

Hepatitis C virus (HCV) infection among men who have sex with men (MSM) in Montreal: Results from the Argus 2005 Survey

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INTRODUCTION

- ARGUS 2005 is the first of biennial surveys of Montreal MSM to monitor the occurrence of HIV, HCV infection and sexually transmitted infections. The survey is part of the national second-generation surveillance project (M-Track) of the Public Health Agency of Canada; Montreal was the first region to participate.
- There are concerns about higher levels of HCV infection among MSM because of:
 - recent reports of clusters of acute HCV infection among HIV-positive MSM [(Götz et al., AIDS 2005, 19(9))] and
 - the link between risky sexual behaviours such as fisting and HCV infection [Craib et al., CJID 2001, 12(Suppl B)].
- In the Omega Cohort Study, a study of HIV occurrence among HIV seronegative MSM, only one case of HCV seroconversion was identified during the study period; this case had a history of active injection drug use and syringe sharing [Alary et al., AJPH 2005, 95(3)].

OBJECTIVE

- To describe HCV-infected MSM and to examine factors associated with HCV-infection.

METHODS

Design

- A survey of MSM recruited from gay social venues (bars, saunas, cafes, recreational groups, etc.) between January and August 2005.

- Recruitment sites were selected based on information from a detailed ethnographic map of social spaces for MSM. Recruitment days and times varied across types of sites (bar, sauna, community association, event, fixed site) and systematic recruitment (one in three) was used if not all MSM could be solicited.

- MSM were eligible to participate if they were at least 18 years of age, a resident of Montreal and had a history of sexual relations with a man.

Data collection

- An anonymous self-administered questionnaire was used to collect information about sociodemographic factors, drug and alcohol use, other HCV infection risks/risk markers (history of transfusion, birth and health care outside of Canada and the US, etc.) and sexual behaviours.

- Dried blood spot specimens were collected and analysed for the presence of anti-HCV (Ortho® HCV Version 3.0 EIA) and anti-HIV-1 (Bio-Rad® Genetic System HIV rLAV EIA) antibodies.

Analysis

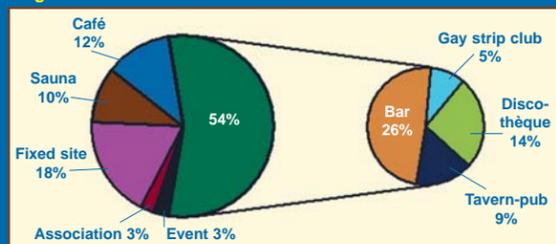
- Multivariate logistic regression was used to model variables in relation to HCV-infection. A manual stepwise regression method based on the likelihood ratio was used. Odds ratios (OR) and 95% confidence intervals (95%CI) are presented.

RESULTS I

Participant characteristics

- Complete data were available for 1944 subjects; recruitment disposition is presented in Figure 1.

Figure 1. Recruitment sites



- Mean age was 38 years (18-81) and 12% were born outside Canada and the US; most (80%) described themselves as homosexual (Table 1).

- Almost 8% reported a history of injection (steroids, cocaine, heroin or other drugs).

Table 1. Profile of Argus 2005 participants (n=1944)

Variable	%
Age	
18 to 29 years	28
30 to 39 years	26
≥ 40 years	46
Gross annual income	
\$0 - 19,000	33
\$20,000 - 29,000	17
\$30,000 - 39,000	19
≥ \$40,000	31
Education	
≤ secondary	32
≥ college	68
Homosexual orientation	80
Born outside of Canada or the US	12
Currently in a couple relationship	19

- Prevalence of HIV, HCV and HIV-HCV co-infection is summarized in Table 2.

- HCV infection relative to injection history:

- Hx of injection: 41.4%, 95%CI: 1.1 - 2.3%
- No Hx of injection: 1.8%, 95%CI: 33.2 - 50.1%

Table 2. HIV, HCV & HIV-HCV Co-infection (n=1944)

	(%)	95% CI
HIV	12.5	11.1 - 14.1
HCV	5.4	4.4 - 6.5
HIV - HCV	1.7	1.2 - 2.5

RESULTS II

- Numerous sociodemographic, alcohol and drug use, and sexual behaviour factors were significantly associated (p=0.05) with HCV infection (Table 3). These included older age, lower education and personal income, self-identification as bisexual or heterosexual, any history of injection, receipt of a blood transfusion before 1990 and being HIV-positive. Indeed, the profile of HCV-infected MSM suggests a group of men that may be distinct from the general MSM population in that they also have female sexual partners, look for sex in heterosexual bars and are involved in the exchange of sex for \$/goods/services.

- A history of snorting or smoking heroine, cocaine or crack was also associated. Fisting, which has been found as a determinant of acute HCV infection among MSM was not associated.

- Additional variables significantly associated with HCV infection include :

- French as first language learned
 - Born in Canada or the US
 - Not in a common-law or married relationship
 - Fewer gay friends, gay friends who are HIV-positive and less time spent with gay men
 - Less satisfaction with social and sexual life*
 - Greater alcohol consumption (e.g. drank ≥ 5 alcoholic beverages on one occasion, > 1/week, past 12 months)
- * at least once within the past 6 months

Table 3. Selected factors associated with HCV-infection among MSM (n=1944)

Variable		HCV-infected (n = 105) N (%)	Not HCV-infected (n = 1839) N (%)	p†
Age (yrs)				0.008
	18-29	25 (5)	511 (95)	
	30-39	40 (8)	447 (92)	
	> 40	39 (4)	842 (96)	
Education				0.000
	≤ secondary	78 (13)	527 (87)	
	≥ college	22 (2)	1270 (98)	
Personal Income				0.000
	< \$20,000	73 (12)	560 (88)	
	≥ \$20,000	26 (2)	1237 (98)	
Sexual orientation				0.000
	Bisexual, heterosexual	56 (15)	320 (85)	
	homosexual	45 (3)	1491 (97)	
Ever snorted or smoked cocaine				0.000
	Yes	34 (72)	13 (28)	
	No	47 (3)	1728 (97)	
Ever snorted or smoked heroin				0.000
	Yes	18 (24)	58 (76)	
	No	63 (4)	1707 (96)	
Ever injected (steroids, cocaine, heroin, other drugs)				0.000
	Yes	58 (41)	82 (59)	
	No	30 (2)	1684 (98)	
Ever shared syringes				0.000
	Yes	34 (72)	13 (28)	
	No	47 (3)	1728 (97)	
Looked for sex at least once* in a straight bar				0.000
	Yes	25 (10)	220 (90)	
	No	56 (4)	1383 (96)	
At least one female sex partner*				0.000
	Yes	44 (18)	206 (82)	
	No	55 (3)	1577 (97)	
Unprotected anal sex with at least one man*				0.030
	Yes	19 (3)	557 (97)	
	No	72 (6)	1203 (94)	
Received \$, goods/services in exchange for sex*				0.000
	Yes	47 (24)	152 (76)	
	No	55 (3)	1602 (97)	
Blood transfusion before 1990				0.004
	Yes	15 (10)	129 (90)	
	No	85 (5)	1661 (95)	
HIV positive (laboratory determined)				0.000
	Yes	34 (14)	209 (86)	
	No	71 (4)	1628 (96)	

† Pearson Chi Square or Fisher's Exact Test, * at least once within the past 6 months, † during sex = 2 hours before or during sex

RESULTS III

- The multivariate modelling exercise demonstrated several factors as important in understanding prevalent HCV infections among MSM (Table 4).

- HCV-infection among MSM was more common among MSM who are older, have lower education and personal income, and who identify themselves as bisexual or heterosexual. Ever injecting and ever snorting/smoking cocaine were the most important independent contributors.

- Effect modification by history of injection was tested and no significant interaction was found.

Table 4. Multivariate logistic regression model[†] of factors associated with HCV-infection among MSM (n=1670)

Variable	Adjusted OR	95% CI
Age		
18 to 29 years	-	--
30 to 39 years	4.24	1.74 - 10.31
≥ 40 years	4.39	1.73 - 11.14
Secondary or less education	3.86	1.79 - 8.33
Annual income < \$20,000	4.63	2.19 - 9.81
Bisexual or heterosexual	2.88	1.43 - 5.79
Ever snorted or smoked cocaine	7.15	2.54 - 20.15
History of injection [‡]	19.46	9.98 - 37.95
Received \$/goods/services for sex*	3.38	1.66 - 6.85

OR=odds ratio, CI=confidence interval, † adjusted for HIV status and history of blood transfusion before 1990
‡ ever injected steroid, heroin, cocaine, other drugs, * within the past 6 months

CONCLUSION & IMPLICATIONS

- In this sample of Montreal MSM, HCV infection is common among men who have injected. The prevalence among MSM who never injected approximates the prevalence of HCV infection in the general population of Montreal (1.5%).

- The association between older age and HCV-infection reflects the cumulative prevalence of this chronic infection. Lower education and personal income as well receiving money/goods/services for sex suggest HCV-infected MSM represent a vulnerable segment of the MSM population.

- HCV-infected MSM were also more likely to self-identify as bisexual or heterosexual. While these men are sexually active with other men, they may not identify with the larger MSM population, perhaps further contributing to a marginalized experience.

- This study confirms the link between the use of injection drugs and HCV infection. In addition, it appears that snorting and smoking of cocaine may contribute to the prevalence of HCV infection among MSM.

- While the sexual transmission of HCV among MSM has been identified as a potentially important route of transmission, like other studies in Montreal and elsewhere, we did not find any link between sexual risk, including unprotected anal sex, number of sexual partners, rimming, and fisting.

Limitations

- The cross-sectional design precludes inference of causality.
- Despite the diversity of recruitment venues, this convenience sample may not be representative of MSM in Montreal and men who do not use or attend such venues. The generalizability of study results is therefore limited.

- Self-reports of drug use and risk behaviours may be biased by social desirability. Because of the questioning time frame (past 6 months and not lifetime), this study has minimal capacity to identify remote exposures perhaps more important in the consideration of prevalent HCV infection.

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