HIV and breastfeeding: the unfolding evidence

Global infant feeding recommendations in the presence of the Human Immunodeficiency Virus (HIV) made an abrupt about-turn in 2009. While replacement feeding was previously promoted to prevent postpartum HIV transmission, global guidance now recommends a return to breastfeeding as the most effective strategy to enhance overall child survival.

Current practice in the UK

By 2014, there had been almost 19,000 pregnancies amongst HIV-positive women in the UK (Population, Policy and Practice Programme 2014). The uptake of antenatal HIV screening is now well over 95%. National HIV infection rates in pregnant women are 1/500 nationally and 1/250 in London. Currently 72% of all HIV-positive mothers living in the UK were born in Africa, particularly in East and Southern Africa, where HIV-prevalence is amongst the highest in the world and where breastfeeding has significant cultural, traditional and child-survival implications. Pregnancy and the birth of a new child are especially vulnerable times in a woman’s life and navigating this journey with an HIV diagnosis can be extremely challenging. Aware of shifting global guidelines, local practitioners are also seeking up to date information and relevant guidance. With good evidence-based practice, we can support women to make informed choices about infant feeding in the context of HIV and provide the skilled help needed.

This article summarises the evidence underpinning evolving HIV and infant feeding recommendations. We conclude with a case study and practice implications for the UK.

What do we know about breastfeeding and HIV?

Discovering how the virus that leads to Acquired Immunodeficiency Syndrome (AIDS) is transmitted, infects, progresses and mutates, as well as how it can be prevented and treated, has been amongst the most pressing and expensive medical endeavours of all time.

A PubMed search shows that since the first report, made almost 30 years ago, of a mother transmitting the virus to her child through her milk, 2265 papers have been published on HIV and breastfeeding. The risk of breastfeeding-associated mother-to-child transmission (MTCT) has been given as the reason why First World HIV-positive mothers should not breastfeed.

Early research on MTCT of HIV through breastfeeding, April 1985

The first report, appearing in the April 1985 *Lancet* (Ziegler et al 1985), retrospectively described a case of simultaneous horizontal and vertical HIV transmission. A 34-year-old Australian mother giving birth to her third child by caesarean section received a blood transfusion of two units of whole blood after a 1200ml blood loss. Breastfeeding, established on day one postpartum, continued for six weeks. Thirteen months later mother and baby tested seropositive for HIV. The child’s father and two siblings were not infected and on investigation it was found that the second unit of blood had been donated by a male homosexual who subsequently developed AIDS-related illnesses. It was concluded that maternal infection had occurred through the transfusion of contaminated blood, and that postnatal transmission to the baby had occurred through breast milk.

Industrialised countries discourage breastfeeding

Within a few months, the US Centers for Disease Control and Prevention (CDC) acted on the recommendation of the Australian report, that women at risk for
The crucial importance of exclusive breastfeeding was first highlighted in research from Durban, South Africa, published between 1999 and 2001. Anna Coutsoudis and colleagues found that when breastfed babies of untreated mothers were prematurely fed other foods and liquids, exposing them to foreign pathogens and antigens, there was an increased risk of postnatal transmission of the virus (Coutsoudis 1999, 2001). In 2005, similar results were noted by Dr Peter Iliff and colleagues at the ZVITAMBO project in Zimbabwe (2005). The Coutsoudis and Iliff results showed that, in babies of untreated mothers, breastfeeding would increase the risk of MTCT of HIV, over and above that occurring in utero, and during birth, by an estimated 10 – 20%.

The impact of formula feeding recommendations on HIV exposed infants internationally

From approximately 1992 until 2006 a considerable body of research appeared to show the acceptability and feasibility of feeding HIV-exposed infants with breast milk substitutes (Becquet et al 2005, Leroy et al 2007), but few formal research results were released which threw light on the sustainability and safety of feeding the majority of HIV-exposed infants with commercially manufactured formula (de Wagt 2004). However, in early 2006 there were disturbing reports of exceptionally high mortality rates in non-breastfed babies in Botswana (Creek 2006, Creek et al 2007, Creek et al 2010). These reports, compiled by the CDC, were soon followed by similar findings from many other developing countries, in particular attesting to the increased risks of infant morbidity, mortality and malnutrition when HIV-positive mothers had adopted formula feeding (WHO 2010).

Key development identified 1999-2005: the importance of exclusive breastfeeding in reducing the risk of postnatal HIV

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## Antiretroviral medications change HIV from a lethal to a chronic disease

The first clinical trial of antiretroviral drugs to reduce vertical HIV-transmission was conducted in 1994 (Connor EM et al.). It was found that treatment with the drug azidothymidine (AZT) reduced transmission during pregnancy and birth by two-thirds. Between 1994 and 1999 the rate of perinatally acquired HIV infection in the United States decreased more than 90% to fewer than 50 cases per year (Vermund 2004).

Following these early trials, there has been a huge quantity of research conducted on various combinations of different drugs at different time-points. Researchers have looked at medicating either mother or baby, or both. They have employed either single dose, or short or long courses of medication during pregnancy, during labour and/or during breastfeeding. It appears that the key to controlling both transmission and disease progression is to reduce the infected individual’s viral load to ‘undetectable’ (less than 50 viral copies/mm3). Appropriate ARV regimens, as currently recommended by the World Health Organization (2013), achieve this aim, to simultaneously:

- **Reduce horizontal transmission** as shown by the HIV Prevention Trials Network (HPTN) 052 study, in which HIV transmission between sexual partners was reduced by 96% (Cohen et al. 2011). No cases of HIV transmission occurred through either anal or vaginal sex when there was a viral load of under 200 copies/ml (Rodger et al. 2014).
- **Reduce vertical transmission** by during pregnancy and delivery (Townsend et al. 2008). In addition, the combined interventions of appropriate maternal postnatal ART with exclusive breastfeeding reduces the risk of postpartum transmission to between 0-1% (See Table 1)
- **Improve the HIV-positive mother’s health**, allowing her to care for her children and enjoy a normal lifespan.

### HIV-positive mothers’ experiences

The importance of breastfeeding, and the distress felt by the majority of HIV-positive mothers in the UK about recommendations not to breastfeed, cannot be overstated (Ayugi de Masi 2012). Most are of African origin. Several researchers writing on African attitudes towards breastfeeding (Leshabari et al. 2007, Moland et al. 2010, Chinkonde et al. 2012) describe breastfeeding as a behaviour at the very heart of motherhood, and regarded by many as the only acceptable way to feed a child. Partners and/or elderly female relations have always played a significant role in influencing infant feeding decisions, not least due to the close links which exist between breastfeeding and sexuality, rendering breastfeeding subject to control, power and authority. More than one British national support organisation for women with HIV has published strategies to combat the stigma experienced by African HIV-positive bottle feeding mothers in the UK (Ayugi de Masi 2012, Namiba 2014). Suggestions have included lying to friends and relations about suffering cracked/painful/infected nipples, failed lactation, or the need to return to work as reasons for not breastfeeding. These recommendations are all the more poignant since up to date research makes them unnecessary. Furthermore, it does not take much imagination to see that these redundant suggestions occasionally spill over to cause reduced rates of breastfeeding amongst uninfected mothers.

### Mechanism for HIV transmission through mixed breastfeeding


<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Displacement of breast milk</td>
<td>→ milk stasis → breast permeability, elevated sodium → mastitis</td>
</tr>
<tr>
<td>Elevated viral levels in milk</td>
<td>Infant gut damage and inflammation</td>
</tr>
<tr>
<td>Contact of virus with infant’s bloodstream</td>
<td>Breast milk AND other foods/liquids containing foreign pathogens and antigens</td>
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Table 1. Studies of postnatal HIV transmission rates <1% at 6 months
(inclusion criteria: mother or child received ART and infants were exclusively breastfed. Breastfeeding-associated transmission was defined as excluding transmission occurring in the first month postpartum)

<table>
<thead>
<tr>
<th>Reference</th>
<th>Duration of exclusive breastfeeding</th>
<th>Antiretroviral treatment and/or prophylaxis</th>
<th>Postnatal transmission</th>
<th>Determined by first infant HIV+ test result between…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palombi et al 2007</td>
<td>6 months</td>
<td>Maternal HAART from 25 weeks’ gestation until weaning: infant sdNVP after birth</td>
<td>0.8% (2/251)</td>
<td>1–6 months</td>
</tr>
<tr>
<td>Kilewo et al 2008</td>
<td>18 weeks</td>
<td>Maternal ZDV &amp; 3TC from ~34 weeks’ gestation to 1 week postpartum; Infant: ZDV &amp; 3TC from 0–1 week, then 3TC alone during breastfeeding</td>
<td>1% (4/398)</td>
<td>6 weeks–6 months</td>
</tr>
<tr>
<td>Kilewo et al 2009</td>
<td>For a maximum of 6 months</td>
<td>Maternal HAART from 34 weeks’ gestation to 6 months postpartum: Infant ZDV &amp; 3TC to 1 week of age</td>
<td>0.9% (4/441)</td>
<td>6 weeks–6 months</td>
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<tr>
<td>Marazzi et al 2009</td>
<td>6 months: mothers advised to start weaning by 6 months ending within 2 months, but likely some breastfeeding 6-12 months</td>
<td>Maternal HAART from 15 weeks’ gestation to 2 months post weaning Infant sdNVP after birth + AZT for 1 week</td>
<td>0.6% (2/341)</td>
<td>6 weeks–6 months</td>
</tr>
<tr>
<td>Peltier et al 2009</td>
<td>6 months: mothers advised to wean at 6 months</td>
<td>Maternal HAART from 28 weeks’ gestation to 7 months postpartum: Infant sdNVP after birth + ZDV for 1 week</td>
<td>0.44% (1/227)</td>
<td>6 weeks–9 months</td>
</tr>
<tr>
<td>Shapiro et al 2010</td>
<td>EBF for 93% of infants to weaning: 71% breastfed &gt;5 months: &lt;1% &gt;6 months</td>
<td>Randomized and varied HAART regimens for mothers from 18–34 weeks’ gestation until weaning: all mothers also received supplemental AZT during labour: Infant sdNVP after delivery plus 1 month AZT</td>
<td>0.3% (2/709)</td>
<td>1–6 months</td>
</tr>
<tr>
<td>Homsy et al 2010</td>
<td>EBF for 92% for 4 months, weaned at 5 months</td>
<td>Maternal FDC, median duration 5.2-20.3 months preceding delivery and during breastfeeding: Infant sdNVP post birth or sdNVP + ZDV 1 week</td>
<td>0% (0/109)</td>
<td>6 weeks of age–6 weeks post weaning</td>
</tr>
<tr>
<td>Thomas et al 2011</td>
<td>6 months</td>
<td>Maternal HAART from 34 weeks’ gestation to 6 months postpartum: infant sdNVP at birth</td>
<td>0.8% (4/487)</td>
<td>6 weeks–6 months</td>
</tr>
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</table>

UK guidelines 2011, and current practice implications

In order to respond to the needs of HIV-positive mothers for recommendations which would fit their circumstances, the British HIV Association and the Children’s HIV Association began a public consultation in 2009, and published a revised position paper in March 2011 (Taylor et al 2011). While the first recommendation is for formula feeding, the revised guidance allows that a woman on effective triple ART with a repeatedly undetectable viral load may, after careful consideration, choose to exclusively breastfeed for the first 6 months of her baby’s life so long as the safeguards set out in the Box opposite are fulfilled.

In January 2013, the Committee on Pediatric AIDS from the American Academy of Pediatrics (AAP), invoked a very similar rationale — to reverse its own previous ban on breastfeeding by HIV-positive women. Like BHIVA, the AAP’s guidance clearly recommends formula-feeding by HIV-positive mothers, but then permits and encourages clinicians to support them in specific ways if they want to breastfeed (Committee on Pediatric AIDS 2013).

A clear need for compliance with maternal ART

Citing the findings of Roger Shapiro and colleagues (2010) that show a risk of HIV-transmission through breastfeeding of 0.28% in mothers receiving full ART, both the AAP and BHIVA/CHIVA express concern that HIV transmission can still occur, even with full maternal ART and an undetectable viral load. In a short online response, Ted Greiner and Pamela Morrison (2013) point out that the necessary safeguard of maternal ART adherence for a sufficient length of time to facilitate an undetectable viral load, was not in place for the 2/709 (0.28%) of mothers who transmitted postnatally in the Shapiro cohorts. A paper by Chibwesha and colleagues (2011) shows that the full effectiveness of ART in preventing vertical transmission is only achieved by maternal adherence to antiretroviral regimens for at least 13 weeks prior to delivery. The study found that women on ART for <4 weeks had a 5.2-fold increased odds of transmission. In the Shapiro cohorts, one of the two transmitting mothers had medication adherence issues. The other had a baseline viral load of 171,000 copies/mL at recruitment at ~28 weeks of pregnancy, received antenatal ART for <4 weeks before delivery at 32 weeks’ gestation, and had a detectable HIV-1 plasma RNA of 257 copies/mL at commencement of breastfeeding.
Guidance for HIV-positive mothers wishing to breastfeed

**Mother** to receive:
- support for her decision to exclusively breastfeed
- triple ART for > 13 weeks before delivery until 1 week after weaning
- monitored undetectable viral load (<50 copies mm⁻³)
- frequent follow-up to check on adherence to her medication
- prompt treatment of any breastfeeding or breast problems.

**Infant** to receive:
- 4-6 weeks of antiretroviral prophylaxis
- frequent monitoring of HIV status, eg at birth, 4 weeks, and post-weaning
- NB child protection measures (which were considered appropriate) must be reconsidered in light of new data.

The importance of maternal ART adherence was also highlighted in a pilot program, reported in 2011, involving 194 Zambian HIV-positive women and their infants (Silverman 2011). The only postnatal transmissions during, not only 6 months exclusive breastfeeding, but also 6 months of appropriate partial breastfeeding with weaning foods, occurred in women who were non-adherent to their medications.

**HIV screening as part of standard antenatal care in the UK**

It should be remembered that in the UK today standard risk reduction strategies include mandatory HIV testing of all pregnant women. ART can be initiated promptly in order to reduce an HIV-positive mother’s viral load to undetectable levels by the 36th week of pregnancy. This current standard of care was originally devised to enable the mother to have a vaginal delivery, thus ensuring the safest possible outcome for herself and her baby (Islam 2010, de Ruiter et al 2014). The same protocol also maintains maternal viral load for the mother who wishes to breastfeed.

While it is acknowledged that outside the context of HIV formula feeding may be seen to be culturally normal for the majority of British-born mothers, with only a tiny percentage of babies exclusively breastfed for the recommended 6 months, in fact formula-feeding is not without risk even in a comparatively privileged environment (Chen & Rogan 2004, Quigley et al 2007, Ip et al 2009, Bartick & Reinhold 2010). The health consequences and the costs to the NHS of formula-feeding are considerable. To this end the Department of Health is committed to increasing breastfeeding rates for British babies (Department of Health 2014).

**Conclusion: the way forward**

Research since 2006 has exposed many of the flaws and inconsistencies of the early studies. Current effective antiretroviral regimens not only allow HIV-infected individuals to live a normal lifespan (Ford et al 2013), but have also transformed infant feeding recommendations, permitting renewed confidence in universal support for breastfeeding. Since formula-feeding is incompatible with cultural norms for the large majority of the HIV-positive mothers giving birth in the UK, health professionals working with this special population of women will welcome ways to assist them in fulfilling their own infant feeding goals when they wish to breastfeed.

**References**


Pamela Morrison, IBCLC

Pamela has been speaking and writing about breastfeeding in the context of HIV since 1995. Having been certified in 1990 as the first International Board Certified Lactation Consultant (IBCLC) in Zimbabwe, a country with extremely high HIV-prevalence, she worked in private practice, served as a member of the Zimbabwe National Multi-Sectoral Breastfeeding Committee as a BFHI trainer and assessor, and assisted with development of national code legislation on HIV and breastfeeding policy. She emigrated to Australia in 2003 and subsequently to England in 2005. She served as Co-coordinator of the World Alliance for Breastfeeding Action (WABA) Task Forces on Human Rights from 2001-2, on Breastfeeding and HIV from 2005-9 and she authored the WABA 2012 publication.

Zoe Faulkner BA Hons, IBCLC

Zoe’s enthusiasm for breastfeeding began in 1997, following the birth of her daughter, and she qualified as an IBCLC in 2011. She has a passion for the breastfeeding relationship and continues to develop her expertise through study days and conferences, as well as sharing her skills and experience through teaching, including recently presenting for iLactation (an organisation that hosts online breastfeeding conferences). Zoe has been employed as a breastfeeding peer support co-ordinator for Sussex Community Trust in Brighton and Hove since 2008. She also volunteers for Lactation Consultants Great Britain (LCGB) and is the communication committee chair, enjoying the diversity of breastfeeding-related work these two roles provide.