug's overall safety profile has been impressive (Wood et al, 2000). A recent expert group meeting concluded that "the safety and effectiveness of antiretroviral (ARV) regimes (including Nevirapine) which prevent HIV transmission from mother to child warrant their use beyond pilot projects and research settings" (UNAIDS/WHO, 2000).

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