

Epi-Update

Hepatitis C virus (HCV) among Aboriginal people surveyed by three national enhanced surveillance systems in Canada

At a Glance

In 2008, the reported rate of HCV was almost five times higher among Aboriginal people compared to other Canadians (4.34 per 100,000 population vs. 0.90 per 100,000 respectively, Enhanced Hepatitis Strain Surveillance System).

The prevalence of HCV was two times higher among Aboriginal street-involved youth compared to their counterparts of other ethnicities (7.4% vs. 4.4%, respectively, Enhanced Street Youth Surveillance, E-SYS, 1999-2005).

Using univariate analyses, demographic and social factors associated with HCV among Aboriginal people include the following:

- ▶ Being a female;
- ▶ Snorting and injecting drugs, particularly Dilaudid and Ritalin;
- ▶ Borrowing used injecting equipment (i.e. syringe, water, cooker, filter, spoons);
- ▶ Initiating drug injecting at a younger age;
- ▶ Body piercing or tattooing;
- ▶ Having history of abuse, sex trade, jail or detention; and
- ▶ Having more than one sexual partner.

Among Aboriginal people who inject drugs, 24% of those with evidence of past or present HCV infection were also positive for HIV (I-Track, 2003-2005).

Among HCV sero-positive Aboriginal street-involved youth, 10% were also positive for HIV (E-SYS, 1999-2005).

Introduction

HCV infections are not uniformly distributed among the Canadian population¹. Available data suggest that Aboriginal people in Canada may bear a higher burden of infection compared to people of other ethnicities. This report presents data on HCV among Aboriginal people in Canada from three national enhanced surveillance systems, described below.

Analyses

Unadjusted odds ratios (uOR) and chi-square tests were performed for bivariate analyses to assess the relationship between various risk factors and HCV. Note: since multivariate analyses and adjusted odds ratios are not included in this *EpiUpdate*, interpretation of factors associated with HCV must be made with caution as the effects of other confounders were not controlled for in this document.

Results

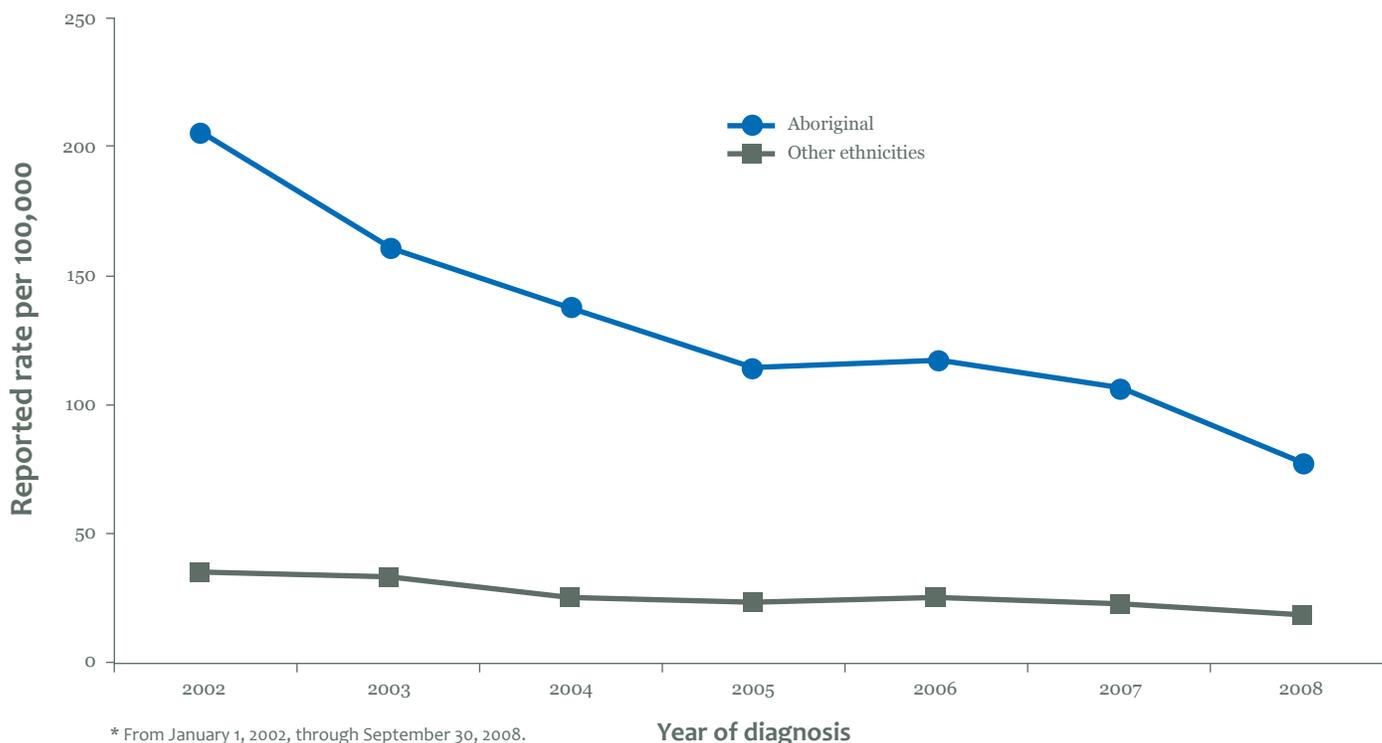
Reported rates of HCV (acute and chronic) and associated risk factors among Aboriginal people (EHSSS)

Data from EHSSS indicate that between 2002 and 2008, the overall reported diagnostic rate of HCV was 4.7 times as high (95% confidence interval [CI] 4.1-5.4) among Aboriginal people than among those of other ethnicities. The reported rate of diagnosed HCV among Aboriginal persons was 203 per 100,000 population in 2002, and 79 per 100,000 population in 2008; among people of other ethnicities it was 36 per 100,000 population in 2002, and 17 per 100,000 population in 2008 (Figure 1).

- ▶ 48.7% of HCV cases among Aboriginal persons were female compared to 33.9% being female among other ethnicities ($p < 0.01$).



Figure 1: Reported rate of newly diagnosed acute and chronic HCV by year and ethnicity in seven sites, EHSSS, 2002-2008*



► Compared to HCV positive EHSSS participants of other ethnicities, a greater proportion of Aboriginal HCV positive participants reported risk factors such as snorting

and injecting drugs, body piercing or tattooing, living with an HCV carrier, and having more than one sexual partner (Table 1).

Table 1: HCV risk factors by ethnicity, EHSSS, 2002-2008

Risk factor	No. (percent of all interviewed cases)		
	Aboriginal (n = 511)	Other ethnicities (n = 3,679)	p value*
Injecting drug use	344 (67.3%)	1,970 (53.6%)	<0.001
Drug snorting	266 (52.0%)	1,610 (43.8%)	<0.001
Blood transfusion/receipt	107 (20.9%)	724 (19.7%)	0.50
Haemodialysis*	1 (0.20%)	19 (0.5%)	0.32
Occupational exposure to blood	37 (7.2%)	310 (8.4%)	0.36
Acupuncture	24 (4.7%)	369 (10.0%)	<0.001
Body piercing	192 (37.6%)	1,204 (32.7%)	0.049
Tattoo	223 (43.6%)	1,222 (33.2%)	<0.001
Surgical procedure	298 (58.3%)	2,415 (65.6%)	<0.001
MSM**	17 (3.3%)	159 (4.3%)	0.29
>1 sex partner	313 (61.3%)	1,930 (52.5%)	<0.001
Household HCV carrier	186 (36.4%)	925 (25.1%)	<0.001

► * Statistically significant at p < 0.05. ► ** MSM = men who have sex with men.

- Upon examination of HCV sero-positive I-track participants who were Aboriginal versus of other ethnicities, significant differences were found in risk behaviours (I-Track, Table 2). Compared with other ethnicities, Aboriginal I-Track participants reported less frequent use of a needle exchange program (NEP), less frequent condom use at last sexual encounter, more frequent borrowing of injecting equipment, and younger age at first injection drug use. However, a higher proportion of those of other ethnicities borrowed needles, reported involvement in the sex trade (female respondents only), and reported having sex with men (male respondents only).

Table 2: Risk factors among HCV sero-positive[§] individuals who inject drugs, by ethnicity, I-Track Phase 1, 2003-2005

Risk factor	No. (percent of all interviewed cases*)		
	Aboriginal (n = 489)	Other ethnicities (n = 1,349)	p value**
Frequency of injection >1-2 times per week	339 (69.6%)	918 (68.5%)	0.64
Any NEP [^] use	419 (88.4%)	1,274 (95.0%)	<0.001
Age first injected <16 yrs ^{***}	107 (21.9%)	218 (16.2%)	0.004
Borrowed needles in past 6 months	72 (14.9%)	343 (25.8%)	<0.001
Borrowed any injecting equipment in past 6 months [†]	164 (34.0%)	383 (28.7%)	0.028
Have been in jail in past 6 months	82 (16.8%)	213 (15.8%)	0.60
Sex trade (female only [†])	57 (28.9%)	123 (45.1%)	<0.001
Any sex trade (All ^{††})	68 (15.7%)	190 (18.7%)	0.17
MSM (male only ^{††})	15 (5.8%)	103 (10.2%)	0.033
FSF (female only [§])	23 (10.4%)	52 (16.2%)	0.057
Condom use at last sex ^{§§}	141 (37.9%)	347 (47.7%)	0.002
More than 1 sex partner in the last 6 months	205 (42.5%)	559 (41.6%)	0.11

► § HCV testing was performed using the Ortho[®] HCV version 3.0 enzyme immunoassay. Confirmatory testing was not performed for samples that tested positive. A positive result indicates past or present HCV infection and does not discriminate acute from chronic or resolved infections. ► * Denominators may vary depending on risk factor (due to missing values). If substantially different than what is indicated in the column headers, denominators are indicated in footnotes. ► ** Statistically significant at p <0.05. ► ^ NEP = Needle exchange program. ► *** All participants. Note that effects are partially mediated by sex but remain significant (not shown). ► † Injecting equipment includes water, filters and cookers. ► †† 197 Aboriginal, 273 other ethnicities. This includes females who had male clients only. ► ††† 432 Aboriginal, 1014 other ethnicities. ► †††† MSM = males who have sex with males; 258 Aboriginal, 1010 other ethnicities. ► § FSF = females who have sex with females. ► §§ 372 Aboriginal, 728 other ethnicities

- Except for body piercing, there were no significant differences in risk factors when comparing HCV sero-positive street-involved youth of Aboriginal ethnicity versus those of other ethnicities (Table 3). However, any interpretation of these data should be made with caution given that sample sizes were small.

Table 3: Risk factors in HCV sero-positive street-involved Aboriginal youth vs. other ethnicities, E-SYS, 1999-2005

Risk factor	No. (percent of all interviewed cases)				p value*
	Aboriginal N = 114		Other ethnicities N = 85		
	n (N)	%	n (N)	%	
Injecting drug use ^{**}	102 (114)	69.3	73 (85)	58.8	0.44
Borrowed injecting paraphernalia	33 (72)	45.8	29 (50)	58.0	0.19
Injected by others	55 (59)	93.2	34 (37)	91.9	0.81
Body piercing	68 (91)	74.7	51 (57)	89.5	0.03
Tattooing	63 (95)	66.3	44 (59)	74.6	0.28
MSM ^{***}	10 (48)	20.8	17 (58)	29.3	0.32
In jail/youth detention	101 (114)	88.6	68 (84)	81.0	0.13

► * Statistically significant at p <0.05. ► ** Includes individuals who indicate they have only injected once. ► *** MSM = Males who have sex with males.

HCV and associated risk factors among Aboriginal individuals who inject drugs (I-Track)

- ▶ HCV rates among Aboriginal IDU were not significantly different from I-Track IDU participants of other ethnicities: 65.8% versus 64.9% respectively.
- ▶ Among Aboriginal IDU with evidence of past or present HCV infection, 24% were also positive for HIV. This

compares to 22.1% among those of other ethnicities, but the difference was not statistically significant.

- ▶ Drug-related behaviours associated with HCV in Aboriginal IDU included initiation of injection drug use before the age of 16 and use of injection drugs more than one or two times per week (Table 4). These behaviours were similar to IDU of other ethnicities (data not shown).

Table 4: Drug-related behaviours associated with HCV among Aboriginal people who inject drugs, I-Track Phase 1, 2003-2005

Variable	Total (n = 743)	HCV + (n = 489)	uOR** (95% CI)	p value*
Age first injected				
Less than 16 years	138	107 (77.5%)	Reference category	
16 years and older	605	382 (63.1%)	0.5 (0.3-0.8)	0.001
Frequency of injection in the last month				
Sometimes or never	267	149 (55.8%)	Reference category	<0.001
Regularly, more than 1-2 times/week	474	339 (71.5%)	2.0 (1.5-2.7)	
Borrowed needles in the last 6 months				
No	636	411 (64.6%)	Reference category	
Yes	96	72 (75.0%)	1.6 (1.0-2.7)	0.047
Borrowed equipment in the last 6 months				
No	481	319 (66.3%)	Reference category	
Yes	251	164 (65.3%)	0.96 (0.7-1.3)	0.79

▶ * Statistically significant at p < 0.05. ▶ ** uOR (95% CI) = unadjusted odds ratio (95% confidence interval).

Risk factors associated with HCV among Aboriginal street-involved youth (E-SYS)

- ▶ Between 1999 and 2005, the prevalence of HCV among Aboriginal street-involved youth was 7.4%, compared to 2.8% among street-involved youth of other ethnicities (p < 0.05). The overall prevalence of HCV for the entire set of participants in E-SYS was 4.4%.
- ▶ The prevalence of HCV was 1.7 times higher among Aboriginal street-involved youth who were females compared to their male counterparts, and 4.2 times

higher among those aged 20-24 years compared to those aged 15-19 years.

- ▶ Among Aboriginal street-involved youth with evidence of past or present HCV infection, 10% were also positive for HIV and over 97% had been previously diagnosed with another sexually transmitted infection.
- ▶ Approximately 27% of Aboriginal street-involved youth reported having ever injected drugs, and this behaviour was the single strongest predictor of HCV positivity (Table 5).

Table 5: Drug use-related risk factors for HCV among participating Aboriginal street-involved youth, E-SYS 1999-2005

Variable		Total (n = 1,523)	HCV + (n = 113)	uOR*** (95% CI)	p value*
Ever used non-injection drugs	No	44	1 (2.3%)	N/A	0.2
	Yes	1,479	112 (7.8%)		
Ever used injection drugs	No	1,141	12 (1.1%)	Reference category 34.6 (18.7-63.8)	<0.001
	Yes	376	101 (26.7%)		
Injected cocaine in the past 3 months**	No	132	36 (27.3%)	Reference category 2.8 (1.6-4.9)	<0.001
	Yes	90	46 (51.1%)		
Injected morphine in the past 3 months**	No	136	40 (29.4%)	Reference category 2.3 (1.3-4.0)	0.004
	Yes	86	42 (48.8%)		
Always used clean needles or other injecting equipment**	No	51	28 (54.9%)	2.1 (1.1-4.1) Reference category	0.03
	Yes	120	44 (36.7%)		

▶ * Statistically significant at $p < 0.05$. ▶ ** Among those who injected drugs more than once. ▶ *** uOR (95% CI) = odds ratio (95% confidence interval).

Discussion

Available surveillance data indicate that although reported rates of HCV have not increased among Aboriginal people in Canada, they are still almost five times higher than those of other ethnicities. Regardless of ethnicity, well-established risk factors such as use of contaminated needles or equipment to inject drugs continue to be frequently associated with HCV transmission and are the most important predictors of HCV among EHSSS, I-Track, and E-SYS participants.

Among Aboriginal persons participating in EHSSS, the reported rate of HCV is higher among females than males. This is in contrast to national trends in the general Canadian population where, in 2008, the reported rate of HCV in males was nearly twice that of the female rate (46.1 per 100,000 population versus 25.8 per 100,000 population, respectively)⁴. This noted difference needs to be further explored.

HCV vulnerability must be considered within the context of the broader mental, emotional, physical, spiritual and socio-economic factors. Disease prevalence is also impacted by factors such as access to adequate housing, education, income and experiences of childhood abuse and neglect. Socio-economic instability has been associated with initiating injection drug use and is a risk factor for drug-related infectious diseases.⁵ Therefore, to address the issue of HCV, we need to examine the indirect pathways that lead to HCV transmission. Furthermore, a multisectoral approach is required to address HCV infection within Aboriginal and other communities across Canada.

Data Sources

Enhanced Hepatitis Strain Surveillance System (EHSSS):

EHSSS is a multi-centre, sentinel surveillance system that gathers information on people newly diagnosed with HCV infection beyond the information available through routine surveillance. Because the EHSSS uses a case definition for acute infection, the incidence of HCV can be estimated. Furthermore, EHSSS gathers information that can be used to assess risk factors associated with HCV transmission. This report includes data on newly diagnosed acute and chronic HCV infections that were available from January 2002 to September 2008 from nine sites across Canada. The population covered by the EHSSS sites represents approximately 33.5% of the Canadian population (i.e. 10.5 million people). The methods used in EHSSS have been described previously.¹

I-Track: I-Track is a multi-site, enhanced surveillance system that monitors changing patterns in drug use and injecting practices, sexual risk behaviours, HIV and HCV prevalence, and testing behaviours among people who inject drugs (IDU) in Canada. Information presented about youth IDU is based on data collected during Phase 1 of I-Track, which was completed between October 2003 and May 2005 and which included 3,031 participants recruited from sites in Victoria, Edmonton, Regina, Winnipeg, Sudbury, Toronto, and the SurvUDI sites: Abitibi-Témiscamingue, Estrie, Mauricie/Centre du Québec, Montérégie, Montréal, Ottawa, Outaouais, Québec, and Saguenay/Lac St-Jean.²

Enhanced Street Youth Surveillance (E-SYS): E-SYS is a multi-centre, enhanced surveillance program that describes the prevalence of STBBIs, risk behaviours, testing behaviours and socio-economic factors associated with STBBIs among Canadian street-involved youth. The information presented is based on data collected from 6,053 street-involved youth recruited between 1999 and 2005 from seven sites: Vancouver, Edmonton, Saskatoon, Winnipeg, Toronto, Ottawa, and Halifax.³

Acknowledgements

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I-Track is possible as a result of collaboration between the Public Health Agency of Canada and researchers, provincial and local health authorities, and community-based organizations from participating sites across Canada; coordination is provided by the Public Health Agency of Canada's Surveillance and Risk Assessment Division; HCV and HIV testing is performed by the National HIV and Retrovirology Laboratory. Special thanks to the I-Track study participants. Further information on I-Track may be obtained at <http://www.phac-aspc.gc.ca/aids-sida/about/itrack-eng.php>.

Enhanced Street Youth Surveillance (E-SYS) is possible as a result of collaboration between the Public Health Agency of Canada and researchers, provincial and local health authorities, and community-based organizations from participating sites across Canada; coordination is provided by the Public Health Agency of Canada's Community Acquired Infections Division; STBBI testing is performed by local laboratories and the National HIV and Retrovirology Laboratory. The names of the organizations and people associated with E-SYS can be found at <http://www.phac-aspc.gc.ca/sti-its-surv-epi/youth-jeunes-eng.php>. Special thanks to the street-involved youth who consented to participate in E-SYS.

References

1. Zou S, Zhang J, Tepper M et al. Enhanced surveillance of acute hepatitis B and C in four health regions in Canada, 1998 to 1999. *Can J Infect Dis* 2001;12(6):357-63.
2. Public Health Agency of Canada. Enhanced Surveillance of Risk Behaviours among Injecting Drug Users in Canada. Available at <http://www.phac-aspc.gc.ca/i-track/sr-re-1/index-eng.php>.
3. Public Health Agency of Canada. Street Youth in Canada – Findings from Enhanced Surveillance of Canadian Street Youth, 1999-2003. Available at <http://www.phac-aspc.gc.ca/sti-its-surv-epi/youth-jeunes-eng.php>.
4. Public Health Agency of Canada. Reported cases and rates of hepatitis C by age group and sex, 2008. Available at <http://www.phac-aspc.gc.ca/sti-its-surv-epi/hepc/hepc-eng.php>.
5. Rhodes T, Treloar C. The social production of hepatitis C risk among injecting drug users: a qualitative synthesis. *Addiction* 2008, 103:1593-1603.

For more information on Hepatitis C, please contact

STI and HCV Surveillance and Epidemiology Section
Community Acquired Infections Division
Centre for Communicable Disease and Infection Control
Infectious Diseases Prevention and Control Branch
Public Health Agency of Canada
Tunney's Pasture
Postal Locator: 0603B
Ottawa, Ontario K1A 0K9
Tel: (613) 941-6338 • Fax: (613) 941-9813