

What is the risk of transmission through breastfeeding?

There are **no studies that have examined the risk of HIV transmission through breast milk in high-resource countries.**

This is because these studies would be impossible to perform.

So **all the research we have has come from low resource settings** where breastfeeding is recommended for mothers living with HIV.



Overall summary of HIV transmission risk through breast milk:

Rates of HIV transmission through breast milk in women on antiretrovirals (ARVs) vary between studies but a WHO commissioned summary of all studies available at the time¹ reported an HIV transmission rate of:

1.1% with 6 months of breastfeeding

this means that on average for every 100 women living with HIV and taking ARVs that breastfeed their infants for 6 months, 1 infant will acquire HIV.

2.9% with 12 months of breastfeeding

this means that on average for every 100 women living with HIV and taking ARVs that breastfeed their infants for 12 months, 3 infants will acquire HIV.

The PROMISE trial

The PROMISE trial is probably the best and most relevant study to look at HIV transmission risk through breast milk².

- The trial took place in 14 sites in sub-Saharan Africa and India
- It included 2,430 infants and their mothers
- 42% of the mothers received a single antiretroviral during pregnancy and 53% received triple combination therapy during pregnancy (triple combination therapy is what women in Canada receive)
- To be included in the study mothers had to have a CD4 count of greater than 350 cells/mm³ (meaning that they were not immune-compromised) – the average CD4 count was 686 cells/mm³
- There were 2 groups (randomly assigned):

Group 1:

1219 mothers were treated with three ARVs (TDF/FTC/LPVr) until 2 weeks after the end of breastfeeding and the infant received 6 weeks of nevirapine – **This group is most similar to the Canadian situation.**

Group 2:

1211 mothers were not treated but the infant was given nevirapine until 2 weeks after the end of breastfeeding

The following transmissions occurred during the breastfeeding period (these don't include transmissions suspected to have happened during delivery):

- A total of 18 infants became infected
- 8 infants out of 1218 in Group 1
- 10 infants out of 1211 in Group 2
- The rates of transmission for Group 1 were as follows:
- For 6 months of breastfeeding: **0.3%**
- For 12 months of breastfeeding: **0.6%**
- For 18-24 months of breastfeeding: **0.7%**
- 2 of 8 women on triple ARVs who transmitted HIV had a confirmed undetectable viral load (<40)³

The HPTN 046 trial

This study shows that the better the health of the mother the lower the risk of transmission⁴. It also shows us that ARVs reduce the risk of transmission.

- 1,527 infants were randomized to 6 months of nevirapine or 6 weeks of nevirapine. Some mothers received ARVs and some did not.
- The HIV transmission rate at 18 months was as follows:
 - If the mother was not on ARVs and had a CD4 count of less than 350 (i.e. was immune-compromised and untreated): **8.9% - 9.6%**
 - If the mother was not on ARVs and have a CD4 count of more than 350 (immune-competent but untreated): **1.9% - 3.5%**
 - If mother on ARVs: **0.5%**

what we know and what we don't know about HIV transmission through breast milk

WE KNOW that the higher the viral load (HIV RNA) in the mother's blood and breast milk the higher the risk of HIV transmission to the baby.

But, **WE DON'T KNOW** if there is a safe viral load.

WE KNOW that you can have undetectable viral load in your blood, but have detectable viral load in your breast milk⁵.

WE KNOW that HIV transmission during breastfeeding has happened in women who had undetectable viral load (HIV RNA) in their blood and breast milk^{3, 5-8}.

WE KNOW that both cell-associated HIV (HIV DNA) and cell-free HIV (HIV RNA) in breast milk have been associated with HIV transmission to the baby⁹⁻¹⁰.

A study that compared the HIV of babies that became infected during breastfeeding to the HIV found in the breast milk of their mothers showed that HIV transmissions that happened in the early months of breastfeeding were more likely to be caused by cell-associated HIV (HIV DNA)⁸.

This is an important finding, because HIV medications can **NOT** get rid of cell-associated HIV.

BUT, WE DON'T KNOW if starting HIV medications as soon as one is diagnosed (early treatment initiation) reduces the amount of cell-associated HIV (HIV DNA) in breast milk.

If a mother is on ARVs and still transmits HIV to the baby during breastfeeding, there is a chance that the baby will have HIV that is drug resistant. This was seen in 2 large studies¹¹⁻¹².

Interestingly, the drug resistance seen in the baby was different from that of the mother. This is important because it suggests that not all ARVs can get into the breast milk at levels that are effective, and this can lead to the generation of drug resistant HIV virus.

BUT, WE DON'T KNOW if this is true for all ARVs, especially the ARVs most commonly used in Canada.

For a nice review see **Waite C et al. Lancet HIV 2018**¹³.

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