

SESSION 6. INFANT FEEDING AND PREVENTION OF MOTHER-TO-CHILD TRANSMISSION OF HIV/AIDS

Purpose (slide 2)

The purpose of this session is to provide students with the concepts and latest research findings related to prevention of mother-to-child transmission of HIV (PMTCT) and lessons for future application to services.

Learning objectives (slide 3)

At the end of this session, students will be able to:

- Describe modes of HIV transmission from mother to child.
- Understand a risk analysis associated with vertical transmission of HIV in pregnancy, labor, and breastfeeding
- Summarize the key research findings on mother-to-child transmission of HIV (MTCT).
- Explain infant feeding challenges faced by HIV-infected and -affected mothers and households, including cultural and social influences on breastfeeding.
- Describe PMTCT interventions.

Prerequisite knowledge

- Basic understanding of reproductive health, including pregnancy, labor, and delivery
- Knowledge of and experience in labor and delivery techniques
- Understanding of infant and young child and maternal nutrition
- Knowledge and understanding of lactation management
- Basic counseling skills
- Knowledge of prenatal, intranatal, and post-natal care
- Understanding of social and cultural aspects of infant and young child feeding

Estimated time: 180 minutes excluding field work

Session guide (slide 4)

Content	Methodology	Activities	Estimated time (minutes)
HIV epidemic in women, infants, and children in east, southern, and central Africa (ECSA)	Presentation	Briefly present transmission of HIV from an infected mother to her child.	5
	Small group work	Have participants form three groups to brainstorm the size of the problem, consequences, and strategies to prevent HIV infection in women, infants, and children.	15
Risk factors associated with mother-to-child transmission of HIV (MTCT)	Participatory lecture	Present the magnitude of risk of MTCT and risk factors during pregnancy, labor, and delivery.	35
	Large group discussion	Discuss possible mechanisms of MTCT during breastfeeding, including risk factors for mothers and infants.	15
Risk analysis of infant feeding options in the context of HIV	Large group discussion	Present the evidence on risks associated with different infant feeding options in the context of HIV and define “informed choice.”	30
		Ask students to explain “informed choice in their own words and give examples.	15
A comprehensive approach to prevention of mother-to-child transmission of HIV (PMTCT)	Participatory lecture	Present an overview of a comprehensive approach to PMTCT.	5
		Ask students to discuss where the suggested entry points for PMTCT are found in the healthy system in their country.	20

	Role-play	Facilitate a counseling role-play on managing drug-food interactions using the case study in Handout 5.3 and class discussion.	20
Conclusions		Explore students' ideas about the need for future research, as well as programming and policy needs in PMTCT and infant feeding, in their country.	10
Conclusions			5
Review			5
Total time			180

Required materials

- Flipchart paper and stand
- Writing pens
- Blackboard and chalk or whiteboard and markers
- Overhead projector or LCD projector

Materials provided

- PowerPoint 6
- **Handout 6.1. AFASS Criteria for Replacement Feeding**

Preparation

1. Review Lecture Notes and PowerPoint 6.
2. Review the handout to identify questions that can help students master the concepts.
3. Modify the names and any other aspects (e.g., foods described) of the case studies as appropriate for the students' context.

Suggested reading

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Introduction (slide 5)

By the end of 2005 an estimated 2.3 million children worldwide were HIV positive, and almost 90 percent of them were in sub-Saharan Africa (UNAIDS 2006). Each year 800,000 more children are infected with HIV, mainly through MTCT (Ross 2004).

HIV has also increased infant mortality in the most severely affected countries. UNICEF and UNAIDS report that approximately 500,000 HIV-infected children die each year from AIDS-related causes (IRIN 2005). An over 100 percent increase in child deaths is projected from 2002 to 2010 in the most heavily affected regions of the world (UNAIDS 2002).

Timing of mother-to-child transmission of HIV (slide 6)

An HIV-positive mother can transmit HIV to her infant during pregnancy, labor and delivery, and breastfeeding. In the absence of any PMTCT interventions, between 20 and 50 percent of HIV-infected mothers will transmit HIV to their infants. Without interventions approximately 5–10 percent of HIV-infected mothers transmit the virus during pregnancy, 10–20 percent during labor and delivery, and 5–20 percent post-natally through breastfeeding up to 24 months. Labor and delivery is the single point of greatest risk, with as much infection occurring within 24 hours as occurs post-natally within 24 months of breastfeeding.

This session focuses primarily on infants who are infected by HIV through breastmilk. Breastfeeding is the basis of most infant nutrition in sub-Saharan Africa, regardless of the mothers' HIV status. PMTCT interventions are the subject of the second portion of the session.

Transmission risk factors during pregnancy (slide 7)

HIV transmission during pregnancy occurs when HIV crosses the placenta to the fetus. The following factors increase the risk of transmission during pregnancy:

- A viral, bacterial, or parasitic placental infection in the mother during pregnancy
- HIV infection of the mother during pregnancy
- A higher viral load (Shaffer et al 1999)
- Severe immune deficiency associated with advanced AIDS in the mother (WHO)

Without treatment, the rate of transmission of HIV during pregnancy ranges from 5–10 percent. A child is considered to have been infected in utero if the HIV-1 genome is detected within 48 hours of delivery by a polymerase chain reaction test (DNA-PCR) or viral culture (UNICEF, UNAIDS, and WHO 1998a).

Transmission risk factors during labor and delivery (slide 8)

Labor and delivery is the time point of greatest risk. There is a 10–20 percent risk of transmission of HIV during this period.

During labor and delivery transmission most often occurs when infants suck, imbibe, or aspirate maternal blood or cervical secretions containing HIV. Higher risks of HIV transmission during labor and delivery are associated with duration of membrane

rupture, acute infection of the placental membranes (chorioamnionitis) resulting from untreated sexually transmitted infections (STIs) or other infections, and invasive delivery techniques that increase the infant's contact with the mother's blood, such as a caesarean section (WHO 1999). Additionally, research has shown that mothers with low CD4 counts near the time of delivery and mothers with severe clinical disease are about three times more likely to transmit HIV to their infants than women who are less severely affected (Leroy et al 2002; European Collaborative Study 2001).

UNICEF, WHO, and UNAIDS (1998) consider transmission to have occurred intrapartum if the results of the diagnostic tests were negative during the first 48 hours after delivery but became positive in subsequent samples taken within 7 to 90 days of delivery.

HIV transmission during breastfeeding (slide 9)

There is a 5–20 percent risk of transmission of HIV through breastfeeding. It is difficult to determine precisely when HIV transmission occurs following birth. The presence of maternal antibodies, combined with a period during which the infection is undetectable, makes it difficult to determine whether infection occurred during delivery or through breastfeeding.

How is HIV transmitted during breastfeeding?

The exact mechanisms for HIV transmission during breastfeeding are not yet completely known or understood. HIV appears to pass from the mother's circulatory systems into her breastmilk.

Studies that have examined breastmilk samples from HIV-positive mothers have shown that 25–35 percent of samples have no detectable virus present. This means either that the virus is not present or that it is present in levels below the limit of detection for the tests used. The HIV appears to be shed intermittently over time. Studies also show that the amount of virus in breastmilk varies between breasts in samples taken at the same time.

When an infant drinks breastmilk from an HIV-positive mother, the virus can enter or infect the infant through permeable mucosa, lymphoid tissues, or lesions in the gastrointestinal tract. This can happen anywhere from the mouth to tonsil area to the intestine. Transmission is not necessarily a result of the presence of HIV in breastmilk, but rather a complex interaction between the anti-infective agents—macrophages, lymphocytes, and immunoglobulin—in breastmilk and HIV.

The most remarkable aspect of HIV transmission during breastfeeding is that although infants exposed to HIV may consume 300,000 or more virions and 25,000 HIV-infected cells each per day, most do not become infected (Lewis et al 2001). Immune factors in breastmilk and infant saliva are believed to play a role in preventing transmission. It has also been hypothesized that exposure through breastmilk may create a protective immunity for some infants.

The exact mechanisms of HIV transmission during breastfeeding are not yet known. Late post-natal transmission (after 3–6 months) can be estimated with the PCR test. A

meta-analysis of five studies concluded that the best available estimate of the risk of breastmilk transmission is 14 percent (Dunn et al 1992).

Transmission risk factors during breastfeeding

Post-natal transmission of HIV during breastfeeding can be influenced by a number of risk factors related to the mother's status, the infants, and breastfeeding practices. These risk factors are discussed below.

Mothers (slide 10)

Maternal immune system status. Maternal immune status appears to increase the risk of transmission of HIV. Immune deficiencies in the mother, including a low CD4 or high CD8 cell count, increase the risk of transmission. The ZVITAMBO study in Zimbabwe (Ilf et al 2005) found post-natal transmission at 33.7 percent in mothers who had baseline CD4 cell counts below 200, but only 6.3 percent among mothers with CD4 counts above 500. A study in Kenya (Richardson et al 2003) found that maternal immune status, as measured by CD4 cell count, was predictive of breastmilk infectivity. Increased breastmilk infectivity was also found in mothers with prenatal CD4 cell counts below the median of the cohort (median = 400).

Maternal plasma viral load. The same study in Kenya (Richardson et al 2003) found that maternal disease, as measured by HIV-1 RNA plasma level, was also predictive of breastmilk infectivity. Mothers with prenatal HIV-1 RNA plasma levels above the median in the cohort (43,120 copies/mL) had fourfold higher breastmilk infectivity.

Breastmilk viral load

Breastmilk viral loads have been found to correlate well with viral load in blood (plasma viral load) and to be associated with the risk of HIV transmission during breastfeeding (Rousseau et al 2002).

Data have also shown that the incidence of HIV transmission is significantly higher in mothers with higher viral loads in their breastmilk over time (Richardson et al 2003). The Kenya study collected multiple samples of breastmilk. Women who repeatedly had evidence of HIV in their breastmilk were significantly more likely to transmit HIV to their infants than those whose milk only sometimes or never had detectable virus levels.

Recent HIV infection. Maternal viral load is higher in mothers with recent HIV infection. The risk of MTCT during breastfeeding nearly doubles if the mother becomes infected while breastfeeding. An analysis of four studies in which mothers became infected post-natally found a 29 percent risk of transmission through breastfeeding, as compared to the expected 8–20 percent risk seen with most HIV-positive breastfeeding mothers (Dunn et al 1992). This increased risk provides a strong rationale for voluntary counseling and testing (VCT) and prevention measures during pregnancy and delivery.

Breast health. Breast health and problems such as mastitis, cracked and bloody nipples, and other indications of breast inflammation may affect transmission of HIV (John et al 2001; Semba et al 1999). The risk of transmission is also higher in an infant with oral lesions such as thrush (Hoffman et al 2003; Ekpini et al 1997; Semba et al 1999). Mastitis may be caused by infectious agents, poor positioning and attachment,

or weak suckling. Deficiencies in the antioxidants vitamin E and selenium also may increase the risk of mastitis. Mastitis causes junctions in the mammary epithelium to become “leaky,” allowing blood plasma constituents (HIV) to enter breastmilk. Cytokines and other immune reactions resulting from mastitis can damage the intestines of young babies.

Maternal nutritional status. The ZVITAMBO study in Zimbabwe (Iloff et al 2005) indicates that maternal nutritional status in Zimbabwe was associated independently with increased risk of post-natal transmission. The assessment of maternal nutritional status was based on measures of underweight (mid-upper arm circumference, or MUAC) and anemia (hemoglobin). Severe maternal anemia was a positive predictor of post-natal transmission of HIV, with the greatest risk in the first 6 months.

Infants (slide 11)

Infant age. While it is difficult to determine how important infant age is for transmission risk (because of the difficulty of determining precisely the timing of transmission in the first month of infancy), several studies report higher post-natal HIV transmission in the first month (4–6 weeks) of life (Moodley et al 2003; Nduati et al 2000; John et al, 2001). Possible explanations include a higher prevalence of mastitis and breastfeeding problems at this age, a more immature and permeable infant gut, and/or greater exposure to HIV because the infant takes in more milk or a higher concentration of cells.

Mucosal integrity (mouth, intestines). Studies show that disruption of the epithelial integrity of the mucous membranes of the intestine or mouth of the infant increases the risk of transmission of HIV (Ekpini et al 1997). Mixed feeding, allergic reactions to complementary foods, and infectious illness can damage the intestine and increase risk of transmission (Bobat et al 1997; Ryder et al 1991; Tess et al 1998b). Oral thrush in an infant may also be associated with MTCT.

Breastfeeding practices (slide 12)

Breastfeeding duration. A meta-analysis of nine studies in Africa (BHITS 2004) showed that the risk of HIV transmission is cumulative, meaning that the longer breastfeeding goes on, the greater the risk of transmission (Read et al 2003; Leroy et al 2002). The risk is about 0.8 percent per month of breastfeeding, or 8.9 infections per 100 child years of breastfeeding.

Pattern or mode of breastfeeding. The pattern or mode of breastfeeding also affects transmission. Infants who are exclusively breastfed have a lower risk of becoming infected than those who consume other liquids, milks, or solid foods in addition to breastmilk during the first months of life (Coutsoudis et al 1999, 2001; Smith and Kuhn 2000). For example, the ZVITAMBO study (Iloff et al 2005) showed that exclusive breastfeeding was associated with a lower risk of infection than mixed feeding. In this study, exclusive breastfeeding was associated with 5.1 HIV infections per 100 child-years of breastfeeding, whereas early mixed feeding was associated with a rate of 10.5 infections per 100 child years of breastfeeding. The twofold increase in the rate of infection remained statistically significant after adjusting for maternal baseline CD4 count and nutritional status, infant birth weight, and maternal death during the follow-up period.

Research conducted in South Africa (Coutsoudis et al 1999, 2001) showed that mothers who exclusively breastfed their infants for 3 months were less likely to transmit the virus than mothers who introduced other foods or fluids before 3 months. At 3 months, infants who were exclusively breastfed had significantly lower transmission rates (19.4 percent) than mixed-fed infants (26.1 percent) and the same transmission rate as formula-fed infants (19.4 percent).

HIV and infant feeding risk analysis (slide 13)

While there is ample evidence of the risks of HIV transmission through breastfeeding, the overwhelming benefits of breastfeeding and risks associated with replacement feeding have been known for a long time. Replacement feeding prevents breastmilk transmission of HIV, but in resource-limited settings and unhygienic conditions, the risk of death from other infections caused by artificial feeding must be weighed against the risk of HIV infection.

Mode of feeding and infant mortality as a result of diarrhea and acute respiratory infection (ARI) (slide 14)

To understand the risks involved in infant feeding choices, it is necessary to examine the evidence of the importance of breastfeeding in reducing risks of infant mortality from infectious diseases. One study (Victora 2000) did a pooled analysis of research on the relative risk of infant mortality by diarrhea and ARI by mode of feeding. The different modes of feeding examined included exclusive breastfeeding, breastfeeding and infant formula feeding, and infant formula feeding only. Differences in the relative risk of infant mortality resulting from the mode of infant feeding were seen most clearly in cases of diarrhea and ARI. After accounting for confounding variables, the study found the following:

- Infants who received powdered milk or cow milk in addition to breastmilk had a 4.2 times higher risk of death from diarrhea and 1.6 times the risk of death from ARI than infants who were exclusively breastfed.
- Infants who did not receive any breastmilk had a 14.2 times higher risk of death from diarrhea and 3.5 times higher risk of death from ARI than infants who were exclusively breastfed.

Similar results were obtained when infants who died from diarrhea were compared with infants who died from diseases that were presumed to be the result of noninfectious causes. The study also found that each additional daily breastfeed reduced the risk of diarrhea death by 20 percent.

Nutritional contributions of breastmilk in resource-limited settings (Slide 15)

Breastmilk provides all the nutrient needs of infants younger than 6 months old and contributes more than 50 percent of the nutrient intake of children 6–11 months old in developing countries. This nutritional contribution is not easy to replace with other foods available in these settings. This is an important point because undernutrition is a major underlying cause of child mortality, and poor infant feeding practices contribute to undernutrition.

Use of infant mortality rate (IMR) to determine infant feeding policy (slide 16)

Taking all of this information about the risks of infant mortality from HIV transmission and replacement feeding, Piwoz and Ross (2005) used mathematical simulation modeling to develop estimates to guide policy decisions about infant feeding in the HIV context using population-specific infant mortality rates. The estimates led to the following suggestions:

- In settings where IMR is < 25/1,000 live births, exclusive replacement feeding from birth by HIV-positive mothers is recommended.
- In settings where IMR is > 25/1,000 live births, exclusive breastfeeding up to 6 months followed by early breastfeeding cessation is recommended.

Informed choice (slide 17)

Given the risks associated with both breastfeeding and replacement feeding, HIV-positive mothers must be given all the information they need to make an informed choice, which is defined by UNAIDS, WHO, and UNICEF as follows:

HIV and breastfeeding policy supports breastfeeding for infants of women without HIV infection or of unknown status and the right of a woman infected with HIV who is informed of her serostatus to choose an infant feeding strategy based on full information about the risks and benefits of each alternative.

WHO recommendations on infant feeding for HIV-positive women (slide 18)

In October 2006 the Inter-agency Task Team (IATT) on Prevention of HIV Infections in Pregnant Women, Mothers and their Infants convened by WHO released a Consensus Statement on HIV and Infant Feeding. The following recommendations from the Consensus Statement are intended for policymakers and program managers and should supplement, clarify, and update existing UN guidance but not replace it. A full report of the review of current evidence on HIV and infant feeding and the IATT recommendations is forthcoming.

- The most appropriate infant feeding option for an HIV-infected mother should continue to depend on her individual circumstances, including her health status and the local situation, but should take greater consideration of the health services available and the counseling and support she is likely to receive.
- Exclusive breastfeeding is recommended for HIV-infected women for the first 6 months of [infant] life unless replacement feeding is acceptable, feasible, affordable, sustainable, and safe (AFASS) for them and their infants before that time.
- When replacement feeding is AFASS, avoidance of all breastfeeding by HIV-infected women is recommended.
- At 6 months, if replacement feeding is still not AFASS, continuation of breastfeeding with additional complementary foods is recommended, while the mother and baby continue to be regularly assessed. All breastfeeding should

stop once a nutritionally adequate and safe diet without breastmilk can be provided.

- Whatever the feeding decision, health services should follow-up all HIV-exposed infants and continue to offer infant feeding counseling and support, particularly when feeding decisions may be reconsidered, such as the time of early infant diagnosis and at 6 months of age.
- Breastfeeding mothers who are known to be HIV infected should be strongly encouraged to continue breastfeeding.
- Governments and other stakeholders should revitalize breastfeeding protection, promotion, and support in the general population. They should also actively support HIV-infected mothers who choose to exclusively breastfeed and take measures to make replacement feeding safer for HIV-infected women who choose that option.
- National programs should provide all HIV-exposed infants and their mothers with a full package of child survival and reproductive health interventions (WHO 2004, 2005) with effective linkages to HIV prevention, treatment, and care services. In addition, health services should make special efforts to support primary prevention for women who test negative in antenatal and delivery settings, with particular attention to the breastfeeding period.
- Governments should ensure that the package of interventions referenced above, as well as the conditions described in current guidance, is available before any distribution of free commercial infant formula is considered.
- Governments and donors should greatly increase their commitment and resources for implementation of the Global Strategy for Infant and Young Child Feeding and the UN HIV and Infant Feeding Framework for Priority Action in order to effectively prevent postnatal HIV infections, improve HIV-free survival, and achieve relevant UNGASS goals.

Table 6.1. defines AFASS criteria for replacement feeding. This is also given in **Handout 6.1**.

Table 6.1. AFASS criteria for replacement feeding

Acceptable	The mother perceives no barrier to choosing replacement feeding for cultural or social reasons, or for fear of stigma and discrimination.
Feasible	The mother or family has adequate time, knowledge, skills, resources, and support to correctly prepare breastmilk substitutes and feed the infant 8–12 times in 24 hours.
Affordable	The mother and family, with available community and/or health system support, can pay the costs associated with the purchase/production, preparation, storage, and use of replacement feeds without compromising the health and nutrition of the family. Costs include ingredients/commodities, fuel, clean water, and medical expenses that may result from unsafe preparation and feeding practices.
Sustainable	A continuous, uninterrupted supply and a dependable system for distribution of all ingredients and products needed to safely practice replacement feeding are available for as long as needed.
Safe	Replacement foods are correctly and hygienically stored and prepared and fed with clean hands using clean cups and utensils, not bottles or teats.

Comprehensive PMTCT approach (slide 19)

A successful approach to PMTCT has to integrate several different programming areas. These areas include prevention of HIV infection; VCT; treatment; infant feeding; counseling on nutrition, safe pregnancy, and infant feeding choices; maternal and child health service delivery; and optimal obstetrical care. A comprehensive approach needs the support, involvement, and participation of the government, international and local organizations, the community, and the private sector in order to make all of these services accessible and affordable.

PMTCT entry points (slide 20)

PMTCT-related interventions can occur during pregnancy, labor and delivery, or the post-natal period. Each of these stages is an opportunity for nurses and midwives to support PMTCT, including infant feeding.

Pregnancy

During pregnancy women should be counseled on primary prevention and the risks of re-infection if they are already HIV positive. They should have access to treatment for STIs that can make them more vulnerable to HIV infection and have been associated with a higher risk of HIV transmission during labor and delivery. Women need access to VCT so that they are aware of their status and can make informed decisions about treatment, infant feeding, safe sex, and labor and delivery based on their status. While the benefits of HIV testing in pregnancy are easily recognized in terms of prevention and care for mother and child, the possible risks of stigmatization, discrimination, and violence also need to be taken into consideration. All testing must be voluntary and confidential.

All women should be encouraged to stay well nourished and hydrated during pregnancy, but this is especially important for HIV-infected pregnant women because 1) they are at increased risk of undernutrition, and 2) as discussed above, maternal nutritional status has been independently associated with an increased risk of transmission of the virus to the fetus.

A growing body of research finds a strong link between HIV and malaria. Studies show that malaria increases viral loads and decreases CD4 counts in pregnant women and that HIV and AIDS impair immunity to malaria in pregnant women (Grimwade et al, 2004; van Eijk et al, 2003). An analysis of data collected from HIV-positive pregnant women in Kigali, Rwanda (Ladner et al 2004) also supports an association between HIV infection and malaria in HIV-positive pregnant women.

Antiretroviral drugs (ARVs) play a key role in PMTCT. ARVs can reduce the risk of transmitting HIV to the infant and should be available when appropriate. Combination therapy in the last 8 weeks of pregnancy along with single-dose Nevirapine during labor and delivery has been shown to reduce MTCT to less than 6 percent at 6 weeks (Lallemant et al 2004). During pregnancy, quality counseling should focus on helping women make decisions regarding treatment, infant feeding, safe sex, labor and delivery, and family planning.

Labor and delivery

Labor and delivery comprise the single biggest risk point for transmission of HIV, with more transmission occurring during a 24 hour period than occurs post-natally during 24 months of breastfeeding. Most ARV prophylaxis regimens aim to reduce HIV transmission during this time.

Women need a safe delivery plan and access to optimal obstetric practices that can prevent avoidable exposure to HIV at birth. For example, the artificial rupture of membranes to hasten labor should be avoided, as well as routine episiotomy for all primagravidas. After delivery the infant should be thoroughly dried, and any remaining maternal blood and amniotic fluid should be removed. Vigorous suctioning of the infant's mouth and pharynx right after delivery should be avoided, and the umbilical cord should be cut and handled carefully. Elective caesarean sections are used for PMTCT but may be risky in certain environments.

Post-natal period

ARVs continue to have a role in the reduction of MTCT during the post-natal period, which is the subject of several ongoing studies. Quality counseling and support for infant feeding decisions by HIV-positive women becomes increasingly important during this period. Whether women opt to exclusively breastfeed or use exclusive replacement feeding in the first months of their infants' lives, considerable challenges need to be addressed. Women who opt to breastfeed need to understand the importance of exclusive breastfeeding and the dangers posed by mixed feeding. They also need informed counseling on maintaining breast health and preventing problems such as mastitis and cracked nipples. All women can benefit from good counseling on complementary feeding.

Women also need to avoid re-infection with HIV for their own health and to reduce the risks of MTCT during breastfeeding. Practices to avoid-infection include abstinence from sexual intercourse or the use of condoms.

Conclusions (slide 21)

The future of PMTCT depends on service providers, programmers, policymakers, and researchers. While successful programs are now being implemented, an even greater investment is needed to address this problem, with particular emphasis on infant feeding.

At the policy level many governments have developed national guidelines on PMTCT. There is a need to share experiences among countries and ensure that guidelines are based on current research findings and programmatic experience. Finally, further research is needed on factors affecting PMTCT.

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Handout 6.1 AFASS Criteria for Replacement Feeding

Acceptable	The mother perceives no barrier to choosing replacement feeding for cultural or social reasons, or for fear of stigma and discrimination.
Feasible	The mother or family has adequate time, knowledge, skills, resources, and support to correctly prepare breastmilk substitutes and feed the infant 8–12 times in 24 hours.
Affordable	The mother and family, with available community and/or health system support, can pay the costs associated with the purchase/production, preparation, storage, and use of replacement feeds without compromising the health and nutrition of the family. Costs include ingredients/commodities, fuel, clean water, and medical expenses that may result from unsafe preparation and feeding practices.
Sustainable	A continuous, uninterrupted supply and a dependable system for distribution of all ingredients and products needed to safely practice replacement feeding are available for as long as needed.
Safe	Replacement foods are correctly and hygienically stored and prepared and fed with clean hands using clean cups and utensils, not bottles or teats.

Session Six: Infant Feeding and Prevention of Mother-to-Child Transmission of HIV



Purpose

Provide concepts and latest research findings related to prevention of mother-to-child transmission of HIV (PMTCT) for application in the workplace.

2

Learning Objectives

- Describe modes of HIV transmission from mother to child.
- Understand mother-to-child transmission (MTCT) risk analysis.
- Understand key MTCT research findings.
- Explain infant feeding challenges faced by HIV-positive mothers.
- Describe PMTCT interventions.

3

Session Outline

- Discussion of MTCT, including associated risk factors
- Risk analysis of infant feeding choices in the HIV context
- Overview of a comprehensive PMTCT approach

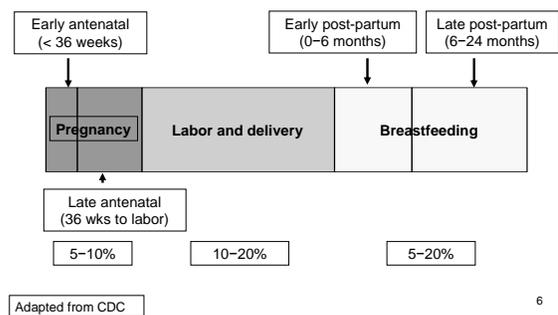
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Magnitude of the MTCT Problem

- In 2005, 2.3 million children in the world were HIV positive; 87% of them were in sub-Saharan Africa.
- 800,000 children are infected with HIV every year, mainly through MTCT.
- The number of child deaths is expected to increase over 100% between 2002 and 2010.

5

Timing of MTCT with No Intervention



6

Transmission Risk Factors during Pregnancy

- Viral, bacterial, or parasitic placental infection in the mother during pregnancy
- HIV infection of mother during pregnancy
- HIV viral load
- Severe immune deficiency associated with advanced AIDS in the mother

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Transmission Risk Factors during Labor and Delivery

- Duration of membrane rupture
- Acute infection of the placental membranes (chorioamnionitis)
- Invasive delivery techniques
- CD4 count of mother
- Severe clinical disease of mother

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HIV Transmission during Breastfeeding

- 5–20% risk
- Exact timing of transmission difficult to determine
- Exact mechanism unknown
- HIV in blood appears to pass to breastmilk
 - Virus shed intermittently (undetectable 25–35%)
 - Levels vary between breasts in samples taken at same time
- Virus may also come directly from infected cells in mammary gland, produced locally in mammary macrophages, lymphocytes, epithelial cells

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Transmission Risk Factors during Breastfeeding: Mother

- Maternal immune system status (measured by CD4 count)
- Maternal plasma viral load
- Breastmilk viral load
- Recent HIV infection
- Breast health
- Maternal nutritional status

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Transmission Risk Factors during Breastfeeding: Infant

- Infant age
- Mucosal integrity in the mouth and intestines

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Transmission Risk Factors during Breastfeeding: Practices

- Duration of breastfeeding
- Pattern of breastfeeding (exclusive breastfeeding or mixed feeding)

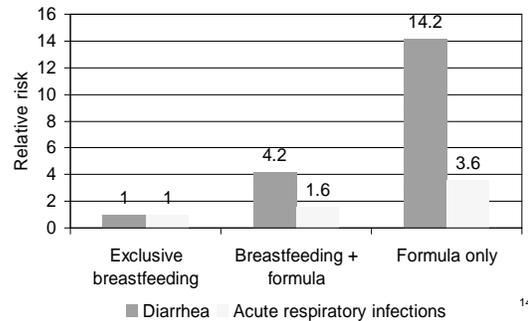
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Risk Analysis of Infant Feeding Choices for an HIV-Positive Mother

- Replacement feeding prevents HIV transmission through breastmilk, but in resource-limited settings, infants risk dying of other infections if replacement feeding is not done properly.
- The benefits of breastfeeding, despite the risk of HIV transmission, outweigh the risk of replacement feeding.

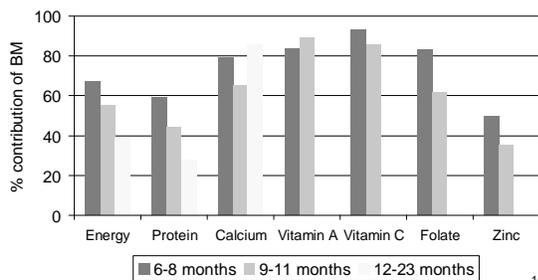
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Relative Risk of Mortality from Diarrhea and ARI by Mode of Feeding



14

Nutrition Contribution of Breastmilk in Resource-Limited Settings



15

Determining Infant Feeding Policy by Infant Mortality Rate

Infant mortality rate	Infant feeding recommendation
< 25/1000 live births	Replacement feeding by HIV-positive mothers from birth
> 25/1000 live births	Exclusive breastfeeding to 6 months followed by early cessation

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Informed Choice

“HIV and breastfeeding policy supports breastfeeding for infants of women without HIV infection or of unknown status and the right of a woman infected with HIV who is informed of her sero-status to choose an infant feeding strategy based on full information about the risks and benefits of each alternative.”

UNAIDS, WHO, UNICEF

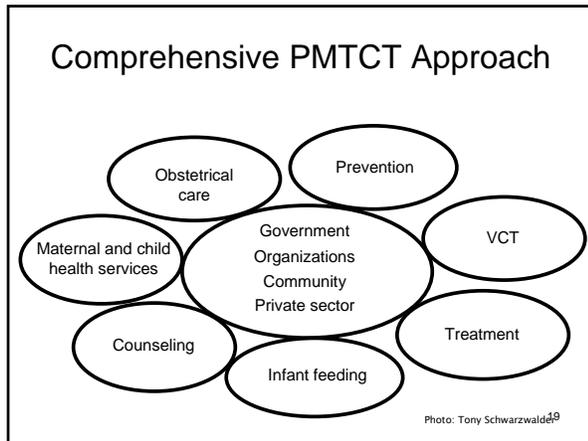
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Infant Feeding Consensus Statement

- The most appropriate infant feeding option for HIV-infected mothers depends on their individual circumstances.
- Exclusive breastfeeding is recommended for HIV-infected women for the first 6 months of life unless replacement feeding is AFASS.
- When replacement feeding is AFASS, avoiding all breastfeeding by HIV-infected women is recommended.
- At 6 months, if replacement feeding is still not AFASS, continuing breastfeeding with additional complementary foods is recommended.

Source: Inter-agency Task Team (IATT) on Prevention of HIV Infections in Pregnant Women, Mothers, and Their Infants convened by WHO, October 2006

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PMTCT Entry Points

Pregnancy	Labor & delivery	Post-natal
<ul style="list-style-type: none"> • Prevention • Treatment of STIs • VCT • Adequate nutrition • Treatment of malaria and other infections • ARVs • Counseling on safe sex, infant feeding, family planning, self-care, and preparing for the future 	<ul style="list-style-type: none"> • ARVs • Safe delivery planning • Non-invasive procedures • Elective C-section • Vaginal cleansing • Minimal infant exposure to maternal fluids 	<ul style="list-style-type: none"> • ARVs • Counseling and support for infant feeding option • Prevention and treatment of breast-feeding problems • Care of infant thrush and oral lesions • Counseling on complementary feeding/early weaning • Infection prevention

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- ### Conclusions
- HIV can be transmitted from mother to child during pregnancy, labor and delivery, and breastfeeding.
 - A comprehensive package of services is needed to prevent transmission.
 - HIV-positive mothers must weight the benefits and risks of breastfeeding before making infant feeding choices.
 - Replacement feeding must be AFASS.
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