CATIE is Canada’s source for up-to-date, unbiased information about HIV and hepatitis C. We connect people living with HIV or hepatitis C, at-risk communities, healthcare providers and community organizations with knowledge, resources and expertise to reduce transmission and improve quality of life.

Production of *HIV in Canada: A primer for service providers* has been made possible through financial contributions from the Public Health Agency of Canada.

**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 or otherwise alter its content. The following credit must appear on any reprint: *This information was provided by CATIE. For more information, contact CATIE at 1-800-263-1638 or www.catie.ca.*

©2015, CATIE (Canadian AIDS Treatment Information Exchange). All rights reserved. Revised in 2015.

Contact CATIE
1-800-263-1638 · www.catie.ca
# HIV IN CANADA

A primer for service providers

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>5</td>
</tr>
<tr>
<td>1. GLOBAL EPIDEMIOLOGY OF HIV</td>
<td>6</td>
</tr>
<tr>
<td>2. CANADIAN EPIDEMIOLOGY OF HIV</td>
<td>8</td>
</tr>
<tr>
<td>2.1 PEOPLE WITH AND AT RISK FOR HIV</td>
<td>10</td>
</tr>
<tr>
<td>2.2 HIV IN SPECIFIC POPULATIONS</td>
<td>11</td>
</tr>
<tr>
<td>2.2.1 Gay men and other men who have sex with men</td>
<td>11</td>
</tr>
<tr>
<td>2.2.2 People who inject drugs</td>
<td>13</td>
</tr>
<tr>
<td>2.2.3 Heterosexual transmission</td>
<td>15</td>
</tr>
<tr>
<td>2.2.4 Aboriginal people</td>
<td>17</td>
</tr>
<tr>
<td>2.2.5 Females</td>
<td>20</td>
</tr>
<tr>
<td>2.2.6 Youth</td>
<td>22</td>
</tr>
<tr>
<td>2.2.7 Older Canadians</td>
<td>24</td>
</tr>
<tr>
<td>2.2.8 Canadian prisoners</td>
<td>25</td>
</tr>
<tr>
<td>3. SEXUALLY TRANSMITTED INFECTIONS, HEPATITIS C AND TUBERCULOSIS IN CANADA</td>
<td>27</td>
</tr>
<tr>
<td>3.1 HEPATITIS C VIRUS</td>
<td>27</td>
</tr>
<tr>
<td>3.2 REPORTABLE SEXUALLY TRANSMITTED INFECTIONS (CHLAMYDIA, GONORRHEA AND INFECTIOUS SYPHILIS)</td>
<td>32</td>
</tr>
<tr>
<td>3.3 HEPATITIS B VIRUS</td>
<td>35</td>
</tr>
<tr>
<td>3.4 HUMAN PAPILLOMAVIRUS</td>
<td>38</td>
</tr>
<tr>
<td>3.5 TUBERCULOSIS</td>
<td>40</td>
</tr>
<tr>
<td>4. HIV PREVENTION</td>
<td>43</td>
</tr>
<tr>
<td>4.1 THE SOCIAL DETERMINANTS OF HEALTH AND STRUCTURAL INTERVENTIONS</td>
<td>43</td>
</tr>
<tr>
<td>4.1.1 Stigma and discrimination</td>
<td>45</td>
</tr>
<tr>
<td>4.1.2 Criminalization of HIV non-disclosure</td>
<td>47</td>
</tr>
<tr>
<td>4.2 HIV PREVENTION INTERVENTIONS</td>
<td>50</td>
</tr>
<tr>
<td>4.2.1 HIV Transmission</td>
<td>50</td>
</tr>
<tr>
<td>4.2.1.1 Biology of Sexual Transmission of HIV.</td>
<td>51</td>
</tr>
<tr>
<td>4.2.1.1.1 Per-act Risk of Sexual HIV Transmission</td>
<td>53</td>
</tr>
<tr>
<td>4.2.1.2 Communication of Risk</td>
<td>55</td>
</tr>
<tr>
<td>4.2.2 Biomedical Prevention Interventions</td>
<td>59</td>
</tr>
<tr>
<td>4.2.2.1 Physical barrier methods</td>
<td>61</td>
</tr>
<tr>
<td>4.2.2.2 Treatment as an Aid to Prevention</td>
<td>64</td>
</tr>
<tr>
<td>4.2.2.2.1 Effective treatment of people living with HIV</td>
<td>64</td>
</tr>
<tr>
<td>4.2.2.2.2 Post-exposure prophylaxis (PEP)</td>
<td>67</td>
</tr>
<tr>
<td>4.2.2.2.3 Pre-exposure prophylaxis (PrEP)</td>
<td>69</td>
</tr>
<tr>
<td>4.2.2.3 Treatment of Other Sexually Transmitted Infections</td>
<td>72</td>
</tr>
<tr>
<td>4.2.2.4 Penile Circumcision</td>
<td>74</td>
</tr>
<tr>
<td>4.2.2.5 Microbicides</td>
<td>76</td>
</tr>
<tr>
<td>4.2.2.6 Vaccines</td>
<td>78</td>
</tr>
<tr>
<td>4.2.3 Behavioural Prevention Interventions</td>
<td>80</td>
</tr>
<tr>
<td>4.2.3.1 Sexual health promotion</td>
<td>83</td>
</tr>
<tr>
<td>4.2.3.2 Harm reduction</td>
<td>85</td>
</tr>
</tbody>
</table>

HIV IN CANADA  A primer for service providers  www.catie.ca  3
4.2.3.3 School-based education ................................................................. 87
4.2.3.4 Prison-based prevention ............................................................... 90
4.2.3.5 Positive prevention ........................................................................ 92
4.2.4 Fertility Options and Prevention of Vertical Transmission ................. 94

5. HIV TESTING AND DIAGNOSIS ............................................................. 97

6. HIV TREATMENT .................................................................................... 102
   6.1 SIDE EFFECTS ................................................................................... 105
   6.2 ADHERENCE ..................................................................................... 107
   6.3 DRUG RESISTANCE ......................................................................... 109
   6.4 DRUG INTERACTIONS ...................................................................... 111
   6.5 THE CURE ......................................................................................... 113

7. CARE AND SUPPORT ............................................................................ 114
   7.1 ACCESS TO HEALTH CARE .............................................................. 114
   7.2 HIV AS AN EPISODIC ILLNESS ......................................................... 116
   7.3 CO-INFECTIONS, CANCERS AND OTHER ILLNESSES ASSOCIATED WITH HIV ......................................................... 117
   7.4 MENTAL HEALTH ............................................................................. 119
      7.4.1 Depression .................................................................................. 120
      7.4.2 Anxiety ....................................................................................... 122
      7.4.3 Drug use and addiction ............................................................... 123
   7.5 HIV AND AGING ............................................................................... 125
   7.6 HOLISTIC APPROACH TO TREATMENT ............................................ 128

8. INTEGRATED APPROACHES TO HIV PROGRAMMING .......................... 129
   8.1 INTEGRATED APPROACHES TO HIV PREVENTION AND TREATMENT ................................................................. 131
      8.1.1 Framework for Integrated Approaches to HIV Prevention and Treatment ................................................................. 134
         8.1.1.1 The HIV treatment cascade .................................................. 136
      8.1.2 New Directions in Program Development Based on Integration of HIV Prevention and Treatment ............................................. 138
      8.1.3 Integration of Related Health Factors such as Chronic Diseases and Mental Health .................................................. 140
   8.2 INTEGRATED APPROACHES TO SEXUALLY TRANSMITTED AND BLOOD-BORNE INFECTIONS AND TUBERCULOSIS .................................................. 141
   8.3 PROGRAM SCIENCE ......................................................................... 143
INTRODUCTION

Over the course of the past 30 years there has been an explosive growth in our collective knowledge of HIV prevention, care, treatment and support and of the individuals and communities most impacted by the virus. However, this knowledge has tended to emerge sporadically from many different communities, disciplines and areas of specialization.

Consequently, our understanding of HIV prevention, care, treatment and support has remained fragmented, with few mechanisms and processes in place to enable different stakeholders to integrate and exchange knowledge to strategically pursue coordinated opportunities for advancing the response to HIV in Canada.

This resource was developed to help address the need for a more integrated approach to HIV knowledge exchange. It provides an overview of the HIV landscape in Canada, including the epidemiology of HIV; trends in diseases related to HIV; and trends and issues in prevention, treatment, care and support for people with or at risk for HIV. The purpose of the resource is to provide some starting points for dialogue among national, regional and local stakeholders in HIV to support strategic HIV planning and decision-making in Canada. It is a living document and will be regularly revised to reflect current knowledge of HIV in Canada.
1. GLOBAL EPIDEMIOLOGY OF HIV

KEY POINTS

- An estimated 35.3 million people were living with HIV worldwide in 2012.
- An estimated 2.3 million new HIV infections occurred worldwide in 2012.
- The estimated global HIV prevalence rate among adults was 0.8% in 2012.

As part of its efforts to monitor the HIV epidemic and assess the effectiveness of prevention efforts, the Joint United Nations Program on HIV/AIDS (UNAIDS) estimates the number of people living with HIV (prevalence) and the number of new HIV infections in one year (incidence).

An estimated 35.3 million people worldwide were living with HIV (including AIDS) in 2012. Globally, the estimated HIV prevalence rate among adults was 0.8% in 2012. Sub-Saharan Africa was the region most affected by HIV; the adult HIV prevalence was 4.7% and the region was home to 71% of all people living with HIV worldwide in 2012 (25 million). The Caribbean is the only other region with an adult HIV prevalence rate above the global average, at 1.0%. Prevalence rates in the remaining regions were all below the global average: 0.7% in Eastern Europe and Central Asia, 0.5% in North America, 0.4% in Latin America, 0.2% in Oceania, 0.2% in Western and Central Europe, 0.1% in the Middle East and North Africa, 0.3% in South and South-East Asia and less than 0.1% in East Asia.

In 2012, an estimated 6,300 people became infected with HIV every day. This resulted in an estimated 2.3 million new HIV infections globally in 2012.

In 2012, an estimated 4,400 people died from an AIDS-related infection every day. This resulted in an estimated 1.6 million deaths as a result of AIDS in 2012.

Globally there are two different types of HIV epidemics. In “concentrated” epidemics, transmission occurs largely in defined vulnerable groups such as sex workers, gay men and other men who have sex with men, and people who use injection drugs. In “generalized” epidemics, transmission is sustained by sexual behaviour in the general population and would persist despite effective programs for vulnerable groups. North America has a concentrated epidemic whereas sub-Saharan Africa has a generalized epidemic.

The understanding of the type of epidemic that countries are facing helps to direct HIV prevention strategies. The rallying cry led by UNAIDS — “Know your epidemic, know your response” — reflects a recognition that HIV epidemics around the world are not the same and that no one approach will stop the spread of HIV. Concentrated epidemics demand targeted interventions for the risk groups involved. Generalized epidemics require intensified interventions for the general population (e.g., interventions aimed at reducing the number of sexual partners or at male circumcision).
RESOURCES
Global epidemiology – World Health Organization PowerPoint presentation
UNAIDS report on the global AIDS epidemic 2013

SOURCES
2. CANADIAN EPIDEMIOLOGY OF HIV

HIV epidemiologic information is used to develop evidence-based prevention and control programs and to promote the most effective use of health resources. The Centre for Communicable Diseases and Infection Control of the Public Health Agency of Canada (PHAC) monitors the HIV epidemic in Canada. PHAC produces estimates of HIV prevalence and incidence and surveillance reports on diagnosed (reported) HIV and AIDS cases.

PHAC reports the number of HIV diagnoses reported to the agency by each province (known as “reported cases”). Information contained in the reported cases provides a useful description of the characteristics of people diagnosed with HIV or AIDS in Canada. However, surveillance data understate the magnitude of the HIV epidemic because such data are subject to reporting delays, under-reporting and changing patterns in HIV testing behaviours (who comes forward for testing); surveillance data also do not include individuals who remain untested and undiagnosed.

National HIV estimates are produced by PHAC and published every three years. PHAC estimates HIV prevalence and incidence using statistical methods that take into account some of the limitations of surveillance data (number of HIV diagnoses reported to PHAC) and also account for the number of people living with HIV who do not yet know they have it. Statistical modelling, using surveillance data and additional sources of information, allows PHAC to produce HIV estimates among those diagnosed and undiagnosed. The most recent estimates available are for 2011. The next set of estimates will be available in 2015 and will pertain to the year 2014. PHAC’s estimates are used when available in HIV in Canada; however, it should be noted that estimates are not available for certain populations. In these instances, reported cases are used.

PHAC also supports a federal initiative involving five second-generation surveillance systems for specific groups: men who have sex with men (M-Track), injection drug users (I-Track), Aboriginal people (A-Track), people from countries where HIV is endemic (E-Track) and people living with HIV (P-Track). The five surveillance systems are in various stages of completion, from development through to implementation. Methods involve the periodic administration of cross-sectional surveys and may include the collection of dried blood spots or saliva for testing (HIV, hepatitis C, sexually transmitted infections) at selected sites across Canada. These surveillance systems allow for the monitoring of the prevalence of and trends in HIV risk behaviours, the prevalence of and trends in HIV testing, the use of HIV prevention services, and trends in the prevalence of HIV and other infections. When available, these data are used in HIV in Canada to supplement information on HIV estimates and diagnosed cases of HIV.
RESOURCES
The epidemiology of HIV in Canada – CATIE fact sheet
Summary: estimates of HIV prevalence and incidence in Canada, 2011 – Public Health Agency of Canada

SOURCES
2.1 PEOPLE WITH AND AT RISK FOR HIV

KEY POINTS

- An estimated 71,300 Canadians were living with HIV in 2011 (prevalence).
- An estimated 25% of Canadians living with HIV were not aware of their infection.
- An estimated 0.2% of Canadians were living with HIV in 2011 (HIV prevalence rate).
- There were an estimated 3,175 new HIV infections in 2011 (incidence).

An estimated 71,300 Canadians (range 54,000 to 76,000) were living with HIV at the end of 2011. This represents an increase of 7,300 infections (11.4%) since 2008. An estimated 0.2% of Canadians were living with HIV in 2011 (prevalence rate). It was estimated that 3,175 new HIV infections occurred in Canada in 2011 compared with 3,335 in 2008.

Of the estimated 71,300 people living with HIV in Canada in 2011, an estimated 25% (17,980 people) were unaware of their HIV infection because they had not been tested. Broken down by HIV transmission route, 20% of HIV-positive men who have sex with men, 24% of HIV-positive injection drug users and 34% of HIV-positive people exposed through heterosexual contact were estimated to be unaware of their HIV infection in 2011.

Infographics are available which graphically display HIV prevalence by region, HIV incidence by region, and HIV incidence for certain populations.

RESOURCES
The epidemiology of HIV in Canada – CATIE fact sheet
Summary: estimates of HIV prevalence and incidence in Canada, 2011 – Public Health Agency of Canada (PHAC)
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic

SOURCES
2.2 HIV IN SPECIFIC POPULATIONS

The next sections summarize the HIV epidemiologic data available from the Public Health Agency of Canada (PHAC) for specific populations in Canada. Please note that there is overlap among the populations (e.g., men who have sex with men within the youth population). Each section includes the latest available estimates of HIV prevalence and incidence and the latest available Track results. Where data from the national Track studies are unavailable for a specific population, data from Canadian studies will be used to provide a fuller picture of the epidemic in that population.

2.2.1 Gay men and other men who have sex with men

**KEY POINTS**
- There were an estimated 369,500 gay men and other men who have sex with men in Canada in 2011.
- Men who have sex with men are 71 times more likely to get HIV than men who do not have sex with men.
- An estimated 50% of new HIV infections were in men who have sex with men in 2011.
- HIV incidence has been stable in men who have sex with men since 2008.
- Men who have sex with men accounted for an estimated 50% of all Canadians living with HIV in 2011.
- 16% of men who have sex with men are HIV positive (based upon studies in six Canadian cities).

There were an estimated 369,500 gay men and other men who have sex with men (MSM) in Canada in 2011. This accounts for 2.6% of the Canadian population aged 15 years and older.

Men who have sex with men are 71 times more likely to get HIV than men who do not have sex with men. According to national 2011 estimates, there were 443 new HIV infections for every 100,000 MSM in Canada. This compares to only 6.2 new HIV infections for every 100,000 other men in Canada.

The 2011 estimates of HIV prevalence and incidence indicate that MSM continue to be the most affected group in Canada. An estimated half of all new HIV infections in Canada in 2011 were in MSM (incidence), equivalent to 1,560 infections in this population. This includes an estimated 1,480 new HIV infections attributed to sex between men in 2011 (47% of all estimated new infections) and an estimated 80 new HIV infections in men who have sex with men who also inject drugs (MSM-IDU) in 2011 (3%). For the category MSM-IDU, infection with HIV may have been caused by either of these behaviours, since both behaviours were present.
HIV incidence has been stable for both MSM and MSM-IDU since 2008, when the number of new infections was estimated at 1,470 in MSM and 90 in MSM-IDU.

At the end of 2011, an estimated 35,490 MSM were living with HIV (prevalence). This represents 50% of all people living with HIV. The estimate includes 33,330 people whose HIV status was attributed to sex between men and 2,160 men who engaged in sex with men as well as injection drug use (MSM-IDU) and whose HIV status could be attributed to either of these behaviours.

According to 2011 national HIV estimates, 20% of HIV-positive men who have sex with men remain undiagnosed. This represents an estimated 6,666 men.

M-Track also collects dried blood spot samples (2005–2007) to test for HIV. Sixteen percent of Canadian MSM (tested in six cities) were HIV positive, but HIV prevalence ranged between 11% and 23% depending on the city.

M-Track collects information on people who are taking treatment for their HIV infection. Of those who self-reported they were HIV positive, 66% were currently taking prescribed drugs for their HIV infection.

RESOURCES
The epidemiology of HIV in gay men and other men who have sex with men – CATIE fact sheet
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic
Gay Men’s Sexual Health Knowledge Centre

SOURCES
2.2.2 People who inject drugs

KEY POINTS

- An estimated 112,900 people injected drugs in Canada in 2011.
- People who inject drugs are 46 times more likely to get HIV than people who do not inject drugs.
- Injection drug use accounted for an estimated 16% of new HIV infections in 2011 (incidence).
- New HIV infections in people who use injection drugs may have decreased slightly since 2008.
- Injection drug use accounted for an estimated 20% of all Canadians living with HIV in 2011 (prevalence).
- 11% of Canadians who inject drugs are HIV positive (based upon studies in 11 Canadian cities).

There were an estimated 112,900 people who injected drugs in Canada in 2011. This accounts for 0.4% of the Canadian population 15 years of age and older.

Injection drug users are 46 times more likely to get HIV than people who do not inject drugs. According to national 2011 estimates, there were 431 new HIV infections for every 100,000 people who inject drugs in Canada. This compares to only 9.3 new HIV infections for every 100,000 people who do not inject drugs in Canada.

Of all the new HIV infections in 2011, an estimated 515 (16%) were in people who inject drugs. This includes an estimated 435 new HIV infections attributed solely to injection drug use in 2011 (14% of all estimated new infections) and an estimated 80 new HIV infections (3.0%) in men for whom either having sex with men or using injection drugs could have been responsible for the infection (MSM-IDU).

HIV incidence may be decreasing for people who inject drugs but it has been stable for MSM-IDU since 2008. In 2008 the estimated number of new HIV infections attributed to injection drug use was 565 and 90 in MSM-IDU.

At the end of 2011, 20% of people living with HIV in Canada may have acquired their HIV infection through injection drug use (14,200 people). This estimate includes 12,040 people (17%) whose HIV status was attributed to injection drug use (IDU) and an additional 2,160 men (3%) whose HIV infection may have been due to either injection drug use or having sex with men (MSM-IDU) because they reported both behaviours at testing.

At the end of 2011, an estimated 14,200 people who injected drugs (at the time of infection) were living with HIV (prevalence). This estimate includes 12,040 people (17%) whose HIV status was attributed to injection drug use (IDU) and an additional 2,160 men (3%) whose HIV
infection may have been due to either injection drug use or having sex with men (MSM-IDU) because they reported both behaviours at testing.

According to 2011 national HIV estimates, 24% of HIV-positive people whose infection is attributable to injection drug use remain undiagnosed. This represents an estimated 2,890 people.

Eleven percent of people who inject drugs tested in 11 Canadian cities in 2010–2012 were HIV positive. Sixty-eight percent had evidence of a current or past infection with hepatitis C. Among those in this study who self-reported they were HIV positive, 95% reported being under the care of a doctor, with 66% currently taking prescribed drugs for their HIV infection. Of those who are aware of a current hepatitis C infection, 48% are under the care of a doctor for their hepatitis C and 2% are currently taking prescribed drugs for hepatitis C.

RESOURCES
The epidemiology of HIV in people who inject drugs in Canada – CATIE fact sheet
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic
Summary of key findings from I-Track Phase 3 (2010–2012) – Public Health Agency of Canada (PHAC)
Injection drug use and HIV/AIDS – Canadian HIV/AIDS Legal Network fact sheets

SOURCES
2.2.3 Heterosexual transmission

KEY POINTS
- Heterosexual transmission accounted for an estimated 37% of new HIV infections in 2011.
- HIV incidence has been stable in Canadians exposed to HIV through heterosexual sex since 2008.
- People from countries where HIV is endemic are over-represented in the Canadian HIV epidemic.

Heterosexual transmission accounted for an estimated 33% of all Canadians living with HIV in 2011. Heterosexual transmission occurs in people from both HIV-endemic countries and non-HIV-endemic countries. For the purpose of HIV surveillance, HIV-endemic countries are generally defined as those that have an adult prevalence of HIV that is 1% or greater and one of the following:

- 50% or more of HIV diagnoses are attributed to heterosexual transmission;
- the male-to-female ratio of people living with HIV is 2:1 or less; or
- the HIV prevalence is 2% or greater among females receiving prenatal care.

Examples of regions where HIV is considered endemic include sub-Saharan Africa and the Caribbean.

There were an estimated 758,647 people from HIV-endemic countries in Canada in 2011. This accounts for 2.2% of the Canadian population.

The 2011 estimates of HIV prevalence and incidence indicate that heterosexual exposure to HIV represents a substantial proportion of the HIV epidemic in Canada. An estimated 1,180 new HIV infections [37% of all new infections in Canada] were attributed to heterosexual contact in 2011. This estimate includes an estimated 535 new infections [17%] attributed to heterosexual sex in people from a country where HIV is endemic and 645 [20%] new infections attributed to heterosexual sex in people from a country where HIV is not endemic.

HIV incidence has been stable in heterosexual populations in Canada since 2008. In 2008, the estimated number of new HIV infections attributed to heterosexual contact was 1,210.

People from HIV-endemic countries (residing in Canada) are 9.2 times more likely to get HIV than people born in Canada and other non-endemic countries. According to national 2011 estimates, there were 71.5 new HIV infections for every 100,000 people from HIV-endemic countries who were residing in Canada. This compares to only 7.8 new HIV infections per 100,000 people born in Canada or non-endemic countries.
At the end of 2011, an estimated 23,170 (33%) people living with HIV in Canada were exposed to HIV through heterosexual sex (prevalence). This estimate includes 10,640 people who came from a country where HIV is endemic (15% of all people living with HIV) and 12,530 people who came from a country where HIV is not endemic (18% of all people living with HIV).

According to 2011 national HIV estimates, 34% of HIV-positive people whose infection is attributable to a heterosexual exposure remain undiagnosed. This represents an estimated 7,878 people.

The epidemiological picture for people from countries where HIV is endemic includes transmission through heterosexual contact only and does not include people exposed to HIV through injection drug use or men who have sex with men who are from an HIV-endemic country.

The communities of people from countries where HIV is endemic are diverse, reflecting variations in historical backgrounds, language and cultural traditions. These communities are disproportionately affected by many social, economic and behavioural factors (determinants of health) that not only increase their vulnerability to HIV but may also act as barriers to accessing prevention, testing, treatment, and care and support programs.

RESOURCES
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic

SOURCES
2.2.4 Aboriginal people

KEY POINTS

- There were an estimated 1,310,391 aboriginal people in Canada in 2011.
- Aboriginal people are 3.6 times more likely to get HIV than people of other ethnicities in Canada.
- Aboriginal people accounted for an estimated 12% of new HIV infections in 2011.
- HIV incidence may have decreased slightly in Aboriginal people since 2008.
- Aboriginal people accounted for an estimated 9% of all Canadians living with HIV in 2011.
- Injection drug use is an important risk factor for HIV transmission among Aboriginal people.
- Five percent of aboriginal people are HIV positive (based on a pilot A-Track site in Regina).

There were an estimated 1,310,391 aboriginal people in Canada in 2011. This accounts for 3.8% of the Canadian population.

Aboriginal people in Canada are 3.6 times more likely to get HIV than people of other ethnicities in Canada. According to national 2011 estimates, there were 29.9 new HIV infections for every 100,000 Aboriginal people in Canada. This compares to only 8.4 new HIV infections for every 100,000 people of other ethnicities in Canada.

An estimated 390 new infections occurred in Aboriginal people in 2011 (12% of new HIV infections).

HIV incidence may have decreased slightly in Aboriginal populations since 2008, when an estimated 420 new HIV infections occurred.

An estimated 6,380 Aboriginal people were living with HIV at the end of 2011, accounting for 9% of HIV infections in Canada (prevalence). Injection drug use is an important risk factor for HIV transmission within the Aboriginal community. In 2011, an estimated 58% of new HIV infections among Aboriginal people were attributed to injection drug use; an estimated 30% were attributed to heterosexual contact; an estimated 9% were attributed to sex between men; and an estimated 3% were attributed to sex between men or injection drug use (in men who reported engaging in both behaviours). We can tell from these numbers that the epidemic among Aboriginal people in Canada is very different than among non-Aboriginal people.

Females make up a comparatively large proportion of the Aboriginal HIV epidemic. Between 1998 and 2008 [the dates for which data are available], 49% of all HIV diagnoses among Aboriginal people were in females whereas among other ethnicities 21% of HIV diagnoses were in females. Aboriginal people testing positive for HIV tend to be younger than non-
Aboriginal people. Again data are only available for the years 1998 to 2008. In this period almost one-third (33%) of Aboriginal HIV diagnoses were in people between 15 and 30 years of age whereas 21% of diagnoses among other ethnicities were in this age group.

Caution should be used, however, when drawing conclusions from the numbers reported for Aboriginal peoples. An adequate description of the HIV epidemic among Aboriginal people in Canada requires accurate and complete access to ethnicity data. Ethnicity data were reported for 30% of HIV diagnoses in 2008 and were not available for all provinces and territories. As a result, only data from certain provinces and territories (all but Ontario and Quebec) are used when examining HIV diagnoses data on Aboriginal people.

A-Track collects dried blood spot samples to test for HIV (2012). Five percent of Aboriginal people enrolled in the study tested positive for HIV. Interestingly, only 56% of participants, who tested positive for HIV, were aware of their status. It should be noted that this A-Track data is from only one pilot site in Regina and may not represent all Aboriginal people in Canada.

According to A-Track, among those who self-reported they were HIV positive, 87% reported being under the care of a doctor for their HIV and 67% reported ever taking prescribed drugs for their HIV.

In Canada, Aboriginal populations are very diverse, with communities that reflect variations in historical backgrounds, language and cultural traditions. These communities are disproportionately affected by many social, economic and cultural factors (determinants of health) that increase their vulnerability to HIV infection.

RESOURCES
Aboriginal peoples – PHAC fact sheet
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic

SOURCES

2.2.5 Females

KEY POINTS

- An estimated 24% of new HIV infections were among females in 2011.
- HIV incidence may have decreased in females since 2008.
- Heterosexual contact and injection drug use are the main modes of transmission in females.
- Females accounted for an estimated 23% of all Canadians living with HIV in 2011.

The HIV epidemic has changed from the early years, from one that affected mostly men who have sex with men to one that increasingly affects other groups, including heterosexuals and people who inject drugs. As a result, the burden of HIV among females is increasing.

In 2011, females accounted for an estimated 24% of new infections, or 755 new infections. HIV incidence may have decreased in females since 2008, when an estimated 865 new HIV infections occurred. Injection drug use and heterosexual contact were the main modes of HIV transmission in females, with an estimated 23% of females exposed through injection drug use and 77% exposed through heterosexual contact.

The estimated HIV incidence rate was 4.3 new HIV infections for every 100,000 women in Canada in 2011.

By the end of 2011, an estimated 16,600 females were living with HIV in Canada; 23% of all people living with HIV were females.

Social and economic conditions (such as poverty, marginalization, gender power inequalities and violence) that fuel the HIV epidemic increase the vulnerability of females to HIV infection.

RESOURCES

The epidemiology of HIV in females – CATIE fact sheet
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic
Women and HIV – Managing your health
Women and the biology of HIV transmission – CATIE fact sheet

SOURCES


2.2.6 Youth

KEY POINTS

- Youth (aged 15–29 years) accounted for 24% of new HIV diagnoses in 2013.
- Youth (aged 15–29 years) accounted for approximately 26% of all Canadians diagnosed with HIV up to 2013.
- Street-involved youth, youth who inject drugs, and young men who have sex with men are at higher risk for HIV.
- High rates of sexually transmitted infections among youth could be an indicator of HIV transmission risk.

Youth (aged 15 to 29 years) accounted for 24% of all new HIV diagnoses (504 reported cases) in 2013. Of these, males accounted for 387 new HIV diagnoses (77%) whereas females accounted for 116 new HIV diagnoses (23%) in 2013. In terms of changes over time, 40% of all new diagnoses of HIV were among youth in 1985; this figure then decreased steadily to a low of 21% in 1999 and has hovered between 21% and 25% up to 2013.

Individuals between the ages of 15 and 29 years accounted for 26% (19,783 reported cases) of all diagnosed HIV infections up to 2013. However, it should be noted that symptoms for HIV may take many years to develop, sometimes as many as 10 years or more, so many people infected when they are youth will probably not be diagnosed until they are adults, once symptoms appear. For this reason, many people infected as youth may not be captured within these statistics.

HIV is prevalent among certain populations of youth. According to national HIV estimates, the HIV prevalence rate in Canada is 0.2%. According to various national surveillance systems, the prevalence rate among street youth, youth who inject drugs, and young men who have sex with men is much higher. According to a national surveillance system of street youth (aged 15 to 24) in Canada conducted between 2009 and 2012 (E-SYS), the HIV prevalence rate among street-involved youth was 1%. According to a national surveillance system of people who inject drugs in Canada conducted between 2010 and 2012 (I-Track), the HIV prevalence rate among youth (aged 15 to 24) who use injection drugs was 3%. According to a national surveillance system of men who have sex with men in Canada conducted between 2005 and 2007 (M-Track), the HIV prevalence rate among young men who have sex with men (aged 29 or less) was 4%.

While HIV prevalence remains low in the general population of youth, increasing rates of sexually transmitted infections show an alarming trend. In 2011 81% of new cases of chlamydia were among youth; 66% of new cases of gonorrhea were among youth; and 31% of new cases of infectious syphilis were among youth. This is a marker of risky sexual behaviour in the population, suggesting that youth may be at risk for HIV.
RESOURCES
The epidemiology of HIV in youth – CATIE fact sheet
People living with HIV in Canada – CATIE infographic
New HIV infections in Canada – CATIE infographic
Where is HIV hitting hardest? – CATIE infographic
Population-specific Status Report: HIV/AIDS and other sexually transmitted and blood
borne infections among youth in Canada – Public Health Agency of Canada

SOURCES
2.2.7 Older Canadians

KEY POINTS

- Twenty-one percent of all new HIV diagnoses in 2013 were in Canadians aged 50 years or older.
- Sexual contact was the main mode of transmission.

In 2013, 443 new HIV diagnoses were reported in Canadians aged 50 years and over (21% of all new diagnosed HIV infections in Canada). Of the new HIV diagnoses in older Canadians, 85% (375 reported cases) were in males and 15% were in females. Of those with known exposure category, 36% of older Canadians were exposed to HIV through heterosexual contact, 46% through sex between men, 11% through the use of injection drugs, 2% through either sex between men or injection drug use, and 1% through exposure to blood or blood products. Trends in HIV diagnoses tell us that the number of diagnoses in Canadians over the age of 50 has increased since the beginning of the HIV epidemic.

It is difficult to know how many older Canadians are living with HIV today. We know that up to the end of 2013, 8,151 Canadians over the age of 50 had ever been diagnosed with HIV. However, this does not account for those who have died or those who became HIV positive at a younger age and have lived to older age. More and more HIV-positive individuals are living longer due to medical advances, such as effective HIV treatment, and this will lead to the continual growth in the number of older Canadians living with HIV.

RESOURCES

- HIV and aging in Canada: an introduction – Canadian AIDS Society fact sheet
- HIV/AIDS among older Canadians – Public Health Agency of Canada Epi Updates
- People living with HIV in Canada – CATIE infographic
- New HIV infections in Canada – CATIE infographic
- Where is HIV hitting hardest? – CATIE infographic
- HIV and aging – Managing your health

SOURCE

2.2.8 Canadian prisoners

KEY POINTS

- HIV prevalence in federal and provincial prisons is estimated at 2% to 8%.
- HIV among prisoners is associated with injection drug use.

According to a national survey by Correctional Service Canada, prisoners entering federal penitentiaries report a high rate of risky drug and sexual behaviours during their last months before incarceration. In terms of injection drug use, 8% of males and 15% of females reported sharing injecting equipment in the six months prior to incarceration. In terms of sexual activities, 70% of men and 70% of women reported condomless sex with a regular partner in the six months prior to incarceration and 33% of males and 27% of females reported condomless sex with casual partners in the six months prior to incarceration.

Risky behaviour continued during incarceration but at a lower rate. In terms of injection drug use, 7% of males and 5% of females reported sharing injecting equipment in the past six months while incarcerated. In terms of sexual activities, 5% of men and 18% of women reported condomless sex with a regular partner in the past six months while incarcerated and 2% of males and 11% of females reported condomless sex with casual partners in the past six months while incarcerated.

Tattooing and body piercing in prison also place people at risk of transmission; roughly 38% of respondents to the survey reported having been tattooed in federal prison and 13% reported having had body piercing performed.

Among prisoners who had ever been tested for HIV, 4.6% reported they were HIV positive. Females were more likely to report being HIV positive than males (7.9% vs. 4.5%). Aboriginal females were a particularly high-risk group as they reported the highest rates of HIV, at 11.7%. Prisoners may become infected with HIV before or after they enter prisons. HIV infection in Canadian prisons is strongly associated with injection drug use.

In the research literature, estimates of the HIV prevalence rate in Canadian federal and provincial prisons range from 2% to 8%. These estimates are at least 10 times higher than the reported prevalence in the Canadian population.

RESOURCES

- People in Prison – Public Health Agency of Canada fact sheet
- HIV prevention, treatment and care in prisons and other closed settings: A comprehensive package of interventions – World Health Organization
- Prison Health NOW – Canadian HIV/AIDS Legal Network
SOURCES
3. SEXUALLY TRANSMITTED INFECTIONS, HEPATITIS C AND TUBERCULOSIS IN CANADA

This section provides summary information on the hepatitis C virus, some sexually transmitted infections and tuberculosis in Canada.

3.1 HEPATITIS C VIRUS

KEY POINTS

- An estimated 220,697 to 245,987 Canadians were living with chronic hepatitis C in 2011.
- An estimated 332,414 people are antibody positive for hepatitis C, indicating a current or past hepatitis C infection.
- The primary mode of hepatitis C transmission in Canada is injection drug use.
- An estimated 0.6% to 0.7% of Canadians were living with chronic hepatitis C in 2011 (this prevalence rate is at least three times higher than that for HIV in Canada).
- Hepatitis C is 10 times more transmissible than HIV through blood contact.
- Testing for hepatitis C among HIV-positive people and for HIV among people infected with hepatitis C is essential.
- Managing treatment in people co-infected with HIV and hepatitis C is more complex than treating people with only one of these infections.
- Hepatitis C is now a curable infection for most people.
- It is possible to be re-infected with hepatitis C after successful treatment.

Hepatitis C is a liver disease caused by the hepatitis C virus. Some people are able to clear the virus from their body soon after becoming infected; however, in about three-quarters of people, the infection becomes chronic. Chronic infection can lead to severe liver damage (cirrhosis), liver cancer and liver failure (which requires a liver transplant). There are treatments for hepatitis C, but no vaccine exists to prevent infection.

Hepatitis C is transmitted when the blood of someone carrying the virus gets into the bloodstream of an uninfected person. The most common ways a person can get infected with the hepatitis C virus are as follows:

- using needles and equipment that have already been used by someone else for preparing, injecting, inhaling or snorting a drug
- receiving a blood transfusion in Canada before blood was effectively and routinely screened for hepatitis C (i.e., before 1992)
• receiving a blood transfusion in a country where procedures for screening blood are not effective or routine

A person can also become infected with the hepatitis C virus in the following less common ways:
• sharing or borrowing personal items, such as razors, toothbrushes or nail clippers, that contain traces of blood from a previous user
• undergoing unsafe medical practices that involve reusing medical equipment that has not been properly sterilized (although this is rare in Canada, it can occur)
• using tattoo, body-piercing or acupuncture equipment that has been reused without being properly sterilized
• having unprotected sex where blood is present (e.g., during menstruation or rough anal sex)

Uncommonly, an infected mother may also transmit the virus to a child during pregnancy or delivery (known as vertical transmission).

Hepatitis C is 10 times more transmissible than HIV through blood contact. However, HIV is more easily transmitted than hepatitis C through sexual contact.

At the end of 2011, an estimated six to seven in every 1,000 Canadians (0.6% to 0.7%) were living with chronic hepatitis C. This means that as of 2011, an estimated 220,697 to 245,987 people in Canada were living with chronic hepatitis C. In 2011, chronic hepatitis C was most prevalent among people born in 1955 to 1959 (1.5%), followed by those born in 1950 to 1954 (1.25%); 1960 to 1964 (1.2%); 1965 to 1969 (1.1%); and 1970 to 1974 (0.8%).

On the basis of national 2011 hepatitis C estimates, approximately 97,107 to 108,234 or 44% of people living with chronic hepatitis C were unaware that they had this infection.

In 2011, an estimated 332,414 people were antibody positive for hepatitis C. This indicates either a current or past infection with hepatitis C. This is the equivalent of 10 people out of every 1,000 Canadians (or 1.0% of the total Canadian population). People who inject drugs (both current and former) comprised 42.6% of all antibody-positive cases. People born in a country outside of Canada comprised an additional 35.0% of all antibody positive cases.

Hepatitis C (antibody positive) is more prevalent in certain populations. On the basis of national hepatitis C estimates and a number of Canadian surveillance systems, an estimated 66.0% of people who inject drugs, 28.5% of people who formerly injected drugs, and 2.3% of people who are homeless [who do not inject drugs] were antibody positive for hepatitis C (2011). Additionally, 24.0% of federal prisoners and 23.3% of provincial prisons were antibody positive for hepatitis C (2011). An estimated 3.0% of people living in nursing homes and long-term care hospitals were antibody positive for hepatitis C (2011). An estimated 1.9% of people born in a country outside of Canada were antibody positive for hepatitis C (2011).
immigrants from countries where hepatitis C is more prevalent may have higher hepatitis C rates upon entry to Canada. Since hepatitis C testing is not done upon entry to Canada, there may be immigrants living with hepatitis C who are not aware of their infection. Based on two national surveillance systems, 5% of gay men and other men who have sex with men were antibody positive for hepatitis C (2005–2007). And 5% of street-involved youth were antibody positive for hepatitis C (2005–2006).

The annual reported rates for hepatitis C infections are declining. Based on 2012 national surveillance data, 10,180 hepatitis C diagnoses were reported to the Public Health Agency of Canada. This is equal to 29.3 cases of hepatitis C per 100,000 Canadians. The rate of reported hepatitis C diagnoses has declined steadily from a peak of 66.9 cases per 100,000 in 1998. Since 1998, the rates of reported hepatitis C diagnoses have declined by 56.2%.

Based on 2012 national surveillance data, men have higher rates of hepatitis C diagnoses than women (36.8 per 100,000 compared to 21.5 per 100,000). Among men, those aged 60 to 59 had the highest rate of hepatitis C diagnoses at 64.4 cases per 100,000. Among women, those aged 25 to 29 had the highest rate of hepatitis C diagnoses at 38.2 per 100,000.

Because HIV and hepatitis C share routes of transmission and individuals infected with one of these infections have an increased susceptibility to the other, individuals infected with HIV are at greater risk of becoming co-infected with hepatitis C and vice versa than people who are not infected with either virus. People who are co-infected are more likely to be Aboriginal, current or former injection drug users, current or former prisoners and/or people who received contaminated blood or blood products in the course of their health care (before implementation of hepatitis C testing in the blood supply). However, since 2000, hepatitis C has been increasingly detected in HIV-positive men who have sex with men who do not report any injection drug use. This has spurred debate about how hepatitis C transmission through sexual contact may occur, especially among HIV-positive gay men.

Many people infected with hepatitis C experience few or no symptoms. This makes it more difficult to ensure timely diagnosis. Because of the shared routes of transmission, it is essential that people who have been diagnosed with either HIV or hepatitis C be tested for the other virus and provided with appropriate prevention counselling. It is imperative that co-infected individuals be aware of their status for two reasons: (1) people who know their status usually make behaviour changes that result in a reduced transmission risk for others and (2) informed decisions cannot be made about treatment and care without this knowledge.

Co-infection with HIV and hepatitis C has implications for care and treatment. In individuals who are also HIV positive, hepatitis C progresses two to three times faster than in individuals with hepatitis C alone. Decisions about HIV treatment may also be more complex because of interactions between the drugs used to treat HIV and hepatitis C and the side effects of treatment, particularly liver toxicity.
Hepatitis C can now be successfully treated in many cases, with treatment eradicating the virus from the body. However, people can be re-infected with hepatitis C after they clear the virus so it is important that people receive harm reduction counselling.

RESOURCES
The epidemiology of hepatitis C in Canada – CATIE fact sheet
Hepatitis C: an in-depth guide
Hepatitis C: key messages

SOURCES


3.2 REPORTABLE SEXUALLY TRANSMITTED INFECTIONS (CHLAMYDIA, GONORRHEA AND INFECTIOUS SYPHILIS)

KEY POINTS

- The number of new diagnoses of sexually transmitted infections is on the rise.
- The presence of some sexually transmitted infections increases the risk of transmitting and acquiring HIV.
- Given that HIV and sexually transmitted infections share some risk factors for infection, people diagnosed with a sexually transmitted infection should be tested for HIV.
- The consistent and correct use of condoms can reduce, but not eliminate, the risk of acquiring or transmitting a sexually transmitted infection.

Sexually transmitted infections (STIs) are caused by microorganisms that can be passed from person to person through sexual contact. In Canada, the three reportable STIs are chlamydia, gonorrhea and infectious syphilis. The consistent and correct use of condoms can reduce, but not eliminate, the risk of acquiring or transmitting these infections.

Chlamydia, gonorrhea and syphilis can all be transmitted through vaginal, anal or oral sexual contact and from mother to child during pregnancy or delivery.

It is possible to be re-infected by these STIs even after a previous infection is successfully cured.

Information on STIs is important to the fight against HIV in three ways. Firstly, an analysis of STI surveillance data can offer important insights into how quickly and to what extent the HIV epidemic may spread in different populations. Secondly, the presence of an STI can increase the risk of an HIV-negative person becoming infected with HIV and of an HIV-positive person passing HIV to others. Thirdly, some STIs can progress more quickly and be more difficult to treat in people who are HIV positive.

Chlamydia can affect the genitals and rectum. It is also known as the silent disease because up to 50% of infected males and 70% of infected females do not have symptoms and are unaware of the infection. Even without symptoms, however, chlamydia can lead to serious health problems, especially for women. In females, untreated chlamydia may lead to pelvic inflammatory disease, infertility and arthritis, while males may develop scarring in the urethra, arthritis and, occasionally, infertility. Chlamydia can be screened through a urine test or a urethral, throat, cervical or anal swab. Chlamydia infections can be cured by antibiotics.

Gonorrhea can affect the genitals, rectum, throat and eyes. Women infected with gonorrhea are more likely than infected men to have no symptoms, or their symptoms are likely to be milder. However, transmission of the bacteria can still occur without symptoms and, if not treated, health complications may develop: pelvic inflammatory disease, infertility, arthritis
and ectopic pregnancies in females and scarring of the urethra, potential infertility and arth-
ritis in males. Gonorrhea can be screened through a urine test or a urethral, throat, cervical or anal swab. Gonorrhea can be cured by a single dose of an antibiotic, but drug-resistant strains of the bacteria are becoming more prevalent.

Syphilis is a bacterial STI that attacks the body in three stages. Some people develop visible symptoms, such as painless sores and rashes, while others don’t. Symptoms may resolve without treatment, at which point the infection becomes latent. After many years in the latent stage, syphilis may progress into a tertiary infection and cause serious damage to the brain, heart, eyes and bones that can lead to death. Syphilis can be screened through a blood test. If syphilis is caught early, it can be cured by a simple antibiotic treatment.

As in other high-income countries, new diagnoses of STIs are on the rise in Canada. Between 2002 and 2011, the number of new diagnoses of chlamydia, the most common bacterial STI in Canada, increased by 62%. There were 100,044 new chlamydia diagnoses in 2011, with twice the number of reported cases in females than in males. The highest rates of new chlamydia diagnoses were in people aged 20 to 24. The distribution of reported cases varied geographically, with the highest rates of new diagnoses in the Northwest Territories, Yukon, Manitoba and Saskatchewan.

Between 2002 and 2011, the number of new gonorrhea diagnoses, the second most common bacterial STI in Canada, increased by 41%. There were 11,397 new gonorrhea diagnoses in 2011. The highest reported rates of gonorrhea were among males aged 20 to 24 and among females aged 15 to 24. The Northwest Territories had the highest rates of new gonorrhea diagnoses in Canada.

Between 2002 and 2011, there was a significant and worrisome increase in the number of new infectious syphilis diagnoses, the least common reportable STI. During this time period, new diagnoses increased by 232%. There were 1,757 new infectious syphilis diagnoses in 2011. Men accounted for 94% of these new diagnoses. Almost 70% of new infectious syphilis diagnoses occurred among Canadians aged 30 years and older in 2011. The distribution of reported cases varied geographically, with the highest rates in Quebec and New Brunswick. Syphilis outbreaks have been reported across Canada, in locations including Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, Montreal and the Yukon. However, affected populations have varied by locale and have included men who have sex with men, heterosexual populations, Aboriginal populations and people who use injection drugs.

Many STIs, including chlamydia and gonorrhea, can be asymptomatic (i.e., they do not produce symptoms). This makes it more difficult to ensure timely diagnosis. Given that STIs and HIV share routes of transmission, it is essential that people who have been diagnosed with either an STI or HIV be tested for the other infection(s) and provided with appropriate prevention counselling. It is imperative that co-infected individuals be aware of their status for two reasons: [1] people who know their status usually make behaviour changes that result in a
reduced transmission risk for others and (2) informed decisions about treatment and care cannot be made without this knowledge.

There have been increasing reports of antibiotic-resistant STIs (especially gonorrhea). In some populations and regions the rise in antibiotic-resistant infections has reduced treatment options. If new antibiotics are not developed, it may become increasingly difficult to control these infections and their complications.

RESOURCES
Canadian guidelines on sexually transmitted infections – Public Health Agency of Canada (PHAC)
Report on Sexually Transmitted Infections in Canada, 2011 – PHAC
Syphilis – CATIE fact sheet
Sexually transmitted infections and HIV transmission – CATIE fact sheet
STIs: What role do they play in HIV transmission? – Prevention in Focus

SOURCES
3.3 HEPATITIS B VIRUS

KEY POINTS

- An estimated 5% of Canadians have had an acute hepatitis B infection at some point in their lives.
- An estimated 0.7–0.9% of Canadians are chronically infected with hepatitis B.
- The primary mode of hepatitis B transmission in Canada is sexual contact.
- The consistent and correct use of condoms can reduce, but not eliminate, the risk of acquiring or transmitting hepatitis B.
- Testing for hepatitis B among HIV-infected people and for HIV among hepatitis B-infected people is essential.
- A vaccine is available to protect against all hepatitis B infections.

Hepatitis B can be transmitted through the blood and bodily fluids (e.g., semen, vaginal fluid, saliva) of a person with hepatitis B. Hepatitis B is about 100 times more infectious than HIV. The most common routes of transmission are the following:

- sexual contact
- sharing of needles and other drug-using paraphernalia (e.g., straws, pipes, spoons and cookers)
- sharing of personal care articles such as razors, scissors, nail clippers or toothbrushes
- exposure to blood or bodily fluids in the workplace
- transmission from a mother to a newborn infant

Hepatitis B is a liver disease caused by the hepatitis B virus. The early stage of infection lasts about six months and is called acute infection. The majority of adults are able to clear the virus from their body during acute infection and develop lifelong immunity. However, some people are unable to clear the virus and become chronically infected. Age is an important factor in the development of chronic hepatitis B infections: the likelihood of developing a chronic infection is 90% for infants, 25–50% for children aged one to five years; 5–10% for adolescents and 1–5% for adults. Hepatitis B chronic carriers are at risk of developing serious liver complications such as cirrhosis and cancer. About one-quarter of chronic carriers will develop chronic liver inflammation, which increases their risk of liver disease or cancer of the liver.

It is estimated that 5% of Canadians have had an acute hepatitis B infection at some point in their lives; an estimated 0.7–0.9% of Canadians are chronically infected with hepatitis B.

In 2012, the reported rate of acute hepatitis B infection was 0.6 per 100,000 Canadians (183 cases). This represents a decline from 1.0 cases per 100,000 in 2005 (304 cases). Sexual contact appears to be the most common route of transmission, followed by injection drug use and drug snorting.
In 2012, the reported rate of chronic hepatitis B infection was 12.0 per 100,000 (2,314 cases). This is down slightly from 2009, when the rate was 14.1 per 100,000 (2,631 cases).

There are several blood tests that can determine if someone has been exposed to hepatitis B and if an infection is acute or chronic. Most people infected with hepatitis B, both acute and chronic, experience few to no symptoms. This is especially true for young children. In adolescents and adults, between 30% and 50% of acute infections will present with clinical symptoms such as jaundice, fatigue, abdominal pain, nausea and joint/muscle aches. Chronic carriers generally do not experience any symptoms, but they will remain infectious for life if they do not receive treatment. This makes it more difficult to ensure timely diagnosis. Because HIV and hepatitis B share routes of transmission, it is essential that people who have been diagnosed with either HIV or hepatitis B be tested for the other virus and provided with appropriate prevention counselling. The risk of acquiring or transmitting hepatitis B can be reduced, but not eliminated, with the consistent and correct use of condoms.

There is no cure for chronic hepatitis B infections; however, treatments are available to reduce the hepatitis B viral load and protect against liver damage.

A vaccine is available to protect uninfected individuals against all hepatitis B infections. On the basis of recommendations from the Canadian Hepatitis B Working Group, all provinces and territories have implemented a school-based hepatitis B vaccination program for Canadians aged 9 to 13 years. It is estimated these programs could prevent 63% of acute infections and 47% of chronic infections. Additionally, the hepatitis B vaccine is recommended for all individuals who are at increased risk of hepatitis B infection, including people who use injection drugs and people who engage in high-risk sexual behaviours. This vaccine is safe for people living with HIV.

It is quite common for people living with HIV to be co-infected with hepatitis B because these two conditions share routes of transmission. Hepatitis B co-infection does not affect HIV disease progression or severity but it can limit treatment options for people living with HIV. HIV can have both positive and negative impacts on hepatitis B in co-infected individuals. HIV lessens the liver damage caused by hepatitis B because it weakens the immune response that destroys hepatitis B-infected cells in the liver. However, this weakened immune response also means that there are higher levels of the hepatitis B virus in the blood of co-infected people and these individuals are thus more infectious than people with hepatitis B mono-infection.

RESOURCES
Hepatitis B Infection in Canada – Public Health Agency of Canada (PHAC)
Hepatitis B: Get the facts – PHAC fact sheet

SOURCES
3.4 HUMAN PAPILLOMAVIRUS

KEY POINTS

- It is estimated that more than 70% of sexually active Canadians will have at least one infection with human papillomavirus in their life.
- Consistent and correct condom use can reduce, but not eliminate, the risk of getting or transmitting human papillomavirus.
- A vaccine is available that prevents certain types of human papillomavirus.
- The presence of human papillomavirus increases the risk of transmitting and acquiring HIV.
- Certain types of human papillomavirus can lead to cervical, penile and anal cancer.

National incidence and prevalence data do not exist for human papillomavirus (HPV) as it is not a notifiable disease in Canada. However, it is estimated that more than 70% of all sexually active Canadians will have at least one HPV infection in their lifetime. The Society of Obstetricians and Gynaecologists of Canada estimates that 10–30% of the adult population has HPV.

There are over 100 strains of HPV. About 40% of HPV strains are transmitted sexually. Some of these strains can cause anogenital warts, some can lead to cancer (e.g., cervical, penile, anal or throat cancer) and others have no known effect.

Consistent and correct condom use can reduce, but not eliminate, the risk of getting or transmitting HPV. This is because a condom can only protect the area it covers so it is possible to become infected by an uncovered anogenital wart. Two vaccines for HPV have been approved for use in Canada: Gardasil (approved in 2006) and Cervarix (approved in 2010). Both vaccines provide protection against two HPV types that cause 70% of all cervical cancers. In addition, Gardasil protects against another two HPV types that cause 90% of all anogenital warts. Gardasil is approved for use in females aged 9 to 45 years and males aged 9 to 26 years; Cervarix is approved for use in females aged 10 to 25 years. There are universal vaccination programs for school-aged females in every Canadian province and territory.

In 2012, the National Advisory Committee on Immunization expanded its recommendations on HPV vaccination to include males aged 9 to 26 years and men who have sex with men. However, not all provinces and territories have expanded HPV vaccination programs to include males.

The vaccines have very high efficacy in preventing the types of HPV infection for which they are indicated, but vaccinated individuals may still become infected with the other types of HPV. Therefore, it is important to continue screening men and women for precancerous and cancerous changes (e.g., Pap tests and digital rectal exams).
Most people infected with HPV remain asymptomatic and the infection usually resolves within two years. However, the infection may persist for many years in some individuals. Some types of HPV may lead to the development of anogenital warts, which are usually painless and flesh coloured and may grow in clusters in more than one location. Anogenital warts may not always be visible as they can be located internally (e.g., inside the vagina or rectum). Other HPV types associated with precancerous and cancerous changes do not present any noticeable symptoms, so regular health check-ups are essential.

There is no cure for HPV, but HPV often clears on its own. If it does not, there are HPV treatment options. For now, HPV treatment focuses on the symptoms of the infection. Symptoms include genital warts associated with certain HPV types (which don’t generally lead to cancers) and the precancerous changes sometimes associated with other types of HPV.

The presence of HPV increases the risk of transmitting and acquiring HIV. Individuals living with HIV are at an increased risk of co-infection with HPV. People living with HIV also have an increased risk for HPV-related complications. Women living with HIV tend to have multiple types of HPV and are more likely to have persistent HPV-related conditions, cervical dysplasia (precancerous changes to the cervix), and are at higher risk for cancers of the cervix, vagina, anus, mouth and throat. HIV-positive men are at an increased risk of developing HPV-related cancers of the penis, anus, mouth and throat. Compared with average HIV-negative men, the relative risk of anal cancer is 37-fold higher in HIV-positive men who do not have sex with men and 60-fold higher in HIV-positive men who have sex with men.

RESOURCES
HPV, cervical dysplasia and cancer – CATIE fact sheet

SOURCES
KEY POINTS

- There were 1,686 new active and re-treatment tuberculosis cases in Canada in 2012.
- The majority of new tuberculosis cases are among foreign-born Canadians and Aboriginal peoples.
- People with HIV are at higher risk for contracting tuberculosis.
- An estimated 1.6% to 5.8% of people living with HIV have active tuberculosis.
- People with HIV are more likely to progress from latent tuberculosis to active tuberculosis.
- People with HIV are more likely to develop extrapulmonary tuberculosis.
- Aboriginal people and immigrants to Canada from countries with higher rates of tuberculosis and HIV are at greater risk for co-infection.

*Mycobacterium tuberculosis* is a bacterium spread from a person with active, infectious tuberculosis (TB) of the lungs or airways to another person through the air. TB is not as contagious as some other airborne infections — exposure must be sustained for infection to occur. When exposure to TB occurs, the body’s immune system can sometimes eliminate the infection. If this does not occur, the bacterium can remain alive but inactive in the body, resulting in a latent TB infection. There are no symptoms associated with latent TB infection and it does not make the person infectious. However, latent TB infection can develop into active TB when the immune system is compromised or becomes weak. If this occurs, symptoms develop and the person becomes infectious to others.

TB can spread outside of the lungs through the blood to other parts of the body (extrapulmonary TB), such as the kidneys, bones and joints, intestines, brain and spinal cord. TB can also infect the entire body (disseminated or miliary TB). TB outside the lungs is usually not infectious to others because they do not spread TB into the air through coughing.

The Bacille Calmette-Guérin (BCG) vaccine partially protects against TB infection. In Canada, this vaccine is not universal and is only provided to infants of First Nations and Inuit communities with high rates of TB.

TB is diagnosed through a TB skin test. Positive results should be followed up with a chest X-ray and a sputum smear to determine if the individual has active TB. TB outside the lungs can be more difficult to diagnose because the chest X-ray and sputum culture will be negative. False-positive skin test results can occur if someone has been vaccinated with BCG or infected with other TB-like illnesses. A false-negative skin test can occur if the immune system is weak, such as in people with HIV. New blood tests are being investigated as alternative methods for diagnosing latent TB.
Both latent and active TB can be cured with antibiotics taken for at least six months. Individuals who fail to fully adhere to the drug regimen can develop drug-resistant TB, making their care more complicated and increasing the chances that they will transmit drug-resistant TB to others. Multi-drug-resistant TB results in increased complications for treatment and care. Extensively drug-resistant TB is almost universally fatal.

In Canada, there were 1,686 new active and re-treatment TB cases in 2012; an increase of 4% from 2011. The majority of all reported TB cases in 2012 were among foreign-born Canadians (64%). In addition, 23% were among Canadian-born Aboriginal people and 10% among Canadian-born non-Aboriginal people. There are pronounced disparities in TB rates between the provinces, with Nunavut having the highest rate of new reported cases in Canada.

People with HIV are at greater risk of contracting TB because of their weakened immune system (the risk is estimated to be between 20 to 37 times greater in people living with HIV than among those without HIV infection). Furthermore, people with HIV are 10 times more likely to develop active TB than people without HIV. People with HIV are also more likely to have active TB outside the lungs.

There is uncertainty regarding the level of co-infection in Canada. The estimates of the percentage of people with HIV who also have active TB range from 1.6% to 5.8%. The estimates of the number of people with TB who are also HIV positive range from 3.8% to 13.8%. Aboriginal people and immigrants to Canada from countries with higher rates of TB and/or HIV are at greater risk for co-infection. Research also suggests that the risk of developing TB increases with the duration of untreated HIV infection.

Because of the close links between HIV and TB, screening policies recommend testing of all TB-infected people for HIV and all HIV-positive people for TB. It is estimated that only 21% of HIV-positive people have been screened for TB.

RESOURCES
Tuberculosis & HIV—background information – CATIE News
Tuberculosis in Canada 2011 – Public Health Agency of Canada (PHAC)
Tuberculosis fact sheets – PHAC

SOURCES
4. HIV PREVENTION

4.1 THE SOCIAL DETERMINANTS OF HEALTH AND STRUCTURAL INTERVENTIONS

KEY POINTS

- The social determinants of health are the range of social, economic and environmental factors that determine the health status of individuals or populations.
- Social determinants of health play a role in HIV infection and the ability of people with HIV to seek treatment, care and support.
- Structural approaches to HIV prevention seek to change the social, economic, political and environmental factors that have an impact on resilience and vulnerability to HIV.
- Structural interventions should be part of a comprehensive prevention package.

The determinants of health are the range of social, economic and environmental factors that determine the health status of individuals or populations. The determinants of health as defined by the Public Health Agency of Canada include the following: income and social status, social support networks, education and literacy, employment/working conditions, social environments, physical environments, personal health practices and coping skills, healthy child development, biology and genetic endowment, health services, gender and culture.

Many factors in our society, including poverty, physical and sexual abuse, lack of education, homelessness, stigma, addiction, violence, untreated mental health problems, lack of employment opportunities, powerlessness, lack of choice, lack of legal resident status and lack of social support, play a role in HIV infection and the ability of people living with HIV to seek treatment, care and support. For example, poverty can lead to powerlessness in relationships and can have a negative impact on one's self-esteem and sense of belonging in the community. All of this can have an impact on one's judgement or can reduce one's ability to protect oneself from HIV.

The understanding that physical, social, cultural, organizational, community, economic, legal and policy factors within our environments can impede or facilitate HIV prevention efforts has led to an interest in structural approaches to HIV prevention. Structural interventions seek to change the context that contributes to an individual's resilience, vulnerability and risk. They include policies or programs that aim to change the conditions in which people live or community responses that bring about social or political change. These approaches address factors that affect the individual's behaviour, in contrast with behavioural approaches, which attempt to change the behaviour. Structural approaches to HIV prevention must be comple-
mented by other prevention programming, including interventions to influence individual
behaviour, to achieve an effective and continued reduction in HIV risk and vulnerability.

Examples of structural HIV prevention initiatives include the following:

- creation of a policy and legal environment that allows for needle
  exchange programs
- implementation of anti-stigma measures that reduce discrimination against
  people with HIV and vulnerable groups
- implementation of gender equality initiatives, including programs to enhance
  women’s education and economic independence and laws to combat
  sexual violence
- implementation of stable housing initiatives for injection drug users
- encouragement and funding for the active involvement of affected communities in
  developing and promoting HIV prevention interventions

Before structural interventions are implemented in a particular community, the social, eco-
nomic, political and environmental facilitators and barriers to HIV risk within that context
must be analyzed. Existing programs that have been successful elsewhere should then be
reviewed for possible adaptation and adoption in the community of interest.

Many structural features that affect HIV vulnerability are difficult to change because they are
depth entrenched in the social, economic and political fabric of society; therefore, address-
ing these factors is viewed as a long-term initiative within broader economic and social
development. Challenges in assessing the effectiveness of structural interventions have
meant that limited evidence has been gathered on the effectiveness of structural approaches
to HIV prevention. Most structural interventions involve large-scale elements that cannot be
easily controlled by experimental or quasi-experimental research designs. There is a need
for new research strategies to assess the impact of these interventions to create a foundation
of knowledge on structural interventions.

RESOURCES
What are the Social Determinants of Health? – National Collaborating Centres for
Public Health
Social Determinants of Health: The Canadian facts

SOURCES
   764–75.
4.1.1 Stigma and discrimination

KEY POINTS

- Stigma and discrimination can negatively impact HIV testing rates and the ability of people living with HIV to seek treatment, care and support.
- Results of a national study show that people living with HIV in Canada are still affected by stigma and discrimination.

Stigma is a form of prejudice that discredits or rejects an individual or group because they are seen to be different from ourselves or from the mainstream. When people act on their prejudice, stigma turns into discrimination. HIV-related stigma arises mostly from fear and ignorance about the disease and/or hostility and existing prejudices about the groups most affected by it (e.g., gay men). HIV-related discrimination is the unfair treatment of people on the basis of their actual or suspected HIV status. Discrimination against people living with HIV also extends to those populations at risk of HIV (e.g., men who have sex with men and people who inject drugs).

The stigma associated with HIV can lead to isolation, which can affect the quality of life of people living with HIV. Stigma and discrimination can also make people who are at risk of HIV less willing to be tested and those with HIV less able to seek treatment, care and support. Blaming people living with or affected by HIV for their situation or abusing them forces the epidemic underground, creating the ideal conditions for HIV to spread.

Canadians’ attitudes and opinions toward people living with HIV were assessed in a national study in 2012. In this study, 69% of respondents felt that people may be unwilling to disclose their HIV status because of the stigma associated with HIV. Furthermore, 55% felt that people with HIV may experience difficulty with basic activities such as finding housing, healthcare or employment because of the stigma. The results of the survey also show that stigma and discrimination still exist in Canada for people living with HIV. Seventy-one percent of Canadians have little tendency to stigmatize people living with HIV, although 22% hold a moderate degree of stigma toward people with HIV and another 7% exhibit a high level of stigma. Many community-based organizations have developed initiatives to reduce stigma and discrimination against people living with HIV and/or communities affected by HIV.

RESOURCE
HIV and AIDS stigma and discrimination – AVERT.org

SOURCES

4.1.2 Criminalization of HIV non-disclosure

KEY POINTS

- Canadian legislation requires that people living with HIV must disclose their HIV status before engaging in sexual behaviours that pose a “realistic possibility” of transmitting HIV to another person.
- More than 145 people who allegedly failed to disclose their HIV status have been charged with criminal offences in Canada. There is no evidence that criminalization of HIV non-disclosure acts as a deterrent against participation in behaviours that can transmit HIV.
- Criminalization of HIV non-disclosure may have many negative consequences.

According to the Supreme Court of Canada’s 1998 decision in R vs Cuerrier, people living with HIV have a legal duty to disclose their HIV status before engaging in sexual relations that pose a “significant risk” of transmitting the virus. In 2012, this duty was made more precise in two decisions from the Supreme Court. Those rulings stated that there is a duty to disclose before any sexual relations that pose a “realistic possibility” of transmission. In the decisions, the court ruled that individuals are not required to disclose their HIV status before having vaginal sex if a condom is used and the HIV-positive person has a “low” HIV viral load. In one of the decisions, the court considered an HIV viral load of 1,500 copies of the virus or fewer per millilitre of blood to be “low.” Whether 1,500 will become the standard for defining “low” is not clear. The court did not rule on disclosure before other types of sex, such as anal sex or oral sex.

Experts in HIV and criminal law have interpreted these decisions to mean that a person with HIV has a legal duty to disclose his or her HIV status before having:

- vaginal, frontal* or anal sex without a condom, regardless of viral load
- vaginal, frontal or anal sex when viral load is higher than “low,” even when a condom is used

The Supreme Court only ruled on specific instances of vaginal sex, so it is unclear whether a person with a “low” viral load has a legal duty to disclose his or her HIV status in the following circumstances:

- having anal sex or frontal sex with a condom
- engaging in sexual acts that have a lower risk of transmission, such as oral sex without a condom

* Frontal sex is what is commonly referred to as vaginal sex. This term is sometimes used by trans men or people on the trans masculine spectrum who feel more comfortable with this language.
• sharing injecting equipment (because this does pose a high risk of transmission, the Canadian HIV/AIDS Legal Network states that it is safest to assume that HIV-positive drug users also have a legal duty to disclose)

Criminal charges have been laid in Canada against people living with HIV because their behaviour posed a real or perceived risk for transmitting HIV, or the person’s positive status was considered a factor aggravating the seriousness of other charges. By the end of 2013 more than 145 people who allegedly failed to disclose their HIV status had been charged with criminal offences in Canada. The number of new charges has increased significantly since 2004. Some people with HIV have been convicted of serious criminal offences and sentenced to significant time in prison for failing to disclose their HIV status before engaging in risky behaviours. People have been charged and convicted of various crimes, including assault, common nuisance, criminal negligence causing bodily harm, murder and attempted murder, and uttering threats.

One of the main arguments for criminal prosecution is that it will act as a deterrent against behaviours that pose a risk for transmitting HIV to others. However, there is no good evidence to support this argument. The other main argument for criminal prosecution is that it punishes the individual for the behaviour.

However, the criminalization of HIV may have negative consequences that should be considered. For example:

• Imprisoning people living with HIV may not prevent HIV transmission. In fact, prisons are environments in which high-risk behaviours are common and where HIV prevention measures are limited. This may lead to the transmission of HIV within prisons and then out into the community after prisoners are released.
• Prevention interventions, such as education and risk-reduction counselling, may be better suited than criminalization for changing complex human behaviours related to sex and drug use.
• The fear of criminal prosecution may deter people from being tested. If someone doesn’t test for HIV, then they won’t know their HIV status and thus may believe that disclosure and/or onward transmission of HIV isn’t an issue for them.
• Extensive use of criminal prosecution could lead to a misperception by the public about the risk of transmission. This is especially relevant in cases where stiff sentences are imposed for behaviours associated with a negligible risk of transmission.
• The public attention given to criminal prosecutions may create a false sense of security that the law will protect people from HIV infection.
• Criminal prosecution can add to the stigma and discrimination faced by people with HIV. It places the burden of preventing HIV transmission on those living with HIV and portrays those living with HIV as potential criminals.
• Confidentiality of records can be breached when evidence is being gathered for a prosecution and the identity of the person living with HIV is revealed. This can lead to stigma and discrimination. It can also undermine trust in the healthcare system.
• Gender and power inequity can make the situation more complex. For example, some HIV-positive women may not be able to insist on condom use because of their social situations or may fear violence if they reveal their HIV status.

Across the country, advocates are responding to the increasing use of criminal prosecution. The Canadian HIV/AIDS Legal Network has partnered with European organizations and the Global Network of People Living with HIV (GNP+) to create a resource kit for advocates and lawyers to support people with HIV who are facing criminal charges. In Ontario, a team of academics and community members is pressing for the creation of prosecutorial guidelines that would define the circumstances under which criminal charges should be laid.

RESOURCE
Criminal Law & HIV Non-Disclosure in Canada – Canadian HIV/AIDS Legal Network

SOURCES
4.2 HIV PREVENTION INTERVENTIONS

4.2.1 HIV Transmission

Key Points

- Only five bodily fluids can contain enough HIV to transmit the virus: blood, semen (including pre-cum), rectal fluid, vaginal fluid and breast milk.
- HIV can be transmitted when one of these fluids from a person with HIV gets into the bloodstream of another person, either through broken skin or the mucous membranes.
- The two main ways that HIV can be transmitted are through anal or vaginal sex without a condom and by sharing needles or other equipment to inject drugs (including steroids).

Only five bodily fluids contain enough HIV to transmit the virus: blood, semen (including pre-cum), rectal fluid, vaginal fluid and breast milk.

HIV can only get transmitted when one of these fluids from a person with HIV gets into the bloodstream of another person, either through broken skin or the mucous membranes (the “wet” tissues of the body, such as the mouth, the vagina and cervix, the rectum, and the penis foreskin and urethra).

The two main ways that HIV can be transmitted are:

- through anal or vaginal sex without a condom
- by sharing needles or other equipment to inject drugs (including steroids)

HIV can also be transmitted:

- by sharing needles or ink to get a tattoo
- by sharing needles or jewellery to get a body piercing
- by sharing acupuncture needles
- to a fetus or baby during pregnancy, birth or breast-feeding

RESOURCE
HIV transmission: An overview – CATIE fact sheet
4.2.1.1 Biology of Sexual Transmission of HIV

KEY POINTS

- There are several steps from initial sexual exposure to HIV infection.
- Not all exposures to HIV lead to infection because of the body’s mucosal defences.
- Several factors can affect the biological risk of HIV transmission.
- Tearing and inflammation can compromise the mucosal defences and increase the risk of HIV infection.
- Viral load may be the most important factor determining whether an exposure leads to infection.

Research has provided improved insight into the steps from sexual exposure to HIV infection. Various biological factors can affect the risk of HIV transmission.

After a sexual fluid (pre-cum, semen, vaginal fluid or rectal fluid) containing HIV comes into contact with a mucous membrane (such as the mouth, the rectum, the penis foreskin and urethra, and the vagina and cervix), the virus must first overcome the protective defences of the mucous membrane before it is able to spread throughout the body to cause a permanent infection. HIV cannot always overcome the mucosal defences and therefore an exposure does not always lead to infection.

The protective defences of the mucous membrane include mucus (a slimy substance that covers the membrane, which can trap and kill germs), an epithelial cell layer (a tight layer of cells covering mucous membranes, which can prevent germs from entering the body), and immune cells in the mucous membrane, which can fight and clear germs that enter the body. For HIV to cause infection after an exposure, it must pass the mucus and epithelial cell layer and replicate for 1–3 days in the mucous membrane without being cleared by immune cells. 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.

The amount of HIV in the fluid to which an individual is exposed may be the most important factor determining whether transmission occurs. This is known as the viral load. A higher viral load can increase the risk of HIV transmission, with research suggesting that the very high viral load during early (acute) HIV infection can increase the risk of HIV transmission by up to 26 times.

Tearing and/or inflammation can increase the probability that transmission occurs. Tearing can allow HIV to pass the epithelial cell layer and enter the body more easily. Inflammation can increase the concentration of immune cells in the mucous membranes of the oral, genital and rectal tissues. These immune cells can serve as target cells that help HIV pass the epithelial cell layer and allow for faster replication once the virus enters the mucous membrane tissue.
Tearing and/or inflammation can happen as a result of irritation, friction, douching/enemas, brushing teeth/flossing, spermicides, vaginal conditions (such as bacterial vaginosis or yeast infections), and other infections (such as gum disease and sexually transmitted infections). While tearing and inflammation can increase risk, HIV transmission can also occur in their absence. HIV is able to pass through the epithelial cell layer even if no tearing or inflammation is present.

It has been suggested that hormonal changes resulting from the use of hormonal contraceptives or from pregnancy and the hormonal changes associated with the menstrual cycle may increase the risk of HIV transmission, but the evidence is inconclusive. Several mechanisms have been suggested for how hormonal changes may increase the risk of HIV infection, including thinning of the cervical and vaginal lining and increasing the number of HIV target cells at the vagina and cervix.

This improved understanding of the biology of HIV transmission and factors that increase risk has led to the development of new biomedical HIV prevention interventions (see Section 4.2.2). These reduce the risk of HIV transmission by attenuating factors that increase risk, by maintaining the mucosal defences or by intervening in the steps that HIV must complete to cause infection.

RESOURCES
From exposure to infection: The biology of HIV transmission – Prevention in Focus
CATIE webinar series: Sexual transmission of HIV

SOURCES
4.2.1.1.1 Per-act Risk of Sexual HIV Transmission

KEY POINTS

- Certain types of sexual activity generally carry a greater risk of HIV transmission than others.
- Receptive anal sex is associated with the highest risk of HIV transmission while oral sex is associated with the lowest.
- Each exposure to HIV is unique and carries its own unique risk for HIV infection.

Several research studies have attempted to calculate the risk of HIV transmission associated with one act of condomless sex with a person who is HIV positive. These have found that certain types of sex generally pose a greater risk of HIV transmission than others.

Receptive anal sex (where an HIV-negative person receives a penis into their anus), carries the highest risk of HIV transmission. Research suggests the risk may be 10 to 20 times higher than that for vaginal or insertive anal sex. This is because the epithelial cell layer lining the rectum is only one layer thick, making it more susceptible to tearing and inflammation. In contrast, the epithelial cell layers in the mouth, vagina and penis are several layers thick.

Studies suggest that receptive vaginal sex is approximately two times riskier than insertive vaginal sex, which may partially explain why females are at higher biological risk of HIV infection than males. This is because the vagina has a greater surface area than the penis and remains in contact with infected fluids for a longer time.

Oral sex is considered to carry a much lower risk than anal or vaginal sex. There are several biological reasons for this. Saliva contains enzymes that can inactivate HIV, the mouth and throat are covered by multiple layers of epithelial cells, and fluids that contain HIV do not stay in prolonged contact with possible routes of infection.

These comparisons of risk are based on research studies that look into average rates of transmission. They do not consider specific biological factors that can impact risk, such as viral load. Because risk involves multiple factors, it is very difficult to accurately quantify the risk from one act of condomless sex with someone who is HIV positive. Each exposure to HIV has a unique risk of transmission, determined by the complex interplay of the various biological factors involved.
RESOURCES

Putting a number on it: the risk from an exposure to HIV – *Prevention in Focus*

HIV transmission risk – Centers for Disease Control and Prevention

SOURCES


4.2.1.2 Communication of Risk

KEY POINTS

- Accurate and meaningful communication of risk is important to help people understand their risk of HIV transmission and make informed decisions about engaging in risky behaviours and seeking health care.
- Absolute risk can refer to risk from one specific exposure or it can refer to the risk of transmission over a given period of time.
- Relative risk tells us how much something, such as a risk factor or prevention strategy, can change a person’s risk.

Accurate and meaningful communication of risk is important to help people understand their risk of HIV transmission and make informed decisions about engaging in risky behaviours and seeking health care, such as engaging in HIV prevention strategies and undergoing HIV testing. However, an improved understanding of the biology of HIV transmission, in addition to the availability of new partially protective HIV prevention strategies, has made the communication of risk more complex.

Risk can generally be communicated in two ways: as a numerical expression or as a qualitative expression. People generally want to know two things about their risk:

1. They want to know their risk of becoming infected with HIV or transmitting HIV (also known as their absolute risk). For example, the average risk of HIV transmission during one act of condomless receptive anal sex is 1.4%; the risk of HIV transmission during condomless receptive anal sex is “very high.”
2. They want to know how much a risk factor or prevention strategy can change their risk (also known as relative risk). For example, HIV treatment can reduce the risk of heterosexual HIV transmission by up to 96%.

Exploring Absolute Risk

Absolute risk can refer to risk from one specific exposure or it can refer to the risk of transmission over a given period of time.

Risk from a Single Act

Because the risk of HIV transmission from an act of condomless sex depends on a wide range of factors, it is difficult to estimate and assess someone’s particular risk. Some researchers have managed to estimate the average risk of HIV transmission from an exposure to HIV through specific types of sexual activity. For example, the average risk of HIV transmission through one act of condomless receptive anal sex with a person who is HIV positive has been estimated to be 1.4%. However, these numbers represent the average risk of HIV transmission in the absence of biological factors (such as other sexually transmitted infections or
an undetectable viral load) that can increase or decrease risk. It is also important to keep in mind that regardless of how low a percentage may seem, transmission can occur after a single exposure to HIV.

Risk over Time

Just as the risk of HIV transmission from a specific exposure is unique to that sexual encounter, so too is the risk over a given period of time unique to each individual. This risk depends on how many times a person is exposed to HIV — which, in turn, depends on how often a person is having sex, the chances that their partner(s) have a different HIV status than they do, and how consistently and correctly they are using condoms — and the unique transmission risk from each exposure that occurs.

In HIV prevention, risk assessments tend to focus on a client’s risk from a single exposure to HIV and not their risk over time. This may lead people to underestimate their risk because risks that may be considered small in the short term can accumulate and become large in the long term. In other words, a client’s overall probability of HIV transmission increases the more they are exposed to HIV (a concept known as cumulative risk).

For example, the average risk of HIV transmission from one act of condomless vaginal sex is estimated to be 0.1%. Although a client may consider this risk to be low, this risk will grow if they continue to have condomless vaginal sex. After 100 exposures through condomless vaginal sex, the cumulative risk of HIV transmission becomes approximately 10%. This risk could be even higher if certain biological risk factors are present, for example, if one partner has a sexually transmitted infection or if the HIV-positive partner has a high viral load.

Exploring Relative Risk

Relative risk tells us how much something, such as a risk factor or prevention strategy, can change a person’s risk. For example, acute HIV infection can increase the risk of HIV transmission by up to 2500%; sexually transmitted infections and some vaginal conditions, such as bacterial vaginosis, can increase the risk of transmission by up to 700%; and being on treatment can decrease the risk of heterosexual HIV transmission by up to 96%.

The effectiveness of HIV prevention strategies and tools can vary greatly. How much a strategy reduces risk is most often communicated as a percent change. For example, HIV treatment can reduce the risk of heterosexual HIV transmission by up to 96%. However, the relative risk reduction associated with a prevention strategy is not a static value, but rather it can change depending on how well the strategy is used.

Furthermore, the relative risk reduction calculated in a study may not apply to everyone. Clinical trials enroll specific populations, and the results may not be directly transferable to other populations.
In addition, trials typically provide a comprehensive package of prevention services to participants, such as adherence and risk-reduction counselling, provision of free condoms, regular testing and treatment for sexually transmitted infections, all of which may improve the protection provided by a strategy. In the "real world" outside of a clinical trial, the same prevention strategy may be less effective because the comprehensive package of services is not readily available.

Clients not only want to know how much a strategy can reduce their risk, they also want to know their absolute risk of HIV transmission while they are using a strategy.

Relative risk numbers describe changes in risk but do not tell us what the risk is changed to. For example, we know that successful HIV treatment can reduce the risk of heterosexual HIV transmission by up to 96%. This means that the risk has been reduced significantly compared with its initial value; it does not mean that the risk has been reduced to 4%. In other words, relative risk is a comparison and does not say anything about the actual risk.

Consequently, it is difficult for people to use relative risk information by itself to assess their risk of HIV transmission while using a prevention strategy. Assessing this risk requires that people also have a good understanding of the context in which they are using the strategy and what their risk was to begin with, also known as their baseline risk.

It is possible for two people who are using the same risk-reduction strategy in the exact same way to have different absolute risks of HIV transmission, because of differences in their baseline risk. For example, a person who has a sexually transmitted infection may have a higher risk of HIV transmission while using a particular strategy than a person using the same strategy who has no sexually transmitted infections.

Simply because a strategy can significantly lower a person’s risk does not necessarily mean that their risk while using the strategy will be low. If a person has a very high baseline risk, their risk may still be high after they adopt a prevention strategy that significantly reduces their risk. For example, we know that the HIV transmission risk from receptive anal sex is up to 18 times higher per exposure than the risk from vaginal sex. Even though a strategy may be able to reduce the risk of HIV transmission by the same amount for both types of sex, the absolute risk may still be higher through anal sex because it poses a higher baseline risk than vaginal sex. Similarly, a person who is using a certain risk-reduction strategy and is having sex 10 times a week may have a higher risk of HIV transmission than someone who is using the same strategy but is only having the same type of sex twice a week.

Strategies and guidelines are needed to help frontline service providers communicate risk in a meaningful way. Several organizations have developed HIV transmission guidelines that integrate, and discuss, the latest scientific advancements. However, messages in these guidelines vary as understandings of risk are subjective and gaps in the research remain.
RESOURCES
Certainly uncertain: Challenges in communicating HIV risk – Prevention in Focus
Views from the front lines: Communicating risk – Prevention in Focus

SOURCES
4.2.2 Biomedical Prevention Interventions

KEY POINTS

- Biomedical prevention interventions aim to reduce the risk of HIV transmission by reducing the risk that an exposure happens or by reducing the risk associated with an exposure.
- Biomedical interventions do not, and are not expected to, provide full protection against HIV.
- All biomedical interventions include behavioural components and need to be used consistently and correctly to maximize their effectiveness.
- Biomedical interventions should be part of a comprehensive prevention package.

Biomedical prevention interventions aim to reduce the risk of HIV transmission by reducing the risk that an exposure happens or by reducing the risk associated with an exposure. Examples include the use of condoms, the use of vaccines, the use of microbicides, penile circumcision, treatment of sexually transmitted infections (STIs) and the use of anti-HIV drugs by HIV-negative people (post-exposure prophylaxis and pre-exposure prophylaxis) and HIV-positive people (effective treatment to prevent transmission).

Some interventions have been found to be effective in research studies and are at various stages of implementation. Improved efforts are needed to move these interventions into practice in a way that is safe and effective. Other interventions are still under development and continued research (including basic science, preclinical and early-phase research) is imperative to expand the number of potential biomedical HIV prevention interventions available to stop the spread of HIV.

The effectiveness of most interventions depends on how consistently and correctly they are used. Although certain interventions can be more effective than others, none are, or are expected to be, 100% effective even when used consistently and correctly. Biomedical HIV prevention initiatives (e.g., condom use) have historically been intertwined with behavioural prevention initiatives (e.g., counselling about safer sex) to help those at risk adopt appropriate strategies and maintain consistent and correct use. This pairing will need to continue.

As no strategy is fully protective, combining different prevention strategies will help improve overall protection against HIV. However, there is some concern that with the adoption of new biomedical interventions, people may increase their risk behaviours (and, subsequently, their risk of HIV transmission) because of a perceived decrease in risk when using the new intervention. Additionally, unlike condoms and clean needles, some new biomedical interventions are only effective against HIV and do not protect against other sexually transmitted or blood-borne infections. Unfortunately the presence of these other infections can then increase the risk of HIV transmission. Education, counselling and support are needed to help people make informed choices about prevention strategies that are appropriate for them. It is also
important to continue the delivery of existing behavioural prevention initiatives to ensure that people continue to practise behaviours that protect them from transmission of HIV and other sexually transmitted or blood-borne infections (such as condom use).

Although biomedical interventions may be able to reduce an individual’s risk of HIV transmission when used consistently and correctly, this does not necessarily mean the intervention will have an impact on the HIV epidemic in Canada. The population impact of biomedical interventions will depend on how many people use them, who uses them and how well they are used. Maximizing the impact of biomedical strategies will require them to be rolled out in combination with additional interventions to improve awareness and support access and consistent/correct use. Given that no strategy alone will be able to end the epidemic, all available biomedical interventions should be considered as part of a comprehensive approach to HIV prevention.

RESOURCE
Prevention Technologies – CATIE

SOURCE
4.2.2.1 Physical barrier methods

KEY POINTS
- Male (external) and female (internal/insertive) condoms provide protection against both HIV and sexually transmitted infections (STIs).
- Condoms reduce the risk of someone being exposed to bodily fluids that may contain HIV.

Male and female condoms are physical barrier methods that provide protection against HIV, sexually transmitted infections (STIs) and pregnancy. The male condom, made of latex, polyurethane or polyisoprene, is put onto the penis. (Lambskin condoms, which are made from sheep’s intestines, do not provide protection from HIV or STIs.) The female condom, made of polyurethane or nitrile, is inserted into the vagina. Since bacteria and viruses cannot penetrate latex, polyurethane, polyisoprene or nitrile, condoms provide a barrier that can prevent the mouth, vagina, penis and rectum from being exposed to the following:

- bodily fluids (such as semen, vaginal fluid and rectal fluid) that can contain HIV and STIs
- skin infected by an STI (such as herpes and syphilis sores and genital warts)

The effectiveness of condoms in reducing the transmission risk of STIs may vary depending on the STI. For infections transmitted through genital and rectal discharge (e.g., gonorrhea and chlamydia), condoms provide an effective barrier to exposure because the organisms are too large to penetrate latex, polyurethane, polyisoprene or nitrile. For STIs that cause genital ulcers (e.g., syphilis and herpes), the degree of protection is lower because these infections are transmitted through contact with genital skin and mucosal surfaces. This contact can occur in areas that the condom does not cover. It is hypothesized that female condoms may provide extra protection against these STIs because the condom covers a wider surface area, including some of the external genitalia. However, no research evidence exists to confirm this hypothesis.

Research studies have estimated the effectiveness of consistent male condom use at preventing HIV transmission to be 80%. However, it is unlikely that all participants in these studies actually used a condom for every act of sex. Also, the effectiveness of condoms may have been compromised by incorrect use among study participants. Therefore, the effectiveness of consistent and correct condom use is probably much higher than 80%. If condoms are used correctly and do not break, slip or leak, then they are virtually 100% protective as no exposure can occur.

The female condom has not been directly assessed for its effectiveness against HIV transmission. However, it has been shown to provide levels of protection against STIs similar to those provided by the male condom. Although the female condom was designed for use during vaginal sex, surveys shows that some people use it for anal sex and some governmental and
non-governmental organizations promote its use for this type of sex. The effectiveness of female condoms for anal sex has not been determined.

Male and female condoms have several advantages over other HIV prevention strategies. Condom use is the only strategy that provides protection against both STIs and HIV, which is important because STIs can increase the risk of HIV transmission. Condom use can also reduce the risk of unintended pregnancy. Given that condoms reduce risk by preventing an exposure to HIV, they are less affected by other factors that can increase transmission risk from an exposure, such as anal sex, STIs or a high viral load. The risk of HIV transmission while using some non-condom HIV prevention strategies may be higher when these factors are present. Also, condoms are cheaper and less toxic than anti-HIV drug-based prevention strategies.

Condom use has several drawbacks. There are many ways condoms can be used incorrectly, and research shows that incorrect use is common. It is difficult for people to use condoms consistently, for a variety of reasons. For example, condom use can be difficult to negotiate with a partner and a condom needs to be available at the time of sex; condom use can make it difficult for some people to maintain an erection; it can be uncomfortable and decrease sexual pleasure and intimacy; and it does not allow conception. Female condoms are more expensive than male condoms and there are additional issues related to their acceptability, such as issues with insertion, appearance and comfort.

Condoms should be provided in combination with interventions to improve consistent and correct use, such as counselling and education on how to use a condom properly. Helping clients/patients find, and use, condoms that have better “fit and feel” may increase their effectiveness. In studies, men who report poor “fit and feel” of male condoms are more likely to report condom breakage and slippage, decreased sexual pleasure and difficulty reaching orgasm, irritation of the penis and condom-associated erection problems. They are also more likely to report removing the condom early and that condoms dried out during sex.

RESOURCES

Condoms for the prevention of HIV and STI transmission – CATIE fact sheet
What is a female condom? – The Canadian Public Health Association

SOURCES

4.2.2.2 Treatment as an Aid to Prevention

Anti-HIV drugs have a role to play in reducing the transmission of HIV in the following ways:

- Effective treatment of people living with HIV
- Post-exposure prophylaxis (PEP)
- Pre-exposure prophylaxis (PrEP)

4.2.2.2.1 Effective treatment of people living with HIV

**KEY POINTS**

- Effective treatment of people living with HIV can reduce the viral load to undetectable levels and lower the risk of HIV transmission.
- There may still be a risk of HIV transmission when the viral load is undetectable because there is still virus in the bodily fluids.
- Treatment as a form of prevention is an important population-level approach to prevention.

Viral load is one of the most important factors influencing the transmission risk from an exposure. Research shows that the higher the viral load, the greater the risk. Viral load tests detect the amount of HIV in the blood of someone living with HIV and have shown that HIV treatment can reduce the level of the virus in the blood to undetectable levels (it should be noted that the virus is still present — the tests just can’t detect it). Viral load tests in Canada cannot detect HIV if there are fewer than 40 copies per millilitre. Given that antiretroviral therapy can also reduce HIV in the vaginal fluid, seminal fluid and/or rectal fluids, it can reduce the chance of transmitting HIV through sex.

In a landmark randomized controlled trial known as HPTN 052, treatment reduced the risk of HIV transmission among heterosexual serodiscordant couples (where one partner is HIV positive and the other is HIV negative) by 96%. In this study, the couples were mostly having vaginal sex and were provided with additional services that helped maximize the effectiveness of treatment, including ongoing adherence and prevention counselling, free condoms, viral load testing, and sexually transmitted infection testing and treatment. It is hard to know how much treatment will reduce the risk of HIV transmission in the “real world” where these additional services may not be available. Until recently, it was also unclear how much the results from HPTN 052 applied to populations that mostly have anal sex, such as some men who have sex with men. However, in March 2014, results from a preliminary analysis of an ongoing study (known as the PARTNER study) provided the first direct evidence that treatment can also significantly reduce the risk of HIV transmission through anal sex.

Although transmission risk was greatly reduced in the HPTN 052 study, there is a general consensus that HIV transmission is still possible when the viral load is undetectable,
because treatment does not eliminate the virus from the body and even when the viral load is undetectable there may still be virus in the bodily fluids that can transmit HIV. There is research showing that HIV can sometimes be detected (although at lowered levels than in people who are not on treatment) in the genital and rectal fluids of some people who have an undetectable viral load in the blood. This may increase the risk of HIV transmission, although it is unclear by how much. The presence of a sexually transmitted infection in someone living with HIV can also increase the amount of virus in the genital and rectal fluids (but not necessarily in the blood). This may also increase the risk of HIV transmission.

The prevention benefits of treatment in individuals may translate to a reduction of HIV transmissions at a population level. The idea is that if enough people living with HIV are on successful treatment, the average amount of the virus circulating in the community (also known as community viral load) should be reduced. This reduction in average community viral load may result in fewer transmissions. Evidence suggests that treatment may be having a prevention impact in heterosexual populations in low-to-middle-income countries. Evidence also suggests that treatment may be having an impact on prevention in populations that use injecting drugs. However, “treatment as prevention” does not appear to be happening among many populations of gay men and other men who have sex with men. In most high-income countries, HIV incidence among men who have sex with men is remaining stable or continuing to increase despite increases in treatment coverage and decreases in community viral load. However, the evidence we have so far is observational and thus should be viewed cautiously because of the limitations of this type of research.

There are several barriers that prevent people living with HIV from being on successful treatment. The series of steps and services that an HIV-positive person must be engaged in to be on successful treatment (HIV testing, linkage to care, retention in care, initiation of treatment, treatment adherence) is also known as the HIV treatment cascade. The concept of an HIV treatment cascade has emerged as a way to identify gaps in this continuum of services.

These gaps mean that the proportion of people living with HIV who are on treatment and have an undetectable viral load is quite low in some areas. For example, it is estimated that only 19% to 28% of people living with HIV in the United States have an undetectable viral load. There are currently no official estimates for Canada; however, preliminary data suggest numbers in Canada may be similar to those in the United States.

Increasing the proportion of people living with HIV who have an undetectable viral load – and maximizing the prevention benefits of treatment – will require the development of interventions to:

- increase the number of people who know they are HIV positive through HIV testing
- increase the number of people who are linked to care after HIV diagnosis
- ensure that people are supported to remain in care after being linked
• improve access to antiretroviral therapy for people who are in care
• ensure that people are supported and counselled to determine when they are ready and eligible to start treatment

In Canada, there are several small- and large-scale initiatives to improve engagement of people living with HIV in the HIV treatment cascade (such as the STOP HIV/AIDS Project in British Columbia). These have the potential to both improve health and reduce HIV transmission. However, excitement about the potential for treatment to prevent HIV transmission has led to concerns that there will be pressure on people to get tested, enter care and start treatment before they are ready. As these initiatives move forward, it is important to ensure that HIV-positive people are ready to begin the treatment cascade and that they have a full understanding of the potential risks and benefits.

A particular concern is that people living with HIV will be offered antiretroviral therapy before it is medically warranted, solely for the population’s benefit for HIV prevention. Starting individuals on treatment earlier than medically necessary may potentially increase the likelihood of poor adherence, virological failure, mortality, side effects and drug resistance. However, more and more research is showing that earlier initiation of HIV treatment is beneficial for people living with HIV, on the basis of clinical outcomes and the theory that chronic HIV inflammation may be damaging to the body over the long term.

The European AIDS Treatment Group along with NAM have developed an international community consensus statement endorsing the use of treatment as prevention which addresses many of these concerns.

Although treatment may have an important role to play in HIV prevention, it should be considered as one part of a comprehensive approach to HIV prevention.

RESOURCES
HIV viral load, HIV treatment and sexual HIV transmission – CATIE fact sheet
Insight into HIV transmission risk when the viral load is undetectable and no condom is used – CATIE News
Treatment and viral load: what do we know about their effect on HIV transmission? – Prevention in Focus
Treatment as prevention: do the individual prevention benefits translate to the population level? – Prevention in Focus
Expert Consensus Viral Load and Risk of HIV Transmission: Summary – Institut national de santé publique du Québec
Antiretroviral Treatment as Prevention (TasP) of HIV and TB – World Health Organization (WHO)
SOURCES


4.2.2.2 Post-exposure prophylaxis (PEP)

Post-exposure prophylaxis (PEP) is the prescription of HIV drugs after an actual or suspected exposure to HIV to prevent HIV transmission.
PEP must be administered as soon as possible, within 72 hours, after a suspected exposure to HIV.
PEP is a regimen of combination HIV drugs that needs to be taken every day for four weeks.
There is limited evidence regarding the level of protection that PEP provides.
PEP is the standard of care for exposures of healthcare workers (occupational exposures) but not sexual exposure and other types of exposure such as through injection drug use (non-occupational exposures).
There is varying availability of PEP across Canada for non-occupational HIV exposure.
Post-exposure prophylaxis (PEP) is the use of HIV drugs after an actual or suspected exposure to HIV to try to prevent HIV transmission. It should be started as soon as possible after exposure and involves taking medications every day for 4 weeks.

There is limited evidence that suggests providing PEP after a potential exposure to HIV can help reduce, but not eliminate, a person's risk of HIV infection. Firstly, in monkey studies, taking PEP for one month protected almost all of the monkeys against infection by HIV-like viruses. Secondly, two studies that compared the number of HIV infections in people who took PEP with the number of infections in those who did not provided some evidence that taking PEP may reduce the likelihood of HIV transmission after a recent exposure by between 80% and 90%. However, these two studies were observational (not randomized, placebo-controlled trials) and the findings are therefore not definitive.

There is no direct evidence to support the use of combination HIV therapy instead of monotherapy, but because of the success of combination therapies in treating HIV infection, combination therapies are generally used for PEP. In experiments on monkeys, PEP was most effective when taken within 24 hours of exposure, but infections were sometimes prevented when PEP was taken as long as 72 hours after exposure. On the basis of this evidence, guidelines suggest that PEP should be started as soon as possible but can be prescribed up to 72 hours after the exposure.

Factors that can limit the effectiveness of PEP include poor adherence to daily pill taking, longer time to PEP initiation and continued exposures to HIV while taking PEP (PEP is only meant to reduce the risk from a single exposure).

The potential risks of PEP include drug toxicity and side effects, interactions with other medications and the development of drug-resistant strains of HIV (if infection occurs). A person who wants to use PEP will have their HIV risk assessed as this therapy is only meant to be used after a potential high-risk exposure. Also, an HIV test will need to be performed to confirm that the person starting PEP is HIV negative.

To improve the impact of PEP, additional prevention interventions should be used to help a person reduce their risk of infection during and after PEP use. There is some evidence to indicate that providing more comprehensive risk-reduction counselling to high-risk individuals accessing PEP can lead to a reduction in HIV transmission after PEP.

PEP is the standard of care for healthcare workers who have experienced a potential exposure to HIV. Accessibility of PEP for non-occupational exposures (consensual sex, sexual assault, sharing needles) varies across Canada. It is available at some hospital emergency departments and health clinics. Even in locations where PEP is available, there are very few health promotion campaigns and therefore awareness is low among both potential PEP users and doctors. The high cost of PEP, potentially more than $1,000 for a full course of medications, could also limit access to PEP. However, the drugs used for PEP may be covered by some private and public health insurance plans in Canada. Currently, only people who are aware of
PEP, can either pay for or get coverage for the cost of PEP, and know where to access it can benefit from PEP.

RESOURCES

Post-exposure Prophylaxis (PEP) – CATIE fact sheet
Can we prevent infection with HIV after an exposure? The world of post-exposure prophylaxis (PEP) – Prevention in Focus
The PEP Program at Clinique l’Actuel – Programming Connection

SOURCES


4.2.2.2.3 Pre-exposure prophylaxis (PrEP)

KEY POINTS

- Pre-exposure prophylaxis (PrEP) involves the regular use of HIV drugs started before an HIV exposure and continued throughout periods of risk.
- HIV drugs used for PrEP may be in the form of a pill, vaginal/rectal gel or injection.
- Microbicides that contain antiretrovirals are a type of pre-exposure prophylaxis.
- Only one type of PrEP (daily use of oral Truvada pills) has been approved for use in the United States. This drug has not been approved for use in Canada or other parts of the world.
- Truvada for use as PrEP may be available through off-label prescriptions from Canadian healthcare providers.
Pre-exposure prophylaxis (PrEP) involves the regular use of HIV drugs beginning before a potential exposure to HIV and continuing through periods of risk. It aims to reduce the risk of transmission from ongoing exposures to HIV. The HIV drugs used for PrEP may be in the form of a pill taken orally, a gel applied vaginally or rectally (also known as an antiretroviral-based microbicide) or an injection. There are a number of possible dosing strategies, such as the use of HIV drugs daily, intermittently/occasionally (a few times a week) or coitally (before and after sex).

Findings from several randomized, placebo-controlled clinical trials indicate that the daily use of Truvada as PrEP can reduce the risk of HIV infection in different populations, including gay men and other men who have sex with men, people who use injection drugs and heterosexual populations. Importantly, these trials also indicate that the effectiveness of PrEP increases the more adherent people are to taking their pill every day.

The effectiveness of PrEP against HIV infection has ranged widely in clinical studies, from 0% to 75%. However, not all participants in these clinical trials took their pills daily and there is a general consensus that PrEP was ineffective in two trials because overall adherence to daily pill-taking was very low. Promisingly, observational analysis of trial results shows that the effectiveness was much higher [perhaps greater than 90%] among participants whose drug levels in their blood suggest they were taking their pills every day.

On the basis of these results, oral Truvada has been approved for use as a form of PrEP by the US Food and Drug Administration. The Centers for Disease Control and Prevention in the United States has released guidelines for healthcare providers for use of PrEP with men who have sex with men, people who use injection drugs and heterosexual populations. Although PrEP has not been approved in Canada, Truvada for use as PrEP may be available through “off-label” prescriptions from healthcare providers who are willing to prescribe it. Some surveys suggest that a small number of people are already using PrEP in Canada.

People wanting to access PrEP will need an HIV test and will be assessed to determine their risk for HIV. PrEP should be seen as a tool for HIV-negative people at high risk for HIV infection. People using PrEP will require ongoing monitoring for side effects and toxicity and regular testing for HIV and sexually transmitted infections. PrEP use also needs to be combined with ongoing adherence support and additional prevention services, such as risk-reduction counselling, access to condoms and linkage to other support services to reduce their risk.

Although Truvada is one of the better tolerated medications, it can still cause some mild side effects (nausea, headache, diarrhea and weight loss) as well as decreases in bone density and kidney function. Drug resistance is another concern and may develop if a person is unknowingly HIV positive when starting PrEP or becomes infected while using PrEP. However, PrEP studies suggest that drug resistance, side effects and toxicity are experienced infrequently. PrEP should only be prescribed by a doctor; obtaining HIV drugs from elsewhere, such as friends, people at parties or the Internet, could be dangerous.
It is unclear what kind of impact PrEP could have on the HIV epidemic in Canada. The mixed results from randomized controlled trials suggest its impact will be limited among people who may have trouble adhering to daily use. Access is another issue. Doctors have to know about PrEP and be willing to prescribe it off label. The cost of PrEP, between $700 and $1000 per month, may also limit access. Not all public and private health insurance plans will cover the cost. Also PrEP does not prevent transmission of other sexually transmitted or blood borne infections.

RESOURCES
Pre-exposure prophylaxis (PrEP) – CATIE fact sheet
Pre-exposure Prophylaxis (PrEP) – Centers for Disease Control and Prevention (CDC)

SOURCES
4.2.2.3 Treatment of Other Sexually Transmitted Infections

**KEY POINTS**

- Sexually transmitted infections (STIs) increase the likelihood of transmitting and acquiring HIV.
- The presence of STIs may increase the risk of HIV transmission while an individual is using some biomedical prevention interventions.

Rates of reportable sexually transmitted infections (STIs; chlamydia, gonorrhea and infectious syphilis) are on the rise in Canada. STIs increase both an HIV-negative’s person risk of getting HIV and an HIV-positive person’s risk of transmitting HIV.

For HIV-negative individuals, inflammation plays an important role in how STIs increase the risk for HIV acquisition. Inflammation increases the concentration of “activated” immune cells in the area infected with the STI. Although the inflammatory response is meant to help fight the STI, HIV likes to infect some of these recruited immune cells, also known as CD4 cells. Also, HIV finds it easier to infect, and replicate in, CD4 cells that are “activated.” Therefore, if someone has an STI in the mouth, genitals or rectum, and that area is exposed to HIV, the higher concentration of “activated” CD4 cells facilitates HIV infection, replication and spread throughout the body. Some types of STIs also increase the risk of HIV transmission through ulcers (e.g., herpes and syphilis), which create “holes” or ways for HIV to enter the body through the mouth, genitals or rectum.

For HIV-positive individuals, inflammation also plays a key role in HIV transmission. Inflammation “activates” and recruits more immune cells to the infected genitals or rectum. Given that some of the immune cells in a person living with HIV are already infected with HIV, the inflammatory response brings more HIV (contained in the infected immune cells) to the site of the STI in the genitals or rectum. HIV also replicates, or makes additional copies of the virus, more quickly in immune cells that have been “activated” through inflammation than in immune cells that are not “activated.” Consequently, more HIV enters the body fluids in that area. Research shows that the greater the amount of virus in the bodily fluids of a person living with HIV, the higher the risk of passing HIV to someone else.

Individuals with STIs who are using some biomedical prevention interventions (those that aim to reduce the transmission risk from an exposure) may have a greater likelihood of transmitting HIV to someone else. Also, while available biomedical prevention strategies reduce the risk of HIV transmission, they do not reduce the risk of STI transmission. Therefore, routine screening for STIs is recommended while using these strategies.

It is generally believed that the management of STIs should be an essential component of a comprehensive approach to HIV prevention. Reducing the infection rates and prevalence of STIs, through improved STI prevention, diagnosis and treatment, may reduce the number of new HIV infections that occur in Canada each year.
However, research studies investigating whether improved management of STIs can reduce the number of new HIV infections have produced mixed results. All of these studies were carried out in heterosexual communities in Africa, and most showed that STI prevention and treatment is not a successful HIV prevention strategy. The reason for this finding is not completely clear, but some researchers believe this may be the result of poor study design or other factors, such as:

- the stage of the epidemic in the population being studied (STI management may be more effective in curtailing an emerging epidemic than one that is more generalized throughout the population)
- poor adherence to STI treatments among the study participants
- ongoing residual inflammation that remains during/after STI treatment

Despite the lack of conclusive research evidence for improved STI prevention, diagnosis and treatment, initiatives should be developed to increase early detection and treatment of STIs as part of a comprehensive HIV prevention initiative. STI screening and treatment programs could be expanded in higher transmission areas, HIV testing should always be recommended for individuals with an STI, and HIV and STI prevention programs should work together in an integrated fashion.

RESOURCES

Canadian guidelines on sexually transmitted infections – Public Health Agency of Canada

SOURCES

4.2.2.4 Penile Circumcision

KEY POINTS

- Penile circumcision has the potential to reduce the risk of heterosexually acquired HIV infection in men by up to 66%.
- Penile circumcision is not recommended as a major initiative in Canada.

Penile circumcision is the surgical removal of all or part of the foreskin of the penis. An estimated 30% to 34% of adult men worldwide are circumcised. The Canadian Pediatric Society states that circumcision is a non-therapeutic procedure (not medically necessary) for newborn boys in Canada. In 2006, around 32% of male infants were circumcised in Canada.

There are several biological explanations as to why male circumcision may reduce the risk of HIV infection for men who have sex with women:

- The inner part of the foreskin contains many special immunological cells that are prime targets for HIV. Some of these are removed with the foreskin, and the remaining cells become less accessible to HIV because of scarring.
- Ulcers on the foreskin from sexually transmitted infections can facilitate HIV transmission; by removing the foreskin, the likelihood of acquiring these ulcers is reduced.
- The foreskin may suffer abrasions or inflammation during sex that makes it easier for HIV to pass through the skin into the body.

The results of three randomized, placebo-controlled trials in Africa found that male circumcision can reduce the risk of getting HIV by up to 66% for men who engage in heterosexual sex (couples in these studies reported having mostly vaginal sex). Observational studies suggest that male circumcision may also reduce HIV incidence in female sexual partners; however, in an African circumcision trial of heterosexual serodiscordant couples where the HIV-positive partner was male, there was no protective effect against HIV transmission to the female partner. Nonetheless, if the overall infection rate in men decreases, this may mean that fewer women would be exposed to HIV over time.

Additional observational studies investigating the effect of male circumcision on populations of men who have sex with men have had inconsistent results. This may be partly explained by the fact that only insertive partners are expected to have a prevention benefit from circumcision. However, men who have sex with men may be involved in both insertive and receptive sexual roles, confounding the results of these studies. Although research suggests circumcision may provide some protection for HIV-negative gay men who only have insertive anal sex, the degree of protection (if any) has yet to be determined.

This body of evidence has resulted in the World Health Organization and UNAIDS recognizing circumcision as an effective population-level intervention for the prevention of heterosexual
HIV acquisition in men. Both agencies recommend voluntary adult penile circumcision in countries with a high prevalence of HIV throughout the population and where there is a low prevalence of circumcision. Penile circumcision for HIV prevention is currently being scaled up in several countries in Eastern and Southern Africa.

Given that there is no convincing research evidence that male circumcision can protect men who have sex with men and women, and the epidemic in Canada is not generalized to the entire population, the implementation of policies to increase male circumcision in Canada is not warranted.

RESOURCES
Penile circumcision to reduce the risk of HIV infection – CATIE fact sheet
Male circumcision – U.S. Centers for Disease Control and Prevention (CDC)

SOURCES
4.2.2.5 Microbicides

**KEY POINTS**

- Microbicides have the potential to prevent the sexual transmission of HIV.
- Early first-generation microbicides did not show any success in clinical trials.
- The research focus is now on microbicides that contain HIV drugs (second-generation microbicides).
- Limited evidence has found one microbicide to be partially protective against the transmission of HIV.
- Rectal microbicides are at earlier stages of development and have yet to be tested in large-scale studies.
- No microbicide has been approved for use in any part of the world.

Microbicides are products that have the ability to prevent the sexual transmission of HIV and other sexually transmitted infections when applied topically. A variety of microbicides that could be delivered in many forms — gels, creams, suppositories, films, sponges or rings — are being researched. These products would be applied topically to the vagina or rectum or inserted like a suppository into the vagina or rectum to prevent infection with HIV and other sexually transmitted infections.

There are various ways in which microbicides could prevent infection. Some microbicides could provide a physical barrier that keeps HIV and other disease-causing germs (e.g., viruses, bacteria) from reaching the target cells. Other microbicides could act by maintaining a protective environment (e.g., acidic pH) in the vagina. Still others could kill or disable germs.

The benefit of microbicides is that they could offer the receptive partner a means to prevent HIV transmission that does not require the consent or even the knowledge of the insertive partner. Microbicides could also have an additional benefit: non-contraceptive microbicides could allow both HIV-negative and HIV-positive women to conceive more safely with a lower risk of becoming infected or infecting their partner.

Six first-generation microbicides did not show any success in preventing HIV infection in clinical trials. In fact, three of these microbicides may have even increased the risk of acquiring HIV because of damage caused to the vaginal mucous membrane. All of these microbicides were used vaginally by women. Currently, there are no first-generation microbicides in large-scale clinical trials.

Researchers are now looking at second-generation microbicides that contain HIV drugs. HIV-drug-based microbicides can be considered a type of pre-exposure prophylaxis. They would be more expensive than first-generation microbicides and carry additional risks, such as toxicity, side effects and potential drug resistance.
A study known as CAPRISA 004 looked at a vaginal microbicide containing tenofovir. It involved a gel containing tenofovir that was applied vaginally before and after sex. Compared to a placebo, the tenofovir gel reduced the overall risk of HIV transmission among heterosexual women by 39%. Among a subgroup of women who reported using the gel more consistently, the level of protection increased to 54%. Surprisingly, the gel also reduced the risk of genital herpes. The same vaginal gel was evaluated in a study known as VOICE. In that study the gel was applied daily and it was not found to be effective. It is believed the lack of protection was due to low adherence to daily gel use among the study participants. Additional studies looking at this gel are ongoing and will need to be completed before regulatory approval of the gel can be considered.

Although the focus thus far has been on vaginal gels, a tenofovir gel specially formulated for rectal use is also in development although it has not yet been evaluated for effectiveness against HIV infection.

No microbicide has been approved for use in any part of the world.

RESOURCES
Microbicides for HIV prevention – AVAC fact sheet
Rectal Microbicides 101 – International Rectal Microbicide Advocates (IRMA)

SOURCES
4.2.2.6 Vaccines

KEY POINTS

- There are two potential types of HIV vaccines: preventative and therapeutic.
- HIV vaccine development has been difficult because of the complexities of the interaction between the virus and the immune system.
- One preventative vaccine has been found to provide some protection in a clinical trial but the level of protection was low.
- An effective HIV vaccine is not expected to be widely available in the foreseeable future.

Vaccines can be used as prevention or as therapy. The term vaccine is most commonly used to describe products that are designed to prevent individuals from getting a disease (known as preventative vaccines).

An ideal preventative vaccine would be 100% effective; however, many of the vaccines available today for other diseases have a much lower effectiveness: between 70% and 90%. There are also public health benefits to a vaccine: if enough people are vaccinated this creates “herd immunity,” where the vaccinated part of the community can provide protection to the rest of the community.

An HIV preventative vaccine would reduce the risk of someone acquiring HIV. The development of an effective preventative HIV vaccine has proven to be difficult because of the complexity of the virus and the body’s response to the virus. First, HIV attacks the immune system immediately, and with a conventional vaccine it would take too long for the immune system to develop a response to prevent infection. Second, the point of first contact with HIV is usually in the wet tissues of the mucosa in the anus, penis or vagina. Researchers are only just beginning to understand how the immune system works in mucosal tissues, so it will take many years before they can fully map the complex changes that HIV triggers in those tissues. Third, the virus mutates, constantly changing its outer layer, making it especially difficult for the immune system to keep up with these changes. An additional challenge is that HIV gets into cells of the immune system and elsewhere deep inside the body, essentially allowing it to hide from the immune system.

All vaccine candidates have failed to provide protection against HIV, except for the combination of two vaccines known together as the Thai prime-boost vaccine. The three-year study that tested this vaccine required participants to receive six injections over six months. After one year, there were 60% fewer infections among those who received the vaccine than among those who received a placebo. However, this difference decreased to 31% by the end of three years. This level of protection was not high enough to warrant approval of this vaccine for use in any part of the world.
Additional studies of the Thai vaccine are planned. Researchers are investigating whether giving additional shots, after the initial six-month vaccine regimen, can boost the immune system and prevent the level of protection from decreasing over time. If the extra booster shots can maintain the level of protection at around 60%, there may be a stronger case for making the vaccine widely available. Additional studies will also enroll men who have sex with men to determine if the vaccine can provide protection against transmission through anal sex. Other possible preventative vaccines are also being studied; however, these may not proceed to larger trials for several years.

Therapeutic vaccines do not prevent infection but instead are designed to boost the immune response of people with HIV, allowing individuals with the virus to delay or prevent the onset of advanced HIV disease. There are no therapeutic HIV vaccines approved for use, but they are being tested in clinical trials to find out if they are safe and effective in treating people with HIV. Unfortunately, the Thai prime-boost vaccine did not provide a therapeutic benefit to study participants who received the vaccine and became infected during the trial.

RESOURCE
AIDS vaccines: An introductory fact sheet – AVAC fact sheet

SOURCES
4.2.3 Behavioural Prevention Interventions

KEY POINTS

- Behavioural interventions for HIV prevention (health promotion) seek to influence knowledge and attitudes, influence people’s perceived risk of acquiring HIV, and provide people with the motivation and skills they need to change their behaviours.
- Behavioural interventions need to remain a main priority for HIV prevention.
- Behavioural prevention strategies need to be delivered with sufficient coverage, intensity and duration to be effective.
- Behavioural prevention interventions are necessary but are not sufficient to eliminate HIV transmission — they need to be combined with structural and biomedical approaches in ways that address the needs of local epidemics.
- Behavioural prevention interventions should be part of a comprehensive package of HIV prevention strategies.

HIV transmission is the result of human social behaviour: sexual and drug-use behaviours cause almost all HIV transmissions in Canada.

Since the beginning of the epidemic, the widespread delivery of effective strategies to change behaviour has been central to HIV prevention efforts in Canada and around the world. Behavioural HIV prevention interventions seek to influence knowledge and attitudes, to influence people’s perceived risk of acquiring HIV, and to provide the motivation and skills people need to change their sexual and drug-using behaviours that place them at risk for HIV. Behavioural strategies have various goals, including the following: attempting to delay the onset of first intercourse, decreasing the number of an individual’s sexual partners, increasing the correct and consistent use of condoms, providing counselling and testing for HIV, encouraging adherence to biomedical strategies for HIV prevention and decreasing the sharing of drug-using equipment.

Behavioural strategies for HIV prevention can be targeted at multiple levels: individuals, couples, families, peer groups or networks, institutions and entire communities. Within households, HIV prevention programs can address the stigma of HIV and sexuality and promote open discussion. At a community level, programs can seek to increase the value associated with safer behaviours, support community members to reduce their risk and reinforce new norms.

Behavioural strategies attempt to motivate behaviour change in individuals and groups through a range of educational, motivational, peer-group, skills-building and community approaches.

However, human behaviour is complex and thus it is challenging to achieve widespread and sustained behaviour changes. Despite the challenges, behavioural interventions for HIV prevention need to remain a main priority for HIV prevention. Although behavioural interven-
tions are necessary, they are not sufficient to eliminate HIV transmission: they need to be combined with structural and biomedical approaches.

To improve the effectiveness of our prevention efforts we need to ensure that all HIV behavioural interventions address the needs of the specific local epidemic. If they are to be effective, these efforts also need to reach a sufficiently large number of people (i.e., there must be sufficient coverage), elicit behaviour change (i.e., they must be delivered at a sufficient intensity) and sustain the change for long periods of time (i.e., they must be delivered for a sufficient length of time).

A mix of communication channels should be employed to disseminate clear and simple messages about risk-reduction and health-seeking options. People must be provided with options on how to reduce their risk, as there is no one-size-fits-all approach. Community involvement in the development and dissemination of messages is essential. Achieving the right mix of behavioural approaches depends on understanding the target population and adapting existing programs to meet the needs of the population.

It is not easy to change behaviours: there are many impediments to successful programming. The stigma and discrimination experienced by the populations at greatest risk for infection have undermined support for these programs. Addressing stigma and discrimination is important to the success of HIV prevention initiatives in Canada. Efforts to implement certain programs have met with social, political and/or ideological disputes; these hamper our ability to implement effective programming. Sexual and drug-using behaviours are diverse and are usually conducted in private, making it difficult for those developing programs to fully understand these behaviours, to locate those most at risk and to motivate behaviour change. Behaviour change, while possible, is difficult to sustain over long periods of time. Our efforts must remain strong to ensure a sustained behavioural response. Finally, efforts to build effective programming are hampered by a lack of understanding of the social context and the other factors that affect whether an individual engages in risk-reduction behaviours.

Existing models of behavioural interventions are often based on cognitive-behavioural theories that assume that individuals will take steps to avoid risks if they are fully informed and sufficiently motivated — that is, that they can exercise personal “agency” when confronted with HIV-associated risk. However, individual behaviour is often heavily influenced by individual, socioeconomic, cultural and environmental factors. Employing structural approaches in combination with behavioural approaches will increase the effectiveness of behavioural interventions.

RESOURCE
Integrating HIV Prevention with Care: Behavioural Interventions in the Clinical Setting – National Collaborating Centre for Infectious Diseases
SOURCES
4.2.3.1 Sexual health promotion

KEY POINTS

- Sexual health promotion is the delivery of strategies to promote sexual health.
- Promotion of sexual health behaviours can involve complex interventions that address issues related to empowerment, negotiation skills, self-esteem and sexual health knowledge.

The World Health Organization defines sexual health as:

“...a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled.” [WHO, 2006]

According to this definition, sexual health is an important part of everyone’s overall health and well-being. It is essential that sexual health promotion activities encompass more than just prevention of HIV and other sexually transmitted infections but include activities that affect such things as healthy relationships, self-esteem, intimacy and pleasure.

Behavioural approaches to sexual health promotion attempt to motivate individuals and groups to change their behaviour through a range of educational, motivational, peer-group, skills-building and community normative approaches. Promotion of sexual health behaviours can involve complex interventions that address issues related to empowerment, negotiation skills, self-esteem and sexual health knowledge. Behavioural strategies to reduce the sexual transmission of HIV include attempts to delay the onset of first intercourse, decrease the number of sexual partners and increase the correct and consistent use of condoms.

Emerging evidence suggests that the favourable behaviour changes seen in individuals during the first year following exposure to a behavioural prevention intervention can fade over time. At the population level, positive behaviour changes often fail to endure because these changes require a level of diligence — for example, consistent condom use — that is often difficult to maintain over the course of people’s everyday lives and within their social contexts. This supports the need for ongoing messaging and support programming.

RESOURCES

Canadian guidelines for sexual health education – Public Health Agency of Canada.
SexualityandU.ca – Society of Obstetricians and Gynecologists of Canada
SOURCES
4.2.3.2 Harm reduction

KEY POINTS

- Harm reduction refers to policies, programs and projects that aim to reduce the health, social and economic harms associated with the use of drugs.
- The current Canadian anti-drug strategy fails to support harm reduction strategies.
- Recommendations for best practices for harm reduction programs in Canada have been developed.

Harm reduction refers to policies, programs and projects that aim to reduce the health, social and economic harms associated with drug use. Harm reduction does not exclude abstinence as a goal for individuals, but rather provides people with more pragmatic choices, such as limiting their substance intake. Harm reduction helps to engage people and motivate them to make contact with treatment and healthcare providers if and when they are ready. Examples of harm reduction include needle distribution, substitution therapy (such as methadone maintenance), outreach, crack-pipe distribution, user empowerment projects, safer drug-use sites, heroin prescription and social justice projects.

Evidence-based harm reduction efforts, such as needle-exchange programs, have proven to be a significant tool for reaching populations that use drugs by improving their health and stemming the spread of HIV, hepatitis C and other infectious diseases. Moreover, these programs build the trust necessary for users to engage in addiction treatment and recovery programs. People who inject drugs should play an important role in the development and delivery of HIV and hepatitis C prevention programming.

In 2007, the Canadian government unveiled the new national anti-drug strategy. This new strategy is based on three pillars: prevention (preventing drug use before it happens), treatment (treatment for drug use) and enforcement (prosecution for drug producers and dealers). The Canadian drug strategy has been criticized for missing a pillar: harm reduction. The fact that this pillar was not included in the new strategy represents a shift in political ideology to a more conservative approach to many social issues, including drug use.

In 2013, Canada’s only legal supervised injection site marked its 10th anniversary. Extensive research conducted on its impact has shown that it has had remarkable successes including reductions in HIV transmissions and overdose deaths.

In 2013, a Canada-wide team of researchers, service providers, policy-makers and people with lived experience developed an updated and comprehensive set of best practice recommendations. The document, called Best Practice Recommendations for Canadian Harm Reduction Programs that Provide Service to People Who Use Drugs and are at Risk for HIV, HCV, and Other Harms, includes recommendations on needle and syringe distribution, handling and disposal.
of used drug equipment, safer drug use education, distribution of safer crack cocaine smoking equipment, opioid overdose prevention (education and naloxone distribution) and more.

RESOURCE
Best Practice Recommendations for Canadian Harm Reduction Programs

SOURCES
4.2.3.3 School-based education

**KEY POINTS**

- There is a high level of sexual risk-taking among Canadian youth.
- Alarming rates of sexually transmitted infections among youth could be an early warning sign of sexual risk-taking that could lead to an increase in HIV infection.
- Comprehensive school-based programs can reduce the behaviours that put youth at risk for sexually transmitted infections including HIV.
- Most Canadian educational jurisdictions have developed “learning outcomes” for sexual health education but very few have developed curricula for school-based sexual health education.
- School-based education that is age appropriate, evidence-based, and acknowledges differences in sexual orientation and gender diversity is essential.

The majority of Canadians are sexually active by the time they are 24 years old. Of youth aged 15 to 24 years, 66% were sexually active and 32% had not used a condom the last time they had sex. Although HIV prevalence remains relatively low among youth, increases in the prevalence of sexually transmitted infections in recent years show an alarming trend of sexual risk-taking in this population. The prevalence of common sexually transmitted infections such as chlamydia, gonorrhea, and human papillomavirus is highest among youth and young adults. These infections are a marker of risky sexual behaviour, which could lead to an outbreak of HIV within this age group.

There is a large body of strong evidence showing that sexual health education can have a positive impact on sexual health behaviours. In Canada, the Sex Information and Education Council of Canada (SIECCAN) has been a leader in research and advocacy for comprehensive school-based sexual health education. Consistent with international evidence, SIECCAN has also found that comprehensive sexual health education can lead to delayed initiation of sex, a reduced number of sexual partners, increased condom and contraceptive use and reduced frequency of sex. Evidence has also shown that comprehensive HIV programming does not hasten the initiation of sex or increase the frequency of sex. By contrast, abstinence-only programs that intentionally do not teach young people the importance of consistent condom and contraceptive use do not delay the initiation of sex, increase the return to abstinence or reduce the number of sexual partners.

Given that schools are the only formal institutions that have contact with nearly every young person in Canada, they are uniquely positioned to provide youth with comprehensive sexual health education before sexual debut and during the teen years. School-based sexual health education can reach a wide range of potentially at-risk youth and play an important role in the primary prevention of HIV.
Despite the evidence for the efficacy of school-based sexual health education and an overwhelming level of support for the provision of HIV/AIDS education in schools by students, parents and teachers, there is much to be done to improve the availability and quality of sexual health and HIV education in schools. Although most Canadian educational jurisdictions have defined learning outcomes related to sexual health, very few have developed curricula to support teachers in working with their students to meet these outcomes. The Canadian AIDS Society undertook a national survey on the state of HIV curricula in 2008. The results provide clear evidence of the need for increased HIV education in schools. Almost one third of students reported that they had not received any HIV education in the past year and just over one quarter reported having received less than one hour. At the same time, educators (77%) and students (59%) rated the quality of the HIV education that was available as fair or poor. Almost 30% of educators reported that they had no experience teaching HIV education and 65% had received no training.

In 2008 the Public Health Agency of Canada (PHAC) released *Canadian Guidelines for Sexual Health Education* to outline principles for the development and evaluation of comprehensive, evidence-based sexual health education in various settings, including schools. One of the primary goals of the guidelines is to offer clear direction to assist local, regional and national groups and government bodies to develop and improve sexual health education policies, programs and curricula that address the diverse needs of all Canadians.

The guidelines offer a framework for the development of effective, comprehensive and inclusive sexual health education. In particular, the guidelines are based on the principle that sexual health education should be accessible to all people and that it should be provided in ways that are “age-appropriate, evidence-based, scientifically accurate, rights-based, culturally sensitive, respectful and inclusive of sexual orientation and gender diversity.” The guidelines support inclusive sexual health education that addresses the needs of all students, including those who are gay, lesbian, bisexual, transgendered and questioning, and note that an understanding of sexual diversity issues is an important component of sexual health education.

**RESOURCES**

Making the case for School-Based Sexual Health Education – SexualityandU.ca

Canadian guidelines for sexual health education – Public Health Agency of Canada

Sexual health education in the schools: Questions and answers – Sex Information and Education Council of Canada

**SOURCES**

4.2.3.4 Prison-based prevention

KEY POINTS
- Condoms are available in federal prisons but not in all provincial or territorial prisons.
- Clean needle distribution is not available in any prison system in Canada.
- Programs to initiate methadone treatment for drug users upon incarceration are only available in the federal system and some provincial systems.
- In the remaining provinces and territories, methadone is only available if the inmate was on methadone before incarceration.

Condoms were made available to inmates of Canada’s federal prisons in January 1992 in an attempt to prevent the sexual transmission of HIV in prisons. Correctional Services of Canada mandates that non-lubricated, non-spermicidal condoms, water-based lubricants and dental dams are made available discreetly to inmates in three locations within each institution and in all private family visiting units. The availability of condoms varies in provincial and territorial prisons. Some provinces have made condoms available but only through prison health services; prisoners may be reluctant to pick up or request condoms for fear of being identified as engaging in homosexual activity and thus being subject to discrimination.

In 1996, bleach was made available to clean drug-injecting equipment in the federal prison system in an attempt to prevent HIV transmission among inmates who inject drugs. Bleach is available in some provincial prison systems but not all. However, compared to the provision of clean needles, the provision of bleach is a suboptimal intervention for preventing HIV transmission and bleach does not prevent hepatitis C transmission through used syringes. In 2004, the World Health Organization concluded that the “evidence supporting the effectiveness of bleach in decontamination of injecting equipment and other forms of disinfection is weak.” Despite this finding, federal, provincial and territorial prison systems do not provide clean needles to inmates.

In 2005, the Correctional Services of Canada and the Public Health Agency of Canada launched a safer tattooing pilot project in six federal prisons across Canada. The pilot program educated inmates about safe tattooing and trained selected inmates on infectious diseases and infection prevention. Selected prisoners were also trained to perform tattoos on fellow inmates. In 2006 the project was cancelled. Prisoners now do not have access to safe and sterile tattooing equipment in any Canadian prison.

Methadone maintenance treatment (MMT) is a form of substitution therapy for opiate use. Methadone has been proven to reduce drug injecting and sharing of drug-use equipment. Only the federal system and one provincial system have formal methadone programs to start opiate users on MMT in prison. In the remaining provinces and territories, MMT is only available if the person was on MMT before incarceration.
RESOURCE
Promoting HIV and hepatitis C prevention programming for prisoners in Canada – Canadian HIV/AIDS Legal Network

SOURCES
4.2.3.5 Positive prevention

**KEY POINTS**
- There is an increasing acknowledgement that prevention initiatives should include people living with HIV.
- Positive prevention should not place the burden of responsibility for reducing HIV transmission on people living with HIV but instead recognize it as a shared responsibility.

Positive prevention, sometimes called “poz prevention,” was originally developed by and for people living with HIV as a way of helping to reduce HIV transmission. For many years, HIV prevention campaigns were directed mainly at HIV-negative people, focusing on how they could protect themselves from HIV. This approach neglected to consider how people with HIV can contribute to HIV prevention.

In 2009, the Global Network of People Living with HIV (GNP+) and UNAIDS organized an international technical consultation to develop *Positive Health, Dignity and Prevention*, which highlights and links the issues of HIV treatment, prevention, support and care within a human rights framework.

Positive prevention aims to empower people living with HIV and their sexual partners, promote healthy sexual relations between HIV-positive and HIV-negative sexual partners, improve the conditions that contribute to strengthening the sexual health, well-being and reproductive rights of people living with HIV, and lower the rates of new HIV and other sexually transmitted infections.

Positive prevention is based on the principle of health promotion. It actively promotes the physical, mental and sexual health of people living with HIV and emphasizes that they should receive the treatment, support and services they require to enhance their health. These initiatives empower people living with HIV to be actively involved in the prevention response rather than be passive targets of prevention messages. It is important that all positive prevention efforts adhere to the GIPA [Greater Involvement of People Living with HIV/AIDS] and MIPA [Meaningful Involvement of People Living with HIV/AIDS] principles.

Positive prevention should be seen as part of a comprehensive and broad prevention strategy and it should not be used to shift the responsibility of prevention solely to people living with HIV.

**RESOURCES**
- A primer on positive prevention – *Prevention in Focus*
- Positive Prevention – *Managing your health*
Poz prevention: knowledge and practice guideline for providing sexual health services to gay men living with HIV in Canada – Toronto People with AIDS Foundation, Ontario’s Gay Men’s Sexual Health Alliance, CATIE

Positive health, dignity and prevention: a policy framework – GNP+, UNAIDS

Recommendations for HIV Prevention with Adults and Adolescents with HIV in the United States, 2014 – Centers for Disease Control and Prevention (CDC)

SOURCES
4.2.4 Fertility Options and Prevention of Vertical Transmission

KEY POINTS

- Pregnancy planning and fertility options are allowing many HIV-positive people in Canada to conceive while reducing the risk of horizontal transmission (HIV transmission to their partners).
- The rate of vertical transmission of HIV (transmission from parent to child) is exceedingly low in Canada.
- If HIV is diagnosed before or early in pregnancy, HIV treatment is effective in preventing transmission to the newborn infant.
- Because HIV can be transmitted through breast milk, it is recommended that HIV-positive mothers in Canada not breastfeed/chestfeed.*

With advances in HIV treatment, increasing numbers of HIV-positive people in Canada are considering having children. Transmission to partners (horizontal transmission) and transmission to the child (vertical transmission) are two significant concerns when considering HIV and conception. Canadian HIV pregnancy planning guidelines, developed in 2012, provide guidance on options to reduce horizontal transmission when a couple tries to conceive. Options include timed natural conception (taking into account HIV viral load in the HIV-positive partner and other factors), home insemination, sperm washing and more advanced techniques such as intra-uterine insemination, in vitro insemination and intra-cytoplasmic sperm injection. These advanced techniques require access to professional fertility services, and there is a movement to increase access to these services.

HIV can be passed from parent to child before birth, during labour and delivery and through breastfeeding. In the absence of preventative HIV therapy, between 15% and 30% of infants born to HIV-positive women will become infected with HIV during pregnancy and delivery; a further 5% to 20% will become infected through breastfeeding.

HIV treatment is most effective in preventing HIV transmission if it is used throughout pregnancy. However, this is only possible if the mother is diagnosed before or during prenatal care. A shorter course of HIV treatment before delivery, although not as effective, can also help reduce the risk of transmission. In both cases, HIV treatment is also given to the infant after birth. Women are advised to not breastfeed but rather to use formula. Finally, if a woman is receiving optimal HIV treatment with complete viral load suppression, she may deliver vaginally (with the option of a Cesarean section). For women who are not receiving optimal HIV treatment, an elective Cesarean section is offered. It should be noted that under Canadian law a woman has the legal right to make all therapeutic decisions on behalf of the child until it is born.

* Chestfeeding refers to nursing an infant using one’s chest. It is a term sometimes used by people on the trans masculine spectrum who feel more comfortable with this language.
Almost all pregnant women in Canada access prenatal care, making this an opportune time to provide counselling regarding HIV testing. However, some groups of women, such as women who inject drugs, immigrants and refugees may not receive adequate prenatal care. To decrease the number of HIV-positive babies born to mothers who are unaware that they themselves are HIV positive, all Canadian provinces and territories have developed universal testing policies for pregnant women. These are designed to increase the likelihood that physicians will offer HIV testing to pregnant women. Some provinces offer opt-in approaches while others offer opt-out approaches. Under the opt-in approach, women typically are provided with pre-test counselling and must consent specifically to an HIV test. Under the opt-out approach, women are notified that an HIV test will be included in the routine prenatal tests and that they may refuse testing.

Between 1984 and 2011, 3,567 infants born in Canada were perinatally exposed to HIV. In 2011, 230 infants were exposed to HIV perinatally. The number of infants confirmed to be HIV positive has decreased in Canada since the advent of HIV treatment. In 2011, only 1.6% of infants exposed to HIV perinatally were confirmed to be HIV positive; neither these infants nor their mothers had received HIV treatment to prevent transmission.

Barriers to preventing mother-to-child transmission include lack of antenatal care, lack of HIV testing in pregnancy, undiagnosed seroconversion (new HIV infection) in pregnancy and lack of HIV treatment or suboptimal therapy in pregnancy (e.g., poor adherence, late start of HIV treatment).

RESOURCES
Canadian HIV pregnancy planning guidelines – Society of Obstetricians and Gynaecologists of Canada
You can have a healthy pregnancy if you are HIV positive – Voices of Positive Women, CATIE
Pregnancy Planning Information for HIV+ Women and Their Partners – Women’s College Hospital
Information for Women who are Diagnosed with HIV during Pregnancy – Women’s College Hospital
Information for HIV+ New Moms – Women’s College Hospital
Pregnancy Planning Information for HIV+ Men and Their Partners – Women’s College Hospital

SOURCES

5. HIV TESTING AND DIAGNOSIS

KEY POINTS

- An estimated 25% of people living with HIV in Canada are not aware of their infection.
- The earlier the HIV diagnosis, the better the chance to improve or maintain health.
- Once diagnosed with HIV, people are significantly more likely to take steps to protect their partners from acquiring HIV.
- As many as 50% of new HIV infections may be transmitted from someone in the early stages of their HIV infection.
- Newer HIV testing technologies can identify HIV infection within 10 to 14 days of an exposure.
- There is a need to promote early testing and increased recognition of HIV seroconversion symptoms.

As of 2011, it was estimated that 17,980 (25%) people living with HIV in Canada were not aware of their infection. This is important because research suggests that as many as 50% of new HIV transmissions in certain populations (such as gay, bisexual and other men who have sex with men) are transmitted from someone with early (acute) HIV infection. Since the infection is so new, many may be unaware they are living with HIV.

Early diagnosis of HIV confers many benefits to the individual. Benefits can come through medical care such as from prophylaxis (preventative treatment) for opportunistic infections, treatment of sexually transmitted infections, treatment for substance use and mental health conditions and, when appropriate, the use of HIV treatment. Other benefits can include access to social services for help with needs such as income supports and housing.

Early diagnosis can also have public health benefits. Research has shown that when people know they are infected with HIV they are more likely to take steps to protect their partners from HIV than when they are unaware. It is now also widely acknowledged that people living with HIV who are on treatment and achieve an undetectable viral load are significantly less likely to transmit HIV.

The first test for HIV became available in Canada in 1985. This test detected HIV antibodies in the blood. However, for the test to work, HIV antibodies had to be present. After HIV infection, it could take up to six months for antibodies to develop that could be detected by the early tests (referred to as the window period). If someone is “in the window period,” there is a chance that even though they have HIV, tests are unable to detect the antibodies and will give a negative result.
Newer generations of HIV antibody tests are more sensitive and have reduced the window period to 34 days for 95% of the population, with the window period for the remainder of the population being three months.

There are also new HIV tests that can detect the virus (instead of the antibodies the body produces). The p24 antigen test detects an HIV protein called p24. This test can detect HIV in the blood 10–14 days after infection. However, the protein peaks at three to four weeks after exposure and is undetectable after five to six weeks. Therefore, this test is useful for people who may have been recently infected. Some tests combine the antigen and antibody tests.

Another test, called NAAT or NAT, detects HIV RNA as early as 7–14 days after infection. Unlike the p24 antigen test, the NAT test will always remain positive as long as HIV remains in the person’s blood.

In Canada, HIV testing may be available in three forms:

1. **Nominal testing** is the most widely used method of HIV testing. The name of the person being tested and identifying information are sent to the laboratory with the sample, and test providers are legally obligated to report HIV-positive results to public health officials.
2. **Non-nominal testing** is similar to nominal testing except the service provider uses a code when sending a sample to be tested. Public health officials are only notified of the identity of the person tested if the result is positive.
3. **Anonymous testing** entails no collection of any personal identifying information about the person being tested. Only epidemiological data are sent to public health officials, regardless of whether results are positive or negative. Therefore, anonymous testing may increase the number of people coming forward for testing and counselling because of the high level of confidentiality it confers.

If someone tests positive for HIV in Canada, it is a legal requirement that public health officials be notified and an attempt be made to trace and notify any sexual or drug-sharing partners that may have been put at risk for HIV infection. There are three approaches to partner notification. The HIV-positive person may notify partners of their potential exposure to HIV, a public health practitioner may notify the partners or a combination of these approaches may be used.

In cases where the public health practitioner notifies, the name of the person who tested positive is not provided to contacts. Despite this anonymity, partner notification may act as a barrier to testing if people do not want their partners to be notified in the event of a positive result. In some provinces, anonymous testing is one way around this barrier (where it is available).

In 2013, the Public Health Agency of Canada released guidelines that include recommendations to address barriers to testing and to improve HIV testing in Canada. The guidelines
acknowledge that targeted testing among populations at highest risk of HIV infection needs to continue but that this approach should be complemented with a less targeted testing approach among populations that may be perceived as being at lower risk. A major recommendation in the guidelines is that care providers take a more active approach and offer HIV testing to patients as part of routine medical care, whether or not they have asked for a test. The guidelines also encourage care providers to use a flexible approach and tailor the extent of pre- and post-test counselling to each client’s unique needs and situation, although providing extended counselling is preferred. More specifically, the guidelines state that briefer counselling may be more appropriate for certain clients or patients, such as pregnant women in labour, well-informed patients and people who have already received counselling with a prior HIV test.

The new testing guidelines also encourage the integration of HIV testing into other services, particularly those that test for infections that can be transmitted the same way as HIV and/or negatively affect the health of people living with HIV. Integrating HIV testing into these other services provides additional opportunities to test for HIV and identify undiagnosed individuals.

The new guidelines also see HIV testing as an important opportunity to educate individuals at risk of acquiring HIV and those who are newly diagnosed and link them to additional services. For example, all people tested for HIV, regardless of their results, should be provided with information and linked to services to help them reduce their risk of acquiring or transmitting HIV. Therefore, in preparation for HIV testing, the guidelines suggest that providers contact care and support organizations to obtain referral resources for clients. Research shows that people living with HIV who are linked to and engaged in care have better health outcomes than those who are not. Therefore, newly diagnosed individuals should be referred to an infectious disease specialist who treats HIV.

British Columbia introduced pilot testing programs as part of the STOP HIV/AIDS Project. Provider-offered testing was extended to physicians in family practices and hospitals to include offers of testing to all adults who have ever had sex but who have not had an HIV test in the last year. In the pilot program, the routine offer of HIV testing in hospitals proved to be cost effective, with the percent positivity at each of the four pilot hospitals integrating testing into care ranging between 0.3% and 0.8% (which is above the STOP Project’s cost-effectiveness threshold of 0.2%). In April 2013, the pilot projects were rolled out across British Columbia.

Another example of an initiative to improve access to testing is rapid point of care (POC) testing. The Ontario government began rapid POC testing for HIV in 2006 and extended it to 50 anonymous test sites, public health units, sexually transmitted infection clinics and community health centres across Ontario in 2007. POC testing is now also available in some centres in British Columbia, Alberta, Saskatchewan, Manitoba and Quebec. POC testing has increased the number of individuals testing for HIV in Ontario for several reasons:

- It is rapid, taking 20 minutes in total, including the pre-test counselling, receipt of the test result and post-test counselling.
• It is anonymous, which is especially important for those who fear the repercussions of their HIV status being known.
• It is free.

In 2012, the US Food and Drug Administration approved the first home-based HIV testing kit for sale in pharmacies. Research indicates that certain populations (such as men who have sex with men) are accepting of home-based testing and its introduction may increase the number of people who are aware of their HIV status. In Canada, no home-based testing kit has been approved by Health Canada. Service providers across Canada do not appear to be embracing home-based testing, often because of concerns about lack of pre- and post-test counselling and the fear that people who test positive at home will not be linked to care and support services. Additionally, current home-based HIV tests are not as accurate as the HIV tests approved in Canada. Incorrect test results from home-based testing may cause some people to falsely believe they are HIV-negative.

RESOURCES
HIV Screening and Testing Guide – Public Health Agency of Canada
HIV Testing in Canada: Technologies and Approaches – Building Blocks: A CATIE webinar series

SOURCES


6. HIV TREATMENT

KEY POINTS

- HIV treatment has significantly reduced the illness and death associated with HIV.
- Newer HIV drugs are safer, simpler and more effective than those available when HIV treatment was first introduced.
- Starting treatment early may improve the long-term health of a person with HIV and reduce the onward transmission of HIV.

When the combinations of powerful new drugs for antiretroviral therapy (ART) became available in the mid-1990s, HIV treatment was revolutionized. There was a drastic reduction in the number of illnesses experienced by people living with HIV and increased survival. ART allowed many people living with HIV to return to work and lead a full life. The power of ART is so profound that a young HIV-positive adult who begins treatment shortly after diagnosis today, who takes his/her medicines every day exactly as directed and who has no or few co-existing health conditions is expected to live a near-normal lifespan. However, treatment is not a cure for HIV.

When HIV is left untreated it causes damage to the body. ART can stop HIV disease progression and reverse some of the damage caused by HIV.

The goal of ART is to greatly reduce the replication of HIV and reduce the amount of HIV in the body. A blood test, called viral load, is used to provide information about how well treatment is working. Ideally, ART will reduce the viral load to an “undetectable” level and it will remain undetectable indefinitely. However, an undetectable viral load does not mean that there is no HIV present. HIV can still be present at low levels in the blood and in other viral reservoirs in the body.

ART must be taken indefinitely because if treatment is stopped the virus will be able to replicate freely, increasing the amount of HIV in the body.

It is important that people on ART take their drugs every day as prescribed to avoid developing drug resistance (see section 6.3).

A sustained increase in viral load may indicate that the treatment is no longer working and/or that the individual is having difficulties adhering to the treatment protocol. The cause of the increase needs to be investigated in order to determine if the treatment should be changed and/or adherence support is required. The treatment regimen may also need to be changed if the side effects are intolerable or if there are drug interactions with other drugs the individual is taking.
Effective ART consists of a combination of a minimum of three drugs from at least two drug classes (or groups). There are currently six classes of approved HIV drugs:

- nucleoside and nucleotide reverse transcriptase inhibitors (NRTIs and NtRTIs; or simply "nukes")
- non-nucleoside reverse transcriptase inhibitors (NNRTIs or non-nukes)
- protease inhibitors
- fusion inhibitor
- CCR5 co-receptor antagonists
- integrase inhibitors

The drugs now preferred for use (if there is no HIV resistance) are safer, simpler and more effective than those available when ART was first introduced.

Starting ART requires a long-term commitment by people living with HIV. Stopping, interrupting or poorly adhering to ART can cause drug resistance or other health problems. Therefore, supporting people to prepare for ART is important and experts recommend doctors begin the discussion of HIV treatment soon after diagnosis. The health of the person with HIV is the most important factor to consider when deciding when to start treatment. A secondary factor that the person with HIV may consider important is the reduced risk of HIV transmission when the viral load is undetectable.

Some people may need to start ART immediately because of specific health-related conditions, such as hepatitis co-infection, pregnancy or heart disease. For others, the importance of starting treatment to maintain their health is often linked to their CD4 count. Over time, HIV damages the immune system, which causes a drop in CD4 counts. Experts have not yet determined at what CD4 count it is best to start HIV treatment for optimal long-term health, but they do agree that people should be on treatment before their CD4 count falls below 350. Furthermore, most guidelines recommend starting treatment before the CD4 count falls below 500 and some guidelines recommend starting treatment as soon as possible after diagnosis. The move towards starting treatment earlier for the health of people with HIV is based on growing evidence that early treatment may prevent some of the more subtle, long-term effects of untreated HIV disease. There is an ongoing randomized controlled trial, called the START study, which is looking at whether or not there are medical benefits to starting treatment earlier — when CD4 levels are above 500 cells/mm³ — or waiting until the count falls to 350 cells/mm³.

Because HIV treatment is complex and lifelong, many people with HIV can benefit from additional care and support services. This may include support for starting treatment, adherence support, support for managing side effects of treatment, or support to navigate healthcare systems. It may also include support for issues that may indirectly affect the ability of people with HIV to take treatment, such as stable housing, food security or mental health challenges.
RESOURCES
A practical guide to HIV drug treatment for people living with HIV
Guidelines for the use of antiretroviral agents in HIV-1-infected adults and adolescents
   – Department of Health and Human Services
Antiretroviral Treatment of Adult HIV Infection: 2014 Recommendations of the International
   Antiviral Society–USA Panel
Guidelines: clinical management and treatment of HIV infected adults in Europe – European
   AIDS Clinical Society
La thérapie antirétrovirale pour les adultes infectés par le VIH : Guide pour les
   professionnels de la santé du Québec – Ministère de la Santé et des Services sociaux
du Québec

SOURCES
1. Panel on Antiretroviral Guidelines for Adults and Adolescents. Guidelines for the use of antiretroviral agents in
   eacs-guidelines/eacs-guidelines.html [accessed December 11, 2013]
6.1 SIDE EFFECTS

KEY POINTS

- Although HIV therapy is generally safe and effective, both short-term and long-term side effects may occur in some users.
- While some side effects can be managed successfully, others may necessitate a switch in treatment.

As with any medication, antiretroviral therapy (ART) can result in side effects ranging from minor to life threatening (in rare cases). Side effects may be short term and lessen or disappear after a few weeks or months. These types of side effects are often associated with starting a new medication. Short-term side effects may include nausea, diarrhea, headache and rash. Side effects may also be long term, slowly affecting specific parts of the body, such as the heart, bones, or kidneys.

It is important people with HIV discuss all their symptoms with their doctors so that they can be properly diagnosed. Some symptoms that appear to be side effects of a particular drug may turn out to have an entirely different cause. ART is not a cure for HIV and therefore small amounts of the virus continue to be produced deep inside the body. Some researchers think that this residual production of HIV affects the immune system, causing it to continuously produce inflammatory signals. Thus, many of the complications that can occur over the long term – such as bone thinning, heart disease and lung inflammation – may arise because of persistent HIV-related inflammation and are not drug-related side effects.

Side effects play an important role when choosing treatment. Short-term side effects are generally common across all medications, while other side effects may be drug or class specific. Selection of anti-HIV drugs will often depend on an individual’s lifestyle, family medical history, history of ART usage, HIV drug resistance testing and personal preferences. In spite of all of the knowledge about these drugs, each individual’s response is different, and what works for one person may not work for another.

Different strategies may be used to manage the symptoms of side effects and improve quality of life, ranging from pharmaceutical solutions to complementary therapies. Some suspected longer-term side effects, such as increases in blood lipids (fats) or insulin resistance, may require major changes in lifestyle or the use of additional medication. Others such as lipodystrophy do not always have immediate or easily accessible solutions. Side effects that are intolerable should be taken seriously because they may lead to non-adherence and may require a treatment switch, assuming other treatment options are available.

RESOURCE
A practical guide to HIV drug side effects – CATIE
SOURCE
6.2 ADHERENCE

KEY POINTS

- Effective treatment with HIV drugs requires long-term adherence.
- Not taking medications regularly can lead to adverse health outcomes.
- Poor adherence can lead to resistance and drug treatment failure.

Although antiretroviral therapy (ART) has helped to transform HIV into a chronic illness in many parts of the world, there are still issues. Treatment must be taken at least once a day, every day, for the rest of the individual’s life for it to be effective. Such high levels of adherence (the extent to which a patient takes his or her medication according to the prescribed schedule) may be difficult to sustain for many years. The best response to ART is seen when adherence is 100%. Levels of adherence below 95% have been associated with poor suppression of HIV viral load and reduced CD4+ count.

Evidence shows that the variables with the strongest effect on adherence include the complexity of the drug regimen, the therapy’s side effects, the “battle fatigue” that results from long-term use, and patients’ attempts to remedy problems by modifying the dosage or administration of drugs. Misperceptions and lack of trust regarding the drug’s effectiveness can add to these problems. Among the social variables that are found to affect adherence, stigma and fear of disclosure have the strongest effects. Women also face unique obstacles to adherence relating to child care, lack of partner support and the attitudes of peers and family members.

Non-adherence to ART can result in poorer treatment outcomes, such as an increased viral load and a reduction in CD4+ cell count, which can lead to greater morbidity (illnesses) and mortality (death). Furthermore, non-adherence can lead to drug resistance, which can reduce future treatment options.

The general wisdom has been that, to be effective, interventions to improve adherence to ART need to be individualized, multifaceted and repetitive. Frequently-used interventions include individualized dosing instructions with photos of the drugs, drug organizers (e.g., seven-day or even 28-day pill boxes), more frequent follow-up, and special adherence education sessions led by members of the care team (nurses, pharmacists, social workers, community health intermediaries or peer educators). In certain populations, such as people who use drugs, directly observed therapy (DOT) for ART has produced significant improvements in adherence and viral suppression. With DOT programs, patients are under direct observation by a caregiver when they take their medications (for example, they may come to a clinic each day to take their medications). Similar to DOT, maximally assisted therapy (MAT) has been used in the Downtown Eastside of Vancouver and elsewhere to enhance adherence. The MAT program provides its clients with ongoing assistance with taking ART and other medications. The goal of the program is to improve adherence to ART through an attitude of acceptance.
and by providing encouragement, counselling, and HIV and health education and outreach to clients.

SOURCES
6.3 DRUG RESISTANCE

KEY POINTS

- Lack of adherence can lead to drug resistance.
- Drug resistance is one of the main reasons for drug treatment failure.
- Drug resistance can be transmitted.

While replicating in the body, HIV is also constantly changing, and mutations in the genetic material (viral RNA) occur regularly. The more viral replications, the more mutations can occur. Most of these mutations are harmless, but sometimes they can result in virus that is drug resistant.

Poor adherence is one of the key factors in the development of drug resistance. When someone doesn’t take their antiretroviral therapy as prescribed, the virus is more likely to replicate. This gives the virus more chances to create mutations. If one of these mutations blocks an antiretroviral drug from working the way it is supposed to work, the virus becomes harder to control. Drug resistance develops when this newly mutated virus can no longer be controlled by the antiretroviral drug and becomes the dominant virus in the body.

Once someone’s virus has developed resistance to a particular drug or group of drugs, the individual should no longer use those drugs because the drug is no longer effective.

If HIV develops resistance to one drug, it may also develop resistance to other drugs in the same class, regardless of whether the person has ever taken those drugs. This is known as cross-resistance.

Different types of resistance testing are available to determine whether an individual’s virus has developed drug resistance: genotypic and phenotypic testing. Genotypic tests are routinely used to identify drug resistance. They identify specific mutations in the virus that can lead to resistance to a particular drug. A phenotypic test measures the amount of drug needed to deactivate a sample of virus: the more drug that is needed, the more resistant the virus is. Phenotypic tests are not commonly used because they are considerably more difficult to run and few laboratories offer them.

An individual’s treatment choices become more limited as the virus develops resistance to different medications, and managing side effects and supporting adherence become increasingly important. The development of new drugs and classes of drugs is important for people living with HIV who have resistance to most or all existing medications. However, even the newer drugs may be prone to resistance. Susceptibility to resistance is often dependent on what class a drug belongs to. Non-nucleoside reverse transcriptase inhibitors (NNRTIs) and integrase inhibitors generally are more susceptible to resistance while protease inhibitors generally are less susceptible.
Transmission of drug-resistant HIV can occur in countries where HIV drugs are widely available. If someone has a drug-resistant strain of HIV, this can be transmitted to an HIV-negative person (primary drug resistance) or to someone already infected with another strain of HIV (superinfection). This can complicate and limit the treatment options for newly infected and reinfected individuals.

According to the 2010 HIV/AIDS Epi Update from the Public Health Agency of Canada, the prevalence of primary drug resistance to at least one HIV drug is 9% in Canada. Little is known about superinfection, although there have been some recorded cases.

SOURCES
6.4 DRUG INTERACTIONS

KEY POINTS

- Prescription drugs, non-prescription (over-the-counter) drugs, street drugs, herbal products and supplements can potentially cause drug interactions.
- Drug interactions can lead to serious or fatal overdoses of some drugs.
- Drug interactions can cause levels of HIV drugs to drop so low that they no longer work effectively, potentially leading to drug resistance.
- It is important that healthcare providers know about all the drugs or products a patient is taking so that drug interactions can be avoided.

The types of prescription or non-prescription (over-the-counter) drugs that are likely to cause interactions with antiretroviral therapy (ART) include certain antifungal drugs and antibiotics, acid-reducing agents and some anti-seizure drugs. Other drugs that may cause interactions include drugs used to treat depression, antihistamines, drugs to control heart rhythm, pain-killers derived from opium, sedatives, drugs to thin the blood, drugs used to treat opiate addiction (such as methadone and buprenorphine), drugs to treat erectile dysfunction (such as Viagra, Cialis and Levitra) and some drugs used to treat tuberculosis, especially rifampin. Also, some HIV drugs can affect the effectiveness of other medications, such as the birth control pill; this drug interaction could result in unwanted pregnancies.

Use of street drugs may also cause interactions with HIV drugs. There are few studies of these types of interactions, but there have been reports of overdoses and deaths when people have taken street drugs and ART.

There has been very little research on interactions between herbal products and HIV drugs. Treatment guidelines indicate that St. John’s wort should not be taken with any protease inhibitor or non-nucleoside reverse transcriptase inhibitor. The impact of this herb on other drug classes is not known, so the use of St. John’s wort when taking ART is best avoided. Other herbs, such as milk thistle, may also interact with HIV drugs or other prescription medicines.

Healthcare providers need to know all the drugs — prescription, over-the-counter and street drugs — that people with HIV are using, as well as any herbs and supplements, to advise them about avoiding drug interactions. An Ontario-based study found that approximately 77% of patients reported that they were using some form of complementary and alternative medicine (CAM). Despite the frequency of CAM use, 53% of the participants did not report any CAM use to their treating physician. In more than 90% of cases where the prescribing physician was unaware of CAM use, patients reported that the physician had not inquired about possible use. Given the potential for adverse reactions and drug interactions related to CAM and drug use, physician awareness is crucial to optimizing patient care. As such, it is essential that both the treating physician and the patient take steps to improve disclosure of CAM and drug use in the conventional medical setting. The routine inclusion by the physician of non-judgemental questions relating to various types of CAM use and drug use including
street drugs, over-the-counter medications and prescribed drugs) in the patient consultation may be a simple method of encouraging such disclosure. Pharmacists can also play an important role in avoiding drug interactions.

RESOURCE
HIV drug interactions – University of Liverpool

SOURCES
6.5 THE CURE

KEY POINTS

- The apparent cure of the “Berlin patient” using chemotherapy, radiation and stem cell transplantation has spurred interest in cure research.
- It will be many years before a potential cure may be found.

In 2008, doctors in Berlin announced that they appeared to have cured an HIV-positive man, who was suffering from leukemia, of both cancer and HIV. The “Berlin patient” received chemotherapy, radiation and other therapies to suppress his immune system, and transplants of stem cells. The stem cells that were transplanted were chosen because they had a rare mutation that made the cells somewhat resistant to HIV infection. The stem cells took hold in his bone marrow, helping to create his new immune system. Since all of these extensive interventions, doctors have been unable to detect HIV in his body. This means the patient has either no HIV or levels of HIV too low for the tests to detect.

Researchers are divided about why the Berlin patient was apparently cured but this case has led to clinical trials to assess different methods for attempting to cure HIV infection. The protocol used on the Berlin patient is dangerous (there have been several deaths) and not practical.

There have been reports of at least two babies being apparently cured (the first was the “Mississippi baby”). However, researchers caution that these cases may be unusual and clinical trials are underway to explore other possible cases of children born with HIV being cured with early HIV drug therapy.

There are many cure studies being proposed, including gene therapies and unusual combinations of drugs. Such studies will be complex and in some cases, perhaps dangerous. Cure research is moving ahead but this is extremely difficult research. There is unlikely to be a simple, safe and widely available cure in the next decade.

In 2013 Canada’s premier scientific agency, the Canadian Institutes for Health Research, funded two five-year Canadian cure-research projects.

RESOURCE

HIV Cure Research – TreatmentUpdate 196

SOURCE

7. CARE AND SUPPORT

7.1 ACCESS TO HEALTH CARE

KEY POINTS

- Individual and system (or structural) level barriers impede access to health care.
- Delayed/lack of access can lead to avoidable illness and death (morbidity and mortality).
- Delayed/lack of access may lead to the increased spread of HIV.

Research suggests that some people living with HIV have problems accessing and navigating the healthcare system due to individual-level barriers due to personal circumstances (e.g., financial, mental health), as well as systems-level or structural barriers (e.g., geography, stigma, clinic hours).

These barriers can negatively impact the ability of some people (e.g., people who inject drugs, ethnic minorities and people with lower socioeconomic status) to access health care. For example, refugees may experience systemic-level barriers in the form of lack of access to provincial healthcare coverage. People who use drugs may experience both individual- and systemic-level barriers in the form of mental illness, stigma and discrimination and lack of providers experienced in the care of this population.

The ability to access health care may also depend on where you live in Canada. For example, people in rural communities may have fewer services available to them and may need more travel time or assistance in order to access healthcare services.

HIV care and treatment has undergone significant clinical advances, resulting in improvements in quality of life and life expectancy for people living with HIV. Increasing access to health care, by overcoming both the individual- and structural-level barriers, can reduce the burden of avoidable illness and death (morbidity and mortality) and increase the quality of life of people living with HIV. Facilitating access to testing, care and support, and treatment can also act as an HIV prevention intervention. People who know their status are more likely to reduce their risk behaviours and effective treatment reduces the risk of onward sexual transmission.

SOURCES


7.2 HIV AS AN EPISODIC ILLNESS

KEY POINTS
- Most disability related to HIV is episodic.
- Rehabilitation can support people with HIV through periods of episodic wellness and illness.

Since the introduction of effective HIV treatment, HIV is increasingly characterized as a chronic, manageable illness. Most disabilities related to HIV are episodic, meaning that HIV disease involves periods of wellness and periods of illness. The episodes of illness may occur on a daily basis or they may occur over extended periods of time, such as an HIV-related infection that results in a hospitalization.

Rehabilitation can be beneficial to people living with HIV in periods of wellness and illness. It supports people with HIV to manage health problems and provides support to enable them to continue living as independently as possible. Rehabilitation services include physiotherapy, occupational therapy or speech-language therapy, and complementary or alternative therapies, such as acupuncture, massage therapy and counselling.

RESOURCES
HIV and rehabilitation – Managing your health, CATIE’s guide for people living with HIV
The Canadian Working Group on HIV and Rehabilitation

SOURCES
7.3 CO-INFECTIONS, CANCERS AND OTHER ILLNESSES ASSOCIATED WITH HIV

**KEY POINTS**
- Life-threatening co-infections are seen much less frequently than in the early days of the HIV epidemic.
- Co-infections can make it more difficult to manage and treat HIV.
- Some cancers are more common in people with HIV.

There are a number of infections and cancers that can develop in people who are living with HIV.

Firstly, there are infections that can be life threatening. These are also known as opportunistic infections. The more common life-threatening infections include a lung infection called Pneumocystis pneumonia (PCP), an eye infection caused by cytomegalovirus (CMV), a brain infection called toxoplasmosis, and a generalized infection called Mycobacterium avium complex (MAC).

These occur only when the immune system is weak making someone vulnerable to infection. If someone has a very low CD4+ cell count, there are drugs they can take to prevent these infections. This is called prophylaxis. However these infections are preventable with proper care and are seen much less frequently than in the early days of the HIV epidemic.

Secondly, there are co-infections that can make it more difficult to manage and treat HIV. HIV can also complicate the management and treatment of co-infections. Co-infections are illnesses that can also occur in people with normal immune systems. Some of the more common co-infections in people living with HIV are hepatitis B, hepatitis C, tuberculosis, sexually transmitted infections such as human papillomavirus (HPV) and herpes, and fungal infections.

Finally, people living with HIV are more vulnerable to certain types of cancers. Cancers seem to be more common in people with HIV even if their immune system is relatively healthy. However, some cancers occur only when the immune system is weakened.

Cancers that are more common include Hodgkin’s lymphoma, lung cancer, skin cancer, anal cancer, cervical and vaginal cancer in women, and testicular and prostate cancer in men. These cancers can often be successfully treated if they occur in people with HIV who maintain healthy immune systems with HIV treatment.

It is important that people with HIV have regular check-ups with their doctor. CD4+ counts and viral load tests monitor how HIV is affecting the immune system and for those on treatment that the treatment is working effectively. Regular screening for sexually transmitted infections as well as other co-infections is recommended. Pap tests are used to screen for cervical abnormalities in women. Men and women with HIV should also be screened for anal cancer.
RESOURCE
HIV-related infections and cancers – *Managing your health: a guide for people living with HIV.*

SOURCE
7.4 MENTAL HEALTH

KEY POINTS

- Mental health conditions are risk factors for HIV transmission.
- Mental health conditions may affect health outcomes of people living with HIV.

Mental health issues are closely linked with HIV. Mental health conditions have been shown to increase the risk of getting HIV. For example, studies estimate that between 5% and 23% of people with chronic mental illness have HIV. This is substantially higher than the estimated 0.2% of Canadians living with HIV in 2011. The risk of HIV transmission is higher in people with mental health conditions primarily because they are more likely to engage in high-risk activities related to sex and drug use.

People living with HIV are also impacted by mental health issues, especially depression and anxiety. These can result from the diagnosis of HIV and dealing with a complex and stigmatized disease. HIV itself can also produce psychological impacts due to its effects on the central nervous system. Complications can include depression, mania, dementia and others.

Mental health issues among people living with HIV can negatively impact their health outcomes. For example, mental health issues can affect their ability to find and be retained in care, and decrease their ability to remain adherent once they start HIV treatment.

Living with HIV can make managing issues of mental health, such as depression and anxiety, more challenging. Depression affects problem-solving skills and financial security and can contribute to increased risk-taking behaviours. Screening for depression and anxiety should be done by a healthcare professional at the time of HIV diagnosis and before starting treatment.

RESOURCES

- HIV and emotional wellness – CATIE
- CAMH – Centre for Addiction and Mental Health
- Canadian Mental Health Association

SOURCE

7.4.1 Depression

KEY POINTS

- There is an increased risk of depression in people living with HIV.
- Depression may lead to negative health outcomes in people living with HIV.
- There are treatments for depression.

Some people develop a state of sadness and helplessness they cannot shake. This can be accompanied by many symptoms including fatigue, problems in sleeping, eating or concentrating, low sex drive and even feelings of wanting to commit suicide. These feelings are known as depression. There is a difference between depression and feeling sad or unhappy. Sadness is a normal way of handling trauma or life events; depression moves beyond this and lasts much longer. Some individuals find continuing with their day-to-day activities very difficult when they are depressed. Depression is a serious mental illness that can interfere with daily life and routine and can reduce quality of life.

The causes of depression may include genetics and family history, past experiences of loss, social isolation without support of friends and family, or the consequences of prolonged street-drug use. Depression may also be brought on by some medications like the HIV drug efavirenz (Sustiva, and also found in the combination pill Atripla) or interferon treatment for hepatitis C.

Depression is more common among people living with HIV compared to the general population. There is significant stigma surrounding depression and, when coupled with the stigma of HIV, it can be difficult for people to disclose when they are experiencing the symptoms of depression.

For people living with HIV, depression may have negative health outcomes due to disengagement with health care, poor treatment adherence and lack of basic self-care. The onset of episodic depression may also be associated with a diagnosis of HIV, the initiation of treatment, side effects of treatment, and/or social isolation.

Treatment of depression can be complex and it may create challenges to effective HIV care. Effective treatment for depression can include individual and group counselling, cognitive behavioural therapy, and antidepressant drugs.

RESOURCES
Depression – Centre for Addiction and Mental Health
Depression – Canadian Mental Health Association
Talking about Depression, Anxiety and HIV/AIDS – Canadian AIDS Society
SOURCE
7.4.2 Anxiety

**KEY POINTS**
- Anxiety can often be unrecognized and can be experienced by people living with HIV and those around them.
- There are treatments for anxiety.

Anxiety is a normal physical and emotional reaction to a perceived threat. It is an important survival mechanism when confronted with danger. When anxiety starts to interfere with normal functioning, it becomes a clinical disorder. There are many different types of anxiety disorders – panic disorder and agoraphobia, social phobia and other phobias, obsessive compulsive disorder (OCD), post-traumatic stress disorder (PTSD), generalized anxiety disorder (GAD), acute stress disorder and anxiety disorder due to a general health condition.

People living with HIV can experience any of these anxiety disorders – some at rates comparable to the general population, while others are exacerbated by HIV. For example, rates of generalized anxiety disorder, panic disorder and post-traumatic stress disorder appear to be higher among people living with HIV compared to the general population. Anxiety disorders among people living with HIV occur most often at certain times – for example, at HIV diagnosis, at diagnosis of an HIV-related infection, or other reminders of their illness.

Anxiety disorders can be treated through pharmacological and non-pharmacological treatments. Non-pharmacological treatments include relaxation, behavioural therapies, acupuncture, etc. Physical activity, self-care including rest and eating well, as well as expressing concerns and worries may relieve some symptoms of anxiety disorders.

**RESOURCES**
- Anxiety Disorders – Centre for Addiction and Mental Health
- Anxiety disorders – Canadian Mental Health Association
- Talking about Depression, Anxiety and HIV/AIDS – Canadian AIDS Society

**SOURCES**
7.4.3 Drug use and addiction

KEY POINTS
- People who use drugs often have multiple health issues.
- People who use drugs can be successful on HIV treatment.

Drug use can cause detrimental effects on many of our bodily systems and organs – including the cardiovascular system, the respiratory system, the gastrointestinal system, the musculoskeletal system, the neurological system and the liver and kidneys. It can also lead to health issues related to poor lifestyles including the effects of poverty, homelessness and poor nutrition. The challenges of maintaining a healthy lifestyle may be exacerbated for drug users living with HIV.

Currently treatment exists for drug use. There are pharmacological treatments to either manage withdrawal or to treat the addiction. However, currently only pharmacological treatments exist to treat opiate addiction (e.g., methadone and buprenorphine). Behavioural treatment also exists that work to engage people in the treatment process, to modify their attitudes and behaviours related to drug abuse, and to improve life skills.

There are concerns about the use of HIV treatment by people with HIV who also use drugs. These concerns include the complexity of treatments and the need to maintain appointments and adherence when there may be multiple competing priorities, such as homelessness and drug use. However, research shows us that people who use drugs, with appropriate supports, can be on successful HIV treatment.

Drug interactions between HIV medications and street drugs are a concern. Case reports have documented drug interactions that lead to decreased effectiveness of protease inhibitors and/or increased mortality when certain street drugs (such as cannabis and MDMA) are combined with HIV medications.

RESOURCES
Harm reduction as a tool to healthy living from Managing your health
Understanding addiction: A primer on drug use and drug dependence – Kingston Community Health Centres fact sheet
Addiction – Centre for Addiction and Mental Health

SOURCES


7.5 HIV AND AGING

KEY POINTS

- Knowledge of HIV and uptake of testing among Canadians over 50 is quite low.
- People with HIV are living longer due to advances in HIV treatment.
- Managing HIV infection becomes more complex as people age.

Knowledge of HIV and uptake of testing among Canadians over 50 is quite low. This can lead to a late HIV diagnosis. This is problematic because untreated HIV may progress more rapidly in older people. Late diagnosis allows HIV to advance significantly, making it more difficult to treat the HIV infection.

However, if HIV is diagnosed early, before the development of advanced HIV disease, HIV treatment appears to work just as well in older people as it does in those who are younger. Older adults also appear to be generally more adherent to treatment than younger adults, which may lead to better clinical outcomes, such as a suppressed viral load.

The success of HIV treatment means that people with HIV are living much longer than before. A new study reveals that the life expectancy of Canadians and Americans who are HIV positive is close to that of the general population. The study suggests that people diagnosed with HIV at age 20 years and who begin treatment shortly after can expect to live into their early 70s.

However, treatment can be more complex due to age-related diseases, such as high blood pressure, arthritis and cancers. These diseases may also need treatment, which may cause drug interactions, complicating HIV treatment.

Side effects from HIV treatment do not seem to be any more frequent in older people compared to those who are younger, but they may be more severe in older people.

There is the potential for higher drug toxicity in older adults because of the decreases in kidney and liver function that come naturally with aging. Dosing of HIV drugs may become an issue, because older people sometimes experience weight loss or changes in hormone levels and metabolism, which may mean that drug dosages may need to be changed.

The risk of developing cardiovascular disease increases with age. Furthermore, being HIV positive and being on HIV treatment are both risk factors for developing cardiovascular disease. Lifestyle changes such as quitting smoking, increased exercise and changes in diet may positively influence health.

Bone density decreases with age, leading to osteopenia and osteoporosis (thinning of the bones). People with HIV, on treatment or not, have higher rates of bone disorders compared to the general population – as many as one third of people with HIV have osteopenia. Strategies
to prevent bone-density loss include calcium and vitamin D supplementation and weight-bearing exercise.

The chance of developing both HIV-related and non-HIV-related cancers increase with age. One large study showed that death due to non-HIV-related cancers has become more common than death from HIV-related cancers among people on HIV treatment. Non-HIV-related cancers seen in HIV-positive populations include skin, lung and prostate cancers. The development of anal cancer seems to be linked to co-infection with HIV and human papillomavirus (HPV). Higher rates of liver cancer are seen in people with HIV who are co-infected with hepatitis C. Prevention of these cancers focuses on sustaining CD4 cell counts and reducing other known cancer risk factors.

There appears to be a link between HIV treatment and diabetes. Improved diet and exercise are the first line of treatment for the general population.

Menopause is not well studied in HIV-positive women; however, it has been shown that menopause may occur earlier in this population.

With advances in HIV research, our understanding of the effects of HIV on the brain has become more nuanced. HIV-associated neurocognitive disorder (HAND) is now recognized as a condition that affects people living with HIV as they age. It is an umbrella term that covers a range of disorders of increasing severity — from asymptomatic (signs of impairment on neuropsychological tests but no loss of function in day-to-day life) to mild (signs of impairment in both tests and daily living) to the most severe form, HIV-associated dementia (HAD). The rate of severe HIV-associated neurocognitive changes has been on the decline since effective HIV treatment became available, but milder forms may be touching a large proportion of older people living with HIV.

Due to the increased risk of these conditions in people living with HIV, especially older adults, standard of care requires screening such as bone density, fasting blood glucose, lipids profile, kidney function, blood pressure, anal and vaginal Pap tests, colorectal cancer screening, prostate screening for men, and mammograms and pelvic exams for women.

RESOURCES
HIV and Aging – CATIE
HIV and Aging – CATIE Webinar Series: Building Blocks
HIV and aging – Canadian AIDS Society
HIV and Aging – Canadian Working Group on HIV and Rehabilitation

SOURCES
5. Special Issue on HIV and Ageing. *AIDS.* January 2004;18[supplement 1].
7.6 HOLISTIC APPROACH TO TREATMENT

KEY POINTS
- Complementary therapies are used to improve general well-being, reduce symptoms and manage side effects.

Holistic approaches to HIV treatment address the physical, emotional, mental and spiritual aspects of health. In addition to HIV drugs and other medical interventions, holistic approaches may involve a range of complementary therapies, such as nutritional support, exercise, herbal therapies, massage, Aboriginal approaches to healing, traditional Chinese medicine, or Ayurveda.

Before the introduction of effective HIV treatments, complementary therapies were mainly used to boost immunity and prevent HIV-related infections. With the introduction of effective HIV treatments, complementary therapies are now being used to improve general well-being, reduce symptoms and manage the side effects of HIV treatment. Complementary therapies are appealing not only because of their potential benefits, but also because they can play a role in a more holistic approach – one that favours the mind and spirit as well as the body.

People living with HIV use a range of different types of complementary therapies. Most studies have found that nutritional supplements are very popular, including vitamins, minerals and antioxidants. In addition to nutritional therapies, people report using various forms of massage and mind–body medicine as well as a range of herbal therapies. Combining complementary therapies with conventional drugs raises new challenges around the potential for adverse interactions. These interactions can lead to increased side effects and/or toxicity. They can also reduce the effectiveness of HIV treatment, possibly leading to drug resistance and treatment failure. It is important that people living with HIV tell all of their healthcare providers (doctors, pharmacists, complementary therapists) about all of the treatments they are taking so that harmful interactions can be avoided.

SOURCE
8. INTEGRATED APPROACHES TO HIV PROGRAMMING

KEY POINTS

- The goal of an integrated approach is to develop comprehensive health programs that will reach people in an appropriate context and with the best combination of services to most effectively reduce HIV transmission (as well as transmission of other infectious diseases) and improve health outcomes.
- Two types of integration are important for HIV programming: integration of HIV prevention and treatment, and integrated approaches to sexually transmitted and blood-borne infections and tuberculosis.
- Program science can play an important role in the planning, implementation and management of integrated programs.

Successful strategies for HIV programming involve selecting and implementing an effective combination of interventions to meet the needs of specific communities. The development of programming therefore involves consideration of the integration of individual interventions: What is the mix of interventions? How are they combined or linked together? How are they embedded within the broader healthcare system? Typically, integrated approaches involve a client-centred approach to HIV program development through which multiple health issues are addressed in a coordinated way.

Integrated approaches require knowledge of multiple factors within the community, such as the epidemiology of HIV and related infections (e.g., hepatitis C or sexually transmitted infections); the availability, accessibility and linkages of health services; and the uptake of health services across the full spectrum of prevention, testing, treatment and support. The goal of an integrated approach is to develop comprehensive health programs that will reach people in an appropriate context and with the best combination of services to most effectively reduce HIV transmissions (as well as transmission of other infectious diseases) and improve health outcomes.

Emerging research is showing that two types of integration are important for HIV programming. First, there is a need to work toward more integrated, client-centred HIV programming that addresses the engagement and linkages across the full continuum of prevention, testing, treatment, and care and support, instead of working in traditional “silos” of HIV services. This is called integration of HIV prevention and treatment. Second, there is a need to consider the way in which multiple infectious diseases within a community or population may collectively contribute to enhanced disease transmission and poor health outcomes. Sexually transmitted infections (such as syphilis, human papillomavirus and gonorrhea), blood-borne infections (such as hepatitis C) and tuberculosis can all make such syndemic contributions to the HIV epidemic. Programs that seek to simultaneously address these co-related infections are called integrated approaches to sexually transmitted and blood-borne infections and tuberculosis.
Program science (see section 8.3) can play an important role in the planning, implementation and management of integrated programs. It can help answer questions related to key program-related functions, such as identification and prioritization of target populations, development and packaging of interventions, community mobilization and resource allocation.

RESOURCE
Transformation to Integrated Care – Canadian Nurses Association

SOURCES
8.1 INTEGRATED APPROACHES TO HIV PREVENTION AND TREATMENT

KEY POINTS

- Each element of the continuum of HIV care is important both for reducing HIV transmission and for improving health outcomes.
- Services should be designed and delivered in a way that improves the client experience and protects the human rights of people living with and at risk for HIV.

Integrated approaches to HIV prevention and treatment recognize that HIV prevention, testing and diagnosis, treatment, and care and support services [also called the continuum of HIV care] are mutually reinforcing elements of an effective response.

There are two compelling reasons for integration of HIV prevention and treatment. First, emerging biomedical and clinical research is showing that each element of the continuum of HIV care is important both for reducing HIV transmission and for improving health outcomes. For example, HIV treatment can help to improve the health of people living with HIV and it can also help to reduce the transmission of HIV as a secondary benefit. HIV testing and counselling are important for the prevention of HIV transmission and serve as a gateway to HIV treatment. In light of this research there is a need to reflect on how better integration of services can maximize both prevention and treatment outcomes.

The second reason for more integrated approaches comes from research and reflection on the experience of clients and their engagement with the continuum of HIV care. Health services are often fragmented by the way in which they are delivered. For example, some services, such as HIV treatment, might be clinic based, while other services, such as support, might be community based and still others, such as HIV testing, might be provided through public health units. This fragmentation is artificial from the perspective of the client and may create unnecessary barriers and challenges to accessing services. There may be missed opportunities to provide important health services, and people are often lost to further linkage and/or engagement in care. Integrated approaches can improve health outcomes by improving the client experience with health services as well as improving their engagement and linkage throughout the continuum of HIV care. This approach should result in more holistic, client-centred service delivery.

Integration of HIV prevention and treatment also brings some specific challenges and concerns. Integrated approaches typically involve harmonizing multiple program objectives from the perspectives of public health, communities at risk, clinical practice and people living with HIV. It is crucial that services are designed and delivered in a way that protects the human rights of people living with and at risk for HIV and that supports clients to make their own informed health decisions based on the best available information.
Integration often involves bringing HIV-related services to new settings in which providers may not be very familiar with HIV, such as the expansion of HIV testing into routine medical services. Expanding the range of providers involved in HIV work requires dedicated efforts to build their capacity through education, guidelines and informational support. This additional capacity building needs to be factored into program development by planners and funders.

Finally, there is a lot of excitement about the potential of antiretroviral drugs for preventing HIV transmission including “treatment as prevention.” However, it is important to maintain core prevention services, such as condom distribution, safer sex counselling and needle exchanges, while exploring the scale-up of new approaches.

RESOURCES
Integrated approaches to HIV prevention and treatment – CATIE webinar

SOURCES

8.1.1 Framework for Integrated Approaches to HIV Prevention and Treatment

KEY POINTS

- The core elements of a framework for integrated approaches to HIV prevention and treatment are prevention, HIV testing and diagnosis, HIV treatment, and care and support.
- These different elements, which form the continuum of HIV care, need to be combined or linked so that people can move seamlessly through the continuum of services depending on their needs and circumstances.
- Interventions may involve one or more of the following levels or aspects: biomedical, behavioural, community and structural.

A framework for integration provides a way of conceptualizing frontline services that allows people involved in the frontline response to situate themselves within the broader landscape of HIV work. The purpose of a framework is to articulate the elements of an integrated program in such a way that the experience of the client is central and the linkages between different program elements are explicit. The framework can be used to assess access to services, to identify new services and/or to increase engagement and linkages across different services with the overall goal of improving client-centred care.

The core elements of a framework for integrated approaches to HIV prevention and treatment are:

- prevention
- HIV testing and diagnosis
- HIV treatment
- care and support

The different elements that form the continuum of HIV care need to be combined or linked so that people—whether they are HIV-positive, HIV-negative or don’t know their status—can move seamlessly through the continuum of services depending on their needs and circumstances. The elements may be combined in a single intervention, such as voluntary testing and counselling that include both prevention and testing services. The elements may also be combined and linked between many different services, such as partnerships between clinics and community organizations that link treatment services with support services. People may enter the continuum of care through any of the elements, so it becomes important that clients are fully engaged, informed and linked to other relevant elements.

In addition to the core elements of service delivery, it is important to recognize that interventions need to work on different levels to be effective—from the individual to the community to...
the social world in which we all live. Typically, interventions may involve one or more of the following levels or aspects:

- **Biomedical aspect** – distributing/using a “technology” or “device” such as a condom, an HIV drug or a testing technology
- **Behavioural aspect** – promoting/supporting changes in behaviour, including changes needed in order for a biomedical technology to be effective such as consistent condom use, adherence to drug treatments or voluntary testing
- **Community aspect** – understanding/influencing the social and cultural context for an intervention, including community norms and acceptability of an intervention
- **Structural aspect** (institutional and systems-level aspect) – identifying/changing policies, procedures and other institutional or system-related issues that may increase HIV risk, limit access to health services or adversely affect health outcomes, such as criminalization of HIV nondisclosure or institutional policies regarding needle exchange

The framework can be used as a tool for addressing some key questions regarding the integration of HIV prevention and treatment, such as:

- What “package” of services should be provided to a specific community?
- Who should be engaged in and offered these services? When? How?
- What is the best setting or context for specific services?
- How should services be linked or combined?

**SOURCES**

8.1.1.1 The HIV treatment cascade

KEY POINTS

- The treatment cascade reflects the different services someone living with HIV needs to achieve optimal health outcomes.
- The treatment cascade is based on the successive steps that are needed for a person living with HIV to achieve an undetectable viral load.
- There are no national estimates of engagement in the HIV treatment cascade for Canada.

The HIV treatment cascade is a subcomponent of a framework for integrated approaches to HIV prevention and treatment. The treatment cascade reflects the different services someone living with HIV needs to achieve optimal health outcomes, including HIV testing and diagnosis, linkage to appropriate medical care (and other health services), support while in care, access to HIV treatment if and when the individual is ready, and support on treatment. While enhanced engagement in the cascade may have a secondary benefit of reducing HIV transmission (as a result of lower community viral load), the HIV treatment cascade does not include services for people who are HIV negative; these services are an additional component of an integrated framework.

The HIV treatment cascade has emerged as a convenient tool for assessing integrated health service delivery for people living with HIV. It is based on the successive steps that are needed for a person living with HIV to achieve an undetectable viral load. Research shows that people living with HIV who have an undetectable viral load are more likely to live long, healthy lives and are less likely to pass HIV to others. Starting from the total number of people living with HIV in a specific region (both diagnosed and undiagnosed), the successive indicators in the stages of engagement in the HIV treatment cascade are:

- total number of people living with HIV
- number of people diagnosed with HIV
- number of people linked to HIV care
- number of people retained in care
- number of people on HIV treatment
- number of people with undetectable viral load

At each stage of the cascade people may be lost to engagement and care as a result of many types of barriers, such as poor access to services; stigma and discrimination; poverty, food security and homelessness; and mental health and addictions issues. Typically only a small proportion of people living with HIV are engaged in all the steps needed to achieve an undetectable viral load. There are no national estimates of engagement in the HIV treatment cascade for Canada. In British Columbia it is estimated that 35% of people living with HIV in 2011 had made it through all of the steps in the cascade and achieved an undetectable viral load.
RESOURCE
The HIV treatment cascade – patching the leaks to improve HIV prevention –

Prevention in Focus

SOURCES
8.1.2 New Directions in Program Development Based on Integration of HIV Prevention and Treatment

KEY POINTS

- HIV prevention services are being implemented in new settings, such as mental health services, services for newcomers or primary care.
- New approaches to HIV testing are being implemented.
- Care and support services are being expanded.

Several new directions in HIV programming are being explored nationally and internationally on the basis of an integrated approach to prevention and treatment.

HIV prevention services are being implemented in new settings, such as mental health services, services for newcomers or primary care. While condom distribution, needle exchange and behavioural counselling form the core of HIV prevention services, several new prevention technologies are being implemented, including treatment as prevention, pre-exposure prophylaxis and post-exposure prophylaxis. Enhanced prevention and support services are being developed for specific audiences, such as couples, people living with HIV and people at ongoing high risk of HIV transmission. Risk-reduction counselling is also being implemented by many organizations in light of new research on HIV transmission.

New approaches to HIV testing include the use of new testing technologies, such as rapid testing, and new settings for testing, such as community-based testing and the routine offer of HIV tests in medical settings. Because HIV testing is the bridge between prevention and treatment, service providers are creating more robust linkages to further services for both those who test positive and those who test negative. Other new directions include couples-based testing and Internet-based platforms for anonymous partner notification. Integrating HIV testing with testing for other infections that share a similar transmission route, such as sexually transmitted infections and hepatitis C, is also being implemented.

Care and support services are being developed for people who are experiencing periods of enhanced physical or emotional need, such as support to people living with HIV around disclosure, support to gay men who are “coming out” and support to women and families during pregnancy. Peer-based support for people living with HIV is another area of program development, including support to navigate the healthcare system, support for treatment decisions and adherence support. Care and support for long-term wellness strategies, including chronic disease prevention and mental health promotion, are also being explored.

RESOURCES
CATIE Forum 2013: New Science, New Directions in HIV & HCV
CATIE Forum Webcast Archive – CATIE Forum 2013: New Science, New Directions in HIV & HCV
SOURCES
1. National deliberative dialogue on integrated approaches to HIV treatment and prevention: meeting report.
Approaches-to-HIV-Treatment-and-Prevention_05312012.pdf.
2. CATIE Forum New Science, New Directions in HIV and HCV – meeting report. CATIE, 2013. Available from:
8.1.3 Integration of Related Health Factors such as Chronic Diseases and Mental Health

KEY POINTS
- Related health factors such as mental illness and addictions have a direct impact on the risk of HIV transmission as well as the health of people living with HIV.
- There is a need to link and/or integrate HIV services with services and programs to address broader health issues.

Integrated approaches to HIV also involve the consideration of related health factors. For example, mental illness and addictions have a direct impact on the risk of HIV transmission as well as the health of people living with HIV. They can also have an indirect impact by adversely affecting the ability of people to seek, access and remain engaged in health services; to adhere to prevention and/or treatment strategies; or to be referred to other health services. As people living with HIV age, problems associated with aging, chronic diseases and other co-morbidities (such as heart disease, diabetes, osteoporosis and some cancers) are emerging concerns. There is a need to link and/or integrate HIV services with services and programs to address these broader health issues. There may also be a need to build capacity within broader health services, such as primary care, acute care, mental health and gerontology, to address the unique needs of people living with HIV.

SOURCE
8.2 INTEGRATED APPROACHES TO SEXUALLY TRANSMITTED AND BLOOD-BORNE INFECTIONS AND TUBERCULOSIS

KEY POINTS

Integration of services for HIV, hepatitis C and other sexually transmitted and blood-borne infections is increasingly being promoted.

The Public Health Agency of Canada, the US Centers for Disease Control and some provincial governments such as those of Alberta and Quebec are increasingly promoting the integration of services for HIV, hepatitis C and other sexually transmitted and blood-borne infections. There are several reasons for this approach:

- These infections share common modes of transmission and common risk behaviours. Therefore, programs that address behavioural risk factors for one infection can also address risk factors for other infections.
- These infections disproportionately impact similar populations because they share common social and structural risk factors. Therefore programs that impact the social drivers of one infection can also impact those of other infections.
- These infections can form synergistic epidemics in which one infection increases the risk of transmission of another infection and/or makes treatment of that infection more difficult. For example, the presence of syphilis can increase the risk of HIV transmission. Therefore, programs that address only one infection may be undermined by the outbreak of another sexually transmitted or blood-borne infection in the same population.
- Integrated approaches to these infections can facilitate a more holistic approach to sexual health and harm reduction that simultaneously addresses a range of client needs.

The integration of HIV and hepatitis C services is being explored in many regions. Owing to the existence of an infrastructure for HIV services (e.g., AIDS service organizations), increased funding and resources to this infrastructure could allow for the uptake of new knowledge and services by these organizations to meet the needs of people at risk for or living with hepatitis C. However, AIDS service organizations may face significant challenges. Some organizations feel that integration may not be appropriate for their clients. For other organizations, the different stigmas related to HIV and hepatitis C may make integration difficult and may result in poor uptake of services by one or more populations at risk. Additionally, the large number of people living with hepatitis C and their often complex conditions may tax the ability of AIDS service organizations to deliver services. Additional resources, capacity building and knowledge sharing about the integration of HIV and hepatitis C services are important components of any integrated strategy. Holistic harm reduction programming for people who use injection drugs is one model of the integration of HIV and hepatitis C services that has shown promise.
The integration of services for HIV and sexually transmitted infections may be more challenging because HIV is a concentrated epidemic in Canada, disproportionately affecting specific populations, while sexually transmitted infections are more generalized to the entire adult population. There are concerns that the integration of services for HIV and sexually transmitted infections might dilute the targeted, population-specific interventions needed to respond effectively to the HIV epidemic. On the other hand, integrating information on sexually transmitted infections into existing HIV programs is important because sexually transmitted infections can increase the spread of the epidemic and lead to poorer health outcomes for people living with HIV. Programming that addresses the holistic sexual health needs of gay men is one model of integration that is being explored in several regions of Canada.

The integration of HIV and tuberculosis services is not common in Canada. However, people living with HIV are at greater risk of acquiring tuberculosis and are more likely to develop active tuberculosis that can be transmitted to others. Some populations at greater risk for HIV are also at greater risk for tuberculosis, such as Aboriginal peoples and people who use injection drugs. For these reasons it may be appropriate to consider integrated approaches to HIV and tuberculosis.

SOURCES
3. Church K, Lewin S. Delivering integrated HIV services: time for a client-centred approach to meet the sexual and reproductive health needs of people living with HIV? AIDS. 2010 Jan 16;24(23):189-93.
8.3 PROGRAM SCIENCE

KEY POINTS

- Program science is the systematic application of scientific knowledge to improve the design, implementation and evaluation of programs.

Program science is a relatively new term that describes the systematic application of scientific knowledge to improve the design, implementation and evaluation of programs. Program science is becoming increasingly important for advancing the response to HIV in Canada and internationally. It is ideally suited to advance integrated approaches to HIV programming.

One aspect of program science is implementation research, which is concerned with the development and implementation of evidence-based interventions. Implementation research plays an important role in HIV program development by providing information about which interventions are effective and for whom. It can also provide information about how interventions can be adapted to new situations or communities. With implementation research the focus is on individual interventions.

However, program science extends beyond implementation research to also consider entire programs involving combinations of interventions for a particular population in a specific context. Various research methods are used to address questions related to holistic aspects of a program, including the following:

- Strategic planning – On the basis of the particular context of the program, who should be targeted? When? For how long?
- Program implementation – What is the optimal mix of interventions? How can synergy across interventions be maximized?
- Program management – How can effective interventions be sustained? How should the program be modified as new knowledge emerges during implementation? What quality improvement processes are important?

Program science typically involves an ongoing process of engagement between researchers, policy makers, program planners, frontline workers and communities through which research is embedded into the design, implementation and continuous improvement of the overall program. Because the focus is on how an entire program impacts a population, program science typically involves consideration of overall health systems. Development and linkage of population-level databases (such as electronic health records) that provide information on testing and diagnosis of health problems, treatments prescribed, health-related outcomes and health-service usage can be important tools in program science.

The Seek and Treat for Optimal Prevention of HIV/AIDS (STOP) project in Vancouver is one example of a recent program science initiative in Canada that illustrates many aspects of this approach to research and program development. The scientific theory of treatment as
prevention was used in the project as a framework to address the continuum of HIV care. The project involved an analysis of regional epidemiological and health service access data to determine strategic priorities. An evaluation framework was created that included over 50 population-level indicators [such as number of new HIV diagnosis, number of people on HIV treatment, number of people accessing specific health services] that were monitored through provincial and regional tracking systems. Over 40 pilot projects and changes in practice or policy were implemented, regularly evaluated and modified on the basis of evaluation outcomes. On the basis of the results of the pilot project, an intensive future state planning process was completed to support sustained redesign of the system of care and services, including expansion of the program across the entire province.

SOURCES