

Title: What impact does missing Québec data have on national HIV surveillance data?

Authors: Kristina Lalonde Tomas¹, Raphaël Bitera², Michel Alary², Micheline Fauvel³, Raymond Parent², Diane Sylvain³, Maureen Hastie³, Christiane Claessens³, Jessica Halverson¹, Chris Archibald¹

¹Surveillance and Risk Assessment Division, Public Health Agency of Canada

²Direction des risques biologiques et de la santé au travail, Institut national de santé publique du Québec

³Laboratoire de santé publique du Québec, Institut national de santé publique du Québec

Objective: To quantify the reduction in the proportion of cases with unknown exposure category and the difference in the exposure category breakdowns of HIV surveillance figures if exposure data from the Institut national de santé publique du Québec (INSPQ) were included in the national HIV dataset.

Background: National HIV/AIDS surveillance is coordinated by the Public Health Agency of Canada's (PHAC) Surveillance and Risk Assessment Division's (SRAD). HIV is reportable in all provinces and territories, although the degree of epidemiologic information collected and submitted varies. Québec's case reports to PHAC come from their laboratory-based surveillance system, which contains positive test reports, by age and sex. All Québec cases are classified in SRAD's dataset as "Not Reported" with respect to exposure category which contributes to the large proportion of cases at the national level with no known exposure category. An unknown exposure category at the national level consists of cases where the exposure category was NIR (No Identified Risk) or Not Reported.

Methods: Québec's provincial HIV surveillance system "*Programme de surveillance de l'infection par le VIH au Québec*", in effect since April 2002, collects further epidemiological information, including exposure category and risk factor information, although recorded separately from the HIV laboratory test results information. This provincial system's surveillance data was substituted for the laboratory data in the national surveillance data, and the exposure category breakdowns recalculated, in order to assess change in the proportion of unknown (i.e. NIR and Not Reported) cases and to quantify the resulting difference in exposure category breakdowns at the national level. It should be noted that the laboratory-based numbers published in the surveillance report reflect the minimum number of HIV-positive individuals, therefore are lower than the surveillance program numbers.

Results:

Unknown exposure category

Currently Table 5A (see Table 1 below) of the National HIV/AIDS Surveillance report provides a breakdown of positive HIV test reports among adults across Canada, by exposure category. Cumulatively, a significant number of cases are assigned to the No Identified Risk (NIR) and Not Reported exposure categories. This is due, in large part, to Québec's data submission from the provincial laboratory-based system, which does not include any risk factor or exposure category information, as well as roughly half of Ontario cases which are missing exposure category information. [For more information on Ontario data, please see HIV/AIDS in Ontario 2008 report, (Ref)]. Historically, this has resulted in approximately one-half of national HIV cases each year which are missing an assigned exposure category.

Table 1
Number and percentage distribution of positive HIV test reports among adults (≥ 15 years) in Canada, by exposure category and year of test, using Québec's laboratory data (currently Table 5A in surveillance report)

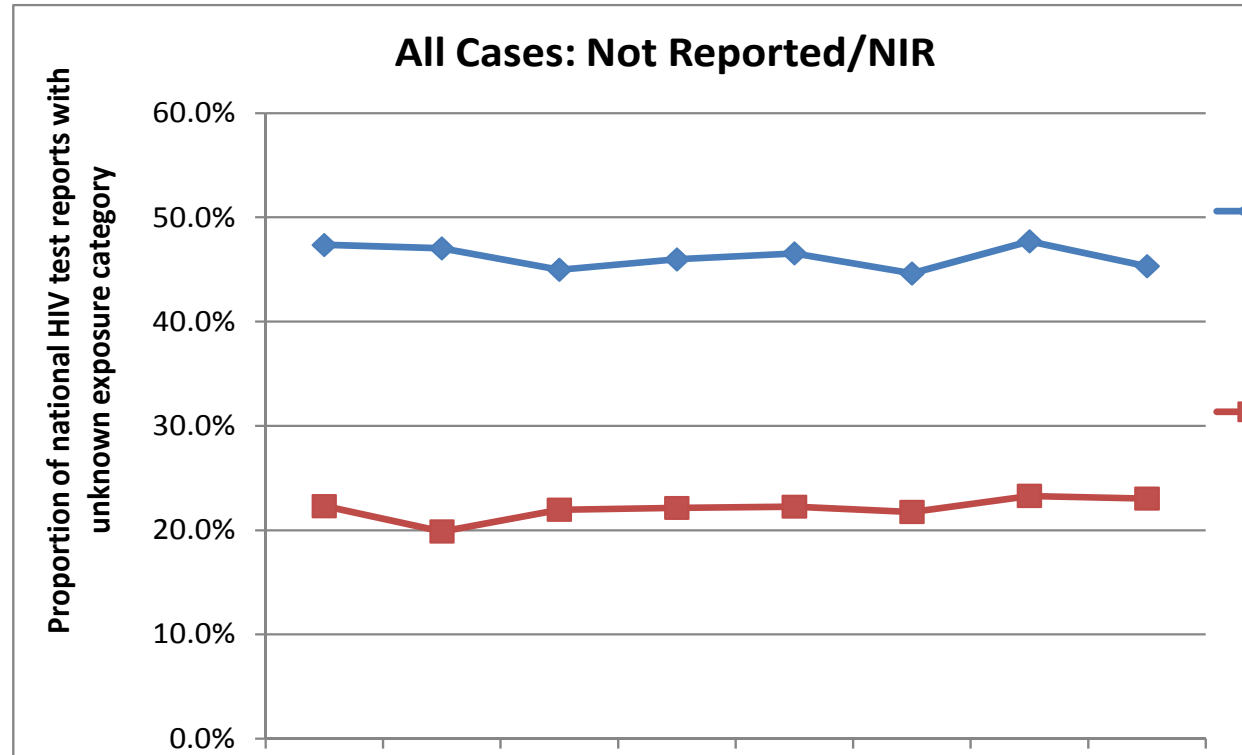
Exposure Category	Year of HIV Test																Total	
	2002		2003		2004		2005		2006		2007		2008		2009			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
MSM	510	40.0%	513	39.6%	582	42.6%	542	41.0%	520	38.7%	536	40.0%	593	43.7%	545	41.8%	4,341	41.0%
MSM/IDU	21	1.6%	29	2.2%	31	2.3%	21	1.6%	27	2.0%	25	1.9%	21	1.5%	30	2.3%	205	1.9%
IDU	304	23.9%	244	18.9%	272	19.9%	298	22.5%	258	19.2%	302	22.6%	273	20.1%	282	21.6%	2,233	21.1%
Blood/blood products																		
Recipient of Blood/Clotting Factor	2	0.2%	1	0.1%	1	0.1%	2	0.2%	0	0.0%	0	0.0%	1	0.1%	1	0.1%	8	0.1%
Recipient of Blood	9	0.7%	12	0.9%	10	0.7%	10	0.8%	10	0.7%	9	0.7%	9	0.7%	9	0.7%	78	0.7%
Recipient of Clotting Factor	0	0.0%	3	0.2%	2	0.1%	2	0.2%	3	0.2%	0	0.0%	0	0.0%	0	0.0%	10	0.1%
Heterosexual contact																		
Origin from an HIV-Endemic country	90	7.1%	100	7.7%	109	8.0%	100	7.6%	123	9.2%	84	6.3%	103	7.6%	72	5.5%	781	7.4%
Sexual contact with a person at risk	163	12.8%	182	14.1%	174	12.7%	162	12.3%	159	11.8%	159	11.9%	149	11.0%	137	10.5%	1,285	12.1%
NIR-Het	135	10.6%	154	11.9%	139	10.2%	129	9.8%	164	12.2%	150	11.2%	171	12.6%	192	14.7%	1,234	11.6%
Other	40	3.1%	56	4.3%	46	3.4%	56	4.2%	78	5.8%	74	5.5%	38	2.8%	36	2.8%	424	4.0%
NIR	54		49		65		64		74		87		90		123		606	
Not Reported	1,092		1,100		1,052		1,061		1,095		992		1,149		958		8,499	
Total	2,420	100.0%	2,443	100.0%	2,483	100.0%	2,447	100.0%	2,511	100.0%	2,418	100.0%	2,597	100.0%	2,385	100.0%	19,704	100.0%

*Percentages based on totally number minus reports for which exposure category was not reported or for which there was no identified risk (NIR).

When Québec's surveillance program data, which does contain complete exposure category information, is substituted into the table, there is a significant decrease in the percentage of cases with unknown exposure category (Figure 1). Cumulatively from 2002 to 2009, there is a 52.2% decrease (from 46.2% to 22.1%) among the proportion of national adult cases within the NIR and Not Reported categories. This significantly increases the validity and quality of the national HIV data, as they are more representative of Canadian trends, with nearly 80% of cases complete for exposure category.

Figure 1

Proportion of national adult HIV case reports with unknown exposure category (i.e. NIR and Not Reported), by Québec's two data sources for HIV cases, 2002- 2009



Assignment of exposure category

Tables 1 and 2 mimic Table 5A of the HIV and AIDS in Canada Surveillance Report, with Table 1 presenting the current table in the 2009 report, and Table 2 showing the table if Québec's surveillance program data were substituted for its laboratory data. The resulting proportional changes among each exposure category are shown in Table 3.

Table 2
Number and percentage distribution of positive HIV test reports among adults (≥ 15 years) in Canada, by exposure category and year of test, using Québec's surveillance program data

Exposure Category	Year of Test																Total	
	2002		2003		2004		2005		2006		2007		2008		2009			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
MSM	780	40.4%	928	41.7%	946	43.9%	894	43.7%	879	42.6%	877	44.2%	962	47.6%	904	47.3%	7,170	43.9%
MSM/IDU	47	2.4%	68	3.1%	69	3.2%	49	2.4%	60	2.9%	44	2.2%	45	2.2%	48	2.5%	430	2.6%
IDU	467	24.2%	455	20.4%	405	18.8%	412	20.2%	371	18.0%	385	19.4%	336	16.6%	334	17.5%	3,165	19.4%
Blood/blood products																		
Recipient of Blood/Clotting Factor	2	0.1%	1	0.0%	1	0.0%	2	0.1%	0	0.0%	0	0.0%	1	0.0%	1	0.1%	8	0.0%
Recipient of Blood	14	0.7%	14	0.6%	15	0.7%	15	0.7%	13	0.6%	11	0.6%	9	0.4%	15	0.8%	106	0.6%
Recipient of Clotting Factor	4	0.2%	6	0.3%	3	0.1%	4	0.2%	7	0.3%	5	0.3%	1	0.0%	6	0.3%	36	0.2%
Heterosexual contact																		
Origin from an HIV-Endemic country	199	10.3%	247	11.1%	239	11.1%	222	10.9%	228	11.1%	179	9.0%	214	10.6%	159	8.3%	1,687	10.3%
Sexual contact with a person at risk	193	10.0%	224	10.1%	211	9.8%	199	9.7%	192	9.3%	185	9.3%	195	9.6%	163	8.5%	1,562	9.6%
NIR-Het	187	9.7%	225	10.1%	216	10.0%	190	9.3%	233	11.3%	223	11.2%	216	10.7%	239	12.5%	1,729	10.6%
Perinatal	0	0.0%	1	0.0%	2	0.1%	1	0.0%	2	0.1%	3	0.2%	6	0.3%	6	0.3%	21	0.1%
Other	40	2.1%	56	2.5%	46	2.1%	56	2.7%	78	3.8%	74	3.7%	38	1.9%	36	1.9%	424	2.6%
NIR	60		62		74		70		74		91		91		124		646	
Not Reported	495		490		532		511		517		461		523		448		3,977	
Total	2,488	100.0%	2,777	100.0%	2,759	100.0%	2,625	100.0%	2,654	100.0%	2,538	100.0%	2,637	100.0%	2,483	100.0%	20,961	100.0%

*Percentages based on totally number minus reports for which exposure category was not reported or for which there was no identified risk (NIR).

Proportional increases were observed in the men who have sex with men (MSM) (2.9%), men who have sex with men and inject drugs (MSM/IDU) (0.7%) and the heterosexual contact-origin from an HIV-endemic country (Het-Endemic) (3.0%) exposure categories. Proportional decreases were observed among the heterosexual contact with a person at risk (Het-Risk) (-2.6%) and injection drug use (IDU) (-1.7%) categories. Of note is the existence of 0.1% of cases attributed to Perinatal transmission in Table 2. While PHAC's current data set does not reveal any adult Perinatal HIV cases, Québec's national surveillance program reports 21 cases between 2002 and 2009. These cases represent the previously diagnosed perinatal cases who have received a confirmation test since the inception of the Quebec HIV Surveillance Program in 2002.

Table 3

Proportional change among exposure categories for national HIV case reports among adults, using Québec's surveillance program data in place of Québec's laboratory data, cumulative 2002-2009

Exposure category	Total Percent change	Men Percent change	Women Percent change
MSM	2.9%	3.0%	--
MSM/IDU	0.7%	0.9%	--
IDU	-1.7%	-0.9%	-3.5%
Blood/blood products	0.0%	0.0%	0.0%
Recipient of Blood/Clotting Factor	0.0%	0.0%	-0.1%
Recipient of Blood	-0.1%	-0.1%	0.0%
Recipient of Clotting Factor	0.1%	0.1%	0.1%
Heterosexual contact	0.0%	0.0%	0.0%
Origin from an HIV- Endemic country	3.0%	1.3%	9.2%
Sexual contact with a person at risk	-2.6%	-2.3%	-2.8%
NIR-Het	-1.1%	-0.8%	-1.6%
Perinatal	0.1%	0.1%	0.2%
Other	-1.4%	-1.3%	-1.5%

Sex

When cases are further broken down by sex, the impact of changes in exposure category is more pronounced. For men, there are proportional increases among MSM (3.0%), Het-Endemic (1.3%) and MSM/IDU (0.9%), and proportional decreases among IDU (-0.9%), Het-Risk (-2.3%) and NIR-Het (-0.8%). Figures 2 to 5 illustrate the differences between the current data and proposed incorporation of QC's public health data, for the MSM, IDU, Het-Endemic and Het-Non-Endemic exposure categories.

Figure 2 shows that MSM cases are currently underrepresented in the current PHAC dataset; the surveillance program data from QC increases the national MSM proportion by up to 6% per year. Figure 3 shows that since 2004, IDU cases among men have been slightly overrepresented in national data over the past five years, with greater difference observed in recent years. Figures 4 and 5 shows that Het-Endemic cases among men have been slightly underrepresented, by roughly 1% per year, while Het-Non-Endemic have been overrepresented at the national level, by 2-4% per year.

Figure 2

Difference in proportion of national cases attributed to MSM, among adult male HIV cases, by Québec's two HIV data sources, 2002-2009

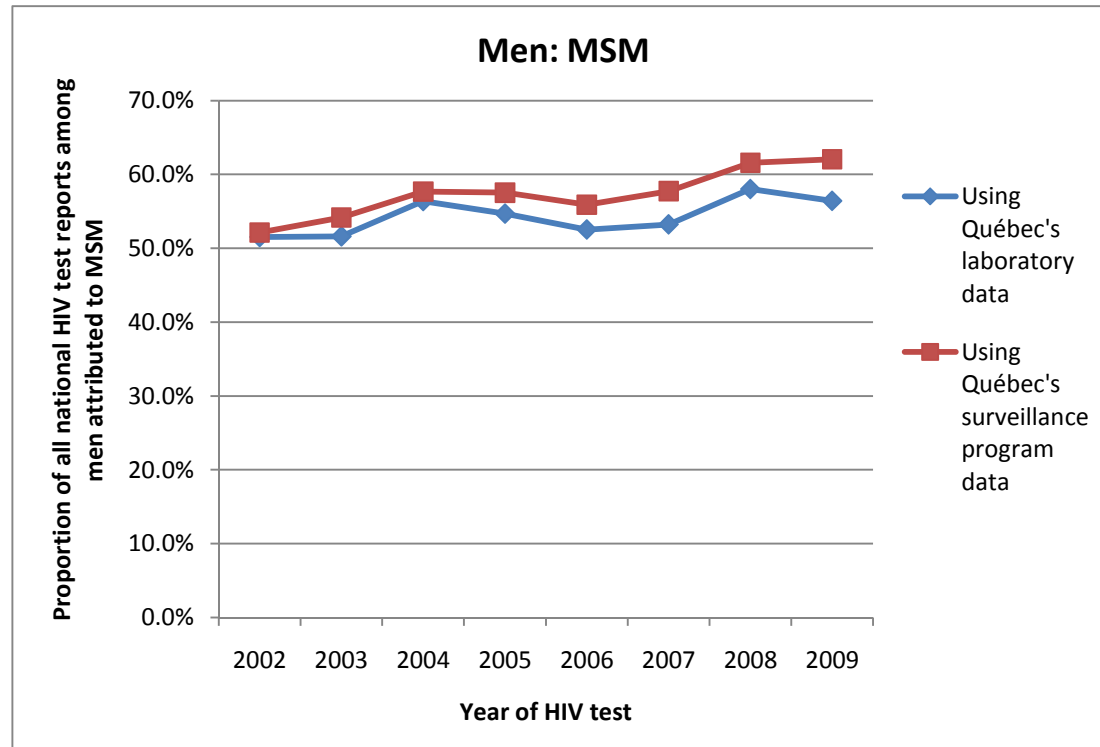


Figure 3
Difference in proportion of national cases attributed to IDU, among adult male HIV cases, by Québec's two HIV data sources, 2002-2009

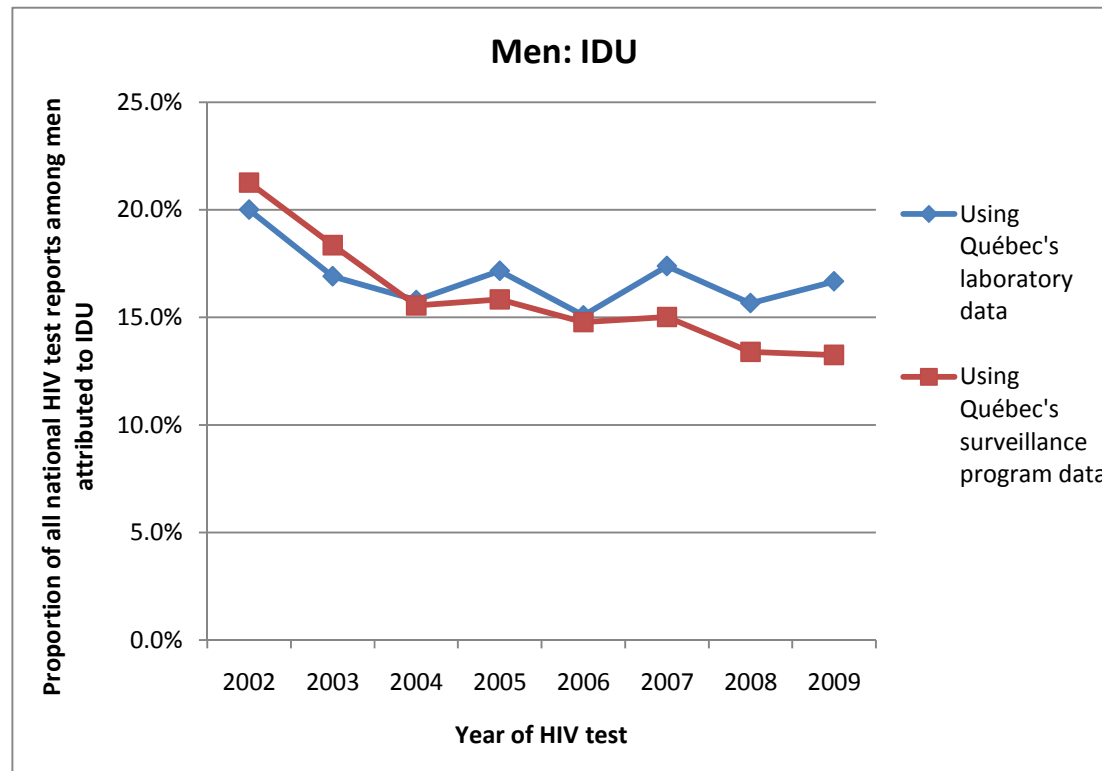


Figure 4
Difference in proportion of national cases attributed to Het-Endemic, among adult male HIV cases, by Québec's two HIV data sources, 2002-2009

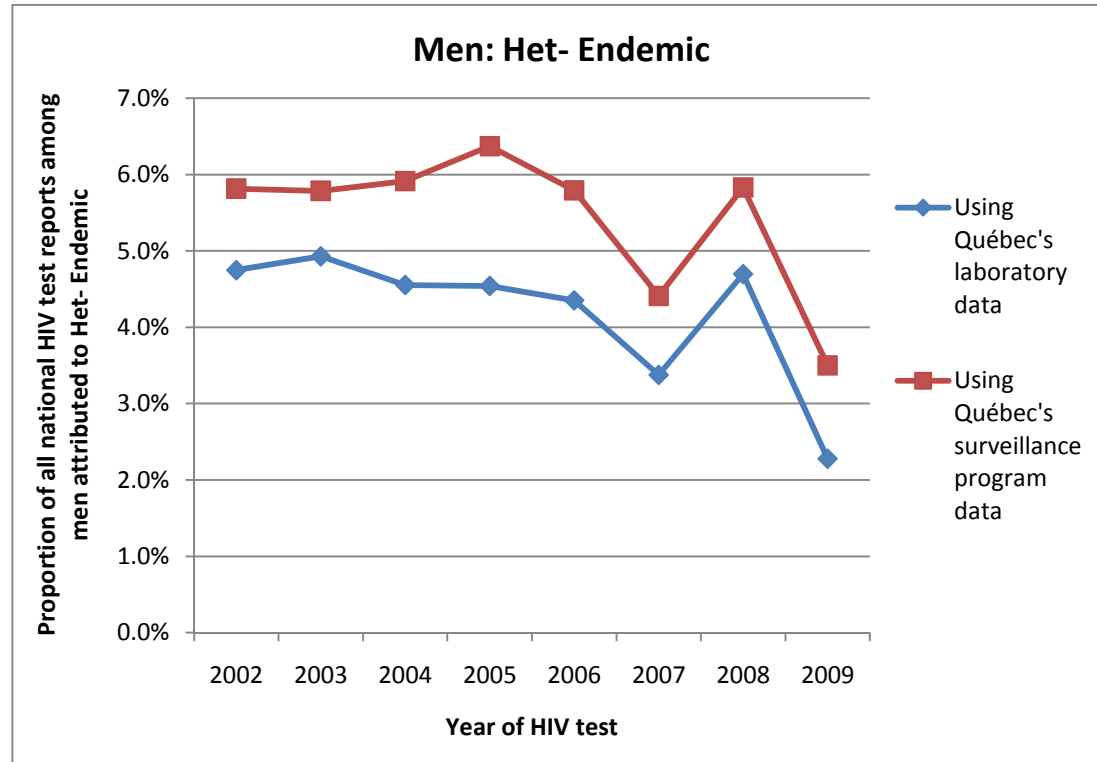
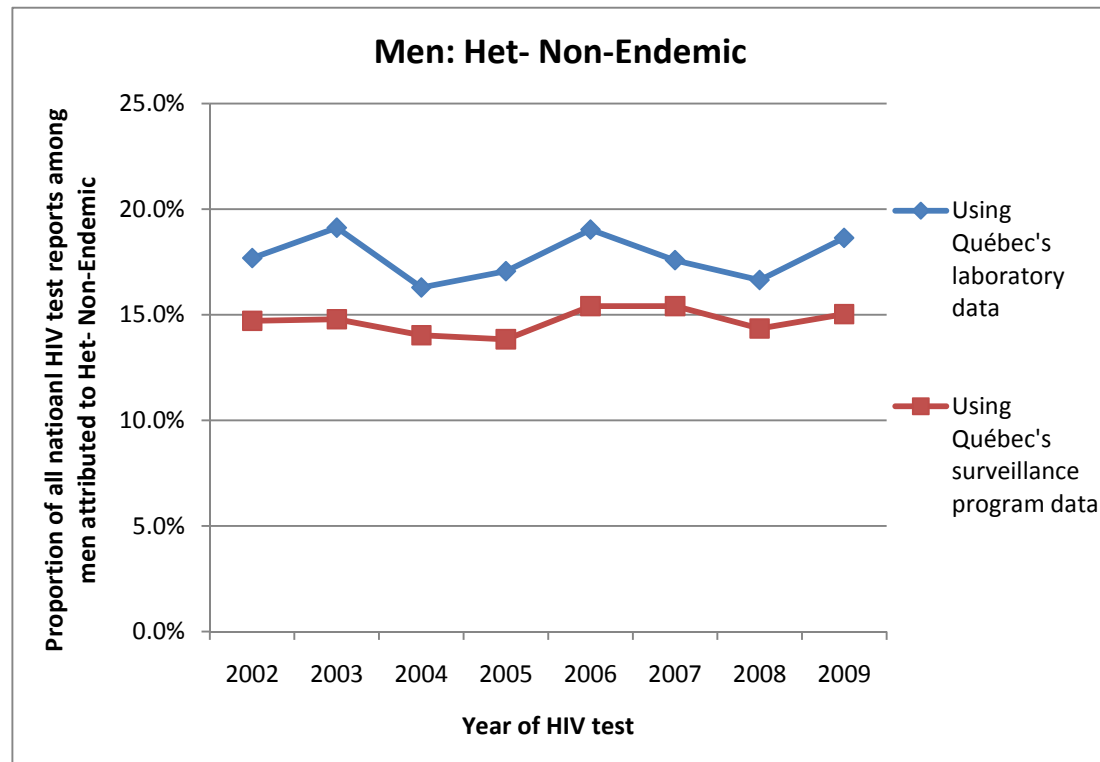


Figure 5

Difference in proportion of national cases attributed to Het-Risk and NIR-Het, among adult male HIV cases, by Québec's two HIV data sources, 2002-2009



Among adult women, proportional increases were noted in the heterosexual contact exposure category (4.9%), but that figure varied when broken down into the different subcategories; a 9.2% increase was observed in the Het-Endemic cases, and 2.8% and 1.6% decreases among Het-Risk and NIR-Het, respectively. A proportional decrease of 3.5% was noted for the proportion of IDU cases among women. Figures 6 to 8 show the difference between the current national data set (inclusion of Québec's lab data) compared to inclusion of QC's surveillance program data for women, among the IDU, Het-Endemic and Het-Non-Endemic categories. Figure 6 shows that IDU cases among women have been overrepresented in national data since 2004, by up to 6% per year. Figure 7 shows the difference in proportion of cases attributed to Het-Endemic cases among women; this category has been significantly underrepresented in national data, by up to 12% per year. Figure 8 shows that Het-Non-Endemic cases (including both the Het-Risk and NIR-Het subcategories) are overrepresented in the current national dataset.

Figure 6

Difference in proportion of national cases attributed to IDU, among adult female HIV cases, by Québec's two HIV data sources, 2002-2009

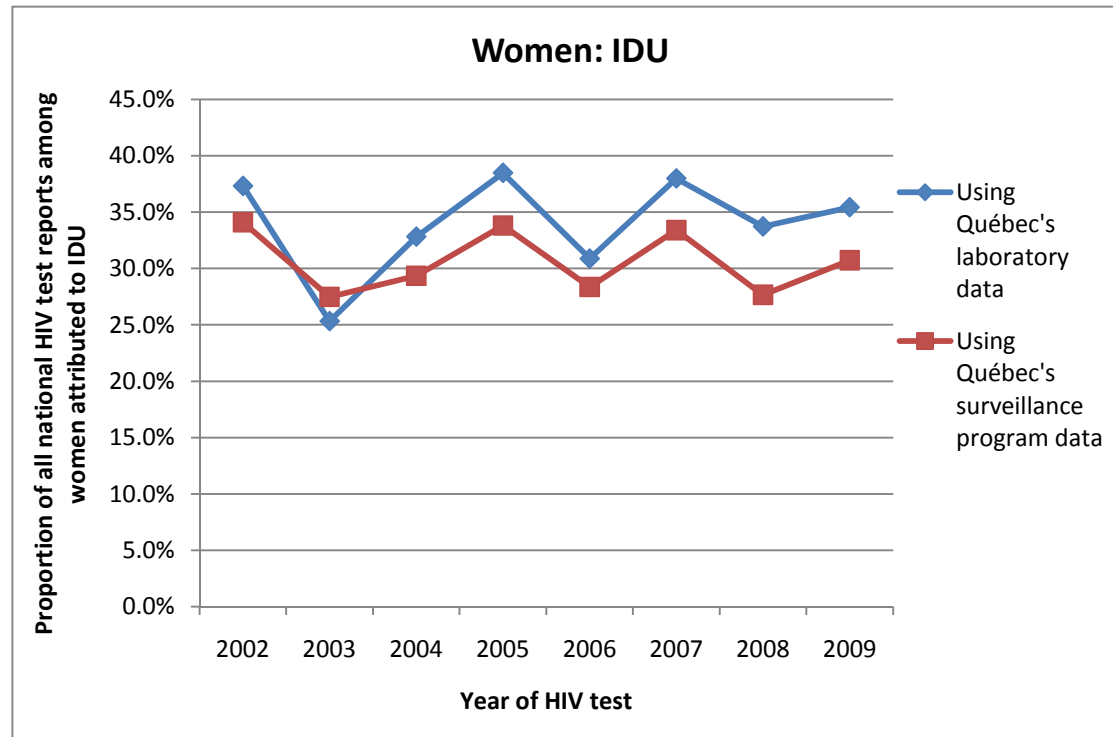


Figure 7
Difference in proportion of national cases attributed to Het-Endemic, among adult female HIV cases, by Québec's two HIV data sources, 2002-2009

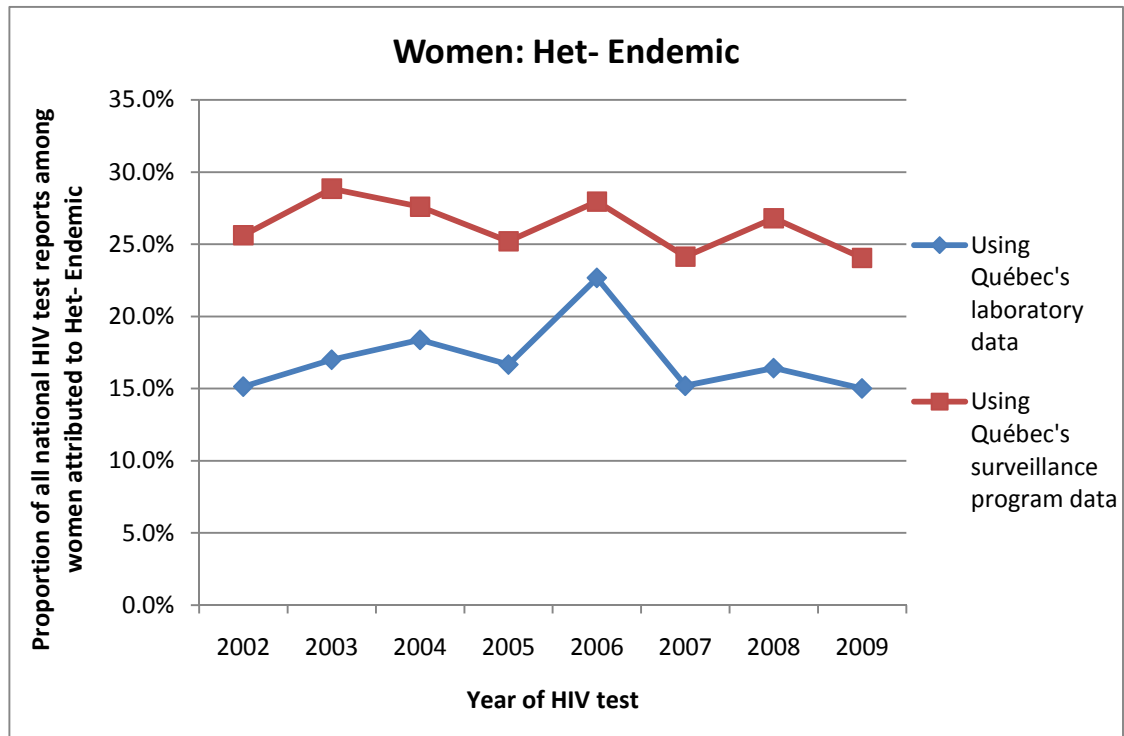
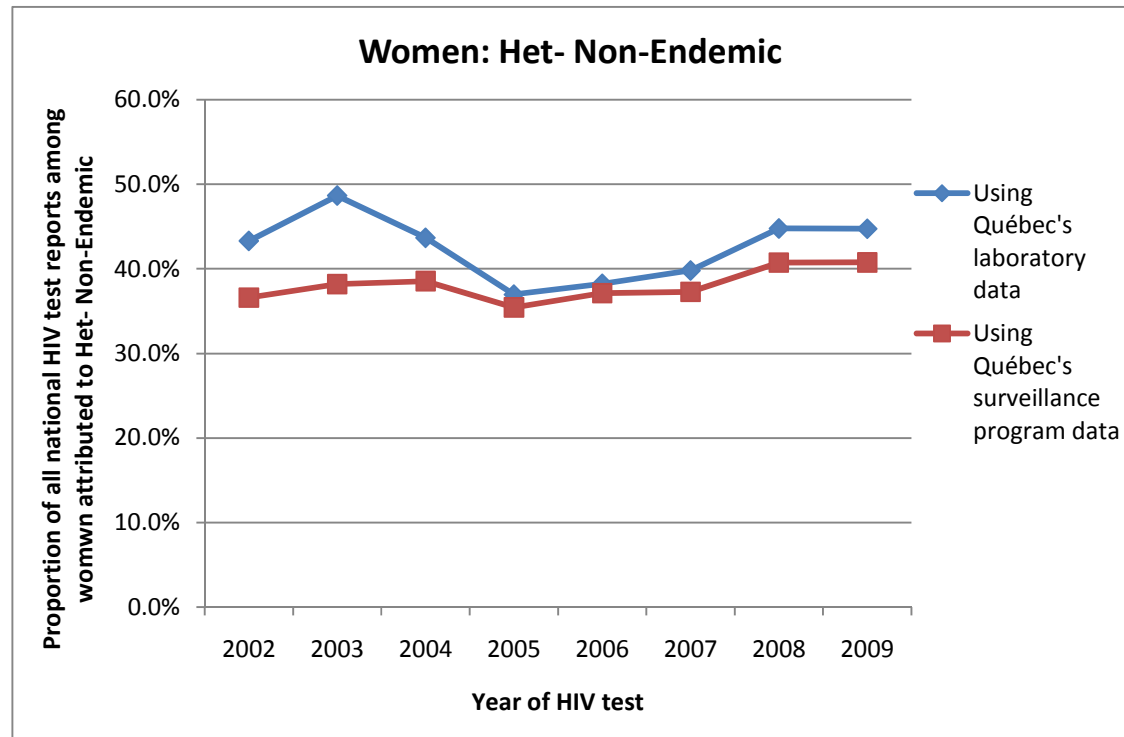


Figure 8

Difference in proportion of national cases attributed to the Het-Risk and Het-NIR categories, among adult female HIV cases, by Québec's two HIV data sources, 2002-2009



Conclusion:

Inclusion of Québec's exposure category data from the INSPQ in the national HIV dataset is significant; the national dataset becomes more complete as the proportion of cases with unknown exposure category is reduced by over half. This renders the national HIV dataset much more complete and reliable, upon which we are able to draw more definitive conclusions regarding exposure category trends at the national level.

This analysis also demonstrates that inclusion of exposure category data, from Québec's INSPQ public health surveillance system, can alter the exposure category breakdowns at the national level from what is currently available and presented. While most of these changes are relatively small, they do change the national dataset, and the trends appearing therein. They also unearth some important findings about representation of the MSM category among men and the Het-Endemic category among women in particular, which warrant further investigation.

The inclusion of Québec's INSPQ data in the national dataset would be beneficial, contributing to improved completeness of information on exposure categories, as well as increased representation of the Canadian epidemic. This more comprehensive data would offer a more accurate picture of HIV diagnoses in Canada. The feasibility of this data inclusion is currently being investigated by INSPQ and PHAC.