

**THE HIV EPIDEMIC AMONG INJECTION DRUG USERS
IN ONTARIO: THE SITUATION IN 1997**

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EXECUTIVE SUMMARY

We have carried out an analysis of the epidemiologic characteristics of HIV infection among injection drug users (IDUs) in Ontario as of mid 1997. We obtained data from multiple sources, including the Ontario AIDS Surveillance Program, the Laboratory Centre for Disease Control, the Ontario HIV Laboratory (Central Public Health Laboratory) and from seroepidemiologic studies carried out in various population of IDUs since the late 1980s. We attempted to construct a composite, integrated picture of the evolving epidemic of HIV infection in this vulnerable community. The impetus for this review came, in part, from a recent presentation of preliminary data from a study carried out among attenders of the Ottawa-Carleton needle exchange program which observed an unexpectedly high rate of HIV infection. We were also preoccupied with the catastrophic and uncontrolled HIV propagation among IDUs in Vancouver and Montreal and a desire that every possible effort be made so that this would not occur in Ontario.

On the basis of our analysis, we estimate conservatively that there are 30,000 active injection drug users in Ontario; a more precise appreciation of this figure must await results from several ongoing studies. With respect to AIDS incidence, both absolute numbers and rates continue to increase in Ontario. AIDS cases among IDUs comprise a growing proportion of all AIDS cases diagnosed in Ontario, though less than that observed in Quebec, British Columbia and Alberta.

The situation with regard to HIV is less reassuring. The prevalence of HIV infection among IDUs in Toronto was observed to increase by almost 70% from 1992 to 1994. HIV prevalence among incarcerated IDUs studied in 1993 was 3.6% in men and 4.2% in women; in this study, rates were greatest among men in the Toronto region and greatest among women elsewhere. The largest concentration of AIDS and HIV infection among Ontario IDUs continues to be in Metropolitan Toronto. AIDS cases among IDUs from the six Toronto health units comprises about 40% of Ontario IDU AIDS cases; HIV diagnoses among IDUs in Metro Toronto comprise about 30% of those in Ontario. AIDS and HIV rates are still among the highest in the province.

From the composite model, we estimate that approximately 1,800 IDUs have been infected with HIV since the early 1980's of whom about 400 have died (from AIDS and other causes). Thus, about 1,400 IDUs are living with HIV infection in Ontario, with an overall prevalence of about 4.7%. Conservatively, 300 new HIV infections are occurring annually for an incidence density of about 1.0 per 100 person-years. It should be noted that prevalence and incidence are probably substantially higher than the provincial mean in Toronto and Ottawa and, perhaps, elsewhere.

An unstable and alarming situation appears to be developing in the Ottawa-Carleton region. Data from a recent study among users of the SITE needle exchange program observed an HIV prevalence of

19% and an incidence of 24 per 100 person-years. While these data may well overestimate the true rates, they probably do indicate an unstable and worrisome situation. Further evidence from the Ontario HIV serodiagnostic database support these observations: whereas cases of AIDS among IDUs in Ottawa-Carleton represent 9% of Ontario AIDS cases in this group, Ottawa-Carleton comprises 29% and 34% of first-time positives and seroconversions respectively. The situation in several other regions, thought perhaps not as dramatic as in Toronto and Ottawa, merits further examination.

The above situation requires intensive intervention and investigation to limit, to the degree possible, the extent of propagation of HIV infection in this population at exceedingly high risk.

1. INTRODUCTION

Persons who inject drugs are at increased risk of HIV infection related in large part to the use of needles previously used by an HIV-infected person. Injection drug use is common throughout the developed world, with particular concentrations in large urban centres. Nevertheless, important pockets are found in rural regions as well as, often related to problems of unemployment, poverty and thrill-seeking. The peak ages of injection drug use are the 20's and, to a lesser extent, the 30's. It appears that IDUs either die or "burn out" at a certain age so that the frequency of current injection is much lower after age 40. Injection drug use appears to be about two to three times more common among men than among women in most populations. In general, the number of IDUs in any given city or region is not known and estimates used by professionals in the field are often based on incomplete and invalid data and assumptions.

Ontario is not spared from the problem of injection drug use or from HIV infection among IDUs. The precise extent of the problem of injection drug use is not known though at least one study is under way to estimate the number and characteristics of IDUs in Metro Toronto. Estimating the number of IDUs is particularly difficult for a number of reasons, including the highly dynamic nature of the population due to a number of elements: recruitment and relapse of injection, in- and out-migration, death, temporary interruption of injection and "burn-out". The presence of "ex-IDUs" in any given population is also important since some of these persons are HIV-infected and are at risk for HIV disease and for transmitting the virus to others, especially sexually.

In this report, we will provide preliminary estimates for the prevalence of injection drug use and attempt to integrate the currently available information on HIV infection from AIDS surveillance, HIV serodiagnostic testing and special studies.

2. METHODS

We collected data on IDUs and HIV infection from several sources and carried out an integrated analysis to obtain an overview of the HIV epidemic in this community in Ontario. Custom outputs were obtained from the Ontario AIDS surveillance program at the Public Health Branch, Ministry of Health. Data on AIDS cases from Canada as a whole had been obtained from the Laboratory Centre for Disease Control for an analysis on trends in AIDS incidence carried out recently by one of the authors (RSR).

As noted above, the actual number of IDUs in Ontario is unknown. However, we extrapolated rates from comparable cities and regions in the United States to provide some preliminary indication (*1*). For this purpose, we classified health units in Ontario as low, intermediate and high IDU prevalence.

We also carried out a preliminary analysis using capture-recapture methodology to estimate the number of IDUs in the Ottawa-Carleton region from HIV serodiagnostic testing data. To do this, we constituted a database of unique persons who indicated IDU on their test requisition for each year from 1992 through 1996. We then compared pairwise successively the five years to identify persons testing in both years. For this purpose, we used the COMPARE procedure of SAS (Statistical Analysis Institute, Cary, NC, USA). The number of IDUs was then calculated using the formula $n1 \times n2 / m$, where $n1$ and $n2$ are the annual numbers of tested IDUs in the two databases and m is the number of identified pairs (i.e., testing in both years).

Data from the HIV serodiagnostic testing program was available from the Ontario Central Public Health Laboratory, Laboratory Services Branch. For the purposes of the analysis, a database was constituted from the master database with all personal identifiers removed and analysed in SAS (Statistical Analysis Institute, Cary, NC, USA). We selected tests for which injection drug use had been indicated and examined results by age, sex and health unit where the HIV test had been carried out. We also reviewed the results stratified by first-time positive versus seroconversion. Finally, we examined time trends in HIV test results.

We reviewed published and presented HIV seroprevalence and sero-incidence studies which included data on IDUs. For this purpose, we consulted the national inventory of HIV studies published in May 1997 produced by the Laboratory Centre for Disease Control (2).

Data on reported AIDS cases and HIV diagnoses were analysed using commercial spreadsheet software (Lotus 1-2-3, Release 4, Lotus Development Corporation, USA). We carried out a composite analysis, integrating and fitting to observed data estimates of HIV incidence and prevalence, diagnosed HIV infections, AIDS incidence, and AIDS-associated mortality. The estimation of the number of IDUs diagnosed with HIV infection took into account the fact that many IDUs who test do not indicate this risk factor on the test requisition (only about 50-60% do). The proportion of HIV infections diagnosed was estimated from several studies among IDUs and taken into account in determining the true incidence of HIV infection. AIDS cases were adjusted for delayed reporting and under-reporting to the extent possible. Since IDUs are known to have a high death rate from other causes (especially drug overdose), we took into account “competing mortality” at a rate of 2.0% annually. For HIV, AIDS and mortality, cumulative incidence was derived by summing annual incidences and, for HIV and AIDS, the prevalence was calculated by subtracting cumulative mortality from cumulative incidence.

3. RESULTS

3.1 prevalence of IDUs in Ontario

Using levels of 0.2%, 0.4% and 0.6% for regions of low, intermediate and high prevalence, respectively based on the comparability to U.S. cities where IDU prevalence was determined yields an estimate of about 30,000 active IDUs in Ontario (see Table 1). This estimate appears reasonable but remains unvalidated for the present time.

Nevertheless, the preliminary analysis carried out using the capture-recapture methodology among IDUs who tested in Ottawa in 1992 and 1994 provides an estimate of 4,717, almost 60% higher than the 2,970 IDUs estimated from the extrapolation from U.S. data. Thus, the estimate of 30,440 may be low and in fact may be much higher if the Ottawa analysis and the assumptions about relative prevalence by health unit are correct. For the time being, we have used the more conservative estimate of 30,440 for Ontario.

3.2 AIDS incidence among IDUs in Ontario

To March 31, 1997, 198 persons who had injection drug use as their only risk factor have been diagnosed with AIDS. In addition, 217 men who have sex with other men and who also injected drugs were reported with AIDS (for these persons it is difficult to identify the actual route of HIV infection through analysis of the occurrence of Kaposi's sarcoma among cases may provide some indirect indication of this).

The number of AIDS cases by year of diagnosis and exposure category is shown on Table 2A. The number of cases has increased progressively for both groups over the years, with the possible exception of 1996-97. A comparative analysis of AIDS incidence among IDUs adjusted for reporting delays for Ontario compared to the other regions of Canada is shown in Figure 1. The number of AIDS cases among IDU and MSM-IDU (male IDUs who report sex with other men) is presented in Figure 2.

AIDS among IDUs and MSM-IDUs represents 3.3% and 3.6%, respectively, of the number of AIDS cases diagnosed in Ontario. However, the proportion of AIDS cases represented by IDUs has been increasing over time (Table 2B). For IDU, this proportion has increased progressively over the past 13 years, going from 0.8% for the period 1979-85, through 3.6% in 1990-92, to 5.4% of cases diagnosed in 1996-97. The proportion of AIDS cases contributed by the MSM-IDU group has been relatively stable over the 13-year period though at an overall higher rate than for IDUs alone; the proportion has varied in the range of 3 to 5% with no clear increasing or decreasing trend.

Data extracted directly from the Ontario AIDS surveillance program provide some further insights into the situation. Of the 195 AIDS cases among heterosexuals reported to end March 31, 1997 (there was a minor discrepancy since 198 AIDS cases among IDUs were found in the LCDC database as

described above), 36, or 18.5%, were among women. Thus, the cumulative incidence of AIDS in men was about four times that in women.

The cumulative incidence of AIDS varied by health unit to an important extent (see Table 3). Cumulative incidence for Ontario as a whole was 1.8 per 100,000 persons. The health units with rates more than 50% over the provincial incidence were (in order of ascending incidence): Sudbury (2.9), Leeds-Grenville (3.1), Muskoka (3.6), Kingston (6.2) and Toronto City (7.5). The rates in the first three health units were based on six or fewer reported AIDS cases. Also note that the rate in Ottawa - Carleton was 2.4 per 100,000, or about 30% higher than the provincial incidence.

AIDS cases by year of diagnosis and by selected health units (with six or more cases) are presented in Table 4.

3.3 HIV serodiagnostic Testing data

Since HIV testing began in late 1985 until June 1996, 494 first-time HIV-positive IDUs without other risk factors have been identified (3); and additional 155 male IDUs reporting sex with other men (MSM-IDU) were identified. The distribution of first-time prevalent HIV infections and seroconverters by health unit is presented in Table 5. During the same period, 61 and 15 seroconverters among IDU and MSM-IDU, respectively were also identified. These data represent an important under-estimate of the true number of IDUs found to be HIV infected (see discussion below).

Of the 452 first-time positive HIV infections identified in the period 1985 through June 1996, 339 were among men and 91 among women (for 22, the sex was unknown). Of the 66 seroconversions identified during the same period, 33 were among men and 30 were among women (for 3, the sex was unknown). Thus, men represented 79% of first-time positive HIV infection identified but only 52% of the seroconversions; this difference was statistically significant ($p=0.0001$).

The number of HIV-positive IDUs (first-time and seroconverters) from 1985 to June 1996 and the proportion of estimated number of IDUs and among the population by health unit and region is presented in Table 5. Several health units appeared to have rates higher than for Ontario as a whole, notably Ottawa-Carleton, City of Toronto, Kingston-Frontenac, Sudbury, Thunder Bay, Wellington-Dufferin and Leeds-Grenville. Some of these results may be due to testing of persons at high risk incarcerated in penal institutions (e.g. Kingston). Subsequent analyses will be carried out stratifying on the institution where the testing was performed. The geographic distribution of IDUs testing HIV-positive is graphically depicted in Figure 3.

During the period 1992-96, data was also available on persons who tested negative, allowing the calculation of positivity rates among IDUs tested. From January 1992 to June 1996, 17,235 tests were

carried out among persons reporting injection drug use. Of these 242 first-time HIV-positive and 38 seroconverters have been identified. The rate of positivity, including both groups, was 1.5%, there was no clear increasing or decreasing trend in rate of positivity over the 4.5 year period. However, these data underestimate the true rate since the denominator used in not persons testing or persons testing for the first time (i.e. duplicates have been removed from the numerator but not from the denominator). Tests among men represented 68% of IDUs tested and 73% of HIV-positive IDUs. The “positivity rate” among men was 1.6% and among women 1.2%.

The analysis for the period 1992-96 presenting positivity rates among IDUs tested by health unit and region is presented in Table 6. The observed prevalence for Ontario was 1.5%; this varied from 0% (in 14 health units) to 3.0%. HIV prevalence was highest in the following health units with more than 400 tests: Ottawa-Carleton (3.0%), North York (2.9%), Sudbury (2.7%), Toronto (2.3%), Thunder Bay (2.1%), Kingston (1.6%) and Hamilton (1.4%). These seven health units accounted for 80% of HIV-positive IDUs identified for the first time in Ontario from January 1992 to June 1996. Variations in HIV prevalence by health region were also noteworthy: prevalence was particularly low in the Southwest and Central West regions, with 0.35% and 0.83% respectively. Prevalence was highest in the Eastern health region (2.3%), followed by the Northern Region (1.7%) and Central East Region (1.5%). Table 6 also displays the rate of testing among IDUs and among the overall population for each health unit and region. The geographic distribution of HIV positivity rates by health unit is graphically depicted in Figure 4.

More detailed analyses of the incidence of HIV infection among repeat testers (i.e. seroconverters) in recent years have been carried out by researchers at the University of Toronto in collaboration with the HIV Diagnostic Laboratory of the Ontario Central Public Health Laboratory (4). HIV incidence density among IDUs increased from 0.8 per 100 person-years in 1992 to 1.2 per 100 person-years in 1995.

It is worthwhile to examine the results of HIV testing from 1985 to June 1996 among heterosexual IDUs in Ottawa-Carleton. Though cases of AIDS among heterosexual IDUs in Ottawa-Carleton represent 9.2% of Ontario AIDS cases in this group (9.4% among males and 8.3% among females), they represented 22.3% of first-time positives (21.5% among males and 27.5% among females) and 30.3% of the seroconverters (24.2% among males and 30.3% among females). Both these differences (i.e. for first-time positives and for seroconverters compared to AIDS cases) were statistically significant ($p=0.0001$).

From January 1992 to June 1996, 2,870 HIV tests were carried out among persons identified as IDUs at the Ottawa-Carleton Health Unit. Of the 2,766 tests where the sex was indicated, 63% were among men and 37% among women. The distribution by age was as follows: <19 years 6.7%, 20-29 years 33%, 30-39 years 42%, 40-49 years 15%, and 50+ years 2.2%. The median age at time of testing

was about 32 years, 34 years in men and 30 years in women. The rate of positive tests was 3.1%, 3.3% in men and 2.6% in women. Nevertheless, of the 13 seroconversions identified among IDUs in Ottawa-Carleton, 7 (54%) were among women versus 19 (27%) of the 71 first-time positive tests. This concentration of Ontario HIV infections in Ottawa-Carleton was slightly more evident in recent years than in the 1985-96 period overall: 29% of the 242 first-time positive infections diagnosed from 1992 to June 1996 in Ontario were from Ottawa-Carleton as were 34% of the 38 seroconversions diagnosed in the same period.

A similar analysis for Metro Toronto revealed that, during the period January 1992 to June 1996, 32% of the first-time positives and 26% of the seroconverting IDUs were from Toronto. Together, Metro Toronto and Ottawa-Carleton accounted for 61% of the first-time positives and 68% of the seroconversions identified among IDUs in the Ontario serodiagnostic database. These two regions represent 29% of the Ontario population.

3.4 Results of seroepidemiologic studies

The first available data was from a study carried out in 1988-90 in collaboration with researchers from Montreal; 1.0% of IDUs in Toronto in treatment were found to be infected with HIV (5).

A study carried out in 1989-90 by Millson and colleagues testing 533 IDUs observed an HIV prevalence of 4.3%, 1.7% among those in treatment and 5.7% among those not in treatment (6).

In the context of a multicentre collaboration organized by WHO over a three-year period from 1991 to 1994 (7,8), Millson and colleagues observed the following rates on direct testing of IDUs in Toronto both in and out of treatment:

Year	N	HIV prevalence
1991-92	479	4.5%
1992-93	489	4.8%
1993-94	499	7.6%

These results showed a statistically significant increase ($p=0.02$) of 68% in HIV prevalence in 1993-94 compared to 1991-93. Also noteworthy is the fact that from 69 to 72% of subjects indicated that they had been tested for HIV previous to the study.

It is also important to note, in this study, HIV prevalence among men varied to an important degree

according to sexual orientation. A more detailed analysis carried out subsequently (9) observed the following:

Year	Men having sex with men	Men not having sex with men
1991-92	12 / 46 (26.1%)	8 / 280 (2.9%)
1992-93	10 / 34 (29.4%)	9 / 339 (2.7%)
1993-94	16 / 63 (25.4%)	16 / 331 (4.8%)

The rates among MSM-IDU were, overall, over sevenfold greater in MSM-IDU compared to non-MSM IDU and did not appear to vary over the three-year study period. However, the rate among non-MSM IDU did women, especially in the third year. The prevalence among women appeared also to increase (data not shown) and the increase among non-MSM IDUs (i.e. male and female) increased significantly from 1991 to 1994.

Calzavara and colleagues studied inmates in Ontario penitentiaries in 1993 (10); this provided the opportunity to measure HIV prevalence among IDUs and, in particular, according to region of residence. Overall, prevalence was 3.6% in males (n=1,184) and 4.2% in females (n=262).

Among males, HIV prevalence was 6.5% in Toronto, compared to 1.7 to 3.0% in all other regions. The rate in Toronto was 3.5 times higher than in the other regions; this difference was statistically significant (p<0.0001). It is noteworthy that in this study, which collected data in 1993, the observed HIV prevalence in men in the Eastern region was similar to that in the other regions outside Toronto.

Among women, a somewhat different pattern was observed. The rate among women from Toronto (2.0% was lower than that from the other regions (7.3%); this difference of almost fourfold was borderline significant (p=0.07). The observed prevalence rate in women in the Eastern region was among the highest observed. Nevertheless, since the number of female inmates studied was small and the confidence limits of the prevalence wide, no definitive conclusions may be drawn from these data.

Leonard and colleagues recently presented data on HIV prevalence and incidence among IDUs in the Ottawa region that are particularly disturbing (11,12). Her study was organized in the context of the Quebec Surveillance Network (13,14), an evaluative multicentre study of IDUs attending needle exchange programs. In the Ottawa component of the study carried out at the SITE intervention project, 250 IDUs were recruited from June 1996 to March 1997. The observed HIV prevalence at study entry was 19.2%, with 95% confidence limits of 14.3% and 24.1%. The HIV prevalence was approximately the same in men and women. Also surprising was the observed HIV incidence of 23.7 per 100 person-years (95% confidence limits of 3.2 and 49 per 100 person-years). This was based on 5 seroconversions among 41 IDUs who came for a second test six months following their first, negative

HIV test (total person-time 21.6 person-years).

3.5 Integrated composite model for HIV infection among IDUs

Using data from the above sources, we developed an integrated model incorporating prevalence estimates of injection drug use, observed HIV prevalence and incidence in special studies, HIV serodiagnostic test results, AIDS surveillance data and AIDS-related and other mortality. The results of this analysis are presented in Table 7 and indicate that an estimated 1,860 IDUs in Ontario have ever been infected, with over 1,400 IDUs currently living with HIV infection.

A similar analysis was carried out for the Ottawa-Carleton Regional Health Unit (see Table 8) based on the conservative estimate of 3,000 active IDUs. Both HIV incidence and prevalence appear to be about 2.6 times that of Ontario as a whole, with HIV incidence in 1996 of 2.6 per 100 person-years and HIV prevalence of 12.1%, compared to 0.99 per 100 person-years and 4.7%, respectively. In Metro Toronto (see Table 9), using the same approach, we estimated that 665 persons among the 8,000 IDUs have been infected with HIV, of whom 512 are living. HIV incidence and prevalence were also higher than for Ontario as a whole.

4. DISCUSSION

In an overview of the HIV epidemic among IDUs in Ontario, we have found evidence of considerable HIV transmission, especially in the Ottawa-Carleton and Toronto regions. The numbers of HIV infections (and perhaps also new HIV infections) are greatest in Toronto. This is understandable given the concentration of IDUs and population in this major urban centre. Nevertheless, the situation in Ottawa-Carleton appears to be the most unstable; currently available information indicates that HIV transmission is occurring in this region at a high rate, perhaps beginning only recently.

Based on the data reviewed and analysed, we estimated that approximately 1,800 IDUs have been infected with HIV since the early 1980's of whom about 400 have died (from AIDS and other causes). Thus, about 1,400 IDUs are living with HIV infection in Ontario, with an overall prevalence of about 4.7%. Conservatively, 300 new HIV infections are occurring annually for an incidence density of about 1.0 per 100 person-years. It should be noted that prevalence and incidence are probably substantially higher than the provincial mean in Toronto and Ottawa-Carleton and, perhaps, elsewhere.

Several important considerations must be kept in mind in the interpretation of the HIV serodiagnostic testing data. First, only an estimated 50-60% of tests among IDUs (without enhancement) indicate this risk factor on the test requisition. Thus, the true numbers of IDUs tested and the number of HIV-positive IDUs may well be double those captured by these analyses. Second, the results are subject to uncertainty about the actual region of residence of the person tested since IDUs may travel to other centres (either because of the unavailability of testing facilities acceptable to persons at high risk or

because of concerns about confidentiality). Test results are classified according to the location of testing not to the region of residence of the person tested. Not all persons at risk for HIV infection undergo serologic testing; thus, rates of testing may vary by sex and region and also over time.

HIV prevalence rates for diagnostic testing carried out from 1992 to 1996 were calculated by dividing the number of unique positive IDUs by the number of tests. This is problematic and the interpretation of such rates must be carried out with caution. The numerator for this rate is the number of unique IDUs who tested positive for the first time during this 4.5 year period, including both IDUs who tested positive on their first HIV test and those who had direct or indirect documentation of a previous, negative test. Tests among persons who had already tested positive were removed to the extent possible. However, given the very large numbers, it was not possible to eliminate duplicate, persistently negative tests among IDUs. Thus, the denominator is somewhat inflated and the rate is likely an underestimate of the true rate. This is evident for example in the City of Toronto where the observed rate in serodiagnostic testing was 2.3% whereas the rate observed in a seroepidemiologic study in 1993-94 (7,8) was 7.6% and, in a study among prisoners in 1993 (10), the overall HIV prevalence among Toronto IDUs was 5.4%.

The above analyses do not take into account fully HIV infections occurring among male IDUs who also have sex with other men (MSM-IDU). In fact, more AIDS cases have been reported in Ontario among MSM-IDU than among heterosexual IDUs (246 compared to 195). There are probably far fewer MSM-IDUs than heterosexual IDUs, but they are likely at much greater risk of HIV infection than either heterosexual IDUs or MSM. In the only study directly addressing this issue, Millson (9) found that HIV prevalence among MSM-IDU was 7.6 times greater than among male, non-MSM IDUs. The number of MSM-IDUs is difficult to estimate because of the definitional issues involved, the highly dynamic nature of this population and the difficulties of obtaining reliable information concerning double risk. In the Millson study, about 10-15% of male IDUs reported having had sex with other men. In the HIV serodiagnostic database from 1985 to June 1996, the number of identified MSM-IDU first-time positive HIV infections was only about 31% of the number of heterosexual IDUs (25% of the seroconversions). Finally, it is difficult to determine the actual source of HIV infection for these men at very high risk, i.e. sharing injection equipment or same-sex contact with other men. Subsequent studies, analyses and interventions should take this important subpopulation into account.

The incidence of AIDS continues to increase in Ontario. However, for Ottawa-Carleton, relatively few cases of AIDS have been reported in recent years and the cumulative incidence of AIDS among heterosexual IDUs in Ottawa-Carleton was only 30% above the provincial rate. There are several possible explanations for this: 1) AIDS reporting among IDUs may be differentially incomplete or deteriorating; there is no evidence to support this possibility at the present time 2) the increase in HIV infection observed among IDUs in Ottawa-Carleton may be artefactual. This is unlikely, however, since high rates of infection were observed both in the SITE program study and in the HIV serodiagnostic testing program, two independent sources of data; 3) the high rate of HIV transmission

may be only a very recent phenomenon, too early to be reflected in AIDS incidence; AIDS is infrequent in the first two to three years following HIV infection. Further data will be necessary to help distinguish between these possibilities.

The situation with respect to the HIV epidemic in IDUs in Ontario is concerning. AIDS incidence in this group is increasing both as a proportion of overall AIDS cases and in absolute numbers and rates. Metro Toronto continues to have the largest concentration of IDUs and HIV infection in IDUs in Ontario; the available data suggest that HIV transmission is continuing to occur. In Metro Toronto, HIV prevalence was observed to increase from 4.5% to 7.6% in the period 1991 through 1994. In the period January 1992 through June 1996, 82 first-time positive and 11 seroconverting IDUs have been diagnosed, representing 32% and 27% of such diagnoses, respectively, in Ontario.

The situation in Ottawa-Carleton is particularly worrisome. Evidence from both the Ontario HIV serodiagnostic testing program and the recent report on IDUs tested at the SITE program suggest that HIV incidence in this population is particularly high, a phenomenon which may have begun only recently. However, there are limitations in both data sets that must be taken into consideration. For the HIV serodiagnostic data, the high proportion of diagnosed HIV infections in Ontario comprised by Ottawa-Carleton could be due to differentially high rates of HIV testing. This probably does not provide the entire explanation for this phenomenon since, overall, Ottawa-Carleton represented only 10.4% of HIV serodiagnoses in Ontario (compared to 34% HIV seroconversions in 1992-96, as noted above).

There are important potential selection biases in the study by Leonard; thus, the observed incidence and prevalence may be an overestimate of the true rates. First, needle exchange attendees are known through many studies, including several in Canada and specifically in Ontario, to be at particular risk for HIV infection and usually have higher HIV incidence and prevalence than those not using needle exchange programs. This may in large part be due to the targeting of the highest risk IDUs, a specific aim of these programs. Also, the persons included in the recently reported study may in other ways be unrepresentative of IDUs as a whole. Subjects included in this study were older and had injected for longer than other subjects in the collaborative SurVIDU network study (and perhaps also IDUs in Ottawa). The mean age among men was 35 years and women 32 years (11) compared to a median of 31 and 25 years (13), respectively; men at the SITE program had injected for 14.6 years and women 10.4 years, compared to a study mean of 6.0 and 4.0 years respectively (14). In this study, HIV prevalence and incidence were both associated positively with duration of injection.

Since the observed HIV incidence and prevalence in the SITE study may overestimate the true values, further studies should be undertaken to help determine the extent of HIV transmission among IDUs in Ottawa. Nevertheless, it is likely that the high rates observed both at the SITE program and among IDUs undergoing serodiagnostic testing reflect a serious situation which requires more intensive intervention and study.

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Table 1 Population and estimated prevalence and numbers of IDUs by health unit and region, Ontario, 1996

	<i>Population</i>	<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDUs</i>		<i>Population</i>	<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDUs</i>
Northern Region					Southwest Region				
Algoma	131827	1.2	0.002	260	Bruce-Grey	158830	1.5	0.002	320
North Bay	96671	0.9	0.002	190	Elgin-St.Thomas	81256	0.7	0.002	160
Northwestern	83520	0.8	0.002	170	Huron	62016	0.6	0.002	120
Porcupine	100098	0.9	0.002	200	Kent	115510	1.1	0.002	230
Sudbury	209721	1.9	0.002	420	Lambton	136302	1.2	0.002	270
Thunder Bay	171166	1.6	0.002	340	Middlesex-London*	401114	3.7	0.004	1600
Timiskaming	40841	0.4	0.002	80	Oxford	100645	0.9	0.002	200
Total	833844	7.6	0.0017	1660	Perth	74366	0.7	0.002	150
					Windsor-Essex*	352463	3.2	0.004	1410
Eastern Region					Total				
Eastern Ontario	192581	1.8	0.002	390		1482502	13.6	0.003	4460
Hastings-Prince Edwa	152429	1.4	0.002	300	Central West Region				
Kingston	177363	1.6	0.002	350	Brant	122788	1.1	0.002	250
Leeds Grenville	158803	1.5	0.002	320	Haldimand-Norfolk	106365	1	0.002	210
Ottawa-Carleton*	743655	6.8	0.004	2970	Halton	345125	3.2	0.002	690
Renfrew	104151	1	0.002	210	Hamilton-Wentworth*	475397	4.3	0.004	1900
Total	1528982	14	0.003	4540	Niagara	415567	3.8	0.002	830
					Waterloo	412105	3.8	0.002	820
Central East Region					Wellington				
Durham	459829	4.2	0.002	920		218565	2	0.002	440
East York*	107620	1	0.004	430	Total				
Etobicoke	324815	3	0.004	1300		2095912	19.2	0.0025	5140
Hailburton-Kawartha	169155	1.5	0.002	340	Province of Ontario				
Muskoka Parry Sound	83174	0.8	0.002	170		10931427	100	0.0028	30440
North York*	589489	5.4	0.002	1180	Metro Toronto	2384663	21.8	0.0041	9690
Peel	845509	7.7	0.002	1690	Metro Toronto outside Toronto Ci	1718865	15.7	0.0033	5700
Peterborough	127196	1.2	0.002	250	Central East outside Toronto City	4324389	39.6	0.0025	10910
Scarborough*	549688	5	0.004	2200	Ontario outside Toronto City	10265629	93.9	0.0026	26450
Simcoe	329435	3	0.002	660	Estimated prevalence IDUs*:				
Toronto City*	665798	6.1	0.006	3990		Low		0.002	
York City*	147253	1.3	0.004	590		Intermedia		0.004	
York Region	591226	5.4	0.002	1180		High		0.006	
Total	4990187	45.6	0.003	14900					

*These estimates are very preliminary and are based on an extrapolation from a study of 96 U.S. metropolitan areas (please see text)

HIV infection among IDUs Ontario

Table 2A Reported AIDS cases by exposure category and year of diagnosis, Ontario, 1979-97

Year	MSM		IDU		MSM-IDU		Endemic		Hetero-other		Occupation	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
1979-84	72	80.9	1	1.1	6	6.7	2	2.2	1	1.1	0	0
1985	133	85.8	1	0.6	5	3.2	1	0.6	2	1.3	0	0
1986	221	84.7	1	0.4	8	3.1	1	0.4	1	0.4	0	0
1987	336	81.4	9	2.2	13	3.1	2	0.5	10	2.4	0	0
1988	378	81.3	8	1.7	14	3	7	1.5	18	3.9	0	0
1989	419	79.1	16	3	16	3	11	2.1	29	5.5	0	0
1990	463	76.2	16	2.6	12	2	12	2	39	6.4	1	1
1991	456	74.5	24	3.9	17	2.8	10	1.6	33	5.4	0	0
1992	512	72	29	4.1	28	3.9	19	2.7	53	7.5	0	0
1993	497	72.3	24	3.5	31	4.5	22	3.2	64	9.3	0	0
1994	440	73.8	25	4.2	30	5	13	2.2	57	9.6	0	0
1995	364	66.9	29	5.3	27	5	17	3.1	62	11.4	0	0
1996	174	63.5	15	5.5	10	3.6	26	9.5	32	11.7	0	0
1997	6	100	0	0	0	0	0	0	0	0	0	0
Total	4471	75.1	198	3.3	217	3.6	143	2.4	401	6.7	1	1

Year	Transfusion		Clot factor		Perinatal		NIR		Total	
	Number	%	Number	%	Number	%	Number	%	Number	%
1979-84	1	1.1	1	1.1	0	0	5	5.6	89	99.8
1985	4	2.6	2	1.3	0	0	7	4.5	155	99.9
1986	10	3.8	3	1.1	0	0	16	6.1	261	100
1987	16	3.9	5	1.2	2	0.5	20	4.8	413	100
1988	20	4.3	7	1.5	3	0.6	10	2.2	465	100
1989	11	2.1	8	1.5	1	0.2	19	3.6	530	100.1
1990	5	0.8	18	3	2	0.3	40	6.6	608	100.1
1991	10	1.6	15	2.5	5	0.8	42	6.9	612	100
1992	12	1.7	10	1.4	5	0.7	43	6	711	100
1993	8	1.2	3	0.4	5	0.7	33	4.8	687	99.9
1994	4	0.7	7	1.2	1	0.2	19	3.2	596	100.1
1995	8	1.5	5	0.9	6	1.1	26	4.8	544	100
1996	2	0.7	0	0	2	0.7	13	4.7	274	99.9
1997	0	0	0	0	0	0	0	0	6	100
Total	111	1.9	84	1.4	32	0.5	293	4.9	5951	99.8

HIV infection among IDUs Ontario

Table 2B Reported AIDS cases by exposure category and year of diagnosis, Ontario, 1979-97

Year	MSM Number	%	IDU Number	%	MSMIDU Number	%	Endemic Number	%	Hetero- other Number	%	% Occupat Number	%
1979-85	205	84	2	0.8	11	4.5	3	1.2	3	1.2	0	0
1986-89	1354	81.1	34	2	51	3.1	21	1.3	58	3.5	0	
1990-92	1431	74.1	69	3.6	57	3	41	2.1	125	6.5	1	0.05
1993-95	1301	71.2	78	4.3	88	4.8	52	2.8	183	10	0	0
1996-97	180	64.3	15	5.4	10	3.6	26	9.3	32	11.4	0	0
Total	4471	75.1	198	3.3	217	3.6	143	2.4	401	6.7	1	0.02

Year	Transfusio n Number	%	Clot factor Number	%	Perinatal Number	%	NIR Number	%	Total Number	%
1979-85	5	2	3	1.2	0	1	12	4.9	244	99.8
1986-89	57	3.4	23	1.4	6	0.4	65	3.9	1669	100.1
1990-92	27	1.4	43	2.2	12	0.6	125	6.5	1931	100.1
1993-95	20	1.1	15	0.8	12	0.7	78	4.3	1827	100
1996-97	2	0.7	0	0	2	0.7	13	4.6	280	100
Total	111	1.9	84	1.4	32	0.5	293	4.9	5951	99.8

Table 3 Population, estimate prevalence and numbers of IDUs and number and rate of AIDS 1983-97 by Health unit, Ontario

	<i>Population</i>	<i>AIDS</i>					
		<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDU's</i>	<i>Number of AIDS cases</i>	<i>cumulative incidence (/100,000)</i>	<i>AIDS rate IDU's (/1000)</i>
Northern Region							
Algoma	131827	1.2	0.002	260	1	0.8	3.8
North Bay	96671	0.9	0.002	190	0	0	0
Northwestern	83520	0.8	0.002	170	0	0	0
Porcupine	100098	0.9	0.002	200	0	0	0
Sudbury	209721	1.9	0.002	420	6	2.9	14.3
Thunder Bay	171166	1.6	0.002	340	2	1.2	5.9
Timiskaming	40841	0.4	0.002	80	0	0	0
Total	833844	7.6	0.002	1660	9	1.1	5.4
Eastern Region							
Eastern Ontario	192581	1.8	0.002	390	3	1.6	7.7
Hastings-Prince Edward	152429	1.4	0.002	300	2	1.3	6.7
Kingston	177363	1.6	0.002	350	11	6.2	31.4
Leeds Grenville	158803	1.5	0.002	320	5	3.1	15.6
Ottawa Carleton*	743655	6.8	0.004	2970	18	2.4	6.1
Renfrew	104151	1	0.002	210	2	1.9	9.5
Total	1528982	14.0	0.003	4540	41	2.7	9
Central East Region							
Durham	459829	4.2	0.002	920	5	1.1	5.4
East York*	107620	1	0.004	430	2	1.9	4.7
Etobicoke*	324815	3	0.004	1300	7	2.2	5.4
Haliburton Kawartha	169155	1.5	0.002	340	1	0.6	2.9
Muskoka Parry Sound	83174	0.8	0.002	170	3	3.6	17.6
North York*	589489	5.4	0.002	1180	8	1.4	6.8
Peel	845509	7.7	0.002	1690	6	0.7	3.6
Petersborough	127196	1.2	0.002	250	3	2.4	12
Scarborough*	549688	5	0.004	2200	9	1.6	4.1
Simcoe	329435	3	0.002	660	3	0.9	4.5
Toronto City*	665798	6.1	0.006	3990	50	7.5	12.5
York City*	147253	1.3	0.004	590	2	1.4	3.4
York Region	591226	5.4	0.002	1180	5	0.8	4.2
Total	4990187	45.6	0.003	14900	104	2.1	7

HIV infection among IDUs Ontario

Table 3 Population, estimate prevalence and numbers of IDUs and number and rate of AIDS 1983-97 by Health unit, Ontario

	<i>Population</i>	<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDU's</i>	<i>Number of AIDS cases</i>	<i>AIDS cumulative incidence (/100,000)</i>	<i>AIDS rate IDU's (/1000)</i>
Southwest Region							
Bruce-Grey	158830	1.5	0.002	320		0	0
Elgin-St.Thomas	81256	0.7	0.002	160		0	0
Huron	62016	0.6	0.002	120		0	0
Kent	115510	1.1	0.002	230	1	0.9	4.3
Lambton	136302	1.2	0.002	270	1	0.7	3.7
Middlesex-London*	401114	3.7	0.004	1600	5	1.2	3.1
Oxford	100645	0.9	0.002	200		0	0
Perth	74366	0.7	0.002	150		0	0
Windsor-Essex*	352463	3.2	0.004	1410	8	2.3	5.7
Total	1482502	13.6	0.003	4460	15	1	3.4
Central West Region							
Brant	122788	1.1	0.002	250	1	0.8	4
Haldimand-Norfolk	106365	1	0.002	210		0	0
Halton	345125	3.2	0.002	690	5	1.4	7.2
Hamilton-Wentworth*	475397	4.3	0.004	1900	11	2.3	5.8
Niagara	415567	3.8	0.002	830	3	0.7	3.6
Waterloo	412105	3.8	0.002	820	2	0.5	2.4
Wellington	218565	2	0.002	440	4	1.8	9.1
Total	2095912	19.2	0.0025	5140	26	1.2	5.1
Province of Ontario	10931427	100	0.0028	30700	195	1.8	6.4
Metro Toronto	2384663	21.8	0.0041	9690	78	3.3	8
Metro Toronto outside Toronto City	1718865	15.7	0.0033	5700	28	1.6	4.9
Central East outside Toronto City	4324389	39.6					
Ontario outside Toronto City	10265629	93.9	0.0026	26710	145	1.4	5.4

Table 4 Reported AIDS cases among IDUs by year of AIDS diagnosis for selected Health Units, Ontario 1983-97

Year	Ottawa- Carleton				Scarborou gh	Toronto City	York City	Metro Toronto							
		East York	Etobicoke	North York					Hamilton	Kingston	Windsor	Sudbury	Peel	Other 20 Health Units	Total Ontario
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
1985	0	0	1	0	0	2	0	3	0	0	0	0	0	0	3
1986	0	0	0	0	0	2	0	2	0	0	0	0	0	1	3
1987	0	0	2	0	1	3	0	6	0	1	0	0	0	6	14
1988	0	0	0	1	0	5	0	6	0	0	0	1	0	3	10
1989	2	0	0	2	2	7	0	7	0	2	2	1	0	7	26
1990	2	0	1	1	1	7	0	9	0	1	1	0	0	9	25
1991	4	0	1	2	0	3	0	5	2	3	1	0	0	5	23
1992	4	1	0	0	0	4	0	8	3	0	2	2	0	8	25
1993	2	0	1	1	1	9	1	13	3	3	0	0	0	5	25
1994	0	0	1	1	3	3	0	8	1	0	0	1	0	4	14
1995	3	1	0	0	0	4	1	6	0	2	1	0	0	3	15
1996	1	0	0	0	1	1	0	2	1	1	0	1	0	5	11
1997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	18	2	7	8	9	50	2	78	11	11	8	6	6	57	195
Prop (%)	9.2	1	3.6	4.1	4.6	25.6	1	40	5.6	5.6	4.1	3.1	3.1	29.2	100

Table 5 Population, estimated prevalence and numbers of IDUs and HIV serodiagnoses by health unit and region, Ontario, 1985-96

	Population	Proportion population Ontario	Estimated proportion IDU	Estimated number IDUs	HIV diagnoses 1985-1996			Population prevalence of IDU HIV infection (/1000)	IDU prevalence of IDU IV infection (/1000)
					Prevalent	SC	Total		
Northern Region									
Algoma	131827	1.2	0.002	260	5	2	7	0.05	26.9
North Bay	96671	0.9	0.002	190	2	0	2	0.02	10.5
Northwestern	83520	0.8	0.002	170	1	0	1	0.01	5.9
Procupine	100098	0.9	0.002	200	1	0	1	0.01	5
Sudbury	209721	1.9	0.002	420	16	4	20	0.1	47.6
Thunder Bay	171166	1.6	0.002	340	9	6	15	0.09	44.1
Timiskaming	40841	0.4	0.002	80	0	0	0	0	0
Total	833844	7.6	0.0017	1660	34	12	46	0.06	32.9
Eastern Region									
Eastern Ontario	192581	1.8	0.002	390	6	2	8	0.04	20.5
Hastings-Prince Edward	152429	1.4	0.002	300	0	0	0	0	0
Kingston	177363	1.6	0.002	350	28	1	29	0.16	82.9
Leeds Grenville	158803	1.5	0.002	320	9	1	10	0.06	31.3
Ottawa Carleton*	743655	6.8	0.004	2970	101	20	121	0.16	40.7
Renfrew	104151	1	0.002	210	2	0	2	0.02	9.5
Total	1528982	14.0	0.003	4540	146	24	170	0.11	37.4
Central East Region									
Durham	459829	4.2	0.002	920	3	0	3	0.01	3.3
East York*	107620	1	0.004	430				0	0
Etobicoke*	324815	3	0.004	1300	4	2	6	0.02	4.6
Haliburton Kawartha	169155	1.5	0.002	340	1	2	3	0.02	8.8
Muskoka Parry Sound	83174	0.8	0.002	170	0	0	0	0	0
North York*	589489	5.4	0.002	1180	19	1	20	0.03	16.9
Peel	845509	7.7	0.002	1690	12	2	14	0.02	8.3
Petersborough	127196	1.2	0.002	250	4	0	4	0.03	16
Scarborough*	549688	5	0.004	2200	11	3	14	0.03	6.4
Simcoe	329435	3	0.002	660	4	1	5	0.02	7.6
Toronto City*	665798	6.1	0.006	3990	136	14	150	0.23	37.6
York City*	147253	1.3	0.004	590				0	0
York Region	591226	5.4	0.002	1180	6	0	6	0.01	5.1
Total	4990187	45.6	0.003	14900	200	25	225	0.05	15.1

HIV infection among IDUs Ontario

Table 5 Population, estimated prevalence and numbers of IDUs and HIV serodiagnoses by health unit and region, Ontario, 1985-96

	<i>Population</i>	<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDUs</i>	<i>HIV diagnoses 1985-1996</i>			<i>Population prevalence of IDU HIV infection (/1000)</i>	<i>IDU prevalence of IDU IV infection (/1000)</i>
Southwest Region									
Bruce-Grey	158830	1.5	0.002	320	0	0	0	0	0
Elgin-St.Thomas	81256	0.7	0.002	160	0	1	1	0.01	6.3
Huron	62016	0.6	0.002	120	0	0	0	0	0
Kent	115510	1.1	0.002	230	1	0	1	0.01	4.3
Lambton	136302	1.2	0.002	270	0	0	0	0	0
Middlesex-London*	401114	3.7	0.004	1600	15	0	15	0.04	9.4
Oxford	100645	0.9	0.002	200	0	0	0	0	0
Perth	74366	0.7	0.002	150	1	0	1	0.01	6.7
Windsor-Essex*	352463	3.2	0.004	1410	4	0	4	0.01	2.8
Total	1482502	13.6	0.003	4460	21	1	22	0.01	4.9
Central West Region									
Brant	122788	1.1	0.002	250	1	0	1	0.01	4
Haldimand-Norfolk	106365	1	0.002	210	0	0	0	0	0
Halton	345125	3.2	0.002	690	5	1	6	0.02	8.7
Hamilton-Wentworth*	475397	4.3	0.004	1900	13	2	15	0.03	7.9
Niagara	415567	3.8	0.002	830	4	0	4	0.01	4.8
Waterloo	412105	3.8	0.002	820	6	0	6	0.01	7.3
Wellington	218565	2	0.002	440	13	0	13	0.06	29.5
Total	2095912	19.2	0.0025	5140	42	3	45	0.02	8.8
Province of Ontario	10931427	100	0.0028	30440	452	66	518	0.05	17
Metro Toronto	2384663	21.8	0.0041	9690	170	20	190	0.08	19.6
Metro Toronto outside Toronto City	1718865	15.7	0.0033	5700	34	6	40	0.02	7
Central East outside Toronto City	4324389	39.6							
Ontario outside Toronto City	10265629	93.9	0.0026	26450	316	52	368	0.04	13.9

Table 6 Population, estimated prevalence and numbers of IDUs and HIV serodiagnoses 1992-96 by Health Unit, Ontario

<i>HIV diagnoses 1992-1996</i>													
	<i>Population</i>	<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDUs</i>	<i>Prevalent</i>	<i>SC</i>	<i>Total</i>	<i>Negative tests</i>	<i>Total tests</i>	<i>HIV Prevalence (%)</i>	<i>Proportion positives Ontario (%)</i>	<i>HIV testing rate IDUs (/100)</i>	<i>HIV testing rate population (/1000)</i>
Northern Region													
Algoma	131827	1.2	0.002	260	3	1	4	344	348	1.1	1.4	133.8	2.6
North Bay	96671	0.9	0.002	190	1	0	1	162	163	0.61	0.3	85.8	1.7
Northwestern	83520	0.8	0.002	170	0	0	0	108	108	0	0	63.5	1.3
Procupine	100098	0.9	0.002	200	0	0	0	89	89	0	0	44.5	0.9
Sudbury	209721	1.9	0.002	420	14	3	17	608	625	2.7	5.7	148.8	3
Thunder Bay	171166	1.6	0.002	340	6	4	10	477	487	2.1	3.4	143.2	2.8
Timiskaming	40841	0.4	0.002	80	0	0	0	86	86	0	0	107.5	2.1
Total	833844	7.7	0.002	1660	24	8	32	1874	1906	1.7	10.8	136.1	2.3
Eastern Region													
Eastern Ontario	192581	1.8	0.002	390	4	2	6	299	305	2	2	78.2	1.6
Hastings-Prince Edwa	152429	1.4	0.002	300	0	0	0	152	152	0	0	50.7	1
Kingston	177363	1.6	0.002	350	21	0	21	1322	1343	1.6	7.1	383.7	7.6
Leeds Grenville	158803	1.5	0.002	320	6	1	7	515	522	1.3	2.4	163.1	3.3
Ottawa Carleton*	743655	6.8	0.004	2970	74	15	89	2870	2959	3	30.1	99.6	4
Renfrew	104151	1	0.002	210	2	0	2	103	105	1.9	0.7	50	1
Total	1528982	14.1	0.002	4540	107	18	125	5261	5386	2.3	42.2	118.6	3.5
Central East Region													
Durham	459829	4.2	0.002	920	1	0	1	332	333	0.3	0.3	36.2	0.7
East York*	107620	1	0.004	430									
Etobicoke*	324815	3	0.004	1300	0	0	0	293	293	0	0	22.5	0.9
Haliburton Kawartha	169155	1.5	0.002	340	0	1	1	254	255	0.39	0.3	75	1.5
Muskoka Parry Sound	83174	0.8	0.002	170	0	0	0	134	134	0	0	78.8	1.6
North York*	589489	5.4	0.002	1180	13	0	13	443	456	2.9	4.4	38.6	0.8
Peel	845509	7.7	0.002	1690	4	0	4	755	759	0.53	1.4	44.9	0.9
Petersborough	127196	1.2	0.002	250	3	0	3	230	233	1.3	1	93.2	1.8
Scarborough*	549688	5	0.004	2200	3	2	5	621	626	0.8	1.7	28.5	1.1
Simcoe	329435	3	0.002	660	1	1	2	565	567	0.35	0.7	85.9	1.7
Toronto City*	665798	6.1	0.006	3990	66	9	75	3172	3247	2.3	25.3	81.4	4.9
York City*	147253	1.3	0.004	590									
York Region	591226	5.4	0.002	1180	4	0	4	289	293	1.4	1.4	24.8	0.5
Total	4990187	45.6	0.003	14900	95	13	108	7088	7196	1.5	36.5	48.3	1.4

Table 6 Population, estimated prevalence and numbers of IDUs and HIV serodiagnoses 1992-96 by Health Unit, Ontario

	Population	<i>HIV diagnoses 1992-1996</i>											
		<i>Proportion population Ontario</i>	<i>Estimated proportion IDU</i>	<i>Estimated number IDUs</i>	<i>Prevalent</i>	<i>SC</i>	<i>Total</i>	<i>Negative tests</i>	<i>Total tests</i>	<i>HIV Prevalence (%)</i>	<i>Proportion positives Ontario (%)</i>	<i>HIV testing rate IDUs (/100)</i>	<i>HIV testing rate population (/1000)</i>
Southwest Region													
Bruce-Grey	158830	1.5	0.002	320	0	0	0	228	228	0	0	71.3	1.4
Elgin-St.Thomas	81256	0.7	0.002	160	0	1	1	108	109	0.92	0.3	68.1	1.3
Huron	62016	0.6	0.002	120	0	0	0	24	24	0	0	20	0.4
Kent	115510	1.1	0.002	230	0	0	0	67	67	0	0	29.1	0.6
Lambton	136302	1.2	0.002	270	0	0	0	148	148	0	0	54.8	1.1
Middlesex-London*	401114	3.7	0.004	1600	6	0	6	1200	1206	0.5	2	75.4	3
Oxford	100645	0.9	0.002	200	0	0	0	66	66	0	0	33	0.7
Perth	74366	0.7	0.002	150	0	0	0	77	77	0	0	51.3	1
Windsor-Essex*	352463	3.2	0.004	1410	1	0	1	330	331	0.3	0.3	23.5	0.9
Total	1482502	13.6	0.002	4460	7	1	8	2248	2256	0.35	2.7	50.6	1.5
Central West Region													
Brant	122788	1.1	0.002	250	0	0	0	228	228	0	0	91.2	1.9
Haldimand-Norfolk	106365	1	0.002	210	0	0	0	42	42	0	0	20	0.4
Halton	345125	3.2	0.002	690	2	0	2	308	310	0.65	0.7	44.9	0.9
Hamilton-Wentworth*	475397	4.3	0.004	1900	10	1	11	797	808	1.4	3.7	42.5	1.7
Niagara	415567	3.8	0.002	830	2	0	2	725	727	0.28	0.7	87.6	1.7
Waterloo	412105	3.8	0.002	820	2	0	2	266	268	0.75	0.7	32.7	0.7
Wellington	218565	2	0.002	440	6	0	6	380	386	1.6	2	87.7	1.8
Total	2095912	19.2	0.0023	5140	22	1	23	2746	2769	0.83	7.8	53.9	1.3
Province of Ontario	10931427	100	0.0028	30440	255	41	296	19217	19513	1.5	100	64.1	1.8
Metro Toronto	2384663	21.8	0.0041	9690	82	11	93	4529	4622	2	31.4	47.7	1.9
Metro Toronto outside Toronto C	1718865	15.7	0.0033	5700	16	2	18	1357	1375	1.3	6.1	24.1	0.8
Central East outside Toronto City	4324389	39.6											
Ontario outside Toronto City	10265629	93.9	0.0026	26450									

Table 7 Plausible estimates of Incidence and Prevalence of HIV Infection, AIDS and mortality among IDUs, Ontario 1984-1996

Year	Annual HIV incidence (number)	Annual HIV incidence (/100p-y)	HIV cumulative incidence to end year	HIV prevalence (number) at end year	HIV prevalence (%) at end year	HIV-	Cumulative	Proportion	Number of	Proportion
						infected IDU diagnosed during year	HIV- infected IDU diagnosed to end year	of all IV-infected IDU diagnosed	living HIV-infected IDU diagnosed at end year	of living HIV-infected IDU diagnosed at end year
<1985	30	0.1	30	29	0.1	0	0	0	0	0
1985	40	0.13	70	66	0.2	6	6	0.09	3.8	0.06
1986	50	0.16	120	109	0.4	9	15	0.13	7.5	0.07
1987	60	0.2	180	156	0.5	36	51	0.28	32	0.21
1988	80	0.26	260	212	0.7	68	119	0.46	76.8	0.36
1989	100	0.33	360	286	0.9	114	233	0.65	164.9	0.58
1990	150	0.49	510	398	1.3	112	345	0.68	241	0.61
1991	150	0.49	660	508	1.7	56	401	0.61	262.6	0.52
1992	200	0.66	860	662	2.2	162	563	0.65	382.2	0.58
1993	200	0.66	1060	813	2.7	112	675	0.64	451.7	0.56
1994	250	0.82	1310	1011	3.3	132	807	0.62	540.6	0.53
1995	250	0.82	1560	1202	3.9	118	925	0.59	611.4	0.51
1996	300	0.99	1860	1438	4.7	144	1069	0.57	705.8	0.49

Year	Annual AIDS incidence	AIDS		Annual AIDS mortality	AIDS		Other annual mortality	Cumulative		Total annual mortality	Total	
		cumulative incidence to end year	AIDS prevalence at end year		AIDS mortality to end year	other cumulative mortality to end year		Total annual mortality	Total cumulative mortality to end year			
<1985	1	1	1	0	0	0	0.6	0.6	0.6	0.6		
1985	4	5	3	2	2	2	1.3	1.9	3.3	3.9		
1986	4	9	2	5	7	7	2.2	4.1	7.2	11.1		
1987	15	24	7	10	17	17	3.1	7.2	13.1	24.2		
1988	18	42	5	20	37	37	4.2	11.4	24.2	48.4		
1989	33	75	18	20	57	57	5.7	17.1	25.7	74.1		
1990	31	106	19	30	87	87	8	25.1	38	112.1		
1991	32	138	21	30	117	117	10.2	35.3	40.2	152.3		
1992	32	170	21	32	149	149	13.2	48.5	45.2	197.5		
1993	32	202	20	33	182	182	16.3	64.8	49.3	246.8		
1994	35	237	23	32	214	214	20.2	85	52.2	299		
1995	40	277	28	35	249	249	24	109	59	358		
1996	40	317	33	35	284	284	28.8	137.8	63.8	421.8		

Estimated number of IDUs: 30440

Table 8 Plausible estimates of Incidence and Prevalence of HIV Infection, AIDS and mortality among IDUs, Ottawa-Carleton 1984-1996

Year	Annual HIV incidence (number)	Annual HIV incidence (/100p-y)	HIV cumulative incidence to end year	HIV prevalence (number) at end year	HIV prevalence (%) at end year	HIV-infected IDU diagnosed during year	Cumulative HIV-infected IDU to end year	Proportion of all IV-infected IDU diagnosed	Number of living HIV-infected IDU at end year	Proportion of living HIV-infected IDU at end year
1985	10	0.33	17	17	0.6	2	2	0.12	2	0.12
1986	13	0.43	30	29	1	4	6	0.2	5.8	0.2
1987	15	0.5	45	43	1.4	10	16	0.36	15.3	0.36
1988	20	0.67	65	61	2	15	31	0.48	28.4	0.47
1989	25	0.83	90	82	2.7	20	51	0.57	45.1	0.55
1990	35	1.2	125	112	3.7	25	76	0.61	65.3	0.58
1991	35	1.2	160	139	4.6	25	101	0.63	83	0.6
1992	50	1.7	210	180	6	50	151	0.72	122.8	0.68
1993	50	1.7	260	219	7.3	40	191	0.73	152.6	0.7
1994	60	2	320	269	9	55	246	0.77	196.9	0.73
1995	60	2	380	318	10.6	46	292	0.77	231.9	0.73
1996	75	2.5	455	379	12.6	55	347	0.76	274	0.72

Year	Annual AIDS incidence	AIDS cumulative incidence to end year	AIDS prevalence at end year	Annual AIDS mortality	AIDS cumulative mortality to end year	Other annual mortality	Cumulative other mortality to end year	Total annual mortality	Total cumulative mortality to end year
1985	0	0	0	0	0	0.3	0.4	0.3	0.4
1986	0	0	0	0	0	0.6	1	0.6	1
1987	1	1	1	0	0	0.9	1.9	0.9	1.9
1988	1	2	1	1	1	1.2	3.1	2.2	4.1
1989	3	5	2	2	3	1.6	4.7	3.6	7.7
1990	4	9	3	3	6	2.2	6.9	5.2	12.9
1991	6	15	4	5	11	2.8	9.7	7.8	20.7
1992	7	22	5	6	17	3.6	13.3	9.6	30.3
1993	5	27	4	6	23	4.4	17.7	10.4	40.7
1994	4	31	3	5	28	5.4	23.1	10.4	51.1
1995	6	37	4	5	33	6.4	29.5	11.4	62.5
1996	7	44	5	6	39	7.6	37.1	13.6	76.1

Estimated number of IDUs: 3000

Table 9 Plausible estimates of Incidence and Prevalence of HIV Infection, AIDS and mortality among IDUs, Metro Toronto Region, 1984-1996

Year	Annual HIV incidence (number)	Annual HIV incidence (/100p-y)	HIV cumulative incidence to end year	HIV prevalence (number) at end year	HIV prevalence (%) at end year	HIV-	Cumulative	Proportion	Number of	Proportion
						infected IDU diagnosed during year	HIV- infected IDU diagnosed to end year	of all IV-infected IDU diagnosed	living HIV-infected IDU diagnosed at end year	of living HIV-infected IDU diagnosed at end year
<1985	10	0.13	10	10	0.1	0	0	0	0	0
1985	15	0.19	25	22	0.3	3	3	0.12	0.9	0.04
1986	20	0.25	45	37	0.5	5	8	0.18	0.7	0.02
1987	25	0.31	70	54	0.7	15	23	0.33	8	0.15
1988	30	0.38	100	75	0.9	20	43	0.43	19.8	0.26
1989	35	0.44	135	96	1.2	25	68	0.5	30.9	0.32
1990	50	0.63	185	132	1.7	30	98	0.53	46.8	0.35
1991	50	0.63	235	170	2.1	30	128	0.54	66.1	0.39
1992	70	0.88	305	230	2.9	65	193	0.63	120.2	0.52
1993	70	0.88	375	282	3.5	50	243	0.65	153	0.54
1994	90	1.1	465	354	4.4	70	313	0.67	205.3	0.58
1995	90	1.1	555	422	5.3	55	368	0.66	240.3	0.57
1996	110	1.4	665	512	6.4	70	438	0.66	292.2	0.57

Year	Annual AIDS incidence	AIDS		Annual AIDS mortality	AIDS		Other annual mortality	Cumulative		Total annual mortality	Total cumulative mortality to end year
		cumulative incidence to end year	AIDS prevalence at end year		cumulative mortality to end year	other mortality to end year					
<1985	1	0	0	0	0	0.2	0.2	0.2	0.2		
1985	4	4	2	2	2	0.4	0.6	2.4	2.6		
1986	4	8	1	5	7	0.7	1.3	5.7	8.3		
1987	8	16	2	7	14	1.1	2.4	8.1	16.4		
1988	8	24	3	7	21	1.5	3.9	8.5	24.9		
1989	15	39	6	12	33	1.9	5.8	13.9	38.8		
1990	14	53	8	12	45	2.6	8.4	14.6	53.4		
1991	8	61	8	8	53	3.4	11.8	11.4	64.8		
1992	7	68	9	6	59	4.6	16.4	10.6	75.4		
1993	19	87	16	12	71	5.6	22	17.6	93		
1994	16	103	21	11	82	7.1	29.1	18.1	111.1		
1995	15	118	23	13	95	8.4	37.5	21.4	132.5		
1996	10	128	23	10	105	10.2	47.7	20.2	152.7		

Estimated number of IDUs: 8000

Figure 1

AIDS incidence among IDU in Canada, 1984-96
(Adjusted for reporting delays)

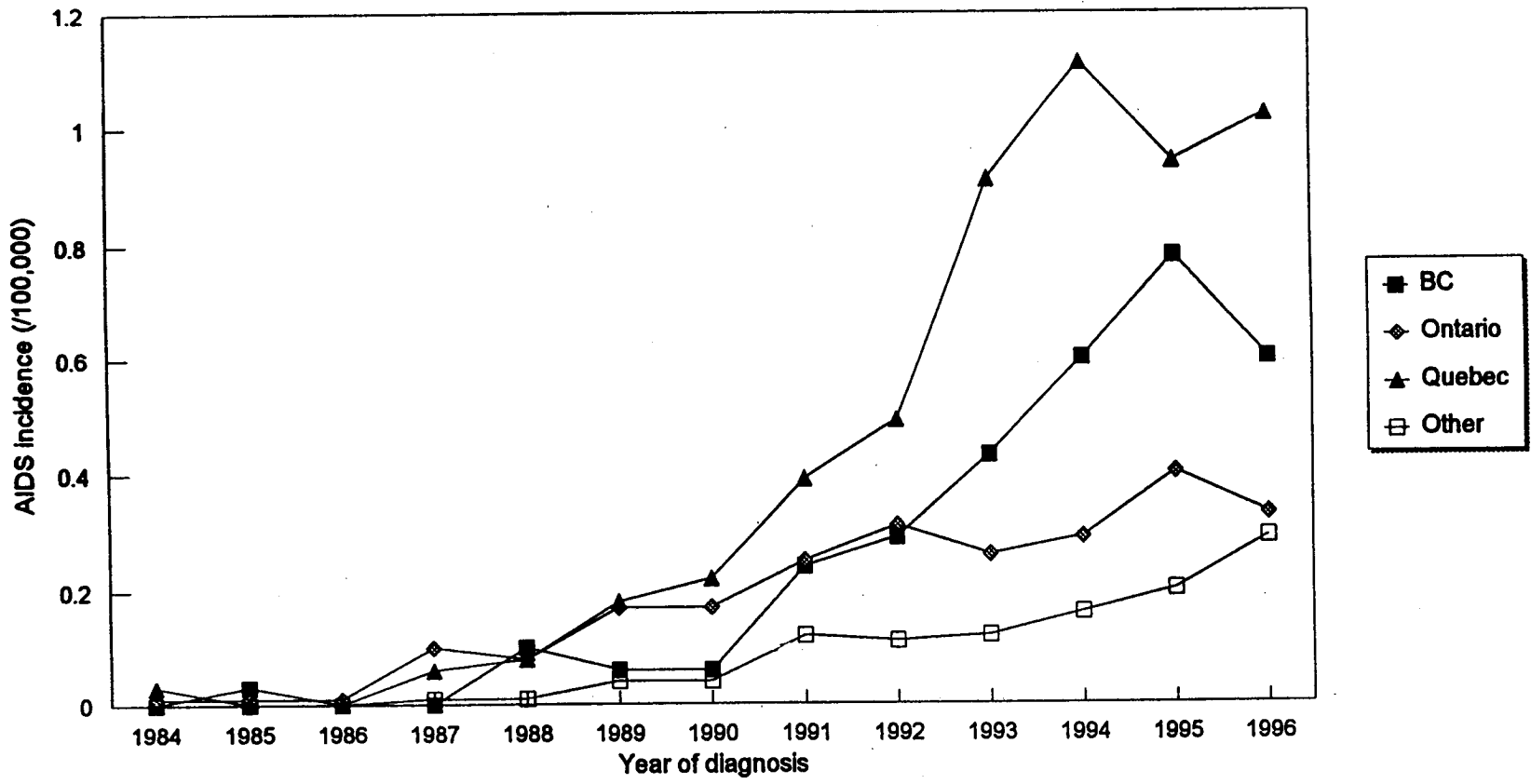


Figure 2

AIDS incidence among IDU and MSM/IDU, Ontario 1979-96

Adjusted for reporting delays

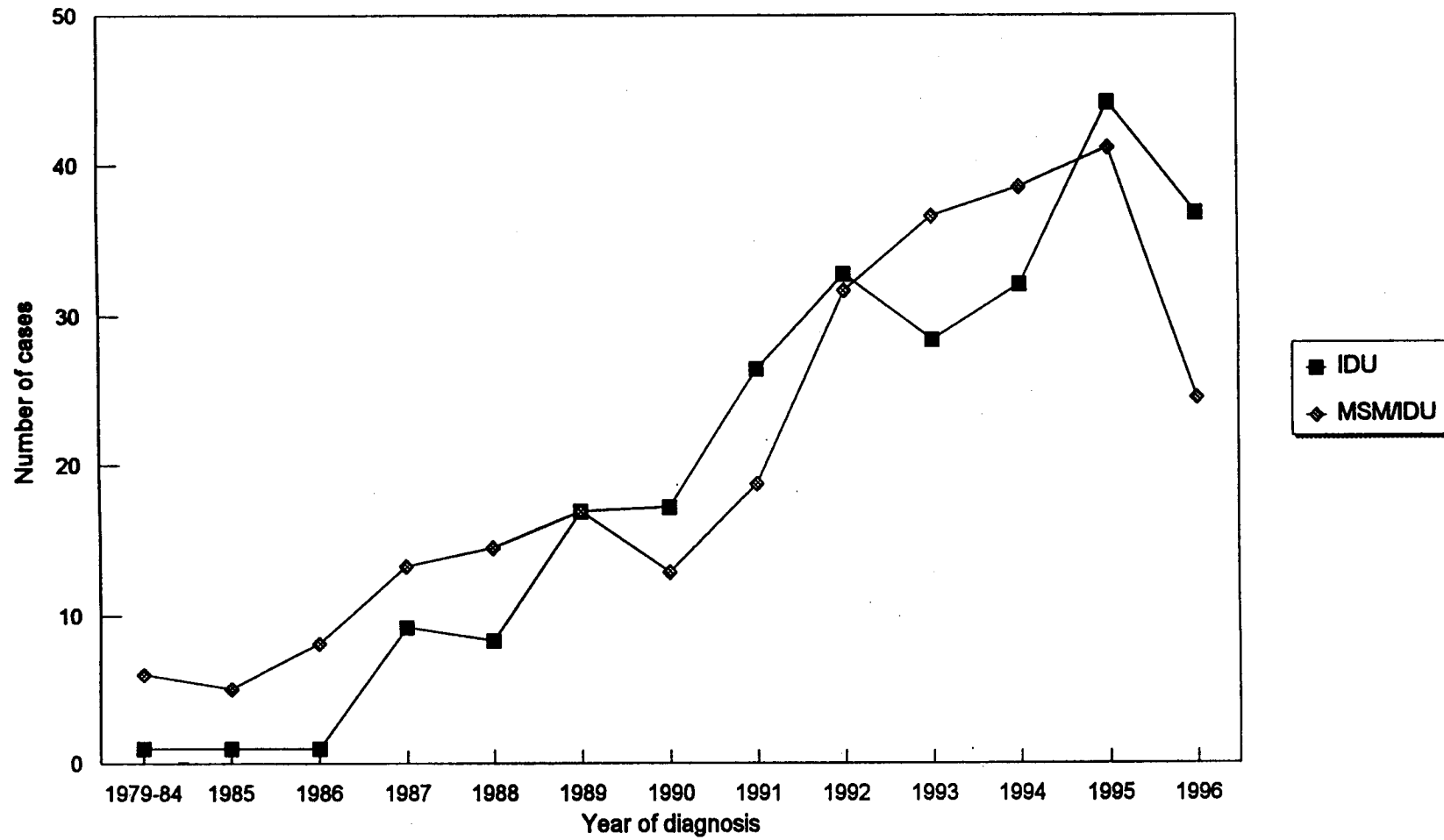


Figure 3

HIV Infections Diagnosed by Health Unit 1985-96

Exposure category = IDU
(excludes MSM/IDU)

n= 573

1 dot = 1 HIV infected person

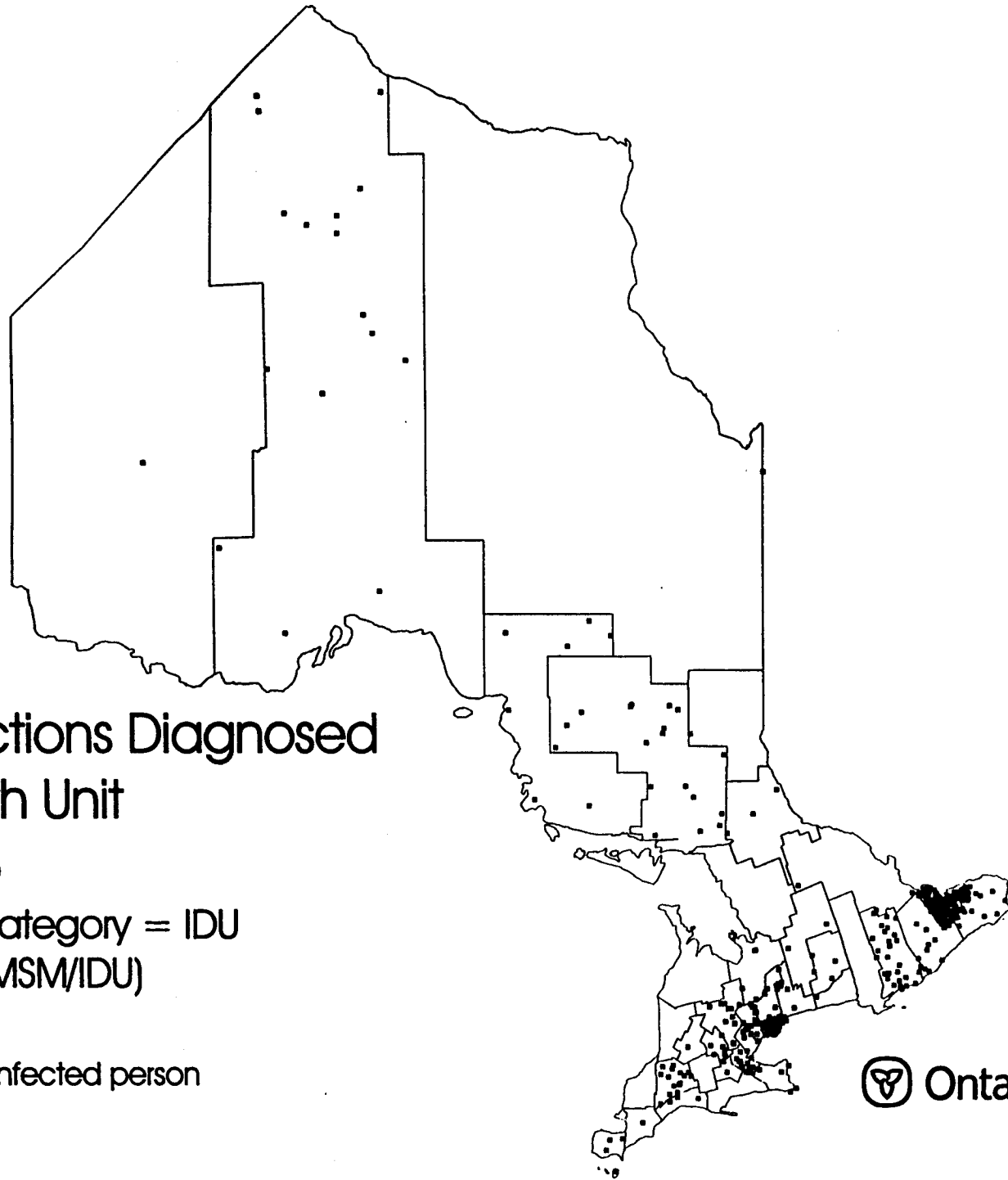
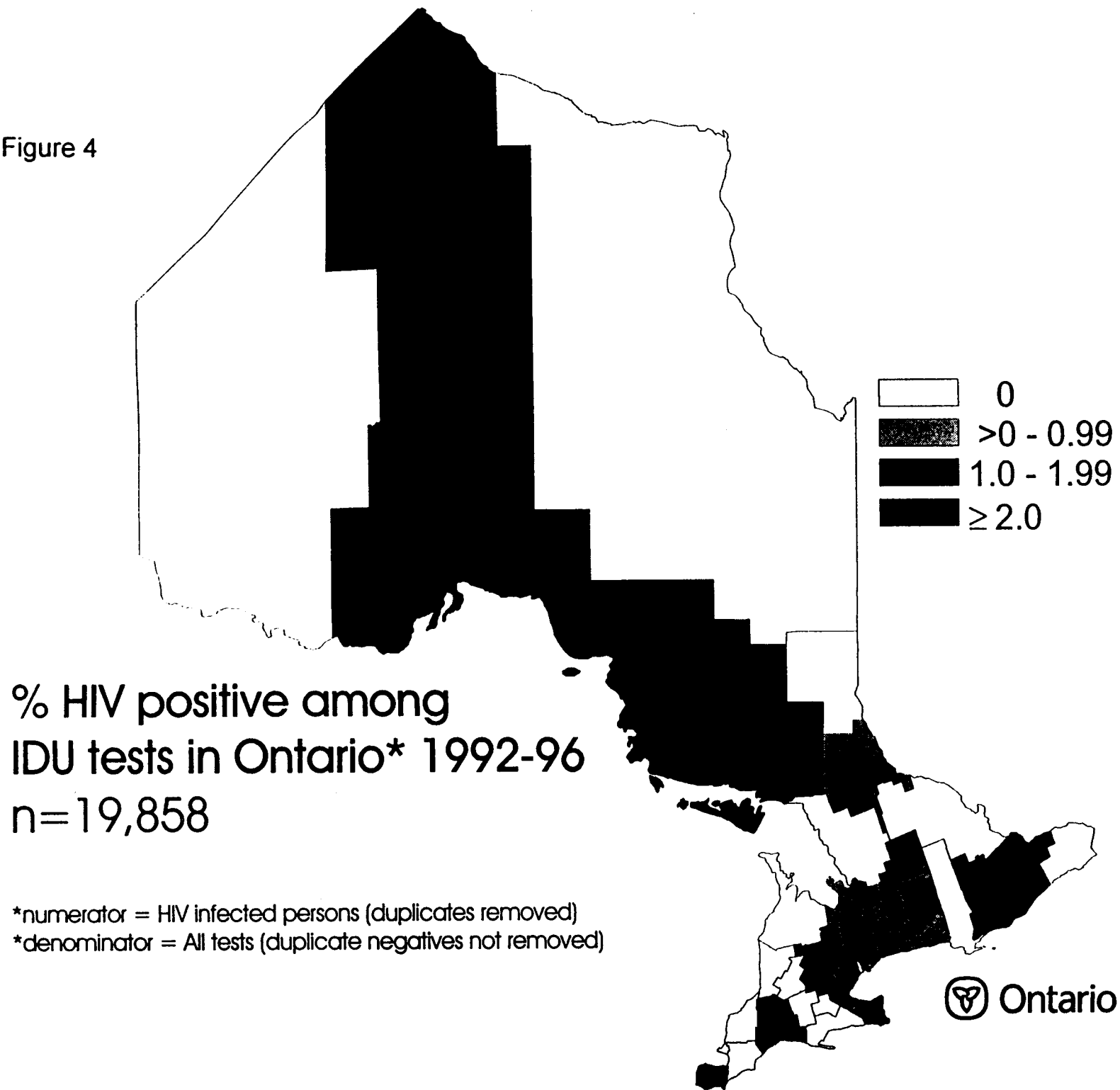


Figure 4



% HIV positive among
IDU tests in Ontario* 1992-96
n=19,858

*numerator = HIV infected persons (duplicates removed)
*denominator = All tests (duplicate negatives not removed)