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# Early Breastfeeding Cessation as an Option for Reducing Postnatal Transmission of HIV in Africa

## *Issues, Risks, and Challenges*

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# Acronyms

AED	Academy for Educational Development
AIDS	Acquired immunodeficiency syndrome
DHS	Demographic and Health Survey (published by Macro International Inc., Calverton, MD)
HIV	Human immunodeficiency virus
JHPIEGO	JHPIEGO Corporation (a nonprofit organization affiliated with Johns Hopkins University, Baltimore, MD)
MTCT	Mother-to-child transmission (of HIV)
NICHD	National Institute of Child Health and Human Development (U.S.)
PLWA	Person living with HIV/AIDS
RTL	Ready to Learn International Center on Care and Education of Children (of AED)
SARA	Support for Analysis and Research in Africa Project
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCT	Voluntary and confidential counseling and testing (for HIV/AIDS)
WHO	World Health Organization

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# Foreword

*Early Breastfeeding Cessation as an Option for Reducing Postnatal Transmission of HIV in Africa* examines the implications and risks of recent recommendations by the World Health Organization for modifying breastfeeding practices to reduce postnatal transmission of HIV in Africa. It is well known that breastmilk offers infants the greatest protection against infection, malnutrition, and premature death during early infancy. Exclusive breastfeeding for the first six months of life is therefore recommended for women worldwide. However, most of the nearly half-million children who died of AIDS in 1999 were infected by their HIV-infected mothers during pregnancy, birth, or breastfeeding. In industrialized countries, HIV-infected mothers are advised not to breastfeed. In Africa, however, HIV/AIDS is epidemic, and alternatives to breastfeeding are frequently unavailable, unaffordable, or culturally unacceptable.

Making breastfeeding safer for HIV-infected women who do not have access to safe, nutritious, and affordable breastmilk substitutes and replacement foods is therefore an urgent priority. The challenge is increased by a number of constraints, including the high prevalence and stigmatization of HIV/AIDS in Africa; a lack of voluntary HIV counseling and testing services; malnutrition, poverty, and household food insecurity; and inadequate access to safe water and sanitation.

This paper examines a practice for “modified breastfeeding” that involves exclusive breastfeeding followed by an early transition to exclusive replacement feeding. Recent research suggests that this may reduce the risks of postnatal HIV transmission, but the practice has not yet been tested through research or field programs. The authors of this paper review the potential benefits and risks of broadly implementing this modified breastfeeding practice in Africa. They raise serious concerns about the overall efficacy and safety of making the transition from current practices to the modified breastfeeding practice. They offer guidelines for making the transition easier for mothers, families, and children, and they strongly recommend further careful study of these and other feeding options for HIV-infected women.

The authors welcome your participation in this important debate.

# Executive Summary

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Given the essential role of breastfeeding in promoting infant survival, health, and nutrition, finding ways to make it safer for HIV-positive women to breastfeed is essential.

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Most of the half-million children worldwide who died from AIDS in 1999 were infected by their HIV-positive mothers during pregnancy, delivery, or breastfeeding (UNAIDS, 2000). In industrialized countries, HIV-positive mothers are instructed not to breastfeed. In Africa, however, alternatives to breastfeeding are frequently unavailable, unaffordable, or culturally unacceptable. Given the essential role of breastfeeding in promoting infant survival, health, and nutrition, finding ways to make it safer for HIV-positive women in Africa to breastfeed is essential.

In fact, most women in Africa do not know their HIV status because they lack access to confidential counseling and testing. Women who know they are HIV-positive have few low-cost options for reducing the odds of transmitting HIV to their babies.

Early cessation of breastfeeding was identified as one infant feeding option for HIV-positive women who find it difficult to avoid breastfeeding completely, who develop symptoms of AIDS during breastfeeding, or who are able to provide adequate replacement feeds after a few months of breastfeeding (WHO, UNAIDS, UNICEF, 1998). Indirect evidence from observational studies and mathematical modeling exercises suggest that exclusive breastfeeding followed by a rapid transition to exclusive replacement feeding may be one of the safest feeding options for HIV-positive mothers (WHO, 2000). This practice, which is still untested, provides infants with the many important benefits of breastfeeding for at least the first few months of life while reducing postnatal exposure to HIV by limiting the duration of breastfeeding.

One challenge associated with this “modified breastfeeding” — exclusive breastfeeding followed by a rapid transition to exclusive replacement feeding — is that it conflicts directly with current infant feeding patterns in Africa. Most African women breastfeed for about two years but seldom practice exclusive breastfeeding. Abrupt weaning does occur, but it is most frequently practiced in the second year of life, after the child has had time to become accustomed to solid foods. Furthermore, the literature strongly suggests that an abrupt switch from exclusive breastfeeding to exclusive replacement feeding without a transition can have serious health and psychosocial consequences for both mothers and infants. Infants may suffer dehydration, refusal to eat, malnutrition, psychological trauma, and lack of attachment. For mothers, abrupt weaning can result in engorgement, mastitis, and depression, and it can increase a mother’s risk of unwanted pregnancy.

This review suggests that a three-prong strategy for modified breastfeeding may help HIV-positive mothers mitigate the risks of postnatal transmission of HIV:

- ▶ Exclusive breastfeeding — no other liquids or food — for six months or until the decision is made to stop breastfeeding if that occurs before six months of age
- ▶ Transition feeding with expressed breastmilk fed by cup

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- Exclusive replacement feeding with breastmilk substitutes and family foods (i.e., no breastmilk).

This paper also describes a step-by-step process for making the transition from exclusive breastfeeding to exclusive replacement feeding. This transition includes accustoming the infant to cup feeding; providing skin-to-skin contact and use of massage and other means to comfort the baby in place of offering the breast; teaching the infant to sleep through the night; monitoring the infant's urine output to detect and prevent dehydration; switching from breastmilk to replacement foods; and supporting and caring for the mother. Many of the behaviors discussed in this review represent a major change in traditional infant care practices in Africa, and their feasibility and impact on child survival have yet to be determined. These recommendations, therefore, must be subjected to additional research and testing before guidelines can be developed for implementing them within HIV/AIDS and maternal child health programs for HIV-positive mothers.

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# 1. Introduction

Most of the half-million children who died from acquired immunodeficiency syndrome (AIDS) in 1999 were infected with human immunodeficiency virus (HIV) by their mothers during pregnancy, delivery, or breastfeeding (UNAIDS, 2000). In the absence of interventions to prevent mother-to-child transmission (MTCT) of HIV, an estimated 25 to 45 percent of HIV-infected untreated mothers will pass the virus to their infants.

The risk of HIV infection from partial breastfeeding (i.e., nonexclusive breastfeeding) by untreated HIV-infected mothers ranges from 10 to 20 percent, and about half of all postnatal transmission occurs after the first six months of life (de Cock et al., 2000; Piwoz, 2000a). Recent studies show that providing HIV-positive mothers with short-course antiretroviral drugs can reduce MTCT by 40 to 50 percent by six weeks post-delivery. However, even with this treatment, about 8 to 10 percent of mothers pass the virus to their babies through continued breastfeeding up to 24 months (Wiktor et al., 2000; Owor et al., 2000).

In industrialized countries, HIV-positive women are advised not to breastfeed as a means of preventing postnatal transmission of HIV. In Africa, however, alternatives to breastfeeding are frequently unavailable, unaffordable, or culturally unacceptable. Because breastfeeding offers the greatest protection against infection, malnutrition, and premature death among infants living in resource-poor settings (WHO Collaborative Study Team, 2000), cessation of breastfeeding by HIV-positive mothers who lack access to safe replacement feeding methods would create a very serious health crisis. Making breastfeeding safer for HIV-positive women who do not have access to safe, nutritious, and affordable breastmilk substitutes and replacement foods is therefore an urgent priority.

Several studies have used mathematical models to examine the impact of breastfeeding duration on the risks of infant HIV infection and mortality (e.g., Ross and Labbok, 2001; Krasovec, 2000; Kuhn and Stein, 1997; Nagelkerke et al., 1995). Because of breastfeeding's important role in promoting infant health, nutrition, and survival, initiation of exclusive breastfeeding followed by early breastfeeding cessation for women who know they are infected with HIV has been suggested as one means to reduce postnatal HIV transmission and is one feeding option offered by WHO, UNAIDS, and UNICEF (1998).

This recommendation gained further support following the publication of results from a study conducted in Durban, South Africa (Coutsoudis et al., 1999). This study's findings suggested that exclusive breastfeeding reduced infants' risk of postnatal HIV infection. The study observed that infants who were exclusively breastfed for at least three months had no excess risk of HIV infection at six months of age compared to infants who were not breastfed. In fact, the exclusively breastfed babies had significantly lower rates of HIV transmission at six months and at 15 months compared to infants who were partially breastfed and who also received other liquids or food in early infancy (Coutsoudis et al., 2001). The hypothesized explanations for the

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Modified breastfeeding — exclusive breastfeeding followed by a relatively rapid transition to replacement feeding — may reduce the risks of postnatal HIV transmission.

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reduction in HIV transmission risk were that exclusively breastfed infants are exposed to fewer bacterial contaminants and food antigens, which can damage the gut lining and cause inflammation. Other liquids and foods may compromise intestinal integrity, resulting in small lesions in the immature gut through which HIV can pass to infect the infant. Mothers who breastfeed exclusively may also follow practices that minimize breast inflammation, mastitis, and cracked, bleeding nipples — known risk factors for breastfeeding-related HIV transmission (Piwoz, 2000b).

These findings, combined with the fact that exclusive breastfeeding is currently recommended for women in the general population (that is, women who do not know their HIV status, who are not HIV-infected, or who are not at risk of HIV), give rise to a three-stage approach to modified breastfeeding for HIV-positive women:

- ▶ Exclusive breastfeeding — no other liquids or food — for six months or until the decision is made to stop breastfeeding if that occurs before six months of age
- ▶ A transition period when the infant is accustomed to new feeding patterns
- ▶ Exclusive replacement feeding with breastmilk substitutes and family foods (i.e., no breastmilk).

Each recommendation in this three-stage approach has its own particular challenges. Truly exclusive breastfeeding is seldom practiced in Africa. Mothers offer plain water or sugar water, even to newborns, and in many countries women supplement breastmilk with thin porridge beginning at two months of age or earlier (Haggerty and Rutstein, 1999). Although cup feeding is more common than bottle feeding throughout Africa, few mothers regularly express milk to feed to their infants. Infants commonly are breastfed into the second year of life, and the switch from breastmilk to other foods and liquids is normally very gradual. An early and rapid switch from exclusive breastfeeding to no breastfeeding is likely to cause intense discomfort for both mothers and infants. The likely result is that mothers will abandon the whole exercise in the absence of adequate preparation and support.

Such preparation and support has its own prerequisites, including the availability of voluntary and confidential counseling and testing (VCT) and the capacity to establish and maintain exclusive breastfeeding within the general population. Since this modified breastfeeding practice applies only to mothers who know they are infected with HIV, VCT services are necessary to identify mothers whose infants might benefit from these recommendations. Much has already been written on the topic of establishing and maintaining exclusive breastfeeding. Providing Baby-Friendly maternity care for all women and continued support within the community are essential (WHO, 1998a).

The challenge of adopting the practice of exclusive replacement feeding in the African context is also immense. In regions of Africa with high HIV prevalence, the incidence of malnutrition is high in children older than six months, even in the absence of HIV. Poverty and household food insecurity are major contributors. The nutritional quality of home-prepared weaning foods is generally poor, with deficits in energy, vitamin A, iron, calcium, zinc, and other essential nutrients (WHO, 1998b). In sub-Saharan Africa, only 50 percent of the population has

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access to safe water, and only 45 percent has adequate sanitation (UNICEF, 2000). Hygienic replacement feeding is difficult under such circumstances (Humphrey and Iliff, 2001), and most of these populations are reliant on breastmilk to nourish young children into their second year of life and beyond. For most women in Africa, breastmilk substitutes are costly and seldom used for infant feeding.

If conditions are appropriate for offering HIV-positive women the option of modified breastfeeding (exclusive breastfeeding followed by a relatively rapid transition to replacement feeding), health workers must be trained to help them succeed. Health care providers will have an enormous responsibility in ensuring that implementation of the practice is safe for both mothers and infants.

The remainder of this paper discusses issues and challenges involved in *making the transition* from exclusive breastfeeding to exclusive replacement feeding. The paper suggests practices that may make this change easier and safer for both mothers and infants. It is intended to inform individuals who are involved in programs and policies related to HIV and infant feeding in Africa. It may also be helpful for those seeking to develop guidelines for counseling and supporting HIV-positive mothers about infant feeding options.

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#### **Box 1.1. Weaning: The Process of Breastfeeding Cessation**

Weaning, or the process of stopping breastfeeding, is the time when an infant switches from being nourished on breastmilk alone to complete reliance on other food (Greiner, 1996). Weaning begins with the introduction of other foods or liquids and it ends with the last breastfeeding.

Researchers have defined three different types of breastfeeding cessation (Riordan and Auerbach, 1993):

**Gradual cessation of breastfeeding** takes place over several weeks or months. Children become accustomed to eating other foods and slowly replace breastfeeds with a modified adult diet. Gradual cessation of breastfeeding allows a mother to slowly reduce the number of breastfeedings and is the least traumatic approach for both infant and mother.

**Deliberate cessation of breastfeeding** is a "conscious effort initiated by the mother in order to end breastfeeding at a particular point in time" (Riordan and Auerbach, 1993). Mothers may decide to stop breastfeeding deliberately for several reasons, such as a desire to return to work, pressure from spouses for sexual access, desire for another child, or to comply with cultural norms regarding the child's age or developmental status. Deliberate cessation of breastfeeding can be done gradually or rapidly.

**Abrupt cessation of breastfeeding** is an immediate cessation of breastfeeding which may be forced on the baby by the mother or on both mother and baby by circumstances. Most reports of "abrupt weaning" suggest that it is generally practiced after the first year of life and more often around two years, when the child has already been consuming other foods for many months (Millard and Graham, 1985). In such cases, the child already has been involved in the process of switching from reliance on breastmilk to consumption of other foods. While the termination of breastfeeding is abrupt, other feeding habits are well established.

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## 2. Current Infant Feeding Patterns

Understanding current feeding patterns helps illustrate why implementation of early breastfeeding cessation may prove difficult, and it also points out behavioral issues that must be addressed within programs aimed at supporting the behavior among HIV-positive mothers in culturally sensitive and appropriate ways. Below is an outline of some of the most common feeding patterns observed in Africa, although it is important to recognize that these patterns vary among countries and ethnic groups and between urban and rural areas.

- **Long Duration of Breastfeeding:** In most African countries, breastfeeding is universally initiated. The average duration of breastfeeding is 18 to 25 months, as shown in Figure 2.1. Few infants under 12 months of age are not breastfed.

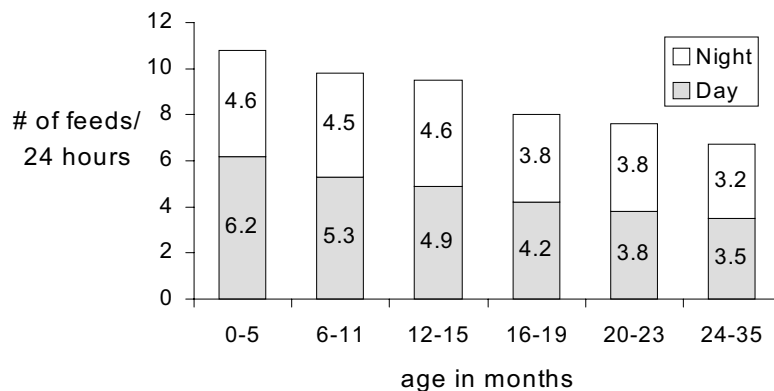
**Figure 2.1. Breastfeeding Patterns in Africa**

Country	Percent of Infants Not Breastfeeding at 6-11 Months Postpartum	Median Duration of Breastfeeding (months)	Percent Proportion of Infants 0-11 Months of Age Receiving Bottles
Burkina Faso 1993	1	25	2
Cameroon 1991	7	18	14
Central African Republic 1994-95	1	21	1
Côte D'Ivoire 1994	3	21	2
Ghana 1993	2	22	21
Kenya 1993	1	22	13
Madagascar 1992	3	20	not available
Malawi	1	21	5
Mali 1995-96	1	23	3
Namibia 1992	15	18	34
Niger 1992	2	22	3
Nigeria 1990	4	20	27
Rwanda 1992	1	28	2
Senegal 1992-93	2	20	5
Tanzania 1991-92	2	22	5
Uganda 1995	4	19	8
Zambia 1992	1	19	6
Zimbabwe 1994	2	18	7

Source: Haggerty P and Rutstein S. Breastfeeding and complementary infant feeding, and the postpartum effects of breastfeeding. Demographic and Health Surveys Comparative Studies No. 30. Calverton, MD: Macro International Inc., June 1999.

- ▶ **High Frequency of Breastfeeding: Infants** are breastfed on demand and are fed frequently during the first year of life, as illustrated for Kenyan infants in Figure 2.2. Ghanaian infants between one and six months of age are fed as often as 21 times per 24 hours (Lartey et al., 1999). With such high-frequency feedings, the duration of feeds is generally short.

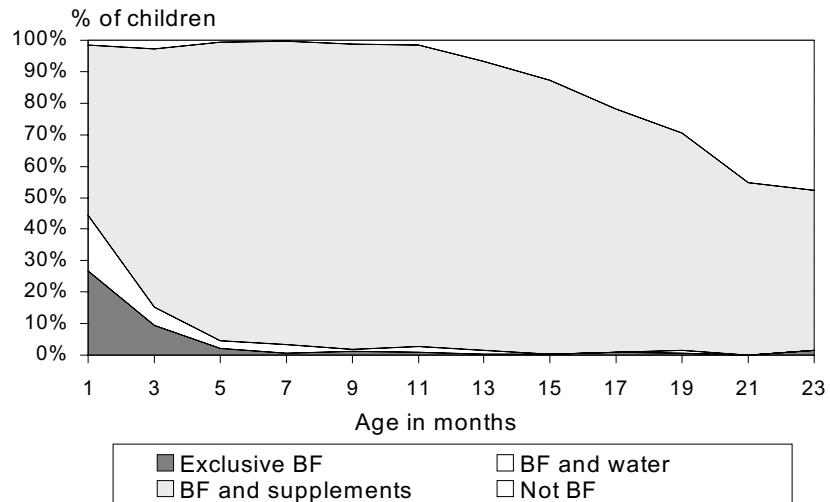
**Figure 2.2. Frequency of Day and Night Breastfeeds in Kenya**



Source: Demographic and Health Survey (DHS), Kenya. Calverton, MD: Macro International, Inc., 1993.

- ▶ **Frequent Night Breastfeeds:** Most infants sleep with their mothers during the night and are given free access to the breast. They continue to breastfeed at night well into their second year of life.
- ▶ **Introduction of Other Liquids and Foods:** Liquids are introduced into infants' diets quite early. By three months of age, nearly three-quarters of infants have received supplements, primarily water or thin porridge (few receive milk other than breastmilk). This means that the practice of exclusive breastfeeding is uncommon, even in the first few months of life. Figure 2.3 shows this typical feeding pattern using data from Kenya (1993).
- ▶ **Poor Nutritional Quality of Infant Foods:** Studies suggest that first foods given to young infants in Africa are nutritionally inadequate because they lack energy (particularly thin porridges), vitamin A, iron, zinc, and other essential nutrients (Bentley et al., 1991; Hung, 1992; Gibson et al., 1998; WHO, 1998b). Furthermore, infrequent feedings and small portion sizes contribute to low consumption of complementary foods by young children (Caulfield et al., 1999; Huffman et al., 2001).
- ▶ **Breastfeeding for Comfort:** Reports suggest that many infants are breastfed whenever they cry or are in need of comfort. Infants in Africa seldom use pacifiers.
- ▶ **Infant Feeding Implements:** African families use many techniques and implements to feed infants, including hands, spoons, cups, and gourds. In general, bottles are used infrequently

The practice of exclusive breastfeeding is uncommon, even in the first few months of life.

**Figure 2.3. Infant Feeding Patterns in Kenya**

Source: Demographic and Health Survey (DHS), Kenya. Calverton, MD: Macro International, Inc., 1993.

(see Figure 2.1), though they are not uncommon in some urban areas. Infants' morbidity and mortality risks are increased by the introduction of any food that is not breastmilk, regardless of the container. These risks are determined by such factors as household feeding and hygiene practices, the source of water, and the preparation and nature of the foods. The frequency of contamination of feeding implements used in urban and rural settings in Africa is not well documented.

- ▶ **Infant Feeding Logistics:** Infant feeding in most traditional African cultures centers around near-constant contact between infants and their mothers or other caregivers. Rural mothers often keep their infants with them as they work in their fields during the day — for example, tying them to their backs and shifting them to the front for breastfeeding. Once children are no longer breastfed, they are often left at home with other caregivers such as grandmothers or older siblings.
- ▶ **Passive Feeding Practices:** Most available reports suggest that active feeding ceases once mothers introduce other foods and children are eating a family diet. Mothers do not typically encourage their children to eat, nor do they talk to their children during feeding sessions (Engle et al., 2000). In some West African cultures, however, forced feeding has been observed — for example, mothers pouring gruel down an infant's throats while closing the nose to force mouth breathing (Oni et al., 1990).
- ▶ **Postpartum Amenorrhea:** Few African women are at risk of pregnancy in the first postpartum year because of current breastfeeding patterns and the associated postpartum amenorrhea (i.e., non-ovulation). Postpartum amenorrhea is especially important given the low contraceptive prevalence in Africa, and many women rely on breastfeeding to protect them

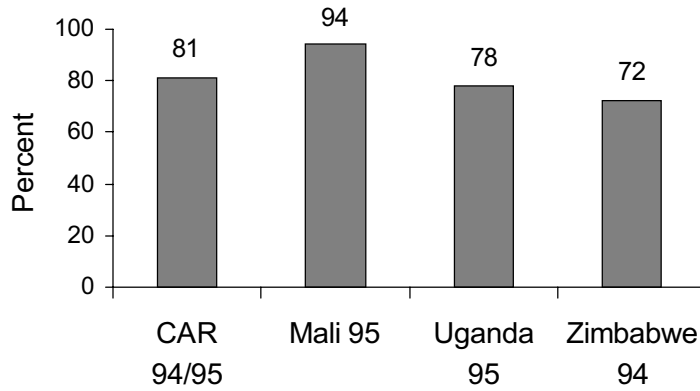
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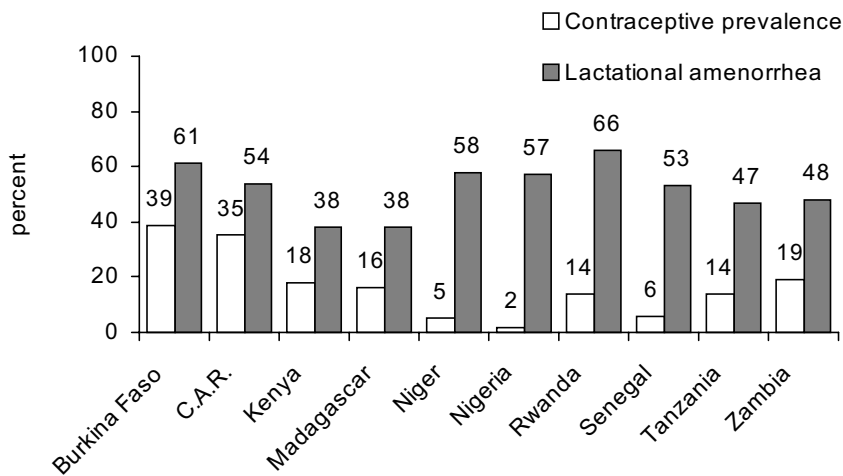
from pregnancy (Figure 2.4). At 12 months postpartum, many more women are amenorrhoeic than are using contraception (Figure 2.5).

**Figure 2.4. Proportion of Breastfeeding Mothers Who Rely on Breastfeeding to Prevent Pregnancy**



Source: Haggerty P, Rutstein S. Breastfeeding and complementary infant feeding, and the postpartum effects of breastfeeding. Demographic and Health Surveys Comparative Studies No. 30. Calverton, MD: Macro International, Inc., June 1999.

**Figure 2.5. Contraceptive Use and Lactational Amenorrhea at 12 Months Postpartum**



Sources: Amenorrhea data: Demographic and Health Surveys (DHS). Calverton, MD: Macro International, Inc., various years. Contraceptive prevalence data: Labbok M, Perez-Escamilla R, Peterson A, Coly S. Breastfeeding and child spacing country profiles. Washington, DC: Georgetown University, Institute for Reproductive Health, 1997.

### 3. Current Techniques for Rapid Cessation of Breastfeeding

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Rapid cessation of breastfeeding is uncommon, though not unknown. It generally occurs with older toddlers.

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Rapid cessation of breastfeeding is not unknown in Africa, but it more commonly occurs with older toddlers, around 18 months of age (Albino and Thompson, 1956; Almedom and de Waal, 1990; Dettwyler, 1987, Harrison et al., 1993; Rwanda Ministry of Health, 1994; Castle and Baum, 1993; Thompson and Rahman, 1967; Vermury and Levine, 1978; Cenac and Diallo, 1987; Mokena, 1988; Bornstein, 1974; Nydegger and Nydegger, 1966.) Women generally stop breastfeeding abruptly when they become pregnant or when a child reaches a particular age. Among the Hausa in Niger, for example:

Mothers are horrified at the idea of gradually reducing the number of times the child nurses per day by separating oneself from the child, or by refusing the breast or stalling to make the child wait longer and longer periods of time before nursing. For Hausa mothers, the abrupt termination means the child only suffers for one day and then the breast is forgotten — a much kinder, gentler process, in their view, than gradually reducing access to the breast. (Keith, 1991)

African women report using several techniques to facilitate the rapid cessation of breastfeeding:

- ▶ **Applying substances to the breast:** In many cultures, bad-tasting substances are applied to the breast to discourage children from suckling, including aloe, ashes, aspirin, betel juice, bitter herbs, cactus, chili pepper, chrysanthemum juice, garlic, iodine, mud, pepper, quinine, soot, tobacco juice, and turmeric (Jubber, 1991; Albino and Thompson, 1956; Thompson and Rahman, 1967; Helsing and Savage King, 1982; Vermury and Levine, 1978; Israel et al., 1983; Bornstein, 1974).
- ▶ **Separating mothers and infants:** Children are often sent to a grandmother for a few days or a few months (Jubber, 1991; Maher, 1967). In some cases, the grandmother provides her own breasts to pacify the child (Thompson and Rahman, 1967). Separation is believed to help a child “forget the breast” and spares mothers the difficulty of refusing the breast amid a barrage of crying.
- ▶ **Giving the child special food:** Providing special foods when breastfeeding ceases is common practice, particularly for toddlers (Keith, 1991; Nydegger and Nydegger, 1966; Levine and Levine, 1966).

- **Preventing access to the breast:** Some women cover their breasts to prevent access by the infant, for example, by wrapping them, wearing a tight dress or top, or wearing a one-piece dress (Castle and Baume, 1993; Keith, 1991).

These techniques do not always work, however. Studies in Sudan, Ethiopia, Uganda, and Peru that found that many mothers who try to stop breastfeeding quickly begin again to comfort their children (Almedom and de Waal, 1990; Bohler and Ingstad, 1996; Marquis et al., 1998<sup>1</sup>). Such failure among HIV-positive mothers may increase the risks of postnatal HIV transmission, since a return to breastmilk after the introduction of replacement foods may increase infants' vulnerability, as discussed in Section 1. The current high frequency of day and night-time feedings and the unavailability of other means to comfort infants accustomed to sucking at the breast may represent additional obstacles to success. Therefore, providing alternative methods of comforting infants and easing them into new feeding patterns before breastfeeding stops completely may help mothers make the transition to exclusive replacement feeding without relactation.

In summary, early breastfeeding cessation may present a viable approach for some HIV-positive mothers to reduce postnatal transmission of HIV, but it runs counter to traditional practices, which are characterized by the gradual introduction of liquids and foods and breastfeeding continuing until the second year of life. It is important, therefore, to distinguish this modified breastfeeding practice from traditional practices by pointing out the relatively rapid transition in the infant's diet, by providing caregivers with alternative methods of comforting infants, and by helping mothers ease their infants into new feeding patterns early in life.

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Providing alternative methods of comforting infants and easing them into new feeding patterns before breastfeeding stops completely may help mothers make the transition to exclusive replacement feeding without relactation.

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1. The study by Marquis et al. (1998) followed a random sample of mothers of 32 infants aged 12-24 months for eight months to assess breastfeeding practices around the time of weaning. They found that the median age at first attempt at weaning was 17.5 months. Twenty percent of women had tried and failed to wean their infants by 12 months of age, and 59 percent had attempted to wean but relactated. The weaning-relactation cycle was found to occur as early as three months of age and as often as four times during the first two years of life. Two-thirds of those who relactated did so because the child cried excessively and 16 percent because the child would not eat. Mothers were especially reluctant to wean because their poverty left them with few foods to use to entice anorexic children to eat, while breastmilk provided an excellent source of nutrition.

## 4. The Risks of Early and Rapid Breastfeeding Cessation

Early and rapid cessation of breastfeeding can cause physical and emotional trauma for both young infants and mothers. Infants may experience dehydration, refusal to eat, malnutrition, cognitive and social deficits associated with disruption of the mother-child bond, and a higher risk of abuse and neglect. For mothers, the effects may include painful engorgement, mastitis, pregnancy, and depression. Counselors who support HIV-positive mothers in implementing this modified breastfeeding option should be aware of the possible consequences for both mothers and children and be prepared to help mitigate them. Some of these issues are outlined below.

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### Box 4.1. The Risks of Breastfeeding Cessation

#### For Infants

- ▶ Dehydration
- ▶ Refusal to eat
- ▶ Weight loss and malnutrition
- ▶ Loss of special bond with mother
- ▶ Loss of sucking
- ▶ Increased risk of neglect

#### For Mothers

- ▶ Engorgement
- ▶ Mastitis
- ▶ Increased risk of pregnancy
- ▶ Depression
- ▶ Stigmatization

(Millard and Graham, 1985)

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## Risks for the Infant

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### Nutritional and Health Risks

- ▶ **Dehydration:** Many infants refuse to drink from cups or bottles when deprived of the breast, and this can quickly lead to dehydration.
- ▶ **Refusal to eat:** The stress of cessation of breastfeeding and unfamiliarity with feeding from a cup or bottle can lead infants to refuse to eat. This can cause lethargy and crying, which in turn can cause or exacerbate dehydration.
- ▶ **Weight loss and malnutrition:** Young infants who are not accustomed to eating other foods can quickly lose weight and become severely malnourished when taken off the breast. Infants who stop breastfeeding too early may develop marasmus (an extreme form of malnutrition) (Jelliffe, 1968). Infants removed from the breast may cry and fuss to indicate that their needs are not being met, but infants who are becoming malnourished also may become listless, silent, and withdrawn, and their physical decline therefore may go unnoticed by the mother and family. Health workers should be concerned about both the quiet, sleeping, “good” baby and the baby who indicates trauma by intense crying.

For early weaning, the most common breastmilk substitute in Africa is cow’s or goat’s milk, both of which are lower in most micronutrients than breastmilk. Vitamin A deficiency is a major concern in weaned infants because most vitamin A comes from breastmilk during the first two years of life and stores of vitamin A in infants are low (Humphrey and Rice, 2000; West et al., 1986; Tarwotjo et al., 1982; Cohen et al., 1983). Vitamin A deficiency is associated with higher rates of diarrheal and respiratory infection in children. High-dose vitamin A supplements need to be provided to infants near the time of breastfeeding cessation.

Scurvy occurred in the United States in the early 20<sup>th</sup> century among some children whose mothers boiled cow’s milk and thus destroyed the vitamin C content (Carpenter, 1999). A similar problem with scurvy and other micronutrient deficiencies may develop among African infants whose mothers boil their milk if they do not consume enough vitamins from foods. There is also a risk that feeding cow’s milk to infants and small children can result in blood loss from the gastrointestinal tract. In some children, such gastrointestinal blood loss appears to be nutritionally significant and may contribute to the development of iron deficiency anemia (Sullivan, 1993).

### Psychological Risks

- ▶ **Trauma:** Rapid cessation of breastfeeding causes trauma for the infant, manifested by intense crying (Nydegger and Nydegger, 1966; Harrison et al., 1993; Shostak, 1983), although as noted above, some infants may also become silent and withdrawn, especially if they are becoming malnourished. Marquis et al. (1998) report that weaning after 12 months was as-

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Young infants who are not accustomed to other foods can quickly lose weight and become malnourished when taken off the breast.

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sociated with short-term negative consequences, including a reversal in motor and language development, emotional disturbances (intense sorrow, resentment, crying, temper tantrums), learning difficulties, and physical problems (illness, weight loss, loss of appetite, and loss of sleep).

Gray (1996) notes that among the Turkana in Kenya, mothers abruptly stop breastfeeding when they become pregnant, and that this is a “traumatic event for both mothers and children.” Children were observed to respond with “frequent tantrums, loss of appetite and refusal to eat.”

When they are removed from the breast, infants lose their main opportunity for sucking, which is a major source of comfort, as are the skin-to-skin contact and warmth that breastfeeding offers. Being deprived of both breastmilk and comfort can make infants angry, frustrated, hungry, and sad, and they are likely to become fussy and cry.

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For young infants, if rapid breastfeeding cessation results in consistent physical or emotional distance from the mother, the attachment process will be drastically interrupted, and the impact can be severe, pervasive, and long-lasting.

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- ▶ **Loss of special bond with mother:** For an infant, breastfeeding confers a special claim to the mother’s care and attention, which cannot be assigned to others (Bohler and Ingstad, 1996; Harrison et al., 1993). When breastfeeding stops, infants lose this special claim, and they can be — and often are by tradition — “handed-off” to grandmothers or siblings.

In Africa, as noted, this transition commonly occurs around age two. Although this may be difficult even for a two-year-old, the traditional timing does not disrupt the fundamental process of attachment, or mother-child bond, which is usually complete by 18 months (Lier et al., 1995). On the other hand, for young infants, if rapid cessation of breastfeeding results in consistent physical or emotional distance from the mother, the attachment process will be drastically interrupted, and the impact can be severe, pervasive, and long-lasting. Insecure, ambivalent, or disorganized attachments are associated with multiple effects on children, including increased stress reactivity (Gunnar et al., 1996; Gunnar, 1998; Joseph, 1999); anorexia (Chatoor et al., 1998); non-organic failure to thrive (Klein, 1990); limited exploratory competence (Cassidy and Berlin, 1994); behavior problems in preschool, elementary school, and high school; and psychopathology in adolescence (Carlson, 1998). Attachment problems are also associated with limited competence in the domains of peer relations, conduct, school, work, and activities (Masten and Coatsworth, 1998).

Proximity, physical contact (Lowinger et al., 1995; Feldman et al., 1999; Lvoff et al., 2000), and responsive caregiving (Valenzuela, 1997) all play a major role in attachment formation. All three would be threatened by physical or emotional separation during an early cessation of breastfeeding.

- ▶ **Loss of sucking:** Sucking helps regulate an infant’s emotional and physical state and reduces stress. Sucking induces calm, reduces heart rate and metabolic rate, and elevates the pain threshold in rats and humans (Blass, 1994). Even non-nutritive sucking (on a pacifier or fingers) improves heart rate, oxygenation, and pain behavior (Bo and Callaghan, 2000; Shiao et al., 1997), the frequency of sleep and calm alert states (Gill et al., 1992), and nutrition and growth (Kimble, 1992). Unless replaced, the loss of sucking caused by an abrupt cessation of breastfeeding may leave the infant less able to cope with everyday stresses and

cause prolonged crying, which in turn may add to the mother's stress and erode the mother-child relationship.

- ▶ **Increased risk of neglect:** Children of mothers who suffer long-term depression are at higher risk of maternal neglect and abuse; mothers who are depressed and also have low levels of social support and/or high levels of stress are significantly more likely to maltreat their children (Kotch et al., 1999). Recent evidence indicates that childhood neglect is associated with reduced brain volume (Glaser, 2000), failure to thrive (Black et al., 1994), and personality disorders during early adulthood (Johnson et al., 1999). HIV-positive mothers who are considering abrupt cessation of breastfeeding may already face a lack of traditional support networks and enormous added stress associated with their HIV status.

## Risks for the Mother

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### Health Risks

- ▶ **Engorgement:** Breastfeeding women may produce 750 mL of milk or more every 24 hours. Missing a feeding at the breast may cause engorgement, plugging of ducts, and mastitis (Lawrence, 1994; Riordan and Auerbach, 1993). Engorgement involves congestion, increased vascularity, and accumulation of milk and may cause considerable pain. Engorgement afflicts one-third to two-thirds of postpartum women who decide not to breastfeed.<sup>2</sup> Anthropological studies report that even mothers of toddlers frequently suffer swollen and painful breasts during abrupt cessation of breastfeeding (Nydegger and Nydegger, 1966).
- ▶ **Mastitis:** Women who rapidly stop breastfeeding experience sudden, poor drainage of the breast. This can be reduced, but not eliminated, if they express their milk. Poor breast drainage can result in plugging of the ducts and, eventually, mastitis (swelling and inflammation of the breast, often accompanied by fever). For example, one study of 65 cases of mastitis found that nine of the women had missed feedings or rapidly stopped breastfeeding prior to the onset of illness (Marshall et al., 1975).

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2. Spitz et al. (1998) found that up to two-thirds of mothers who do not breastfeed experience moderate or severe engorgement and breast pain. Among women who used a brassier or binder, ice packs, or analgesics, moderate breast engorgement was reported in 21-52 percent and severe engorgement was reported in 1-44 percent. Moderate pain was reported in 29-68 percent of all women, and severe pain was reported in 10-33 percent. Kochenour (1980) looked at a compilation of studies which suggested that, among postpartum females who did not breastfeed, approximately 30 percent experienced leaking breasts, 30 percent experienced engorgement, and 40 percent experienced significant pain. Another study found a 55 percent incidence of lactation and a 45 percent incidence of pain and engorgement among 75 nonbreastfeeding mothers (Kosar et al., 1959).

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Women can quickly become pregnant once they resume menses or stop breastfeeding, a fact that may be unknown to African women.

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Studies show a higher incidence of clinical mastitis in industrialized countries than in Africa.<sup>3</sup> This may be explained by African women's more frequent breastfeeding. Reducing the frequency of breastfeeding to accommodate early cessation of breastfeeding therefore may increase rates of mastitis, even if the process is not rapid or abrupt.

Mastitis can be especially dangerous for immune-compromised women, such as those with HIV infection, because it may lead to systemic infection and breast abscesses. Furthermore, elevated breastmilk sodium, due to inflammation or reduced breastmilk production, and mastitis are associated greater risks of HIV transmission during breastfeeding (Semba, 1999; Semba et al., 1999; Willumsen et al., 1999).<sup>4</sup>

- ▶ **Increased risk of pregnancy:** The risk of pregnancy is very low among women who exclusively breastfeed during the first six months postpartum. Exclusive breastfeeding extends the duration of amenorrhea (non-ovulation) and less than 2 percent of women who fully breastfeed day and night and are amenorrheic risk pregnancy during the first six months postpartum. However, women can quickly become pregnant once they resume menses or stop breastfeeding, a fact that may be unknown to African women, who are used to being protected from pregnancy by breastfeeding. Closely timed pregnancies can be detrimental to the health of the mother, her infant, and her fetus.

## Psychological Risks

- ▶ **Grief and loss:** The potential for lifelong damage to infants from disruption of the mother-child attachment was emphasized above. The loss, however, cuts both ways. Mothers are nourished by bonding with their young infants and will mourn the loss of these close bonds even if they initiate the change in this relationship. Disruption of the normal mother-infant bond may cause extreme sadness, grief, and loss for a mother.
- ▶ **Depression:** Mothers who rapidly stop breastfeeding may experience extra emotional stress and fatigue if the infant reacts to abrupt cessation of breastfeeding with excessive crying, waking at night, and refusal to eat. Hearing her infant cry without being able to provide the comfort of breastfeeding can be anguishing for the mother, especially where prolonged cry-

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3. A cohort of 350 mothers in New Zealand were followed for one year postpartum. Twenty-four percent reported one or more episodes of mastitis symptoms, and 17 percent reported symptoms including fever. Sixteen percent received one or more courses of antibiotics for mastitis, and 8.5 percent of the total had recurrent episodes of mastitis symptoms (Vogel et al., 1999). A study in Australia found an incidence of approximately 20 percent in the first six months after delivery. Most occurred in the first seven weeks after delivery (Kinlay et al., 1998). Another study in Australia found a cumulative incidence rate for lactation mastitis of 27.1 percent and a cumulative recurrence rate of 6.5 percent. Fifty-one percent occurred in the first two weeks postpartum (Fetherston, 1997). It is probable that the incidence of mastitis would be high among women who abruptly wean.

4. Sub-clinical mastitis, as indicated by an elevated breastmilk sodium concentration, was present in 10-20 percent of lactating women in the first few months postpartum in Malawi, Bangladesh, and Tanzania (Semba et al., 1999; Filteau et al., 1999a; Filteau et al., 1999b). Subclinical mastitis has been associated with an increased concentration of HIV in breastmilk (Tomkins, 2000; Willumsen et al., 1999).

ing is considered unacceptable, as in most non-industrialized cultures. Maternal depression can lead to poor caregiving practices which may affect the child's nutritional status, health, and psychosocial development.

Rapid cessation of breastfeeding causes a sudden drop in the mother's blood levels of prolactin, which is associated with feelings of well-being. This drop is more pronounced if breastfeeding cessation occurs earlier in lactation because prolactin levels are higher immediately postpartum (Lawrence, 1994). A sudden drop in prolactin may be associated with feelings of sadness and depression (Lawrence, 1994).

Maternal depression may be compounded by loss of the special status conferred on breastfeeding mothers, the loss of the mutual comfort provided by the breastfeeding activity itself, and the loss of the wonderful and satisfying power associated with the ability to comfort, calm, and nourish an infant in a way no other family member can. Sadness is a common response among American women when they stop breastfeeding, especially if the cessation does not occur according to their own feeding plans (Chezem et al., 1997).

Depressed mothers tend to be withdrawn, intrusive, or disorganized, providing inadequate stimulation and arousal modulation (Field 1998a). In addition, children of depressed mothers show more emotional and behavioral disturbances and delays in expressive language development at two years of age (Cox et al., 1987) and perform less well on measures of cognitive-linguistic functioning at three years of age (NICHD, 1999). One recent review of research on maternal depression notes that infants as young as three months are able to detect depression in their mothers. The study concludes: "depressed mothers are sufficiently different from non-depressed mothers in affect and interaction that the social, emotional, and cognitive functioning of their infants are compromised" (Weinberg and Tronick, 1998).

- **Stigmatization:** Women who rapidly stop breastfeeding when their children are very young may quickly be identified by the community as being HIV-positive and may face the added stress of having to deal with the prejudice and stigma that often accompany HIV infection.

## Risks for Other Family Members

Other family members may be affected by rapid cessation of breastfeeding. For example, a baby that cries for prolonged periods may be distressing and disturbing for the entire household. Since these family members are likely to be the mother's primary support system, their distress may affect the level of support and comfort provided to both mother and child. Sleep disturbance within the household may negatively affect family members' breadwinning potential, ability to carry out physical labor, mood, and emotions — all at a time when the mother most needs their help and emotional support.

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Mothers who rapidly stop breastfeeding may experience extra emotional stress and fatigue if the infant reacts to abrupt cessation of breastfeeding with excessive crying, waking at night, and refusal to eat.

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# 5. The Transition from Exclusive Breastfeeding to Exclusive Replacement Feeding

This review suggests that a three-stage strategy for modified breastfeeding may help HIV-positive mothers mitigate the risks of postnatal transmission of HIV:

- ▶ Exclusive breastfeeding — no other liquids or food — for six months or until the decision is made to stop breastfeeding if that occurs before six months of age
- ▶ A transition period when the infant is accustomed to new feeding patterns
- ▶ Exclusive replacement feeding with breastmilk substitutes and family foods (i.e., no breastmilk).

Some of the behaviors associated with this three-stage modified breastfeeding strategy represent a major change from traditional infant care practices, and this may make it difficult or impossible for HIV-positive women to successfully make an early transition from exclusive breastfeeding to exclusive replacement feeding. For example, mothers may not be willing to express their breastmilk or to use a cup to feed their infants; or family members may consider these practices to be cruel or unhealthy for a young and fretful baby.

Even so, HIV-positive mothers who choose to stop breastfeeding early must be helped to do so as safely as possible. Suggestions for how this may be done in a way that reduces risks and discomforts for mothers, infants, and families are given below. It is very important to point out that neither the strategy suggested here, nor the general recommendation to minimize the period of transition from exclusive breastfeeding to exclusive replacement feeding (WHO, 2000), have been formally tested. Before these practices can be recommended broadly, their feasibility and impact will need to be tested in the field.<sup>5</sup>

In light of these concerns, it is firmly recommended that programs move carefully in introducing modified breastfeeding recommendations and that counselors be provided with clear information about how to inform and support women and families who choose to implement this feeding option. The need for a measured approach is underscored by the fact that early ter-

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Both the strategy suggested here and the general recommendation to minimize the period of transition from exclusive breastfeeding to exclusive replacement feeding must be subjected to research and field testing before they can be broadly recommended.

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5. Studies are currently being carried out in Zambia (Thea, personal communication) and South Africa (Rollins, personal communication) to assess the feasibility and impact of exclusive breastfeeding followed by a rapid transition to exclusive replacement feeding.

mination of breastfeeding by women in Africa who do not know their HIV status but fear they are infected would have a devastating impact on infant health and survival.

Guidelines must be developed and tested to assist those HIV-positive women who choose early breastfeeding cessation to safely and comfortably make the transition from exclusive breastfeeding to exclusive replacement feeding. Failure to provide feasible recommendations and support may undermine other efforts to counsel HIV-positive women and their families on infant feeding matters.

Box 5.1 summarizes a process by which mothers can smooth this transition by gradually getting their infants accustomed to less frequent feeding from the breast and to drinking expressed breastmilk from a cup. These intermediate steps are crucial for minimizing the risks (outlined in Section 4) of adopting the proposed strategy for both mothers and infants. The remainder of this section reviews each step in detail.

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Failure to provide feasible recommendations and support may undermine other efforts to counsel HIV-positive women and their families on infant feeding matters.

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#### **Box 5.1. Making the Transition from Exclusive Breastfeeding to Exclusive Replacement Feeding**

1. Start the transition when the mother decides she soon will be unable to exclusively breastfeed, preferably at about five months of age.
  2. Express breastmilk.
  3. Accustom the infant to cup feeding with expressed breastmilk.
    - ▶ Have the mother feed expressed breastmilk to the infant by cup between breastfeedings.
    - ▶ If the infant refuses the expressed breastmilk in a cup, have another caregiver try.
    - ▶ If the infant still refuses the expressed breastmilk, wait until the infant is very hungry and try again.
    - ▶ Repeat these steps until the infant readily takes breastmilk from a cup.
    - ▶ Once the infant readily takes breastmilk from the cup, eliminate one breastfeeding, feeding the infant instead with a cup of expressed milk.
  4. Find alternative means to comfort the infant during day and night.
    - ▶ Help the baby to sleep through the night to avoid nighttime food preparation and feeding.
    - ▶ As feedings are reduced, find alternative ways to meet the infant's suckling needs, such as sucking on the mother's or infant's finger or forearm, or sucking a special toy or cloth that is always kept clean.
    - ▶ Comfort the infant when he or she awakens by rocking, singing, carrying, or practicing infant massage. If comforting alone is insufficient to soothe the infant, have the mother or other caregiver feed the infant with expressed milk in a cup during the night.
  5. Monitor the infant's urine output. To ensure that the infant is taking in enough milk, monitor urine output during the transition and after the start of replacement feeding.
  6. Start exclusive replacement feeding. Eliminate the final breastfeed and, on the same day, begin to feed the infant breastmilk substitutes or heat-treated expressed breastmilk. Do not replace milk feedings with family foods until the transition away from breastfeeding has been completed and the infant is growing well.
  7. Provide the mother adequate support and care to avoid complications of early, rapid breastfeeding cessation.
    - ▶ Prevent and treat breast engorgement.
    - ▶ Provide supportive counseling and education on how to feed and care for non-breastfed infants.
    - ▶ Provide family planning services.
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## Step 1. Start the Transition

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HIV-positive mothers should begin to accustom their infants to new feeding patterns prior to the time when they feel they can no longer breastfeed exclusively. Whenever possible, health workers may want to encourage mothers to begin the transition at somewhat later ages (e.g., at six months of age rather than three months) to ensure that infants receive optimal nutrition for a longer period. Also, at older ages, infants are more physiologically ready for non-milk foods. For example, by about five months of age, up and down motions of the jaw (referred to as “munching”) start to occur, permitting consumption of some solids regardless of whether teeth have erupted (Brown et al., 1998). Before six months, infants will suck on food rather than “munch” or chew it. Infants are also likely to be reaching for food and trying to feed themselves at about five to six months of age and can thus be more easily distracted from the breast by solids such as fruit.

Delaying breastfeeding cessation until six months of age also allows the infants more time to become accustomed to different feeding patterns (cup feeding, fewer breastfeeds, no nightfeeds) before the breast becomes unavailable. When breastfeeding cessation takes place early, more changes must occur within a shorter period of time, which may increase the difficulty for both mothers and infants.

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When breastfeeding cessation takes place early, more changes must occur within a shorter period of time, which may increase the difficulty for both mothers and infants.

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## Step 2. Express Breastmilk

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Starting an infant on expressed breastmilk in a cup eases the transition from exclusive breastfeeding to no breastfeeding by allowing the infant to become accustomed to alternative feeding patterns while the mother continues breastfeeding.<sup>6</sup> Otherwise, the change from breast to replacement feeding is more abrupt. Offering the first cup feeds with expressed breastmilk, which has a familiar taste and smell, helps minimize the trauma for the infant.

Expressing breastmilk is not always culturally acceptable. For example, in Uganda, there is a strong cultural prohibition against expressing breastmilk and feeding it to a baby (Steel and Sserunjogi, 1993). In Rwanda, mothers consider the idea of expressing breastmilk and feeding it to their children to be strange and unnatural (Wellstart International and Rwanda Ministry of Health, 1994).

Health providers will need to provide counseling and demonstrations to help mothers change traditional patterns and become familiar and comfortable with expressing breastmilk. Mothers must learn to express enough breastmilk to allow their infants to learn to drink from a cup, since no other liquids should be given in the first six months. (For more information on how to express breastmilk, see UNICEF, WHO, 1993.)

In order to successfully make the transition to exclusive replacement feeding, mothers will need support with childcare and household work because it takes almost twice as long to feed

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6. Expressed milk should be heat-treated when offered to infants who are no longer breastfeeding exclusively. More information on heat-treating is found in Step 6.

expressed milk than to breastfeed. First the mother must express the milk (which is slower than breastfeeding in obtaining the same amount of milk) and then she must feed her infant by cup. The time required for heat treatment is also considerable (see Step 6). Additional time is required to clean the feeding cup and any additional containers used to collect the expressed milk. This makes it especially challenging to feed expressed milk in some circumstances, such as at agriculture or market work sites.

### **Step 3. Accustom the Infant to a Cup**

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Infants need to be accustomed to feeding from a source other than the breast before breastfeeding is stopped. For an exclusively breastfed infant, this means receiving expressed breastmilk in a cup, bowl, or bottle.

Cup feeding expressed breastmilk has several advantages over bottle feeding. Cups are easier to clean, more readily available, more culturally appropriate, and more conducive of personal contact with the feeding infant than bottles. Although bottles with nipples may provide an infant with the satisfaction of sucking, the potential for pathogenic contamination is considerable in resource-constrained environments. Furthermore, a bottle can be administered without any contact, either visual or tactile, with the feeding infant. Propping bottles and feeding with a minimum of interaction pose the risk of social and emotional neglect for infants. In addition, bottle propping may increase the risk of choking (Perez-Escamilla et al., 1995). Cup feeding, in contrast, demands that the caregiver interact with the infant. Use of a cup is also less likely to interfere with breastfeeding during the transition period.<sup>7</sup>

One common concern is that cup feeding takes longer than bottle feeding. However, a randomized controlled trial found that there was no difference in the time required to feed a newborn with the same amount of milk delivered by cup (5.3 minutes) or by bottle (5.9 minutes) (Howard et al., 1999). However, cup feeding with expressed breastmilk requires additional time for milk expression, heat treatment when necessary, and cleaning of utensils, as noted in Step 2.

Cup feeding is used in hospitals in many developing countries, including the Mulago Hospital of Makerere University Medical School in Kampala, Uganda; the Kenyatta National Hospital in Nairobi, Kenya; and at the Jose Fabella Hospital in the Philippines (UNICEF, 1999). When studied in a U.S. hospital setting, cup feeding resulted in no difference in duration of feed, choking, apnea, or oxygen saturation (Marinelli, as reported by UNICEF, 1999). There are anecdotal reports of breastfed infants being quickly weaned to a cup at six to seven months of age in the United States (Furman, 1990). Cup feeding is already practiced in many parts of Africa (e.g., Piwoz et al., 1999).

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7. Data on bottle use suggests that even a daily bottle among given by breastfeeding mothers may have a negative impact of breastfeeding rates. In a U.S. study, women were randomly selected either to give a bottle each day to their infant from the second week to the sixth week of life or to give no bottles during this time period. The rate of breastfeeding at six months was 59 percent in the bottle-feeding group and 69 percent in the control group (Cronenwett et al., 1992). Even among the breastfeeding women in the control group who were not asked to give bottles, mothers gave one to two bottles a week for the first six weeks.

La Leche League suggests the “Don’t offer, don’t refuse” technique to teach infants to feed with a cup (Mohrbacher and Stock, 1997). As a mother starts to cup feed, she offers the cup instead of the breast. If the infant is unwilling to take the cup first, she gives the breast and tries again with the cup when the infant is less hungry.

Finally, there is a rich body of anecdotes but little actual research on making the transition from breast to alternative feeding modes. It is widely reported across cultures that some infants resist the bottle when introduced after the early weeks or months, preferring and insisting on the breast. Whether similar problems will plague African women attempting a rapid transition to cups or other implements is unknown, as is the likelihood that receptivity to cup feeding is heightened at some stages of infant development and lower at others. It is also unclear whether such strategies as having alternate caregivers, rather than mothers, do the feeds, or mixing expressed, heat-treated breastmilk with alternatives and phasing out the breastmilk over time are effective in lowering infants’ resistance to new feeding implements.

## **Step 4. Find Alternative Means for Comforting the Infant During Day and Night**

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Infants need sensory, cognitive, and social stimulation to foster normal brain development; therefore, skin-to-skin contact and opportunities for sucking is important even after breastfeeding ends.

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Breastfeeding has been clinically shown to relieve infant pain by three means: skin-to-skin contact, sucking (even non-nutritive), and taste/ flavor (sweet taste reduces pain) (Gray et al., 2000; Barr et al., 1994). Therefore, providing infants with skin-to-skin contact and opportunities for sucking is important even after breastfeeding ends. It is also imperative that infants receive sensory, cognitive, and social stimulation to foster normal brain development.

### **4.a. Help the Infant Sleep through the Night**

Traditional practices like feeding on demand throughout the night may leave caregivers sleep-deprived if this pattern is adapted to replacement feeding because they would need to work intermittently throughout the night to prepare alternative feedings. Thus having infants become accustomed to *not* feeding at night may help mothers make the transition from exclusive breastfeeding to replacement feeding.

An abrupt stop to night feedings can be traumatic for infants, and mothers may benefit from conditioning their infants to sleep through the night before they stop breastfeeding. However, this represents a major change in practice for most women in Africa and may be culturally unacceptable, both for mothers and for other members of the family. Box 5.2 outlines methods used in one study to help exclusively breastfeeding women in the United States help their infants sleep through the night. One hundred percent of the infants involved were sleeping through the night by eight weeks of age.

Breastfeeding frequency is higher among women who sleep with their infants than among those who sleep apart (McKenna et al., 1997). A common technique used in industrialized countries to start the process of breastfeeding cessation is to have the infant sleep separately or in another room. Mothers who are unable to separate from their infants and those who plan to

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Mothers may benefit from conditioning their infants to sleep through the night before they stop breastfeeding.

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**Box 5.2. Methods to Reduce Night Breastfeeding**

1. Breastfeed your baby late — around 22:00-24:00 hours. Accustom your baby to a late night feeding.
  - ▶ Reduce the number of night feedings gradually so that by four months the infant is not waking often to feed.
  - ▶ When it is near the time to stop breastfeeding, carry or rock the baby to sleep if he or she wakes in the night.
2. Try not to nurse the infant to sleep.
  - ▶ Instead, lay the baby down and pat his back gently and rhythmically to calm him and ease him into sleep.
  - ▶ Helping your baby fall asleep on his own will facilitate the transition to complete weaning because the baby will not rely only on breastfeeding to fall asleep.
3. Help your baby learn the difference between day and night.
  - ▶ Follow a nighttime ritual of bathing, cuddling, and feeding each night to accustom the baby to bedtime.
  - ▶ Don't overstimulate your baby with loud noise or play before bedtime.
  - ▶ This may help your baby sleep longer through the night, minimizing the disturbance to other family members.
  - ▶ If the baby wakes, determine if he or she is cold or uncomfortable first, and take care of these needs before feeding.
4. Sucking provides comfort to your baby.
  - ▶ Let your baby suck on its own fingers or on your forearm or finger if necessary.
  - ▶ Make sure that anything that goes in your baby's mouth is clean.

(Adapted from Pinella and Birch, 1993)

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continue sleeping with them after breastfeeding stops should begin the process by not breastfeeding while lying down in bed and, instead, getting out of bed to breastfeed at night. This helps the infants learn that the bed is no longer a place for breastfeeding and allows continued physical contact at night without the expectation of breastfeeding.

While elimination of night feeding during early infancy is possible, it is difficult for some women to maintain an adequate milk supply for exclusive breastfeeding if they do not feed at night. Breastfeeding at night is also important for maintaining lactation-related infertility. Therefore, night breastfeeding should continue until the mother decides to begin the transition to replacement feeding (for example, a few weeks before the planned change).

#### 4.b. Meet the Infant's Suckling Needs

Sucking can reduce pain and stress in young infants and is a means of comforting them (Field and Goldson, 1984; Blass and Hoffmeyer, 1991; Campos, 1994).<sup>8</sup> Encouraging the use of replacement sucking techniques therefore may help mothers calm their fretful infants. Infants can be encouraged to suck on their own or their mothers' fingers or forearms, or on a special clean toy or cloth. Pacifiers may or may not be appropriate depending on the culture and environment (Larsson and Dahlin., 1985).

It is important to note that pacifiers are generally not recommended for young infants because they can interfere with exclusive breastfeeding (Righard and Alade, 1997; Victora et al., 1993; Barros et al., 1995)<sup>9</sup> and also because of concerns about hygiene and the potential for disease. It may be better, therefore, to avoid the use of pacifiers or use them infrequently to calm a fretful infant. For example, pacifiers might be recommended for use only during the night when the infant awakes.

#### 4.c. Comfort the Infant

##### Promote Proximity, Holding, and Talking with Infants

As noted in Section 3, mothers may handle the stresses of stopping breastfeeding by physically separating themselves from their infants, but in doing so they lose the attachment-building benefits of proximity and touch. HIV-positive women may find that distancing themselves physically and emotionally from their infants helps them to manage the multiple stresses of exposing their HIV status and implementing alternative feeding patterns — and perhaps some natural resentment over these new problems — even if this tradition does not exist in their culture.

It will be essential to provide education and counseling to mothers about the importance of maintaining proximity and interaction with their infants even after they stop breastfeeding. The message is that, just as breastmilk must be replaced by other foods, the touching and talking that accompany breastfeeding must be maintained and, if possible, enhanced. Messages can be simple: “Talk to your baby. Sing to your baby. Say anything! It doesn't matter. Just being able to look at you and hear you helps babies grow and stay healthy.”

Successful ways to comfort infants include rocking, swaddling, continuous soft sound (“white noise”), human heart beats, other sustained sounds, and sucking on a pacifier (Korner and Thoman, 1972). Box 5.3 outlines some means by which mothers who have stopped breastfeeding can retain the interactive qualities of breastfeeding.

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Just as breastmilk must be replaced by other foods, the touching and talking that accompany breastfeeding must be maintained and, if possible, enhanced.

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8. In a study of newborns, those who sucked a pacifier exhibited less time spent crying during circumcision than those in the control group (31 percent for a pacifier dipped in sucrose, 45 percent for a pacifier dipped in water, and 61 percent for controls) (Blass and Hoffmeyer, 1991). Another study among newborns observed that pacifiers calmed infants receiving a heel prick more than rocking, but both were more effective than no intervention (Campos, 1994). Pacifiers were more likely to induce sleep than rocking.
9. Pacifier use has also been associated with lower rates of exclusive breastfeeding in the United States (Righard and Alade, 1997), and shorter durations of breastfeeding in Brazil (Victora et al., 1993; Barros et al., 1995). Breastfeeding problems were more common among mothers using pacifiers more than two hours per day than among those using pacifiers occasionally or not at all (Righard and Alade, 1997).

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**Box 5.3. Maintaining Psychosocial Stimulation After Breastfeeding Cessation**

1. Spend time with your baby.
    - ▶Your baby needs your attention even if you are not breastfeeding.
    - ▶Hold and cuddle your baby as often as possible.
  2. Cradle the baby during feedings.
    - ▶Make sure the baby's face is turned to you.
    - ▶Gaze at the baby during feeds for eye-to-eye contact.
    - ▶Switch cradling arms whenever necessary.
  3. Take your time when you feed your baby.
    - ▶Have patience since infants eat slowly and need time to swallow.
    - ▶Talk lovingly and caress your baby during pauses.
  4. Snuggle with the baby for a few minutes after each feed.
    - ▶This will allow you to be close to the baby and show your love.
    - ▶Provide skin-to-skin contact after feeding or whenever the baby is not hungry.
    - ▶Skin-to-skin contact may be made using other parts of your body, such as your back.
  5. Sleep with the baby after weaning has been completed.
    - ▶During the early weaning period, sleeping together may cause problems for mother and baby. At this time, the baby can sleep with the father or another adult who can provide comfort.
    - ▶After weaning, the baby may sleep with the mother again, but keeping the breasts covered is recommended to restrict access to the breast.
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### Practice Infant Massage

There is empirical evidence that infant massage therapy facilitates growth, reduces pain, increases alertness, diminishes depression, and enhances immune function (Field 1998b).<sup>10</sup> Of

10. Massage therapy has improved clinical course for premature infants, cocaine-exposed infants, HIV-exposed infants, infants parented by depressed mothers, and full-term infants without medication problems (Field, 1995). Of special interest is the study conducted with neonates born to HIV-positive mothers. Treatment infants were given three 15-minute massages daily for 10 days. The massaged group showed superior performance on almost every Brazelton newborn cluster score and had a greater daily weight gain at the end of the treatment period; control group infants in contrast showed declining performance (Scafidi and Field, 1996).

Less structured touch-focused interventions have also proved helpful with high-risk newborns. "Kangaroo care," which involves increased skin-to-skin contact, increases maternal responsiveness to at-risk infants (Tessier et al., 1998) and has been found to facilitate mother-infant attachment and sequential sensory development in premature infants (Feldman et al., 1999). "TAC-TIC" therapy (Touching and Caressing, Tend in Caring), a stroking intervention used in London hospitals with premature infants, has similar effects: stabilized cardiovascular responses, enhanced secretory immunity, and increased frequency of comfort behaviors (Hayes, 1998).

Most of the above studies were conducted in hospitals with pre-term at-risk newborns, a captive research population. There is additional evidence with older children and at least one study in a developing country to extend the generality of findings. Frequency of physical contact plays a role in attachment at four and seven months of age (Lowinger et al., 1995); extremely infrequent touching is associated with failure to thrive in children 9 to 19 months of age (Polan and Ward, 1994). One study in southern India followed infants through six months of age and showed a catch-up in weight gain for low birthweight infants enrolled in a massage program (Landers, 1989).

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Infant massage therapy facilitates growth, reduces pain, increases alertness, diminishes depression, and enhances immune function.

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particular importance is the evidence that infant massage contributes to the sense of well-being in grandparents and volunteers used in many massage therapy studies (Field, 1995) and elevates the mood of depressed mothers (Field, 1998b). HIV-positive mothers may help themselves by massaging their infants. Box 5.4 offers suggestions for conducting infant massage.

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**Box 5.4. Comforting and Stimulating an Infant with Massage**

1. Any kind of touching and stroking will benefit a child as long as it is done with patience, love, and care.
  - ▶Practice massage when your baby is neither hungry nor cranky (fussy).
  - ▶If your baby is sleepy, try again after a nap.
  - ▶Massage can help to comfort and relax you and your baby, and it also a way for you and the baby to bond.
2. To massage your baby's chest:
  - ▶With your hands together at the center of the chest, push out to both sides, following the baby's rib cage as if you were flattening a piece of cloth.
  - ▶Without lifting your hands, bring them around in a heart-shaped motion to the center.
3. To massage the baby's armpits and arms:
  - ▶Lift the arm and stroke the baby's armpit a few times. Do both armpits.
  - ▶Hold your hands together around baby's arm at the shoulder (as if you were holding a thick stick). Move your hands in opposite directions, back and forth, from baby's shoulder to hand, gently squeezing as you do. Stroke the other arm.
4. To massage the baby's stomach:
  - ▶Try the "two-handed scoop" using the outside of each hand, make paddling strokes on baby's tummy, one hand following the other, as if you were scooping sand toward yourself.
  - ▶Try the "walking stroke" using your fingertips to walk across your baby's tummy.
5. To massage the baby's legs:
  - ▶Try the "squeeze and twist." Hold the baby's leg as if you were holding a stick. Then move your hands up the leg together, turning in opposite directions and squeezing slightly.
  - ▶Try the "roll." Roll baby's legs from knee to ankle between your hands.
6. To massage the baby's back:
  - ▶Turn the baby onto his or her stomach. Start on its back with your hands together at the top, at right angles to the spine. Move your hands back and forth in opposite directions, going down the back to the buttocks, then up to the shoulders, and back down once again.

(Adapted from Gunzenhauser, 1990; Johnson and Johnson Pediatric Institute, 1998).

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## Step 5. Monitor the Infant's Urine Output

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Carefully monitoring the infant's urine output throughout the transition to replacement feeding helps ensure he or she is taking in enough milk and prevents dehydration. It is also a method that mothers and families may use to address their own concerns about safely completing the transition process. An infant should urinate at least six times in 24 hours (LINKAGES, 1999). Urine monitoring should continue when the infant is switched to replacement feeding.

## Step 6. Start Exclusive Replacement Feeding

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Exclusive replacement feeding should not begin until the mother and infant are comfortable with cup feeding and the other transitioning methods described in Steps 1-5.

If mothers feel they can no longer breastfeed exclusively, but they are also unwilling or unable to stop providing human milk, they may continue feeding their infants with expressed and heat-treated breastmilk while introducing family foods and breastmilk substitutes. Heat-treating is required to deactivate the HIV virus in human milk (WHO, UNAIDS, UNICEF, 1998) and reduce the risk of transmission during this period.<sup>11</sup> This gives infants some of the benefits of breastmilk and an opportunity to more gradually adjust to the change in flavor of the new breastmilk substitute, if this is a concern. This feeding pattern may continue until the mother is comfortable with exclusive replacement feeding and the infant is taking the foods well and growing.

Infants who are sick frequently and not growing adequately should be evaluated by a trained health provider before breastfeeding stops. If HIV-infection is suspected, or confirmed through appropriate testing, then breastfeeding cessation should not be recommended since these infants are likely to be placed in even greater risk of early death without the nutritional and other benefits of breastfeeding.

Once mothers begin exclusive replacement feeding, every effort must be made to ensure that their infants are fed frequently and patiently, with nutritious foods that will meet all their nutrient requirements. Programs should conduct nutritional and behavioral research to identify locally appropriate and nutritious foods for feeding non-breastfeeding infants. As noted above, such foods are rarely available in poor AIDS-affected families and communities. Non-breastfeeding infants of HIV-positive mothers are therefore at great risk of malnutrition, and their growth and development should be monitored regularly.

Non-breastfeeding infants should receive a vitamin A supplement before weaning, and they should also receive periodic high-dose vitamin A supplements per WHO guidelines (1997). If local diet assessments identify the likelihood of other nutrient deficiencies, then appropriate nutritional supplements will also be required.

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11. A study in Pretoria, South Africa, is testing the use of a simple pasteurization system to heat-treat breastmilk, as reported at the XIII International AIDS conference in Durban in July 2000. Dr. Bridget Jeffrey of Kalafong Hospital is testing the use of placing a jar containing 50-150 mL of expressed milk into a pot of 400-500 mL of water (the amount in a Coke bottle) that has boiled with vigorous bubbling. The milk is left in the hot boiled water for 20 minutes and then cooled for 15 minutes, after which it can be fed to the infant (Mundell, 2000).

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Mothers may continue feeding their infants with expressed and heat-treated breastmilk while introducing family foods and breastmilk substitutes.

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If HIV-infection is suspected, or confirmed through appropriate testing, then breastfeeding cessation should not be recommended.

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## Step 7. Provide the Mother Adequate Support and Care

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### 7.a. Prevent and Treat Engorgement

Breast engorgement can occur at any time during lactation if there is an interruption in the frequency or duration of feedings or in the baby's efficiency in removing the milk from the mother's breast.<sup>12</sup> Some strategies for transitioning from exclusive breastfeeding to no breastfeeding may increase the risk of breast engorgement and mastitis. If engorgement occurs while the baby is still exclusively breastfeeding, standard lactation management treatment for engorgement is recommended in order to maintain a sufficient milk supply and minimize the risk of mastitis (UNICEF, WHO, 1993). This treatment includes removing milk at least eight to ten times in any 24-hour period; manually expressing milk just enough to soften the areola so the baby can attach; using the warm bottle technique if necessary<sup>13</sup>; and using warm or cold packs. Although warm packs may stimulate swelling, the heat may be relaxing to the mother and might allow for more effective milk ejection reflex.

Once the infant is no longer breastfeeding, the mother will need to stop producing breastmilk. This should be done by gradually reducing milk production. This gradual reduction will reduce the risk of engorgement and minimize discomfort.

The gradual cessation of breastmilk production requires about two weeks, and possibly longer, if the mother has practiced exclusive breastfeeding. During this time, the mother will be removing milk from her breast through expression. To reduce milk production she should begin by eliminating one breast expression per day. After a few days, the milk supply will respond to the decreased demand/stimulation. Once supply responds to the decreased stimulation, the mother can eliminate another breast expression and wait a few days. The process continues until milk is no longer produced.

If engorgement occurs during this process, the treatment approach is to make the mother as comfortable as possible while not interfering with breast involution. Although the efficacy is still under discussion, cool cabbage leaves applied to the breasts and changed every two hours may decrease discomfort and swelling.<sup>14</sup> Cold packs will reduce breast vascularity and will often provide pain relief.<sup>15</sup> If available, pain may be alleviated with Ibuprofen or any available pain medication that does not interfere with her ability to care for her child. If the mother is still feeding her infant expressed human milk, then only Ibuprofen is recommended (Wester, personal communication; Creer, personal communication).

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12. The symptoms for engorgement include intense natural physical discomfort as a result of hard, swollen shiny breasts that are warm to the touch. A headache and backache are not unusual, as well as a fever of 37.8 -38 degrees Celsius (100-101.7 degrees Fahrenheit). Areolae are firm, and nipples are often flattened.

13. A warmed bottle (with the size of the open top that can fit easily over the nipple) is placed over the engorged breast to help pull out the nipple so the baby can suck. The bottle contracts as it cools, creating a vacuum.

14. Cabbage leaves have been used for the treatment of severe engorgement. While there is some literature (Roberts, 1995; Roberts et al., 1995; Nikodem et al., 1993), anecdotal evidence suggests it may help relieve engorgement pain.

## 7.b. Build Support Networks for Mothers

Many studies have shown the benefits of support groups for maternal and infant health,<sup>16</sup> and providing a means for HIV-positive mothers to talk about their experiences with early cessation of breastfeeding therefore may be beneficial. Holistic care and support, particularly among peers, is especially important for HIV-positive women.<sup>17</sup>

Mothers need to be reminded that they have decided to stop breastfeeding because they feel it is right for their infants, and that they are showing the loving care and responsibility that their children need to grow. If other mothers in the community have made other decisions, it does not mean that their decision is wrong. They will need support for what they are doing, and talking to others who have made the same choice (and whose children are a bit older) can be extremely helpful. Family and friends need to know how much the mothers care for their children, so they will encourage and support them as good parents.

The helplessness and hopelessness associated with depression may be partially alleviated by better information about survival, health issues, and rights. Isolation and stigma — sources of health-threatening stress by themselves — can be further reduced by the formation of groups. Women sharing experiences about the technical, financial, and social difficulties of early breastfeeding cessation may be able to act together to decrease them, as well as to comfort each other.

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Holistic care and support, particularly among peers, is especially important for HIV-positive women.

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15. Cold packs may help relieve engorgement swelling because they constrict blood vessels and decrease lymph and blood flow to the breast, decreasing initial engorgement (Wong and Stepp-Gilbert, 1985). Cold packs may be placed over the area of the breasts near the armpit for 15-20 minutes at least four times a day.

Wearing a firm, well-fitting bra may make the mother more comfortable. If she is engorged, it is recommended she wear it 24 hours a day (Lawrence, 1994). Breast binding, however, is not generally recommended since pressure on the breasts can cause plugged ducts or breast infections.

16. A recent study of two- to five-year-old children and their caregivers participating in the Longitudinal Studies of Child Abuse and Neglect reports that parents' "social capital" is strongly associated with positive developmental and behavior outcomes. The measures that best discriminated between levels of child functioning were the most direct measure of social capital: church affiliation, perception of social support, and support within the neighborhood (Runyan et al., 1998).

17. Kasolo et al. (1998) report that initiation of networking among HIV-positive women in Uganda has proved a positive approach in addressing problems of isolation and stigmatization. The Theta Organization, a branch of the National Community of Women Living with HIV/AIDS, is attached to traditional healers' clinics. They sponsor seminars and workshops to sensitize women on health and rights issues. Groups provide an opportunity to share experiences, identify common problems, and try to resolve them in a supportive environment. Theta has also sponsored economic self-help programs. As a result of these efforts, many more women have "come out" and begun working actively to help themselves and others.

Rose and Collins (1997) report on the multi-faceted efforts of AWOFs (AIDS Widow Orphan Family Support group) in Uganda. This organization promotes education and counseling, skill training, income-generating projects in pig-raising, tailoring, and poultry; it offers legal assistance, advocacy, and recreational activities. Among other results, the "inferiority complex among infected women is lower than before." Rose and Collins particularly emphasize the importance of education "that one can live positively for many years." One of the authors is an eight-year PLWA (person living with HIV/AIDS). Mothers may also need education about children's chances of remaining uninfected and/or healthy for many years.

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Success in adopting early cessation of breastfeeding depends to a considerable extent on whether the mothers feel certain in their hearts that they are doing the right thing.

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Success in adopting early cessation of breastfeeding, and in surmounting all its special challenges, will depend to a considerable extent on whether the mothers feel certain in their hearts that they are doing the right thing. Offering information about HIV transmission and replacement feeding will help mothers initiate the practice; offering support for their psychological needs and those of their infants will help them sustain it.

### **7.c. Provide Family Planning Services**

Once mothers resume menstruation, or prior to the time when they plan to stop breastfeeding, they should have access to counseling and family planning methods. Methods that prevent the transmission of HIV to partners (male and female condoms) are the obvious choices once intercourse is initiated in the postpartum period (Cates and Allen, 2000). It is essential that women also have an understanding of and access to effective methods before they stop breastfeeding in order to prevent subsequent pregnancies and to help protect their health and the health of their young children.

## 6. The Implications for Maternal and Child Health

The three-stage modified breastfeeding strategy discussed in this paper applies only to HIV-positive women in Africa who know their status and have decided to breastfeed. If these recommendations were to “spill-over” into the general population, with the effect of altering traditional infant feeding, child-rearing, and social practices, the result would be detrimental to the health, nutrition, and well-being of the majority of children who are not at risk of HIV infection.

For HIV-positive mothers, an early switch from exclusive breastfeeding to replacement feeding has been suggested as a means for reducing the risks of postnatal HIV transmission while maximizing the health and psychosocial benefits of breastfeeding. To date, however, there has been little research to examine the acceptability, feasibility, or consequences of this approach in practice, and such research is essential before this strategy is widely recommended as a public health measure. The transition approaches described in this paper may be helpful for mothers who wish to stop breastfeeding early, whether this transition is abrupt or occurs over a limited time period.

There are several real reasons for using caution in disseminating this modified breastfeeding practice. This advice is only appropriate for HIV-infected women who know their HIV status, are able to exclusively breastfeed for several months, and can provide appropriate breastmilk substitutes to their infants once breastfeeding has ceased. Even for these women, there are certain prerequisites for success. The woman must:

- ▶ have access to voluntary confidential counseling and testing (VCT) services
- ▶ agree to be tested for HIV
- ▶ return to obtain her HIV test results
- ▶ receive counseling on feeding options from a trained health professional or counselor
- ▶ choose to breastfeed exclusively
- ▶ receive counseling and support on how to exclusively breastfeed
- ▶ receive counseling and support on how to make the transition from exclusive breastfeeding to no breastfeeding
- ▶ receive counseling on how to safely feed a non-breastfed infant
- ▶ have access to suitable replacement foods, clean water, and other feeding utensils.

At present, relatively few women in Africa have access to either VCT services or appropriate infant feeding counseling (Israel and Huber, 1999). Experience to date with various MTCT pilot projects reveals that even where free testing, counseling, and prophylactic antiretroviral drugs are available, a significant portion of HIV-positive women do not receive these services because

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The modified breastfeeding practice outlined in this paper is only appropriate for HIV-positive women who know their HIV status, are able to exclusively breastfeed for several months, and can provide appropriate breastmilk substitutes to their infants once breastfeeding has ceased.

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of inadequate counseling, poor community involvement in the programs, and fear or stigma associated with the disease (Piwoz, 2000c).

Since exclusive breastfeeding is not a common practice in most African countries, support and counseling are essential to help women exclusively breastfeed. Readers are encouraged to consult Huffman et al. (2001), Morrow et al. (1999), Green (1999), and Lutter (2000) for strategies to support exclusive breastfeeding.

Guidelines for counseling mothers on how to make transition from exclusive breastfeeding to exclusive replacement feeding also will be essential and, although some suggestions for doing this are provided in this paper, caution is advised in implementing these proposed practices without further testing and experience. This modified breastfeeding strategy could result in increased rates of malnutrition, non-HIV infection, and infant mortality *unless* suitable, safe breastmilk substitutes are available, affordable, and hygienic to use. When such conditions do not exist, non-breastfeeding infants in Africa are at a significantly greater risk of death than breastfeeding infants (WHO Collaborative Team, 2000; Mbori-Ngacha et al., 2000). The problems associated with poor feeding have been well documented, and the difficulties poor women have in appropriately feeding non-breastfed infants are well known (Victora et al., 1999; Victora et al., 1993; Victora et al., 1987; Lutter, 2000; Cesar et al., 1999; Savage King, 1992).

It is also important to recognize that the impact of early and rapid breastfeeding cessation on maternal and infant health remains unknown. Mathematical models suggest that the number of HIV-infections that would be averted by early breastfeeding cessation is not likely to be great. According to one model, within a cohort of 200 infants born to HIV-positive mothers, approximately three infants would be saved from HIV-infection or mortality if women exclusively breastfed for six months and then rapidly ceased breastfeeding, compared to women who continued breastfeeding (Ross and Labbok, 2001). If the modified breastfeeding practice described in this paper is included among the several infant feeding options available to HIV-positive mothers, it will be important to balance the unsubstantiated *potential* benefit of the practice against the “also unknown health affects and other costs of achieving it” (Ross and Labbok, 2001).

In addition to the issues raised in this paper, the success of programs to change feeding practices among HIV-positive women will depend on several other factors. First among them is the strong stigmatization associated with HIV/AIDS and the difficulties this poses for targeted education, promotion, and counseling programs. Transforming the infant feeding practices of HIV-positive mothers who do not wish to be identified or singled out for behavior change will require careful planning, community outreach, and social support, as well as financial commitment. Such resources are currently scarce in the areas most affected by HIV. Without public education to build awareness and social support for new patterns of infant feeding, and without adequate counseling, mothers may be subjected to a difficult and isolating experience. They may be able to follow through only partially and end up with mixed feeding patterns that could increase rather than reduce HIV transmission.

Public education, counseling services, and support networks will be essential if any positive changes in infant feeding patterns are to be observed or promoted in the face of HIV. Specifically:

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This modified breastfeeding strategy could result in increased rates of malnutrition, non-HIV infection, and infant mortality unless suitable, safe breastmilk substitutes are available, affordable, and hygienic to use.

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Transforming the infant feeding practices of HIV-positive mothers who do not wish to be identified or singled out for behavior change will require careful planning, community outreach, and social support, as well as financial commitment.

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- ▶ Health service procedures and protocols should permit and reward **counseling** for mothers, caregivers, and other household members. In order to avoid infant dehydration, anorexia, malnutrition, persistent crying, and later behavior problems, mothers will need instruction and support to carry out the behaviors described in this paper. All caregivers will need education and counseling to help them manage hygiene and nutrition with new implements and foods. Mothers will be at risk for breast engorgement, mastitis, pregnancy, and depression. They will require counseling targeted to managing these risks. Equally important, they will need education and counseling to understand how to maintain the physical and personal interaction with infants that is essential to sound psychosocial and cognitive development and to the preservation of social bonds.
- ▶ **Community health services and support networks** will be required to aid and support mothers with new feeding practices. Mothers themselves deserve and need every possible support for taking action to prevent HIV transmission. Early cessation of breastfeeding is not a common practice. Expertise in how to implement some of the behaviors described in this paper will be unavailable to most families and will need to be added to the services provided by local health facilities. Finally, any change in breastfeeding practices may heighten suspicion that a mother has HIV/AIDS. This can result in spousal violence, community shunning, or expulsion. Community support networks are essential to help mothers cope with possibility for discrimination or stigmatization.
- ▶ **Political will** is required to give this issue priority in the face of many other crises in AIDS-affected nations and communities. In countries with high rates of HIV infection, social service staff losses are massive; competition for funding is fierce to support preventive, palliative, and “curative” care; and local social networks and community-based organizations are already overburdened. Bottom-up and top-down mobilization will be needed for effective action on the issue of infant feeding in AIDS-affected communities.

Careful further study is frequently suggested at the end of issue papers like this one. In light of the many serious issues and concerns raised, however, careful further study of these recommendations and all other feeding options available to HIV-positive mothers is not simply suggested, it is strongly advised.

# References

- Albino R, Thompson V. The effects of sudden weaning on Zulu children. *Br J Med Psychol* 1956;29:177-210
- Almedom A, de Waal A. Constraints on weaning: evidence from Ethiopia and Sudan. *J Biosoc Sci* 1990;22:489-500
- Barr R, Quek V, Cousineau D, Oberlander T, Brian J, Young S. Effects of intra-oral sucrose on crying, mouthing and hand-mouth contact in newborn and six-week-old infants. *Dev Med Child Neurol* 1994;36:608-18
- Barros FC, Victora CG, Semer TC, Tonioli Filho S, Tomasi E, Weiderpass E. Use of pacifiers is associated with decreased breast-feeding duration. *Pediatrics* 1995;95(4):497-99.
- Bentley ME, Dickin KL, Mebrahatu S, et al. Development of a nutritionally adequate and culturally appropriate weaning food in Kwara State, Nigeria: An interdisciplinary approach. *Soc Sci Med* 1991;33(10):1103-11.
- Black MM, Hutcheson JJ, Dubowitz H, Berenson-Howard J. Parenting style and developmental status among children with nonorganic failure to thrive. *J Pediatr Psychol* 1994;19(6):689-707
- Blass EM. Behavioral and physiological consequences of suckling in rat and human newborns. *Act Paediatr Suppl* 1994;397:71-76
- Blass EM, Hoffmeyer LB. Sucrose as an analgesic for newborn infants. *Pediatrics* 1991;87(2):215-18
- Bo LK, Callaghan P. Soothing pain-elicited distress in Chinese neonates. *Pediatrics* 2000;105(4):E49
- Bohler E, Ingstad B. The struggle of weaning: factors determining breastfeeding duration in East Bhutan. *Soc Sci Med* 1996;43(12):1805-15
- Bornstein A. Food and society in the Yemen Arab Republic. (ESN: MISC/74/4) Rome: Food and Agricultural Organization of the United Nations, 1974
- Brown KH, Dewey KG, Allen LH, et al. Complementary feeding of young children in developing countries: a review of current scientific knowledge. Geneva: World Health Organization, 1998
- Campos RG. Rocking and pacifiers: two comforting interventions for heelstick pain. *Res Nurs Health* 1994;17:321-31
- Carlson EA. A prospective longitudinal study of attachment disorganization/disorientation. *Child Dev* 1998;69(4):1107-28
- Carpenter KJ. Vitamin deficiencies in North America in the 20<sup>th</sup> century. *Nutrition Today* 1999;34(6):223
- Cassidy J, Berlin LJ. The insecure/ambivalent pattern of attachment: theory and research. *Child Dev* 1994;65(4):971-91
- Castle S, Baume C. The social context of infant feeding in Chikwawa district, Malawi. Culture and Breastfeeding Series. San Diego: Expanded Promotion of Breastfeeding Pro-

- gram, Wellstart International, April 1993
- Cates W, Allen M. Mother-to-Child HIV-1 transmission. *Lancet* 2000;356:945
- Caulfield LE, Huffman SL, Piwoz EG. Interventions to improve complementary food intakes of 6-12 month old infants in developing countries: Impact on growth, prevalence of malnutrition, and potential contribution to child survival. *Food Nutr Bull* 1999;20(20):183-200
- Cenac A, Diallo SB. Le sevrage infantile en milieux Haoussa, Djerma et Peul. *Med Trop* 1987;47(2):161-66
- Cesar JA, Victora CG, Barros FC, Santos IS, Flores JA. Impact of breast feeding on admission for pneumonia during postneonatal period in Brazil: nested case-control study. *BMJ* 1999;318(7194):1316-20
- Chatoor I, Ganiban J, Colin V, Plummer N, Harmon RJ. Attachment and feeding problems: a reexamination of nonorganic failure to thrive and attachment insecurity. *J Am Acad Child Adolesc Psychiatry* 1998;37(11):1217-24
- Chezem J, Montgomery P, Forman T. Maternal feelings after cessation of breastfeeding: influence of factors related to employment and duration. *J Perinat Neonatal Nurs* 1997; 11(2):61-70
- Cohen N, Measham C, Khanun S, Ahmed N. Xerophthalmia-implications for vitamin A deficiency preventive strategies. *Acta Paediatric Scand* 1983;72(4):531-36
- Coutsoudis A, Pillay K, Spooner E, Kuhn L, Coovadia HM. Influence of infant-feeding patterns on early mother-to-child transmission of HIV-1 in Durban, South Africa: a prospective cohort study. South African Vitamin A Study Group. *Lancet* 1999;354(9177):471-76
- Coutsoudis A, Pillay K, Kuhn L, et al. Method of feeding and transmission of HIV-1 from mothers to children by 15 months of age: prospective cohort study from Durban, South Africa. *AIDS* 2001;15(3):379-87.
- Cox AD, Puckering C, Pound A, Millis M. The impact of maternal depression in young children. *J Child Psychol Psychiatry* 1987;28(6):917-28
- Creer E. personal communication, 2000
- Cronenwett L, Stukel T, Kearney M, Barrett J, Covington C, Del Monte K, Reinhardt R, Rippe L. Single daily bottle use in the early weeks postpartum and breastfeeding outcomes. *Pediatrics* 1992;90(5):760-66
- de Cock KM, Fowler MG, Mercier E, et al. Prevention of mother-to-child HIV transmission in resource poor countries. *JAMA* 2000;283(9):1175-82
- Dettwyler K. Breastfeeding and weaning in Mali: cultural context and hard data. *Soc Sci Med* 1987;24(8):633-44
- Engle PL, Bentley M, Pelto G. The role of care in nutrition programmes: current research and a research agenda. *Proc Nutr Soc* 2000;59(1):25-35
- Feldman R, Weller A, Leckman JF, Juint J, Eidelman AI. The nature of the mother's tie to her infants: maternal bonding under conditions of proximity, separation, and potential loss. *J Child Psychol Psychiatry* 1999;40(6):929-39
- Fetherston C. Characteristics of lactation mastitis in a Western Australian cohort. *Breastfeed Rev* 1997;5(2):5-11
- Field T, Goldson E. Pacifying effects of nonnutritive sucking on term and preterm neonates

- during heelstick procedures. *Pediatrics* 1984;74:1012-15
- Field T. Massage therapy for infants and children. *J Dev Behav Pediatr* 1995;12(2):105-11
- Field T. Maternal depression effects on infants and early interventions. *Prev Med* 1998a;27(2):200-03
- Field T. Massage therapy effects. *Am Psychol* 1998b; 53(12):1270-81
- Filteau SM, Lietz G, Mulokozi G, Bilotta S, Henry CJK, Tomkins AM. Milk cytokines and subclinical breast inflammation in Tanzanian women: effects of dietary red palm oil or sunflower oil supplementation. *Immunology* 1999a;97:595-600
- Filteau SM, Rice AL, Ball JJ, Chakraborty J, Stoltzfus R, de Francisco A, Willumsen JF. Breast milk immune factors in Bangladeshi women in supplemented postpartum with retinol or beta-carotene. *Am J Clin Nutr* 1999b;69:953-58
- Furman L. Reactions to weaning. *Clinical Pediatrics* 1990;29(3):195
- Gibson RS, Ferguson EL, Lehrfeld J. Complementary foods for infant feeding in developing countries: their nutrient adequacy and improvement. *Euro J Clin Nutr* 1998;52(10):764-70
- Gill NE, Behnke M, Conlon M, Anderson GC. Nonnutritive sucking modulates behavioral state for preterm infants before feeding. *Scand J Caring Sce* 1992;6(1):3-7
- Glaser D. Child abuse and neglect and the brain—a review. *J Child Psychol Psychiatry* 2000;41(1):96-116
- Gray L, Watt L, Blass E. Skin-to-skin contact is analgesic in healthy newborns. *Pediatrics* 2000;105(1):e14
- Gray S. Ecology of weaning among nomadic Turkana Pastoralists of Kenya: maternal thinking, maternal behavior and human adaptive strategies. *Hum Biol* 1996;68(3):437-65
- Green C. Improving breastfeeding behaviors: evidence from two decades of intervention research. Washington, DC: LINKAGES, Academy for Educational Development, November 1999
- Greiner T. The concept of weaning: definitions and their implications. *J Hum Lact* 1996;12(2):123-28
- Gunnar MR, Brodersen L, Nachmias M, Buss K, Rigatuso J. Stress reactivity and attachment security. *Dev Psychobiol* 1996;29(3):191-204
- Gunnar MR. Quality of early care and buffering of neuroendocrine stress reactions: potential effects on the developing human brain. *Prev Med* 1998;27(2):208-11
- Gunzenhauser N. Advances in touch: new implications in human development. Johnson & Johnson Pediatric Round Table Series 14. Skillman, NJ: Johnson and Johnson Consumer Products, 1990
- Haggerty P, Rutstein S. Breastfeeding and complementary infant feeding, and the postpartum effects of breastfeeding. *Demographic and Health Surveys Comparative Studies No. 30*. Calverton, MD: Macro International Inc., June 1999
- Harrison GG, Zaghloul SS, Galal OM, Gabr A. Breastfeeding and weaning in a poor urban neighborhood in Cairo, Egypt: maternal beliefs and perceptions. *Soc Sci Med* 1993; 36(8):1063-69
- Hayes J. TAC-TIC therapy: a non-pharmacological stroking intervention for premature infants.

- Complement Ther Nurs Midwifery 1998;4(1):25-27
- Helsing E, Savage King F. Breast-feeding in practice: a manual for health workers. Oxford: Oxford University Press, 1982
- Howard C, de Blicke E, ten Hoopen C, Howard F, Lanphear B, Lawrence R. Physiologic stability of newborns during cup- and bottle-feeding. *Pediatrics* 1999;104(5):1204-07.
- Huffman SL, Green CP, Caulfield LE, Piwoz EG. Improving infant feeding practices: programs can be effective! *Nutr Rev* 2001; in press
- Humphrey J, Iliff P. Is breast not best? Feeding babies born to HIV-positive mothers: Bringing balance to a complex issue. *Nutr Rev* 2001;59(4):119-27
- Humphrey J, Rice A. Vitamin A supplementation of young infants. *Lancet* 2000;356(9227):422-24
- Hung MM. Evaluation de la valeur nutritive de trois preparations traditionnelles (koko, fura et tuwo) et de recettes preconisees par le projet PRITECH. Paper prepared for the PRITECH Project, Niamey, Niger, 1992
- Israel E, Huber D. HIV transmission through breastfeeding. Technical Guidance Series 1. Watertown, MA: Pathfinder International, December 1999
- Israel R, Nestor Tighe J, Blumensteil Taylor E, Wirtz, eds. Maternal and infant nutrition reviews. Bolivia: a guide to the literature. Newton, MA: International Nutrition Communication Service (INCS), Education Development Center, Inc., May 1983
- Jelliffe, EFB. Infant nutrition in the subtropics and tropics. Geneva: World Health Organization, 1968
- Johnson and Johnson Pediatric Institute. Touch...A Parent's guide to Infant Massage. Clifton, NJ: Johnson and Johnson Inc., 1998
- Johnson JG, Cohen P, Brown J, Smailes EM, Bernstein DP. Childhood maltreatment increases risk for personality disorders during early adulthood. *Arch Gen Psychiatry* 1999;56(7):600-06
- Joseph R. Environmental influences on neural plasticity, the limbic system, emotional development and attachment: a review. *Child Psychiatry Hum Dev* 1999;29(3):189-208
- Jubber K. Extreme methods of weaning. *Nursing RSA Verpleging* 1991;6(5):30-33
- Kasolo NS, Kiiza N, Nakijoba R. Networking among HIV positive women in Uganda: a 5-years PWAs experience. *Int Conf AIDS* 1998;12:508 (abstract no. 24353)
- Keith N. Young child feeding, weaning, and diarrhea illness: practice in a Hausa village and educational implications. Part I: The ethnographic study. (Assgn no: LPC 089-NG). Arlington, VA: Technologies for Primary Health Care (PRITECH) Project, February, 18, 1991
- Kimble C. Nonnutritive sucking: adaptation and health for the neonate. *Neonatal Netw* 1992;11(2):29-33
- Kinlay JR, O'Connell DL, Kinlay S. Incidence of mastitis in breastfeeding women during the six months after delivery: a prospective cohort study. *Med J Aust* 1998;169(6):310-12
- Klein MJ. The home health nurse clinician's role in the prevention of nonorganic failure to thrive. *J Pediatr Nurs* 1990;5(2):129-35
- Kochenour N. Lactation suppression. *Clin Obstet Gynecol* 1980;23(4):1045-59
- Korner A, Thoman E. The relative efficacy of contact and vestibular-proprioceptive stimulation

- in soothing neonates. *Child Dev* 1972; 43:443-53
- Kosar W, Nash W, Buxton C. The use of diensetrol to inhibit lactation in nonnursing mothers. *Am J Obstet Gynecol* 1959;65:639
- Kotch JB, Browne DC, Dufort V, Winsor J. Predicting child maltreatment in the first 4 years of life from characteristics assessed in the neonatal period. *Child Abuse Negl* 1999;23(4):305-19
- Krasovec K. Cost effectiveness of feeding interventions for preventing mother-to-child transmission of HIV. Presented at the XIII International AIDS Meeting and Related Satellite Meetings, Mother-to-Child Transmission of HIV, July 8-14, 2000. Abstract [WeOrC618]. Bethesda, MD: Abt Associates Inc., 2000
- Kuhn L, Stein Z. Infant survival, HIV infection, and feeding alternatives in less developed countries. *Am J Public Health* 1997;87:926-31
- Labbok M, Perez-Escamilla R, Peterson A, Coly S. Breastfeeding and child spacing country profiles. Washington, DC: Georgetown University, Institute for Reproductive Health, 1997
- Landers C. Biological, cultural, and social determinants of infant development in a south Indian community. In: Nugent K, Lester B, Grazelton T, eds. *The Cultural Context of Infancy*. New York: Ablex Press, 1989
- Larsson E, Dahlin K. The prevalence and the etiology of the initial dummy- and finger-sucking habit. *Am J Orthod* 1985;87(5):432-35
- Lartey A, Manu A, Brown K, Peerson J, Dewey K. A randomized, community-based trial of the effects of improved, centrally processed complementary foods on growth and micro-nutrient status of Ghanaian infants from 6 to 12 mo of age. *Am J Clin Nutr* 1999;70(3):391-404
- Lawrence R. *Breastfeeding: a guide for the medical profession*. 4<sup>th</sup> ed. St. Louis, MO: Mosby, 1994
- Levine R, Levine B. *Nyansongo: a Gusii community in Kenya*. New York: Wiley, 1966
- Lier L, Gammeltoft M, Knudsen IJ. Early mother-child relationship: the Copenhagen model of early preventive interventions towards mother-infant relationship disturbances. *Arctic Med Res* 1995;54 Suppl 1:15-23
- LINKAGES. *Facts for feeding: Recommended practices to improve infant nutrition during the first six months*. Washington, DC: Academy for Educational Development, LINKAGES Project, 1999
- Lowinger S, Dimitrovsky L, Strauss H, Mogilner C. Maternal social and physical contact: links to early infant attachment behaviors. *J Genet Psychol* 1995;156(4):461-76
- Lutter CK. Breastfeeding promotion – is its effectiveness supported by scientific evidence and global changes in breastfeeding behaviors? *Adv Exp Med Biol* 2000;478:355-68
- Lvoff NM, Lvoff V, Klaus MH. Effect of the baby-friendly initiative on infant abandonment in a Russian hospital. *Arch Pediatr Adolesc Med* 2000;154(5):474-77
- Macro International Inc., *Demographic and Health Survey (DHS) 1993, Kenya*. Calverton, MD: Macro International Inc., 1993
- Maher V. Breastfeeding in cross-cultural perspective. In: Maher V, ed., *The anthropology of breast-feeding: natural law or social construct*. Oxford/Providence: Berg, 1967
- Marquis G, Diaz J, Bartolini R, Creed de Kanashiro H, Rasmussen K. Recognizing the reversible

- nature of child-feeding decisions: breastfeeding, weaning, and relactation patterns in a shanty town community of Lima, Peru. *Soc Sci Med* 1998; 47(5):645-56
- Marshall B, Hepper J, Zirbel C. Sporadic puerperal mastitis. *JAMA* 1975; 233:1377
- Masten AS, Coatsworth JD. The development of competence in favorable and unfavorable environments: lessons from research on successful children. *Am Psychol* 1998;53(2):205-20
- Mbori-Ngacha D, Nduati R, John G, Reilly M, Mwatha A, Overbaugh J, Welch M, Ndinya-Achola J, Bwayol J, Kreiss J. Morbidity and mortality in breastfed and formula fed infants of HIV-1 infected women: results of a randomized clinical trial. Presented at the XIII International AIDS Meeting and Related Satellite Meetings, Mother-to-Child Transmission of HIV, July 8-14, 2000. Abstract [WeOrC494]
- McKenna J, Mosko S, Richard C. Bedsharing promotes breastfeeding. *Pediatrics* 1997;100(2):214-19
- Millard AV, Graham MA. Abrupt weaning reconsidered: evidence from central Mexico. *J Trop Pediatr* 1985;31:229-34
- Mohrbacher N, Stock J. *La Leche League International: The breastfeeding answer book*. Rev. ed. Schaumburg, IL: La Leche League International, 1997
- Mokwena C. Use of fermented foods in child feeding in Botswana. In: Alnwick D, Moses S, Schmidt OG, eds. *Improving young child feeding in Eastern and Southern Africa: household-level food technology*. Proceedings of a workshop held in Nairobi, Kenya, 12-16 October 1987. IDRC-265e. Ottawa: International Development Research Centre, 1988
- Morrow AL, Guerrero ML, Shults J, et al. Efficacy of home-based peer counseling to promote exclusive breastfeeding: a randomized controlled trial. *Lancet* 1999; 353:1226-31
- Mundell, EJ. Simple method could solve HIV breastfeeding dilemma. *Reuters Health*, July 13, 2000
- Nagelkerke NJ, Moses S, Embree JE, Jenniskens F, Plummer FA. The duration of breastfeeding by HIV-1-infected mothers in developing countries: balancing benefits and risks. *J Acquir Immune Defic Syndr Hum Retrovirol* 1995;8(2):176-81
- NICHD Dearly Child Care Research Network. Chronicity of maternal depressive symptoms, maternal sensitivity, and child functioning at 36 months. *Dev Psychol* 1999;35(5)1297-310
- Nikodem V, Danziger D, Gebka N, Gulmezoglu M, Hofmeyr J. Do cabbage leaves prevent breast engorgement? A randomized, controlled study. *Birth* 1993;20(2):61-64
- Nydegger W, Nydegger C. *Tarong: Ilocos Barrio in the Philippines*. Six Culture Series. Vol. VI. New York: John Wiley and Sons, 1966.
- Oni GA, Brown KH, Bentley ME, Dickin KL, Kayode B, Alade I. Feeding practices and prevalence of hand-feeding of infants and young children in Kwara State, Nigeria. *Ecol Food Nutr* 1990; 25:1-11
- Owor M, Deseyve M, Duefield C, et al. The one year safety and efficacy of data of the HIVNET 012 trial. Presented at the XIII International AIDS Meeting and Related Satellite Meetings, Mother-to-Child Transmission of HIV, July 8-14, 2000. Abstract [LbOr1]
- Perez-Escamilla R, Segura-Millan S, Dewey K. Infant bottle propping among low-income

- urban population in Mexico. *Bull Pan Am Health Organ* 1995;29(2):138-46
- Pinilla T, Birch L. Help me make it through the night: behavioral entrainment of breast-fed infants' sleep patterns. *Pediatrics* 1993;91:436-44
- Piwoz EG. HIV/AIDS and infant feeding: risks and realities in Africa. Washington, DC: Support for Analysis and Research in Africa Project, Academy for Educational Development, June 12, 2000a
- Piwoz EG. Maternal transmission of HIV in breastfeeding populations: can exclusive breastfeeding promotion make a difference? Washington, DC: Support for Analysis and Research in Africa Project, Academy for Educational Development, July 2000b
- Piwoz, EG. Summary of Findings Presented at the XIII International AIDS Meeting and Related Satellite Meetings, Mother-to-Child Transmission of HIV, July 8-14, 2000. Washington, DC: Support for Analysis and Research in Africa Project, Academy for Educational Development, 2000c
- Piwoz EG, Chintu M, Ntombela N, et al. 1999. Infant feeding options for HIV+ women: Findings and recommendations from a formative research study in Ndola, Zambia. Second conference on Global Strategies for the Prevention of HIV Transmission from Mothers to Babies, Montreal, Canada, September 1-6, 1999. Abstract No. 484.
- Polan HG, Ward MJ. Role of the mother's touch in failure to thrive: a preliminary investigation. *J Am Acad Child Adolesc Psychiatry* 1994;33(8):1098-105
- Righard L, Alade M. Breastfeeding and the use of pacifiers. 1997;24(2):116-20
- Riordan J, Auerbach K. Breastfeeding and human lactation. Boston: Jones and Bartlett Publishing, 1993
- Roberts K, Reiter M, Shuster D. A comparison of chilled and room temperature cabbage leaves in treating breast engorgement. *J Hum Lact* 1995;11(3):191-94
- Roberts K. A comparison of chilled cabbage leaves and chilled gelpaks in reducing breast engorgement. *J Hum Lact* 1995;11(1):17-20
- Rollins. personal communication, 2001.
- Rose NJ, Collins S. Strategies to prevent the consequences of HIV/AIDS (e.g., psychosocial, neuropsychiatric, physical disability, and stress and coping) with women and their families. *Natl Conf Women HIV* 1997. May 4-7;181 (abstract no 2.34)
- Ross J, Labbok M. Modeling the effects of different infant feeding strategies and antiretroviral therapy on survival and mother-to-child transmission of HIV. Draft paper. Washington, DC: LINKAGES, Academy for Educational Development, 2001
- Runyan DK, Hunter WM, Socolar RRS, Amaya-Jackson L, English D, Landsverk J, Dubowitz H, Browne DH, Bangdiwala SI, Mathew RM. Children who prosper in unfavorable environments: the relationship to social capital. *Pediatrics* 1998;101(1):12-18
- Rwanda Ministry of Health, Wellstart International. Qualitative research on breastfeeding in Kibungo and Gitarama provinces, Rwanda. San Diego: Expanded Promotion of Breastfeeding Program, Wellstart International, January 1994
- Savage King F. Helping mothers to breastfeed. Rev. ed. Nairobi: African Medical and Research Foundation, 1992
- Scafidi F, Field T. Massage therapy improved behavior in neonates born to HIV-positive mothers. *J Pediatr Psychol* 1996;21(6):889-97
- Semba R. Mastitis and vertical transmission of HIV among breastfeeding women. *Prenat Neo-*

- nat Med 1999;4:370-75
- Semba R, et al. Mastitis and immunological factors in breast milk of lactating women in Malawi. *Clin Diagn Lab Immunol* 1999;6(5):671-74
- Shiao SY, Chang YJ, Lannon H, Yarandi H. Meta-analysis of the effects of nonnutritive sucking on heart rate and peripheral oxygenation: research from the past 30 years. *Issues Compr Pediatr Nurs* 1997;20(1):11-24
- Shostak, M. *Nisa: the life and words of a !Kung woman*. New York: Vintage Books, 1983
- Spitz A, Lee N, Peterson H. Treatment for lactation suppression: little progress in one hundred years. *Am J Obstet Gynecol* 1998;179(6 pt 1):1485-90
- Steel A, Sserunjogi L. Breastfeeding assessment in Uganda: qualitative research. Trip report. March 13-May 5, 1993. San Diego: Expanded Promotion of Breastfeeding Project, Wellstart International, 1993
- Sullivan PB. Cow's milk induced intestinal bleeding in infancy. *Arch Dis Child* 1993 Feb;68(2):240-45
- Tarwotjo I, Sommer A, Soegiharto T, Susanto D, Muhilal. Dietary practices and xerophthalmia among Indonesian children. *Am J Clin Nutr* 1982;35(3):574-81
- Tessier R, Cristo M, Velez S, Giron M, deCalume ZF, Ruiz-Palaez JG, Charpak Y, Charpak N. Kangaroo mother care and the bonding hypothesis. *Pediatrics* 1998;102(2):e17
- Thea D. personal communication, 2000.
- Thompson B, Rahman A. Infant feeding and child care in a West African village. *J Trop Pediatr* 1967;13(3):124-38
- Tomkins A. Malnutrition, morbidity and mortality in children and their mothers. *Proc Nutr Soc.* 2000;59(1):135-46
- UNAIDS (Joint United Nations Programme on HIV/AIDS). Report on the global HIV/AIDS epidemic. New York: Joint United Nations Programme on HIV/AIDS (UNAIDS), June 2000
- UNICEF. Cup feeding: better than bottles. In: BFHI News. The Baby-Friendly Hospital Initiative Newsletter. New York: UNICEF, The Division of Communication, May/June 1999
- UNICEF, WHO. Breastfeeding counseling: a training course. (UNICEF/NUT/93.2.or WHO/CDR/93.4). New York: UNICEF, 1993
- UNICEF. State of the world's children 2000. Oxford: Oxford University Press, 2000
- Valenzuela M. Maternal sensitivity in a developing society: the context of urban poverty and infant chronic undernutrition. *Dev Psychol* 1997;33(5):845-55
- Vemury M, Levine H. Beliefs and practices that affect food habits in developing countries: a literature review. New York: CARE, Inc., August 1978
- Victora CG, Kirkwood BR, Ashworth A, Black RE, Rogers S, Sazawal S, Campbell H, Gove S. Potential interventions for the prevention of childhood pneumonia in developing countries: improving nutrition. *Am J Clin Nutr* 1999;70(3):309-20
- Victora CG, Tomasi E, Olinto MT, Barros FC. Use of pacifiers and breastfeeding duration. *Lancet* 1993;341(8842):404-06
- Victora CG, Smith PG, Vaughan JP, Nobre LC, Lombardi C, Teixeira AM, Fuchs SM, Moreira LB, Gigante LP, Barros FC. Evidence for protection by breastfeeding against infant deaths from infectious diseases in Brazil. *Lancet* 1987;2(8554):319-22
- Vogel A, Hutchinson BL, Mitchell EA. Mastitis in the first year postpartum. *Birth*

- 1999;26(4):218-25
- Weinberg MK, Tronick EZ. Emotional characteristics of infants associated with maternal depression and anxiety. *Pediatrics* 1998;102(5 Suppl E):1298-304
- Wellstart International, Rwanda Ministry of Health. Qualitative research on breastfeeding in Kibungo and Gitarama provinces: Rwanda. Culture and Breastfeeding Series. San Diego: Expanded Promotion of Breastfeeding Program, Wellstart International, January 1994
- West K, Chirambo M, Katz J, Sommer A, Malawi Survey Group. Breast-feeding, weaning patterns, and the risk of xerophthalmia in Southern Malawi. *Am J Clin Nutr* 1986;44:690-97
- Wester R. personal communication, 2000
- WHO. New data on the prevention of mother-to-child transmission of HIV and their policy implications: conclusions and recommendations. WHO Technical Consultation on Behalf of the UNFPA/UNICEF/WHO/UNAIDS Inter-Agency Task Team on Mother-to-Child Transmission of HIV, Geneva, 11-13 October 2000
- WHO. Evidence for the ten steps to successful breastfeeding (Revised). Geneva: WHO Division of Child Health and Development, 1998a
- WHO. Complementary feeding of young children in developing countries: a review of current scientific knowledge. Geneva: WHO, 1998b
- WHO. Vitamin A supplements: a guide to their use in the treatment and prevention of vitamin A deficiency and xerophthalmia. Geneva: WHO, 1997
- WHO Collaborative Study Team on the Role of Breastfeeding on the Prevention of Infant Mortality. Effect of breastfeeding on infant and child mortality due to infectious diseases in less developed countries: a pooled analysis. *Lancet* 2000; 355(9202):451-55
- WHO, UNAIDS, UNICEF. HIV and infant feeding: a guide for health-care managers and supervisors. [(WHO/FRH/CHD/98.2), (UNAIDS/98.4), (UNICEF/PD/NUT/(J)98-2)]. Geneva: World Health Organization, 1998
- Wiktor SZ, Leroy V, Ekpini ER, Alioum A, Karon J, Msellati P, Hudgens M, Meda M, Greenberg AE. 24-month efficacy of short-course maternal zidovudine for the prevention of mother-to-child HIV-1 transmission in a breast feeding population: a pooled analysis of two randomized clinical trials in West Africa. Presented at the XIII International AIDS Meeting and Related Satellite Meetings, Mother-to-Child Transmission of HIV, July 8-14, 2000. Abstract [TuOrB354]
- Willumsen J, Filteau SM, Coutsooudis A, et al. Subclinical mastitis and breastmilk viral load among lactating women infected with HIV-1 in South Africa. Paper presented at the Second Conference on Global Strategies for the Prevention of HIV Transmission from Mothers to Infants, Montreal, September 1999
- Wong S, Stepp-Gilbert E. Lactation suppression: nonpharmaceutical versus pharmaceutical methods. *J Obstet Gynecol Neonatal Nurs* 1985;14(4):302-10