HIV IN CANADA

TRENDS AND ISSUES THAT AFFECT HIV PREVENTION, CARE, TREATMENT AND SUPPORT

DECEMBER 2010

CATIE

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: Trends and Issues that Affect HIV Prevention, Care, Treatment and Support* has been made possible through financial contributions from the Public Health Agency of Canada.

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Canada's source for HIV and hepatitis C information

1 INTRODUCTION

In our new role as a national knowledge exchange broker in HIV, CATIE champions and supports innovation and excellence in knowledge exchange for the care, treatment and support of people living with HIV and the prevention of HIV transmission. CATIE does this by:

- collaborating with and building the capacity of frontline organizations to use knowledge effectively to respond to the HIV epidemic;
- supporting and connecting people with HIV, other individuals and organizations to develop, synthesize, share and apply HIV knowledge; and
- acting as a central contact point for the flow of comprehensive, accurate, unbiased, timely and accessible HIV information and community-based knowledge.

Over the course of the past 25 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, understanding of HIV prevention, care, treatment and support has remained fragmented, with few mechanisms and processes in place for integration and exchange of knowledge among different stakeholders in order to strategically pursue coordinated opportunities for advancing the response to HIV in Canada.

This report 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 report is to provide some starting points for dialogue among national, regional and local stakeholders in HIV in order to support strategic HIV/AIDS planning and decision-making in Canada. It is a living document and will be regularly revised to reflect current knowledge of HIV in Canada.

This report is intended to complement other initiatives in order to provide a comprehensive picture of HIV in Canada, including but not limited to the:

- status reports on HIV in specific populations under development by the Public Health Agency of Canada; and the
- epidemiological reports on HIV and community acquired infections published by the Public Health Agency of Canada.

We hope you find the publication a valuable resource. We welcome any comments or questions you might have about this report.

2 GLOBAL EPIDEMIOLOGY OF HIV

KEY POINTS

- **33.4 million people are living with HIV worldwide.**
- **The global adult HIV prevalence rate is 0.8%.**

As a means of monitoring the HIV epidemic and assessing the effectiveness of prevention efforts, estimates of the number of people living with HIV (prevalence) and the number of new HIV infections in one year (incidence) are made by the UNAIDS/WHO Working Group on Global HIV/AIDS and STI Surveillance.

An estimated 33.4 million people worldwide were living with HIV infection (including AIDS) in 2008. Globally, the adult HIV prevalence rate was 0.8% in 2008. Sub-Saharan Africa was the region most affected by HIV; the adult HIV prevalence was 5.2% and it was home to 67% of all people living with HIV worldwide in 2008. The country with the highest HIV prevalence within this region was Swaziland at 26%. The only other region with an adult HIV prevalence rate above the global average was the Caribbean (1.0%). The remaining regions were all below the global average: Eastern Europe and Central Asia (0.7%), North America (0.6%), Latin America (0.6%), Oceania (0.3%), Western and Central Europe (0.3%), Middle East and North Africa (0.2%), South and South-East Asia (0.3%), and East Asia (<0.1%).

In 2008, more than 7,300 people were estimated to become infected with HIV every day. This results in an estimated 2.7 million new HIV infections in 2008; 70% of these infections occurred in sub-Saharan Africa. In 2008, more than 5,400 people were estimated to have died from AIDS every day. This results in an estimated 2.0 million deaths due to AIDS in 2008; 70% of these deaths were in sub-Saharan Africa.

Globally there are two different types of HIV epidemics. Epidemics are "concentrated" if 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. Conversely, epidemics are "generalized" if 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 compared to sub-Saharan Africa, which 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 within that area. Generalized epidemics require intensified interventions for the general population (e.g. interventions aimed at partner reduction, male circumcision).

3 CANADIAN EPIDEMIOLOGY OF HIV

HIV epidemiologic information helps to enable evidence-based development of prevention and control programmes and to promote the most effective use of health resources. The Public Health Agency of Canada's (PHAC) Centre for Infectious Disease Prevention and Control (CIDPC) monitors the HIV epidemic in Canada. PHAC produces estimates of HIV prevalence and incidence and surveillance data on reported HIV and AIDS cases.

Reported cases represent the number of cases reported to PHAC by each province. These reported cases provide a description of persons 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, underreporting and changing patterns in HIV testing behaviours (who comes forward for testing); surveillance data also do not include individuals who remain untested and undiagnosed.

Estimates of HIV prevalence and incidence are produced using a combination of methods that brings together all of the available data, including the HIV and AIDS surveillance data, in order to describe the HIV epidemic among both diagnosed and undiagnosed Canadians. Estimates also attempt to overcome some of the underreporting and reporting delays of surveillance data. The most recent estimates available are for 2008. Estimates are used when available in this scan, however, it should be noted that estimates are not available for all populations. In these instances, reported cases were used.

PHAC also supports a new 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/AIDS (P-Track). The five surveillance systems are in various stages, from development through to implementation. Methods involve periodic 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 new surveillance systems allow for the monitoring of:

- prevalence and trends in HIV risk behaviours;
- prevalence and trends in HIV testing;
- use of HIV prevention services; and
- trends in the prevalence of HIV and other infections.

3.1 PEOPLE WITH AND AT RISK FOR HIV/AIDS

KEY POINTS

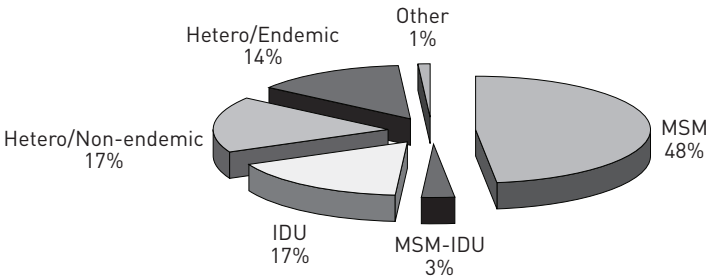
- An estimated 65,000 Canadians were living with HIV in 2008 (prevalence).
- The prevalence of HIV in the Canadian adult population was 0.3% in 2008.
- An estimated 26% of people with HIV/AIDS were not aware of their infection
- There were an estimated 2,300 to 4,300 new HIV infections in 2008 (incidence).
- HIV incidence has been stable since 2005.

An estimated 65,000 Canadians (range 54,000 to 76,000) were living with HIV infection (including AIDS) at the end of 2008. This represents an increase of 8,000 infections (14%) since 2005. In 2008, the adult prevalence rate of HIV in Canada was estimated to be 0.3%. An estimated 2,300 to 4,300 new HIV infections occurred in Canada in 2008 compared to an estimated 2,200 to 4,200 in 2005.

It was estimated that of the 65,000 people living with HIV in Canada in 2008, 26% (16,900 people) were unaware of their HIV infection because they had not been tested. Broken down by HIV transmission route, 19% of MSM (6,000 people), 25% of IDU (2,800 people) and 35% of people exposed through heterosexual contact (7,000 people) were unaware of their HIV infection in 2008.

An estimated 48% of prevalent HIV infections were attributed to sex between men in 2008. These continue to account for the majority of HIV infections in Canada. An additional 3% of prevalent HIV infections could be attributed to either sex between men or injection drug use (MSM-IDU), as both behaviours were reported at the time of their HIV test. An estimated 17% of prevalent HIV infections were attributed to injection drug use only in 2008. An estimated 31% of people living with HIV were infected through heterosexual sex—this estimate includes 17% from countries where HIV is not endemic and 14% from countries where HIV is endemic (Figure 1).Transmission by blood transfusion is effectively nonexistent and mother-to-child transmission is now exceedingly rare (4 cases in 2008).

FIGURE 1. Distribution of the estimated percentage of people living with HIV infection (including AIDS) in Canada in 2008 by exposure category



3.2 HIV IN SPECIFIC POPULATIONS

The next sections of the report summarize the HIV epidemiology available from PHAC for specific populations in Canada. Please note that there is overlap among the populations (e.g. MSM within the youth population). Each section includes the latest estimates of HIV prevalence and incidence and the latest I-Track and M-Track results (since they are currently available). Where data from the national Track studies are unavailable, data from Canadian studies will be used to provide a fuller picture of the epidemic in that specific population.

Where available, the following statistics are provided for sections 3.2.1 to 3.2.8:

- prevalence of HIV within the population (i.e. proportion of people in each population who are HIV positive);
- comparison of the prevalence of HIV within the specific population to the Canadian population;
- estimated prevalence of HIV attributable to the population (e.g. proportion of HIV cases attributable to each population);
- estimated incidence of HIV attributable to the population;
- trend in HIV incidence rates since 2005; and
- any other fact or figure that could enhance our understanding of issues related to the population.

3.2.1 Gay Men and Other Men Who Have Sex with Men (MSM)

KEY POINTS

- **HIV prevalence rates are estimated to range between 12% and 24% in MSM in five Canadian cities.**
- **The HIV prevalence rate in MSM is approximately 50 times higher in five Canadian cities than among the Canadian adult population.**
- **MSM continue to participate in sexual behaviours that place them at risk for contracting HIV.**
- **MSM accounted for 51% of all people living with HIV/AIDS in 2008.**
- **An estimated 47% of new HIV infections were in MSM in 2008.**
- **HIV incidence has been stable in MSM since 2005.**

In a nationally representative health survey, 2.1% of Canadian men aged 18 to 59 self-identify as gay or bisexual. When applied to the number of men in Canada aged 18 and older, there are approximately 247,000 men who identify as gay or bisexual. However, it is important to note that there may be more men who engage in sex with men but do not consider themselves to be either gay or bisexual. Therefore, this number may under-represent the real number of MSM in Canada.

The federal surveillance system for MSM (M-Track) has launched in six Canadian cities. In the sites where data is available (5), the prevalence rate among MSM is on average 15% but ranges between 12% and 24%. Compared to the HIV prevalence rate in the Canadian adult population (0.3%), the prevalence rate in MSM in these cities is approximately 50 times higher. Data on risk behaviours collected through M-Track suggest that certain sub-groups of MSM continue to be at considerable risk of HIV infection and other sexually transmitted infections (STIs) by engaging in risky sexual practices. For example, in M-track sites between 22% and 31% of MSM reported at least one unprotected anal sexual encounter with a casual male partner in the past six months.

The 2008 estimates of HIV prevalence and incidence indicate that MSM continue to be the most affected group in Canada. At the end of 2008, an estimated 33,360 gay men and other men who have sex with men (MSM) were living with HIV. This represents 51% of all people living with HIV. The estimate includes 31,330 people whose HIV status was attributed to sex between men and 2,030 men whose HIV status could either be attributed to sex between men or injection drug use (MSM-IDU). For the category MSM-IDU, infection with HIV may have been caused by either of these behaviours, since both behaviours were present.

An estimated 47% of new HIV infections in 2008 were in MSM. This includes an estimated 1,000 to 1,900 new HIV infections attributed to sex between men in 2008 (44% of all estimated new infections) and an estimated 50 to 130 new HIV infections in men who have sex with men who also inject drugs (MSM-IDU) in 2008 (3% of all estimated new infections). 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 2005, when the number of new infections was an estimated 1,000 to 1,900 in MSM and an estimated 40 to 130 in MSM-IDU.

3.2.2 Injection Drug Users (IDUs)

KEY POINTS

- **HIV prevalence rates range from 3% to 21% among IDU nationally (average 14%).**
- **The average HIV prevalence rate among IDU in Canada is 47 times higher than that of the Canadian adult population.**
- **20% of all people living with HIV/AIDS in 2008 had injected drugs at some point in their lives.**
- **An estimated 20% of new HIV infections in 2008 were in people who use injection drugs.**
- **HIV incidence may have increased slightly since 2005.**
- **People who use injection drugs continue to participate in injecting behaviours that place them at risk for contracting HIV.**

Because people who inject drugs are a highly marginalized and hidden population, it is hard to get an accurate picture of who they are. Based on the Canadian Addiction Survey conducted in 2004, 4.1 million Canadians reported having injected drugs in their lifetime and 269,000 reported having used a drug by injection in 2004.

I-Track demonstrated an HIV prevalence rate of 14% nationally in IDU in 2005 to 2008. City-specific estimates ranged from 3% to 21%: Victoria 12%, Central and North Vancouver Island 6%, Prince George 18%, Edmonton 13%, Regina 9%, Thunder Bay 5%, Sudbury 14%, Toronto 5%, Kingston 3%, and Quebec (including Ottawa) 21%. Compared to the prevalence rate in the Canadian adult population (0.3%), the average prevalence rate in IDU was 47 times higher.

Nationally, just over 20% of IDU reported borrowing or lending used needles or syringes in the past six months and approximately 40% reported borrowing or lending injecting equipment in the past six months. These numbers suggest that there is a significant potential for the transmission of HIV and HCV (see section 4.1) in this population.

At the end of 2008, an estimated 13,210 people may have been infected with HIV while using injection drugs (20% of people living with HIV). This estimate includes 11,180 people (17% of people living with HIV) who were likely infected when injecting drugs and an additional 2,030 people (3% of people living with HIV) whose HIV infection may have been due to either injection drug use or sex between men, since both behaviours were reported at testing.

An estimated 20% of all new HIV infections in 2008 were in people who had used injection drugs. This includes an estimated 390 to 750 new HIV infections attributable to injection drug use (17% of all estimated new infections) and an estimated 50 to 130 new HIV infections in men who have sex with men who also inject drugs (MSM-IDU) in 2008 (3% of all estimated new infections). For the category MSM-IDU, infection with HIV may have been caused by either of these behaviours since both behaviours were present. HIV incidence may have increased slightly since 2005 in IDU but may be stable for MSM-IDU when the number of new infections were an estimated 360 to 680 in IDU and an estimated 40 to 130 in MSM-IDU.

3.2.3 Heterosexual Transmission

KEY POINTS

- Heterosexual sex accounted for 31% of all people estimated to be living with HIV in 2008.
  - Heterosexual contact in people from countries where HIV is not endemic accounted for an estimated 17% of all people living with HIV/AIDS in 2008.
  - Heterosexual contact in people from countries where HIV is endemic accounted for an estimated 14% of all people living with HIV.
- An estimated 36% of all new HIV infections were attributed to people who acquired HIV through heterosexual sex in 2008.
  - An estimated 20% of all new HIV infections were attributed to heterosexual contact in people from countries where HIV is not endemic in 2008.
  - An estimated 16% of all new HIV infections were attributed to people from an HIV-endemic country who acquired HIV through heterosexual sex in 2008.
- The HIV incidence rate was approximately 8.5 times higher in people from HIV-endemic countries who acquired HIV through heterosexual contact than among the Canadian adult population.
- HIV incidence in people who acquired HIV through heterosexual sex has been stable since 2005.

Heterosexual transmission occurs in people from HIV-endemic countries and in people from 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 cases are attributed to heterosexual transmission;
- male-to-female ratio of HIV at 2:1 or less; or
- HIV prevalence greater than or equal to 2% among women receiving prenatal care.

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

According to the 2006 census, approximately 2.2% of the Canadian population (roughly 695,500 people) were born in an HIV-endemic country.

In Canada, an estimated 19,960 (31%) people living with HIV/AIDS in 2008 were exposed to HIV through heterosexual sex. Of these, 9,250 people living with HIV were from a country where HIV is endemic.

An estimated 36% of new HIV infections were attributed to heterosexual contact in 2008. Of these, an estimated 370 to 690 new infections were attributable to people from countries where HIV is endemic in 2008 compared to an estimated 360 to 670 in 2005. The HIV infection rate was estimated to be 8.5 times higher in this population compared to the Canadian adult population. In people from non-HIV-endemic countries, an estimated 450 to 860 new infections were due to heterosexual contact in 2008 compared to an estimated 440 to 820 in 2005.

It should be noted that for people from countries where HIV is endemic, this includes transmission through heterosexual contact only and does not include people exposed to HIV through IDU or MSM who are from an HIV endemic country. This is due to the way risk of HIV acquisition is assigned. Therefore, these data do not provide a national picture of the HIV/AIDS epidemic among persons from countries where HIV is endemic.

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/AIDS but may also act as barriers to accessing prevention, screening and treatment programs.

3.2.4 Aboriginal People

KEY POINTS

- **Aboriginal people accounted for an estimated 8% of all people living with HIV/AIDS in 2008.**
- **The HIV prevalence rate in Aboriginal people is 1.7 times higher than that of the Canadian adult population.**
- **An estimated 13% of new HIV infections were among Aboriginal people in 2008.**
- **The estimated HIV incidence rate in Aboriginal people was 3.6 times higher than among the non-Aboriginal Canadian population in 2008.**
- **HIV incidence may have increased since 2005.**
- **Injection drug use is an important risk factor for HIV transmission among Aboriginal people.**

An estimated 4,300 to 6,100 Aboriginal people were living with HIV at the end of 2008, accounting for 8% of prevalent HIV infections in Canada. According to data from the 2006 Canadian Census, 1.2 million people self-identified as Aboriginal (3.8% of the Canadian population). Therefore, the HIV prevalence rate among Aboriginal people in Canada is approximately 0.5%, which is 1.7 times higher than the HIV prevalence rate in adults in Canada.

There were an estimated 300 to 520 new infections in Aboriginal people in 2008 compared to an estimated 240 to 430 in 2005. This represents 13% of all new HIV infections in 2008. The

estimated infection rate among Aboriginal people was approximately 3.6 times higher than the adult HIV infection rate in 2008.

Injection drug use is an important risk factor for HIV transmission within the Aboriginal community. Sixty-six percent of the estimated number of new HIV infections among Aboriginal people were attributable to injection drug use compared to only 17% among all new estimated infections. Heterosexual contact accounted for an estimated 23% of new HIV infections among Aboriginal people.

Females make up a comparatively large proportion of the Aboriginal HIV epidemic, representing 49% of all positive HIV test reports compared to 21% among other ethnicities. Aboriginal people testing positive for HIV tend to be younger than non-Aboriginal people; almost one-third (33%) of positive HIV test reports from Aboriginal persons were among people younger than 30 years of age compared to 21% among other ethnicities.

Caution should be used, however, when making conclusions based on the numbers presented within this group. An adequate description of the HIV/AIDS epidemic among Aboriginal people in Canada requires accurate and complete access to ethnicity data. For positive HIV test reports in 2008, ethnicity data were reported for 26% of records 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 positive HIV test data on Aboriginal people.

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 behavioural factors (determinants of health) that increase their vulnerability to HIV infection.

3.2.5 Women

KEY POINTS

- **Women accounted for an estimated 22% of all people living with HIV/AIDS in 2008.**
- **An estimated 26% of new HIV infections were among women in 2008.**
- **HIV incidence has been stable since 2005.**
- **Heterosexual sex and injection drug use were the main modes of transmission in women.**

The HIV epidemic has changed from the early years—from one that affected mostly MSM to one that increasingly affects other groups, including IDU and heterosexuals. As a result, the burden of HIV among women is increasing. By the end of 2008, an estimated 14,300 women were living with HIV; this accounted for 22% of all people living with HIV/AIDS.

In 2008, women accounted for 26% of new infections, or an estimated 600 to 1,120 new infections compared to an estimated 590 to 1,110 infections in 2005. In terms of how women might have been infected, an estimated 73% of women were infected through heterosexual contact and 27% were infected through injection drug use.

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

3.2.6 Youth

KEY POINTS

- **Youth (aged 15-19) accounted for approximately 1.5% of all people diagnosed with HIV/AIDS up to 2008.**
- **Young adults (aged 20-29) accounted for approximately 25% of all people diagnosed with HIV/AIDS up to 2008.**
- **The number of new cases of HIV among youth and young adults may have increased since 2007.**
- **There is a high level of sexual risk-taking among youth that could lead to HIV transmission.**
- **High rates of STIs among youth could be an early indication of increasing HIV transmission.**
- **Street-involved youth engage in high-risk activities that could lead to infection with HIV.**

Individuals between the ages of 15 and 19 accounted for 1.5% (973 reported cases) of all diagnosed HIV infections, and those aged 20 to 29 accounted for an additional 25% (15,939 reported cases) up to 2008. However, it should be noted that the development of symptoms for HIV may take many years, sometimes as many as 10 or more, so those infected as youth may be more likely to be diagnosed as an adult once symptoms appear. For this reason, many people infected as youth may not be captured within these statistics.

The number of new cases of HIV in youth and young adults may have increased since 2007. There were 60 reported cases of HIV among youth in 2008 compared to 41 in 2007. There were 545 reported cases of HIV among young adults in 2008 compared to 489 cases in 2007. In 2008, the highest proportion of new positive HIV tests in youth were attributed to men who have sex with men (54%), then heterosexual contact (23%) and finally injection drug use (19%).

In a national study, approximately half a million teenagers between the ages of 14 and 17 reported they were sexually active in Canada. On average, Canadian teenagers reported three sexual partners, and 24% of sexually active teenagers reported not using a condom at their last sexual encounter (125,000 teenagers). HIV prevalence remains low in the general

population of youth, but increasing STI rates show an alarming trend. In 2008, women aged 15 to 24 and men aged 20 to 24 are the most affected group for infection with Chlamydia and gonorrhea. These rates are a marker of risky sexual behaviour in the population and may lead to an outbreak of HIV within these age groups.

Street-involved youth are at particularly higher risk of HIV. Nationally, it has been estimated that every day 150,000 youth are living on the street in Canada. Participation in behaviours that place them at risk for HIV and other STIs is very high. Ninety-five percent of street youth in Canada reported being sexually active, with an average of more than 17 partners in their lifetime. This compares to a national sample in which only 24% of youth reported being sexually active, with an average of only three partners. Twenty percent of street youth reported having participated in the sex trade in the past year. Approximately 50% of street youth reported using a condom at their last sexual encounter. Ninety-five percent of street youth reported using drugs in their lifetime, with 20% reporting they had ever injected drugs. Of those who had injected, 31% reported they did not always use clean injecting equipment. A national survey of street youth found that 25% reported having a previous STI, 5% tested positive for hepatitis C virus (HCV) and less than 1% for HIV.

3.2.7 Older Canadians

KEY POINTS

- **Older Canadians accounted for approximately 10% of all people diagnosed with HIV/AIDS up to 2008.**
- **The number of new cases of HIV has increased since 1999.**
- **Sexual contact was the main mode of transmission.**

Up to 2008, Canadians aged 50 years and older accounted for 6,036 reported HIV infections in Canada, representing 10% of all diagnosed HIV infections.

The proportion of annual positive HIV test reports in this age group rose from 11% in 1999 to 15% in 2008 (399 reported cases).

Among older Canadians, in which an exposure category could be attributed, sexual contact was the major risk factor for HIV infection. In 2008, the MSM category accounted for 41% and the heterosexual contact exposure category for 41% of positive HIV test reports in those 50 years of age or older. Injection drug use accounted for 11% of positive test reports. Blood transfusions accounted for 3% of positive test reports and men who participated in both sex with a man and injection drug use accounted for 4% of positive test reports.

With the advent of highly active antiretroviral therapy (HAART), the life expectancy of people with HIV/AIDS has greatly increased, which over time may lead to the continual growth of this group of people living with HIV/AIDS.

3.2.8 HIV/AIDS in Canadian Prisons

KEY POINTS

- **HIV prevalence in federal and provincial prisons ranges from 2% to 8%.**
- **The HIV prevalence rate is at least 10 times higher than the prevalence rate in the Canadian population.**
- **HIV among inmates is strongly associated with injection drug use.**

The estimated HIV prevalence rate in Canadian federal and provincial prisons ranges from 2% to 8%. This is 10 times higher than in the Canadian population.

Infection with HIV within the prison population may occur prior to entry or after entry to the institution. HIV infection in Canadian prisons is strongly associated with injection drug use; roughly one-third of offenders reported a history of injection drug use and some continue to inject while incarcerated. About half of those who continued to inject in prison reported that they are unsure of the cleanliness of their equipment. Tattooing and body piercing in prison also place people at risk of infection; roughly 13% reported having been tattooed in prison and 5% reported having had body piercing performed. While sexual activity is considered to be a less significant risk factor for HIV transmission within the prison system compared with injection drug use, it does occur and should not be discounted.

4 EPIDEMIOLOGICAL TRENDS IN HEPATITIS C, TUBERCULOSIS AND SEXUALLY TRANSMITTED INFECTIONS IN CANADA

This section provides summary information on the hepatitis C virus (HCV), sexually transmitted infections (STIs) and tuberculosis (TB) in Canada.

4.1 HEPATITIS C VIRUS (HCV)

KEY POINTS

- **An estimated 242,500 Canadians were living with HCV in 2007.**
- **The primary mode of HCV transmission is injection drug use.**
- **An estimated 0.8% of Canadians are infected with HCV (almost three times higher than the Canadian adult HIV prevalence rate).**
- **HCV is 10 times more transmissible than HIV through blood contact.**
- **Testing for HCV among HIV-infected people and for HIV among HCV-infected people is essential.**
- **Managing treatment in people co-infected with HIV and HCV is more complex than treating people with only one infection.**

Hepatitis C is a liver disease caused by the hepatitis C virus (HCV), which is transmitted primarily through blood-to-blood contact. The virus can be spontaneously cleared in approximately 15% to 25% of people infected. However, up to 85% of people do not clear the virus; the disease progresses to chronic infection and over time inflames the liver and causes scarring to develop in the liver. This may lead to cirrhosis and liver cancer.

HCV may be contracted through:

- sharing of any blood-contaminated equipment, including equipment used for drug injection/snorting/smoking, piercing, tattooing, nail care, electrolysis, shaving, acupuncture;
- unsanitary medical procedures, where flawed infection-control procedures allow re-use of blood-contaminated equipment;
- some sexual activities (for example, unprotected sex during menstruation, unprotected anal sex or when tissue trauma or lesions are present);
- needle-stick injuries;
- vertical transmission (in utero, during childbirth and possibly through breastfeeding if nipples are cracked and bleeding); and
- blood transfusions in countries where effective screening is not available.

HCV is 10 times more transmissible than HIV through blood contact. However, HIV is more transmissible than HCV through sexual contact. The most common mode of HCV transmission

in Canada is injection drug use. Since 2000, increasingly HCV is being detected in MSM with HIV who do not report any injection drug use. This has spurred debate about how HCV transmission through sexual contact may occur, especially among HIV-positive gay men. Since 1992, HCV is no longer transmitted by blood transfusions, blood products or organ transplants in Canada. Vertical transmission of HCV remains a possibility for women living with HCV.

An estimated 7,900 persons were newly infected with HCV in Canada in 2007. As of December 2007, an estimated 242,500 persons in Canada were infected with HCV. Therefore, the prevalence rate for hepatitis C in Canada is approximately 0.8%, almost three times the adult HIV prevalence rate. Injection drug use accounted for 58% of cases of HCV, blood transfusions 11%, haemophilia 0.4%, and "other" 31% (mostly sexual transmission and parenteral exposures). An estimated 34,900 Aboriginal people were living with HCV and an estimated 6,300 incarcerated people were HCV infected.

Because of common routes of transmission and increased susceptibility, individuals infected with HIV are at risk of becoming co-infected with hepatitis C and vice versa. People who are co-infected are more likely to be Aboriginal, current or former IDU, current or former prisoners and/or people who received contaminated blood or blood products in the course of their health care (prior to implementation of HCV testing in the blood supply).

Many people experience few to no symptoms associated with infection. It is estimated that one-third of those living with HCV don't know they have it. Approximately 26% of people living with HIV also don't know they have it. Therefore, it is essential that people who have been diagnosed with either HIV or HCV are tested for the other virus. Knowledge of HIV and HCV status may result in behaviour changes that reduce transmission to others and allow for informed decisions surrounding treatment and care.

Co-infection has implications for care and treatment. In the presence of HIV, HCV progresses two to three times faster than HCV alone and hepatitis C treatment is often less successful in co-infected people. Also, decisions about HIV treatment are more complex due to the drug interactions between HIV and HCV treatments and the side effects of treatment, particularly liver toxicity.

4.2 SEXUALLY TRANSMITTED INFECTIONS (STIS)

KEY POINTS

- **STI incidence is on the rise.**
- **The presence of some STIs increases the risk of transmitting and acquiring HIV.**
- **Due to similar risk factors for infection, people diagnosed with an STI should be tested for HIV.**

STI trends can offer important insights into where the HIV epidemic may grow, making STI surveillance data crucial for understanding the potential of the HIV epidemic. As in other high-income countries, Canadian estimates of STIs show that incidence in the general population is on the rise. Chlamydia, the most common bacterial STI in Canada, has increased by 80% from 1999 to 2008. Women and younger age groups are particularly at risk. In 2008, women had twice the rate of new Chlamydia infections compared to men and 83% of new cases were in people under 30. The distribution of reported cases varies geographically, with the highest rates in Nunavut, the Northwest Territories and Yukon.

Gonorrhea, the second most common bacterial STI in Canada, increased by 117% between 1999 and 2008. Females aged 15 to 24 and males ages 20 to 24 had the highest number of new cases of gonorrhea. The distribution of reported cases varies geographically, with the highest rates in the Northwest Territories and Nunavut.

Finally, infectious syphilis, the least common reportable STI, has shown a significant and worrisome increase between 1999 and 2008, with rates increasing by 600%. Infection rates were highest in men aged 30 to 59 and the highest rates among women were in the 25 to 59 age group. Outbreaks have been reported in Vancouver, Edmonton, Calgary, Winnipeg, Toronto, Ottawa, Montreal and the Yukon in men who have sex with men and in heterosexual populations.

International and some Canadian research shows the incidence of syphilis, gonorrhea, Chlamydia, genital herpes, hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), human papillomavirus (HPV) and HIV has been rising in MSM since the mid-1990s.

Individuals infected with either HIV or an STI are at risk of being co-infected due to common routes of transmission (sexual contact). Furthermore, the presence of an STI may increase the risk of transmitting or acquiring HIV through sexual contact. Therefore, those with an STI are at greater risk of becoming infected with HIV. There are also many STIs that are asymptomatic (i.e. they do not show symptoms) and therefore may never be properly diagnosed. For all these reasons, a diagnosis of an STI or HIV should be accompanied by counseling about HIV/STI prevention and testing.

Another troubling trend is the increase in reports of antibiotic-resistant STIs. In some populations and regions this has reduced treatment options. Without the development of new antibiotics, a rise in drug-resistant STIs may increase the difficulty in controlling these infections and their complications.

4.3 TUBERCULOSIS (TB)

KEY POINTS

- People with HIV/AIDS are at higher risk for contracting TB if exposed.
- An estimated 1.6% to 5.8% of people living with HIV have active TB.
- People with HIV/AIDS are more likely to progress from latent TB to active TB.
- People with HIV/AIDS are more likely to develop extrapulmonary TB.
- Aboriginal people and immigrants to Canada from countries with higher rates of TB and HIV are at greater risk for co-infection.

Mycobacterium tuberculosis (TB) is a bacteria spread from a person with active, infectious 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 in order for infection to occur. When exposure to TB occurs, the body's immune system can sometimes eliminate the TB infection. If this does not occur, TB can remain alive but inactive, 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). People with TB outside the lungs are usually not infectious to others because they do not spread TB into the air through coughing.

Bacille Calmette-Guerin (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.

Latent TB is diagnosed through a TB skin test. Positive results should lead to chest X-rays and sputum smears to determine if it is active TB. However, 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/AIDS. 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. Failure to be fully adherent to the drug regimen can result in drug-resistant TB, making care more complicated and increasing the chances of transmitting 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.

People with HIV/AIDS are at greater risk of contracting TB due to a weakened immune system. People with HIV are more likely to develop active TB. People with HIV have a 10% chance of developing active TB every year compared to the general population, in which approximately 10% of people develop active TB in their lifetime. People with HIV/AIDS are also more likely to have active TB outside the lungs. There is uncertainty regarding the level of co-infection in Canada. Estimates of the percentage of people with HIV who also have active TB range from 1.6% to 5.8%. Two studies estimate the number of people with TB who are also HIV positive—the estimates are 3.8% and 13.8%. Research has shown that Aboriginal people and immigrants to Canada from countries with higher rates of TB and/or HIV are at greater risk for co-infection.

Due to 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.

5 EMERGING TRENDS AND ISSUES IN HIV/AIDS

This section of the report describes the emerging trends and issues in HIV/AIDS.

5.1 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/AIDS also extends to those populations at risk of HIV (e.g. MSM and IDU).

The stigma associated with HIV can lead to isolation, which can affect the quality of life of people living with HIV/AIDS. Stigma and discrimination can also make people who are at risk of HIV/AIDS less willing to be tested and those with HIV less able to seek treatment. Responding to HIV/AIDS with blame or abuse toward people living with or affected by the disease forces the epidemic underground, creating the ideal conditions for HIV to spread.

In a national study conducted in 2003, tolerance toward people living with HIV was assessed. The results of the survey show that stigma and discrimination continue to affect people with and at risk for HIV.

- 18% of Canadians felt that people who have HIV/AIDS should not be allowed to serve the public in positions like hairstylists.
- 44% of Canadians felt that people who have HIV/AIDS should not be allowed to serve the public in positions like dentists and cooks.
- 11% of Canadians felt that people who got HIV/AIDS through sex or drug use got what they deserve.
- 8% of Canadians felt that they could not be friends with someone who has HIV/AIDS.
- Six scenarios were used to create a "comfort scale"; one in 4 Canadians demonstrated a low level of comfort with HIV/AIDS, 41% demonstrated a moderate level of comfort and 35% had a high level of comfort.

5.2 CRIMINALIZATION OF HIV NON-DISCLOSURE

KEY POINTS

- **Criminal law requires that people living with HIV must disclose their HIV status before engaging in sexual behaviours that pose a "significant risk" of transmitting HIV to another person.**
- **Almost 100 people who have allegedly failed to disclose their HIV status have been charged with criminal offences in Canada.**
- **Arguments for criminalization of HIV non-disclosure include acting as a deterrent against participating in behaviours that can transmit HIV and punishing the individuals for these behaviours.**
- **Criminalization of HIV non-disclosure may deter some people from getting tested.**

According to the Supreme Court of Canada's decision in *R vs Cuerrier*, people living with HIV must disclose their HIV status before engaging in sexual behaviours that pose a "significant risk" of transmitting the virus. The courts have ruled that this includes unprotected anal and vaginal sex. It is unclear whether engaging in sexual acts that have a lower risk of transmission, such as oral sex without a condom, requires disclosure of HIV status, as no Canadian court has ruled on this issue. No Canadian court has ruled on whether HIV positive drug users have the legal obligation to disclose their HIV status when sharing injecting equipment; however, since it 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 when a person's positive status has been considered a factor aggravating the seriousness of other charges. Almost 100 people who have allegedly failed to disclose their HIV status have been charged with criminal offences in Canada. The number of new charges has increased significantly since 2004. As a consequence, 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 different 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 to act as a deterrent against behaviours that pose a risk for transmitting HIV to others. However, there is no good evidence that criminalization is effective as a deterrent. The other main argument for criminal prosecution is to punish the individual for the behaviour.

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

- 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 the institution and then out into the community upon the person's release.
- Sexual behaviour and drug use are complex human behaviours which may be more malleable when other interventions are utilized, such as education and risk-reduction counselling.
- The fear of criminal prosecution may deter people from being tested.
- Extensive use of criminal prosecution could lead to a misperception within the public about risk of transmission. This is especially relevant in cases where behaviours which have a negligible risk of transmission (such as biting, scratching and spitting) result in stiff sentences being imposed.
- 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.
- Gender and power inequity can also make the situation more complex. For example, some HIV positive women may not have the ability to insist on condom use due to 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 law. The Canadian HIV/AIDS Legal Network has partnered to create a resource kit for advocates and lawyers to support people with HIV facing these sorts of criminal charges. Another approach is being taken in Ontario, where a team of academics and community members is pressing for the creation of provincial prosecutorial guidelines that would define the circumstances under which criminal charges should be laid.

5.3 HIV PREVENTION INTERVENTIONS

5.3.1 Combination HIV Prevention

KEY POINTS

- **There are effective structural, behavioural and biomedical approaches to HIV prevention.**
- **HIV prevention should employ a strategic combination of all three approaches.**
- **Prevention programs should employ the best intervention mix with sufficient coverage, intensity and duration.**
- **Context-specific, evidence-based HIV prevention strategies need to be utilized.**

Successful prevention programming and strategies require knowledge of the epidemic, an understanding of the socioeconomic and cultural factors facilitating HIV transmission, and knowledge of effective evidence-informed prevention interventions specific to at-risk populations. An effective response to HIV prevention also requires governmental leadership and community activism, which are important for renewing and sustaining the response to HIV prevention.

Combination prevention is now seen as the way forward to preventing HIV transmission. This approach utilizes a strategic combination of effective behavioural, structural and biomedical prevention approaches. Specific prevention approaches and strategies need to be developed or chosen based on context-specific knowledge of the epidemic, evidence of effectiveness, and the ability to adapt the approach to the specific context. In order to ensure optimal outcome there needs to be community engagement through all stages from development to implementation. This strategic approach will involve determining an appropriate case mix of evidence-based HIV prevention approaches at sufficient coverage, intensity and duration to have optimal public health benefit. Prevention programming will be ineffective if it doesn't reach those at risk for HIV and if the availability of programming is not sustained in order for risk-reduction to be maintained.

Evaluation research needs to continue to build the evidence base on effective HIV prevention programming in order to better guide the selection of available behavioural, biomedical and structural interventions in specific contexts and populations (see next section). However, few prevention studies have investigated combinations of interventions, opting instead to evaluate the behavioural and epidemiological impact of discrete components of combination prevention strategies. This approach runs counter to the way people live their lives and make decisions; it is therefore difficult to gauge success when these individual approaches are combined with other prevention components.

5.3.2 Evidence in HIV Prevention Programming

KEY POINTS

- **The randomized control trial is gaining support as the best design for HIV prevention program evaluation; however, it has its drawbacks.**
- **The research question should guide the choice of methodology for program evaluation.**
- **The definition of evidence should include a spectrum from research evidence to the lived experience.**

In the United States there has been an increasing push for the adoption of an evidence-based public health approach to HIV prevention science. The evidence-based approach emphasizes the use of rigorous research methodologies—the gold standard being the randomized control trial (RCT). An RCT is an experiment in which investigators randomly assign eligible subjects into groups to receive or not receive one or more interventions that are being compared. This design allows for a high level of control, which minimizes the risk for biases and false conclusions. However, RCTs may be problematic, as they may be inappropriate or unethical for certain HIV prevention situations. Demonstration of efficacy under the controlled conditions of an RCT does not ensure that the same interventions will be effective in the real world—especially for behavioural interventions that may be very sensitive to the social environment and the population of interest.

Further complicating the push to rigorous research methodologies such as the RCT is the inability of front-line agencies to find resources to employ these approaches to evaluate the impact of their programs. It is important for front-line organizations to evaluate new approaches—the push to use an RCT design should not undermine this research. Furthermore, an RCT may not always be appropriate within these contexts. It is important to look at the research question of interest and find the best methodology to address the question as opposed to fitting a research question into a desired methodology.

There are also issues with the ability to apply the RCT design to assess social and policy interventions—social factors, institutions and structures have been shown to fuel the epidemic and structural interventions need to be studied to determine their impact. Other forms of research, such as observational studies, ethnography and policy analysis, may be better able to evaluate social and policy change for HIV prevention.

Evidence can be narrowly defined to include only rigorous findings from biological, behavioural and social science research, however, that excludes other forms of knowledge, such as knowledge gained from lived experience of individuals and communities affected with HIV/AIDS. These types of knowledge may not be as "hard" as that gathered through scientific research but should not be discounted or ignored.

Political or ideological beliefs can also get in the way and lead to challenges to scientifically proven evidence. A good example of this in Canada is the overwhelming evidence that supports the positive impact of a supervised injection facility in Vancouver's Downtown Eastside. Despite a large HIV epidemic and a proven positive impact of the supervised injection facility, the federal government has tried to close this facility through the court system.

5.3.3 The Social Determinants of Health and Structural HIV 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 impact on vulnerability to HIV.**
- **Structural interventions should be part of a comprehensive prevention package.**

The social determinants of health are a subset of the determinants of health. They are the range of social, economic and environmental factors that help to determine the health status of individuals or populations. The determinants of health as defined by the Public Health Agency of Canada include: 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 self-esteem and a reduced sense of belonging in the community. All of this can have an impact on a person's judgment or can reduce one's ability to protect him- or herself from HIV.

The understanding that the physical, social, cultural, organizational, community, economic, legal or 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 vulnerability and risk through changing social, economic, political and environmental factors. Structural approaches 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 behaviour, compared to behavioural approaches, which attempt to change the behaviour. Structural approaches to HIV prevention must be complemented by other prevention programming, including interventions to influence individual behaviour, in order to achieve an effective and continued reduction in HIV risk and vulnerability.

Examples of structural HIV prevention initiatives include:

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

When assessing structural interventions within a community context, there must be an initial analysis of the social, economic, political and environmental facilitators and barriers to HIV risk within that context. The development of strategies to combat these factors begins with a review of existing programs that have been developed elsewhere and then adopting and adapting them to meet the current situation.

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

5.3.4 Behavioural HIV Prevention Interventions

KEY POINTS

- **Behavioural HIV prevention interventions (health promotion) seek to influence knowledge, attitudes and behaviours.**
- **Behavioural interventions should be part of a comprehensive prevention package.**

HIV infection is the result of human social behaviour – behavioural HIV prevention interventions seek to influence knowledge, attitudes and behaviours that place an individual at risk for HIV. These include both sexual and drug-use behaviours. Behavioural strategies include those that attempt to delay the onset of first intercourse, decrease the number of sexual partners, increase the number of sexual acts that are protected, decrease sharing of needles and syringes, and decrease substance use.

Human behaviour is complex, widespread behaviour changes are challenging to achieve, and there are some important gaps in our knowledge about the effectiveness of behavioural HIV prevention strategies. Nonetheless, numerous behavioural interventions have been shown to reduce HIV transmission. The wide delivery of effective behaviour change strategies has been central to addressing the HIV epidemic.

Behavioural strategies to accomplish HIV prevention can focus on individuals, couples, families, peer groups or networks, institutions and entire communities. Behavioural strategies attempt to motivate behavioural change in individuals and groups by use of a range of educational, motivational, peer-group, skills-building approaches and community approaches. Programs promote accurate individual knowledge and perception of risk and increase individual motivation to avoid risky behaviour. Prevention programs also build individual skills needed to access prevention initiatives properly and to avoid, or effectively negotiate safety within, risky situations. Within households, HIV prevention programs address the stigma of HIV and sexuality and promote open discussion. At a community level, programs seek to increase the value associated with safer behaviours, support community members to reduce their risk, and reinforce new norms. Community level strategies include the use of mass media, social marketing and community mobilization.

HIV prevention efforts have generally focused on protecting individuals from becoming infected, but there is a movement toward helping people with HIV avoid spreading HIV to others (See section 5.3.4.6 - positive prevention). In order for these programs to be effective, efforts should be combined with interventions to increase HIV testing rates in order to reduce the number of HIV positive people who are unaware of their infection.

In order for behavioural prevention strategies to be successful, they must reach a sufficiently large number of people, they must elicit behaviour change, and they must sustain the change for long periods of time. A mix of communication channels must be employed to disseminate clear and simple messages of risk-reduction and health-seeking options. Providing people with options on how to reduce their risk is key, as there is no one-size-fits-all approach. Community involvement in the development and dissemination of messages is essential. The right mix of behavioural approaches depends on an understanding of the target population and the adaptation of existing programs to meet the needs of the population.

However, changing behaviours is not easy. Stigma and discrimination toward populations at greatest risk for infection have undermined support for these programs. Furthermore, efforts to implement certain programs have met with social and ideological disputes. Sexual

and drug-using behaviours are diverse and are usually conducted in private, making it difficult to fully understand these behaviours and motivate behaviour change. Finally, a lack of understanding of the social context, as well as the other factors that play into whether an individual participates in risk-reduction behaviours, hampers efforts to build effective programming to motivate change.

Despite these challenges, the efficacy and effectiveness of behavioural HIV prevention efforts have been proven through randomized control trials and observational research. Failure to implement these initiatives on a wider scale will allow the epidemic to grow in Canada.

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. Yet 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. Furthermore, the introduction of biomedical prevention interventions may result in increases in risky behaviours due to a false belief that biomedical interventions will protect all people. However, biomedical prevention strategies are unlikely to be 100% effective. To avoid the increase in risk behaviours that may occur if new biomedical tools are introduced, behavioural interventions that minimize risky behaviour in these new circumstances need to be employed.

5.3.4.1 Role of Sexual Behaviour Change (Sexual Health Promotion)

KEY POINTS

- **The delivery and adoption of strategies for sexual behaviour change, including reducing the number of sexual partners and using condoms, has the ability to greatly decrease HIV and STI infection rates.**
- **Promotion of behaviours emphasizing sexual health can involve complex interventions that address issues related to empowerment, negotiation skills, self-esteem and sexual health knowledge.**
- **Successful HIV behavioural prevention strategies need to be delivered with sufficient coverage, intensity and duration.**
- **Sexual health promotion needs to be part of a comprehensive prevention package.**

Behavioural strategies attempt to motivate behavioural changes within individuals and groups through a range of educational, motivational, peer-group, skills building and community normative approaches. 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 number of sexual acts that are protected.

Emerging evidence suggests that 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 in order for positive behaviour changes to be maintained.

5.3.4.2 Role of Injection Behaviour Change (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 psychoactive substances.**
- **The current Canadian anti-drug strategy fails to support harm reduction strategies.**
- **Harm reduction should be envisioned as part of a comprehensive prevention package.**

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 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. These types of interventions have been proven to reduce the risks of HIV and HCV infection in people who use drugs. It is important to note that people who inject drugs can play an important role in the development and delivery of HIV and HCV prevention programming.

On October 4th, 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 (treating the drug user) and enforcement (prosecution for drug producers and dealers). The new drug strategy has been criticized for the missing pillar—harm reduction. Evidence-based harm reduction, such as needle-exchange programs, has proven to be a significant tool for reaching populations that use drugs by improving their health and stemming the spread of HIV, HCV and other infectious diseases. Moreover, these programs build the trust necessary for users to engage in addiction treatment and recovery programs. The missing pillar represents a shift in political ideology to a more conservative approach to many social issues, including drug use. An example of this shift can be seen in the history of Insite, the first supervised injection facility in Canada.

Insite

Insite was opened in 2003 as the first legal supervised injection site in North America, in the Downtown Eastside neighbourhood of Vancouver, British Columbia. Since opening its doors, Insite has been a clean, safe environment where users can inject their own drugs under the supervision of clinical staff. Nurses and counsellors provide on-site access and referral to drug use treatment services and primary healthcare and mental healthcare providers, as well as first aid and wound care. Research on Insite has shown an array of benefits. These include a reduction in public injecting and needle/syringe sharing, increases in the use of treatment services and reduced public injections. As well, it has been shown that Insite does not increase crime rates, saves one life a year from overdose, provides nursing services to drug users and is generally supported by the public. In 2008, a cost-effectiveness study modeled that 1,191 cases of HIV infection and 54 cases of hepatitis C virus infection could be averted due to Insite over 10 years. Furthermore, it estimated a total net savings of $14 million over 10 years.

To operate Insite legally, Vancouver Coastal Health Authority was granted a three-year operating exemption under Section 56 of the Controlled Drugs and Substances Act in 2003 by the federal government. This exemption protected staff and clients from prosecution during the three-year pilot project. Despite the scientific evidence and the need for ongoing evaluation of this intervention, the federal government kept delaying the decision about granting an exemption to Insite beyond the pilot phase, which would allow them to continue to operate.

In May 2008, a case went to the BC Supreme Court launched by the non-profit organization that runs Insite and a group of drug users who argued that the site addresses a public health crisis. Justice Ian Pitfield ruled that denying drug addicts access to the healthcare services at Insite violates their charter rights to life, liberty and security of the person. The ruling will allow Insite to remain open under current drug laws. The judge ruled that the federal government, within the year, must rewrite its laws to allow for medical use of illegal drugs if they are part of a healthcare program. The Attorney General of Canada appealed this decision, however, on January 15, 2010. The BC Court of Appeal dismissed the appeal by the Attorney General of Canada, allowing Insite to continue operations. However, the federal government may still appeal the decision to the nation's highest court, the Supreme Court of Canada.

5.3.4.3 Role of Drug Use Treatment

KEY POINTS

- **Treatment for drug use can reduce the risk of HIV transmission.**
- **Treatment does not need to be abstinence-based to be effective at reducing the risk for HIV.**
- **Sufficient treatment spaces need to be readily available.**
- **Drug treatment programs need to be envisioned as part of a comprehensive prevention package.**

The objectives of drug use treatment include the achievement and maintenance of physical, psychological and social well-being. This can be accomplished through reducing the risk-taking associated with drug use, through reducing levels of drug use, or through complete abstinence from drug use. Because of the chronic relapsing nature of drug dependence and the need to address social and psychological dimensions, achieving abstinence is often a lengthy and difficult process for many people—some may never achieve it. However, that does not diminish the beneficial effects of drug treatment programming.

Treatment programs for drug use have been shown to reduce drug use, reduce needle/syringe/equipment-sharing behaviours and reduce sexual risk behaviours. Treatment also provides a platform for HIV education and medical care.

However, there is no one-size-fits-all for the treatment of drug users. The comprehensive provision of a varied range of treatment services is essential for effective HIV prevention. Furthermore, treatment spaces need to be readily available for drug users when they decide to enter. Currently, long wait lists hamper prevention efforts.

5.3.4.4 Role of School-Based Education

KEY POINTS

- **There is a high level of sexual risk-taking among youth that could lead to HIV transmission.**
- **High rates of STIs among youth could be an early warning sign of sexual risk-taking that could lead to an increase in HIV infection.**
- **A national survey found evidence for the need to increase HIV/AIDS education in schools across Canada.**
- **Evidence shows that comprehensive school-based programs can reduce the behaviours that put youth at risk for HIV.**
- **School-based education should be envisioned as part of a comprehensive prevention package.**

Approximately half a million teenagers between the ages of 14 and 17 are sexually active in Canada. On average, Canadian teenagers report three sexual partners, and 24% of sexually active teenagers reported not using a condom at their last sexual encounter (125,000). HIV prevalence remains low in the general population of youth, but increasing STI rates show an alarming trend. Women aged 15 to 24 and men aged 20 to 24 are the most affected group for infection with Chlamydia and gonorrhea. These rates are a marker of risky sexual behaviour in the population and may lead to an outbreak of HIV within this age group (see section 3.2.6 for the epidemiology of HIV in youth in Canada).

In addition, young women under the age of 20 have an increased risk of acquiring HIV through vaginal sex, as their cervix has not fully developed. During this time, the protective tissues of the cervix are thinner, thereby increasing its vulnerability to infection by HIV and other STIs.

Due to this additional biological risk factor, it is particularly important that young women under 20, as well as their sexual partners, have access to accurate sexual health and HIV prevention information and methods.

School-based sexuality and HIV prevention education can reach a wide range of potentially at-risk youth. Evidence shows that abstinence-only programs do not delay the initiation of sex, increase the return to abstinence or reduce the number of sexual partners. Comprehensive programs that support healthy sexual practices for sexually active teens have been shown to have positive behavioural effects. These programs can lead to delayed initiation of sex, reduction in the number of sexual partners, increased condom 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. The Centers for Disease Control and Prevention (CDC) in the United States has researched the characteristics of effective school-based programs. These include a basis in social learning theory, a narrow focus on a specific behavior, experiential activities to personalize risk information, instruction on resisting negative social influences, reinforcement of positive peer norms and values, and activities to increase skills and confidence.

The Canadian AIDS Society (CAS) undertook a national survey on the state of HIV curriculum. The results of the survey provide clear evidence of the need for increased HIV education in schools. Parents (96%), educators (99%) and students (94%) overwhelmingly believe that HIV education should be provided within the school system. However, almost one-third of students reported that they had not received any HIV education in the past year. At the same time, educators (77%) and students (59%) rated the quality of the HIV/AIDS education that was available as fair or poor. Almost 30% of educators reported that they had no experience teaching HIV education and 64% had received no training.

CAS concluded that there is a need to provide more support and resources on HIV to teachers in Canada and states that it will work to strengthen partnerships with policy makers and educators in order to provide youth with comprehensive HIV education and to create national standards for HIV and AIDS education in Canadian schools.

5.3.4.5 Role of Prison-Based Prevention Programming

KEY POINTS

- **Condoms are available in federal prisons but not in all provincial or territorial prisons.**
- **Bleach is available in federal prisons but not in all provincial or territorial systems.**
- **Clean needle distribution is not available in any prison system in Canada.**
- **Methadone initiation programs to start drug users on treatment 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 prior to incarceration.**
- **Prison-based prevention programming needs to be part of a comprehensive prevention package.**

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. As per the Correctional Services of Canada (CSC), 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. It should be noted, however, that provincial and territorial prisons vary in the availability of condoms. Furthermore, some provinces have made condoms available but only through prison health services; this can make a prisoner reluctant to pick up or request condoms for fear of being identified as engaging in homosexual activity and discrimination.

In 1996, bleach became available 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. While this is an important prevention initiative, it should be noted that the provision of bleach is a suboptimal intervention. 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." It was concluded that new needles/syringes are safer than needles/syringes that have been sterilized with bleach. This is because people do not know, or do not consistently practice, the proper method of using bleach for disinfecting needles. Furthermore, cleaning with bleach may not kill the hepatitis C virus.

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 while also training 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 treatment 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 already on MMT before incarceration.

5.3.4.6 Role of Positive Prevention

KEY POINTS

- **There is an increasing acknowledgement that prevention initiatives should include people with HIV/AIDS.**
- **There are concerns that increased emphasis on positive prevention will place the burden of responsibility for stopping the transmission of HIV on people with HIV instead of recognizing it as a shared responsibility.**
- **Positive prevention should be envisioned as part of a comprehensive prevention package.**

Positive prevention (or "poz prevention") for people with HIV aims to empower HIV positive individuals, promote healthy sexual relations among HIV-positive and/or HIV-negative sexual partners, strengthen the sexual health and well-being of people with HIV, and reduce the possibility of new HIV infections and other STIs.

Historically, HIV prevention programs have mainly targeted those at high risk for becoming infected with HIV by attempting to reduce risk-taking behaviours. Now people with HIV are becoming a priority population for HIV prevention initiatives in order to further improve the effectiveness of HIV prevention. Positive prevention is based on the principle of health promotion. Positive prevention actively promotes the physical, mental and sexual health of people living with HIV and emphasizes that people with HIV should receive the appropriate treatment, support and services they require to enhance their health. These initiatives empower people living with HIV to be actively involved in prevention.

However, care should be taken to ensure that positive prevention is part of a comprehensive and broad prevention strategy. Positive prevention should not be used to shift the responsibility of prevention to people who are living with HIV/AIDS.

5.3.5 Biomedical HIV Prevention Interventions

KEY POINTS

- **Biomedical interventions aim to reduce the risk of HIV infection in HIV-negative people or decrease the infectiousness of HIV-positive people.**
- **Biomedical interventions are not expected to provide full protection against HIV.**
- **Biomedical interventions should be part of a comprehensive prevention package.**

Biomedical interventions aim to reduce the risk of HIV infection in HIV-negative people or decrease the infectiousness of HIV-positive people. Examples include condoms, vaccines, microbicides, male circumcision, treatment of STIs and antiretroviral use in HIV-negative and

HIV-positive people. Research efforts have shown effectiveness of some of these interventions while others are still under development and may be decades away from implementation. 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.

Biomedical HIV prevention initiatives (e.g. condoms) have historically been intertwined with behavioural prevention initiatives (e.g. safer-sex counselling). This pairing will need to continue, as biomedical interventions do not, and are not expected to, provide 100% protection against HIV infection. Furthermore, there is some concern that with the advent of new biomedical interventions, people may increase their risk behaviours because of a perceived decrease in risk. The continued delivery of behavioural prevention initiatives will be critical moving forward to ensure that people continue to practice behaviours that protect them from HIV transmission (such as safer sex and clean needle use).

5.3.5.1 Physical Barrier Methods

KEY POINTS

- **Male and female condoms provide dual protection against HIV and some STIs.**
- **The female condom is the only available method to protect against HIV that can be initiated solely by women.**

Male and female condoms are physical barrier methods that provide protection against HIV, some STIs and pregnancy. The male condom is put onto the male's penis and is made of latex or polyurethane. The female condom is inserted into the woman's vagina and is made of polyurethane or nitrile. Both male and female condoms provide protection against HIV by providing a barrier against exposure to genital fluids, since the virus cannot penetrate latex, polyurethane or nitrile.

The effectiveness of condoms in reducing the transmission risk of STIs varies depending on the STI. For infections transmitted through genital discharge (e.g. gonorrhea and Chlamydia), condoms provide a barrier to exposure since the organisms are too large to penetrate the latex or polyurethane. For STIs that cause genital ulcers (e.g. syphilis and herpes), the degree of protection is lower since 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 the female condom may provide extra protection against these STIs since the condom covers a wider surface area, including some of the external genitalia.

A systematic review of research on male condoms estimated the effectiveness of male latex condoms for the prevention of HIV transmission at 85%. Their effectiveness can be as high as 95% when they are used consistently and properly. However, condoms may not be as accepted in certain populations or in certain types of relationships (e.g. regular partners).

Furthermore, in order to prevent HIV and STIs, condoms must be used consistently, therefore, a readily available supply is required.

The use of the male condom depends on the willingness of the man; this led to the development of the only female-initiated method for HIV prevention—the female condom. Laboratory tests have shown that the female condom does provide an effective physical barrier to HIV, but the effectiveness in real-life circumstances has not been directly assessed. Female condoms are being used by women and promoted by some organizations, however, their effectiveness and safety for anal sex has not been determined.

The female condom has some drawbacks. The outer ring of the condom is visible outside the vagina and the condom can make noise during intercourse, making it detectable by the woman's partner and difficult to use secretly. It requires practice to insert and remove, has higher failure rates in preventing pregnancy, and is expensive and not well marketed. There are mixed results concerning its effect on sexual pleasure. In a research study conducted in Toronto, some women identified that initially the "work" of insertion interfered with their enjoyment but with experience and practice they relaxed and enjoyed the sex, especially as they grew to trust the condom's effectiveness. Other women found sex with the female condom more pleasurable than with the male condom, while for others the problems of slippage and irritation from the rings caused the sex to be less pleasurable. Newer versions of the female condom are in development and hope to overcome some of the drawbacks of the original version. A second-generation female condom, called the FC2, was approved by the FDA in 2009. The FC2 is made of a nitrile material that is less expensive and softer than the first-generation polyurethane version (FC1), therefore it may be less noisy and may improve sexual pleasure.

5.3.5.2 Vaccines

KEY POINTS

- **There are two types of HIV vaccines in development: 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 and there are no large-scale clinical trials currently planned.**
- **If developed, preventative vaccines would need to be envisioned as part of a comprehensive prevention package.**

The term *vaccine* is usually used to describe products that are designed to prevent individuals from getting a disease (known as preventative vaccines). Therefore, an HIV preventative

vaccine would reduce the risk of becoming infected with HIV. However, the development of an effective preventative HIV vaccine has remained difficult for several reasons. First, HIV attacks the immune system immediately, and with conventional vaccines the immune system takes too long to develop a response in order to prevent infection. Second, the point of first contact with HIV is usually in the wet tissues of the mucosa in the anus, penis and 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.

To date, there have been more than 100 clinical trials with at least 30 different potential HIV vaccines. All vaccine candidates, except for one, have failed to provide protection against this virus. The successful vaccine, called the Thai Prime-Boost Vaccine, did not provide enough protection for it to be made widely available. Currently, there are no phase III HIV vaccine trails underway and an HIV vaccine is not expected within the foreseeable future. However, based on the Thai Vaccine trial results and research with small numbers of people exposed to but not infected with HIV, it appears that it is possible for the immune system to encounter HIV and successfully contain this virus. Also, there is a small number of people who become infected with HIV but do not seem to progress in their disease very quickly. These findings keep scientists hopeful that one day an effective vaccine may be developed.

An ideal preventative vaccine would be 100% effective against HIV, so that a vaccinated person would no longer be at risk for HIV infection. However, the one vaccine that was found effective in a clinical trial—the Thai Prime-Boost vaccine—had a low vaccine efficacy (ranging from 26% to 31%, depending on the analysis). An HIV vaccine that provides some immunity (i.e. not 100% effective) may still be able to deliver public health benefits, however, the lowest practical level of efficacy is still under debate. Whatever the level, a vaccine that is not 100% efficacious could not replace the need for other forms of HIV prevention (e.g. safer-sex and safer-injection practices). The major drawback of a vaccine that does not confer 100% immunity is the potential that vaccinated individuals (or their partners) would falsely think that they are no longer at risk for HIV. This could lead to an increase in behaviours that place people at risk for HIV infection, which has the potential to increase HIV infection rates.

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 AIDS. It appears possible that if a vaccine could boost the immune response of people with HIV, it could decrease the levels of virus in the blood and semen, therefore decreasing HIV transmission risk. 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.

In June 2004, the Global HIV Vaccine Enterprise was established with the support of the Bill & Melinda Gates Foundation and the United States National Institutes of Health. The Global Enterprise is an alliance of independent organizations, governments and stakeholders around the world dedicated to accelerating the development of preventative HIV vaccines. In February 2007, the Canadian HIV Vaccine Initiative (CHVI) was established. The CHVI is a collaboration between the government of Canada and the Bill & Melinda Gates Foundation.

5.3.5.3 Microbicides

KEY POINTS

- **Microbicides have the potential to prevent the sexual transmission of HIV when applied topically or used as a suppository in the vagina or rectum.**
- **Early first-generation microbicides did not show any success in clinical trials.**
- **Microbicides that contain antiretrovirals—second-generation microbicides—are now the only microbicides being tested in ongoing trials.**
- **Microbicides should be part of a comprehensive prevention strategy when available.**

Microbicides are products that have the ability to prevent the sexual transmission of HIV and other STIs 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 in order to prevent infection with HIV and other STIs.

There are different ways in which microbicides could act to prevent infection. Some microbicides could provide a physical barrier that keeps HIV and other disease-causing agents (pathogens) from reaching the target cells. Other microbicides could act by maintaining a protective environment (acidic pH) in the vagina, while others could kill or disable pathogens.

Scientists have identified a large number of inexpensive substances that could be incorporated into a microbicide to prevent the transmission of HIV in the ways described above. Six of these first-generation microbicides have proceeded to large clinical trials but they have all failed to prevent HIV infection. Three of these microbicides may have even increased the risk of acquiring HIV because of damage caused to the vaginal mucous membrane. Currently, there are no conventional microbicides in large-scale clinical trials. Researchers are now looking at second-generation microbicides that contain antiretroviral drugs. ARV-based microbicides can be considered a type of pre-exposure prophylaxis (PrEP) and are discussed later in section 5.3.5.6.3.

The benefit of microbicides is that they could offer women a means to prevent HIV transmission that does not require the cooperation of a male 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.

If microbicides ever become a reality they will likely not be 100% effective. A cost-benefit analysis has shown that a microbicide that reduces the risk of infection by 40% that covers 30% of a population could prevent approximately three million HIV infections over three years worldwide. Such a microbicide would not provide 100% immunity, however, and therefore would not replace the need for other forms of HIV prevention (e.g. safer-sex and safer-injection practices). The major drawback of a microbicide that does not offer 100% protection is the potential that individuals may falsely think that they are no longer at risk for HIV if they use a microbicide. This could lead to an increase in behaviours that increase the risk of HIV infection. Furthermore, microbicides do not affect other modes of transmission, such as needle sharing. Therefore, microbicides, once available, should be part of a comprehensive prevention strategy.

5.3.5.4 Male Circumcision

KEY POINTS

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

Male 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. Circumcision in male infants in Canada has dropped from approximately 50% in 1998 to about 14% in 2003.

Based on the following evidence, male circumcision is thought to be a partially effective method of HIV prevention for men in heterosexual relationships but not effective in MSM nor directly effective for decreasing HIV rates in women. The results of three 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. 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, while the remaining cells become less accessible to HIV due to the scarring.
- Ulcers on the foreskin from STIs 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.

Observational studies suggest that male circumcision may also reduce HIV incidence in female sexual partners; however, in an African circumcision trial of HIV-infected men, there was no protective effect against HIV transmission to the female partner. But if the 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 MSM have had inconsistent results. This may be partly explained by the fact that men in these relationships may be involved in both insertive and receptive sexual roles—HIV acquisition is more likely with receptive anal intercourse compared to insertive anal intercourse and circumcision would have no effect on transmission to the receptive partner.

The body of evidence discussed 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 circumcision in countries with a high prevalence of HIV throughout the population and where there is a low prevalence of circumcision. Male circumcision for HIV prevention is currently being scaled-up in several countries in Eastern and Southern Africa. Several challenges exist for this strategy. Acceptability may be low in certain populations, and therefore uptake of the procedure could be low, limiting its impact. There are also concerns that male circumcision may be seen as a "quick fix" and might lead to an increase in high-risk sexual behaviours (e.g. refusal to use condoms). Statistical modeling suggests that an increase in risky sexual behaviour after circumcision could cancel any benefits. Therefore, the implementation of this prevention intervention should be seen as part of a more comprehensive prevention package—one that continues to include HIV testing and counselling, promotion of safer-sex practices and the provision of condoms. Furthermore, it is essential that circumcision is conducted in a safe environment.

Since there is no convincing research evidence that male circumcision can protect MSM and women, nor is the epidemic in Canada generalized to the entire population, the implementation of policies to increase male circumcision is not warranted. Modeling has shown that there would be a limited public health impact from promoting this type of intervention within contexts such as Canada. Therefore, within the Canadian context, this type of intervention is not recommended.

5.3.5.5 Treatment of Other Sexually Transmitted Infections (STIs)

KEY POINTS

- **Sexually transmitted infections (STIs) increase the likelihood of transmitting and acquiring HIV.**
- **Treatment of STIs should be envisioned as part of a comprehensive prevention program.**

STIs may increase the likelihood of acquiring and transmitting HIV. In terms of increased susceptibility, genital ulcers result in breaks in genital mucous membranes, which can allow

HIV to enter. Additionally, inflammation caused by STIs can increase the concentration of cells—at the genital and rectal tissues—that can serve as target cells for HIV entry into the body. In terms of HIV transmission, the presence of an STI in someone who has HIV can increase the amount of HIV in genital secretions, which increases the risk of transmitting HIV to others.

Unexpectedly, three randomized controlled trials completed in Africa did not find that the suppression of genital herpes, through the daily treatment of herpes-infected people with acyclovir, could reduce the chance of acquiring or transmitting HIV. This may have been because of poor adherence to daily acyclovir or because the dose of the medication was too low. Additionally, four randomized control trials were also completed in Africa to assess the effect on HIV acquisition of improved STI detection and treatment of symptomatic STIs or periodic mass treatment of STIs in the community. Only one of these trials found a significant reduction in new HIV infections; this trial was conducted in an area where the epidemic was less well established and where there were lower rates of HIV-risk behaviours and lower rates of STIs. This might mean that the effect of treatment services for STIs may depend on the stage of the HIV epidemic, and that effectiveness decreases as the epidemic becomes more established. However, the impact of STI control in the reduction of HIV transmission requires further research and investigation.

Despite the lack of conclusive research evidence for treating herpes at an individual level and mass treating STIs at a population level, 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 model.

5.3.5.6 Treatment as an Aid to Prevention

Antiretroviral therapy could have a role to play in reducing the transmission of HIV in the following ways:

- effective treatment of infected persons;
- post-exposure prophylaxis (PEP); and
- pre-exposure prophylaxis (PrEP).

KEY POINTS

- **Effective treatment of infected persons has the potential to reduce their infectiousness and decrease their risk of transmitting HIV to others.**
- **HIV is not eliminated from the body through treatment and therefore the risk for HIV transmission remains.**
- **Treatment as a form of prevention may be an important population-level approach to prevention but cannot replace conventional approaches (e.g. condoms and clean needles) for individuals.**

One of the factors that affects the transmissibility of HIV from someone with HIV to someone else is the amount of HIV they have in their body. Viral load tests can be used to detect the amount of HIV in the blood of someone living with HIV—these tests have proven 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). If Highly active antiretroviral therapy (HAART) also reduces HIV in the genital tract, seminal fluid and/or rectal fluids, then this may reduce the sexual infectiousness of the person and thereby reduce the chance of transmitting HIV.

However, there are a few issues that should be noted. There is research showing that HIV *can be* detected in the genital fluids of some people who have undetectable viral load in the blood. If these people have unprotected sex with a seronegative partner because they think they have undetectable viral load, then they are at an increased risk of transmitting HIV. Secondly, blips occur sporadically in the viral load of some people who have had undetectable viral load—this could lead to increases in HIV in seminal, anal and vaginal fluids, sometimes unknowingly to people living with HIV. This could increase the risk of HIV transmission during unprotected sex. Finally, sexually transmitted infections (STIs) have also been implicated in causing increases in viral load in genital fluids, which could affect one's ability to transmit the virus.

Furthermore, treatment does not eliminate the virus from the body, which means that the risk of transmission from one person to another is only *potentially* reduced and not eliminated. Therefore, there is still a risk of infection when an HIV-negative person has unprotected sex with an HIV-positive person. This is why treatment as prevention does not work on an individual level. However, treatment as prevention may work on a population level. The idea is that if enough people living with HIV are diagnosed and successfully treated, then the result should be a reduction in the average amount of the virus circulating in the community. This reduction in average viral load, over many different exposures to HIV within a population, may result in the occurrence of fewer transmissions. The reduced HIV transmission rate is an effect that only happens when large groups of people living with HIV are successfully treated. This is why experts only envision treatment as prevention as a population-level approach, which would be undertaken in combination with conventional prevention programs.

If HAART can be used for population-level HIV prevention, mechanisms to increase the number of people on treatment are needed. This can be accomplished in three ways:

- by increasing the number of people who know they are HIV positive through HIV testing
- by improving access of hard-to-reach populations to HAART; and
- by increasing the CD4+ level at which one could begin therapy.

Improving adherence of people currently receiving HAART can also have an impact by ensuring the best suppression of viral load, resulting in less infectiousness for the individual. Increasing coverage and adherence may involve extensive, labour-intensive and innovative approaches to bring underserved and hidden populations into the healthcare system and improve the chances that individuals take their medications properly, thereby improving the effectiveness of HAART. It could also involve the development of improved treatments with fewer side effects and simplified delivery mechanisms (e.g. patches).

The contentious issue for this approach would be if people living with HIV were initiated on 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, virologic failure, mortality, side effects and drug resistance. However, there is currently a trend toward earlier initiation of HIV treatment for the benefit of the person living with HIV, based on clinical outcomes and the theory that chronic HIV inflammation may be damaging to the body over the long term. All treatment guidelines are in agreement that treatment should be started before the CD4 cell count has dropped to 350 cells/mm^3, rather than waiting for it to drop below 200 cells/mm^3, which used to be the standard. However, not all treatment guidelines agree on what CD4 level people with HIV should start therapy. For example, two treatment guidelines from the United States (the Department of Health and Human Services and the International AIDS Society US Panel) recommend starting treatment with CD4 counts between 350 and 500 cells/mm^3. Moreover, some experts are recommending starting treatment with CD4 counts > 500 cells/mm^3. These recommendations for starting treatment above 350 cells/mm^3 are based on observational studies only.

Some studies have suggested that potential gains derived from the expansion of HAART coverage on HIV transmission could be reduced by an increase in high-risk behaviour, decreased adherence to HAART and the resulting increase in drug-resistant virus.

Because this issue is so new, there is currently much confusion in the community about the impact of HAART on HIV transmission. More research and dialogue is necessary in order to fully understand the complexities of using HAART as prevention.

KEY POINTS

- **PEP is the prescription of antiretroviral HIV medications after an actual or suspected exposure to HIV in order to prevent infection.**
- **PEP must be administered as soon as possible, within a maximum of 72 hours, after a suspected exposure to HIV.**
- **PEP is a regimen of combination antiretroviral therapy that needs to be taken every day for four weeks.**
- **There is no definitive evidence regarding the level of protection that PEP provides.**
- **PEP is the standard of care for healthcare workers (occupational exposures) but its use is controversial for sexual exposure and other types of exposure such as injection drug use.**
- **There is varying availability to PEP across Canada for non-occupational HIV exposure.**
- **PEP is not 100% effective and should be envisioned as part of a comprehensive prevention program.**

Post-exposure prophylaxis (PEP) is the prescription of antiretroviral HIV medications after an actual or suspected exposure to HIV in order to try to prevent infection. When HIV infects the body, there is a window of opportunity before HIV becomes systemic in the body when certain types of antiretroviral drugs can block the replication of HIV. PEP aims to inhibit the first replication of HIV to prevent the establishment of chronic HIV infection.

For ethical reasons, prospective randomized controlled trials designed to investigate whether PEP works in people exposed to HIV have not been conducted. However, a case-control study provided evidence for the protective effect of zidovudine (AZT) monotherapy for post-occupational exposure (needle-stick injury in a healthcare setting) in reducing the risk of HIV infection. There is no direct evidence to support the use of combination antiretroviral therapy, instead of monotherapy, but due to 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. Due to this evidence, guidelines suggest that PEP should ideally be started within 24 hours of exposure but can be prescribed up to 72 hours and should be taken for four weeks.

PEP is not 100% effective and there are several reports of people who have used PEP after an exposure but still became infected. Studies have estimated that PEP may prevent up to 80% to 90% of HIV infections, but these are just estimates and every exposure carries different risks depending on how much HIV was present, the strength of the virus, the type of exposure and the strength of the exposed individual's immune system. A longer delay in

starting medications after an exposure and poor adherence to medications once PEP has been started could decrease the effectiveness of PEP.

The potential risks of PEP include drug toxicity, interactions with other medications, the development and transmission of drug-resistant strains of HIV, and the reduced effectiveness of behavioural prevention measures.

Accessibility of PEP for non-occupational exposure varies across the country. Even in locations where PEP is available, there are very few health promotion campaigns about PEP as prevention. 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. Therefore, the only people who currently benefit from this prevention intervention are those who are aware of PEP, can afford the full course and know where to get access.

5.3.5.6.3 Pre-Exposure Prophylaxis (PrEP)

KEY POINTS

- **PrEP is the use of antiretroviral HIV medications before a potential exposure to HIV in order to decrease the risk of acquiring HIV.**
- **PrEP involves the regular use of antiretroviral drugs started before an HIV exposure and continued throughout potential periods of risk.**
- **Antiretroviral 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.**
- **PrEP is not licensed for use anywhere in the world. However, trials are ongoing.**

Pre-exposure prophylaxis (PrEP) involves the regular use of antiretroviral medications beginning before a potential exposure to HIV and continuing through potential periods of risk. It aims to reduce the chance of infection in the event of an exposure to HIV. The antiretrovirals used for PrEP may be in the form of a pill taken orally, gel applied vaginally or rectally (also known as a ARV-based microbicide), or as an injection. There are a number of dosing strategies that may be possible, such as the use of antiretrovirals daily, intermittently/occasionally (a few times a week) or coitally (before and after sex).

Studies examining the safety and efficacy of PrEP are still underway and there is no consensus on the type of PrEP needed to prevent infection or about the amount of protection it may offer. Support for PrEP comes from animal studies and studies that show that the use of antiretroviral medications reduces mother-to-child transmission.

Results released at the AIDS 2010 Conference in Vienna provided proof-of-concept for pre-exposure prophylaxis. A study called the CAPRISA 004 trial found that a vaginal gel containing tenofovir, applied before and after sex, reduced the risk of HIV infection in women by 39%. Women who applied the gel for more than 80% of their sex acts had a higher level of protection—54%. Further trials are needed to confirm these results and also provide information on other types of PrEP.

PrEP has some theoretical advantages over PEP. PrEP dosing does not require individuals to identify high-risk exposures (which can be challenging) and does not need to be initiated within a critical period after exposure. While PrEP is not licensed for use in Canada, there are anecdotal reports of unapproved PrEP use occurring in the community outside of clinical trials. Surveys conducted in gay communities in the United States suggest that PrEP is being used but it is rare. In Canada, one small survey of people getting tested for HIV at an STI clinic in Toronto did not document any PrEP use. However, there are concerns that unapproved use could increase as clinical trial results are released and awareness of PrEP increases. PrEP needs to be prescribed by a doctor and obtaining antiretrovirals from elsewhere—such as friends, people at parties or the Internet—could be dangerous.

As of August 2010, there were five large efficacy trials of PrEP ongoing. The main PrEP strategies under study are the daily use of a single drug called Viread, which contains tenofovir disoproxil fumarate (TDF), or a combination drug called Truvada, which combines tenofovir with the drug FTC (emtricitabine). There is one trial looking at the same tenofovir gel evaluated in the CAPRISA 004 study but when the gel is applied every day instead of before and after sex. Scientists have focused on the antiretroviral drugs tenofovir and FTC because of their proven safety for use in humans for HIV treatment and because they remain in the blood stream for long periods of time, require once-daily dosing and have unique resistance profiles—meaning that if someone developed drug resistance to tenofovir or FTC, he or she would still be able to use many other types of antiretrovirals. Conducting clinical trials with both monotherapy and combination therapy will allow for the evaluation of the safety and efficacy of both regimens and may help determine the optimal number of drugs needed for PrEP.

There are many issues that need to be addressed prior to initiation of PrEP as a prevention strategy. The use of antiretrovirals could lead to the development and transmission of drug-resistant HIV. To reduce the risk of drug resistance, regular HIV testing will be required to identify those who become infected while taking PrEP and ensure that their PrEP use is discontinued. Many antiretrovirals produce side effects, some of which are quite toxic, thus the benefits of using PrEP must outweigh the potential costs. Adherence may be a challenge for many individuals and high adherence will likely be necessary to maintain the effectiveness of PrEP in preventing HIV infection—as seen in the CAPRISA 004 trial. The use of PrEP may also lead to an increase in risky behaviours due to a false belief that PrEP will provide complete protection. This could negatively impact infection rates despite any protection PrEP may confer. Other issues include the cost associated with its use, who decides when PrEP can be taken (access and availability issues), and potential interactions with other drugs, including street drugs. In Canada, PrEP may only be a viable strategy for populations at highest risk of HIV acquisition.

5.3.5.7 Prevention of Mother-to-Child Transmission

KEY POINTS

- **Transmission of HIV from mother to child in Canada is exceedingly low.**
- **If HIV is diagnosed early in pregnancy, antiretroviral therapy is effective in preventing transmission to the newborn infant.**
- **Because HIV can be transmitted through breast milk, HIV-positive mothers in Canada are recommended to not breastfeed.**
- **Prevention of mother-to-child transmission should be envisioned as part of a comprehensive prevention package.**

HIV can be passed from mother 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.

Between 1990 and 2008, 2,366 infants born in Canada were perinatally (before or just after birth) exposed to HIV; of these infants, 6.4% have been confirmed HIV positive. Between 1997 and 2008 (HAART era), the overall transmission rate was 3.5%. However, it was only 0.7% among mothers and infants who received HAART. In 2008, four infants acquired HIV, however, neither the mothers nor the infants had received HAART to prevent transmission.

Antiretroviral therapy 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 antiretroviral therapy prior to delivery, although not as effective, can also help reduce the risk of transmission. In both cases, antiretroviral therapy is also given to the infant after birth. Women are advised to not breastfeed but to use formula. Finally, if a woman is receiving optimal antiretroviral therapy with complete viral load suppression, she may deliver vaginally (with the option of a Cesarean section). For women who are not receiving optimal antiretroviral therapy, 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.

Almost all pregnant women in Canada access prenatal care, making this an opportune time to counsel regarding HIV testing. However, groups such as IDUs, immigrant and refugee women may not receive adequate prenatal care. In order 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.

Barriers to preventing mother-to-child transmission include lack of antenatal care, no HIV testing in pregnancy, undiagnosed seroconversion (new HIV infection) in pregnancy and no antiretroviral use or suboptimal therapy in pregnancy (e.g. poor adherence, late start of antiretrovirals).

5.4 HIV TESTING AND COUNSELLING

KEY POINTS

- **An estimated 26% of people living with HIV/AIDS 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.**
- **An estimated 50% of new HIV infections are transmitted from someone in the early stages of their HIV infection.**
- **There is a need to promote early testing and increased recognition of HIV seroconversion symptoms.**

As of 2008, it was estimated that 16,900 (26%) people living with HIV/AIDS in Canada were not aware of their infection. Early diagnosis of HIV can confer medical benefit to the individual. Medical benefit can come from prophylaxis (preventive treatment) for AIDS-related opportunistic infections, treatment of STIs, treatment for substance use and mental health conditions, access to social services and, when appropriate, the use of HAART. 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 than when they are unaware.

The test for HIV became available in Canada in 1985. The Canadian Medical Association's HIV testing policy (2007) recommends counselling before and after HIV testing with written informed consent (opt-in). If someone tests positive for HIV in Canada, it is a legal requirement that public health officials be notified and an attempt made to trace and notify any sexual or drug-sharing partners that may have been put at risk for HIV infection. The name of the person who tested positive is not provided by public health to contacts, but contact tracing may be a barrier to people testing if they know that their partner(s) will have to be notified if the test result is positive.

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

1. **Nominal Testing** is the most widely used method of HIV testing. The tester's name 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 tester's identity if the result is positive.
3. **Anonymous Testing** entails no collection of any personal identifying information about the tester. Only epidemiological data is sent to public health officials regardless of a positive or negative result.

Anonymous testing may increase the number of people coming forward for testing and counselling because of the high level of confidentiality it confers. People in high-risk groups may be more likely to test if anonymous testing is available, as well as those who would not come forward if the testing was nominal or non-nominal.

Another way to increase uptake of HIV testing would be to introduce an opt-out testing approach. Currently, in most provinces and territories people are not routinely tested for HIV unless they request it (opt-in). In opt-out testing, people would be routinely tested for HIV as part of an annual check-up, if blood is drawn in a hospital setting, or during prenatal screening, unless they specifically decline to be tested. Using this approach, many more people who may not consider themselves at high risk for HIV infection would be tested and it may help to identify those who are unknowingly HIV positive. Some form of pre- and post-test counselling would still need to be offered to prepare people for a positive result. The increased burden on healthcare professionals to offer counselling may be a barrier to opt-out testing being widely adopted. Another barrier is the cost to the healthcare system.

Another example of an initiative to improve access to testing is point of care testing (POCT). In the fall of 2007, the Ontario government began rapid point of care testing for HIV at 50 anonymous test sites, public health units, STI clinics and community health centres across Ontario. Rapid testing has increased the number of individuals testing for HIV for several reasons:

- It is rapid, taking 20 minutes to receive the test result, including pre- 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.

An issue to consider is that rapid testing increases the demands on agencies that provide this service and may also increase demands on agencies that provide services to people living with HIV/AIDS (due to an increase in the number of people who are aware of their infection), which will necessitate increases in funding.

Increasing the uptake of HIV tests is important to help reduce the number of people who are diagnosed at the advanced stages of HIV infection. People who are diagnosed late in infection may be more likely to pass HIV to their partners, especially if they are not practicing safer sex or other harm reduction methods. Late diagnosis means that people are more likely to develop co-infections because their immune systems are severely compromised. As well as

the personal impact of ill health, there is a financial impact because people may need to be admitted to hospital or receive acute care to treat infections that could have been avoided if they were receiving HAART.

5.5 HIV TREATMENT, CARE AND SUPPORT

5.5.1 HIV Treatment

KEY POINTS

- **HAART has reduced the morbidity and mortality associated with HIV/AIDS.**
- **The debate continues as to when is the best time to initiate HIV treatment.**

When the powerful new drug therapies (highly active antiretroviral therapy, or HAART) became available in the mid-1990s, HIV treatment was revolutionized because of the drastic reduction in the number of illnesses experienced by people living with HIV/AIDS and their increased survival. HAART allowed many to return to work and lead a full life. Antiretroviral therapy, however, is not a cure for HIV.

Since the advent of effective combination antiretroviral therapy, which consists of a minimum of three drugs from at least two drug classes (groups), researchers have learned much about how best to treat HIV, and treatment has shifted from managing AIDS-related opportunistic illness to suppressing the virus to the greatest extent. The key goal of antiretroviral therapy is to reduce HIV replication as much as possible in order to enable the immune system to repair itself. In high-income countries, there are six classes of approved anti-HIV agents:

- nucleoside and nucleotide reverse transcriptase inhibitors (NRTIs and NtRTIs);
- non-nucleoside reverse transcriptase inhibitors (NNRTIs);
- protease inhibitors;
- fusion inhibitors;
- CCR5 co-receptor antagonists; and
- integrase inhibitors.

Debate continues about the best time in the course of HIV infection to start HAART. After the introduction of HAART, some experts believed that starting effective treatment very early would reduce the risk of disease progression and possibly even get rid of the virus completely. But due to long-term side effects and the acknowledgment that HIV eradication is unlikely with currently available drugs, the focus shifted to delaying treatment until immune system deterioration was detectable.

Evidence from recent research, however, suggests a return to the notion that earlier treatment may be more beneficial. In untreated HIV infection the virus appears to prematurely age

blood vessels and there is an increased risk for the development of cancers, nerve damage and HIV-related brain damage. The most common antiretroviral regimens used by people starting treatment today are much more tolerable than those used in the past and appear less likely to cause long-term complications. All treatment guidelines are in agreement that treatment should be started before the CD4 cell count has dropped to 350 cells/mm^3, rather than waiting for it to drop below 200 cells/mm^3, which used to be the standard. However, not all treatment guidelines agree on what CD4 level people living with HIV should start therapy. For example, two treatment guidelines from the United States (the Department of Health and Human Services and the International AIDS Society US Panel) recommend starting treatment with CD4 counts between 350 and 500 cells/mm^3. Moreover, some experts are recommending starting treatment with CD4 counts > 500 cells/mm^3. These recommendations for starting treatment above 350 cells/mm^3 are based on observational studies only. There is an ongoing randomized controlled trial called the START study that is looking at whether or not there are medical benefits to starting treatment earlier. If earlier treatment is in the interest of both the person living with HIV and the prevention of transmission, some argue for developing programs that more pro-actively "seek" out people who are eligible for treatment and start them on HIV therapy.

However, earlier initiation of treatment comes with greater inconvenience and expense, the potential for reduced quality of life due to side effects over a longer period of time, and the risk of "using up" available drugs sooner due to the development of drug resistance. In addition, there is still limited evidence that starting treatment earlier will provide long-term benefits in terms of slower disease progression or longer survival.

5.5.2 Adherence

KEY POINTS

- **Effective treatment with antiretroviral drugs requires long-term adherence.**
- **Interruptions in medication taking can lead to adverse health outcomes.**
- **Lack of adherence can lead to resistance and drug treatment failure.**

Effective treatment with antiretroviral drugs requires long-term adherence. Adherence is the extent to which a patient takes his or her medication according to the prescribed schedule. The best response to HAART 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, 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 medication's effectiveness further add to these problems. Women face unique obstacles relating to child care, lack of partner

support and the attitudes of peers and family members. Among the social variables that are found to affect adherence, stigma and fear of disclosure have the strongest effects.

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

The general wisdom has been that in order to be effective, interventions to improve adherence to HAART need to be individualized, multifaceted and repetitive. Frequently used interventions include individualized dosing instructions with photos of the medications, medication organizers (e.g. seven-day pill boxes), more frequent follow-up, and special adherence education sessions by members of the care team (nurses, pharmacists, social workers, community health intermediaries or peer educators). In certain populations, such as drug users, the use of directly observed therapy (DOT) for HAART has shown significant improvements in adherence and viral suppression. DOT involves drug administration observed by an appointed authority. 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 ongoing assistance with taking HAART and other medications. The goal of the program is to improve adherence to antiretrovirals through an attitude of acceptance, encouragement, counselling, HIV and health education and outreach to clients' homes when needed.

5.5.3 Drug Resistance

KEY POINTS

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

The high risk for the development of drug resistance in HIV comes from the virus' ability to easily mutate frequently. A mutation is a change in the virus' RNA that can then affect the virus' ability to reproduce itself. Mutations can also affect how the virus responds to a drug. When the amount of an anti-HIV drug falls below the level necessary to control the reproduction of HIV, as is the case with poor adherence, the drug will not be able to adequately suppress HIV. Certain drugs may still work against the original, or "wild-type," strain but are not effective against the strain of HIV that has emerged through the process of mutation. In time, the mutated strain of HIV becomes the dominant type in the body 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." Resistance can be partial or complete; with partial drug resistance the drug may still function but it will not be as effective as it once was.

Different types of resistance testing are available to determine whether an individual's virus has developed drug resistance; genotype and virtual phenotype testing are commonly used.

Once someone's virus has developed resistance to a particular medication or group of medications, those drugs should no longer be used in that individual in order to avoid further resistance and because the drug is no longer effective at preventing viral replication. One notable exception is the virus with the M184V mutation, which causes resistance to lamivudine (3TC) and emtricitabine (FTC). Because this mutation actually slows down the virus and causes it to be more vulnerable to some of the other HIV medications, physicians sometimes choose to keep patients on these medications in spite of resistance.

An individual's treatment choices become more and more limited as his or her virus develops resistance to different medications, underlining the importance of adherence and side-effect management. The recent approval of new classes of drugs has been important to long-term survivors with resistance to most or all existing medications. Even so, the potency of these new medications is sometimes offset by the fragility of their "resistance threshold"—that is, sometimes a very powerful drug can be undone by a single viral mutation. Whether or not a drug has a high or low resistance threshold is often dependent on what class it belongs to, with non-nucleoside reverse transcriptase inhibitors (NNRTIs) and integrase inhibitors generally having a low threshold and protease inhibitors generally having a higher threshold.

Transmission of drug-resistant HIV is increasingly common in countries where antiretrovirals are widely available. Transmission of drug resistance can occur when someone becomes newly infected with HIV ("primary drug resistance") or may occur in the context of "superinfection," where drug-resistant virus is passed from one HIV-positive person to another; this complicates and limits treatment options for the re-infected individual. According to the 2007 HIV/AIDS Epi Update from the Public Health Agency of Canada, the prevalence of primary drug resistance to at least one antiretroviral medication is 9.1% in Canada. Little is known about superinfection, although there have been some recorded cases.

5.5.4 Side Effects

KEY POINTS

- **The use of antiretroviral therapy can result in short- and long-term side effects ranging from minor to life threatening.**
- **While some side effects can be managed successfully, others may necessitate a switch in treatment.**

As with any medication, antiretroviral therapy can result in side effects ranging from minor to life threatening (in rare cases). Side effects may be short-term, resolving after a period of time, or long-term, as with lipodystrophy and other metabolic complications. Short-term side effects may include nausea, diarrhea, headache and rash; these usually resolve or

lessen within one to two months of starting therapy. Different strategies may be used to manage these symptoms and improve quality of life, ranging from pharmaceutical solutions to herbal therapies. Some longer-term side effects, such as increases in blood lipids (fats) or insulin resistance, may require major changes in lifestyle or the use of medication. Other long-term side effects such as lipodystrophy do not always have immediate or easily accessible solutions.

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 antiretrovirals will often depend on an individual's lifestyle, family medical history 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 necessarily work for another. Side effects that are intolerable should be taken seriously, since they may lead to non-adherence and may require a treatment switch, assuming other treatment options are available.

5.5.5 HIV and Co-infections

KEY POINTS

- **Common co-infections include, HBV, HCV, tuberculosis, herpes infections and human papillomavirus (HPV) infection.**
- **Co-infections can make it more difficult to manage HIV and can complicate HIV treatment.**

There are certain infections that can occur in people living with HIV, even when a person living with HIV has adequate CD4+ levels. Co-infections can make it more difficult to manage HIV and can complicate the treatment of HIV itself. On the other hand, HIV can also complicate the treatment of co-infections.

Hepatitis B is a viral infection of the liver caused by the hepatitis B virus (HBV). A vaccination is available for HBV. HBV can cause liver damage, however, many people with HBV clear the infection on their own. Blood tests determine whether someone is actively infected. In the case of someone who is actively infected, there are antiviral drugs available for the treatment of HBV but it is unclear which treatment is considered best. People who are living with HIV and HBV must have their treatment monitored carefully due to the risk of drug resistance.

Hepatitis C is a viral infection of the liver caused by the hepatitis C virus (HCV). Often there are no symptoms associated with HCV infection and blood tests are necessary to determine infection. HCV can cause liver damage and possible liver cancer in the long term. There are no vaccinations available for HCV but if treatment is necessary there is a combination of antiviral drugs. HCV treatment is complicated and can last from several months (and upwards of a year) depending of the results of ongoing blood work. Unfortunately, HCV treatment is

often very unpleasant and can produce difficult side effects. Even after a long-term regimen of antivirals, treatment success cannot be guaranteed.

Tuberculosis (TB) is a lung infection caused by a bacterium called *Mycobacterium tuberculosis*. In order to tell if someone has been exposed to TB a skin test is done. TB can cause fever, chills, trouble breathing and weight loss; it can also cause fatal illness if it is not detected and treated properly. TB treatment can last several months and the drugs taken depend on whether the infection is "active" or not. It is important for people taking TB treatment to be aware that drug-resistant TB is a growing concern. Because of this, it is crucial that the full course of treatment be completed.

Herpes infections are common and are transmitted by both physical contact and through sex. Herpes simplex is the name used to describe the virus that causes cold sores on the mouth or painful sores on the genitals. Varicella-zoster describes the infection that generally causes chicken pox and shingles.

With herpes infections, often a healthy immune system keeps herpes itself under control. When stress brings out an outbreak of herpes sores, they can last 7-10 days or longer. For people living with HIV and who have lower CD4+ cell counts, herpes outbreaks may be more frequent and last longer. People who have CD4+ cell counts below 100 are at risk for developing herpes infections all over their bodies and in the brain. There are antiviral drugs available for people with frequent outbreaks (regardless of CD4+ counts) in order to keep the herpes virus suppressed.

Human papillomavirus (HPV) infection is more common than many people tend to think. Approximately 75% of Canadians actually harbour HPV, but most people will never show any signs or symptoms, making it likely that they will unknowingly pass on the virus. There are more than 150 types of HPV and 30 of those can infect the genital tract through skin-to-skin and sexual contact.

When it comes to understanding how HPV vaccines work, it is helpful to know that HPV genotypes 6 and 11 can cause ano-genital warts. Other genotypes, most commonly genotypes 16 and 18, can cause precancerous lesions and cancers most commonly affecting the cervix and vulva in women and the anus in both men and women, and (in rare cases) cancer of the penis in men.

Because both HPV and HIV are sexually transmitted, co-infection with both viruses is common. Women with HIV should have regular Pap tests and men should have anal and rectal Pap tests where available. For people living with HIV, oftentimes genital warts can be harder to treat and can increase the likelihood of certain types of cancers developing. Regular monitoring is the best way to ensure that any problems are detected and treated as soon as possible.

5.5.6 HIV and Aging

KEY POINTS

- **People with HIV/AIDS are living longer due to advances in HIV treatment.**
- **Managing HIV infection becomes more complex as people age.**

Due to significant clinical advances in the care and treatment of people with HIV/AIDS, there have been marked improvements in the life expectancy of people with HIV/AIDS. Approximately 9% of reported cases of HIV are in people over the age of 50 in Canada and this is expected to rise over the next decade, mainly due to the increased life expectancy associated with HAART but also due to new diagnoses (see section 3.2.7).

However, managing HIV infection becomes more complex as people age. With age, the immune system starts to function less effectively. The thymus gland shrinks, producing fewer CD4+ cells, and the immune system takes longer to respond to infections. Research shows that HIV progresses more quickly in older people than in those younger. Yet studies have found that once on treatment older people seem to have better responses to therapy than younger people (which may be due to better adherence).

Screening for people with HIV over 50 should include tests 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.

The risk of developing cardiovascular disease (CVD) increases with age. As well, being HIV positive and being on HIV treatment have been shown to be risk factors for developing CVD. Lifestyle changes and medications may be needed.

Bone density decreases with age, leading to osteopenia and osteoporosis. People with HIV, on treatment or not, have higher rates of bone disorders compared to the general population—as much as one-third of people with HIV have osteopenia. Strategies to manage or prevent bone-density loss, such as calcium and vitamin D supplementation and weight-bearing exercise, are important for people with HIV to know about.

Chances of developing both AIDS-related and non-AIDS-related cancers increase with age. One large study showed that death due to non-AIDS-defining cancers has become more common than death from AIDS-defining cancers among people on HIV treatment. Non-AIDS-related cancers seen in the HIV-positive population include skin, lung and prostate cancers. The development of anal cancer seems to be linked to HIV and human papilloma virus (HPV). Liver cancer is seen in people with HIV who are co-infected with hepatitis C. Prevention of these cancers focuses on sustaining high 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 abnormal blood sugar levels 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.

The rate of severe HIV-associated neurocognitive changes has been on the decline since effective HIV treatment became available. However, age and a history of substance use increases the risk of developing dementia unrelated to HIV.

Sexual problems and low libido can occur in men and women as they age, but HIV and the side effects of HIV medications may also play a role.

Living with HIV over the long term may also lead to mental-health issues such as depression, quality-of-life issues such as isolation, and financial issues related to living on a limited income.

Side effects from HIV treatment do not seem to be any more frequent but may be more severe in older people. There is the potential for higher toxicity in older age associated with decreases in kidney and liver function that come naturally with aging. Dosing of HIV drugs may become an issue, especially as older people sometimes experience weight loss or changes in hormone levels and metabolism. Side effects may also be affected by non-HIV medications because of drug interactions.

5.5.7 Holistic Approach to Treatment

KEY POINTS

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

Before the introduction of antiretroviral therapies, complementary therapies were mainly used to boost immunity and prevent AIDS-related opportunistic infections. With the introduction of HAART as an effective way to manage HIV infection, complementary therapies are now being used to improve general well being, reduce symptoms and manage the side effects of HAART. They 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 HAART, possibly leading to drug resistance and treatment failure.

5.5.8 Drug Interactions

KEY POINTS

- **Prescription drugs, non-prescription (over-the-counter) or recreational drugs, herbal products or food products can cause drug interactions.**
- **Drug interactions can lead to serious or fatal overdoses of some drugs, or can drop drug levels too low to prevent HIV replication, leading to drug resistance.**
- **It is important that healthcare providers know about all the drugs or products a patient is taking in order to avoid any interactions.**

Types of drugs that are likely to cause interactions with HAART include certain antifungal drugs, certain antibiotics, acid-reducing agents and some drugs that prevent convulsions. Other drugs that may cause interactions include drugs used to treat depression, certain antihistamines, drugs to control heart rhythm, certain painkillers derived from opium, certain sedatives, drugs to thin the blood, methadone and buprenorphine, drugs to treat erectile dysfunction (such as Viagra), and certain drugs used to treat tuberculosis, especially rifampin. Also, certain antiretrovirals can affect the birth control pill and this kind of drug interaction could result in unwanted pregnancies.

Use of street or so-called "club" drugs may also cause interactions with HIV medications. There are few studies of these types of interactions, but there have been reports of overdoses and deaths caused by taking street drugs and HAART.

There has been very little research on interactions between herbal products and antiretroviral medications. Treatment guidelines indicate that St. John's Wort should not be taken with any protease inhibitor or non-nucleoside reverse transcriptase inhibitor.

Healthcare providers need to know all the drugs—prescription, over the counter and illicit—that people with HIV are using, as well the herbs and supplements, in order to advise them about avoiding drug interactions. A recent 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 nonjudgmental questions relating to various types of CAM use and drug use (both illicit and licit) in the patient consultation may be a simple method of encouraging such disclosure.

5.5.9 Access to Health Care

KEY POINTS

- **Many studies have indicated that individuals from disadvantaged groups have the lowest level of access to HIV care and services, including testing, care and treatment.**
- **Avoidable morbidity and mortality may be unaddressed.**
- **Delayed/lack of access to testing and treatment by members of marginalized groups may lead to the increased spread of HIV.**

There are many barriers to accessing healthcare services including testing, care and treatment for people with HIV. Structural and cultural barriers affect the ability of certain populations (e.g. injection drug users, ethnic minorities and people with lower socioeconomic status) to access health care. Refugees or people with insecure immigration status may not be able to use healthcare services because they may not have access to Canada's universal health care system or they may be unfamiliar with how to access the system. IDUs may not access treatment due to mental illness, stigma and discrimination and lack of providers experienced in the care of this population. The ability to access healthcare may also depend on where you live in Canada. Provincial variation exists in drug reimbursement which can affect the type of medications received and differences exist in the ability of a rural population to access HIV care compared to urban populations.

Access to certain services has also been shown to be suboptimal for certain populations, despite the fact that they have already accessed HIV care. A study in Ontario has shown that IDUs and those with lower education are less likely to have regular viral-load monitoring than others. Differences also exist in the ability of people living with HIV to access resistance testing in Ontario, despite access to HIV health care.

A study out of British Columbia investigated deaths among HIV-positive individuals between the years 1995 and 2001. According to the results, 1,239 deaths due to complications from AIDS occurred in that time; 33% of these people had never used anti-HIV drugs. These cases were more likely to occur among Aboriginal people, women and people with low incomes.

HIV care and treatment has undergone significant clinical advances, resulting in improvements in quality of life and life expectancy. Increasing the ability of certain populations to access services can reduce the burden of avoidable illness and death on Canada's healthcare system and increase the quality of life of people living with HIV. Furthermore, facilitating

access to testing and treatment can also act as an HIV prevention intervention, as people who know their status are more likely to reduce their risk behaviours and people on effective treatment may be less infectious than others.

5.5.10 HIV as an Episodic Illness

KEY POINTS

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

Since the introduction of HAART, HIV is increasingly characterized as a chronic, manageable illness. Most disabilities related to HIV are episodic, meaning that HIV disease is characterized by periods of wellness and periods of illness. These episodes may occur on a daily basis or include more major health fluctuations such as an 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, as well as complementary or alternative therapies such as acupuncture, massage therapy and counselling.

Among the many emerging issues relating to HIV and rehabilitation, a few have been identified as particularly important to the overall health of people with HIV:

- income support and work;
- the role of self-management using rehabilitation concepts and strategies;
- living with HIV and other conditions or diseases; and
- the role of rehabilitation in the management of medications and their side effects.

5.6 INTEGRATION OF HIV PREVENTION, TREATMENT, CARE AND SUPPORT PROGRAMMING

KEY POINTS

- **There is growing support for providing integrated HIV/AIDS services.**
- **HIV prevention needs to be envisioned as part of a continuum of care that includes treatment, care and support for people with HIV.**

There is growing support for envisioning HIV prevention as part of a continuum of care that includes treatment, care and support for people with HIV. Integration of HIV prevention, treatment, care and support programming ensures that there are no missed opportunities

to provide needed services. Furthermore, research has shown that people do not seek out services and support in ways that always fit with programming divisions. Integration helps to ensure that all aspects of a person's needs can be attended to.

Integration can be defined by the ideas of primary, secondary and tertiary prevention. Primary prevention initiatives are designed to avoid the development of a disease. Most population-based health-promotion activities are primary preventive measures. Secondary prevention activities are aimed at early disease detection (diagnosis), thereby increasing opportunities for interventions to prevent progression of the disease and emergence of symptoms. Tertiary prevention reduces the negative impact of an already-established disease by restoring function and reducing disease-related complications. In this framework, all HIV/AIDS services can be seen as interventions that aim to prevent negative health outcomes.

5.7 INTEGRATION OF SERVICES FOR COMMUNITY ACQUIRED INFECTIONS

KEY POINTS

- **There is a growing push to integrate services for hepatitis B, hepatitis C, HIV, STIs and/or TB.**
- **The existing infrastructure for HIV could be uniquely positioned to take on hepatitis C services.**
- **Drawbacks may exist to the integration of these services.**

The Public Health Agency of Canada is increasingly promoting the integration of services for hepatitis B, hepatitis C, HIV, STIs and/or TB.

HIV and hepatitis C services are currently planned and funded separately in Canada. However, there are changes happening in health services in Canada that may lead to the greater integration of these services, allowing the delivery of consistent and reliable information for mono-infected people and for those who are co-infected.

Due 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 HCV and HIV/HCV co-infected individuals. HIV organizations are uniquely positioned to take on this role for several reasons:

- Common risk factors and behaviours lead to both infections.
- Common key populations are disadvantaged in similar ways and need various services in addition to HIV/HCV information.
- Transmission and progression of HCV is more efficient and rapid when HIV is present.

- A long history of the provision of HIV information positions them well to add hepatitis C information to ensure informed decision-making by clients.
- The existing national infrastructure effectively provides HIV services, even in rural areas.
- Leveraging of existing resources will avoid duplication in efforts.
- Promoting testing for HCV or HIV of mono-infected people who are accessing services will ensure that all co-infections are diagnosed.

There may be several drawbacks to the integration of HIV and HCV services:

- conflicting sentiments regarding the appropriateness of integrated services;
- HIV stigma may inhibit uptake of HCV services at AIDS service organizations;
- stigmas affecting HCV-positive people and/or IDUs (needle use, high rates of complex mental health illness) may inhibit their integration into AIDS service organizations; and
- the large number of people living with HCV and their often complex conditions may tax the ability of AIDS service organizations to deliver services.

The integration of HIV and STI services is more problematic because HIV is a concentrated epidemic in Canada, disproportionately affecting specific populations, and STIs are more generalized to the entire adult population. There are concerns that the integration of HIV and STI services might dilute the targeted, population-specific interventions needed to respond effectively to the HIV epidemic. On the other hand, integrating STI information into existing HIV programs is important because STIs can increase the spread of the epidemic and lead to poorer health outcomes for people living with HIV.

ACKNOWLEDGEMENTS

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