HIV treatment and an undetectable viral load to prevent HIV transmission

Summary

It is now well known that the use of HIV treatment not only improves the health of people living with HIV, but is also a highly effective strategy to prevent HIV transmission. This is because HIV treatment can reduce the amount of virus (viral load) in the blood and other bodily fluids (such as semen and vaginal and rectal fluids) to undetectable levels. To become and remain undetectable, people living with HIV need to take their HIV treatment as prescribed. In addition to taking HIV medications, regular medical visits are important to monitor viral load to make sure it stays undetectable, and to receive other medical support.

When a person with HIV reaches and maintains an undetectable viral load their risk of passing HIV to sex partners is negligible (meaning insignificant, or so small as to not be worth considering). Evidence shows that HIV-positive people who are on treatment, engaged in care, and have an ongoing undetectable viral load do not transmit HIV to their sexual partners. For people with HIV who inject drugs, the risk of transmitting HIV is also considerably reduced if they are on treatment and maintain an undetectable viral load, but there is currently not enough evidence to conclude that the risk is negligible.

How does HIV treatment and an undetectable viral load work to prevent HIV transmission?

HIV treatment, also called antiretroviral therapy (ART), works by controlling the replication of HIV in the body – that is, it reduces HIV’s ability to make copies of itself. When HIV replication is controlled, the viral load in the blood and bodily fluids decreases. Research tells us that as the viral load decreases, so does the risk of HIV transmission. When the viral load becomes and stays undetectable with successful treatment, the risk for sexual transmission of HIV is negligible.

ART usually consists of a combination of at least three antiretroviral drugs taken daily.
Newer HIV treatments are safer, simpler and more effective than when ART was first introduced. The power of ART today is so profound that many people who start effective treatment soon after becoming HIV positive will have a near normal life span.

For most people the virus becomes so well controlled that within three to six months of starting treatment the amount of virus in their blood becomes undetectable by routinely used tests. Viral load tests used in Canada cannot detect HIV in the blood if there are less than 40 to 50 copies of the virus per ml. However, the virus is still present at very low amounts in the body when the viral load is undetectable.

What is involved in the consistent and correct use of ART and an undetectable viral load for HIV prevention?

The consistent and correct use of ART to maintain an undetectable viral load includes:

- high adherence to ART medications, to achieve and maintain an undetectable viral load
- regular medical appointments to monitor viral load and receive adherence support, if needed

Regular testing and treatment for sexually transmitted infections (STIs) is also important since this strategy does not protect against STIs.

A person on ART needs to work with their doctor to determine an appropriate schedule for medical check-ups and viral load monitoring.

What is important for this approach to work?

After starting treatment the viral load needs to become and remain undetectable for this approach to provide protection. Research shows that HIV transmissions can happen when a person taking ART does not have an undetectable viral load.

When a person first begins treatment, it usually takes three to six months for the viral load to become undetectable. Most people will eventually have an undetectable viral load if they have a drug combination that is effective against their strain of HIV and take it as prescribed by their doctor.

The viral load should remain undetectable for at least six months before depending on this approach as an effective HIV prevention strategy. A person must continue to have high adherence to treatment to maintain an undetectable viral load over time. The only way to know if the viral load remains undetectable over the long term is to have regular viral load tests.

However, not everyone’s viral load becomes and remains undetectable on treatment. This most commonly happens when someone has low adherence to medications, but it can also occur due to drug resistance or drug toxicity. When treatment fails, a person won’t know that their viral load is detectable until they get another viral load test. Depending on the reason the treatment failed, a person may require a change in treatment, or may benefit from adherence counselling, to bring their viral load back down to undetectable levels. The best options for moving forward should be discussed with a doctor.

How well does the use of ART to maintain an undetectable viral load prevent the sexual transmission of HIV?

Research conducted in serodiscordant couples (where one partner is HIV positive and the other is HIV negative) shows that, when used consistently and correctly, the use of ART to maintain an undetectable viral load is a highly effective strategy to prevent the sexual transmission of HIV for both heterosexual and same-sex male couples. Evidence from this research shows that when people on ART are engaged in care and maintain an undetectable viral load, they do not transmit HIV through sex.
The first study to show that ART has a major prevention benefit was the randomized controlled trial known as HPTN 052. Interim results from this study showed that taking ART reduced the risk of HIV transmission by 96% among heterosexual serodiscordant couples having mostly vaginal sex. In the final analysis, which included 1,763 couples (half of whom were followed for over five and a half years), no HIV transmissions occurred between couples in the study when the HIV-positive partner was on ART and had an undetectable viral load. In total, eight transmissions occurred between these couples while the HIV-positive partner was on ART; however, in all eight cases the viral load was detectable, despite being on ART. Four transmissions occurred in the first three months after the HIV-positive partner started treatment, before the viral load was undetectable. The other four happened when treatment failed to maintain the viral load at undetectable levels. Couples in this study reported high rates of condom use, which may have partially contributed to the low number of HIV infections during the study. Although there were few transmissions between couples enrolled in the study, 26 people acquired HIV infection from a sex partner outside of the primary relationship, showing that in a serodiscordant couple in which the HIV-positive partner is on ART with an undetectable viral load, the main risk of HIV transmission comes from outside the relationship.

An observational study known as PARTNER followed 548 heterosexual and 340 gay male couples who engaged in a large number of unprotected sex acts when the HIV-positive partner’s viral load was undetectable. The couples did not use condoms, pre-exposure prophylaxis (PrEP) or post-exposure prophylaxis (PEP). No HIV transmissions occurred, despite 36,000 unprotected sex acts among heterosexual couples and 22,000 among gay male couples. By the end of the study, 11 of the HIV-negative partners became HIV positive; however, all 11 acquired HIV from a sex partner outside of the relationship, and not from the HIV-positive partner with whom they enrolled in the study.

A preliminary analysis of another study called Opposites Attract also found no HIV transmissions among serodiscordant gay male couples when the viral load was undetectable despite over 5,000 condomless anal sex acts.

All participants in these studies were engaged in regular healthcare appointments to check viral load, test for STIs, and receive adherence and prevention counselling. They were also treated for STIs when needed. These comprehensive supports are an important part of regular follow-up care while on ART.

The results of these (and earlier) studies provide a strong body of evidence showing that people living with HIV who are adherent to ART and engaged in regular healthcare, with a sustained undetectable viral load, have a negligible risk of sexually transmitting HIV. The PARTNER and Opposites Attract studies show that this is true even when condoms are not used. Both of these studies are continuing to follow gay male serodiscordant partners to gather more data on sex when no condoms, PrEP or PEP are used.

There is one case study reported in the literature where sexual HIV transmission is suspected to have occurred in a couple where the HIV-positive partner likely had an undetectable viral load at the time of transmission. This is an exceptional suspected case within a large body of evidence, and did not occur within the context of any of the large trials.

How well does the use of ART to maintain an undetectable viral load prevent HIV transmission through injection drug use?

An HIV-positive person who is engaged in care, on ART and has a sustained undetectable viral load is also considerably less likely to pass HIV through injection drug use. The available research suggests that this strategy is effective at preventing HIV transmission among people...
who inject drugs; however, there is not enough evidence to conclude that the risk is negligible.

Two ecological studies from Vancouver and Baltimore reported on reductions in new HIV infections over time and found an association with a reduction in the community viral load of people who inject drugs. Although it is likely that increased uptake of ART is partly responsible for the observed decline in the number of new infections, some researchers have pointed out that with this study design it is difficult to know how much of this change can be attributed to an increase in harm reduction services that also occurred during this period. A recent cohort study in India among 14,481 people who inject drugs and 12,022 men who have sex with men found a clear correlation between estimated HIV incidence and both community-level treatment coverage and viral suppression. This study found significant correlations at the community level, but since it was not designed to look at individual risk of transmission, no estimate of effectiveness was available.

Is the use of ART to maintain an undetectable viral load intended to be used as a replacement for condoms and other HIV prevention strategies?

Although the use of ART to maintain an undetectable viral load works regardless of whether condoms or PrEP are used, everyone should be able to choose a prevention strategy that works best for them. This strategy is one of several highly effective options for preventing sexual HIV transmission; however, it does not offer protection against STIs (such as herpes, chlamydia or syphilis). Condoms are the only effective strategy to help prevent STIs.

For people who inject drugs, other prevention programs and strategies (such as the distribution and use of new injecting equipment) are important to help prevent HIV transmission, as well as other blood-borne infections such as hepatitis C.

---

Resources

CATIE resources

CATIE statement on the use of antiretroviral treatment (ART) as a highly effective strategy to maintain an undetectable viral load to prevent the sexual transmission of HIV

Undetectable viral load and HIV sexual transmission

Negligible Risk: Updated results from two studies continue to show that antiretroviral treatment and an undetectable viral load is a highly effective HIV prevention strategy – CATIE News

Insight into HIV transmission risk when the viral load is undetectable and no condom is used (overview of the PARTNER study) – CATIE News

Guidelines, position papers and consensus statements

Canadian Consensus Statement on the health and prevention benefits of HIV antiretroviral medications and HIV testing – CTAC, CATIE, positivelite.com

Risk of sexual transmission of HIV from a person with HIV who has an undetectable viral load: Messaging primer – Prevention Access Campaign

Community Consensus Statement on access to HIV treatment and its use for prevention – AVAC, EATG, MSMGF, GNP+, HIV i-Base, the International HIV/AIDS Alliance, ITPC, NAM/aidsmap

Expert Consensus: Viral Load and Risk of HIV Transmission – Institut National de Santé Publique du Quebec (INSPQ)

Consolidated guidelines on HIV prevention, diagnosis, treatment and care for key populations – World Health Organization (WHO)

References


Gruulich AE, Bavinton BR, Jin F, et al. HIV transmission in male serodiscordant couples in Australia, Thailand and Brazil. 22nd Conference on Retroviruses and Opportunistic Infections, Seattle, USA, 2015. Late breaker poster 1019 LB.


Contact us

by telephone
1.800.263.1638
416.203.7122

by fax
416.203.8284

by e-mail
info@catie.ca

by mail
505-555 Richmond Street West
Box 1104
Toronto ON M5V 3B1

Disclaimer

Decisions about particular medical treatments should always be made in consultation with a qualified medical practitioner knowledgeable about HIV- and hepatitis C-related illness and the treatments in question.

CATIE provides information resources to help people living with HIV and/or hepatitis C who wish to manage their own health care in partnership with their care providers. Information accessed through or published or provided by CATIE, however, is not to be considered medical advice. We do not recommend or advocate particular treatments and we urge users to consult as broad a range of sources as possible. We strongly urge users to consult with a qualified medical practitioner prior to undertaking any decision, use or action of a medical nature.

CATIE endeavours to provide the most up-to-date and accurate information at the time of publication. However, information changes and users are encouraged to consult as broad a range of sources as possible. Users relying on this information do so entirely at their own risk. Neither CATIE, nor any of its partners, funders, employees, directors, officers or volunteers may be held liable for damages of any kind that may result from the use or misuse of any such information. The views expressed herein or in any article or publication accessed or published or provided by CATIE do not necessarily reflect the policies or opinions of CATIE nor the views of its partners and funders.

Permission to reproduce

This document is copyrighted. It may be reprinted and distributed in its entirety for non-commercial purposes without prior permission, but permission must be obtained to edit its content. The following credit must appear on any reprint: This information was provided by the Canadian AIDS Treatment Information Exchange (CATIE). For more information, contact CATIE at 1.800.263.1638.

Funding has been provided by the Public Health Agency of Canada.

CATIE Ordering Centre No: ATI-50235
(aussi disponible en français, ATI-50236)

CATIE fact sheets are available for free at www.catie.ca