

Mother-to-child transmission is largely preventable

When transmission happens

Mother-to-child transmission, also called **vertical transmission**, can happen during **pregnancy, childbirth or breastfeeding**. But a mother having HIV does not mean her baby will necessarily acquire it.

How prevention works

The first step is **HIV testing during pregnancy**, so treatment can start early. Antiretroviral therapy, or **ART**, suppresses the virus and lowers the mother's viral load: the amount of HIV in her blood. This protects her health and greatly reduces the risk of transmission to the baby.

Prevention continues after birth. The baby receives **preventive antiretroviral medicine and HIV testing**, and the mother needs continued treatment and follow-up. Infant feeding also needs individual advice: treatment reduces transmission through breastfeeding, but does not make that risk zero.

What the figures show

Worldwide, estimated new HIV infections in children fell from **300,000 in 2010 to 93,000 in 2025**: a decline of 69%. Wider access to testing and treatment during pregnancy has been central to that progress.

The EU and European Economic Area still reported **196 diagnoses attributed to mother-to-child transmission in 2024**. That was 1.1% of diagnoses **with a known transmission route**. Estonia reported one such diagnosis in 2023. These are diagnosis counts, not necessarily infections acquired locally that year.

PrEP and PEP

PrEP: before exposure

Medicines can also prevent HIV in someone who does not have it. The main difference between **PrEP and PEP is when they are used.**

PrEP means pre-exposure prophylaxis. Prophylaxis simply means prevention. It is taken before a possible exposure, so protective drug levels are already present when needed. It can suit someone with an ongoing risk of acquiring HIV.

PrEP needs a medical assessment, a negative HIV test before starting, and regular testing while it is used. It is not a vaccine, and protection depends on taking it according to the prescribed schedule.

PEP: after exposure

PEP means post-exposure prophylaxis. This is emergency prevention after a possible exposure, such as a needlestick injury or a condom breaking when there may have been an HIV risk.

It should start **as soon as possible, ideally within 24 hours and no later than 72 hours.** The course lasts **28 days.** The point is to interrupt infection early, so we do not wait for symptoms or for a test to turn positive.

What both require

Both need correct use and follow-up. They prevent **HIV, not other sexually transmitted infections**, so condoms and other prevention measures still matter. In short: PrEP is planned prevention; PEP is an emergency response.

Medicines and targets

Oral PrEP: two medicines

A commonly used oral PrEP combination is **tenofovir disoproxil fumarate and emtricitabine**, shortened to **TDF/FTC**. The slash means two medicines in one combination, not one drug with two names.

Both target **reverse transcriptase**, the HIV enzyme that makes a DNA copy from the virus's RNA. They belong to the nucleoside or nucleotide reverse transcriptase inhibitor group, usually called **NRTIs**. Blocking this step makes it harder for HIV to establish infection.

PEP: an additional target

The PEP example here uses the same two medicines **plus dolutegravir**. Dolutegravir targets a different HIV enzyme, **integrase**, which normally inserts viral DNA into the infected cell's DNA.

So this regimen contains **three medicines acting at two different steps**: making viral DNA, and inserting it into the host genome. Dolutegravir is an integrase strand transfer inhibitor, or **INSTI**.

Why the distinction matters

This is one example of a PEP regimen, not the only option. The choice depends on clinical assessment, including other medicines and kidney function. Also, the two-drug TDF/FTC PrEP combination alone is **not a complete treatment regimen for established HIV**. That is one reason testing before PrEP matters.

How the medicines work

First: RNA becomes DNA

Following the diagram from left to right, HIV carries its genetic information as **RNA**. After entering a CD4 T cell, it uses **reverse transcriptase** to build a DNA copy. CD4 T cells are helper T cells, which help coordinate immune responses.

Think of DNA synthesis as adding building blocks, or **nucleotides**, one at a time. Tenofovir and emtricitabine are converted into active forms inside cells. These resemble normal DNA building blocks and compete with them.

If reverse transcriptase adds one of these drug molecules to the growing viral DNA, the chain cannot extend normally. This is **chain termination**. The medicines interfere with making the DNA copy; they do not simply destroy every virus particle.

Then: viral DNA is inserted into host DNA

If HIV has made its DNA copy, **integrase** normally inserts it into the cell's DNA. The integrated viral instructions can then be used by the cell to make components of new viruses.

Dolutegravir blocks this insertion step. It does not remove HIV DNA that has already integrated. That difference helps explain why preventing infection and treating established HIV are not quite the same situation.

The two targets

Tenofovir and emtricitabine interrupt DNA copying; dolutegravir interrupts DNA integration. They act on viral enzymes, rather than relying only on the immune system to recognise HIV.

Testing and treatment as prevention

Testing comes first

Prevention also depends on finding HIV early. A person can have HIV and **feel completely well**, so symptoms are not a reliable guide. Testing allows treatment to start before substantial immune damage develops.

A negative test immediately after an exposure does not necessarily rule out infection. Tests have a **window period**: the time before they can reliably detect it. That is why the timing of testing and, when needed, repeat testing matter.

Access in Estonia

In Estonia, HIV counselling and testing centres offer **free, anonymous testing, including for people without health insurance**. Anonymous means you do not have to give your name. That removes practical barriers, but people also need to know the service exists.

What U=U means

Treatment benefits both the person and their partners. **U=U means undetectable equals untransmittable**. Someone who takes effective treatment and maintains an undetectable viral load **does not transmit HIV sexually**.

Viral load measures how much HIV RNA is in the blood. It is different from a **CD4 count**, which measures immune cells. By suppressing HIV replication, treatment helps preserve those cells and immune function.

What U=U does not mean

Undetectable does **not mean cured**, and the protection is not immediate after the first tablet. It depends on achieving and maintaining suppression, with continued treatment and monitoring. U=U refers to **sexual transmission**; it should not be extended to breastfeeding or protection from other sexually transmitted infections.