Seroprevalence and Correlates of HIV and HCV among Injecting Drug Users in Edmonton, Alberta

Sabrina S. Plitt, PhD,¹ Jennifer Gratrix, BScN, MSc,² Sharyn Hewitt, RN,² Patsy Conroy, RN,² Tracy Parnell,² Beverly Lucki, BScN,² Vicki Pilling, BScN,² Barbara Anderson, BScN, MSc,² Yogesh Choudri, MD,¹ Chris P. Archibald, MD,¹ Ameeta E. Singh, BMBS, MSc²

ABSTRACT

Background: Injection drug users (IDUs) are at risk for acquiring human immunodeficiency virus (HIV) and hepatitis C virus (HCV) via parenteral and sexual transmission. We determined the seroprevalence and correlates of HIV and HCV for IDUs recruited in Edmonton, Alberta.

Methods: Edmonton was one site of a multi-site, national survey (I-Track Study). From April to June 2005, IDUs were recruited and administered a questionnaire collecting information on demographics, drug use, sexual behaviours, and HIV/HCV testing behaviours. Finger-prick blood samples were collected for serology testing. Seroprevalence of HIV and HCV was determined and correlates of infection were assessed using logistic regression.

Results: Of 275 IDUs, 68% were male, the median age was 38 years and 70.6% were Aboriginal. HIV prevalence was 23.9%, HCV prevalence was 66.1% and HIV/HCV co-infection was 22.8%. Cocaine (36.9%) was reported to be the drug injected most often in the previous six months. Correlates for HIV were sex trade (OR 2.9, 95% CI 1.0-8.3) for women, and older age (OR 1.1, 95% CI 1.0-1.2) and needle exchange program (NEP) use (OR 5.7, 95% CI 1.3-23.7) for men. For women, having a casual sex partner was protective for HCV (OR 0.28, 95% CI 0.10-0.78). Independent correlates for HCV among males included age (AOR 1.2, 95% CI 1.1-1.3) and younger age of first injection (AOR 0.92, 95% CI 0.87-0.96).

Conclusion: The high HIV and HCV prevalence found in this study among IDUs in Edmonton highlights the complex needs of the IDU community and the continued need for targeted programming.

Key words: HIV; HCV; injection drug use; Canada

La traduction du résumé se trouve à la fin de l'article.

Can J Public Health 2010;101(1):50-55.

Injection drug users (IDUs) are at risk for acquiring blood-borne pathogens (BBP), such as human immunodeficiency virus (HIV) and hepatitis C virus (HCV), through the use of contaminated drug equipment. HIV (and to a far lesser extent, HCV) may also be acquired through sexual transmission routes, which place IDUs at additional risk for infection. Illicit drug use is associated with high-risk sexual behaviours, such as the exchange of sex for drugs or money,¹⁻³ and a greater likelihood of exposure to social and sexual networks with high HIV (and HCV) prevalence.

In 2006, the rate of positive HIV test reports among Canadian adults was 9.4/100,000 and IDUs represented 19.1% of all such reports. In the province of Alberta, the rate of new adult HIV case reports was 7.2/100,000 with 21.8% of all cases being identified as IDU.⁴ Nationally, the rate of newly reported HCV cases in 2004 was 44.7/100,000.⁵ In Alberta, the rate of newly reported HCV cases in 2006 was 41.7/100,000 of which approximately 68% were attributed to IDU (Alberta Health and Wellness, 2008).

The objective of this research was to determine the seroprevalence and correlates of HIV and HCV and associated risk behaviours for a cohort of IDUs recruited in Edmonton, Alberta.

METHODS

Edmonton was selected as one of multiple sites for a national, cross-sectional survey (I-Track Study) developed by the Public Health Agency of Canada (PHAC) to describe drug and sexual risk behaviours, and HIV/HCV prevalence among IDUs.⁶ This study was approved by the University of Alberta Health Research Ethics Board.

From April to June 2005, recruitment was performed at sites known to have IDUs as clients. Inclusion criteria were: 1) 15 years of age or older, 2) appeared capable of giving informed consent, 3) understood English, and 4) had injected drugs for non-therapeutic purposes in the preceding six months. A single community health representative helped identify and recruit individuals to the study and assessed study eligibility through prescreening questions related to injection drug use practices. Research nurses received informed consent, administered the study questionnaire and collected a finger-prick blood sample on a cotton-fibre-based filter paper to create a dried blood spot (DBS). HIV and HCV testing of the DBS was conducted at the National HIV and Retrovirology laboratory. HIV testing was performed using an enzyme immunoassay (EIA; Bio-Rad GS HIV-1 rLAV) and reactive samples were confirmed by Western Blot (Bio-Rad GS HIV-1 WB). HCV testing was performed by EIA (Ortho HCV version 3). Participants received

Author Affiliations

1. Surveillance and Risk Assessment Division, Centre for Communicable Disease and Infection Control, Public Health Agency of Canada, Ottawa, ON

2. Alberta Health Services - Edmonton STD Centre, Edmonton, AB

Correspondence: Dr. Ameeta Singh, Alberta Health Services-Edmonton STD Centre, 3B20-11111 Jasper Ave, Edmonton, AB T5K 0L4, Tel: 780-342-2300, Fax: 780-425-2194, E-mail: ameeta@ualberta.ca

Acknowledgements: We acknowledge the I-Track participants for their time and participation. We are also grateful to the many staff at the Public Health Agency of Canada for their time and effort with regard to study design, laboratory testing and data management for the I-Track study. Finally, we acknowledge the staff of the following agencies in Edmonton for their time and participation: the Bissell Centre, Boyle McCauley Health Centre, Kindred House, HIV Edmonton, and the STD Centre.

Conflict of Interest: None to declare.

Table 1. Gender-specific Demographics, Drug-using Behaviours and Sex Behaviours, Edmonton, Alberta, 2005, %(n)*

Factor	Total (n = 275)†	Males (n = 187)†	Females (n = 85)†	P-value‡
Median age (IQR)	38 (33-44)	39 (34-46)	36 (33-41)	0.002
Ethnicity§				
Aboriginal	70.6 (194)	64.2 (120)	83.5 (71)	0.001
Non-Aboriginal	29.4 (81)	35.8 (67)	16.5 (14)	
Completed high school	41.5 (114)	46.5 (87)	29.4 (25)	0.008
Drug-injecting Behaviours				
Median age of injection initiation	19 (16-25)	18 (16-25)	21 (17-28)	0.04
Frequency of injection				
Never	12.7 (35)	11.8 (22)	15.3 (13)	0.71
Not regularly	32.4 (89)	32.6 (61)	30.6 (26)	
1-2 x/week	16.7 (46)	18.2 (34)	12.9 (11)	
>3 x/week	16.7 (46)	17.1 (32)	16.5 (14)	
Daily	21.5 (59)	20.3 (38)	24.7 (21)	
Median injections/day	3 (2-5.5)	3 (2-6)	3 (2-5)	0.91
Most frequently injected with¶:				
Sex partner	20.2 (55)	13.9 (26)	34.1 (29)	0.002
Close friend	42.9 (117)	47.6 (88)	31.8 (27)	
Family	5.9 (16)	6 (11)	5.9 (5)	
Acquaintance	4.8 (13)	6 (11)	1.2 (1)	
Stranger	0.4 (1)	0.5 (1)	0 (0)	
No one	26 (71)	26 (48)	27.1 (23)	
Shared needles¶	8.7 (24)	3.7 (7)	20 (17)	<0.001
Most frequently shared used needles with¶:				
Sex partner	29.2 (7)	16.7 (1)	35.3 (6)	0.57
Close friend	37.5 (9)	66.7 (4)	29.4 (5)	
Family	12.5 (3)	16.7 (1)	11.8 (2)	
Acquaintance	8.3 (2)	0 (0)	11.8 (2)	
Stranger	8.3 (2)	0 (0)	11.8 (2)	
Frequency of sharing used needles				
Always	4.3 (1)	0 (0)	5.9 (1)	0.66
Occasionally	78.3 (18)	100 (6)	70.6 (12)	
Sometimes	17.4 (4)	0 (0)	23.5 (4)	
Shared other injection equipment				
Cookers	28.4 (78)	23.5 (44)	37.7 (32)	0.05
Water	24 (66)	21.4 (40)	28.3 (24)	0.37
Filters	20 (55)	16.6 (31)	25.9 (22)	0.16
Ever used a needle exchange program	81.8 (225)	80.8 (151)	84.7 (72)	0.43
Daily use of a needle exchange program¶	4.7 (13)	4.8 (9)	4.7 (4)	0.97
Sexual Risk Behaviours¶				
Had a sex partner	84.7 (233)	82.4 (154)	89.4 (76)	0.14
Regular**	70.8 (165)	68.2 (105)	77.6 (59)	0.14
Casual††	44.6 (104)	50 (77)	34.2 (26)	0.02
Paid for sex	3.9 (9)	5.8 (9)	0 (0)	0.03
Was paid for sex	13.7 (32)	2.6 (4)	34.2 (26)	<0.001
Had sex with a person of same sex	5.9 (16)	4.3 (8)	9.4 (8)	0.095
Used a condom in last sexual encounter	51.9 (96)	58.1 (68)	40.0 (26)	0.04

* except for continuous variables which are expressed as median (IQR: inter-quartile range)

† denominator totals may not represent column totals due to missing data

‡ p-values represent only male and female comparisons; p-values were calculated using Chi-square test or Fisher's exact test for categorical variables and Mann-Whitney test for continuous variables

§ all non-Aboriginal participants were Caucasian except for one African-Canadian male

|| in previous month

¶ in previous 6 months

** defined as someone with whom you have had a relationship and with whom you are emotionally involved

†† defined as someone with whom you have had a sexual relationship one or a few times, but with whom you have no emotional involvement

Note: three transgendered individuals are not included in this table or analysis

\$20 as compensation for their time. All testing was anonymous and unlinked, therefore participants did not receive test results. Simultaneous testing (following usual regional testing procedures) was offered; this was not linked to study participation.

Sex-specific comparisons of demographics and risk behaviours were determined by Chi-square or Fisher's exact test for proportions and by the Mann-Whitney test for continuous variables. Transgender participants were not included in gender-specific analyses and their data are not shown due to their small number (n=3). A 95% binomial confidence interval (CI) was calculated for each seroprevalence. Univariate and multivariate logistic regression models were used to determine correlates of HIV and HCV seropositivity, and to estimate odds ratios (OR), adjusted odds ratios (AORs) and 95% CIs. Data were analyzed using Stata version 10.0 (Stata Corp, College Station, TX, USA).

RESULTS

Of the 275 participants, 68% (n=187) were male (Table 1). Males were significantly older than females (median: 39 years vs. 36 years, p=0.002). The majority of participants (70.6%) were Aboriginal (i.e., First Nations, Metis, or Inuit), with a higher proportion among females than males (83.5% vs. 64.2%; p=0.001).

Overall, 36.9% of participants reported cocaine as the drug they had injected most often in the previous six months, followed by morphine (non-prescription) at 24.9%. Crack was reported as being the non-injection drug used most often by 22.2% of participants. Males initiated injection drug use at a younger age than did females (median: 18 vs. 21 years, p=0.04). Of participants, 21.5% were daily injectors and they reported injecting 2 to 5.5 times per day. Three quarters of participants (74.2%) reported most frequently injecting with someone else. Females were significantly more likely to report

Table 2. HIV and HCV Current Test Results, Past Testing Results and Medical Care and Treatment, Edmonton, Alberta, 2005, %(n)

Factor	Total % (n = 275)*	Males % (n = 187)*	Females % (n = 85)*	p-value†
Study results				
HIV positive	23.9 (65)	21.2 (39)	29.4 (25)	0.14
HCV positive	66.1 (181)	64.0 (119)	70.6 (60)	0.29
Co-infection	22.8 (62)	20.7 (38)	27.1 (23)	0.24
Past HIV testing results				
Positive	25.8 (65)	24.0 (40)	29.3 (24)	0.045
Negative	68.3 (172)	72.5 (121)	59.8 (49)	
Indeterminate	0.4 (1)	0 (0)	1.2 (1)	
Don't know	5.2 (13)	0 (0)	8.5 (7)	
Refused	0.4 (1)	0 (0)	1.2 (1)	
Total tested in lifetime	91.6 (252)	89.3 (167)	96.5 (82)	0.14
Total tested within past 2 years	64.7 (163)	65.9 (110)	62.2 (51)	0.60
Self-reported HIV-positive participants				
Under medical care for HIV	87.7 (57)	85 (34)	91.7 (22)	0.44
On treatment for HIV	40 (26)	37.5 (15)	41.7 (10)	0.74
Past HCV testing results				
Positive	67.1 (163)	65.8 (104)	68.7 (57)	0.19
Negative	2.8 (70)	31.7 (50)	24.1 (20)	
Don't know	3.7 (9)	2.5 (4)	6 (5)	
Refused	0.4 (1)	0 (0)	1.2 (1)	
Total tested in lifetime	88.4 (243)	84.5 (158)	97.7 (83)	0.006
Self-reported HCV-positive participants				
Under medical care for HCV	54.3 (88)	56.7 (59)	50 (28)	0.42
On treatment for HCV	2.5 (4)	1.9 (2)	3.6 (2)	0.52

* denominator will not equal column total as three males were not tested for HIV and one male was not tested for HCV

† p-values represent only male and female comparisons; p-values were calculated using Chi-square test or Fisher's exact test for categorical variables and Mann-Whitney test for continuous variables

Note: three transgendered individuals are not included in this table or analysis

Table 3. Correlates of HIV Seroprevalence by Gender, Edmonton, Alberta, 2005

	Total n	HIV Positive % (n)*	HIV Negative % (n)*	OR† (95% CI†)	AOR† (95% CI)
Females					
Been paid for sex	76	52.4 (11)	27.3 (15)	2.9 (1.0-8.3)	5.5 (1.4-21.3)‡
Males					
Median age (yrs; IQR)	183	43 (40-47)	38 (33-43)	1.1 (1.0-1.2)	1.09 (1.04-1.14)§
Ever used a needle-exchange program	184	94.9 (37)	76.6 (111)	5.7 (1.3-24.7)	7.4 (1.7-33.0)
Daily use of a needle-exchange program	184	15.4 (6)	2.1 (3)	8.6 (2.1-36.2)	6.8 (1.4-33.6)

* except for continuous variables which are expressed as median and interquartile range (IQR)

† OR: Odds Ratio, 95% CI: 95% confidence interval, AOR: Adjusted Odds Ratio

‡ age-adjusted

§ OR for age represents an increase in odds associated with a one-year increase in age

|| within previous six months

injecting with their regular sexual partner than were males (34.1% vs. 13.9%, $p=0.002$). Only 8.7% of participants reported sharing needles in the previous 6 months, with females being significantly more likely to share needles than males (20% vs. 3.7%, $p<0.001$). The vast majority of participants (81.8%) had used a needle-exchange program (NEP); 4.7% reported using NEPs on a daily basis in the previous 6 months, compared to 29.8% who used them weekly and 20.4% who had not used one at all in that time period.

The majority of participants reported having a sex partner in the previous six months (84.7%), with more reporting a regular partner than a casual one (70.8% vs. 44.6%). Females were significantly more likely than males to report being paid for sex (34.2% vs. 2.6%, $p=0.03$), while males were significantly more likely to report having paid for sex (5.8% vs. 0%, $p<0.001$). Females were significantly less likely to have used a condom during their last sexual encounter as compared to males (40% vs. 58.1%, $p=0.04$).

Nearly one quarter of participants (23.6%, 95% CI 18.7%-29.1%) tested positive for HIV (Table 2), with a higher proportion being females compared to males (29.4% vs. 21.2%, $p=0.14$). Of participants, 91.6% reported HIV testing in the past. Among respondents who reported previously testing negative ($n=171$), 6 new HIV cases (3.5%) were detected; conversely, 7 participants who reported being HIV positive were found to be negative upon testing. Of the 65 self-

reported HIV-positive participants, 87.7% reported being under medical care and 40% were on treatment for HIV.

Among females, being paid for sex was the only factor found to be significantly associated with HIV seroprevalence (OR 2.9, 95% CI 1.0-8.3) (Table 3). For males, factors positively associated with HIV seroprevalence were older age (OR 1.1, 95% CI 1.0-1.2), having ever used a NEP (OR 5.7, 95% CI 1.3-24.7) and daily use of a NEP in the previous six months (OR 8.6, 95% CI 2.1-36.2). All three factors remained significant in multivariable analyses: age (AOR 1.1, 95% CI 1.0-1.1), having ever used a NEP (AOR 6.8, 95% CI 1.4-33.6) and daily use of a NEP in the previous six months (AOR 7.4, 95% CI 1.7-33.0).

Two thirds of participants (66.1%, 95% CI 60.1%-71.6%) tested positive for HCV with 88.4% reporting HCV testing in the past (Table 2). Of the 181 HCV-positive participants, 15 self-reported testing negative at their last test, while 12 who self-reported as positive at their last test currently tested negative. Among the HCV-positive participants, 54.3% reported being under medical care and 2.5% were on treatment for HCV.

Having a casual sex partner in the previous six months was protective for being HCV seropositive among females (OR 0.28, 95% CI 0.10-0.78) (Table 4). For males, younger age of first injection (OR 0.95, 95% CI 0.91-0.99), older age (OR 1.15, 95% CI 1.1-1.2), daily

Table 4. Correlates of HCV Seroprevalence by Gender, Edmonton, Alberta, 2005

	Total n	HCV Positive % (n)*	HCV Negative % (n)*	OR† (95% CI)†	AOR† (95% CI)
Females					
Recent casual sex partner	76	25.0 (13)	54.2 (13)	0.28 (0.10-0.78)	—‡
Males					
Median age of first injection (yrs; IQR)	185	18 (38-47)	21 (18-27)	0.95 (0.91-0.99)	0.92 (0.87-0.96)
Median age (yrs; IQR)	185	42 (38-47)	35 (29-39)	1.15 (1.1-1.2)	1.18§ (1.1-1.3)
Daily injection (within previous month)	186	25.2 (30)	11.9 (8)	2.5 (1.1-5.8)	2.3 (0.84-6.3)
Ever used a needle-exchange program	186	86.6 (103)	70.2 (47)	2.7 (1.3-5.8)	2.5 (0.94-6.8)
Recent sex partner (within previous 6 months)	186	77.3 (92)	92.5 (62)	0.27 (0.10-0.75)	0.29 (0.74-1.1)
Condom use at last sexual encounter	117	66.2 (49)	44.2 (19)	2.5 (1.1-5.4)	—

* except for continuous variables which are expressed as median and interquartile range (IQR)

† OR: Odds Ratio, 95% CI: 95% confidence interval, AOR: Adjusted Odds Ratio

‡ no multivariate analysis performed due to lack of significant variables in univariate analyses

§ OR for age represents an increase in odds associated with a one-year increase in age

|| not included in final multivariate model due to collinearity with recent sex partner variable

injection (OR 2.5, 95% CI 1.1-5.8), ever use of a NEP (OR 2.7, 95% CI 1.3-5.8) and using a condom at the time of the last sexual encounter (OR 2.5, 95% CI 1.1-5.3) were positively associated with being HCV positive, while having a recent sex partner (OR 0.27, 95% CI 0.10-0.75) was protective. In multivariate analyses, older age (AOR 1.2, 95% CI 1.1-1.3) and younger age of first injection (AOR 0.92, 95% CI 0.87-0.96) remained significantly associated with being HCV positive for males.

DISCUSSION

Among this sample of IDUs in Edmonton, one quarter (23.9%) tested HIV positive, two thirds (66.1%) tested HCV positive and one quarter (22.8%) of the population was co-infected with HCV and HIV. The majority of this cohort had previously been tested for HIV and HCV, and a majority of infected persons were already aware of their positive status. More people were aware of their HIV compared to their HCV infection status. Among HCV-infected persons, only half were currently under medical care, emphasizing the need for initiatives to improve access to HCV treatment and care.

The need for BBP prevalence data among IDU in Edmonton has been highlighted by local researchers.⁷ A phone survey in the mid-1990s estimated the IDU population of Edmonton to be approximately 4,000 (Canada's Alcohol and Other Drugs Survey, 1996). The first HIV prevalence data collected among IDUs in Edmonton was completed in 1992 as part of an evaluation of the local needle exchange program. This evaluation reported 3 positive HIV results from 616 saliva samples tested over a two-year period.⁸ In Wild et al.'s 2000-2002 study of 30 IDU in Edmonton, 17% self-reported as being HIV positive and 72% self-reported as being HCV positive,⁷ which is similar to the prevalence data reported in this study.

In comparison to other national sites involved in the I-Track study, Edmonton had the highest HIV prevalence at 23.9%. The average HIV prevalence across sites participating in I-Track was 13.2% (range: 2.9% to 23.9%). The Edmonton I-Track HCV prevalence of 66.1% was similar to the national I-Track HCV prevalence of 65.7% (range 61.8% to 68.5%).⁹ It is possible that selection bias may have led to an overestimation of the true HIV prevalence among IDUs in Edmonton as recruitment was done via community-based organizations, some of which were fixed needle exchange sites and one of which catered to HIV-positive individuals. However, a site-by-site analysis (data not shown) showed no statistically significant difference in HIV (or HCV) prevalence.

Previously reported HIV and HCV prevalence among Canadian IDU cohorts has been varied. A 2002 multi-site Canadian cohort

study of illicit opioid users (OPICAN) reported that among current IDUs, the HIV prevalence was 16.9% and the HCV prevalence was 59.0%.¹⁰ Prevalence data from other Canadian cities include HIV 23% and HCV 88% among Vancouver IDUs,¹¹ HIV 10.1% among IDUs attending a needle-exchange program in Quebec City,¹² and HIV 7.2% and HCV 54.2% among Winnipeg IDUs.¹³

Correlates for HIV infection were few. For females, being involved in the sex trade was positively associated with being HIV positive. Sex trade has often been identified as an important risk factor for HIV and STIs among female drug users.^{11,14,15} This emphasizes the strong overlap of drug use and sexual relationships among female IDUs¹⁶⁻¹⁸ and the need for targeted programming to prevent infection and transmission of HIV for IDUs involved in commercial sex work.

HIV-positive males were more likely to use NEP services than men testing negative. Ever having used and daily use of NEP services were significantly associated with HIV seroprevalence for males. It has been well documented that NEPs are most frequently used by higher-risk individuals, such as those involved in the sex trade,^{19,20} those with unstable housing,¹⁹ those with daily drug use,²¹ and those who attend "shooting galleries".²¹ In the current study, NEP use was statistically associated with daily injection ($p=0.04$) and involvement in the sex trade ($p=0.02$; data not shown). By attracting higher-risk IDUs, NEPs provide an important opportunity to prevent HIV and HCV infection and transmission. It is unclear from our data why the availability of NEPs in the city have not kept HIV rates lower but it may be explained by links between IDU, sex trade and the sexual transmission of HIV. Sexual transmission has been the predominant mode of transmission of HIV in Alberta since 2002 (Alberta Health and Wellness, 2008).

Supervised injection sites have the potential to positively impact injecting practices and thereby reduce the acquisition of HIV and HCV through injection drug use.²² In this current research, correlates for HCV infection among males included injection-related factors, such as earlier age of first injection and daily injection, emphasizing the importance of safe injecting habits among IDUs. The impact of supervised injection sites has not been explored in the city of Edmonton. In addition, given that nearly one quarter (22.2%) of study participants indicated that crack cocaine was their most commonly used non-injection drug, and that 84% of participants had reported using non-injection crack at some time in the previous six months, the impact of crack distribution kits on HCV and HIV incidence would also be worth exploring. Smoking crack cocaine has been linked to transmission of blood-borne infections

and high-risk sexual practices including involvement in sex trade.²³

The majority of individuals in this IDU cohort were Aboriginal (70.6%), although Aboriginals make up approximately 5% of the Alberta population.²⁴ This disproportionate representation of Aboriginals among IDU cohorts was reported for many of the other I-Track recruitment sites, including Regina (87.2% Aboriginal) and Winnipeg (69.6%). This is reflective of socio-economic disparities among Aboriginal persons in Canada. For example, in Canada, Aboriginals represent the largest ethnic group after Whites to be infected with HIV.⁴ In 2006 in Alberta, 23.9% of the 222 HIV cases were classified as Aboriginal. Among these Aboriginal cases, 47.2% were IDU while only 11.8% of the non-Aboriginal cases were classified as IDU (Alberta Health and Wellness, 2008). In total, 13.5% of all HCV cases in 2006 were among Aboriginal persons (Alberta Health and Wellness, 2008). The high mobility of Aboriginal people between inner cities and rural areas has the potential to increase the risk of infectious disease transmission to remote Aboriginal communities.²⁵ This highlights the need for commitment to and support for the development and implementation of prevention and control strategies among Aboriginal persons in Canada.

There are several limitations to this research. The cross-sectional study design did not allow the determination of temporal relationships between behaviours and HIV/HCV infection. Given the older age and long length of time that these IDUs have been injecting, it is likely that they were infected years ago, making the association of recent/current behaviours with infection status less meaningful. Most of the data collected in the study used self-report via an interviewer-administered questionnaire, therefore the possibility of social desirability bias does exist. However, this bias may have been reduced by using interviewers who were trained and familiar with the IDU population in Edmonton. Sample size may have limited our ability to find statistically significant results, this being especially true for female participants. Finally, this sample may not be representative of IDU populations in other cities in Canada and may not be representative of the IDU population in Edmonton. It is hoped that by using a variety of recruitment sites, we have improved the representativeness of this population.

The high HIV and HCV prevalence found in this study among IDUs in Edmonton highlights the complex needs of the IDU community as well as the continued need for targeted programming. Although a small proportion of the study participants reported sharing needles, nearly half of them admitted to having unprotected sex the last time they had sex, putting them at risk for HIV and other STIs. To better meet the health needs of the IDU community, continued surveillance of their communicable diseases risk and behaviours together with targeted interventions should be a high priority for policy-makers.

REFERENCES

1. Institute of Medicine. The Hidden Epidemic: Confronting Sexually Transmitted Diseases. Washington, DC: National Academy Press, 1997.
2. Cohen E, Navaline H, Metzger D. High-risk behaviors for HIV: A comparison between crack-abusing and opioid-abusing African-American women. *J Psychoactive Drugs* 1994;26(3):233-41.
3. Kim MY, Marmor M, Dubin N, Wolfe H. HIV risk-related sexual behaviors among heterosexuals in New York City: Associations with race, sex, and intravenous drug use. *AIDS* 1993;7(3):409-14.
4. Public Health Agency of Canada. HIV and AIDS in Canada: Surveillance Report to December 31, 2006. Ottawa, ON: Surveillance and Risk Assessment

- Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2007.
5. Public Health Agency of Canada. Notifiable Diseases On-Line. Available at: http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/c_ind_e.html#top_list (Accessed February 3, 2008).
6. Public Health Agency of Canada. I-Track: Enhanced Surveillance of Risk Behaviours among People who Inject Drugs. Procedural Guidelines. Phase I, November 2004. Surveillance and Risk Assessment Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2004.
7. Wild TC, Prakash M, O'Connor H, Taylor M, Edwards J, Predy G. Injection Drug Use in Edmonton's Inner City: A Multimethod Study. Edmonton, AB: Centre for Health Promotion Studies, University of Alberta, 2003.
8. Wolfe R, Sykes B. Needleworks: Prevention of HIV in Injection Drug Users. Final Report and Evaluation. Edmonton, 1992.
9. Public Health Agency of Canada. I-Track: Enhanced Surveillance of Risk Behaviours among People who Inject Drugs. Phase I Report, August 2006. Surveillance and Risk Assessment Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2006.
10. Fischer B, Manzoni P, Rehm J. Comparing injecting and non-injecting illicit opioid users in a multisite Canadian sample (OPICAN Cohort). *Eur Addict Res* 2006;12(4):230-39.
11. Strathdee S, Patrick DM, Currie SL, Cornelisse PG, Rekart ML, Montaner JS, et al. Needle exchange is not enough: Lessons from the Vancouver injecting drug use study. *AIDS* 1997;11(8):F59-F65.
12. Poulin C, Alary M, Bernier F, Ringuelet J, Joly JR. Prevalence of Chlamydia trachomatis, Neisseria gonorrhoeae, and HIV infection among drug users attending an STD/HIV prevention and needle-exchange program in Quebec City, Canada. *Sex Transm Dis* 1999;26(7):410-20.
13. Wylie JL, Shah L, Jolly AM. Demographic, risk behaviour and personal network variables associated with prevalent hepatitis C, hepatitis B, and HIV infection in injection drug users in Winnipeg, Canada. *BMC Public Health* 2006;6:229.
14. Kral AH, Bluthenthal RN, Lorrwick J, Gee L, Bacchetti P, Edlin BR. Sexual transmission of HIV-1 among injection drug users in San Francisco, USA: Risk-factor analysis. *Lancet* 2001;357(9266):1397-401.
15. Plitt SS, Sherman SG, Strathdee SA, Taha TE. Herpes simplex virus 2 and syphilis among young drug users in Baltimore, Maryland. *Sex Transm Infect* 2005;81(3):248-53.
16. Evans JL, Hahn JA, Page-Shafer K, Lum PJ, Stein ES, Davidson PJ, et al. Gender differences in sexual and injection risk behavior among active young injection drug users in San Francisco (the UFO Study). *J Urban Health* 2003;80(1):137-46.
17. Powis B, Griffiths P, Gossop M, Strang J. The differences between male and female drug users: Community samples of heroin and cocaine users compared. *Subst Use Misuse* 1996;31(5):529-43.
18. Henderson DJ, Boyd C, Mieczkowski T. Gender, relationships, and crack cocaine: A content analysis. *Res Nurs Health* 1994;17(4):265-72.
19. Schechter MT, Strathdee SA, Cornelisse PG, Currie S, Patrick DM, Rekart ML, et al. Do needle exchange programmes increase the spread of HIV among injection drug users?: An investigation of the Vancouver outbreak. *AIDS* 1999;13(6):F45-F51.
20. Cao W, Treloar C. Comparison of needle and syringe programme attendees and non-attendees from a high drug-using area in Sydney, New South Wales. *Drug Alcohol Rev* 2006;25(5):439-44.
21. Wood E, Lloyd-Smith E, Li K, Strathdee S, Small W, Tyndall M, et al. Frequent needle exchange use and HIV incidence in Vancouver, Canada. *Am J Med* 2007;120(2):172-79.
22. Stoltz JA, Wood E, Small W, Li K, Tyndall M, Montaner J, et al. Changes in injecting practices associated with the use of a medically supervised safer injection facility. *J Public Health (Oxf)* 2007;29(1):35-39.
23. Cornish JW, O'Brien CP. Crack cocaine abuse: An epidemic with many public health consequences. *Annu Rev Public Health* 1996;17:259-73.
24. Statistics Canada. 2001 Census Aboriginal Population Profiles. Released June 17, 2003. Last modified: 2005-11-30. Statistics Canada Catalogue no. 93F0043XIE, 2002.
25. Public Health Agency of Canada. HIV/AIDS Epi Updates, May 2003. Ottawa, ON: Surveillance and Risk Assessment Division, Centre for Infectious Disease Prevention and Control, Public Health Agency of Canada, 2005.

Received: February 5, 2009

Accepted: October 8, 2009

RÉSUMÉ

Objectifs : Les utilisateurs de drogues par injection (UDI) sont à risque d'être infectés par le virus de l'immunodéficience humaine (VIH) et le virus de l'hépatite C (VHC) par la voie parentérale et la transmission sexuelle. Nous avons déterminé la séroprévalence et les corrélats du VIH et VHC chez des UDI recrutés à Edmonton (Alberta).

Méthode : Edmonton était l'un des nombreux sites d'une enquête nationale (étude I-Track). D'avril à juin 2005, nous avons recruté des UDI et nous leur avons administré un questionnaire sur leur profil démographique, leur consommation de drogue, leur comportement sexuel et leur comportement à l'égard de la détection du VIH et du VHC. Des échantillons de sang ont été prélevés par ponction digitale pour des tests sérologiques. Nous avons déterminé la séroprévalence du VIH et VHC et évalué les corrélats des infections par régression logistique.

Résultats : Des 275 UDI, 68 % étaient des hommes, leur âge médian était de 38 ans, et 70,6 % étaient des Autochtones. Les prévalences du VIH et VHC étaient respectivement de 23,9 % et de 66,1 %, et la coinfection par le VIH et le VHC était de 22,8 %. La cocaïne (36,9 %) était la drogue injectée le plus souvent au cours des six derniers mois. Chez les femmes, le commerce du sexe était corrélé avec le VIH (RC 2,9, IC 95% 1,0-8,3), tandis que chez les hommes, les corrélats du VIH étaient

le fait d'être plus âgé (RC 1,1, IC 95% 1,0-1,2) et le recours aux programmes d'échange de seringues (PES) (RC 5,7, IC 95% 1,3-23,7). Pour les femmes, avoir un partenaire sexuel occasionnel était un facteur de protection contre le VHC (RC 0,28, IC 95% 0,10-0,78). Les corrélats indépendants pour le VHC chez les hommes incluaient l'âge (RCa 1,2, IC 95% 1,1-1,3) et un plus jeune âge lors de la première injection (RCa 0,92, IC 95% 0,87-0,96).

Conclusion : La forte prévalence du VIH et du VHC dans cette étude auprès des UDI d'Edmonton met en évidence la complexité des besoins de la communauté UDI et la nécessité continue d'avoir des programmes ciblés.

Mots clés : VIH; VHC; utilisation de drogues par injection; Canada

Coming Events • Activités à venir

6th Canadian HIV/AIDS Skills Building Symposium/ 6^e symposium national de perfectionnement des compétences dans le domaine du VIH/sida

Leading Together 2010 / Au premier plan 2010

4-7 March/mars 2010 Montreal, QC

Contact/contacter :
skills2010@cdnaids.ca www.hivaids-skills.ca

3rd International Congress on Physical Activity and Public Health / 3^e Conférence internationale sur l'activité physique et la santé publique

Mobilizing Research for Global Action in Policy and Practice /

La recherche au service de l'action mondiale politique et pratique

5-8 May/mai 2010 Toronto, ON

Contact/contacter :
www.cflri.ca/icpaph/en/index.php www.cflri.ca/icpaph/fr/index.php

CAVEPM 2010 Conference / La conférence 2010 de l'ACEMPV *Towards One Health: Multiple Disciplines Working Together for Optimal Health of People, Animals and the Environment / Vers une santé : Plusieurs disciplines travaillant ensemble pour la santé optimale des humains, des animaux et de l'environnement*

26 May/mai - 2 June/juin 2010 Guelph, ON

Contact/contacter :
www.ovc.uoguelph.ca/cavepm/index.cfm
www.ovc.uoguelph.ca/cavepm/index_french.cfm

20th World Conference of Disaster Management (WCDM)

*20 Years of Progress: Are We Prepared to Face Future Challenges? Emergency
Management and Business Continuity Working Together*

Presented by the Canadian Centre for Emergency Preparedness

6-9 June 2010 Toronto, ON

Contact:
Adrian Gordon
Tel: 905-331-2552, Ext.221
E-mail: agordon@ccep.ca
www.wcdm.org

CPHA Centennial Conference/Conférence du centenaire de l'ACSP *Public Health in Canada: Shaping the Future Together / La santé publique au Canada : dessinons l'avenir ensemble*

13-16 June/juin 2010 Toronto, ON

Contact/contacter :
conference@cpha.ca conference.cpha.ca

Summer Institute 2010, National Collaborating Centres for Public Health / Atelier d'été 2010, Les Centres de collaboration nationale en santé publique

*Making Connections for Public Health Practice, Policy, and Research / Créer des
liens pour les pratiques, les politiques et la recherche en santé publique*

28-30 June /juin 2010 Winnipeg, Manitoba

Contact/contacter :
si2010.ca
si2010.netedit.info

26th International Papillomavirus Conference

Sharing Knowledge for Global Health

Organized by the International Papillomavirus Society (IPVS)

3-8 July 2010 Montréal, QC

Contact:
www.hpv2010.org

20th IUHPE World Conference on Health Promotion

*Health, Equity and Sustainable Development / Santé, équité et développement
durable*

11-15 July/juillet 2010 Geneva, Switzerland

Contact/contacter :
Florian Kündig, Assistant Conference Manager
+41 (0)31 350 04 35
E-mail: info@iuhpeconference.net
www.iuhpe.org

The Pacific Region Indigenous Doctors Congress 2010

Sharing Our Stories: Building Strength through the Circle of Knowledge Translation

Hosted by the Indigenous Physicians Association of Canada

26-29 August 2010 Whistler, BC

Contact:
www.ipac-amic.org

11th World Congress on Environmental Health

Global Health Protection from Sea to Sky

Hosted by the International Federation of Environmental Health (IFEH)
together with the Canadian Institute of Public Health Inspectors (CIPHI)

5-10 September 2010 Vancouver, BC

Contact:
www.ifeh2010.org

9th Canadian Immunization Conference/ 9^e Conférence canadienne sur l'immunisation

5-8 December/décembre 2010 Québec City/Ville de Québec (Québec)

Contact/contacter :
www.phac-aspc.gc.ca/cnic-ccni/
www.phac-aspc.gc.ca/cnic-ccni/index-fra.php