World Nutrition, June 2026;17(2): 222-232
DOI: https://doi.org/10.26596/wn.2026172222-232

WORLD NUTRITION
The Official Journal of the World Public Health Nutrition Association
Journal homepage: https://www.worldnutritionjournal.org
ISSN: 2041-9775

Policy and Perspectives

HIV Undetectable = HIV Untransmittable (U=U) for breastfeeding also

Pamela Morrison[1,*]

[1] International Board Certified Lactation Consultant (Retired), West Sussex, England

OPEN ACCESS

***Corresponding Author**
Morrison P.
pamelamorrisonibclc@gmail.com
ORCID: 0000-0003-0050-4519

Article History
Received: March 08, 2026
Reviewed: May 02, 2026
Revised: May 17, 2026
Accepted: May 19, 2026
Published: June 30, 2026

Citation
Morrison P. (2026). HIV Undetectable = HIV Untransmittable (U=U) for breastfeeding also. *World Nutrition*, 17(2), June, 222–232. https://doi.org/10.26596/wn.2026172222-232

Academic Editor
Ted Greiner, PhD

Copyright © 2026 Morrison. Published by WPHNA. This is an open-access article distributed under the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Highlights/Key Messages

- Maternal antiretroviral regimens prevent perinatal transmission of HIV.
- Undetectable = Untransmittable (U=U) also applies to postpartum transmission.
- Mothers living with HIV seek support to safely breastfeed their babies.

Abstract

Following the global success of antiretroviral therapy in reducing transmission of HIV, an increasing number of mothers living with the virus in high-income countries (HICs) are keen to receive the same support to breastfeed as mothers living in low and middle-income countries (LMICs). However, breastfeeding is often discouraged in HICs by risk-averse healthcare providers. Despite adopting the approach that Undetectable = Untransmittable (U=U) for all other routes of transmission, U=U is not applied to breastfeeding. However, the evidence demonstrates that the risk of transmission via breastfeeding is indeed zero when U=U principles are strictly applied. Clinicians, lactation consultants, and others working with mothers to help them achieve their infant feeding goals can thus have greater confidence that U=U for breastfeeding, too.

Keywords: **breastfeeding, HIV, risk of transmission, U=U, maternal support**

Introduction

An increasing number of women living with HIV in Europe and North America, who are mostly but not exclusively of African descent -- sometimes called 'the HIV diaspora' -- (Rai et al. 2023) are choosing to breastfeed their babies. Breastfeeding is their cultural norm and a valued traditional practice, with important health and social implications.

Current guidance from the British HIV Association, first formalised in 2011, acknowledges that a mother living with HIV, while having received a recommendation to formula-feed, may nevertheless choose to breastfeed if she is receiving and adherent to effective antiretroviral therapy (ART) resulting in viral suppression.

However, the definition of "undetectable" varies among policy-makers. In the UK, the British HIV Association sets the definition of an undetectable viral load at <50 copies of HIV per mL of blood (British HIV Association 2025). The US Department of Health and Human Services defines viral suppression as having <200 copies of HIV per mL of blood (Clinical Info Update 2026), but information on perinatal exposure cites a threshold of <50 copies/mL (Clinical Info 2024).

Taking Britain's lead, Australia, New Zealand, and many other European countries have also relaxed previous prohibitions on breastfeeding with HIV. In January 2023 (subsequently confirmed in a 2025 Update), the US National Institutes of Health, in their federally approved Guidelines on the Treatment of HIV during Pregnancy and Prevention of Perinatal Transmission, also affirmed that individuals with HIV who are on ART with a sustained undetectable viral load and who choose to breastfeed should be supported in this decision.

Despite this positive official guidance, mothers living with HIV often receive discouraging or confusing advice from individual healthcare providers about the risks of transmission through breastfeeding (Kasadha et al. 2022). Mothers report that conscientious but risk-averse obstetricians, paediatricians, and nursing staff may subtly or overtly undermine their confidence and sabotage their attempts to breastfeed their babies. Advice to curtail breastfeeding or to stop early in favour of formula-feeding is underpinned

by the stated possibility of a viral reservoir of infected cells, maternal breast infections, failure of maternal ART, and inability of mothers to adhere to their drug regimens. In HICs, these reasons, together with a widespread but erroneous belief in the safety and normality of formula-feeding, discourage breastfeeding for all but the most determined women, leading some to seek help beyond their immediate clinical team to be empowered in their decision to breastfeed (Kasadha et al. 2022). As an IBCLC working in private practice, the author has experience working with such mothers.

These mothers often report that their babies' paediatricians advise early breastfeeding cessation. Their advice indicates that they seem to know little about either the normal course of breastfeeding, nor how to provide solutions to common difficulties. Mothers find such a lack of trust in the safety of breastfeeding to be discouraging and demoralising.

Amongst healthcare providers, there is widespread scepticism that even though women may be receiving and are adherent to effective ART, and even when HIV testing shows viral suppression, the principle of U=U (Undetectable = Untransmittable), which today is confidently applied to all other routes of horizontal and vertical transmission of HIV, remains inapplicable to breastfeeding (Moseholm et al. 2024). The common belief is that though the risk is low, it is not zero. However, close scrutiny of study results shows that when the protocol fails, there is a reason, most often that mothers are either not adherent to their ART or that it was taken for too short a time before the initiation of breastfeeding (Shapiro et al., 2010; Flynn et al. 2018; Flynn et al. 2021). On the other hand, when mothers are prescribed effective ART during early pregnancy and are able to take it for long enough to achieve an undetectable viral load during the postpartum, they do not transmit HIV to their babies during breastfeeding. Thus, the slogan U=U can be applied to breastfeeding, too.

U=U

The success of ART to treat and prevent infection with HIV has been an unqualified success, transforming a diagnosis of HIV from a death sentence to a chronic, but manageable disease (Delaney 2006). Uninterrupted treatment with various drug combinations can result in suppression of viral replication and immune recovery. Adherence to effective ART can suppress an HIV-infected individual's viral load to undetectable, allowing them to live a normal lifespan and prevent transmission either horizontally to sexual partners (through vaginal or anal sex) or vertically from mothers to babies (during pregnancy and delivery). The slogan U=U (Undetectable = Untransmittable) is based on these thoroughly researched principles.

U=U for horizontal transmission

In 2000, the Rakai Project in Uganda first established the correlation between low viral load and protection from infectivity in serodiscordant couples when the uninfected partner was not receiving ART. As the viral load increased, so too did the risk of transmission, with each log increment associated with a 2.5-fold increase in risk. Importantly, there were no transmissions among 51 couples in which the infected partner had a viral load <1,500 copies/mL (Quinn et al. 2000).

A subsequent Spanish study of 393 monogamous, serodiscordant couples who received either early or late ART, or none, found no transmission to the uninfected partner when the infected partner had been treated with Highly Active ART (HAART) (Castilla et al. 2005).

In 2011, the HPTN-052 Study recruited 1763 couples, 97% of whom were heterosexual, from 13 sites in Botswana, Brazil, India, Kenya, Malawi, South Africa, Thailand, the United States, and Zimbabwe. The HIV+ partners were randomised to either start ART immediately or to wait until their CD4 count dropped to 350 cells/mm (the then threshold in WHO guidelines for starting treatment). Treatment with HAART so conclusively reduced the risk of transmission to the uninfected partner that the study was stopped early to allow all participants to receive treatment (Cohen et al. 2011). Follow-up over at least another 4 years confirmed the durability of these early results (Cohen et al. 2015).

Results from the prospective observational PARTNER study involving 75 sites in 14 European countries were published in 2009. Researchers enrolled 1166 serodiscordant couples (60% heterosexual and 40% homosexual, where the HIV+ partner was on ART, and where condoms were not always used, often for many years) (Rodger et al. 2016). Undetectable viral load was defined as <200 copies/mL. The final results, published in July 2016, reported zero transmissions after 58,000 sexual encounters without condoms.

The Opposites Attract Study, running from 2012-2015, was an observational prospective longitudinal cohort study of 358 homosexual serodiscordant couples in Australia, Brazil and Thailand (Bavington et al. 2014; Grulich et al. 2017). The infected partner received ART and his viral load and HIV antibodies were tested at every clinic visit. There were zero transmissions after almost 17,000 acts of condomless anal intercourse.

The PARTNER 2 extension study, which ran to April 2018, collected results in gay couples where the HIV-positive partner was taking ART to achieve a plasma viral load of <200 copies/mL (Rodger et al. 2019). Couples reported condomless anal sex a total of 76,088 times. If a seroconversion occurred in the uninfected partner, anonymised phylogenetic analysis, i.e., examination of the relationship between viruses, revealed through genetic DNA and RNA sequencing, was done to identify linked transmissions. While 37% of 777 HIV-negative men reported condomless sex with other partners and 15 new HIV infections occurred during follow-up, none were phylogenetically linked to within-couple transmissions.

The Swiss Statement

In an effort to offset laws in Switzerland that criminalised HIV transmission between sexual partners, even if condoms were used, or between serodiscordant couples who wanted to conceive, even with full consent, Vernazza and colleagues reviewed >25 studies showing that uninterrupted ART prevented transmission of HIV. In what came to be known as The Swiss Statement (Vernazza et al. 2008), the principle of Undetectable = Untransmittable, or U=U was accepted and endorsed by over 1000 organizations in 102 countries (U=U

Global Community 2025). The Swiss Statement estimated the risk of HIV transmission to be <1 in 100,000 (0.001%) – and therefore effectively zero - when the following criteria were met. The HIV-infected individual should:

- Be adherent to their ART drugs
- Be engaged in routine medical care
- Have an undetectable viral load for at least 6 months
- Have no other sexually transmitted infections (STIs)

U=U for vertical transmission during pregnancy and birth

Clinical evidence of the importance of viral load on the risk of transmission of HIV during pregnancy was presented at the 1998 International AIDS Society Conference. Sixteen pregnant women living with HIV in San Francisco took double combination ART, and 6 took triple therapy. Combination therapy was well tolerated and lowered maternal viral burden in all mothers, usually to non-detectable levels. Triple therapy substantially reduced mother-to-child transmission (MTCT) (Beckerman et al. 1998). This finding led to the 1998 US DHHS guidance to begin early ART (Department of Health and Human Services, 1998).

The following year Garcia et al. (1999) found an increasing percentage risk of transmission of MTCT of HIV with increasing geometric mean levels of plasma HIV-1 RNA, as follows:

0% for	<1,000 copies/mL
16.6% for	1,000 - 10,000 copies/mL
21.3% for	10,001 - 50,000 copies/mL
30.9% for	50,001 - 100,000 copies/mL and
40.6 % for	>100,000 copies/mL
63% for	>100,000 copies/mL with no ART

In 2011, a study investigating the optimal time to start HAART during pregnancy to maximise protective effectiveness for the baby at delivery, Chibwesha et al. (2011) noted that the duration of antenatal HAART was the most important predictor of perinatal HIV transmission. Women who received HAART for <4 weeks had a 5.2-fold increased odds of HIV transmission compared to women initiating HAART at least 13 weeks earlier in pregnancy. Maximal effectiveness in preventing MTCT was achieved by initiating HAART at least 13 weeks prior to delivery.

An analysis conducted by Sibiude et al. (2023), spanning 2000 to 2017, included 14,630 women with access to free ART during pregnancy and to monthly viral load assessment. Perinatal transmission to babies (who were not breastfed) according to timing and outcome of prophylaxis was as follows:

- Maternal antiretroviral prophylaxis before conception; undetectable viral load near delivery, 0%
- Prophylaxis begun during pregnancy; undetectable viral load near delivery, 0.57%.
- Prophylaxis begun when HIV detected; viral load still detectable near delivery, 1.08%.

The authors noted that the apparent higher risk of perinatal transmission in preterm births was probably mainly driven by a shorter duration of ART when initiated later during the pregnancy, instead of before or near conception. They concluded that ART treatment initiated before pregnancy, with strict control of the maternal viral load near delivery, could lead to virtual elimination of perinatal transmission.

A background of fear hinders acknowledgement of U=U for breastfeeding

MTCT via breast milk has been seen as a potential transmission route for HIV ever since the first report in 1985 that a baby had been infected through breastfeeding (Zeigler et al. 1985).

The initial response of HICs was to ban breastfeeding in the context of HIV (Centers for Disease Control and Prevention 1985). Prior to the development and testing of effective ART, breastfeeding was seen to pose a "substantial risk" of transmission (Mofenson 1999) with as much as much as 44% of paediatric HIV infection being attributed to breastfeeding (WHO 2007).

ART to prevent postpartum MTCT

From 1994, different antiretroviral regimens in varying doses and durations of treatment were administered either to the mother, to the baby, or to both as prophylaxis against MTCT of HIV during pregnancy, during birth or during breastfeeding. Short-course regimens providing ART to mothers during pregnancy or delivery were shown to be effective in reducing perinatal transmission to non-breastfed babies, but their application in populations in developing countries where breastfeeding was commonly practised posed "considerable challenges" (Dabis et al. 2000).

The competing risks of HIV-transmission via breastfeeding vs replacement feeding

Following the success of the early trials in formula-fed babies, it seemed futile to many policy-makers to provide maternal ART to save babies from HIV-infection during pregnancy and birth, only to expose them to the risk of acquiring the virus through breastfeeding. This rationale formed the basis of the early prevention of MTCT pilot programmes in LMICs, which provided mothers who had tested HIV-positive with infant feeding counselling and free artificial infant formula (replacement feeding) with the goal of preventing HIV transmission to the next generation (UNAIDS 1997). However, while the use of formula in HICs was seen as a feasible alternative to avoid all risk through breastfeeding, health outcomes for artificially fed babies in low-income settings proved to be problematic. In 2006, devastating floods in Botswana led to such high infant mortality rates in formula-fed babies that the government requested an investigation by the Centers of Disease Control (Creek et al. 2010). Their findings shone a spotlight on the priority of HIV-free survival, rather than simply prevention of HIV-transmission (defined as a child remaining alive and free of HIV-infection at a particular time point, usually several weeks or months after cessation of breastfeeding).

Participants at the 2009 WHO Technical Consultation on

HIV and infant feeding described the results emanating from PMTCT sites in Botswana, Zambia, South Africa and other LMICs as "transformational". In recognition that HIV-free survival was maximised by providing adequate ART to mothers, and recommending 6 months of exclusive breastfeeding with continued breastfeeding for up to two years for their infants, HIV and infant feeding policy reverted once again to promoting breastfeeding for all, regardless of the HIV status of the mother (WHO 2010).

Importantly, even in HICs which enjoy access to safe water and feeding alternatives, there is substantial evidence of increased morbidity and mortality with breastfeeding avoidance, both within and outside the context of HIV (Stuebe 2009; Morrison et al., 2011; Bartick & Reinhold 2020).

Duration of ART matters

Initial evidence showing that postpartum transmission could be almost completely prevented when mothers with HIV received adequate ART throughout the breastfeeding period came from several trials conducted in African countries of high HIV prevalence (Morrison et al. 2011). By mid-2011, results from at least 8 studies demonstrated that early and appropriate ART with exclusive breastfeeding for up to 6 months reduced the risk of postnatal transmission to 0–1% (Palombi et al. 2007; Kilewo et al. 2008; Kilewo et al. 2009; Marazzi et al. 2009; Peltier et al. 2009; Shapiro et al. 2010; Homsy et al. 2010; Thomas et al. 2011).

Pooled data in large meta-analyses, "risk is not zero"

An over-cautious view was perpetuated by several meta-analyses of MTCT of HIV, which, by pooling together very large heterogeneous cohorts of mothers and babies tracked over several decades, concluded that the risk of HIV transmission through breastfeeding is not zero. A systematic review of 110 studies from 2018 – 2024 estimated that ART in pregnancy reduced the odds of vertical transmission by 5.6% per week, but concluded that the probability of vertical HIV transmission was less effective when ART was initiated late in pregnancy (Walters et al. 2025).

Dugdale et al. (2025) reviewed 147 studies between 1989 and 2024 involving 82,723 dyads and estimated perinatal transmission by 6 weeks or during breastfeeding according to maternal viral load as follows:

- 0.2% with <50 copies/mL,
- 1.3% with 50 - 999 copies/mL and
- 5.1% with ≥1000 copies/mL

The risk of transmission during breastfeeding, using data largely lacking frequent maternal testing, or modern first-line ART regimens, among women with a recent viral load of <50 copies/mL, was said to be very low—"but not zero". In an accompanying commentary on the Dugdale analysis, John-Stewart and Njugana (2025) noted that breastfeeding poses "a not insubstantial risk" of 0·1% per month, which could accumulate to 1·2% after 1 year of breastfeeding or 2·4% after 2 years.

However, in a subgroup analysis of 5 studies, Dugdale et al. (2025) reporting on 4,675 women receiving pre-conception ART with a viral load of <50 copies/mL near birth, found there were zero transmissions (0%, 0·0–0·1) perinatal transmissions, supporting U=U in pregnancy and birth.

Conflict and tensions

WHO recommends exclusive breastfeeding for at least 6 months and continued breastfeeding with the addition of household complementary foods up to 12 or 24 months for HIV-exposed babies (World Health Organisation 2016). More and more women living with HIV who emigrate to North America, Europe, Australia and New Zealand, taking their cultural beliefs and practices with them, wish to breastfeed. Social, cultural, and personal beliefs about breastfeeding, and opposing recommendations in low-income, high HIV-prevalence countries, create tensions for these mothers, and especially when there is coercion to formula-feed (Van der Wekken-Pas et al. 2026; Ulfa et al. 2026; John et al. 2026; Bukkems et al. 2023; Lazenby et al. 2023; Nyatsanza et al. 2021; Tariq et al. 2016). Conscientious healthcare providers have reported difficulty navigating the incongruity between WHO guidelines and local public health policy (Tuthill et al. 2019). Too often, the current narrative repeats the caution that while breastfeeding carries a very low risk of transmission of the virus, "the risk is not zero" (Clinical Info (2023) and Update (2025); British HIV Association 2025; Waitt et al. 2018; Rai et al. 2023). Both mothers and professionals express the need for expert support and clear communication strategies to engage all stakeholders and foster empowerment and trust.

Waitt et al. (2018) asked if the campaign Undetectable=Untransmittable (U=U), established for the sexual transmission of HIV, could be applied to the transmission of HIV through breastfeeding. Identifying the reasons for the difference in approach, they noted that although recommendations were based on the same data, the balance of benefits versus harms differed for breastfeeding depending on the setting. In LMICs, the risk of morbidity and mortality due to infections from unclean water used in formula preparation and loss of protective antibodies in breastmilk outweighs the risks of HIV transmission through breastfeeding.

Swiss Statement for breastfeeding

In 2018, the authors of the 2008 U=U Swiss Statement subsequently added breastfeeding in a situation of clinical equipoise when ART is accessible (Kahlert et al. 2018). Given the theoretically very low risk through breastfeeding with combined ART (cART), and the advantages and benefits of breastfeeding, also in industrialised countries, the strong recommendation to HIV-infected mothers to refrain from breastfeeding in this setting may no longer be justified. Combined ART is able to fully suppress HIV RNA in body compartments and fluids, including blood, rectal tissue, genital secretions, lymph node tissue, and breast milk. Thus, when cART is implemented, resulting in an undetectable plasma viral load, transmission is effectively prevented. In their literature review, Kahlert et al. (2018) were not able to

identify a single case of HIV transmission via breastfeeding when mothers fulfilled the "optimal scenario". Specifically, there is virtually zero risk of MTCT when a pregnant woman:

i. is adherent in taking her cART,
ii. receives regular clinical care, and
iii. has a suppressed HIV plasma viral load of <50 RNA copies/ml throughout pregnancy and breastfeeding.

Current studies supporting U=U for breastfeeding

Between 2020 and 2025 a dozen papers were published showing that when mothers living with HIV received and were adherent to effective ART during pregnancy and breastfeeding, resulting in an undetectable viral load, there was no transmission to their babies. These studies are listed and their findings summarised in Table 1.

Table 1. U=U for breastfeeding: Research indicating that babies are uninfected after having been breastfed by mothers living with HIV in HICs who received antiretroviral therapy and maintained an undetectable viral load

Country	Infants	Year:	Description
England/UK	300	2012 - 2023	The Integrated Screening Outcomes Surveillance Service (ISOSS) is the largest register for babies breastfed by mothers living with HIV in the developed world. The latest report, covering the period 1 January 2012-31 December 2023 (ISOSS, 2025), tracks socio-demographic data, including infant feeding, health outcomes, and final HIV status. By December 2024, no vertical transmission had been reported after breastfeeding cessation among 309 mother-infant pairs supported to breastfeed; 300 had either received negative antibody test results at >18 months or had at least one documented negative PCR result after cessation of breastfeeding at ≥3 months of age. The remaining 9 babies were • presumed negative but lost to follow-up (7) or • indeterminate, still in follow-up (1) or • lost to follow-up (1).
Germany, Sister Program	40	2009 - 2020	Haberl et al. (2021) recorded outcomes over 11 years for 42 babies in the Sister Program who were breastfed in 15 treatment centres. Due to virologic failure (with viral loads of 867 copies/ml and 76 copies/ml, respectively), 2 mothers abruptly stopped breastfeeding, leaving 40 babies who remained uninfected after breastfeeding had ended.
Germany, Munich	25	2016 - 2020	Weiss et al. (2022) retrospectively analysed data for all 30 babies born to women living with HIV in Munich. Mothers were treated with combined ART at delivery, and infants received ARV prophylaxis (zidovudine) for between 2 and 8 weeks after birth. While 5 mothers had a detectable viral load in pregnancy or the postpartum period, there were no vertical transmissions of HIV for the remaining 25 babies.
Germany, Berlin	77	2017 – 2023	Feitana-Sperling et al. (2025) retrospectively extracted data from medical records and hospital databases in Berlin for babies born between 2017 and 2023. Follow-up lasted until February 2025. No case of MTCT of HIV occurred in 77 breastfeeding mothers who maintained a viral load <50 copies/ml. 2 infants who were still being breastfed had remained HIV DNA PCR negative, with final post-breastfeeding testing confirmation pending. Higher exclusivity of breastfeeding was associated with longer duration. The authors conclude that maternal viral load is the most critical determinant in preventing transmission. Breastfeeding with HIV appears safe in high-resource settings with close monitoring and multidisciplinary care. Sustained viral suppression and ART adherence were key.
Switzerland	20	2019 - 2021	Crisinel et al. (2023) reported on 20 mothers living with HIV, adherent to cART, who achieved a viral load of <50 copies/mL at least at the last 2 consecutive measurements before birth and the last measurement >36 weeks of pregnancy, who breastfed their babies for a median duration of 6.3 months. None of the breastfed neonates received HIV post-exposure prophylaxis. Breastfeeding women either breastfed exclusively or combined breastfeeding with formula, but delayed introducing solid foods until after 6 months. No breastfed infant acquired HIV.
USA, Johns Hopkins, Baltimore	10	2018	Yusuf et al. (2022) describe how 9 mothers living with HIV, all of African descent, breastfed 10 babies (including a set of twins) with careful follow-up. All mothers reported adherence to ART and attended antenatal visits. Of those whose viral loads were >20 copies/mL at the first antenatal visit, all reached a nadir of <20 copies/mL at delivery, except for 1 patient whose VL was 24 copies/mL Infants received triple ARV prophylaxis for 4-6 weeks after birth and nevirapine throughout the breastfeeding period and for 4 weeks after breastfeeding had ended. Babies were exclusively breastfed for between 1 and 8.6 months (mean duration 4.4 months). On PCR at a median age of 16 months, all babies tested negative.
USA Washington	7	2018 - 2021	Koay and Rakhmanina (2022) supported 6 mothers with HIV to breastfeed 7 infants. Mothers achieved viral suppression with ART (4 with a VL of <20 copies/mL, and 2 with a VL of <30-40 copies/mL). Babies received short ARV prophylaxis depending on the provider's or parental preference; • 1 with 4 weeks ZDV, • 3 with 6 weeks ZDV, • 2 with 6 weeks ZDV and NVP, and • 1 with ZDV + 3TC + NVP for 2 weeks followed by 4 weeks of ZDV Despite counselling promoting exclusive breastfeeding, 5 mothers used some degree of formula-feeding. 3 babies tested HIV-negative after breastfeeding cessation. 4 babies aged 6-15 months, whose mothers had suppressed viral load, continued to be breastfed with confirmed negative results at the time of publication of this report.
USA, CHIP program, Colorado	13	2015 - 2022	Abuogi et al. (2023) report on 10 women living with HIV who breastfed 13 babies (1 mother – 3 babies, 1 mother – 2 babies and 8 mothers – 1 baby each). Mothers maintained excellent adherence to ART, achieving viral suppression. Babies received ARV prophylaxis as follows: • 12 breastfed infants received single drug antiretroviral prophylaxis with either zidovudine or nevirapine throughout breastfeeding, plus 4-6 weeks after breastfeeding cessation. • 1 infant received three drug prophylaxis for 4 weeks, then nevirapine prophylaxis until 4 weeks after breastfeeding cessation.

Country	Infants	Year:	Description
			Mothers were encouraged to exclusively breastfeed for the first 6 months, but the duration of breastfeeding varied, ranging from 1 to 309 days (median 62). There were several challenges, including early breastfeeding cessation due to concerns about breastmilk supply, mastitis, elevated viral load to 50 and 68 copies/mL, and maternal medical complications. In spite of these difficulties, all breastfed infants tested HIV-negative at the time of publication, including 8 of 10 infants who had breastfed for ⩾6 months.
USA and Canada	47 (+21 included in rows 6, 7 and 12)	2014 - 2022	Levison et al. (2023) describe the largest observational study in North America, which included 72 babies from 8 sites (44 cases) in the US and 3 sites (28 cases) in Canada. Most mothers had already been receiving ART and had undetectable viral loads at delivery. Viral load was defined as either "undetectable or ≤ 40 copies/mL". Regimens for infant prophylaxis varied between institutions. • 12 infants received zidovudine alone for 4–6 weeks (similar to recommendations for non-breastfed infants), • 7 received nevirapine monotherapy for 6 weeks or until breastfeeding stopped. • 12 received zidovudine with or followed by nevirapine for 6 weeks, until or after breastfeeding stopped. • 10 received full triple therapy for 6 weeks and then nevirapine monotherapy until breastfeeding fully stopped, 22 received triple therapy until after cessation of breastfeeding. Babies were breastfed from 1 day to 72 weeks (median duration 24 weeks). Most babies were exclusively breastfed; however, one/third of mothers reported challenges, commonly inadequate breastmilk supply, nipple pain/damage, mastitis or latching difficulties. 16 mothers reported mixed feeding, and 8 reported introducing solid foods at 4-5 months. Providers reported concerns about managing these challenges. No neonatal transmissions occurred among the 94% of infants for whom results were available ⩾6 weeks after breastfeeding cessation; 68 infants had documented negative HIV PCR results at least 6 weeks after breastfeeding had ended, and 4 babies were lost to follow-up. **NB** The pooled analysis included 72 babies in total: 21 already described in the Yusuf, Koay and Nashid cohorts, leaving 51. Of these, 4 were lost to follow-up, leaving 47 who were not infected with HIV through breastfeeding.
Italy	13	2017 - 2021	Prestileo et al. (2022) report on 13 HIV-infected pregnant women who elected to breastfeed their babies against specific medical advice. The mothers were on ART (darunavir or raltegravir plus emtricitabine/tenofovir disoproxil) and remained HIV-RNA undetectable and had >400 cells/mm3 CD4+ lymphocyte counts during pregnancy and breastfeeding. Babies received prophylactic ARV (zidovudine) for 4 weeks. The mean duration of breastfeeding was 5.4 months. Newborns tested HIV-negative at birth, 1, 3, and 6 months, and 1, 3 and 6 months after the end of breastfeeding; no infants were infected by HIV through breastfeeding.
Belgium	2	2020	Bansaccal et al. (2020) describe 2 mothers living with HIV who breastfed their babies, against medical advice. The first mother, an immigrant, had breastfed her first baby in Congo. She was taking a single-dose combination ART drug, and her viral load had become undetectable before the second pregnancy. The baby was exclusively breastfed for 4 months and received dual cART with lamivudine and zidovudine from birth until 1 month after breastfeeding cessation. Blood and milk viral loads remained undetectable during breastfeeding. Monthly HIV-1 DNA and RNA PCR in the infant's blood remained negative up to 1 month after breastfeeding stopped. The child's HIV antibody test was negative at 18 months. The second mother received ART for 5 years before becoming pregnant with her second child; she had an undetectable viral load and wished to breastfeed, against medical advice. Formula supplements had to be introduced in the newborn period due to weight loss, dehydration and hypernatremia. The baby received triple cART with AZT, 3TC and NVP during mixed feeding and subsequently dual prophylaxis without NVP when the mother returned to exclusive breastfeeding until 5 months. The milk and mother's blood viral loads remained undetectable during breastfeeding, and the baby remained uninfected on HIV antibody testing at 18 months.
Canada	3	2018	Nashid et al. (2020) in Canada reported breastfeeding by 2 mothers living with HIV, where their 3 infants (one singleton born at 41 weeks' gestation, and one set of twins born prematurely at 31 weeks' gestation) received triple cART. The singleton mother was adherent to treatment and had sustained virologic suppression before and throughout pregnancy. Her baby repeatedly tested HIV-negative until 18 months of age. The other mother gave birth prematurely to twin boys at 31 weeks. Both infants required neonatal intensive care for 5 weeks and received standard oral zidovudine prophylaxis. and donated breastmilk followed by formula. At 6 weeks, the mother initiated breastfeeding after discharge. Formula supplementation was required because the mother's milk supply was insufficient; the infants were mixed-fed for a total of 12 weeks. Triple cART (zidovudine, lamivudine, and nevirapine) was initiated while breastfeeding and continued until 3 weeks after breastfeeding cessation (15 weeks total). The babies' HIV tests were repeatedly negative until 18 months of age.
TOTAL	557		

Definition of undetectable viral load: Note that while the official cut-off point for an undetectable viral load as defined by the WHO ranges from <50 copies/ml in high-income countries to <1,000 copies/ml in low to middle-income countries, an undetectable viral load is usually defined as under <200 copies/ml.

The "optimal scenario" for U=U via breastfeeding

Today, health practitioners accept that there is no route of transmission of HIV which cannot be prevented by adequate ART for infected individuals, e.g., during oral sex, vaginal sex or anal sex; between straight couples, gay couples, discordant couples, and between mother and baby in utero or during birth – every possible way, in fact -- except through breastfeeding, the single transmission route that health practitioners do not acknowledge as being covered by U=U.

Studies looking at the effectiveness of ART in preventing onward transmission of HIV, notwithstanding their importance, have sometimes taken several years to be published, possibly due to concerns that the results would

undermine previous HIV prevention campaigns. This has been the case in trials looking at the need for consistent use of condoms vs. individual ART adherence as a means to prevent horizontal transmission (Rodger et al. 2018). A parallel can be drawn with the difficulty in making any headway with endorsement of measures which can reduce postnatal transmission through breastfeeding. There may be fears by those who remain sceptical about the efficacy of U=U for breastfeeding that suspension of recommendations for formula-feeding would lead more women with HIV to choose to breastfeed, increasing the number of infants at risk of postpartum transmission of HIV.

Rudin et al. (2025) assert that, despite the unresolved questions, there is currently no evidence that any potential risks are so relevant that breastfeeding under optimal conditions cannot be unconditionally supported. Almost all pregnant mothers with HIV in the Global North today fulfil what one of the authors of the Swiss Statement called the "optimal scenario" (Kahlert 2018):

- Antenatal HIV screening in the first trimester,
- Maternal HAART from diagnosis and for life,
- An undetectable viral load: i.e., a low chance of experiencing >200 copies/mL as a result of 9 months ART (Ryan, 2017).

Thus, having been diagnosed early in pregnancy, mothers living with HIV begin treatment with HAART very early, reducing their viral load so effectively that they qualify to safely give birth to their babies vaginally. Of interest in this context is that the time of greatest risk of MTCT of HIV is around the 24 hours of birth, yet due to the effectiveness of current ART regimens, obstetricians no longer recommend routine Caesarean section. This recommendation for a vaginal delivery could be used as a marker for sufficient viral suppression to also allow for safe breastfeeding.

The Integrated Screening Outcomes Surveillance Service (2023) reported that in England, >95% of women diagnosed before pregnancy were on ART prior to conception, 98.7% received ART during pregnancy, and 92% gave birth with an undetectable viral load. Mothers living with HIV today in HICs enjoy ideal conditions to prevent transmission of HIV from mother to child by any route, including breastfeeding: early HIV screening during pregnancy, prompt provision of ART, and regular monitoring of maternal viral load and HIV status until after their babies stop breastfeeding.

Limitations

One of the key criteria for U=U is meticulous maternal adherence to ART. U-U requires uninterrupted access to effective ART. Challenges to funding for programs which provide ART may limit women's access to continuous treatment, and unfortunately there is currently no safe compromise on this requirement. In addition, women often experience stigma and loss of confidentiality due to their need to take daily oral ART medications. Provision of long-acting injectable antiretroviral drugs, currently in development, could provide women with greater flexibility and convenience, lifting some of the burden of daily dosing of oral medications and the risk of detection of ART use for women who wish to keep their HIV status secret from partners or other family members. However, none of this is exclusive to postpartum transmission.

The way forward

In a detailed discussion of the viral dynamics of HIV in breastmilk, Powers (2024) outline clinical considerations and mechanisms of transmission in the modern era of cART. Innate and adaptive immune responses in the breast milk compartment influence HIV replication and the risk for breast milk transmission. To avoid postnatal transmission, initiation of maternal cART as early as possible, ideally pre-conception, and maintenance of viral suppression throughout pregnancy and breastfeeding are critical.

Providers should be aware of the full benefits of breastfeeding for mothers and infants as opposed to the almost negligible risk of HIV transmission in mothers who are virally suppressed, adherent to their ARVs, and receiving the necessary breastfeeding support and encouragement from professionals, family and peers. Best practices can be employed to maximise risk reduction during lactation and breastfeeding for mothers living with HIV, such as those described by Powell (2023), which were developed by a multi-disciplinary team of specialist doctors from Johns Hopkins School of Medicine and a representative from a support organisation for individuals living with HIV.

The health and well-being of HIV-exposed babies is paramount. Complacency about the safety of formula feeding in HICs needs to be challenged, and the risks and harms of routine formula use acknowledged. Mothers living with HIV who wish to breastfeed seek clear and detailed guidance to implement their decision. Close scrutiny of the literature reveals that when mothers are prescribed effective ART for sufficient duration to achieve viral suppression, and when they are meticulously adherent to their medications, their babies do not become infected through breastfeeding. Conversely, close examination of the small number of cases of postpartum transmission reveals a failure to attain these key criteria. As with other routes of infection, U=U for breastfeeding pertains when these strict criteria are met.

The development of effective antiretroviral drugs has transformed HIV from a lethal disease to a long-term, but treatable condition with a normal lifespan. Over 500 well-documented cases of HIV-free breastfeeding now demonstrate that when maternal ART is taken from early in pregnancy and for long enough to result in an undetectable viral load by delivery, and when mothers continue taking ART during breastfeeding, they do not transmit HIV to their babies through their milk. Using similar principles to those documented for horizontal and other routes of vertical transmission, for the growing number of mothers with HIV who wish to breastfeed their babies and for their healthcare providers, acceptance of U=U for breastfeeding is overdue.

The world is a very different place than it was when AIDS was of unknown origin and so terrifying to both the general population and the medical fraternity. Breastfeeding and its undeniably positive effects on short- and long-term health

outcomes should not be held hostage to residual prejudice that lingers from an earlier era.

"It is politics that determines whose truth is heard."
Penny van Esterik, York University

Author Contributions
Pamela Morrison is the sole author and is responsible for conceptualising and drafting the entire manuscript.

Declaration of Generative AI and AI-Assisted Technologies in Scientific Writing
Nothing to disclose.

Acknowledgements
None

Data Availability Statement
All relevant data are available within the manuscript

Funding
The author has received no grant or funding for this review.

Conflict of Interest
Pamela Morrison receives royalties from a webinar presentation on lactation management and two books on the topic of breastfeeding with HIV:
Morrison P, GOLD Learning lecture, Managing Low Weight Gain in the Exclusively Breastfed Baby, 60 minutes, GOLDLactation.com https://www.goldlearning.com/component/k2/item/219-pamela-morrison
Morrison P, HIV and Breastfeeding: The Untold Story. ISBN 978-1-78066-750-8, published by Pinter & Martin, London, 2022.
Morrison P, Breastfeeding Positively: Essential Information for Mothers Living with HIV. ISBN 978-1-78066-805-5 published by Pinter & Martin, London, 2024.

Publisher's Note: *All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher. The publisher remains neutral with regard to jurisdictional claims.*

REFERENCES

Abuogi, L.; Smith, C.; Kinzie, K.; Barr, E.; Bonham, A.; Johnson, R.L.; Dinnebeil, M. ... Weinberg, A. (2023). Development and implementation of an interdisciplinary model for the management of breastfeeding in women with HIV in the United States: Experience from the Children's Hospital Colorado Immunodeficiency Program. *Journal of Acquired Immune Deficiency Syndromes,* 93(5):395-402. https://doi.org/10.1097/QAI.0000000000003213

Bansaccal, N.; Van der Linden, D.; Marot, J-C. & Belkhir, L. (2020). HIV-infected mothers who decide to breastfeed their infants under close supervision in Belgium: about two cases. *Frontiers in Pediatrics,* 8:248. https://doi.org/10.3389/fped.2020.00248

Bartick M & Reinhold A. (2010). The burden of suboptimal breastfeeding in the United States: a pediatric cost analysis. *Pediatrics,* 125(5):e1048-56. doi: 10.1542/peds.2009-1616. https://pubmed.ncbi.nlm.nih.gov/20368314/

Bavinton, B.R.; Jin, F.; Prestage, G.; Zablotska, I.; Koelsch, K.; Phanuphak, N.; Grinsztejn, B. ... Grulich, A.E. & the Opposites Attract Study Group (2014). The Opposites Attract Study of viral load, HIV treatment and HIV transmission in serodiscordant homosexual male couples: design and methods, *BMC Public Health*, 14, 917. https://doi.org/10.1186/1471-2458-14-917

Beckerman, K.; Benson, M.; Dahud, S. & Shannon, M. (1998). Control of maternal HIV-1 disease during pregnancy. International Conference on AIDS 3;12:41. Poster abstract 459. Full text here

British HIV Association (2025). Guidelines on the management of HIV in pregnancy and the postpartum period. https://bhiva.org/clinical-guideline/pregnancy-guidelines/

Bukkems, V.E; Finkenflügel, R.N.N.; Grintjes, K.; Marneef, M.; de Haan, M.; Mielitz, I.; van Hulzen, A. ... Colbers, A. (2023). Exploring the breastfeeding desires and decision-making of women living with HIV in the Netherlands: Implications for perinatal hiv management in developed countries. *Breastfeeding Medicine*, 18(5):356-361. https://doi.org/10.1089/bfm.2023.0004.

Castilla, J.; Del Romero, J.; Hernando, V.; Marincovich,B.; Garcia, S. & Rodrigues,C. (2005). Effectiveness of highly active antiretroviral therapy in reducing heterosexual transmission of HIV. *Journal of Acquired Immune Deficiency Syndromes,* 40, 96-101. https://pubmed.ncbi.nlm.nih.gov/16123689

Centers for Disease Control and Prevention (1985). Recommendations for assisting in the prevention of perinatal transmission of human T lymphotropic virus type III/lymphadenopathy-associated virus and acquired immunodeficiency syndrome. *Morbidity and Mortality Weekly Report*, 34:721–726, 731–732. https://www.ncbi.nlm.nih.gov/pubmed/2999576

Chibwesha, C.J.; Giganti, M.J.; Putta, N.; Chintu, N.; Mulindwa, J.; Dorton, B.J.; Chi, B.H. ... Stringer, E.M. (2011). Optimal time on HAART for prevention of mother-to-child transmission of HIV. *Journal of Acquired Immune Deficiency Syndromes*, 58(2), 224-8. https://doi.org/10.1097/QAI.0b013e318229147e.

Clinical Info (2023) and Update (2025). Panel on Treatment of HIV During Pregnancy and Prevention of Perinatal Transmission. Recommendations for the use of antiretroviral drugs during pregnancy and interventions to reduce perinatal HIV transmission in the United States. https://clinicalinfo.hiv.gov/en/guidelines/perinatal

Clinical Info (2024) Guidelines for the use of antiretroviral agents in pediatric HIV Infection, antiretroviral management of infants with in utero, intrapartum or breastfeeding exposure to HIV. Full text here

Clinical Info Update (2026). HIV treatment. Viral suppression and an undetectable viral load. Full text here

Cohen, M.S.; Chen, Y.Q.; McCauley, M.; Gamble,T.; Hosseinipour, M.C.; Kumarasamy, N.; Hakim, J.G. ... Fleming, T.R. for the HPTN 052 Study Team (2011). Prevention of HIV-1 infection with early antiretroviral therapy. *New England Journal of Medicine,* 365, 493-505. http://www.nejm.org/doi/full/10.1056/NEJMoa1105243

Cohen, M.; Chen, Y.; McCauley, M.; Gamble, T.; Hosseinipour, M.; Kumarasamy, N.; Hakim, J. ... Fleming, T. for the HPTN 052 Study Group (2015). Final results of the HPTN 052 randomized controlled trial: antiretroviral therapy prevents HIV transmission. International AIDS Society, Vancouver. Abstract MOAC0101LB. http://dx.doi.org/10.7448/IAS.18.5.20482

Creek, T.L.; Andrea, K.; Lu, L.; Bowen, A.; Masunge, J.; Arvelo, W.; Smit, M. ... Davis, M.K. (2010).. Hospitalization and mortality among primarily nonbreastfed children during a large outbreak of diarrhea and malnutrition in Botswana, 2006. *Journal of Acquired Immune Deficiency Syndromes* 53(1):14-9. https://doi.org/10.1097/QAI.0b013e3181bdf676.

Crisinel, P.A.; Kusejko, K.; Kahlert, C.R.; Wagner, N.; Beyer, L.S.; Martinez De Tejada, B.; Hösli , I. ... Aebi-Popp, K. (2023). Successful implementation of new Swiss recommendations on breast-feeding of infants born to women living with HIV. *European Journal of Obstetrics & Gynecology & Reproductive Biology*, 283, 86–89. https://doi.org/10.1016/j.ejogrb.2023.02.013

Dabis, F.; Leroy, V.; Castetbon, K.; Spira, R.; Newell, M-L. & Roger, S. (2000). Preventing mother-to-child transmission of HIV in Africa in the year 2000. AIDS, 14(8), 1017–1026. https://doi.org/10.1097/00002030-200005260-00014.

Delaney M. (2006). History of HAART – the true story of how effective multi-drug therapy was developed for treatment of HIV disease. *Retrovirology,* 3(S1), S6. https://doi.org/10.1186/1742-4690-3-S1-S6.

Department of Health and Human Services (1998). Guidelines for the Use of Antiretroviral Agents in HIV-1-Infected Adults and Adolescents. Full text here

Dugdale, C.; Ufio, C.; Giardina, J.; Shebl, F.; Coskun, E.; Pletner, E.; Torola, P.R. ... Ciaranello, A.L. (2025). Estimating the effect of maternal viral load on perinatal and postnatal HIV transmission: a systematic review and meta-analysis. *The Lancet,* 406, 349-357, https://doi.org/10.1016/S0140-6736(25)00765-2.

Feiterna-Sperling, C.; Kruger, R.; Bethke, H.; Siedentopf, J-P.; von Weizsäcker K.; Heinrich-Rohr, M.; & Rohr, I. (2025).. Breastfeeding in HIV-positive mothers under optimized conditions: 'real-life' results from a well-resourced healthcare setting, *Journal of Perinatal Medicine*, 22;53(6):765-774. https://doi.org/10.1515/jpm-2025-0170.

Flynn, P.M.; Taha, T.E.; Cababasay, M.; Fowler, M.G.; Mofenson, L.M.; Owor, M.; Fiscus, S. ... Shapiro, D.E. for the PROMISE Study Team (2018). Prevention of HIV-1 transmission through breastfeeding: efficacy and safety of maternal antiretroviral therapy versus infant nevirapine prophylaxis for duration of breastfeeding in HIV-1-Infected women with high CD4 cell count (IMPAACT PROMISE): a randomized, open-label, clinical trial. *Journal of Acquired Immune Deficiency Syndromes,* 77(4):383-392. https://doi.org/10.1097/QAI.0000000000001612.

Flynn, P.M.; Taha, T.E.; Cababasay, M.; Butler, K,; Fowler, M.G.; Mofenson, L.M.; Owor, M. ... Shapiro, D.E. for the PROMISE Study Team (2021). Association of maternal viral load and CD4 count with perinatal HIV-1 transmission risk during breastfeeding in the PROMISE postpartum component. *Journal of Acquired Immune Deficiency Syndromes,* 88:206–213. https://doi.org/10.1097/QAI.0000000000002744.

Garcia, P.M.; Kalish, L.A.; Pitt, J. Minkoff, H.; Quinn, T.C.; Burchett, S.K.; Kornegay, J. ... Lew, J.F. (1999).. Maternal levels of plasma human immunodeficiency virus type 1 RNA and the risk of perinatal transmission. Women and Infants Transmission Study Group. *New England Journal of Medicine,* 341(6):394-402. https://pubmed.ncbi.nlm.nih.gov/10432324/

Grulich, A.; Bavinton B.; Grinsztejn, B.; Phanuphak, N.; Jin, F.; Zablotska, I.; Prestage, G. ... Cooper, D. for The Opposites Attract Study Group (2017). HIV treatment prevents HIV transmission in

male serodiscordant couples in Australia, Thailand and Brazil. International AIDS Society, Paris. Oral abstract TUAC0506LB. http://programme.ias2017.org/Abstract/Abstract/5469

Haberl, L.; Audebert, F.; Feiterna-Sperling, C.; Gillor, D.; Jakubowski, P.; Jomsson- Oldenbüttel, C.; Khaykin, P. ... Haberl, A. (2021). Not recommended, but done: breastfeeding with HIV in Germany. AIDS Patient Care STDS 35(2);33-38 https://doi.org/10.1089/apc.2020.0223.

Homsy, J.; Moore, D.; Barasa, A.; Were, W.; Likicho, C.; Waiswa, B.; Downing, R. ... Mermin, J. (2010). Breastfeeding, mother-to-child HIV transmission, and mortality among infants born to HIV-infected women on highly active antiretroviral therapy in rural Uganda. *Journal of Acquired Immune Deficiency Syndromes,* 53, 28–35. https://pubmed.ncbi.nlm.nih.gov/19797972/

Integrated Screening Outcomes Surveillance Service (ISOSS) Report (2025). section 13, page 42. Full text here

John, T.; Jegathesan, T.; Yudin, M.H. & Campbell D.M. (2026). Exploring the complexities of infant feeding decisions for immigrant pregnant people living with HIV in Ontario, Canada: a qualitative study. *AIDS Care,* 38(1):47-60. https://doi.org/10.1080/09540121.2025.2562239.

John-Stewart G. & Njugana I. (2025). Getting to zero: when can we guarantee vertical transmission will not occur? *The Lancet*, 406:310-311. https://doi.org/10.1016/S0140-6736(25)01282-6.

Kahlert, C.R.; Aebi-Popp, K.; B, Bernasconi, B.; Martinez de Tejada, B.; Nadal, D.; Paioni, P.; Rudin, C. ... Vernazza, P. (2018). Is breastfeeding an equipoise option in effectively treated HIV-infected mothers in a high-income setting? Swiss Medical Weekly 23, 148, w14648. https://smw.ch/article/doi/smw.2018.14648

Kasadha, B,; Tariq, S.; Nyatsanza, F.; Freeman-Romilly, N.; Namiba, A. & Rai, T. (2022). Who knows 'best' when it comes to breast? The Heather Trickey Prize. Full text here

Kilewo, C.; Karlsson, K.; Massawe, A.; Lyamuya, E.; Swai, A.; Khalu, F.; Biberfeld, G. & the Mitra Study Team (2008). Prevention of mother-to-child transmission of HIV-1 through breast-feeding by treating infants prophylactically with lamivudine in Dar es Salaam, Tanzania: the Mitra Study. *Journal of Acquired Immune Deficiency Syndromes,* 48:315–323. https://pubmed.ncbi.nlm.nih.gov/18344879/

Kilewo, C.; Karlsson, K.; Ngarina, M.; Massawe, A.; Lyamuya, E.; Swai, A.; Lipyoga, R. ... Biberfeld, G. for the Mitra Plus Study Team (2009). Prevention of mother to child transmission of HIV-1 through breastfeeding by treating mothers with triple antiretroviral therapy in Dar es Salaam, Tanzania: the Mitra Plus study. *Journal of Acquired Immune Deficiency Syndrome,* 52:406–416. https://pubmed.ncbi.nlm.nih.gov/19730269/

Koay W.L.A. & Rakhmanina N.Y. (2022). Supporting mothers living with HIV in the United States who choose to breastfeed. *Journal of the Pediatric Infectious Diseases Society*, 11(5):239. https://doi.org/10.1093/jpids/piac005

Levison, J.; McKinney, J.; Duque, A.; Hawkins, J.; Bowden, E.V.H.; Dorland, J.; Bitnon, A. ... Widener, R. (2023). Attitudes on breast feeding among persons with HIV who have given birth and their perceptions of coercion during counseling on safe infant feeding practices. *AIDS Care*. 35(12):1852-1862. https://doi.org/10.1080/09540121.2022.2147481.

Marazzi, M.C.; Nielsen-Saines, K.; Buonomo, E.; Scarcella, P; Germano, P.; Majid, N.A.; Zimba, I. ... Palombi, L. (2009). Increased infant human immunodeficiency virus-type one free survival at one year of age in sub-Saharan Africa with maternal use of highly active antiretroviral therapy during breast-feeding. *The Pediatric Infectious Disease Journal,* 28:483– 487. https://doi.org/10.1097/INF.0b013e3181950c56.

Morrison, P.; Israel-Ballard, K. & Greiner T. (2011). Short-course zidovudine for prevention of perinatal infection. *The Lancet,* 353(9155), 766-767. Full text here

Moselholm, E.; Aho, I.; Mellgren, A.; Johansen, I.S.; Katzenstein, T.L.; Pedersen, G.; Storgaard, M. & Weis, N. (2024). Infant feeding knowledge among women living with HIV and their interaction with healthcare providers in a high-income setting: a longitudinal mixed methods study. *International Breastfeeding Journal,* 19(1):71. https://doi.org/10.1186/s13006-024-00677-2.

Nashid. N.; Khan, S.; Loutfy. M.; MacGillivray, J.; Yudin, M.H.; Campbell, D.M.; Barozzino, T. ... Bitnun, A. (2020). Breastfeeding by women living with human immunodeficiency virus in a resource-rich setting: a case series of maternal and infant management and outcomes. *Journal of Pediatric Infectious Diseases Society,* 9:228–31. https://pubmed.ncbi.nlm.nih.gov/30753640/

Nyatsanza, F.; Gubbin, J.; Gubbin, T.; Seery, P.; Farrugia, P.; Croucher, A.; Gilleece, Y. ... Lyall, H. (2021). Over a third of childbearing women with HIV would like to breastfeed: A UK survey of women living with HIV. *International Journal of STD AIDS,* 32(9):856-860. https://doi.org/10.1177/0956462421999951.

Palombi, L.; Marazzi, M.C.; Voetberg, A. & Magid, N.A. (2007). Treatment acceleration program and the experience of the DREAM program in prevention of mother-to-child transmission of HIV. AIDS 21(S4):S65–S71. https://pubmed.ncbi.nlm.nih.gov/17620755/

Powell A.M. (2023). Infant feeding for people living with HIV in high resource settings: a multi-disciplinary approach with best practices to maximise risk reduction. *The Lancet Regional Health – Americas,* 22:100509, https://doi.org/10.1016/j.lana.2023.100509.

Powers J.S. (2024). HIV and breastfeeding: Clinical considerations and mechanisms of transmission in the modern era of combined antiretroviral therapy (cART). *Clinics in Perinatology*. 51(4):783–799. https://doi.org/10.1016/j.clp.2024.08.001.

Prestileo, T.; Adriana, S.; Lorenza, D.M. and Argo, A. (2022). From undetectable equals un-transmittable (U=U) to breastfeeding: is the jump short? *Infectious Disease Reports,* 2022;14:220–227. https://doi.org/10.3390/idr14020027

Quinn. T.C.; Wawer, M.J.; Sewankambo, N.; Serwadda, D.; Li, C.; Wabwire-Mangen, F.; Meehan, M.O. ... Gray, R,H. (2000). Viral load and heterosexual transmission of HIV type 1. Rakai Project Study Group. *New England Journal of Medicine*, 342:921-929. Full text here

Rai, T.; Kasadha, B.; Tariq, S.; Keating, S.; Hinton, L.; Namiba, A. & Pope, C. (2023). Infant feeding as a transgressive practice in the context of HIV in the UK: A qualitative interview study, *Women's Studies International Forum,* 101:102834, https://doi.org/10.1016/j.wsif.2023.102834.

Rodger, A.J.; Cambiano, V.; Bruun, T.; Vernazza, P.; Collins, S.; van Lunzen, J.; Corbelli, G.M. ... Lundgren, J. for the PARTNER Study Group (2016). Sexual activity without condoms and risk of HIV transmission in serodifferent couples when the HIV-positive partner is using suppressive antiretroviral therapy. *Journal of the American Medical Association*, 316(2):171-181. https://doi.org/10.1001/jama.2016.5148.

Rodger A. (2018). Risk of HIV transmission through condomless sex in MSM couples with suppressive ART: The PARTNER2 Study extended results in gay men. AIDS Amsterdam. Late breaker oral abstract WEAX0104LB. Full text here

Rodger, A.J.; Cambiano V.; Bruun, T.; Vernazza, P.; Collins, S.; Degen, O.; Corbelli, G.M. ... Lundgren, J. for the PARTNER Study Group (2019). Risk of HIV transmission through condomless sex in serodifferent gay couples with the HIV positive partner taking suppressive antiretroviral therapy (PARTNER): final results of a multicentre, prospective, observational study, *The Lancet,* 393:2428-2438. https://doi.org/10.1016/S0140-6736(19)30418-0

Rudin, C.; Martinez de Tejada, B.; Paioni, P.; Crisinel, P.A.; Wagner, N.; Notter, J.; Hachfeld, A. ... Kahlert, C.R. (2025). Breastfeeding with HIV in a high-income setting: equipoise and beyond – time to question the zero-risk policy. *Swiss Medical Weekly* 155(11):4537. https://www.smw.ch/index.php/smw/article/view/4537

Ryan B. (2017). Viral Rebound Chance is Low for those on successful HIV treatment. POZ, Full text here

Shapiro, R.L.; Hughes, M.D.; Ogwu, A.; Kitch.,D..; Lockman, S.; Moffat, C.; Makhema, J. ... Essex, M. (2010). . Antiretroviral regimens in pregnancy and breastfeeding in Botswana. *New England Journal of Medicine*, 362:2282–2294. Full text here

Sibiude, J.; Le Chenadec, J.; Mandelbrot, L.; Hoctin, A.; Dollfus, C.; Faye, A.; Bui, E. ... Tubiana, R. (2023). Update of perinatal human immunodeficiency virus type 1 transmission in France: zero transmission for 5482 mothers on continuous antiretroviral therapy from conception and with undetectable viral load at delivery, *Clinical Infectious Diseases*, 77(3):e590-e598. Full text here

Stuebe A. (2009). The risks of not breastfeeding for mothers and infants. *Reviews in Obstetrics & Gynecology*, 2(4):222-31. https://pmc.ncbi.nlm.nih.gov/articles/PMC2812877/

Tariq, S.; Elford, J.; Tookey, P.; Anderson, J.; de Ruiter, A.; O'Connell, R. & Pillen, A. (2016). It pains me because as a woman you have to breastfeed your baby: Decision-making about infant feeding among African women living with HIV in the UK. Sexually Transmitted Infections 92(5):331–336; https://doi.org/10.1136/sextrans-2015-052224.

Thomas, T.K.; Masaba, R.; Borkowf, C.B.; Ndivo, R.; Zeh, C.; Misore, A.; Otieno, J. ... Fowler, M.G. for the KiBS Study Team (2011). Triple-antiretroviral prophylaxis to prevent mother-to-child HIV transmission through breastfeeding: the Kisumu Breastfeeding Study, Kenya – a clinical trial. *PLoS Medicine* 8:e100101. Full text here

Tuthill, E.L.; Tomori, C.; van Natta, M. & Coleman, J.S. (2019). In the United States, we say, 'No breastfeeding,' but that is no longer realistic": provider perspectives towards infant feeding among women living with HIV in the United States. *Journal of the International AIDS Society*, 22(1):e25224. https://doi.org/10.1002/jia2.25224.

U=U Global Community 2025, Prevention Access Campaign https://www.preventionaccess.org/community

Ulfa, Y.M.; Horiuchi, S.; Shishido, E.; Miyauchi, A.; Maruyama, N. & Shimoda, K. (2026). Breastfeeding experience among women living with HIV: A global qualitative evidence synthesis. *Journal of the Association of Nurses in AIDS Care*. 37(1):5-43. https://doi.org/10.1097/JNC.0000000000000604.

UNAIDS, UNICEF & WHO (1997). HIV and infant feeding: A policy statement developed collaboratively by UNAIDS, WHO and UNICEF 1997, Annex 1, page 26, Full text here

Van der Wekken-Pas, L., Kleuskens, M., Bekker, C., Van Leeuwen, L., Burger, D., & Colbers, A. (2026). Factors influencing counseling on infant feeding options: a qualitative study with women living with HIV and their healthcare professionals in a high-income setting, *AIDS Care*, https://doi.org/10.1080/09540121.2025.2611072.

Vernazza, P.; Hirschel, B.; Bernasconi, E. & Flepp, M. (2008). HIV-positive individuals not suffering from any other STD and adhering to an effective antiretroviral treatment do not transmit HIV sexually. *Bulletin des médecins suisses*, 89(5), Included with English translation. Full text here

Walters. M.K.; Bulterys, M.A.; Barry, M.; Hicks, S.; Richey, A.; Sabin, M.; Louden, D. ..... Imai-Eaton, J.W. (2025). Probability of vertical HIV transmission: a systematic review and meta-regression, *The Lancet HIV* 12:e638–48. https://pubmed.ncbi.nlm.nih.gov/40753992/

Waitt, C.; Low, N.; Van de Perre, P.; Lyons, F.; Loutfy, M. & Aebi-Popp, K. (2018). U=U for breastfeeding mothers and infants? Breastfeeding by mothers on effective treatment for HIV infection in high-income settings. *The Lancet HIV,* S2352-3018(18)30098-5. http://dx.doi.org/10.1016/

Weiss, F.; von Both, U.; Rack-Hoch, A.; Sollinger, F.; Eberle, J.; Mahner, S.; Kaestner, R.; Alba, A.I. (2022). Brief report: HIV-positive and breast-feeding in high-income settings: 5-year experience fro m a perinatal center in Germany. *Journal of Acquired Immune Deficiency Syndromes*, 91:364–7. Full text here

World Health Organisation (2007). HIV transmission through breastfeeding a review of available evidence an update from 2001 to 2007. Full text here

World Health Organisation (2010). Guidelines on HIV and infant feeding: Principles and recomendations for infant feeding in the context of HIV and a summary of evidence. Full text here

World Health Organisation (2016). Guideline. Updates on HIV and infant feeding: the duration of breastfeeding and support from health services to improve feeding practices among mothers living with HIV. Full text here

Yusuf, H.E.; Knott-Grasso, M.A.; Anderson, J.; Livingston, A.; Rosenblum, N.; Sturdivant, H.; Byrnes, K.C. ...Agwu, A.L. (2022). Experience and outcomes of breastfed infants of women living with HIV in the United States: findings from a single-center breastfeeding support initiative. *Journal of the Pediatric Infectious Diseases Society,* 1(11):24-27. Full text here

Ziegler, J.B., Cooper, D.A., Johnson, R.O. & Gold, J. (1985). Postnatal transmission of AIDS-associated retrovirus from mother to infant. *The Lancet,* 20;1(8434):896-8. doi: 10.1016/s0140-6736(85)91673-3. https://pubmed.ncbi.nlm.nih.gov/2858746