

SUMMARY: ESTIMATES OF HIV INCIDENCE, PREVALENCE AND PROPORTION UNDIAGNOSED IN CANADA, 2014



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CANADA

BACKGROUND

The Public Health Agency of Canada (the Agency) produces national HIV and AIDS surveillance reports annually. These HIV and AIDS surveillance reports reflect information about individuals who have been tested and diagnosed; the data do not include individuals who are infected but have not been tested. Therefore, modelling and additional sources of information are required to produce estimates that describe the epidemic among all Canadians living with HIV, both diagnosed and undiagnosed. This is an activity that is undertaken around the world to monitor national and global HIV epidemics, and to guide prevention and control programs.

The Agency produces three types of estimates as part of its mandate to monitor HIV trends in Canada:

- Incidence: The number of new HIV infections in a one year period;
- Prevalence: The number of people living with HIV (including AIDS) at a specific point in time;
- Proportion undiagnosed: The proportion of people living with HIV who have not been diagnosed, and therefore are not aware of their HIV-positive status.

Understanding HIV incidence, the rate at which new infections is occurring in Canada, is critical for tracking the leading edge of the epidemic, for planning HIV prevention programs, and for evaluating the impact of existing prevention programs. Estimating HIV prevalence is critical for planning and allocating resources towards care and treatment for people living with and affected by HIV and AIDS. Estimating the number and proportion of people with undiagnosed HIV infection is important to help increase early diagnosis, which benefits individuals with HIV (where early care and appropriate treatment can result in prolonged and improved quality of life) and the overall population (since people who know their HIV-positive status are more likely to adopt strategies to reduce the possibility of onward transmission of the virus). These estimates guide the work done by the Agency and other federal departments who, under the *Federal Initiative to Address HIV/AIDS in Canada*, work jointly to address HIV and AIDS in Canada.

The Agency has produced national HIV incidence and prevalence estimates for Canada every three years since 1996. Estimates published in this report replace all previous estimates published by the Agency concerning HIV incidence, prevalence and proportion undiagnosed in Canada. In this summary, estimates for preceding years have been revised because updated data and new information are available, which allow for an improved analysis of the epidemic and more reliable historical estimates.

ESTIMATE OF THE NUMBER OF NEW HIV INFECTIONS IN 2014

Ongoing HIV transmission remains an issue of concern in Canada. The Agency estimates that 2,570 new infections (range between 1,940 and 3,200) occurred in Canada in 2014. This estimate is slightly lower than the estimate for 2011 (2,800; range between 2,100 and 3,500) (Table 1, Figure 1). The estimated incidence rate in Canada in 2014 was 7.2 per 100,000 population (range between 5.5 and 9.0 per 100,000 population).

In terms of exposure category (defined in Appendix 1), the estimates for 2014 (Table 1, Figure 2) are as follows:

- There were approximately 1,396 new infections in 2014 attributed to the men who have sex with men (MSM) exposure category, representing 54.3% of all new infections. This estimate is similar to the 2011 estimate of 1,416 new infections.
- The estimate of 270 new infections in 2014 attributed to injection drug use (IDU) exposure was noticeably lower than the estimated of 384 for 2011.
- Similarly, the number of new infections attributed to the combined heterosexual contact exposure categories (non-endemic and endemic) was slighter lower in 2014 (839) compared to 2011 (927).

People from countries where HIV is endemic continue to be over-represented in Canada's HIV epidemic. An estimated 358 new infections were attributed to the heterosexual-endemic exposure category^a in 2014 (Table 1). This category accounted for 13.9% of new infections in Canada in 2014, whereas people born in HIV-endemic countries represented approximately 2.5% of the overall Canadian population according to the 2011 Census. The HIV incidence rate for this population was 40.3 per 100,000 population in 2014, which is 6.3 times higher than the rate for other Canadians (6.4 per 100,000 population).

Aboriginal people also continue to be over-represented in the HIV epidemic in Canada. An estimated 278 new HIV infections in 2014 occurred among Aboriginal people (Table 1), which represents 10.8% of all new infections in 2014. By contrast, Aboriginal people represent 4.3% of the total Canadian population (according to the 2011 Census). This 2014 estimate is slightly lower than the estimate for 2011, which was 349 new infections and 12.5% of all new infections. The HIV incidence rate for Aboriginal people was 18.2 per 100,000 population in 2014, which is 2.7 times higher than the non-Aboriginal Canadian population (6.7 per 100,000 population) in 2014. With respect to exposure category, nearly half (45.3%) of new infections were attributed to IDU exposure, followed by heterosexual contact (40.3%), MSM (10.4%) and MSM-IDU (4.0%) exposures.

There were an estimated 595 (range of 440 to 750) new HIV infections among females in Canada in 2014 (Table 1). This estimate represents 23.2% of all new infections in 2014, which is similar to the proportion estimated for 2011. The majority (79.2%) acquired their infection through heterosexual contact; 20.8% acquired their infection via IDU exposure.

^a Exposure during heterosexual sex and born in a country where HIV is endemic (See Appendix 1)

ESTIMATE OF THE NUMBER OF PEOPLE LIVING WITH HIV AT THE END OF 2014

The Agency estimates that approximately 75,500 (range between 63,400 and 87,600) people were living with HIV (including AIDS) at the end of 2014. This estimate represents a 9.7% increase from the estimated 68,800 (range between 57,600 and 80,000) at the end of 2011 (Table 2, Figure 3). The estimated prevalence rate in Canada at the end of 2014 was 212 per 100,000 population (range between 178 and 246 per 100,000 population).

Of the estimated 75,500 people living with HIV in Canada at the end of 2014:

- Nearly half (49.3%) acquired their infection through MSM exposure. The three other predominant exposure categories (IDU, heterosexual/non-endemic and heterosexual/endemic) comprised similar proportions of the remaining population of people living with HIV at the end of 2014.
- Just under one in ten (9.1%) were Aboriginal people. The estimate of 6,850 Aboriginal people living with HIV at the end of 2014 represents an increase of 12.1% from the 2011 estimate of 6,110. Based on the estimate, the HIV prevalence rate for Aboriginal people in Canada in 2014 was 448 per 100,000 population (range of 360-537 per 100,000 population).
- About one in five people living with HIV at the end of 2014 was female. The estimate of 16,880 females living with HIV (including AIDS) represents 22.4% of the national total. This proportion is similar to what was observed for 2011.

UNDIAGNOSED HIV INFECTIONS IN CANADA

Undiagnosed HIV infections represent the difference between (1) the total number of people living with HIV (diagnosed and undiagnosed), and (2) the total number of people living with diagnosed HIV.

The Agency estimates that 16,020 (range between 13,000 and 19,000) people were living with undiagnosed HIV in Canada at the end of 2014, representing 21% of all people living with HIV in Canada at that time.

This estimate was obtained as follows:

- A total of 80,469 positive HIV tests have been reported to the Agency since testing began in November 1985 through December 31, 2014. After adjusting for underreporting, reporting delay and duplicates, we estimated that there were a cumulative total of 85,880 persons diagnosed with HIV or AIDS in Canada by the end of 2014.
- Of these, we further estimated that approximately 26,400 individuals with HIV had died by the end of 2014.
- Thus, there were an estimated 59,480 (that is, 85,880 minus 26,400) Canadians living with HIV infection by the end of 2014 who have been diagnosed and were therefore aware of their HIV status.
- Since there were an estimated 75,500 people living with HIV in Canada in 2014, the remaining 16,020 (75,500 minus 59,480) people were unaware of their HIV infection.

It is important to note that during the process of developing the 2014 estimates, we used updated data from earlier years and revised methods to adjust for under-reporting, reporting delay and duplicates. Applying the same methods retrospectively resulted in a similar proportion undiagnosed for 2011 (approximately 21%). Our method and data limitations do not allow us to detect any difference between the estimates for 2011 versus 2014, although a decrease may have occurred given that many jurisdictions have implemented programs to increase access to HIV testing. This is a particularly important area where better data would help improve the estimates.

The estimated proportion of people living with HIV who were undiagnosed (and therefore unaware of their HIV status) varied by exposure category:

- Amongst people whose HIV infection was acquired through MSM exposure, approximately 18% were unaware of their infection.
- Amongst people whose HIV infection was acquired through IDU exposure, approximately 20% were unaware of their HIV infection.
- Amongst those whose HIV infection was acquired through heterosexual contact (endemic and non-endemic combined), approximately 28% were unaware of their HIV-positive status.

CONCLUSION

The 2014 estimates provide new insight into the evolving HIV trends in Canada, and comprise a key part of the evidence used to monitor the epidemic in Canada and to inform prevention and care programs.

Since new HIV treatments have reduced HIV mortality and new infections continue to occur at a rate greater than the number of deaths of people living with HIV, the overall number of Canadians living with HIV infection will likely continue to increase in the years to come. This will mean increased demand for HIV-related care and treatment for those living with and affected by HIV.

Looking at the trend since 2005, it appears that HIV incidence in Canada is declining; however, due to the wide ranges of uncertainty around the point estimates, it is difficult to determine if this is a true decline. Additional years of data are needed to determine whether the decline in HIV incidence is genuine or due to data variability.

Similarly, there appears to be a decreasing trend in new infections attributed to IDU exposure as well as new infections attributed to heterosexual sex. By contrast, there is no observable decline in the HIV incidence attributed to MSM exposure.

Aboriginal people and people from countries where HIV is endemic continue to be over-represented in Canada's HIV epidemic, highlighting the need for specific measures to address the unique aspects of certain populations and communities.

At the end of 2014, an estimated 21% of the 75,500 individuals living with HIV in Canada were unaware of their infection. These people are hidden from the health care and disease monitoring systems, and thus cannot take advantage of appropriate prevention, care and treatment services until they are tested and diagnosed.

Table 1. HIV incidence: Estimated number of new HIV infections and associated ranges of uncertainty in Canada in 2014 and 2011, by exposure category, sex and ethnicity/origin.

Category	2014			2011		
	Point estimate	Range*	Percentage	Point estimate	Range*	Percentage
HIV exposure category						
MSM	1,396	990-1,800	54.3%	1,416	1,030-1,800	50.6%
MSM-IDU	65	40-90	2.5%	73	50-100	2.6%
IDU	270	180-360	10.5%	384	270-500	13.7%
Heterosexual/non-endemic	481	330-630	18.7%	531	380-680	19.0%
Heterosexual/endemic	358	250-470	13.9%	396	280-510	14.1%
Others	<20			<20		
Sex						
Female	595	440-750	23.2%	663	480-850	23.7%
Male	1,975	1,550-2,400	76.8%	2,137	1,670-2,600	76.3%
Ethnicity/origin						
Aboriginal	278	200-360	10.8%	349	250-450	12.5%
Non-Aboriginal	2,292	1,700-2,900	89.2%	2,451	1,900-3,000	87.5%
Total	2,570	1,940-3,200	100%	2,800	2,100-3,500	100%

*Range of uncertainty; range estimates are rounded to the nearest ten.

See Appendix 1 for exposure category definitions

Table 2. HIV Prevalence: Estimated number of people living with HIV and associated ranges of uncertainty in Canada at the end of 2014 and 2011, by exposure category, sex and ethnicity/origin.

Category	2014			2011		
	Point estimate	Range*	Percentage	Point estimate	Range*	Percentage
HIV exposure category						
MSM	37,230	31,000-43,500	49.3%	33,685	27,900-39,500	49.0%
MSM-IDU	2,400	1,800-3,000	3.2%	2,240	1,700-2,800	3.3%
IDU	11,560	9,500-13,600	15.3%	10,955	9,100-12,800	15.9%
Heterosexual/non-endemic	12,340	10,000-14,600	16.3%	11,090	9,200-13,000	16.1%
Heterosexual/endemic	11,360	9,300-13,400	15.0%	10,185	8,400-12,000	14.8%
Others	610	400-800	0.8%	645	400-900	0.9%
Sex						
Female	16,880	13,800-20,000	22.4%	15,240	12,500-18,000	22.2%
Male	58,620	48,200-69,000	77.6%	53,560	44,100-63,000	77.8%
Ethnicity/origin						
Aboriginal	6,850	5,500-8,200	9.1%	6,110	5,000-7,200	8.9%
Non-Aboriginal	68,650	57,000-80,300	90.9%	62,690	52,100-73,300	91.1%
Total	75,500	63,400-87,600	100%	68,800	57,600-80,000	100%

*Range of uncertainty; range estimates are rounded to the nearest hundred.

See Appendix 1 for exposure category definitions

Figure 1. HIV incidence: Estimated number of new HIV infections in Canada for selected years (including range of uncertainty for point estimates).

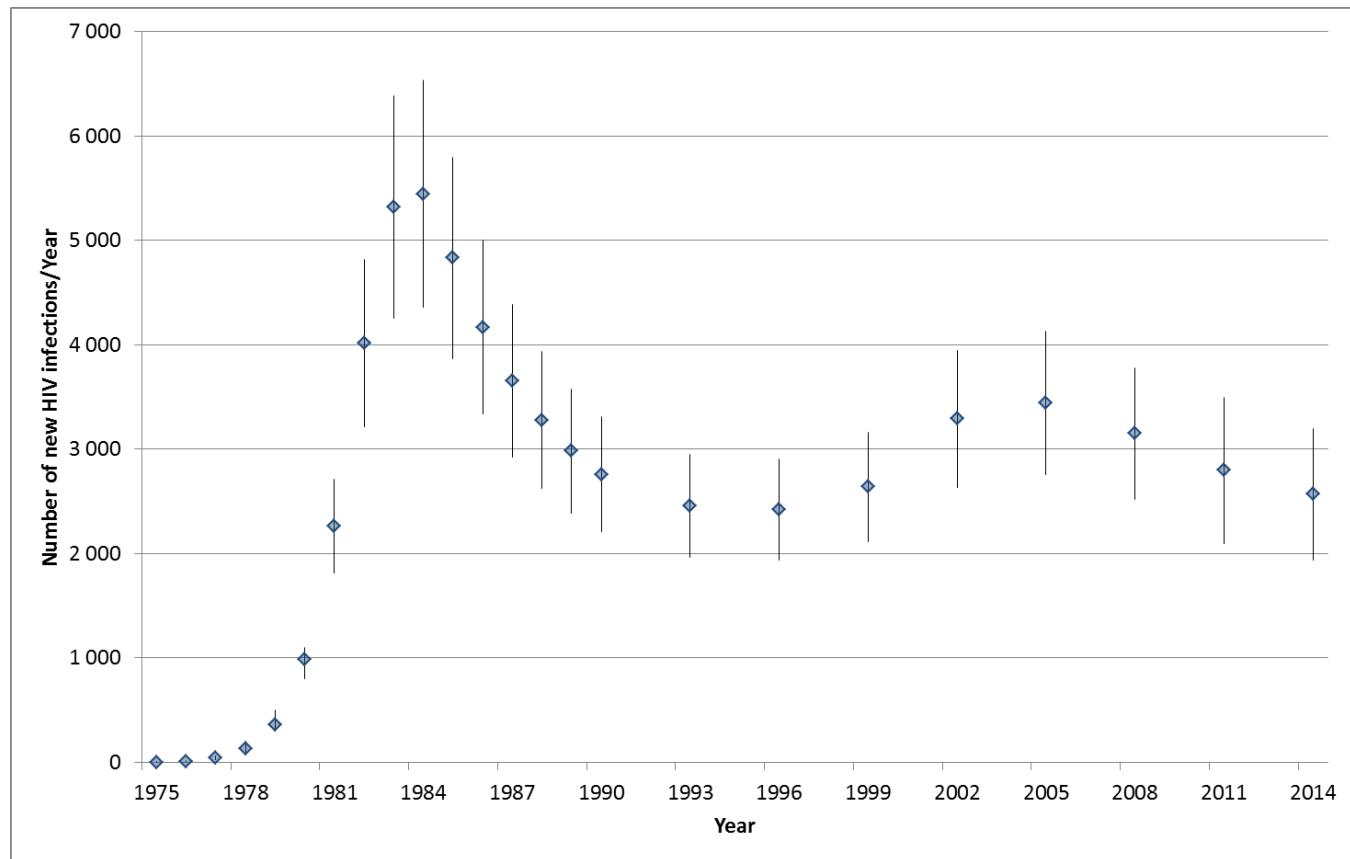


Figure 2. Estimated number of new HIV infections in Canada for selected time periods and years, by exposure category (range of uncertainty omitted; for time periods, average annual estimates are shown).

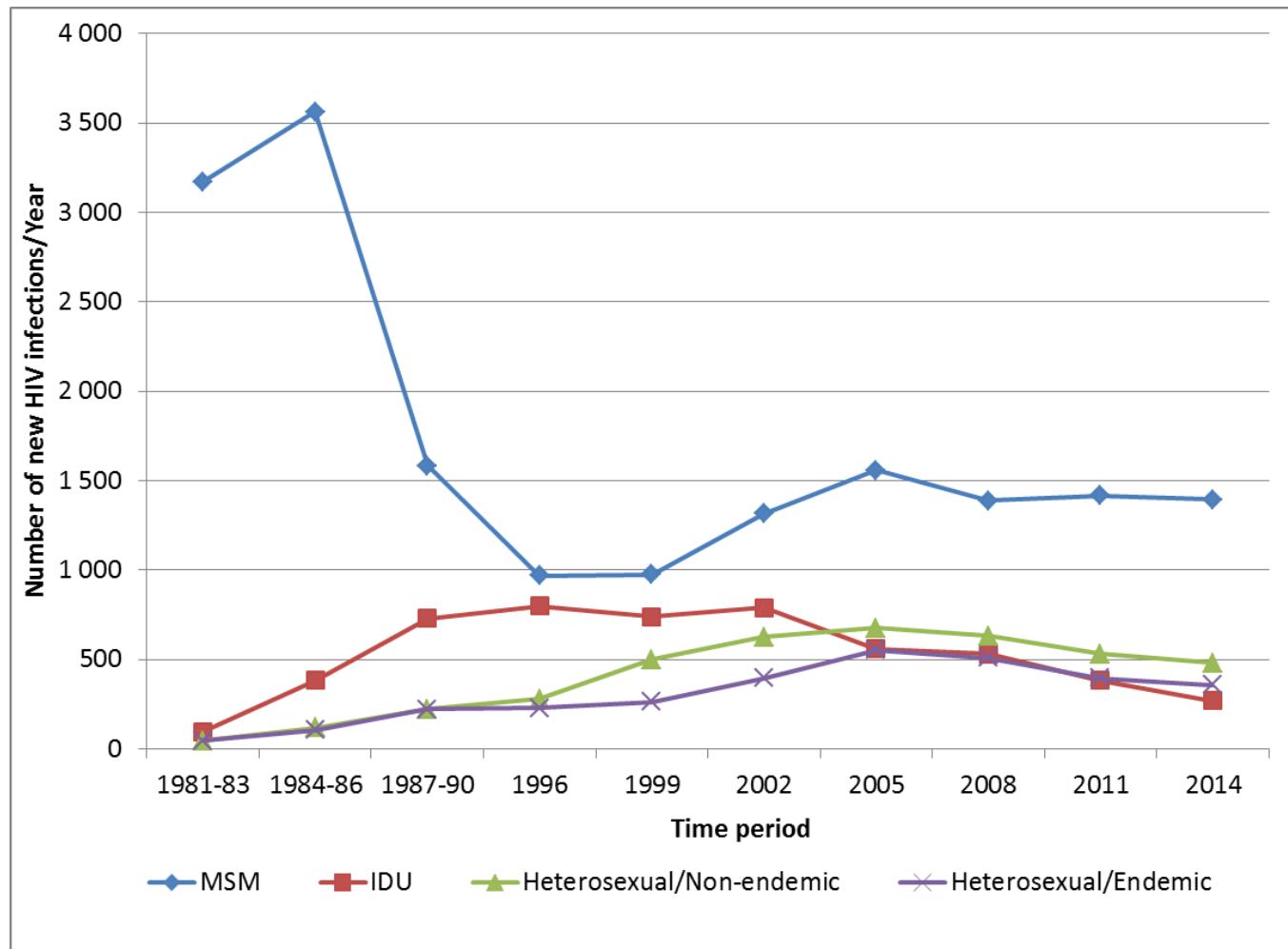
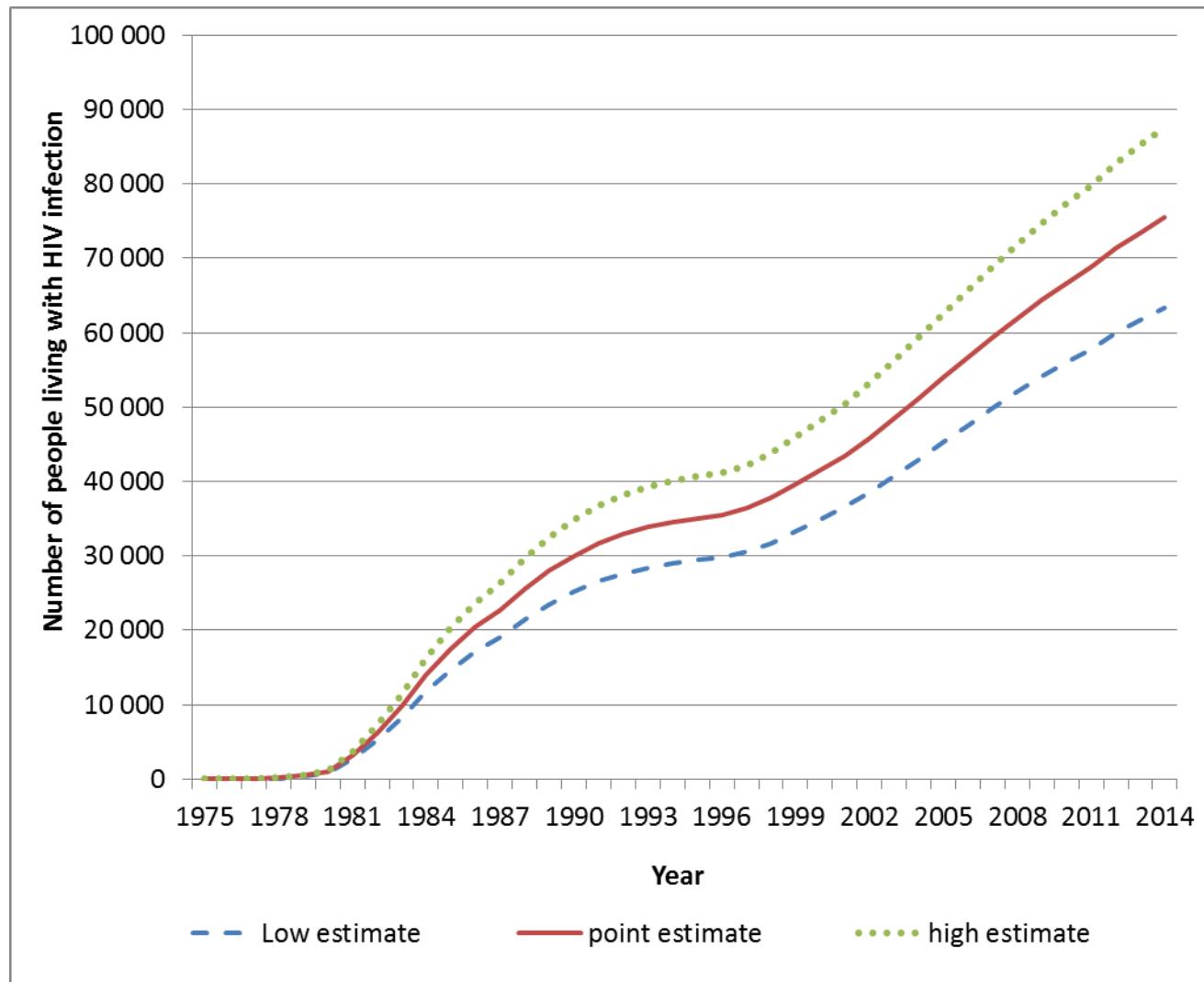


Figure 3. HIV Prevalence: Estimated number of people living with HIV in Canada by year



Appendix 1

HIV exposure categories used for HIV case surveillance and estimation process for HIV incidence, prevalence and proportion undiagnosed.

Exposure category classification	Type of exposure
Men who have had sex with men (MSM)	During male-to-male sex
Injection drug use (IDU)	During use of injection drugs
MSM-IDU	During either male-to-male sex and/or the use of injection drugs - used in instances where both exposures were reported for one person
Heterosexual/endemic	Exposure during heterosexual sex and born in a country where HIV is endemic*
Heterosexual/non-endemic	Exposure during heterosexual sex and born in Canada or in a country not on the HIV-endemic list
Other	Exposure attributed to receipt of transfusion of blood or clotting factor, perinatal exposure, or occupational exposure

* The Public Health Agency of Canada defines countries where HIV is endemic as those countries where the prevalence of HIV among adults (age 15-49 years) is 1.0% or greater and one of the following: 50% or more of HIV cases are attributed to heterosexual transmission; a male to female ratio of 2:1 or less among prevalent infections; or HIV prevalence greater than or equal to 2% among women receiving prenatal care.