

# Prevalence and Correlates of Cervical Cancer Screening Among Injection Drug Users

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## Abstract

**Objective:** Access to cervical cancer screening may be lower among lower income and socially disadvantaged populations. However, few studies have specifically examined factors associated with cervical cancer screening among socially marginalized populations, especially in settings with free health care systems.

**Methods:** The present study was conducted to examine the prevalence and correlates of cervical cancer screening among injection drug users. We examined rates of Papanicolaou (Pap) smear testing among female participants in the Vancouver Injection Drug Users Study (VIDUS). Univariate and logistic regression analyses were used to evaluate factors associated with cervical cancer screening.

**Results:** During the period from December 2004 to May 2005, 297 female injection drug users were seen. In logistic regression analyses, age (adjusted odds ratio [AOR] = 0.70; 95% confidence intervals [CI] 0.53, 0.92,  $P = 0.010$ ), HIV infection (AOR = 2.46; 95% CI 1.41, 4.26,  $P = 0.001$ ), hepatitis C infection (AOR = 0.25; 95% CI 0.09, 0.71,  $P = 0.010$ ), and having visited a family physician in the prior six months (OR = 3.10; 95% CI 1.58, 6.07,  $P = 0.001$ ) were independently associated with recent cervical cancer screening.

**Conclusions:** After adjustment for regular physician visits, HIV infection was associated with elevated rates of cervical screening. This is reassuring, given the elevated risk of cervical cancer among this population. Interventions may be required to improve uptake of screening among older injection drug users and drug users infected with hepatitis C.

## Résumé

**Objectif :** Il est possible que l'accès au dépistage du cancer du col soit plus restreint au sein des populations à faible revenu et désavantagées sur le plan social. Toutefois, peu d'études se sont spécifiquement penchées sur les facteurs associés au dépistage du cancer du col au sein des populations marginalisées sur le plan social, particulièrement dans les milieux bénéficiant de systèmes de soins de santé gratuits.

**Key Words:** Cervical cancer, injection drug use, access to health care

Competing Interests: None declared.

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**Méthodes :** La présente étude a été menée en vue d'examiner la prévalence et les corrélats du dépistage du cancer du col chez les utilisatrices de drogues injectables. Nous nous sommes penchés sur les taux de frottis de Papanicolaou (Pap) chez les participantes de la *Vancouver Injection Drug Users Study* (VIDUS). Des analyses univariées et de régression logistique ont été menées pour évaluer les facteurs associés au dépistage du cancer du col.

**Résultats :** Au cours de la période allant de décembre 2004 à mai 2005, 297 utilisatrices de drogues injectables ont fait l'objet d'une consultation. Dans le cadre des analyses de régression logistique, l'âge (rapport de cotes standardisé [RCS] = 0,70; intervalles de confiance [IC] à 95 %, 0,53 - 0,92,  $P = 0,010$ ), l'infection à VIH (RCS = 2,46; IC à 95 %, 1,41 - 4,26,  $P = 0,001$ ), l'infection à hépatite C (RCS = 0,25; IC à 95 %, 0,09 - 0,71,  $P = 0,010$ ) et le fait d'avoir consulté un omnipraticien au cours des six mois précédents (RC = 3,10; IC à 95 %, 1,58 - 6,07,  $P = 0,001$ ) ont été indépendamment associés à un dépistage récent du cancer du col.

**Conclusions :** Après neutralisation de l'effet des consultations régulières avec un médecin, l'infection à VIH a été associée à des taux élevés de dépistage cervical. Voilà qui est rassurant, compte tenu du risque élevé de cancer du col que l'on constate au sein de cette population. Des interventions pourraient s'avérer requises pour hausser le recours au dépistage chez les utilisatrices âgées de drogues injectables et chez les utilisatrices présentant une hépatite C.

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## INTRODUCTION

Cervical cancer is the second most common cause of cancer-related death among women worldwide.<sup>1</sup> However, it has been well demonstrated that cervical cancer is preceded by detectable precursor lesions that are easily identifiable through Papanicolaou (Pap) screening.<sup>2</sup> As such, guidelines commonly recommend annual screening commencing at age 18, or when women become sexually active if younger than 18 years.<sup>3,4</sup> Screening should continue throughout a woman's lifetime because the incidence of cervical cancer increases with age.<sup>3,4</sup> In women found to have either atypical squamous cells or squamous intraepithelial lesions, a colposcopy is usually recommended. In this procedure, the cervix, vagina, and vulva are inspected using a light source and magnification,<sup>5,6</sup> and a

biopsy may also be performed. The use of regular screening has been shown to be effective in lowering the risk of developing invasive cervical cancer. In fact, the highest risk of invasive cervical cancer is associated with not having had a Pap smear in the preceding five years.<sup>7,8</sup>

Previous studies have shown that a number of factors may predict a lack of regular Pap screening. For instance, women in ethnic minorities or of lower socio-economic status may have lower access to regular Pap screening than women in higher socio-economic strata.<sup>9-11</sup> However, few studies have specifically examined why some lower income or marginalized women access cervical cancer screening and others do not. Such analyses may be challenging in settings in countries such as the United States where there may be financial barriers to health care. Low access to cervical cancer screening is an important issue for certain lower income populations since certain diseases such as HIV infection may be associated with a greater need for regular cervical cancer screening.<sup>12,13</sup> The present study was conducted to evaluate the prevalence and correlates of cervical cancer screening among injection drug users (IDU) in the context of a universal health care system where all medical care is provided free of charge.

## **METHODS**

Beginning in May 1996, persons who had injected illicit drugs in the previous month were recruited into the Vancouver Injection Drug User Study (VIDUS), a prospective cohort study that has been described in detail previously.<sup>14-16</sup> Persons were eligible for the study if they had injected illicit drugs at least once in the previous month, resided in the greater Vancouver region, and provided written informed consent. At baseline and semi-annually, subjects provided blood samples for HIV and hepatitis C (HCV) serology and completed an interviewer-administered questionnaire. The questionnaire elicited demographic data and information about illicit drug use, HIV risk behaviour, and addiction treatment, in addition to use of primary health care services including access to cervical cancer screening. The study has been approved by the University of British Columbia's Research Ethics Board.

In the present study we examined the prevalence and correlates of cervical cancer screening among VIDUS participants who were interviewed during the period from December 2004 to May 2005. Univariate and multivariate statistical techniques were applied to determine factors associated with reporting cervical cancer screening (Pap smear) in the prior year. Socio-demographic characteristics considered in the analyses included ethnic background (aboriginal v.s. other), age, HCV and HIV sero-status, unstable housing, daily cocaine and heroin use, sex trade

work, crack smoking, methadone use, and having visited a family physician in the preceding six months. Unstable housing was defined as a single-room occupancy hotel, a transitional arrangement, or homelessness, whereas stable housing was defined as an apartment or a house. Sex-trade work was defined as trading sex for money or drugs. All variable definitions were identical to earlier reports.<sup>14-16</sup>

Statistical analyses were applied to compare data derived from participants who reported having had a Pap smear in the preceding year with data from those who had not. Categorical explanatory variables were analyzed using Pearson's chi-square test, and continuous variables were analyzed using the Wilcoxon rank sum test. We then used a logistic regression model to evaluate variables that were independently associated with a report of having had a Pap smear in the preceding year. In order to control for potential confounders, all covariates that were statistically significant ( $P < 0.05$ ) in univariate analyses were included in the final model. All reported  $P$ -values are two-sided.

## **RESULTS**

Overall, 297 female participants were followed between December 2004 and May 2005. Their median age was 38 years (interquartile range 30-45), and 133 (45%) were aboriginal (First Nations), 144 (48%) were white, and 20 (7%) were of other ethnicity. Overall, 53 (18%) reported daily cocaine injection, 77 (26%) reported daily heroin injection, and 144 (49%) reported daily crack use. Of these participants, seven (2%) reported having never had a Pap smear or being unsure if they had ever had a Pap smear. Of the total group, 119 (40.1%) reported having not had a Pap smear in the past year, and 178 (59.9%) reported having a Pap smear in the past year.

The univariate analysis of factors associated with cervical cancer screening in the prior year is shown in Table 1. As shown here, older age (odds ratio [OR] 0.97 per year older; 95% confidence intervals [CI] 0.95, 0.99,  $P = 0.005$ ) and being HCV-positive (OR 0.26; 95% CI 0.09, 0.69,  $P = 0.004$ ) were negatively associated with having had a Pap smear test done in the previous year. Conversely, being HIV-infected (OR 2.31; 95% CI 1.37, 3.91,  $P = 0.002$ ) and having seen a doctor in the previous six months (OR 2.78; 95% CI 1.50, 5.17,  $P < 0.001$ ) were positively associated with having had a Pap smear in the previous year. Interestingly, we found no statistical evidence that ethnic background, unstable housing, cocaine and heroin use, sex trade work, crack smoking, or methadone use were associated with having had a Pap smear in the previous year.

Variables that were independently associated with reporting cervical cancer screening in the previous year are shown in Table 2. In logistic regression analyses, age (adjusted odds

**Table 1. Univariate analyses of study participants' socio-demographic and drug use characteristics associated with cervical cancer screening in the past year**

<b>Cervical Cancer Screening</b>					
	No n (%)	Yes n (%)	Unadjusted odds ratio	95% CI	<i>P</i>
Ethnic Background					
Other	64 (53.8)	100 (56.2)			
Aboriginal	55 (46.2)	78 (43.8)	0.91	(0.57–1.45)	0.684
Age (years)					
Median	41	37			
Interquartile range	(31–46)	(29–43)	0.97	(0.94–0.99)	0.005
HCV positive					
No	5 (4.2)	26 (14.6)			
Yes	114 (95.8)	152 (85.4)	0.26	(0.09–0.69)	0.004
HIV positive					
No	92 (77.3)	106 (59.6)			
Yes	27 (22.7)	72 (40.5)	2.31	(1.37–3.91)	0.002
Unstable housing*					
No	65 (54.6)	103 (57.9)			
Yes	54 (45.4)	75 (42.1)	0.88	(0.55–1.40)	0.581
Daily cocaine injection*					
No	98 (82.4)	146 (82.0)			
Yes	21 (17.7)	32 (18.0)	1.02	(0.56–1.88)	0.942
Daily heroin injection*					
No	85 (71.4)	135 (75.8)			
Yes	34 (28.6)	43 (24.2)	0.80	(0.47–1.35)	0.395
Sex trade work*					
No	87 (73.1)	124 (69.7)			
Yes	32 (26.9)	54 (30.3)	1.18	(0.71–1.98)	0.521
Crack smoking*					
No	62 (52.1)	91 (51.1)			
Yes	57 (47.9)	87 (48.9)	1.04	0.65–1.65)	0.869
Methadone use**					
No	64 (53.8)	86 (48.3)			
Yes	55 (46.2)	92 (51.7)	1.24	(0.78–1.98)	0.356
Physician visit*					
No	31 (26.0)	20 (11.2)			
Yes	88 (74.0)	158 (88.8)	2.78	(1.50–5.17)	< 0.001

\* Within the previous six months at time of interview

\*\*Current use

CI: confidence intervals; HCV: hepatitis C virus; HIV: human immunodeficiency virus.

**Table 2. Logistic regression analysis\* of factors associated with injection drug users having a Pap smear in the previous six months**

Variable	AOR	95% CI	P
Age (Per 10 years older)	0.70	(0.53–0.92)	0.010
HCV (Yes v.s. no)	0.25	0.085–0.71)	0.010
HIV (Yes v.s. no)	2.46	(1.41–4.26)	0.001
Recent visit to family physician (Yes v.s. no)	3.10	(1.58–6.07)	0.001

\*Model was constructed using the a priori protocol of including all variables that were statistically significant at  $P < 0.05$  in univariate analyses.

AOR: Adjusted odds ratio; CI: confidence interval; HCV: hepatitis C virus; HIV: human immunodeficiency virus.

ratio [AOR] 0.70; 95% CI 0.53, 0.92,  $P = 0.010$ ) and hepatitis C infection (AOR 0.25; 95% CI 0.09, 0.71,  $P = 0.010$ ) were associated with a lower rate of screening, whereas being HIV-infected (AOR 2.46; 95% CI 1.41, 4.26,  $P = 0.001$ ) and having visited a family physician in the past six months (OR 3.10; 95% CI 1.58, 6.07,  $P = 0.001$ ) were positively associated with cervical cancer screening in multivariate analyses.

## DISCUSSION

In the present study we found that approximately 60% of injection drug users reported having had cervical cancer screening in the preceding year and that 40% had not been screened. Interestingly, in multivariate analyses, older age and infection with HCV were negatively associated with cervical cancer screening, whereas being HIV-infected was positively associated with cervical cancer screening. This analysis was adjusted for a physician visit in the prior six months, which was also associated with a higher rate of screening.

Although several studies have examined barriers to cervical cancer screening, the present study is unique because it specifically examines the participation of injection drug users in screening. It is reassuring that HIV infection was positively associated with more regular cervical cancer screening, given that HIV has been associated with more rapid progression of cervical cancer.<sup>12,13</sup> This association may be due to the large number of health clinics that have been established in this neighbourhood, many of which combine the delivery of antiretroviral therapy with primary medical care.<sup>17,18</sup> This conclusion is supported by the fact that the association between HIV and more regular screening was

consistently shown even after we adjusted for more regular physician visits. Previous studies have suggested that more regular cervical cancer screening is warranted in HIV-infected individuals, particularly among individuals with lower CD4 cell counts.<sup>12,13</sup> The fact that older age was negatively associated with Pap screening is somewhat alarming, given the relatively young age of the cohort and the fact that the incidence of cervical cancer has been shown to increase with age.<sup>3,4</sup> Efforts to improve screening among older IDU are warranted in our setting, and further study is required to explain this association. Similarly, it was surprising that hepatitis C infection was negatively associated with cervical cancer screening in multivariate analyses. One could hypothesize that the difference between funding and treatment programs for individuals infected with HCV and for those infected with HIV may account for the difference in correlation between the two groups. However, further study is necessary to explain this association.

This study has several limitations. The most important is the study's reliance on self-report of IDU, which makes it susceptible to socially desirable reporting.<sup>19</sup> However, the data were collected as part of an ongoing prospective cohort study and not as a formal evaluation of a cervical cancer screening program. Thus, we know of no reason why reporting Pap smear rates would be subject to this concern. A further limitation of the present study is that it identifies only overall low rates of cervical cancer screening among Vancouver IDU, as well as those factors that are associated with higher or lower access to this service. Therefore, while interventions are implemented to try to improve access to cervical cancer screening among this

population, further study will be required to allow a full interpretation of our findings.

## CONCLUSIONS

We found that approximately 60% of injection drug users reported cervical cancer screening in the prior year, whereas 40% reported having not been screened during this period. Overall, we observed that being HIV-infected was associated with higher rates of cervical cancer screening, and further study will be required to determine whether unique interventions for HIV-positive IDU in Vancouver are responsible for this observation. Our study also indicates that older injection drug users may need to be specifically targeted for more regular cervical cancer screening.

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