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le VIH et l'hépatite C

From *HIV in Canada: A primer for service providers*

## Biology of Sexual Transmission of HIV

### Key Points

- For HIV transmission to occur there are three necessary components: fluid, route, and activity.
- Not all exposures to HIV lead to infection because of the body's natural defences.
- Several biological factors can affect the risk of HIV transmission.

For HIV transmission to occur there are three necessary components: fluid, route, and activity. There needs to be a **fluid** from a person with HIV that contains enough HIV to cause infection, a **route** that HIV can use to enter the body of a person who is HIV negative, and an **activity** that brings the fluid and route together.

The fluids most commonly involved in the transmission of HIV are: blood, semen (including pre-ejaculate or pre-cum), vaginal fluid and rectal fluid.

The routes that HIV uses to enter the body include mucous membranes and broken skin. During sex, HIV most commonly enters the body through the mucous membranes of the vagina and cervix, urethra and foreskin, and the rectum. HIV can also get into the body through broken skin, such as when someone shares needles used to inject drugs or when needle stick injuries occur in hospital settings.

Activities that most commonly bring the fluid and route together are vaginal and anal sex and sharing drug use equipment.

When a sexual fluid containing HIV comes into contact with the mucous membrane of an HIV-negative person, the virus must overcome the defences of the mucous membrane before it is able to spread throughout the body and cause a permanent infection. These natural defences include mucus (a slimy substance that covers the membrane, which can trap and kill germs), an epithelial cell layer (a tight layer of cells that can prevent germs from entering the body), and immune cells, which can fight and clear germs that enter the body.

When someone prepares their drugs for injection by sharing needles/syringes or other injection equipment, blood can get into the needle/syringe they are using to inject their drugs. When the drugs are then injected, blood that may contain HIV directly enters the bloodstream through the broken skin which is an efficient mode of HIV transmission. The immune cells are the only natural defence against this type of HIV transmission.

Once in the body, HIV needs to infect immune cells and replicate for one to three days without being cleared by the immune system. If the virus can replicate for a sufficient period of time, it is then able to spread from the initial site of replication to other parts of the body and cause a permanent infection. HIV cannot always overcome the body's defences and therefore an exposure does not always lead to infection.

There are several biological factors that can increase the risk of HIV transmission if an exposure occurs, including:

- A high amount of HIV in the blood and sexual fluid can increase the risk of sexual and injection-related HIV transmission. The viral load is a very important factor determining whether transmission occurs. The higher the viral load, the greater the risk of HIV transmission.
- Damage to the epithelial cell layer of a mucous membrane can increase the risk of sexual HIV transmission. Damage to the genital, rectal and oral mucous membranes of an HIV-negative person makes it easier for HIV to cross into the body. Damage can be caused in a variety of ways including STIs and friction during sex.
- Inflammation can increase the risk of sexual HIV transmission. Inflammation can increase the concentration of immune cells in the mucous membranes, which then serve as target cells for HIV to infect and replicate within.
- Certain hormonal changes may also increase the risk of sexual HIV transmission.
- A higher volume of blood in the needle/syringe can increase the risk of injection-related HIV transmission.

There are a number of strategies that can reduce or eliminate the risk of HIV transmission. Highly effective strategies for preventing HIV include:

- The consistent and correct use of condoms for sex
- The consistent and correct use of antiretroviral treatment (ART) by people with HIV to maintain an undetectable viral load
- The consistent and correct use of oral pre-exposure prophylaxis (PrEP)
- The consistent and correct use of harm reduction approaches (including needle and syringe programs, opioid agonist therapy and supervised consumption services)

## Resources

[From exposure to infection: The biology of HIV transmission](#) - *Prevention in Focus*

[HIV and the female genital tract - what does it mean for HIV prevention?](#) - *Prevention in Focus*

## Sources

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- [Per-act Risk of Sexual HIV Transmission](#)
  - [Communication of Risk](#)

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