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Are people living with HIV less likely to pass HIV to others if they are on treatment? Exploring the use of treatment as prevention

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HIV/AIDS in Canada



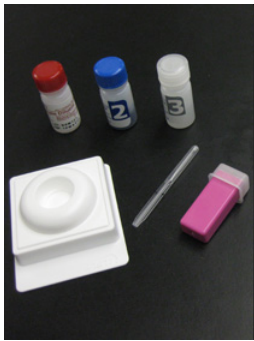
- Number of people living with HIV
 - 57,000 in 2005
 - 65,000 in 2008
- 2,200 to 4,200 infected in 2005
- 2,300 to 4,300 infected in 2008
 - MSM (44%)
 - IDU (17%)
 - Women (26%)
 - Aboriginal (12.5%)



Source: Public Health Agency of Canada

Improving HIV prevention

1. Do better with the strategies that we already have



2. Develop new biomedical technologies to prevent HIV



3. Adopt a more comprehensive approach to HIV/AIDS prevention

Turning to antiretrovirals for prevention

The use of antiretrovirals for prevention by

1. HIV-negative individuals to reduce their risk of infection
 - Post-exposure prophylaxis (PEP)
 - Pre-exposure prophylaxis (PrEP)
 - » Oral PrEP (pills)
 - » Topical PrEP (ARV-based microbicides)
2. HIV-positive individuals to reduce their risk of transmitting HIV
 - Treatment as prevention

What is antiretroviral treatment?

- The daily use of a combination of at least three antiretroviral drugs by people living with HIV
- Over 25 antiretrovirals drugs currently available
- Goals of treatment
 - Limit viral replication
 - Raise levels of CD4 cells
 - Slow progression of HIV disease



When is antiretroviral treatment started?

Summary of when to start treatment

CD4 count and physical condition	Recommendation
CD4 count below 200 cells or any significant symptoms or conditions related to HIV infection	Start treatment immediately
CD4 count below 350 cells	Start treatment
CD4 count above 350 cells	Consider starting treatment
Women who are pregnant or considering becoming pregnant (with any CD4 count)	Start treatment immediately if pregnant; consider starting treatment before pregnancy

CATIE's Practical Guide to HIV Drug Treatment

What is viral load?

- Number of virus in the bodily fluids of someone living with HIV
 - Copies of HIV per ml of fluid (copies/ml)
- Blood viral load used to monitor the effectiveness of treatment
 - Others bodily fluids not routinely measured
- The viral load in the different body fluids are correlated

Viral load and HIV transmission

- HIV transmission occurs after an exposure to a body fluid that contains HIV
 - Does the number of virus in the fluid influence the risk of HIV transmission?

What does the research say?

- **Blood viral load** is associated with the risk of sexual HIV transmission

Higher blood viral load



Higher viral load in semen/vaginal fluid/rectal fluid



Higher risk of sexual HIV transmission

Antiretroviral treatment and HIV transmission

- We know that...
 1. Blood viral load is associated with the risk of sexual HIV transmission
 2. Successful treatment reduces the blood viral load to undetectable levels
- Opens the possibility of using treatment to prevent HIV transmission
- Also known as “treatment as prevention”

The use of treatment as prevention

- **Individual level**

- The use of treatment as a risk-reduction strategy
- Individual risk-taking behavior

- **Population level**

- The use of treatment as an intervention to reduce HIV infections in a population
- Public health perspective

What does the research say about treatment as prevention?

- **Observational studies**
- **Randomized controlled trials**

What does the research say about treatment as prevention?

- **Observational studies**

1. Heterosexual serodiscordant couples

- Is transmission less likely if HIV-positive partner is on treatment?

2. Population-based

- Does increasing the number of people on treatment in a population reduce HIV transmissions?

What does the research say about treatment as prevention?

- **Observational studies**

1. Heterosexual serodiscordant couples

- Is transmission less likely if HIV-positive partner is on treatment?

- **What does the research say?**

- Recent review of seven observational studies
 - » 71 transmissions among treated couples
 - » 365 transmissions among untreated couples
- Treatment reduced transmission by between 66 to 86%

Why does undetectable \neq sexually non-infectious?

- Undetectable does not mean there is no virus
 - It means that the virus is below the limit of detection

Why does undetectable \neq sexually non-infectious?

- Undetectable does not mean there is no virus
- Undetectable in the blood does not always mean the virus is undetectable in other fluids
 - Antiretroviral drug levels (blood vs. mucous membranes)
 - Sexually transmitted infections

Why does undetectable \neq sexually non-infectious?

- Undetectable does not mean there is no virus
- Undetectable in the blood does not always mean the virus is undetectable in other fluids
- Viral load may become detectable since last measurement
 - Poor adherence
 - Drug resistance
 - Unexplained “blips”

What does the research say about treatment as prevention?

- **Observational studies**

1. Heterosexual serodiscordant couples

2. Population-based

- Does increasing the number of people on treatment in a population reduce HIV transmissions?

- **What does the research say?**

- The research is mixed
 - » Reduced number of HIV transmissions → British Columbia, San Francisco, Taiwan
 - » No effect in other locations

What is a “test and treat” strategy?

- Improving access to HIV testing, care, support, and treatment
- Objectives
 1. Increase the number of people living with HIV who know their HIV status.
 2. Ensure that those who test positive are linked to care.
 3. Increase the number of people living with HIV who are on treatment (if **ready** to start treatment).
 4. Support people who are on treatment with regular clinical monitoring, management of side-effects, adherence counseling, diagnosis and treatment of STIs, and risk-reduction counseling.

Challenges of a “test and treat” strategy

- Feasibility
- Sexually transmitted infections
- Recent HIV infection
- Ethical concerns

How early should someone start treatment?

- It is unclear whether starting treatment earlier is beneficial for a person living with HIV
 - Is it ethical to recommend earlier treatment to someone solely for the benefit of others?



HPTN 052 – the first randomized controlled trial

- Study details
 - Enrolled 1,762 serodiscordant couples
 - CD4 count between 350-550
 - Willing to start treatment earlier than guidelines
 - HIV-positive partner randomized to either
 1. Start treatment immediately (CD4 count between 350-550)
 2. Delay treatment until CD4 count dropped between 200 to 250
 - Comprehensive package of prevention services
 - Adherence counseling
 - Risk-reduction counseling
 - Access to free male and female condoms
 - STI diagnosis and treatment

HPTN 052 – The results

	# HIV transmissions
Early treatment	1
Delayed treatment	27

Earlier treatment reduced the risk of HIV transmission by
96%

What do we know about treatment as prevention?

- Antiretroviral treatment significantly reduces – but not eliminate - the risk of sexual HIV transmission
- Although rare, it is still possible for a person with an undetectable viral load to transmit HIV
- Earlier initiation of treatment by the HIV-positive partner in a *heterosexual serodiscordant relationship* reduces the risk of HIV transmission to the HIV-negative partner
- A “test and treat” strategy may be an effective way of reducing the number of HIV transmissions in a population

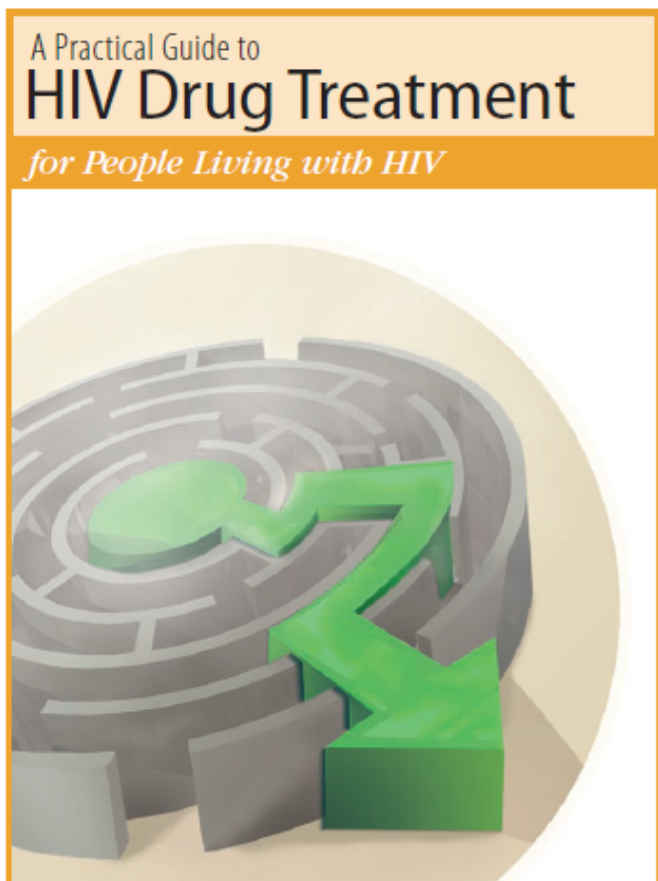
Unanswered questions...

- What is the risk of HIV transmission when the blood viral load is undetectable?
- How effective is treatment at reducing the risk of HIV transmission through anal sex? Injection drug use?
- Is a “test and treat” strategy feasible?
- Does starting treatment earlier provide a benefit to the person living with HIV?

Ongoing research

Study	Location	Population	Aim of Study	Completion
Seek and Treat for Optimal Prevention of HIV/AIDS (STOP HIV/AIDS)	Vancouver and Prince George		Expansion of HIV testing, treatment, and support services	2013
Testing and Linkage to care PLUS (HPTN 065)	Bronx, New York and Washington, DC		Feasibility of a community-level test, link to care, plus treat strategy	2013
Strategic Timing of Antiretroviral Treatment (START)	30 countries around the world	4,000 men and women	Individual benefit of starting treatment with a CD4 count of above 500	2015

CATIE Resources



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Spring 2010, Issue 1

Treatment as prevention: We've all heard about it but what does it really mean?

By [Laurel Challacombe](#)

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A new idea came to the forefront in 2006 at the International AIDS Conference held in Toronto. Since then, this idea has received increasing attention around the world. Treating people living with HIV may reduce the sexual transmission of HIV on a population level. We are familiar with the idea that if someone uses a condom for sex they can protect themselves and others from getting HIV—this is something an individual is able to do to protect themselves and others. But “treatment as prevention” moves away from the focus on individual prevention efforts toward an approach that

CATIE-News: Bite-sized HIV/AIDS news bulletins

Early treatment reduces HIV transmission in heterosexual serodiscordant couples

The early results of a clinical trial, called HPTN 052, show that starting treatment early can significantly reduce the transmission of HIV in heterosexual serodiscordant couples.

Treatment as prevention

The use of antiretroviral treatment by HIV-positive individuals to reduce their risk of transmitting HIV to their sexual partners is commonly referred to as “treatment as prevention.” Antiretroviral treatment can reduce the amount of HIV in bodily fluids (such as rectal fluid, semen and vaginal fluid) of someone living with HIV and may therefore make them less likely to transmit HIV to others during unprotected sex. The possibility of reducing the risk of HIV transmission is one argument made to support early initiation of HIV treatment.



Thank you!

