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# HIV/AIDS Among Gay, Bisexual and Other Men Who Have Sex with Men in Canada

## At a Glance

- In 2008, the MSM (men who have sex with men) exposure category continued to account for the largest proportion of positive HIV test reports among adults, representing 45.1% (557) of positive tests reported.
- The estimated number of new HIV infections attributed to the MSM exposure category also accounted for the highest proportion of new infections in 2008, representing 44% of estimated new infections.
- In 2008, an estimated 19% of men in the MSM exposure category were unaware of their HIV infection. This is lower than the overall estimated percentage (26%) of people living with HIV in Canada who were unaware of their HIV positive status. Still, this translates to an estimated 6,000 (4,500-7,500) people living with HIV in the MSM exposure category who were unaware of their HIV positive status.
- HIV transmission among MSM in Canada is ongoing; recent research indicates that certain subgroups of MSM continue to be at considerable risk of HIV infection by engaging in risky sexual practices, such as unprotected anal intercourse with serodiscordant partners or partners of unknown HIV status.

## Introduction

In Canada, the HIV/AIDS epidemic continues to have a disproportionate effect on gay, bisexual and other men who have sex with men (MSM). Despite past achievements in curbing the epidemic among MSM, research in the early 21st century pointed to an increase in the transmission of HIV among MSM in Western countries, including Canada. This evidence renewed questions about how to enhance existing programs and policies aimed at preventing the transmission of HIV among MSM.[1, 2]

This chapter draws together findings from multiple sources to provide an update on the status of HIV/AIDS among MSM in Canada. Specifically, it summarizes selected data from the most recently available routine HIV and AIDS surveillance data, selected findings from Phase 1 of M-Track (the national, second-generation HIV surveillance system focused on MSM in Canada) and data from the most recently available national estimates of HIV in Canada. Selected findings from recent research are also presented, including information on the prevalence and incidence of HIV among MSM in Canada and associated factors, as well as findings from research focusing on risk behaviours and correlates of risk behaviour among MSM in Canada. The chapter concludes with a discussion of the strengths and limitations of existing research and provides a summary of the findings presented.

## Routine Surveillance

The Public Health Agency of Canada's Centre for Communicable Diseases and Infection Control (CCDIC) collects surveillance data on positive HIV test reports and reported AIDS cases in Canada. Epidemiologic information includes (but is not limited to) age, sex, risks associated with the transmission of HIV and self-reported ethnicity. For AIDS cases, death data are also collected. Health care providers and/or laboratories forward this information to provincial and territorial public health officials, who, in turn, voluntarily submit positive HIV test reports and AIDS diagnoses to the Centre, where the data are synthesized and analyzed at the national level. There are several limitations regarding surveillance data, including reporting delays, underreporting, missing information and undiagnosed infections. (Please refer to Chapter 3 for a full description of HIV/AIDS surveillance in Canada).

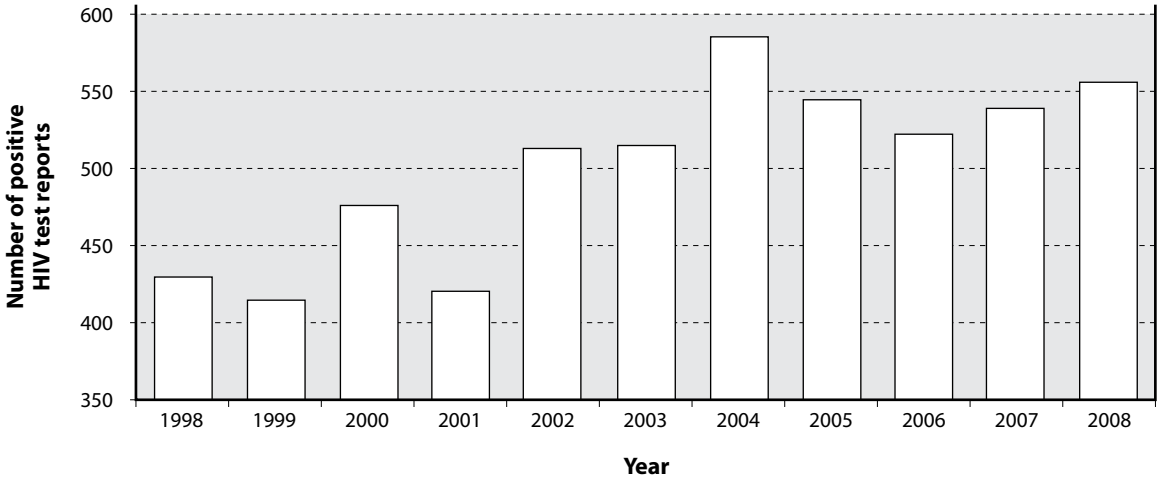
## AIDS surveillance data[3]

- Starting in 1979 and up to December 31, 2008, there had been 21,300 AIDS cases reported to the Public Health Agency of Canada (PHAC). Since reporting began, the MSM exposure category has accounted for the largest proportion of total AIDS cases among adults (≥ 15 years), with a total of 13,419 cases or 68.3% of all AIDS cases reported with known exposure category. The MSM/IDU[±] exposure category has accounted for an additional 4.4% (869 cases) of the total number of AIDS cases reported among adults.
- With the exception of 2005, the number of AIDS diagnoses reported to PHAC has steadily declined over the last 10 years.
- In 2008, 255 AIDS cases were reported to PHAC. Of those for which exposure category was known, 45.5% (55 cases) were attributed to the MSM exposure category. This represented the largest proportion of AIDS diagnoses among adults in 2008.

## HIV surveillance data[3]

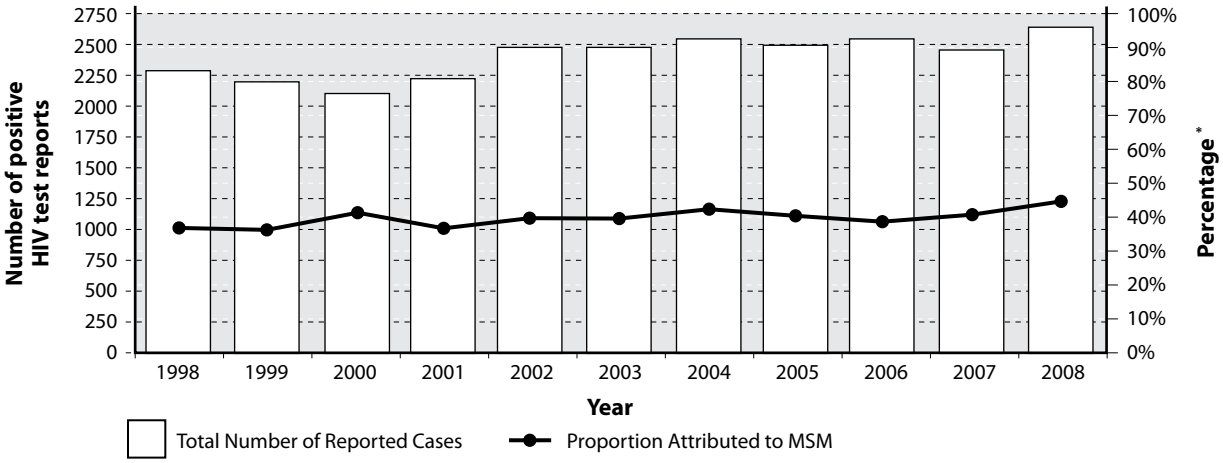
- As of December 31, 2008, a total of 67,442 positive HIV tests had been reported to PHAC since reporting began in 1985. Since reporting began, the MSM exposure category has accounted for the largest proportion of positive HIV test reports among adults, with a cumulative 18,699 positive HIV test reports, representing 56.1% of total HIV positive test reports with known exposure category. The MSM/IDU exposure category has accounted for an additional 2.4% (790 test reports) of all positive HIV test reports.
- The number of positive HIV test reports among adults attributed to the MSM exposure category increased by 34.2% between 1999 (415 test reports) and 2008 (557 test reports), peaking in 2004, after which it declined for two consecutive years. In 2007 and 2008, the annual number of reported HIV positive tests increased slightly (Figure 1).
- In 2008, the number of positive HIV test reports attributed to the MSM exposure category continued to account for the largest proportion of HIV test reports, representing 45.1% (557 test reports) of all positive tests reported among adults (Figure 2). The MSM/IDU exposure category accounted for an additional 1.6% (20 test reports) of all positive HIV test reports in 2008.
- Over the period 2004 to 2008, the proportion of new positive HIV test reports attributed to the MSM exposure category has been relatively stable (Figure 2).

**Figure 1. Number of positive HIV test reports among adults attributed to the MSM exposure category by year, 1998-2008**




[±] MSM/IDU: men who have sex with men/people who inject drugs combined exposure category. For details on exposure categories, please refer to Chapter 3.

**Figure 2. Total number of positive HIV test reports and proportion attributed to the MSM exposure category by year, 1998-2008**




* Percentage based on total number minus reports for which exposure category was not reported and for which there was no identified risk.

## Enhanced Surveillance/Population-Specific Surveillance Data

As part of the *Federal Initiative to Address HIV/AIDS in Canada,* PHAC monitors trends in HIV prevalence and associated risk behaviors in key vulnerable populations identified in Canada. The overall objectives of these second-generation HIV surveillance systems (known as the "Track" systems) are to describe the changing patterns in the prevalence and incidence of HIV infections, risk behaviour practices and testing patterns for HIV, hepatitis C and other sexually transmitted and blood borne infections (STBBIs) in each respective population. For a more detailed description of the Track systems, please refer to Chapter 3.

### M-Track: second generation HIV surveillance among gay, bisexual and other men who have sex with men in Canada

M-Track is the national, second-generation HIV surveillance system among MSM in Canada. As of December 31, 2009, a total of six sites had participated in M-Track across Canada. M-Track was first implemented in Montreal in 2005. Between 2006 and 2007, four additional sites joined M-Track: Toronto, Ottawa, Winnipeg and Victoria. Over 4,500 men participated in M-Track between 2005 and 2007 (Phase 1). In 2008, Vancouver became the most recent site to implement M-Track (see Table 1).

### Summary of descriptive data† from M-Track Phase 1[4]

#### *Participant overview and socio-demographic characteristics of participants*

- 4,838 men across five sentinel sites participated in Phase 1 of M-Track (2005-2007) (Table 1).
- The highest proportion of respondents was between the ages of 30 and 49 (54%) with fewer respondents between the ages of 15 and 29 (26%) and over the age of 50 (20%).
- A substantial proportion of respondents self-reported their sexual orientation as gay (82%) and an additional 14% as bisexual. Others identified themselves as straight or "Other" (4%).
- When asked about their ethnic and/or cultural ancestry, the majority of men most strongly identified themselves as being North American (66%); 6% of respondents reported Aboriginal ancestry.

† Unless otherwise noted, the data presented here include eligible respondents (for any given variable) who provided responses. Respondents who did not provide responses (i.e. "Missing") or who responded "Don't know" or who "Refused" to answer were excluded from the analyses. Respondents who provided a dried blood specimen only (i.e. did not respond to the questionnaire) are excluded from all analyses presented here unless otherwise stated. No tests of statistical significance were conducted.

**Table 1. Summary of M-Track sites, year of implementation and number of participants**

| Province | Site | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| **British Columbia** | **Victoria** | | | Phase 1 - 224 men | |
| **British Columbia** | **Vancouver** | | | | Phase 2 - 1,169 men |
| **Manitoba** | **Winnipeg** | | Phase 1 - 121 men | | |
| **Ontario** | **Toronto** | | | Phase 1 - 2,020 men | |
| **Ontario** | **Ottawa** | | | Phase 1 - 516 men | |
| **Quebec** | **Montreal** | Phase 1 - 1,957 men | | | Phase 2 - 1,873 men |
| **All sites** | | **4,838 men surveyed** | | | **3,042 men surveyed to date** |

### *Sexual risk behaviours*

- The majority of men reported multiple male sex partners (oral and/or anal sex) in the 6 months preceding survey administration (64%).
- Among men who reported having anal sex with a casual male partner[*] in the previous 6 months, nearly half reported consistent ("always") condom use during anal sex (insertive and/or receptive) (46%).
- With respect to lifetime history of commercial sex involvement,[**] roughly 10% of men independently reported giving or receiving money, drugs or other goods/services in exchange for sex.
- Men who participated in M-Track commonly reported looking for sex in a variety of social and other public settings in the 6 months preceding survey administration. For example, nearly a quarter of men reported looking for sex in social settings, such as community organizations/events, gay associations and other recreational groups (24%) as well as in public settings, such as parks and public restrooms (22%).
- A large proportion of men also reported looking for sex in bars (56%), in saunas (41%) and on the Internet (39%) in the previous 6 months.
- Among men who looked for sex in saunas and on the Internet, 36% and 57% reported doing so on a regular basis respectively (more than once a month).

### *HIV prevalence, testing and treatment history*

- Most men who participated in M-Track reported having been tested for HIV (86%). Similarly, of men who reported that their most recent HIV test was negative a large proportion had been tested for HIV in the 2 years preceding survey participation (81%).
- Among participants who provided a biological sample of sufficient quantity for testing and who completed a questionnaire, the prevalence of HIV was 15%.[†] Of the men whose biological sample tested positive for HIV, 19% were unaware of their HIV positive status.[‡]

### *Sexually transmitted and other blood borne* infections (STBBIs)

- With respect to other STBBIs, 63% and 67% of men reported ever having been tested for syphilis and HCV respectively.

[*] A casual partner is a man with whom the respondent had sex only once (a "one night stand" or an encounter in a bathhouse, for example). Casual partners do not include men to whom the respondent gave or from whom he received money, drugs or other goods or services in exchange for sex.

[**] Commercial sex involvement: giving or receiving sex in exchange for money, drugs or other goods or services.

[†] HIV screening was performed using the Bio-Rad GS rLAV HIV-1 EIA (enzyme immunoassay). Confirmatory testing was subsequently performed using the Bio-Rad Genetic SystemsTM HIV-1 Western Blot assay. A positive result indicates a current HIV infection. Both the HIV screening (EIA) and confirmatory assay (Western Blot) are approved by Health Canada as diagnostic assays for use with dried blood spot (DBS) specimens.

[‡] Excludes respondents who did not provide answers to questions regarding HIV testing history.

- Among participants who provided a biological sample of sufficient quantity for testing and who completed a questionnaire, the lifetime prevalence of syphilis and HCV was 6% and 5% respectively.[§]
- M-Track participants were also asked to report whether they had ever been diagnosed with an STBBI; 42% of men reported having being told by a doctor that they had an STBBI.[¶]

In addition to determining the prevalence and identifying patterns of HIV, HCV and syphilis testing, and describing changing patterns and trends in sexual behaviour among MSM in Canada, one of M-Track's primary objectives is to establish a core set of comparable behavioural measures across participating sentinel surveillance sites while addressing local and regional issues and questions of specific local interest. As such, respective sentinel sites produce and publish site-specific findings in the form of summary reports, research papers, conference posters and abstracts. Site-specific publications often explore questions and issues of particular interest to community members, researchers, and policy and program analysts.

Selected site-specific findings from M-Track sentinel sites are presented along with other independent research findings below (please see "Summary of recent data on HIV prevalence, incidence and risk behaviours among MSM").

## National Estimates of HIV/AIDS Prevalence and Incidence

PHAC uses multiple methods to provide an overall picture of the HIV epidemic among all Canadians living with HIV (including AIDS), including those with both diagnosed and undiagnosed infection. Using these combined methods, PHAC produces two types of estimates: prevalence, the number of people living with HIV (including AIDS), and incidence, the number of new infections in a 1-year period. PHAC produces estimates of national HIV prevalence and incidence approximately every 3 years. (Please refer to Chapter 1 for a full description of national HIV prevalence and incidence estimates for 2008).

### National estimates for 2008: HIV/AIDS prevalence data[5]

- National estimates for 2008 indicate that the number of people living with HIV (including AIDS) in Canada (prevalence) continues to rise. Between 2005 and 2008, the prevalence of HIV (including AIDS) is estimated to have increased by 14%, from 57,000 in 2005 to 65,000 in 2008.
- The most recent national estimates indicate that MSM continued to be the most affected group, representing the highest proportion of cases at an estimated 48% (31,330) of all prevalent cases in 2008. However, this estimated overall proportion has not changed since 2005.
- The combined MSM/IDU exposure category was estimated to represent an additional 3% (2,030) of prevalent cases.
- Of the estimated 65,000 people living with HIV in Canada in 2008, 26% (16,900) were unaware of their HIV infection. This represents a slight decrease from 2005, when it was estimated that 27% of people living with HIV in Canada were unaware of their HIV infection.
- A lower percentage of HIV-positive individuals in the MSM exposure category were estimated to be unaware of their HIV infection relative to all people living with HIV in Canada (19% in the MSM exposure category vs. 26% of all prevalent infections). This translated to an estimated 6,000 (4,500-7,500) people living with HIV in the MSM exposure category who were unaware of their HIV-positive status.
- By comparison, a higher proportion of HIV-infected people in the injection drug use exposure category and in the heterosexual exposure category (endemic and non-endemic combined) were estimated to be unaware of their HIV infection (25% and 35% respectively).

### National estimates for 2008: HIV/AIDS incidence data[5]

- The estimated number of new cases of HIV (incident) in 2008 is thought to have remained the same or to have increased slightly since 2005, with an estimated range of 2,300 to 4,300 new cases in 2008 compared with an estimated range of 2,200 to 4,200 new cases in 2005.

[§] HCV testing was performed using the Ortho® HCV version 3.0 EIA. Confirmatory testing is not performed for samples that test positive. A positive result indicates past or present HCV infection and does not discriminate acute from chronic or resolved infections. Validation of commercially available laboratory tests on DBS specimens for HCV is ongoing.

Syphilis testing was performed using the Serodia® TP-PA assay. Confirmatory testing is not performed for samples that test positive. A positive result indicates past or present syphilis infection. Validation of commercially available laboratory tests on DBS specimens for syphilis is ongoing.

[¶] For the purpose of these analyses, STBBI included gonorrhoea, chlamydia, genital or anal warts, syphilis, genital herpes, hepatitis A and B or unknown hepatitis virus.

- MSM continued to account for the highest proportion of estimated new cases in 2008, representing 44% of estimated new cases. This was slightly lower than the estimated 45% of new cases attributed to the MSM exposure category in 2005 but represented the same overall number of new cases (1,000-1,900) as in 2005.
- The combined MSM/IDU exposure category represented an additional 3% (50-130 cases) of new HIV cases in 2008.

## Summary of Recent Data on HIV Prevalence, Incidence and Risk Behaviours among MSM

In addition to the data gathered through routine and enhanced HIV surveillance, as well as the national HIV estimates, several studies exploring HIV and associated risk factors among MSM in Canada are ongoing.

Below is a summary of available data and literature results for the period 2006 to 2009 in MSM populations in Canada.

### Prevalence of HIV among MSM in Canada

Earlier on in the HIV/AIDS epidemic, study findings suggested that the prevalence of HIV among MSM in Canada was very high.[6-9] More recent findings, however, suggest that it may have declined and/or that there is significant variation across different subpopulations (Annex 1).[1, 10-19] As described in some detail in Annex 1, the prevalence of HIV among MSM in more recent analyses ranges from a low of 1.0% in a subsample of young non-White MSM born outside of Canada and living in Vancouver or Montreal [18] to a high of 24% in a small sample of Black MSM in Toronto ($n$ = 168).[13]

Recently described correlates of HIV prevalence include unprotected receptive anal sex, lower levels of education, not being in the labour force and regular attendance at bathhouses, as well as hepatitis B infection, urethral gonorrhoea and genital or anal warts.[11] An independent analysis that explored the relationship between circumcision and HIV status did not find any correlation between the two variables.[20]

### Incidence of HIV among MSM in Canada

Fewer recent publications have provided estimates of the incidence of HIV among MSM (Annex 1).[21-23] Despite differences in methodology, studies continue to document a relatively high incidence of HIV among MSM, ranging from a low of 0.62/100 person-years (py) in a cohort of MSM in Montreal[21] to a high of 1.14/100 py based on data from the Laboratory Enhancement Study in Ontario.[22]

Similar to the conclusions drawn from the national estimates of HIV incidence among MSM in Canada,[5] recent studies suggest that the incidence of HIV among MSM in Canada is relatively stable or is increasing slightly.[22]

In addition to documenting the incidence of HIV among MSM, several researchers have explored factors associated with HIV seroconversion among MSM. Recently reported risk factors for HIV seroconversion include any anal-sex-related practices with a serodiscordant, casual or commercial sex partner,[21] as well as high numbers of casual partners, sharing a needle with someone who is HIV positive[21] and experiencing stressful life events.[24]

**For example:**

- Burchell et al. analyzed data from the Polaris HIV Seroconversion Study to investigate how stress may be related to HIV infection and found that the odds of becoming HIV infected were 3.14 times higher among men who reported more than five stressful events during the period of infection compared with men who reported no stressful events. After controlling for receptive anal intercourse, the relation between stress and HIV infection remained but was not as strong (adjusted odds ratio: 2.16, 95% confidence interval 1.07, 4.38).[24]
- In the Omega Cohort Study, based on over 7 years of follow-up, the following factors were independently associated with HIV seroconversion: a high number of casual partners (50+), sharing a needle with someone who was HIV positive and all anal-sex-related practices with a high-risk partner, including regular partners of positive or unknown HIV status, casual partners and commercial sex partners.[21]

### Risk behaviours and correlates of risk behaviour among MSM in Canada

Recent data on sexual practices and HIV-related risk behaviour indicate that certain subgroups of MSM continue to be at considerable risk of HIV infection by engaging in risky sexual practices, such as unprotected anal intercourse (UAI) with serodiscordant partners or partners of unknown HIV status.[13, 21, 25, 26] Recent studies also indicate that casual sex is common among MSM; these studies point out that the majority of men surveyed continue to practise safe sex.[13, 21, 26] Differences across studies, including definitions of safe sex, however, make it difficult to make direct comparisons across findings and thus generally preclude one from drawing any specific conclusions regarding trends in risk behaviours over time.

**For example:**

- Analyses of Montreal M-Track/ARGUS data indicated that, in the 6 months preceding survey participation, 33% of men reported having had six or more casual partners and 21% reported at least one episode of UAI with a casual partner. These analyses also found that 28% of men who reported that they were HIV negative or of unknown HIV status had had UAI with a man whom they thought was HIV positive or whose HIV status was unknown.[27]
- In an analysis of Omega Cohort Study data, one-third of participants reported more than five casual partners, and nearly 40% of men reported any UAI in the previous 6 months; however, any UAI was more commonly reported among men having sex with HIV-negative partners.[21]
- In an independent analysis of the Omega Cohort Study data, George et al. reported a statistically significant and consistent temporal increase in UAI; increases in UAI were reported with regular seroconcordant partners, with casual partners and with any type of partner. However, the authors note that this increase was not consistent across all groups of men as defined by partnership and serostatus.[25]
- In contrast, comparisons across two cross-sectional Sex Now surveys found no significant change in HIV risk taking with respect to sexual practices across survey periods (2002 and 2004), most notably in the indicator considered most critical (UAI with a partner of unknown HIV status). Data from Sex Now further suggest that HIV-related risk behaviours were largely confined to a quarter of survey participants. The survey also found that casual sex was common among participants (64%); of these men, a majority reported consistently safe practices (61%), and 39% reported some HIV-related risk behaviour(s). Moreover, just over half of the men (52%) who reported anal sex with a casual partner had used a condom consistently.[26]

Numerous and conceptually diverse correlates of HIV risk behaviours, such as UAI, having multiple partners and commercial sex involvement, have been explored among MSM. Studies have primarily focused on factors associated with UAI in general, such as recreational drug use.[17, 19, 28-32]

Although findings across studies have varied, recent publications continue to support the notion that a host of complex and interrelated factors are associated with HIV-related risk behaviours among MSM. The reasons underlying these behaviours, however, are equally numerous and complex.

**For example:**

- Using data from the Ontario Men's Survey, Xu and colleagues found that the odds of reporting UAI with both regular and casual partners were higher among men who always and sometimes (vs. never) disclosed their HIV status; who moved to larger communities; who reported being HIV positive (vs. those of unknown serostatus); who reported more than 10 partners; who engaged in commercial sex; and finally among men who used recreational drugs.[33]
- Haubrich et al. provided a brief summary of HIV-related sexual risk events identified by Polaris Study participants. Participants indicated that substance use, notably the use of crystal methamphetamine, ecstasy, cocaine and alcohol, had an impact on their sexual risk behaviours, most often UAI. Other factors reported included entering into a new relationship and validation of a monogamous relationship.[31]
- In an analysis of Vanguard Study participants, Lampinen and colleagues reported that the use of nitrite inhalants was significantly associated with having casual partners, with reporting multiple casual partners (including partners of unknown serostatus and HIV-positive partners) and with anal intercourse. A detailed analysis of the data did not, however, find any association between nitrite inhalant use and unprotected sex with casual partners.[19]
- Montreal M-Track/ARGUS investigators also explored correlates of UAI and reported that, among self-reported HIV-negative men and men of unknown HIV status who had had sex with a non-couple partner at their last sexual encounter (LSE), being in a couple with a man was one of the strongest background factor correlates of UAI. Other background correlates of UAI in the final multivariate model included agreeing with the statement that an HIV-positive man taking medication is less likely to transmit HIV, and reporting a history of STI diagnosis. Notably, the number of male sex partners in the previous 6 months was not associated with UAI at LSE. Event-level factors associated with UAI in the final model included finding the partner to be very or extremely attractive and using alcohol (five or more drinks) or cocaine within 2 hours of or during sex.[29]
- The Ontario M-Track/Lambda study team has also recently explored the prevalence of, and factors associated with, UAI. In a subanalysis of men who reported UAI with a casual partner in the previous 6 months, 35.7% ($n$ = 163) and 63.2% ($n$ = 294) reported UAI with casual partners believed to be HIV-positive or of unknown HIV status respectively.

Among HIV-negative men, the use of non-injection drugs was associated with UAI with casual partners believed to be HIV positive.[28]

Others have explored the role that the Internet may be playing in the lives of MSM with respect to risk behaviour.[17]

**For example:**

- Chiasson et al. recruited men on-line to assess whether men who met partners on-line were more likely to have UAI than those who did not. No differences were found between the two groups in bivariate or multivariate analysis. This event-based analysis also reported that 23% of men had had sex with multiple partners at their LSE, a high-risk behaviour that is not well described in the literature and requires further study, given the higher potential of HIV transmission. Among men who reported multiple partners at their LSE, UAI was significantly associated with being HIV positive and with use of crystal methamphetamine, sildenafil and alcohol before sex, regardless of whether partners were met on- or off-line. Among men reporting a single partner at LSE, use of crystal methamphetamine and having no college degree were significantly associated with UAI.[17]
- Chiasson et al further hypothesized that men meeting partners on-line may be more inclined to disclose their HIV status to potential partners before meeting in person, and their findings confirmed this hypothesis. At their LSE, men who met their partners on-line were significantly more likely to disclose their HIV status than those who met their partners off-line.[17]
- Ogilvie and colleagues used data from the Sex Now survey to explore the differences in sexual risk behaviour between MSM who seek partners on the Internet and those who do not. They reported higher risk behaviours among MSM seeking sex on the Internet: for example, having significantly more sexual partners and seeking sexual partners in other higher-risk environments known to be associated with the transmission of HIV. However, no differences were reported with respect to UAI between the two groups.[34]

The social influences of risk taking among MSM are equally multifaceted.[32]

**For example:**

- Trussler et al. reported that, compared with men who reported only safe sex in the previous year, the odds of reporting UAI with a casual partner of unknown serostatus were higher among men who reported feeling pressured to have unsafe sex; who had broken a safe sex agreement with their primary partner; who were inconsistent in their views about sexual safety; who had numerous partners; and, finally, among men who reported use of crystal methamphetamine during sex.[32]
- Calzavara et al. used longitudinal logistic regression to explore the effect of stress specifically as it relates to UAI with non-regular partners. The relation between stressful life events and sexual risk behaviours was found to be complex. An increase in UAI was positively associated with financial stress, losing one's job, ending a romantic relationship, and drug and alcohol related problems. The "death of a close friend" was inversely related to UAI, as was serious illness among HIV-positive participants.[35]

Specific sexual practices, such as delayed condom application (DCA), barebacking, group sex and fisting have also garnered the attention of recent research.[1, 30, 36]

**For example:**

- In a subsample of data from the Ontario Men's Survey, the overall prevalence of DCA in the previous 12 months among 2,614 men during insertive anal intercourse was 47.0%. Factors significantly and positively associated with DCA included bathhouse attendance, lifetime history of STIs, multiple partners (> 5 male partners), disclosure of HIV status to casual partners and experience with condom failure. The use of cocaine, poppers and steroids, receipt of money and/or other items in exchange for sex with a male, and multiple sexual relationships with a regular male partner (past 3 months) were all associated with DCA and unsafe sexual activities.[10]
- As a site-specific add-on to the Ontario M-Track/Lambda survey, participants were asked questions about DCA. Among sexually active men, on the basis of practices in the previous 6 months nearly half of participants (46.8%, $n$ = 677) reported DCA-R (receptive); 32.0% ($n$ = 460) and 15.1% ($n$ = 217) reported multiple occasions and a single episode of DCA-R respectively. In multivariate modeling, no socio-demographic characteristics were found to be associated with DCA-R. However, the authors noted that men reporting DCA-R also reported other unsafe sexual behaviours.[37]
- The Montreal M-Track/ARGUS study team reported that 9% of men had purposely sought UAI (barebacking) with a casual partner.[27]
- Adam et al. sought to delineate the characteristics of men who report that they like to, and look to, participate in barebacking. They found that, compared with men who reported casual sex partners but no interest in barebacking, men who identified themselves with barebacking environments had a distinctive profile of unprotected sexual practices (more likely to report both unprotected receptive and insertive anal intercourse). In this study sample, men who liked to, and looked to, participate in barebacking accounted for just over half (51.9%) of

all men surveyed who reported UAI. Further, these men formed a distinct "circuit" with beliefs and attitudes highly divergent from those of other MSM around them regarding appropriate norms and expectations of sexual practice.[1]

- To better understand situations in which unprotected sex is the norm, Adam et al. recruited men most likely to be involved in bareback scenes. On the basis of data collected through semi-structured interviews with a small number of men ($n$ = 34), the study authors reported different beliefs among distinct circuits of MSM and "taken-for-granted rules of conduct for sexual interactions" (p. 759) which that give rise to high-risk situations. For example, many of the HIV-positive men interviewed spoke of "being part of a social environment where 'everybody knows' a set of rules whereby sex without condoms can happen as default circumstance to be interrupted only when a partner asserts a need to protect himself"(p. 759).[36]
- Finally, given the limited information available on fisting, as a site-specific add-on, the Vancouver M-Track/ManCount survey asked participants whether they had been fisted by a partner in the previous 6 months. The reported prevalence of fisting in this sample of MSM in Vancouver was 4.5% ($n$ = 33) and after adjustment for potential confounders was found to be associated with looking for sex in public venues, pre-coital hygiene and the use of sex toys.[38]

Patterns of risk behaviours across different types of partnerships have also recently been addressed in the literature:

In their brief synopsis of findings from a subsample of partnered men who took part in the Men, Sex and Love Web study, the authors reported that HIV discordant couples were significantly more likely to consistently use a condom during anal sex. By contrast, being in a partnership of unknown concordance was not associated with consistent condom use.[39]

The characteristics of, and HIV-related risk behaviours in, specific subpopulations of MSM, such as MSM who also inject drugs (MSM/IDU), MSM who were born outside of Canada and MSM who are living with HIV, have also been the subject of recent analyses.

**For example:**

- Among MSM who also inject drugs, HIV-related risk behaviours, such as borrowing used needles, are reportedly higher than among other IDU who do not report sex with men.[40]
- George and colleagues combined data from two prospective Canadian cohorts (Omega and Vanguard) to explore whether sexual behaviours and other factors that may increase vulnerability to HIV differ between MSM born outside of Canada and Canadian-born MSM. One of the key findings from their analyses was that White MSM born outside of Canada were more likely to report high-risk sexual behaviours, including being most likely to have sex with a known HIV-positive partner and most likely to have unprotected sex while travelling outside of their home province. Non-White respondents born outside of Canada, on the other hand, were more likely to have ever sold sex.[18]
- Preliminary analysis of data from a cohort study in Montreal of people living with HIV (MAYA study) reported that of sexually active MSM 77% of participants ($n$ = 240) reported consistent condom use in the previous 6 months with partners of negative or unknown HIV status. The authors conclude that other findings from this analysis suggest that cognitive factors, such as perceived behavioural control and a longer period of time since diagnosis (> 3 years), are associated with safe sex practices among HIV-positive MSM.[41] Using GEE (generalized estimating equations) modeling the authors also reported additional data based on this cohort: among MSM living with HIV, being younger, not being an IDU, shorter time period since HIV diagnosis (< 3 years) and receiving money for sex were factors associated with UAI with HIV-negative partners or partners of unknown HIV status.[42]
- Again using a subsample of data from the MAYA study, Lavoie and colleagues focused on HIV-positive MSM and their level of risk-taking with different types of partners and also explored how viral load level may alter behaviours. They found that approximately 20% of MSM had had unprotected anal sex with a regular negative partner. The authors reported that HIV-positive MSM in this sample may have adjusted their level of risk-taking according to the serostatus of their partner. In this analysis, viral load levels were not associated with risk-taking behaviours.[43]

In addition to studying correlates and causes of HIV-related risk behaviours among MSM, other topics of relevance have also recently been studied, including HIV testing patterns and factors associated with HIV testing among MSM. HIV testing uptake is relatively high among MSM in Canada, including subpopulations of MSM, and men who report higher-risk behaviours also report higher odds of testing.[4, 44, 45] Non-consensual condom removal during anal sex and non-disclosure of HIV-positive status by a partner have been reported as reasons for seeking HIV testing among MSM.[31]

# Comment

## Strengths and limitations

Many of the research studies presented in this chapter have a number of important strengths. For example, most of the findings presented here are based on recent data drawn from large community samples of MSM, enabling researchers to explore a wide variety of hypotheses. Many of these studies have generated new evidence, critical to prevention programs and policy making at all levels: national, provincial and local. Moreover, because of the relatively large survey sample sizes, adequate statistical power is available to examine multiple risk behaviours and their associated factors.

There are also several limitations that should be considered when interpreting the results presented here. The majority of the findings are based on cross-sectional studies, thus, any inferences regarding cause and effect between the variables being explored must be made with caution. Generally, studies in this area must rely on self-reported data, which may introduce a variety of social biases. For example, it is possible that some information, such as sexual behaviours and recreational drug use, were misreported or underreported by some respondents because of the sensitive nature of the questions. To overcome some of the inherent challenges in this type of research, most studies used venue-based or other forms of convenience sampling. Given this, the findings cannot be generalized beyond the study populations.

For more specific study-level limitations, please refer to the respective studies referenced within this chapter.

Finally, as previously noted, an important limitation of the present update on the epidemiology of HIV/AIDS among MSM in Canada is that differences across studies, including variations in recruitment methods, eligibility criteria, variable definitions, as well as differences in statistical methods and power, make it challenging to make direct comparisons across findings. This makes it difficult to draw any specific conclusions regarding trends in risk behaviours over time.

# Conclusion

When available data from the literature, HIV surveillance systems and the national HIV estimates are considered as a whole, it is clear that the transmission of HIV among MSM in Canada is ongoing.

Recent research indicates that certain subgroups of MSM continue to be at considerable risk of HIV infection by engaging in risky sexual practices, such as UAI with serodiscordant partners or partners of unknown HIV status. Research further suggests that men who engage in one high-risk behaviour tend to engage in other, higher-risk, behaviours, forming clusters of men at higher risk of HIV transmission. For example, men who partake in or seek sex in one higher-risk behaviour or in higher-risk environments, such as in bathhouses, also tend to partake in or seek sex in other higher-risk environments, such as public settings and on Internet sites.[1, 28, 34, 37, 40, 46, 47]

UAI, particularly receptive UAI, with a partner of unknown or HIV-positive status or with a casual or commercial sex partner continues to be reported as the main risk factor for HIV seroconversion among MSM.[10, 21, 28, 48]

Several hypotheses have been explored in an effort to explain why some men continue to practise unsafe sex. Although specific outcome measures and findings across studies have varied, recent publications continue to support the notion that a host of complex and interrelated factors are associated with HIV-related risk behaviours among MSM.[17, 19, 28-34] A limited number of recent studies have also started exploring and identifying the psychological and social factors underlying decisions to engage in riskier sexual behaviours.[31-33, 35]

Despite the continuing risk behaviours reported in many studies, a growing body of research indicates that most men continue to have safe sex most of the time.[26, 41, 49] Nonetheless, as outlined above, those who report UAI with both regular and casual partners represent a significant subpopulation.[33]

While the scientific community continues to be interested in gaining a better understanding of the context in which high-risk behaviours take place, research suggests that some MSM are using strategies, such as "serosorting", to mitigate their risk of acquiring HIV.[21, 43, 50, 51] The effectiveness of said strategies, however, is still controversial.[21, 51]

Myths and misconceptions regarding the transmission of HIV still exist among some groups of MSM.[52] Thus, as Adam and colleagues have recently suggested, prevention messages are still valuable, "as there are always new men entering into relations with other men, whether they arrive from the upcoming generation, immigration, or self-discovery" (p. 420).[1] These authors note, however, that simply having the facts at hand is not necessarily enough to bring about behaviour change and thus a consistent reduction in the transmission of HIV in all MSM.[1] Rather, the implication for prevention programs is to recognize that there is an uneven distribution of risk among MSM and that prevention messages relevant to one group of men may lack resonance with others.[1] Researchers have further argued that sexual health services should offer services in multiple languages and offer multicultural services through various mediums to meet the needs of diverse MSM.[52, 53]

Some have specifically suggested that the Internet is an important delivery tool for information about safer sex and the transmission and prevention of HIV and sexually transmitted infections among MSM.[54]

Taken together, the findings presented here suggest that investigation of specific risk behaviours, measured more consistently over time in diverse groups of MSM across Canada, is still needed. Improved information could, in turn, be used to enhance policies, programs and services intended to reach and benefit MSM in Canada.

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## Annex 1: Prevalence and Incidence of MSM in Canada

| Authors and year of publication | Study design & study objectives | Recruitment & study period | Study population & sample size | Subsample used for analysis | HIV incidence | HIV prevalence |
|---|---|---|---|---|---|---|
| Allman et al. (2009) [1] | • Cross-sectional<br>• Self-administered questionnaire<br>• Ontario Men's Survey (OMS)<br>"To examine the prevalence of [delayed condom application] within a gay community and explore factors associated with condom use among those who practice only safer sex and those who report at least some unprotected anal sex." (775) | Venue-based purposive sampling<br>February–June 2002 | Gay and bisexual men 15 years and older in Ontario<br>*n* = 5,080 | Men who answered questions about delayed condom application in the previous 12 months<br>*n* = 2,614 | NA | Based on self report<br>8.9% |
| Myers et al. (2009) [2] | • Cross-sectional<br>• Self-administered questionnaire and optional saliva sample<br>• Ontario Men's Survey (OMS)<br>"To describe hepatitis C (HCV) and HIV prevalence and co-infection, and to examine variables associated with infection in a community sample of men who have sex with men (MSM)." (1) | Venue-based purposive sampling<br>February–June 2002 | Gay and bisexual men, 15 years and older in Ontario<br>*n* = 5,080 | Men who provided sufficient fluid to conduct laboratory tests to detect the presence of both HCV and HIV antibodies<br>*n* = 3,304 | NA | Based on saliva specimen<br>Overall: 9.0% |
| Xu et al. (2009) [3] | • Cross-sectional<br>• Self-administered questionnaire<br>• Ontario Men's Survey (OMS) and Lambda (M-Track sentinel site)<br>"To compare the prevalence of HIV, HCV, HIV-HCV co-infection between bisexual and gay men in two cross-sectional studies undertaken at different points in time." (66B) | Venue-based sampling<br>OMS:<br>February–June 2002<br>Lambda:<br>March–July 2007 | Overall sample size not specified<br>OMS:<br>Bisexual, *n* = 355<br>Gay, *n* = 2,480<br>Lambda:<br>Bisexual, *n* = 217<br>Gay, *n* = 1,876 | Men who provided biological specimens of sufficient quantity for laboratory testing | NA | OMS<br>(Based on saliva sample)<br>7.3% among bisexual men;<br>1.3% among gay men<br>Lambda<br>(Based on dried blood spot [DBS]): 14.7% among bisexual men;<br>20.7% among gay men |

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| Authors and year of publication | Study design & study objectives | Recruitment & study period | Study population & sample size | Subsample used for analysis | HIV incidence | HIV prevalence |
|---|---|---|---|---|---|---|
| Adam et al. (2008) [4] | • Cross sectional survey<br>• Toronto Pride Survey 2005<br>"To delineate characteristics of men who report that they like to participate in the "bareback scene" and cruise "bareback Web sites" by comparing them with men who had casual male partners during the last 6 months but do *not* report an interest in bareback scenes or Web sites." (421) | Men who attended Toronto Pride Event 2005<br>June 2005 | Men who had sex with a man during the previous 6 months or reported a gay identity<br>*n* = 922 | NA | NA | Based on self-reported serostatus<br>12.6% |
| George et al. (2008) [5] | • Self-administered questionnaire<br>"To improve our understanding of BMSM communities and networks in Toronto for evidence-informed HIV prevention efforts/ programs." (80A) | Venue-based sampling<br>June 2007–January 2008 | Black MSM in Toronto<br>*n* =168 | NA | NA | Based on self-report<br>24% |
| Hirshfield et al. (2008) [6] | • Cross-sectional<br>• Internet survey<br>"To assess the utility of screening for, and characteristics associated with, depressive symptoms in an online survey of MSM." (904) | Banner linking to survey advertised on gay-oriented American and Canadian websites<br>October 2003–March 2004 | MSM 18 yrs & older from 10 Canadian provinces, the United States and 65 other countries<br>*n* = 4,030 | Men who met the study criteria and did not refuse or omit a response:<br>*n* = 2,964<br>Prevalence is based on those who had been tested:<br>*n* = 2,414 | NA | Based on self-reported HIV status<br>Overall: 9.0% |
| Lampinen et al. (2008) [7] | • Prospective open cohort study<br>• Self-administered questionnaire<br>• Blood sample<br>• Vanguard Project<br>"To determine incidence of, prevalence of, and risk factors for sexual orientation-related physical assault in young men who have sex with men (MSM)." (1028) | Venue-based convenience sampling<br>May 1995–May 2004 | Young (15 to 30 years of age), gay, bisexual and other MSM living in the greater Vancouver area who had not previously received an HIV-seropositive test result<br>*n* = 863 | Men with ≥1 follow-up study visit and complete data for the variables of greatest interest in present analysis<br>*n* = 521 | NA | Based on blood sample<br>7.1% among men with history of assault prior to study enrolment;<br>2.3% among men with no history of assault prior to study enrolment. |

## Annex 1: Prevalence and Incidence of MSM in Canada

| Authors and year of publication | Study design & study objectives | Recruitment & study period | Study population & sample size | Subsample used for analysis | HIV incidence | HIV prevalence |
|---|---|---|---|---|---|---|
| Lavoie et al. (2008) [8] | • Cohort study<br>• Self-administered questionnaires<br>• Structured interviews<br>• HIV, syphilis and hepatitis B testing<br>• Omega<br>"To estimate human immunodeficiency virus (HIV) incidence risk factors among men who have sex with men (MSM)." (25) | Venue- and other convenience-based sampling<br>October 1996–July 2003 | MSM 16 yrs & older, HIV negative at baseline living in Montreal or surrounding area<br>*n* = 1,846 | Participants with at least one follow-up visit<br>*n* = 1,587 | 0.62/100 person years (PY)<br>(95% confidence interval 0.41–0.84) | NA |
| Remis et al. (2008) [9] | • Cross sectional study<br>• Lambda (M-track sentinel site)<br>"To examine the association of HIV prevalence and participant characteristics." (26A) | Venue-based sampling<br>March–July 2007 | MSM:<br>Toronto: *n* = 2,021<br>Ottawa: *n* = 517 | MSM who provided DBS sample | NA | Based on DBS sample<br>Toronto: 23.2%<br>Ottawa: 11.9% |
| Chiasson et al. (2007) [10] | • Cross-sectional on-line survey<br>"To assess whether men who have sex with men (MSM) are more likely to report unprotected anal intercourse (UAI) with partners met online compared with those met offline" (235) | Banner linking to survey advertised on gay-oriented American and Canadian websites<br>October 2003–March 2004 | MSM 18 yrs & older from 10 Canadian provinces, the United States and 65 other countries<br>*n* = 4,030 | 18 years of age or older from the United States or 10 Canadian provinces and reported sex with a new or casual male partner in their last sexual encounter in the previous 3 months:<br>*n* = 1,683<br>Prevalence is based on those who reported ever having an HIV test:<br>*n* = 1,298 | N/A | Based on self-report<br>11% |

## Annex 1: Prevalence and Incidence of MSM in Canada

| Authors and year of publication | Study design & study objectives | Recruitment & study period | Study population & sample size | Subsample used for analysis | HIV incidence | HIV prevalence |
|---|---|---|---|---|---|---|
| George et al. (2007) [11] | • Prospective cohort study<br>• Omega Cohort and Vanguard Project<br>"To identify key differences in sexual, psychological and other characteristics between foreign-born and Canadian born MSM that may increase their vulnerability for HIV."(10) | Vanguard: Venue-based sampling<br>May 1995–May 2004<br>Omega: Venue- and other convenience-based sampling<br>October 1996–July 2003 | Vanguard:<br>Young (15 to 30 years of age) HIV-seronegative gay, bisexual and other MSM living in the greater Vancouver area:<br>*n* = 863<br>Omega Cohort:<br>MSM 16 yrs & older, HIV seronegative at baseline living in Montreal or surrounding area:<br>*n* = 1,846 | Combined sample from both studies used for analysis: *n* = 1,148. Analysis restricted to baseline data as of Sept 1999 for subjects <30 years of age<br>Canadian Aboriginals excluded from analysis | NA | Based on biological samples<br>1.5% – White born in Canada<br>2.1% – White born outside of Canada<br>2.8% – Non-white born in Canada<br>1.0% – Non-white born outside of Canada |
| Lampinen et al. (2007) [12] | • Prospective cohort<br>• Self-administered questionnaire<br>• Serologic testing<br>• Vanguard Project<br>"To study the prevalence and correlates of contemporary nitrite inhalant use among young MSM in Vancouver." (2) | Venue-based sampling<br>May 1995–May 2004 | Young (15 to 30 years of age) HIV-seronegative gay and bisexual men living in the greater Vancouver area<br>*n* = 863 | Restricted to eighth and final wave of data collection, Oct 2002 to May 2004<br>*n* = 354 | NA | Based on biological sample<br>Overall: 7% |
| Remis et al. (2007) [13] | • Cross-sectional survey<br>• Objective was not stated | Questionnaire was sent with all first-time HIV-positive test results and 1:200 sample of HIV-negative results<br>January 2001–September 2006 | All those who received first-time HIV-positive test results and 1:200 sample of HIV-negative results in Ontario from January 2001 to September 2006 | People reporting MSM as a risk factor<br>*n* = 2,745 | Laboratory based (detuned assay)<br>Crude: 1.75/100 PY<br>Adjusted: 1.14/100 PY | NA |

## Annex 1: Prevalence and Incidence of MSM in Canada

| Authors and year of publication | Study design & study objectives | Recruitment & study period | Study population & sample size | Subsample used for analysis | HIV incidence | HIV prevalence |
|---|---|---|---|---|---|---|
| Burchell et al. (2006) [14] | • Secondary data analysis of databases records<br>"To describe incidence among men who have sex with men (MSM) undergoing repeat testing in Ontario in 1993-2003 and to determine whether rates have declined since 1999." (44A) | MSM in Ontario identified by computerized and manual record linkage<br>1993-2003 | *n* = 603 seroconverters; 17,361 repeat-negative testers<br>Combined: 60,469 PY | Men who reported sex with men but no injection drug use | 0.97/100 py | NA |

## Annex 1 References


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