



INFO Project
Center for Communication
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FOCUS ON...

Breastfeeding Decisions for Women With HIV

A Digest of Key Resources

This issue of *Focus On...* is intended to help health care practitioners better understand the current state of knowledge on breastfeeding and HIV transmission. It examines the most recent studies and expert guidance on the topic and provides the key points from recent research trials, literature reviews, and program evaluation studies.

Of course, the literature on breastfeeding decisions for women with HIV is broader. For women with HIV, infant feeding decisions are shaped by their access to infant feeding counseling and antiretroviral treatment, on the social stigma surrounding people with HIV, exclusive breastfeeding, and exclusive replacement feeding, on access to clean and safe water and food supplements, and on partner and family support. These topics are covered in more detail in the *Population Reports* issue, "Better Breastfeeding, Healthier Lives."

A woman infected with HIV can pass HIV on to her infant during pregnancy, at the time of labor and delivery, and through breastfeeding. Without treatment, between 15% and 30% of infants born to mothers with HIV become infected with HIV during pregnancy, labor, and delivery. An additional 10% to 20% become infected during breastfeeding depending on how long the infant is breastfed¹.

For ordering print copies, please see "Obtaining Full-Text Resources" on the back cover.

Welcome to *Focus on...*

Welcome to *Focus on...*, a digest that highlights important resources on a key family planning or related reproductive health topic. *Focus on...* is intended to help program managers, health care providers, and trainers in developing countries to keep current in the technical and programmatic literature through a digest of selected materials they can request from publishers. As topics grow in importance, many organizations and experts offer key information and guidance through a number of different channels. With the abundance of information available today, it can be a challenge to find and to choose the most useful resources to focus on. This series selects materials with the greatest relevance to expanding services and improving practices in developing countries. Materials are selected in consultation with an expert in the field or an expert working group to highlight: (1) important themes, (2) recent and relevant developments, (3) practical information, and (4) successful program experiences. Then, through edited abstracts, summaries, extracts, or key points drawn from these selected resources, *Focus on...* introduces health care professionals to these important information resources. **For those who want more, each entry includes information about access to the full text in print and/or electronic versions** (see box, back page).

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¹ See <http://www.who.int/reproductive-health/stis/mtct/index.htm> for the most recent mother-to-child transmission rates.



Program efforts to prevent mother-to-child HIV infection have increased over the last five years. Yet, programs have given little attention to preventing HIV transmission during breastfeeding. Most programs emphasize antenatal HIV testing and counseling, short-course antiretroviral therapy to prevent transmission during pregnancy, delivery, and the first weeks postpartum, and improving access to HIV treatment for women who are eligible. To date, most programs provide antenatal infant feeding counseling, yet few provide much needed follow-up support.

Mothers living with HIV face a difficult decision—whether to breastfeed, in order to give their infants important nutrients and protection from potentially deadly diseases, or not to breastfeed, to avoid the risk of transmitting HIV through breastmilk. In many resource-poor countries, the risks to infant health of **not** breastfeeding are high. Infants not breastfed miss the early immunological protection conveyed by breastmilk, and many are at risk for malnutrition and for disease from exposure to contaminated water.

Particularly for women infected with HIV, infant feeding decisions often are limited by the absence of information about the benefits and risks of breastfeeding or not breastfeeding. Many women are following the advice of health care workers without a full understanding of these risks. Health care providers need to be better informed of the facts so they can in turn provide women with full information.

World Health Organization Updates Infant Feeding Guidance

The World Health Organization (WHO) and Inter-agency Task Team (IATT²) on Prevention of HIV Infections in Pregnant Women, Mothers, and their Infants met at WHO headquarters in Geneva in October 2006 to review the new body of evidence and experience regarding HIV and infant feeding accumulated since the previous technical consultation in October 2000. The group released a preliminary summary, which supplements and updates existing UN guidance with the following key recommendations:

- The most appropriate infant feeding option for a mother with HIV should depend on her individual circumstances, including her health status and the local situation, but take greater consideration of the health services available and the counseling and support she is likely to receive.
- A woman with HIV should breastfeed exclusively for the first six months of her infant's life unless replacement feeding is acceptable, feasible, affordable, sustainable, and safe for her and her infant before that time.
- When replacement feeding is acceptable, feasible, affordable, sustainable, and safe, mothers with HIV should avoid breastfeeding completely.
- At six months, if replacement feeding is still not acceptable, feasible, affordable, sustainable, and safe, a mother with HIV should continue

Continued next page

² The IATT consists of Academy for Educational Development, Catholic Medical Mission Board, Columbia University, Elizabeth Glaser Pediatric AIDS Foundation, UNAIDS, UNFPA, UNICEF, US Agency for International Development, and the US Centers for Disease Control.

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breastfeeding with additional complementary food, while the mother and baby continue to be assessed regularly. 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 infants exposed to HIV and continue to offer infant feeding counseling and support, particularly at key times when feeding decisions may be reconsidered, such as the time of early infant diagnosis and at six months of age.
- Breastfeeding mothers of infants and young children who are known to have HIV should be strongly encouraged to continue breastfeeding.

- Governments and other stakeholders should re-vitalize breastfeeding protection, promotion, and support in the general population. They should also actively support mothers with HIV who choose to exclusively breastfeed, and take measures to make replacement feeding safer for women with HIV who choose it.
- National programs should provide all infants exposed to HIV and their mothers with a full package of child survival and reproductive health interventions 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.

Factors Affecting the Risk of HIV Transmission Through Breastfeeding

Understanding the factors that influence the likelihood of mother-to-child-transmission of HIV through breastfeeding is key to finding effective ways to reduce HIV transmission. Studies find that maternal health, the progression of HIV in mothers, and the timing of when they become infected with HIV affect their risk for transmitting HIV to their infants through breastfeeding. Mothers recently infected with HIV and mothers with advanced HIV disease are at particular risk for passing HIV through breastfeeding.

Research also provides strong evidence that feeding infants both breastmilk and other solids or liquids before six months (as opposed to breastfeeding exclusively) and breastfeeding for longer durations increase the risk of HIV transmission from mothers with HIV to their infants.

Late postnatal transmission of HIV-1 in breast-fed children: An individual patient data meta-analysis

Authors: Coutoudis, A., Dabis, F., Fawzi, W., Gaillard, P., Haverkamp, G., Harris, D.R., Jackson, J.B., Leroy, V., Meda, N., Msellati, P., Newell, M.L., Nsuati, R., Read, J.S., and Wiktor, S.

Source: Breastfeeding and HIV International Transmission Study Group. *Journal of Infectious Diseases* 189(12): 2154–2166. Jun. 15, 2004.

POPLINE Ordering Number: 192858

Note: The study is a pooled analysis of 4,085 children from nine randomized, controlled clinical trials of women with HIV-1 and their children in six African countries—Burkina Faso, Côte d'Ivoire, Kenya, South Africa, Tanzania, and Uganda. The researchers analyzed individual patient data to determine the factors affecting the risk of HIV transmission and the extent to which breastfeeding contributes to the overall risk of mother-to-child transmission of HIV-1. HIV transmission through breastfeeding is also described as late postnatal transmission of HIV.

Key points:

- **HIV transmission through breastfeeding accounts for a substantial portion of mother-to-child HIV infections.** Among children with HIV whose timing of infection was known, 42% of infections occurred through breastfeeding. The overall risk of transmission due to breastfeeding was 8.9 transmissions per 100 child-years. The risk increased as mothers' CD4+cell counts decreased. While other studies have shown that a mother's age and number of children are associated with HIV transmission through breastfeeding, this analysis found no such relationship. The study found that low infant birth weight, which other studies have found to be associated with HIV transmission during pregnancy and birth, was not associated with transmission through breastfeeding.

Note: For people with HIV, the CD4+cell count (commonly referred to as the T4 cell count) reflects the strength of their immune system and the severity of HIV infection. The CD4+cell count declines when the virus is replicating quickly, signaling advancing disease and a weakening immune system. Thus mothers with lower CD4+cell counts are at greater risk of transmitting HIV through breastfeeding. Low CD4+cell counts are associated with high HIV viral loads in maternal blood. Since viral load indicates the amount of HIV in the body, it is another risk factor for HIV transmission through breastmilk. Testing for either low CD4+cell count or high viral load can show how far HIV has progressed. Where either test is available, testing could help women at greater risk for transmitting HIV through breastfeeding decide on different feeding programs.

- **The longer mothers with HIV breastfeed their infants, the more likely they are to transmit HIV.** The cumulative probability of HIV transmission between six weeks and 18 months of age was 9.3%. The risk of transmission was nearly constant—that is, each day of breastfeeding had roughly the same risk of HIV transmission as the day before.

Early exclusive breastfeeding reduces the risk of postnatal HIV-1 transmission and increases HIV-free survival

Authors: Iliff, P.J., Piwoz, E.G., Tavengwa, N.V., Zunguza, C.D., Marinda, E.T., Nathoo, K.J., Moulton, L.H., Ward, B.J., Humphrey, J.H.

Source: Journal of Acquired Immune Deficiency Syndromes 19(7): 699–708. Apr. 29, 2005.

POPLINE Ordering Number: 306873

Note: This study compares HIV infection rates and death rates among infants of mothers with HIV according to three different breastfeeding practices:

- 1) exclusive breastfeeding (only breastmilk and no other solid or liquid foods, even water),
- 2) predominant breastfeeding (breastmilk and non-milk liquids such as water, tea, and juice), and
- 3) mixed feeding (breastmilk along with other liquid or solid foods).

The study was conducted in Zimbabwe, November 1997 to January 2000 among more than 2,000 mother-infant pairs. It is drawn from the ZVITAMBO clinical trial on vitamin A and infant feeding practices. The study followed mothers and their infants at 3-month intervals for up to 24 months.

Key points:

- **Mixed feeding is associated with a higher risk of HIV transmission than exclusive breastfeeding in the first months of life.** Infants who were mixed-fed in the first three months had about four times greater risk of HIV

transmission at both 6 months and 12 months of age than infants who were exclusively breastfed in the first three months. At 18 months, children who were mixed-fed during the first 3 months were 2.6 times more likely to be infected with HIV than children who were exclusively breastfed. Predominant breastfeeding carried a lower risk of HIV transmission than mixed feeding, but about twice the risk of exclusive breastfeeding. Infants with HIV transmission during pregnancy and birth, was not associated with transmission through breastfeeding.

- **Mothers with severe HIV infection are more likely to transmit HIV through breastfeeding.** Among mothers with HIV who had CD4+cells counts less than 200 cells/microliter, one-third of their children became infected through breastfeeding by 18 months of age. This rate is more than twice that of all women in the study. Women with CD4+cells counts less than 200 cells/microliter were five times as likely to transmit HIV to their infants compared with women with CD4+cell counts over 500.
- **Better nourished mothers are less likely to transmit HIV to their infants.** When women are well-nourished, HIV progresses more slowly. Thus there is a lower risk of transmitting HIV through breastfeeding. HIV transmission from mothers with HIV to their infants decreased between 6% and 12% for each centimeter increase in the mother’s mid-upper arm circumference (arm circumference is an indicator of nutritional status). Severe maternal anemia also increased the risk of HIV transmission through breastfeeding by sevenfold in the infant’s first six months.

Reducing the Risk Factors for Mother-to-Child-Transmission of HIV Through Breastfeeding

Researchers are exploring ways to reduce the risk of mothers transmitting HIV to their infants. They are exploring whether providing antiretroviral drugs (ARVs) to infants beyond the first week of life and/or treating breastfeeding mothers with highly active antiretroviral therapy (HAART) can reduce the risk of HIV transmission through breastfeeding. Also, evidence suggests that where giving infants formula instead of breastfeeding is not possible, exclusive breastfeeding—that is, giving infants only breastmilk and no other solids or liquids—can be an effective strategy. Another finding is that caring better for breasts by avoiding and treating such problems as cracked nipples and mastitis can reduce risks.

For the latest WHO recommendations on reducing mother-to-child transmission through antiretroviral therapies, see “Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants: Towards Universal Access. Recommendations for a public health approach” at <http://www.who.int/hiv/pub/guidelines/pmtctguidelines2.pdf>.

Breastfeeding plus infant zidovudine prophylaxis for 6 months vs formula feeding plus infant zidovudine for 1 month to reduce mother-to-child HIV transmission in Botswana. A randomized trial: The MASHI study

Authors: Thior, I., Lockman, S., Smeaton, L.M., Shapiro, R.L., Wester, C., Heymann, J.S., Gilbert, P.B., Stevens, L., Peter, T., Kim, S., van Widenfelt, E., Moffat, G., Ndase, P., Arimi, P., Kebaabetswe, P., Mazonde, P., Makhema, J., McIntosh, K., Novitsky, V., Lee, T., Marlink, R., Lagakos, S., and Essex, M.

Source: Journal of the American Medical Association 296(7): 794–805. Aug. 16, 2006

POPLINE Ordering Number: 306263

Note: This study compares the effectiveness of two infant feeding strategies with antiretroviral treatment on reducing mother-to-child transmission of HIV after birth (known as post-natal HIV transmission). The study recruited 1,200 pregnant women with HIV from March 2001 to October 2003

in the southern region of Botswana. All the women were given 300 mg zidovudine orally twice a day from 34 weeks gestation until the start of labor, and every three hours during labor until delivery. Upon delivery, mothers and their infants were given either single-dose nevirapine or a placebo. Four mg of zidovudine syrup was given to all infants every 12 hours from birth until one month of age. After one month of age, treatment differed between formula-fed and breastfed infants:

- Among infants who were formula fed, zidovudine was discontinued at one month. Mothers who stopped breastfeeding were given formula for 12 months.
- Among breastfed infants, four mg of zidovudine were given every eight hours up to two months, and six mg were given every eight hours from two months to six months. Mothers were encouraged to exclusively breastfeed their infants, and to begin and complete weaning between five and six months of age. Free formula was provided from 5 to 12 months of age.

Also see: “Use of antiretroviral drugs to prevent HIV-1 transmission through breastfeeding: From animal studies to randomized clinical trials” (POPLINE Ordering Number: 305137).

Key points:

- **Giving infants’ formula with one month of zidovudine treatment was more effective than breastfeeding with zidovudine over six months in preventing postnatal mother-to-child transmission of HIV.** At seven months of age, 5.6% (32) of formula-fed infants and 9% (51) of breastfed infants were infected with HIV.
- **Breastfeeding with zidovudine over six months resulted in fewer deaths from causes other than HIV than giving formula with one month of zidovudine.** At seven months of age, 4.9% of breastfed infants had died compared with 9.3% of formula-fed infants. The most common causes of infant death in the formula-fed group were diarrhea and pneumonia, and in the breastfed group the most common cause was HIV infection.
- **The rates of HIV-free survival rates (infants surviving and remaining uninfected with HIV) at 7 months and 18 months of age were comparable between the two infant feeding groups.** At seven months, 12.5% of formula-fed infants and 12.9% of breastfed infants had died or acquired HIV. At 18 months, 13.9% of formula-fed infants, and 15.1% of breastfed infants, had died or acquired HIV.
- **Treating mothers with HAART effectively prevents HIV infections in the postpartum period.** After October 2002, HAART was offered to women with CD4+cell counts of less than 200 cells/mm³, women with an AIDS-defining illness at enrollment, and to women during follow-up. When researchers limited

their analysis to the group of women given HAART, the HIV infection rates and death rates for the formula-fed and breastfed groups were lower and more similar to each other than among infants born to women not receiving HAART. Also, more infants survived without becoming infected with HIV in both feeding groups when HAART was given to women.

Modeling the effects of different infant feeding strategies on infant survival and mother-to-child transmission (MTCT) of HIV

Authors: Ross, J.S. and Labbok, M.H.

Source: American Journal of Public Health 94(7): 1174–1180. Jul. 2004

POPLINE Ordering Number: 194576

Note: This study examines the risk of mother-to-child transmission of HIV through breastfeeding compared with the risk of infant death from replacement feeding. Infants who are not breastfed miss the early immunological protection conveyed by breastmilk, and are at risk for malnutrition and diseases caused by exposure to contaminated water. This study uses a simulation model of mothers with HIV during pregnancy to predict the risks for different infant feeding scenarios during different age groups in resource-poor settings. Rates of HIV transmission before and during delivery and during breastfeeding, as well as infant mortality rates, are estimated from population-based studies conducted in both developing and developed countries.

Also see “Use of population-specific infant mortality rates to inform policy decisions regarding HIV and infant feeding” (POPLINE Ordering Number: 288065).

Key points:

- **In resource-poor settings mothers with HIV should prevent and treat breast problems and breastfeed exclusively for the first six months before switching to replacement foods, because more infants survive without HIV when mothers follow these practices (which the study calls “safer breastfeeding”).** Safer breastfeeding for the first six months followed by replacement feeding results in 291 infant deaths or infections per 1,000 live births. In comparison, replacement feeding starting from birth results in 349 deaths per 1,000 live births. The least safe feeding approach is to breastfeed for 24 months without any effort to make breastfeeding safer through exclusive breastfeeding and proper breast care. This approach results in 391 deaths or infections per 1,000 live births.
- **Local health conditions should determine when replacement feeding can safely begin following exclusive breastfeeding.** The study’s recommendation to switch from exclusive breastfeeding to replacement feeding at six months of age is intended as general



guidance. Specific recommendations should reflect the infant health risks and infant mortality rates in the community. Where there is lower risk from infant disease—and thus, a lower infant mortality rate—replacement feeding can safely begin before six months.

- **Where higher infant mortality rates prevail, it is safer for mothers to exclusively breastfeed their infants for longer than six months than to begin replacement feeding at six months or earlier.** In places where the infant mortality rate is relatively low (for instance, less than 54 deaths per 1,000 live births), replacement feeding between the ages of two and four months is as safe as breastfeeding. Where the infant mortality rate is high (for instance, greater than 249 deaths per 1,000 live births), more infants survive without HIV when exclusive breastfeeding is practiced until the ages of six to nine months and replacement feeding is delayed.

Mastitis: Causes and management

Author: World Health Organization (WHO)

Source: Geneva, WHO. 2000. 43 p.

Web Site: http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/WHO_FCH_CAH_00_13.pdf

POPLINE Ordering Number: 161400

Note: This report from WHO brings together the latest information on mastitis and related breast conditions that occur during breastfeeding and their causes. It guides health care professionals to help women manage such problems and maintain breastfeeding.

Key points:

- **Mastitis and its main cause, milk stasis, can be prevented through effective breastfeeding management.** Mastitis occurs in 10% to 30% of women, generally when the mother's milk is not drained from the breast efficiently, a condition known as milk stasis. Infection will occasionally follow milk stasis, as breastmilk is a good medium for bacterial growth. Milk stasis can be caused by the poor attachment of the infant to the breast, blockage of milk ducts, and a reduction in the frequency and/or duration of feeds. Women can prevent milk stasis and mastitis by: starting breastfeeding within an hour after delivery; properly attaching her infant to the breast; breastfeeding as often as her infants want; letting her infant finish the first breast before offering the other; and exclusively breastfeeding for six months.
- **If detected early, milk stasis can be treated at home without the help of a doctor.** If the mother has a fever or feels any lumps in her breasts, especially if she is having difficulty breastfeeding her infant, she can take a number of measures to overcome the problem: getting bed rest, frequently breastfeeding with the affected breast, putting a warm compress on the breast, and gently massaging any lumps. If the condition does not

improve by the next day, however, she should seek medical attention from a health care provider.

- **Cracked and painful nipples, which can lead to milk stasis, can be prevented through proper attachment of the infant to the breast.** If poorly attached to the breast, an infant will not be able to remove milk efficiently and will cause irritation, leading to nipple fissures. As these fissures can be painful, mothers often decide not to feed their infants from the affected breast. This practice in turn can cause milk stasis and engorgement. Proper attachment can substantially reduce the severity of cracked nipples and prevent milk stasis.
- **If they develop mastitis, women with HIV should not breastfeed their infant from the affected breast until the infection clears up, and they should express and discard the milk from the affected breast instead.** Most infants can get enough milk from the unaffected breast alone. For all women with mastitis, removing breastmilk by expressing it is the most essential part of treatment, as the accumulated milk can cause further inflammation and infection.

Vitamin A, mastitis, and mother-to-child transmission of HIV-1 through breast-feeding: Current information and gaps in knowledge

Author: Dorosko, S.M.

Source: Nutrition Review 63(10): 332–346. Oct. 2005

POPLINE Ordering Number: 305136

Note: This article summarizes the evidence on the relationship between vitamin A levels, mastitis, and mother-to-child transmission of HIV through breastfeeding. Six studies on mastitis as a risk factor for mother-to-child transmission of HIV and seven studies on vitamin A related to HIV transmission were reviewed. The studies cover Bangladesh, Côte d'Ivoire, Kenya, Malawi, South Africa, and Tanzania and range in size from 87 study participants to 1,078 participants.

Key points:

- **Taking vitamin A supplements does not appear to help mothers with HIV prevent HIV transmission through breastfeeding.** Over the last 10 years, several studies have looked at whether breastfeeding mothers with HIV can decrease HIV transmission to infants by taking vitamin A supplements. These studies follow from findings that link mastitis, HIV, and vitamin A levels—specifically findings that levels of vitamin A are low in women with mastitis and women with HIV, and that reducing mastitis reduces the risk of HIV transmission through breastfeeding. Studies in Kenya, Malawi, South Africa, and Tanzania have found that mastitis causes a three- to four-fold increase in HIV transmission through breastmilk. Yet, other studies in Bangladesh and Tanzania among women without HIV found that vitamin A did not decrease the risk of mastitis, despite finding an increased risk of mastitis with low vitamin A stores.

- **Multivitamins appear to have a small positive effect on reducing HIV transmission through breastfeeding. The greatest benefit of multivitamins may be among mothers who are malnourished or have more severe HIV disease.** In Tanzania among mothers with HIV, taking multivitamin supplements resulted in a small de-

crease of the risk of HIV transmission through breastfeeding in the first two years of the child's life. Among malnourished women, or those with advanced HIV disease, multivitamin supplements resulted in an average 63% decrease in HIV transmission through breastfeeding.

How Programs and Providers Can Work With Mothers to Reduce the Risk of HIV Transmission

For women in developing countries, deciding whether or not to breastfeed can be challenging, particularly for women with HIV. To help women make their individual decisions, health care providers can inform mothers with HIV about their infant feeding options. This information includes the risks of breastfeeding versus not breastfeeding, safer breastfeeding practices such as exclusive breastfeeding, and non-breastfeeding options such as formula.

Women need to consider their personal circumstances when choosing a feeding option. Some women find it difficult to maintain exclusive breastfeeding, and women who choose to formula feed often face social disapproval and problems obtaining adequate supplies. While health workers can give mothers valuable advice, the decision to breastfeed or not ultimately rests with each mother. A woman's breastfeeding choices should always be respected and supported.

HIV transmission through breastfeeding: A review of available evidence

Author: Newell, M.L.

Source: Geneva, WHO. 2004.

Web Site: http://www.who.int/child-adolescent-health/New_Publications/NUTRITION/ISBN_92_4_156271_4.pdf

POPLINE Ordering Number: 195608

Note: This report summarizes the scientific evidence on mother-to-child transmission of HIV through breastfeeding. This evidence constitutes the basis of the guidelines offered for decision-makers and health care managers. The report also discusses current prevention of HIV transmission through breastfeeding and research planned or underway to reduce the risk.

Key points:

- **Mothers with HIV should avoid breastfeeding whenever replacement feeding meets five essential criteria: it is acceptable, feasible, affordable, sustainable, and safe (see box, p. 9). If these criteria cannot all be met, mothers with HIV should exclusively breastfeed their infants for the first [six] months of life or until replacement feeding can meet the five essential criteria.**
- **Health care providers should counsel women with HIV on the risks and benefits of the various infant**

feeding options and should give each woman specific guidance on the best option for her situation. Mothers with HIV can choose among replacement feeding with commercial infant formula or home-modified animal milk, exclusive breastfeeding [for six months], expressing and heat-treating breastmilk, and wet-nursing or breastmilk banks. Each of these options has risks and benefits. Mixed feeding is not recommended, as HIV transmission rates are higher than with exclusive breastfeeding and mixed-fed infants are exposed both to the risk of HIV infection from breastmilk and to the risk of diarrhea and other infectious diseases from unclean supplemental water and foods.

- **Replacement feeding.** Mothers who give their infants suitable breastmilk substitutes, such as infant formula or home-modified animal milk, can protect them from acquiring HIV through breastfeeding. To avoid risks of other diseases, however, they must ensure a reliable supply of formula prepared using clean drinking water and utensils, and correctly diluted or fortified. In some countries hygienic conditions are difficult to ensure. Studies in Africa have found that replacement feeding does not decrease overall infant mortality among infants born to mothers with HIV. In many cases, higher rates of infectious diseases among replacement-fed infants lead to the same number of deaths as HIV infection through breastfeeding.
- **Exclusive breastfeeding [for six months unless replacement feeding is acceptable, feasible, affordable, sustainable, and safe for the mother and her infant before that time, according to the latest WHO guidance].** Women with HIV who exclusively breastfeed are less likely to transmit HIV to their infants than women who practice mixed feeding. Also, exclusive breastfeeding protects against common diseases such as diarrhea better than mixed feeding because it avoids exposure to the risk of unclean water and food.
- **Treatment of breastmilk.** Heat-treating breastmilk substantially reduces the amount of HIV it contains and thus can decrease or eliminate the risk of HIV transmission through breastfeeding. Another option being



explored is treating breastmilk with microbicides to kill HIV. Studies find that adding microbicides to breastmilk and letting it stand for 5 to 10 minutes inactivates HIV.

- **Wet-nursing by a woman who has been tested and found not to have HIV.** Wet-nursing may be an option for mothers with HIV who live in communities where substitute breastfeeding by a family member or a woman in the community is an accepted practice. Wet-nurses need to avoid becoming infected with HIV and be tested regularly.
- **Breastmilk banks.** Although only limited information is available about breastmilk banks and HIV prevention, in some countries experience with breastmilk banks has been promising for other purposes. All breastmilk banks should heat-treat breastmilk to ensure that it is free of HIV and other infectious agents.
- **Mothers with HIV need access to follow-up care and support to help them feed their infants as safely and nutritiously as possible.** Providers can offer continuing support to help women with HIV carry out their preferred infant feeding approach and to adopt a new approach if their circumstances change. For women with HIV, nutritional support is especially important since HIV progresses more rapidly in women who are undernourished.

HIV and infant feeding:

A compilation of programmatic evidence

Authors: Koniz-Booher, P., Burkhalter, B., de Wagt, A., Iliff, P., and Willumsen, J.

Sources: Bethesda, Maryland, Quality Assurance Project (QAP), University Research Co, LLC, Jul. 2004. 108 p..

Web Site: <http://www.qaproject.org/strat/HIVinfantfeed1004screen.pdf>

POPLINE Ordering Number: 279757

Note: This report examines program literature on experiences preventing mother-to-child transmission of HIV, with an emphasis on infant feeding strategies. The programs covered in the report range from small community research projects to national programs. They were selected from over 100 documents from more than 20 countries. Collectively, the experience of these programs provides insights that can help update international guidelines, adapt the guidelines to individual settings, and develop and improve programs for reducing mother-to-child transmission of HIV.

Key points:

Replacement Feeding

- **Mothers who know they have HIV choose replacement feeding more often than women who do not know if they have HIV.** These findings come from studies in Botswana, Côte d'Ivoire, and Thailand. In Botswana 89% of women with HIV wanted to replace feed and nearly all successfully did so at six

months postpartum. Conversely, mothers who did not know whether they had HIV preferred to breastfeed. In Botswana and Thailand, 91% and 83% of mothers respectively who did not know whether they had HIV chose to breastfeed.

- **Its high cost is a barrier to using replacement feeding successfully.** Even in programs where commercial infant formula was provided free, the cost of boiling water to use with the formula and to clean the utensils was too high for many people. In fact, providing free infant formula in Uganda did not lead to increased rates of exclusive replacement feeding but instead led to higher rates of mixed feeding—a feeding practice that mothers with HIV should avoid.

Exclusive Breastfeeding

- **In some places social pressures cause some women with HIV to choose exclusive breastfeeding even if they could replacement feed safely and thus better avoid risks of mother-to-child HIV transmission.** In South Africa most women with HIV who met the five criteria for safe replacement feeding (see box, p. 9) decided to exclusively breastfeed. They cited family expectations, stigma, and disclosure of their HIV status as their reasons.
- **Findings are mixed on whether women with HIV can successfully stop breastfeeding completely without a period of weaning.** In Nigeria and Uganda some women were able to stop breastfeeding abruptly, while others followed community norms that call for practicing a period of weaning. Also, in Uganda, many women were able to wean early (by seven months). They reported that education on mother-to-child HIV transmission, counseling, and help from relatives and friends made the difference to help them wean early.
- **Clinic and home-based counseling, combined with breastfeeding promotion in communities, increases rates of exclusive breastfeeding.** In South Africa community promotion involving posters, pamphlets, and newspaper articles together with provider support for breastfeeding helped more mothers with HIV breastfeed exclusively and for more weeks.

Mixed Feeding

- **The majority of mothers with HIV who begin either exclusive breastfeeding or replacement feeding switch to mixed feeding within a few months.** Avoiding mixed feeding helps reduce mother-to-child transmission of HIV. Yet, even mothers with HIV who receive strong support to maintain either exclusive breastfeeding or complete replacement feeding end up mixed feeding.

Counseling and Informed Choice

- **Most guidance on infant feeding from health counselors or program policies contains a bias towards one feeding option or another.** In a majority of the

Five Criteria for Replacement Feeding

WHO and other UN agencies advise that mothers with HIV avoid breastfeeding if replacement feeding meets five essential criteria. Together, the criteria are commonly referred to as the AFASS criteria, for the first letter of each of the criteria.

1. Acceptable: A mother has family and community support to replacement feed, or is able to cope with pressure from family and friends to breastfeed. Replacement feeding may not be acceptable where it is associated with HIV or in places where it is not known.

2. Feasible: The mother or family has adequate time, knowledge, skills, and other resources to prepare the replacement food correctly and feed the infant up to 12 times in 24 hours.

3. Affordable: The mother and family, with community or health care program support, can pay for the cost of purchasing, preparing, and using replacement feeding. If a mother begins replacement feeding and is unable to buy more formula, her child's health is put at risk.

4. Sustainable: The mother can obtain a continuous and uninterrupted supply of safe replacement feeding for up to one year of age or longer. Programs that supply free formula solve the affordability problem, but may not be able to sustain the free formula for as long as the infant needs.

5. Safe: The mother can prepare and store replacement foods correctly and hygienically. She will need clean water to be able to sterilize bottles and other feeding equipment.

studies reviewed, the bias among providers was in favor of replacement feeding and/or against exclusive breastfeeding for mothers with HIV—feeding options that WHO guidelines do not recommend for mothers with HIV (see “World Health Organization Updates Infant Feeding Guidance,” p. 2). Studies show that mothers want advice of health care workers on infant feeding and follow their advice. Thus providers who are well informed and able to give a balanced perspective on infant feeding options can help women adopt a practice that is in the best interests of themselves and their infants.

- **Many counselors do not ask enough questions about a mother's situation to assess her infant-feeding situation.** Few counselors ask a mother if she has money to buy formula, water, and fuel. Also, counselors rarely ask whether or not a mother has disclosed her HIV status to her partner, family, or friends. In South Africa, training providers specifically on how to identify safe replacement feeding conditions helped them successfully balance the counseling messages that they gave mothers.

The Role of Community, Partner, and Family Support

- **Programs directed to partners and families to improve knowledge or reduce misunderstanding of HIV/AIDS are a good starting point for addressing social stigma and for increasing community support for women with HIV.** Programs also need to work with community members directly to address issues of stigma. In parts of India and South Africa, studies have found that, even where levels of knowledge about HIV are high, a great deal of social stigma remains. In Zambia a study found that conducting a public education program and improving services to reduce mother-to-child HIV transmission helped reduce the stigma associated with HIV infection.
- **Mothers with HIV are more successful at replacement feeding when their partner and family support them.** Often, a woman with HIV is discriminated against when her family learns that she is infected. The ability of mothers to maintain their infant feeding decisions often depends on having a supportive partner. For example, the study in Zambia showed that involving men in the counseling process resulted in greater support for the mothers and their decisions.

Improved knowledge and practices among end-users of mother-to-child transmission of HIV prevention services in rural Zimbabwe

Authors: Orne-Gliemann, J., Mukotekwa, T., Perez, F., Miller, A., Sakarovitch, C., Glenshaw, M., Engelsmann, B., and Dabis, F.

Sources: Tropical Medicine and International Health 11(3): 341–934. Mar. 2006.

POPLINE Ordering Number: 297416

Note: This study evaluates the effect of a campaign to prevent mother-to-child HIV transmission in rural Zimbabwe on mothers' awareness and knowledge of available services and on involvement and support among community leaders. Community leaders provided input into the campaign and also learned about the services offered. Peer educators held discussions with women, health professionals, and the community leaders.

Key points:

- **Women have limited knowledge of ways to prevent transmission of HIV to their infants.** A survey conducted before the campaign found that women generally knew how HIV could be transmitted from mothers to their infants but often did not know that such practices as mixed feeding and breastfeeding for longer durations increased the risk of HIV transmission. Women also did not understand that breastfeeding could be good for their infants despite the risk of transmitting HIV, because the risks of illness and death could be even greater from feeding with unclean water and contaminated food.
- **Programs to prevent mother-to-child HIV transmission should find ways to involve community leaders and health professionals, as well as focusing on clients themselves.** Involving influential community members in developing educational messages and in outreach activities can help the community support programs and promote their services. Programs that involve health professionals can ensure that they understand infant feeding messages and convey them accurately.
- **A survey conducted after the campaign found that over twice as many mothers knew of the risk factors**



for HIV transmission through breastfeeding (see Table).

Knowledge that mothers could transmit HIV to their infants during pregnancy, delivery, and breastfeeding was higher than knowledge of the specific risk factors for transmission. The campaign improved levels of knowledge in every category, and particularly for breastfeeding. The percentage of women who knew that HIV transmission could occur through breastfeeding and who knew the risk factors for HIV transmission through breastfeeding increased the most.

Percent of women who knew about mother-to-child HIV transmission...	Before campaign	After campaign
during pregnancy	77%	91%
during delivery	60%	78%
during breastfeeding	64%	83%
risk factors during pregnancy	45%	54%
risk factors during delivery	22%	42%
risk factors during breastfeeding	23%	60%

Infant feeding dilemmas created by HIV: South African experiences

Author: Coutsooudis, A.

Source: Journal of Nutrition 135(4): 956–959. Apr. 2005.

POPLINE Ordering Number: 286237

Note: This study investigates the extent to which the Safer Breastfeeding Programme carried out in Durban, South Africa, from January 2000 to December 2003 helped mothers with HIV breastfeed their infants more safely and reduced the incidence of mother-to-child transmission of HIV through breastfeeding. Counselors trained in HIV and infant feeding helped mothers decide how to feed their infants. Mothers who chose to breastfeed were counseled on:

- Starting breastfeeding as soon as possible after delivery;
- Correctly positioning and attaching the infant to the breast to avoid mastitis;
- Breastfeeding their infants exclusively for up to six months;
- Preventing and coping with cracked, bleeding nipples or abscesses; and
- Expressing and heat-treating breastmilk.

Along with clinic-based counseling, the program included a campaign promoting exclusive breastfeeding in the clinic and community. About 70% of enrolled mothers and/or their infants were given one dose of the antiretroviral drug nevirapine to prevent HIV transmission from mothers to infants during delivery.

Key points:

- **Counseling women on safer breastfeeding can reduce mother-to-child transmission of HIV through breastfeeding.** Among mothers and infants enrolled in the program, the risk of HIV transmission was an estimated 0.35% per month of breastfeeding. This risk is about half the 0.74% risk of HIV transmission identified by a study pooling data from multiple countries in Africa (See “Late postnatal transmission of HIV-1 in breastfed children: An individual patient data meta-analysis,” p. 3).

- **After receiving counseling on preventing and caring for breast problems, some mothers experienced mild breast problems but few developed serious problems.** About 12% of mothers experienced cracked nipples, a rate similar to those in other studies. Counselors advised women with cracked nipples to apply pure lanolin ointment to the affected area and to continue breastfeeding. Mastitis was diagnosed in only 2% of women, whereas in others studies in Africa between 7% and 11% of women were diagnosed with mastitis. Women who developed mastitis were treated with antibiotics.
- **Stopping breastfeeding early is difficult for women with HIV.** About 90% of women who stopped breastfeeding when their infant was between six and nine months old said they had problems stopping. About 40% of women mentioned that either she or her baby became emotionally distressed as a result of weaning. A slightly lower percentage of women (36%) reported breast engorgement as a troublesome problem during weaning. Women also mentioned as problems the social stigma of stopping breastfeeding early and difficulty affording breastmilk alternatives.
- **Expressing and heat-treating breastmilk was unpopular among women studied—only 6% of women fed their infants heat-treated breastmilk.** In discussions, mothers reported that they were reluctant to use this method because:
 - The Department of Health provided no visible support for the method, especially through posters or media coverage;
 - Mothers believed that not enough breastmilk can be expressed to satisfy the baby’s hunger; and
 - No demonstrations of the heat-treatment process were given, and thus mothers lacked confidence in their ability to use it correctly.

Prevention of mother-to-child HIV transmission: Assessing feasibility, acceptability, and cost of services in Kenya and Zambia

Author: Horizons.

Source: Washington, D.C., Population Council, Dec. 2003. 16 p

Web site: <http://www.popcouncil.org/pdfs/horizons/hrptdec03.pdf>

POPLINE Ordering Number: 195988

Note: This study examines a pilot program at nine sites in Kenya and Zambia, where a package of services for prevention of mother-to-child transmission of HIV was integrated into existing maternal and child health programs. A total of 3,102 women selected from the sites participated in the study, sharing their experiences, knowledge, attitudes, and practices, their health status and that of their infants, and their satisfaction with services.

Key points:

- **Integrating HIV counseling into existing maternal and child health programs can reach women with-**

out HIV and those at risk for HIV. Despite initial concern that integration of services would scare women without HIV away from services because they feared being stigmatized with HIV, the number of clients using maternal and child health services did not decrease. The majority of pregnant women without HIV reported gaining knowledge about HIV infection as a result of HIV counseling during antenatal visits. More were able to name steps that they could take to reduce the risk of HIV transmission through breastfeeding.

- **Women find it difficult to practice exclusive breastfeeding.** Women at the pilot sites were counseled to avoid mixed feeding. Nonetheless, at three months after their infant's birth, one-third of women with HIV who began exclusive breastfeeding had introduced other foods. By six months, more than half of mothers with HIV were practicing mixed feeding. Women without HIV were

even more likely to introduce other foods besides breast-milk; 40% had introduced other foods by three months, while 90% had introduced other foods by six months.

- **To increase the effectiveness of integrated programs, the researchers recommend that counseling on mother-to-child HIV transmission offer additional services, including:**
 - Reinforcing exclusive breastfeeding;
 - Extending infant feeding counseling beyond antenatal care visits;
 - Following-up with clients in the postpartum period when women may be reassessing the feeding choice they made; and
 - Identifying strategies for helping women with HIV wean their infants before six months of age.

The Effects of Breastfeeding on the Health and Survival of Mothers with HIV and their Infants

Recent studies find that mothers with HIV do not face increased risks of illness or death if they breastfeed their infants. An earlier study in 2001 had caused concern that breastfeeding by mothers with HIV might drain them of energy and nutrients necessary to slow the rate at which HIV disease develops.

Many studies have examined the health effects of not breastfeeding and breastfeeding on the infants of mothers with HIV. Among infants born to women with HIV, breastfeeding protects against illness and death in the early weeks. As infants grow, the risk of hospitalization or death is the same as for non-breastfed infants.

The impact of breastfeeding on the health of HIV-positive mothers and their children in sub-Saharan Africa

Authors: Taha, T.E., Kumwenda, N.I., Hoover, D.R., Kafalufala, G., Fiscus, S.A., Nkhoma, C., Chen, S., and Broadhead, R.L.

Source: Bulletin of the World Health Organization 84(7): 546–554. Jul. 2006.

POPLINE Ordering Number: 303726

Note: This study, which was conducted in Malawi from 2000 to 2003 among 2,000 women with HIV, examines the effects of breastfeeding on the health of mothers and their children. The mothers and their newborns were enrolled at the time of birth and returned for follow-up visits at three-month intervals. The study uses the term “non-breastfeeding infants” to describe children who are fed anything other than breastmilk, including formula, cow’s milk, juice, and gruel. Thus the findings are most applicable where the five AFASS criteria for safe formula feeding cannot be met (for the criteria, see p. 9).

Key points:

- **Women with HIV who breastfeed are no more likely to become sick or die than non-breastfeeding women with HIV.** Such measures as number of hospitalizations, symptomatic HIV disease, medicine use, or limitations on physical activity show that breastfeeding does not cause HIV disease to progress faster. Among all mothers with HIV, whether breastfeeding or not, studies have found that the most important factor contributing to faster HIV progression is a higher viral load (the amount of HIV in the blood).
- **At six to eight weeks after birth, the risk of death is decreased among breastfed infants for both infants infected with HIV and those not infected with HIV than for infants not breastfed.** Infants with HIV have 64% less risk of death when breastfed and 57% less risk when exclusively breastfed than non-breastfed infants. Infants without HIV have 66% less risk of death when breastfed and 89% less risk when exclusively breastfed than non-breastfed infants.

Two-year morbidity-mortality and alternatives to prolonged breast-feeding among children born to HIV-infected mothers in Côte d’Ivoire

Authors: Becquet, R., Bequet, L., Ekouevi, D.K., Viho, I., Sakarovitch, C., Fassinou, P., Bedikou, G., Timite-Konan, M., Dabis, F., and Leroy, V.

Source: PLoS Medicine (4)1: e17. Jan. 2007.

POPLINE Ordering Number: 310971

Note: This study looked at the effect of replacement feeding with formula versus four months of exclusive breastfeeding on the health of infants born to mothers with HIV, two years after birth. Of 557 living children included in the study in



Abidjan, Côte d'Ivoire, from March 2001 to March 2003, 53% were formula-fed and 47% were breastfed for four months. The study also compared survival among infants given these two infant feeding options with survival among infants traditionally fed for longer durations.

Also see "Morbidity and mortality in breastfed and formula-fed infants of HIV-1-infected women" (POPLINE Ordering Number: 305138).

Key points:

- **Formula-fed infants have a slightly increased risk of diarrhea or acute respiratory infections by age two compared with infants' breastfed for four months and then weaned.** Formula-fed infants are 1.4 times more likely to experience diarrhea and 1.7 times more likely to experience acute respiratory infection compared with breastfed infants. These differences do not appear to affect malnutrition, hospitalization, or death rates.
- **Risk of hospitalization or death by age two was roughly the same for infants who were formula-fed as for infants who were breastfed for four months. Although hospitalization and death are not associated with whether the child was formula-fed or breast-fed, they are associated with whether or not an infant has HIV.** Among breastfed infants, the probability of remaining free from hospitalization or death was 0.89 among children without HIV, and 0.50 among children with HIV. Among formula-fed infants, the probability was also 0.89 among children without HIV, and 0.48 among children with HIV.
- **In a separate analysis, short-term breastfeeding and formula feeding resulted in higher chances of survival than with traditional long-term breastfeeding.** Survival was 92% and 93%, respectively, with the modified feeding strategies compared with 83% with long-

term breastfeeding. Among children not infected with HIV, survival was the same among the three groups.

Mortality of infected and uninfected infants born to HIV-infected mothers in Africa: A pooled analysis.

Authors: Newell, M.L., Coovadia, H., Cortina-Borja, M., Rollins, N., Gaillard, P., and Dabis, F.

Source: Lancet 364(9441): 1236-1243. Oct. 2004.

POPLINE Ordering Number: 275693

Note: This study analyzes results of seven clinical trials conducted in sub-Saharan Africa—in Burkina Faso, Côte d'Ivoire, Kenya, South Africa, Tanzania, and Uganda—to determine the effect of breastfeeding on infant mortality among children of women with HIV. Only mothers with HIV and their infants were enrolled in the trials. All of the infants were born before January 2000.

Key points:

- **Death among mothers with HIV is a significant predictor of infant mortality.** Among HIV-infected infants, maternal death and low maternal CD4+ cell counts are significantly associated with infant death. Among uninfected infants, maternal death (no matter what the cause) is the only significant risk factor for mortality.
- **Infants who acquire HIV through breastfeeding survive longer than infants infected during pregnancy or birth.** Infants infected with HIV through breastfeeding are about 60% less likely to die in the first two years of life than infants infected during either pregnancy or birth. This difference in survival is probably because infants who acquire HIV through breastfeeding generally do so after they have reached at least two or three months of age, when their immune systems are better developed than those of newborns.

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