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In this issue:

Safer infant feeding; *page 2*

- Summary
- Background on breastfeeding
- Exclusive breastfeeding vs. mixed feeding
- Operational research findings
- Counselling
- Factors influencing infant feeding choices
- More clearly defining the risk of transmission
- Transmission of nevirapine-resistant virus via breast-milk
- Treatment
- Panel comments
- Resources at www.aidsmap.com
- Further resources
- References

Safer infant feeding

By Theo Smart

"When they see me coming with the tins, they laugh at me. They say I have HIV, and I tell them I do not have AIDS; it is because I have TB and a lot of people know I have TB ... I hide the tins..."

from an interview with an HIV-positive mother of an 8-month old formula-fed infant in South Africa Nkonki et al.

Summary

- Breastfeeding is the recommended form of feeding for infants worldwide, but avoidance of breastfeeding has been recommended for HIV-positive mothers if safe formula feeding is possible.
- Breastfeeding carries a high risk of HIV transmission, but the majority of infants exposed to HIV through breast milk will not become infected.
- Formula feeding in infants of HIV-positive mothers may lead to a higher risk of childhood illnesses, especially if clean water is not available.
- The World Health Organization recommends exclusive breastfeeding to HIV-positive mothers if safe formula feeding is not possible.
- Research shows that there is considerable confusion and inconsistency in the advice given to HIV-positive women about infant feeding.
- Exclusive breastfeeding is associated with a much lower risk of HIV transmission than mixed feeding but the message about what exclusive breastfeeding means is not being passed on to HIV-positive women.
- Counsellors need to be better trained to give consistent messages about infant feeding. Mothers are strongly influenced by what counsellors tell them.
- Social pressures against early weaning will remain a problem even if mothers are given the correct information.
- If antiretroviral treatment for mothers is available, this is likely to have an impact on transmission if the regimen includes nevirapine. This reduces HIV levels in breast milk and may also provide a degree of post-exposure prophylaxis for the infant.
- If the mother does not yet need antiretroviral treatment, 3TC for the breastfeeding infant has been shown to reduce the risk of transmission.

The best feeding practice for childhood welfare, growth and survival, according to World Health Organization (WHO) and the United Nations Children's Fund's (UNICEF) Global Strategy for Infant and Young Child Feeding, is exclusive breastfeeding for the first six months and continued breastfeeding for up to two years and beyond, with supplemental foods that are nutritionally adequate and safe from age six months, together with related nutrition and support for the mother.

However, because of the risk of HIV transmission, UNICEF and WHO recommend that HIV-infected mothers completely avoid breastfeeding when replacement feeding is "acceptable, feasible, affordable, sustainable and safe." Otherwise exclusive breastfeeding is recommended during the first months of life with the caveat that it should then be discontinued as soon as possible once the conditions for safe replacement feeding can be met.

This caution about breastfeeding by women with HIV has generated markedly different reactions in different countries. National programmes have widely divergent approaches to translating the feeding strategy into local policies. So it is perhaps not surprising that success putting these policies into practice on the ground has been mixed at best, according to reports at the WHO meeting on Nutrition and HIV, and the South African AIDS Conference earlier this year.

In South Africa, "health workers [are] confused and paralysed on what to do about infant feeding. We've been putting a lot of emphasis on the development of protocols, policies and materials, and relatively little focus on the translation and implementation in the districts and clinics on the frontline," said Dr. Mickey Chopra of the University of Cape Town. His comments were based upon the findings of the Good Start Study, the first major operational research study of the PMTCT programme in South Africa, which he and colleagues presented at the 2nd South African AIDS conference in June (see below).

Dr. Chopra is not alone in his concerns about how the infant feeding guidelines are being implemented. In various presentations and discussions at HIV-related conferences held over the last several months, researchers and clinicians described the challenges of implementing safer infant feeding policies. In addition, new data presented at the IAS conference shed light on just how complex the issue of HIV transmission via breast milk is, with evidence that some breastfed infants apparently develop immunity to the virus — though others most certainly do not. Finally, other recently published studies lend support to those who believe that if our goal is to prevent HIV transmission, we should be putting more of an emphasis on antiretroviral treatment rather than on feeding strategies.

Background on breastfeeding

Normally breastfeeding is by far the best way to feed an infant — especially in the developing world. It is the simplest and most efficient way to deliver good nutrition to the infant. Breast milk also contains maternal antibodies and other factors that help the baby fight off infections. Children who aren't breastfed are far more likely to suffer from malnutrition and to contract life-threatening diseases during the first year of life. According to a WHO meta-analysis, in the poorest countries, children who aren't breastfed during the first two months of life are six times more likely to die from infectious diseases. Breastfeeding also benefits the mother, by delaying the return to fertility, which helps with child spacing and reduces the burden of childbearing.

But when the mother has HIV, breastfeeding carries a risk of HIV transmission to her infant. That risk can be quite substantial in countries where prolonged breastfeeding is common, accounting for 42% of HIV infections in infants and young children in Africa according to a major meta-analysis of breastfeeding studies (Newell 2003). Overall, an estimated 5–20% of infants born to HIV-infected mothers are infected post-natally.

In the developed world, fear of HIV transmission leads most mothers with HIV to opt for replacement feeding but that option simply isn't available to many women in resource-limited settings. Furthermore, some experts were concerned that children would lose out on the other health benefits that breastfeeding offers. One of the first controlled studies comparing outcomes in breastfed and formula-fed infants of HIV-infected mothers in Nairobi reported that survival at two years was similar in both study arms even though the rate of HIV transmission was significantly higher in the

breastfeeding arm (Nduati) (see news story <http://www.aidsmap.com/en/news/5EE981A4-7C25-4810-A312-2166E31460E4.asp>). But it must be pointed out that women in this study had consistent access to clean drinking water. However, an observational Indian study reported that use of breast milk substitutes by HIV-infected mothers had significant risks for her infant. Twenty-one out of 77 non-breastfed infants had to be admitted to hospital compared to none of the 66 exclusively breastfed infants (Phadke). The setting in this observational study – in a population with limited access to safe infant formula and clean water – probably more closely reflects real world conditions where there is a high burden of HIV.

Exclusive breastfeeding vs. mixed feeding

However, breastfeeding can be made less risky. A number of studies have now shown that exclusive breastfeeding is much safer than feeding the infant with a mixture of breast milk and formula or other replacement foods during the first several months of life. According to the Zvitambo trial published in April, children who received a mixture feeding (breast milk with other liquids and solid replacement foods) were more than four times more likely to have become infected with HIV at the age of six months than infants who were exclusively breastfed (see <http://www.aidsmap.com/en/news/2CE28909-E352-4CB0-89CE-1E1272D10B92.asp>).

The study had three arms:

- exclusive breastfeeding,
- predominant feeding (breast milk and other liquid substitutes)
- mixed feeding.

Although the difference between exclusive breastfeeding and “predominant” feeding didn’t reach statistical significance, there was still a consistently higher rate of HIV transmission when children were not exclusively breastfed.

The rate of transmission from exclusive breastfeeding in Zvitambo was so low – only 1.31% at six months and 6.9% at 18 months compared to 4.4% and 13.9% respectively for mixed feeding – that it suggests the high transmission rates seen in the earlier studies were actually due to mostly mixed feeding – which is indeed standard practice in most countries. There also appeared to be a survival benefit associated with exclusive breastfeeding. In Kaplan–Meier estimates of mortality in Zvitambo at 18 months (death with or without HIV infection) were 1.96% [95% confidence interval (CI) 0.64–5.95], 3.57% (95% CI 2.19–5.81) and 4.17% (95% CI 3.18–5.47) for the exclusive breastfeeding, predominant breastfeeding and mixed breastfeeding infants, respectively.

The study’s findings suggest that support of exclusive breastfeeding with early, complete (and possibly abrupt?) weaning by around six months would so greatly minimise the risk of HIV transmission to the infants that, in a risk benefit analysis of exclusive breastfeeding vs. formula feeding, exclusive breastfeeding might be the best possible choice for an infant especially considering the other nutritional and health survival benefits offered by breast milk. This may be the case even if replacement feeding is “acceptable, feasible, affordable, sustainable and safe.” Of course, exclusive breastfeeding may carry greater risks in mothers with advanced HIV disease (more on that later).

In any case, what is clear, is that the infant feeding policies, protocols and programmes that are put into operation should not

have the effect of increasing mixed feeding – which poses the greatest threat of HIV transmission to the infant.

Operational research findings

With that in mind, data presented at the 2nd South African AIDS conference suggest that programmes may be doing just that – failing to adequately support women’s choices to either exclusively breastfeed or formula feed with the probable result of increased mixed feeding.

According to a study presented by Dr. Lindiwe Sibeko of McGill University at the South African AIDS conference, hospitals in South Africa sometimes make it difficult for women to exclusively breastfeed. According to the Baby Friendly Hospital Initiative (BFHI) (Wimmer-Puchinger & Nagel, 1982; deChateau and Wiber, 1977), and the South African breastfeeding guidelines, early initiation of breastfeeding (within 30 minutes of childbirth) is considered important for the establishment of successful breastfeeding. But in an assessment of the experience of 150 mother/newborn pairs at one hospital in Durban, the mean time to first breastfeeding was 10.53 hours (the maximum was 71.50). And in most cases, no medical reason was recorded for the delay. Some HIV-positive mothers reported they were told to formula feed by their health care worker even though they had decided to breastfeed – without the health care worker checking to see whether formula feeding was actually a viable option for the women.

“Despite endorsement of early initiation of breastfeeding guidelines for health professionals, our data indicates that there are practices within health services that interfere with maximizing the opportunity to get breastfeeding off to a good start. Moreover, most delays in initiating breastfeeding were due to separation of mother from her infant with no documentation of illness requiring the extended separation,” said Dr. Sibeko.

There were several presentations of findings from the Good Start Study, which evaluated the operational effectiveness of the South African National PMTCT Programme. Dr. Debra Jackson reported the clinical results of the study, which measured the perinatal vertical transmission rate as well as HIV-free survival among 665 women attending three of the PMTCT programme’s original 18 pilot sites. The sites in Paarl (Western Cape), Umlazi (KwaZulu Natal) and Rietvlei (in the Eastern Cape) were chosen to represent the diversity of South Africa’s socioeconomic regions, health infrastructures, rural/urban locations and differing HIV prevalence.

The study found that HIV transmission and survival varied greatly depending upon whether the site was in resource-poor or relatively resource-rich parts of the country, with fairly good results in Paarl to poor results in Rietvlei. In general, though, late post-natal HIV transmission (at nine months) was higher than in BHITS (the major meta-analysis of breastfeeding studies mentioned earlier in this article). (See graph)

Late Post-Natal HIV Transmission

(Infant HIV- @ 3 weeks then HIV+ @ 36 weeks)

Infant mortality was extremely high in Rietvlei (see graph). Overall, in Rietvlei, HIV-free survival was only 64% at nine months – actually worse than placebo in some PMTCT studies – suggesting that “all the gains from peri-partum nevirapine are being lost in the postnatal period,” said Dr. Jackson.

Infant Mortality at 36 weeks (%)

So the team looked for predictors of HIV transmission and/or death that could explain the differences in outcomes at the sites. Even though patients in Paarl were more likely to formula feed, women were also more likely to breastfeed in Umlazi than in Rietvlei. In a Cox regression analysis, breastfeeding (any) was only weakly predictive of transmission. More significant predictors were maternal viral load, prematurity, socioeconomic score, and access to antenatal care as well as the quality of counselling received.

Counselling

Dr. Tanya Doherty, of South Africa's Health System Trust presented a closer look at infant feeding counselling. The programme employs lay counsellors, midwives and nurses to provide voluntary counselling and testing (VCT) and infant feeding counselling. Pregnant women receive infant feeding counselling during post-HIV test counselling at most sites. According to South African policy, two infant feeding options should be supported: 1) exclusive breastfeeding with early, rapid weaning, as soon as feasibly possible, and 2) exclusive formula feeding with free formula provided for six months.

The researchers conducted structured observations of counselling sessions and performed exit interviews with mothers. Although counsellors got high marks for their communications skills, the content that was communicated varied significantly from site to site, and there were considerable gaps in information.

In Paarl, there seems to have been a bias against exclusive breastfeeding. "The vast majority of HIV-positive mothers chose formula feeding in Paarl, but limited information was given on safe formula feeding to those making this choice," said Dr. Doherty. Even though Paarl is generally a region that is better off economically, less than half of the participants from Paarl had piped water or electricity in their homes. Nevertheless, counsellors in Paarl never asked about the source of fuel or water in the women's homes, or told the women of the need to boil water for the formula preparation or the potential risks of illness associated with formula feeding.

Only women in Umlazi were asked whether they understood what exclusive breastfeeding meant. Overall, counselling was considerably better in Umlazi for HIV-positive women who chose to breastfeed. Even so, no one was shown how to position the baby on the breast, or asked whether it would be possible for them to exclusively breastfeed.

Women weren't shown how to prepare infant formula at any of the sites; only a third were given instructions on how to prepare it; and only half the pregnant women were given instructions on when and how to collect formula from the clinic.

Counselling for the mothers who tested negative or whose status was unknown was even less thorough. Only 12% were informed of the risks of HIV transmission, and only 4% were informed that there is a very high risk of transmission if they became infected while breastfeeding. (According to data from another study presented by Professor Nigel Rollins at the South African meeting, HIV-positive women who didn't know their status at delivery or who were HIV-negative but had since seroconverted, were the most likely to transmit HIV to their infants.)

In the exit interviews, mother's knowledge about infant feeding remained poor after the counselling. Half of the women (31/60) were planning to practice sub-optimal feeding methods. Only 18% (11/60) could correctly define exclusive breastfeeding, though about 67% (40/60) identified the danger of HIV transmission from mixed feeding.

Factors influencing infant feeding choices

Such incomplete counselling is unlikely to lead to successful implementation of South Africa's infant feeding policy. According to Dr. Lungiswa Nkonki, of the University of Cape Town, who presented another sub-study of the Good Start Study, "there are distinct challenges inherent in both [feeding] options. In the South African setting, an initial period of breastfeeding is seen as the norm for 86% of African mothers, combined with the early introduction of liquids such as water and tea. The most recent Demographic and Health Survey (DHS) from South Africa found a wide range of sub-optimal early feeding practices in the general population, and very limited advice, skills and support being given by health providers on infant feeding issues."

"There are a number of social, cultural and economic constraints on the ability of women to provide exclusive formula feeding," Dr. Nkonki said "with the consequence that they may resort to mixing formula feeds with breastmilk." She also noted that it isn't clear how poor women are to feed their child after their free six-month supply of formula runs out. Likewise, no one really knows what will happen when women who are exclusively breastfeeding try to wean the infant abruptly, and how those women will feed their child "which could have serious consequences for the nutritional status of the infant, especially given that access to formula milk is not guaranteed in many settings," said Dr. Nkonki.

Her research involved interviewing 40 mothers (about half of whom were first-time mothers) from the Good Start study in order to gain a better understanding of the factors influencing their infant feeding choices and behaviours by HIV positive caregivers.

She identified a few key themes.

First, mothers want to protect their infants but, being insecure about their choices or their ability to feed their infant correctly, they are quite easily influenced by what counsellors or others tell them – so whether or not the counsellor is giving them complete or incomplete information, they are apt to try to act on the advice if they believe it is for the best.

There are supply problems. Occasionally, there are stock outs of the formula (see

<http://www.aidsmap.com/en/news/0624EC9F-F6EE-4624-982C-D14E43B0A984.asp>)

and other times, mothers will run out of their monthly supply early and are usually afraid to ask for more.

Finally, both formula feeding and early weaning are against the societal norm, and stigmatising to the mother within her community. The mothers are continually under pressure from neighbours, mothers and others in the community to whom they have not disclosed their HIV status to continue breastfeeding – though not to exclusively breastfeed.

At a session on breastfeeding at the WHO meeting on Nutrition and HIV earlier in the year, Dr. Magdalena Nhatanga from Namibia also raised this point: "The problem we are having with early cessation of breastfeeding where women understand their options and choices regarding infant feeding but when it comes to the young HIV-positive mothers – they are not necessarily independent. They live within the family where the mother or the mother-in-law still have control over them. When they decide to stop breastfeeding, and their status is not disclosed, it becomes a big problem because they are under pressure to continue breastfeeding."

According to Dr. Siobhan Crowley, who helped organize the WHO meeting, "the support that mums need to effectively follow their

infant feeding options is critical and is not well characterised or implemented in most of the resource constrained settings where this could make important contributions to reducing HIV transmission and improving nutritional outcomes for exposed and uninfected kids. The role for PLHA and other community structure here is little explored and poorly utilised and not at all well characterised or documented."

Said Dr. Nigel Rollins, who co-chaired the WHO session on breastfeeding, "we need to identify community interventions to increase the acceptability of other feeding practices. This is a key intervention that we need to understand better."

While it is prudent to involve the community in developing programmes that support mothers with HIV where they live, it's difficult to see how breastfeeding practices that run counter to what is recommended for most mothers can be supported without exposing the woman's HIV status. Many young mothers will have only recently learned their HIV status in the antenatal clinic, and most are relatively healthy.

More clearly defining the risk of transmission

Confounding matters even more: it's not really clear how necessary safer feeding measures are in healthier women with HIV. Data from various studies suggest that it is the women with low CD4 cell counts, high viral loads or who are otherwise too ill to breastfeed who are most likely to transmit HIV to their infant while breastfeeding. Especially given how few women actually know their HIV status, it might be better to use clinical parameters to guide counselling and infant feeding decisions. But aside from CD4 cell testing, it isn't clear what parameters should be used — the risk of transmission from breastmilk is still not very well characterized.

A presentation by Dr. Sarah Rowland-Jones of the UK's Medical Research Council at the recent International AIDS Society (IAS) meeting in Rio illustrated just how little is understood about HIV transmission from breast milk. According to her findings, a significant proportion of infants born to women with HIV develop immune responses that protect them from late postnatal transmission from breastfeeding.

Breast-milk contains both free and cell-associated virus. In the macaque-SIV model, SIV infects the tonsils in neonatal macaques, then spreads rapidly to other lymphoid organs — and it probably occurs in humans in much the same way.

But despite the fact that each baby breastfed by an HIV-infected mother ingests hundreds of litres of infected milk around 80% remain uninfected.

"We postulated that breast milk could provide low dose oral exposure to HIV that could, in those infants who were not infected, be associated with the development of protective immunity," said Dr. Rowland-Jones.

Her co-researchers, Drs. Grace John-Stewart and Dorothy Mbori-Ngacha, designed a study to see whether the presence or absence of HIV-specific CD8-cell responses correlated with resistance or susceptibility to post-natal HIV transmission. The trial involved 510 HIV-positive women recruited from Nairobi antenatal clinics who were offered short-course AZT for the last four to eight weeks of pregnancy. Although formula milk was provided, most women chose to exclusively breast-feed (72%). "Formula feeding in many settings is like advertising your HIV status to your neighbors," Dr. Rowland-Jones said.

Vertical transmission occurred in 19.4% of the births; and there were significant correlations between maternal viral load and

transmission both at recruitment (OR 3.6, $p < 0.001$) and delivery (OR 2.4, $p < 0.001$).

A small number of the infected infants (15%) became infected after the first month (all were breastfed).

Investigators were able to perform the ELISpot test (to detect a cellular immune response to HIV) in 93% of the children (410 out of 440) at or beyond one month of age (without knowing the infant's infection status). In 1,062 ELISpot assays in 288 infants who remained uninfected, 144 (50%) infants had at least one positive test: 30% had high levels of HIV-specific CTLs. At each point of follow-up, 15-25% of exposed uninfected infants had responses, in contrast to none of 20 control HIV-unexposed infants. None of 54 infants with HIV-specific CTLs detected at one month became infected compared to 11 of 179 (6.1%) without such responses ($p = 0.03$).

"Although the numbers of children that became infected was small, this does strongly associate the presence of an immune response to HIV with protection against subsequent infection," said Dr. Rowland-Jones. "Half of children in the first year of life, even if they're not infected with HIV, can generate immune response to the virus; this can be broad, high magnitude even in the first months of life and this is strongly associated with protection from breast milk transmission."

When the final analysis of this study is presented, it will be important to see whether these protective immune responses can be linked with other easily measurable factors in the mother such as higher CD4 cell counts or lower viral loads. If so, it would lend more support to the choice of exclusive breastfeeding in healthier women with HIV.

Transmission of nevirapine-resistant virus via breast-milk

Conversely, recently findings that suggest that a third of women who take single-dose nevirapine (Viramune) to prevent mother-to-child transmission of HIV have virus resistant to non-nucleoside reverse transcriptase inhibitors (NNRTIs) present in their breastmilk eight weeks after giving birth, according to a study published in the October 1st edition of *Clinical Infectious Diseases* (see <http://www.aidsmap.com/en/news/702AA7B5-1347-408C-84DE-4A3FB5A4A072.asp>).

Treatment

In a perfect world, mothers with more advanced disease should be offered antiretroviral treatment (ART). And according to studies recently published in the 1st September edition of *The Journal of Infectious Diseases*, ART reduces viral loads (free virus) in breast milk and could achieve anti-HIV drug levels sufficient to prevent HIV transmission in the infant (see <http://www.aidsmap.com/en/news/37FAC18C-BBF2-42F0-AD8F-5F48C16EB2AE.asp>). Treating infants directly also may reduce infection — even with 3TC monotherapy (see <http://www.aidsmap.com/en/news/BEB006E6-A7B9-4B30-B28E-2A0261F95A5F.asp>), though complete ART of the mothers, especially those in need of treatment for their own health, would seem to be a better approach.

In an accompanying editorial the authors write, "the quantities of nevirapine, although perhaps not of 3TC or AZT, that a child ingests through breast milk may not only reduce maternal viral load in breast milk but could potentially also provide infants with drug levels sufficient for prophylaxis against transmission."

"This may be yet another reason to instruct women to practice exclusive breast-feeding of their infants," they write.

Panel comments

Chris Green, Treatment Educator, Spiritia Foundation, Jakarta, Indonesia

The numbers of mothers who know they are infected with HIV before birth is still small here. In addition, effectively there are almost no antenatal clinics in this country, and it is clear that the counselling and decision-making is best made well in advance.

1. This matter should perhaps be discussed in the context of often relatively high rates of infant mortality. In many cases, it is just another childhood death, which is to a certain extent accepted as 'normal'. There are so many other interventions the could impact on this; do we perhaps inadvertently make matters worse by focusing on transmission of HIV? I guess perhaps the situation is different in higher-prevalence settings.

2. There is no doubt whatsoever that breastfeeding is best for those infants who are infected with HIV at birth. Our problem is in identifying these. As better and cheaper tests to identify infection at an earlier stage become available, how will we incorporate this into the guidelines?

4. Although there is growing acceptance of the role of the community in providing information to mothers, this remains grudging, and sometimes undermined by healthcare providers who cast doubt on the ability of lay workers. This doubt often supports the preconceptions of the 'patient', who only trust someone in a white coat. There needs to be an institutionalising of community workers, including providing them with recognition. (Of course this is a more general concern regarding lay counsellors and peer group workers!)

5. In such a fast moving field, it is very difficult to keep everyone up to date on the latest developments. Do we not need a regular newsletter in simple language, easily translated, widely disseminated to all those involved in counselling? Part of the problem, as with PMTCT counselling, is that those providing the information are not 'singing from the same song sheet', with the result that the 'patient' gets confused, unable to make a decision, and thus takes the easy way out.

6. You note that ART to the mother reduces the transmission, and picture a perfect world in which the mothers would be offered this. I know we won't achieve "3 by 5", but surely we are making progress. The challenge surely is to prioritise pregnant women and breastfeeding mothers in this effort. We may not be able to achieve a perfect world, but this bit should be doable. In this country, the much bigger challenge is to identify the HIV-infected women early enough to provide the treatment.

Dr Henry Barigye

Dr. Henry Barigye is currently a project leader (paediatric studies) for the Medical Research Council Unit on AIDS in Uganda that is running a community based PMTCT programme in a rural community.

"My view on infant feeding strategy is that it is critical that national feeding policy should be in place so that the options are narrowed down to probably one or two and take into consideration the time available for health workers at the community level to offer counselling. This is because primary health workers at the community level would hardly find the time to offer individualised counselling as recommended by WHO (initially to explain the options, then later to support them with options, then other follow up). In addition, when various options are offered, the situation

becomes crowded and women end up getting confused. In my project we have narrowed down to exclusive breastfeeding for 6 months and abrupt weaning unless one can afford replacement feeding. The challenge is for mothers to avoid mixed feeding for six months because when they travel or go to the garden as the child grows, they have to leave the child with siblings or other helpers who cannot "deny" a drink if he/she craves for it or needs consolation etc.

There is enough evidence that ART to the mother during pregnancy and prophylaxis to the child during the time of breastfeeding reduces infection significantly. What more evidence do we need? A study in Rakai - Uganda showed that mothers were able to self-medicate and also provide ART to their babies (<http://www.aidsmap.com/en/news/74CED5D9-175A-4831-B487-81FA78B52198.asp>).

Why not allow children to breastfeed for at most 6 months and use ARVs to prevent infection by bringing down the viral load in the mother and exposure prophylaxis during breastfeeding?"

Resources at www.aidsmap.com

Infant feeding

<http://www.aidsmap.com/en/docs/492CD1F9-7D9E-4840-BDF2-31475737BF85.asp>

Short course treatment to prevent mother to child transmission -

<http://www.aidsmap.com/en/docs/969A6B2B-595F-4F05-BD07-534F8FAF9CFE.asp>

Treating HIV and AIDS: a training toolkit - module on infant feeding

<http://www.aidsmap.com/en/docs/7A8C18FF-4A5D-4409-91C4-C3436DFA698B.asp>

Further resources

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http://www.who.int/child-adolescent-health/publications/NUTRITION/HIV_IF_Framework.htm

WHO. International code of marketing of breast-milk substitutes. Geneva, 1981.

http://www.who.int/nut/documents/code_english.PDF

WHO has recently posted tools to help health workers before, during and after a counselling session better support HIV-positive mothers (see

http://www.who.int/child-adolescent-health/publications/NUTRITION/HIV_IF_CT.htm).

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about HATiP

A regular electronic newsletter for health care workers and community-based organisations on HIV treatment in resource-limited settings.

The newsletter is edited by Theo Smart (Cape Town) and Keith Alcorn, NAM's Senior Editor (London).

For further information please visit the HATIP section of aidsmap.com