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Original Research

Prevalence and correlates of cigarette smoking among men who have sex with men (MSM) in Vancouver, Canada: A cross-sectional survey

By Laura Haley,[1] Jason Wong,[2] David Moore,[1,3] Keith Chan[3], Warren Michelow,[3] Meena Dawar,[4] Wayne Robert,[5] Robert S. Hogg,[3] Mark Gilbert[6] , the ManCount Study Team

[1]Faculty of Medicine, University of British Columbia, [2]School of Population and Public Health, University of British Columbia, [3]BC Centre for Excellence in HIV/AIDS, Vancouver, BC, [4]Vancouver Coastal Health Authority, Vancouver, BC, [5]Health Initiative for Men, Vancouver, BC, [6]BC Centre for Disease Control, Vancouver, BC

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Corresponding Author:
David M Moore,
University of British Columbia
BC Centre for Excellence in HIV/AIDS
608-1081 Burrard Street
Vancouver, Canada
dmoore@cfenet.ubc.ca

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Abstract

Objectives: Past studies of men who have sex with men (MSM) in Canada and elsewhere have reported high prevalence of cigarette smoking. In the context of a declining prevalence of smoking in the general population, we sought to gather more recent estimates of the prevalence of smoking among a sample of MSM in Vancouver and examine correlates of current smoking status.

Methods: We conducted a cross-sectional survey of MSM selected through a venue-based time-place sampling method in Vancouver. Correlates of smoking were investigated using bivariate analyses and multivariate logistic regression modeling. We also examined the association between smoking status and use of mood-altering substances.

Results: A total of 37.0% (413/1115) of study participants were current smokers. HIV-positive individuals (50.0%), men under 30 years old (40.4%), and individuals earning < $20,000 per year (51.6%) reported the highest prevalence of smoking. Asian men had a much lower prevalence of smoking (20.5%) ($p < 0.001$ for all). Multivariate modeling found a reduced odds of smoking among individuals of Asian heritage and increased odds of smoking among individuals aged <45 years; income levels below $60,000, self-reported HIV seropositivity and self-reported sexual orientation other than gay.

Conclusion: The prevalence of current smoking among MSM in this sample was 37.0% which is lower than previous studies of MSM in Canada, but still much higher than of the general male population in British Columbia. Men's health programs which are directed towards gay, bisexual and other MSM should prioritize smoking cessation programs, particularly for young men and those living with HIV.

INTRODUCTION

Cigarette smoking continues to be a serious public health concern worldwide. In Canada, more than 37,000 individuals die from smoking-related diseases and/or exposure to second hand smoke on an annual basis [1] . Fortunately, the prevalence of smoking has been declining. The proportion of people over 15 years old who reported being current smokers has fallen from 25% in 1999 to 17% in 2011 [2]. However, the prevalence of smoking among sexual minorities, such as men who have sex with men (MSM), has been shown to be substantially higher than the general population [3.4]. More concerning is the compounded effect of smoking on morbidity and mortality with HIV infection. A recent study found that HIV-infected individuals who also smoked had a significantly higher risk of major cardiovascular disease, non-AIDS cancers, bacterial pneumonia, and all-cause mortality [5].

However, relatively few studies have explored smoking behaviour among MSM in Canada. The Toronto Rainbow Tobacco Survey, conducted in 2006, found that the prevalence of smoking in gay and bisexual men was 33% and 45%, respectively [4]. Similarly, a survey from Vancouver from 1999 noted that over 50% of HIV-negative MSM aged 18 to 35 years reported smoking during the previous year, about twice that as other men in British Columbia (BC) [3].

The primary objective of this study is to gather recent available data on the prevalence of smoking among MSM in Vancouver. In addition, we wanted to explore factors that may be associated with current smoking status and examine how cigarette smoking is associated with the use of other substances.

METHODS

Data for this study was from the ManCount study, the Vancouver component of M-Track (an enhanced surveillance system of HIV and other sexually transmitted and blood-borne infections among MSM in Canada). Details of the ManCount methodology are described elsewhere [6].

The ManCount study is a cross-sectional, HIV serobehavioural survey of MSM conducted in Vancouver, BC from August 1, 2008 to February 28, 2009. The survey employed venue-date-time sampling of venues known to be frequented by MSM in Vancouver. Participation was offered to men 18 years old or older who had previously had sex with men. Those who had previously completed the survey and those who could not complete the survey in English were excluded. Ethics approval of the survey was obtained from the Research Ethics Boards at both the University of BC and Health Canada.

After giving informed consent, participants completed an anonymous survey and gave a dried blood spot (DBS) sample. The questionnaire posed questions on demographics, drug use, sexual behaviour and health care information (e.g. utilization and disease status). The DBS was later used for HIV testing. In our analysis, we included only those individuals who answered the question: "At the present time, do you smoke cigarettes?" This question was part of the common set of questions asked in all M-track surveys and is a slightly modified version of the question used by the Canadian Tobacco-Use Survey [7]. Ethnic and cultural identity was asked as an open ended question which asked participants to identify the single ethnic or cultural group with which they most strongly identify.

We conducted bivariate analyses of the response to this question with sociodemographic characteristics, sexual orientation, HIV serostatus, and drug and alcohol use using the Wilcoxon Rank-Sum test for continuous variables and the Chi-square test or Fisher's Exact test, for categorical variables. Further, we constructed an explanatory logistic regression model to examine factors associated with current cigarette smoking. All variables which were associated with the outcome at $p<0.10$ in unadjusted analyses were considered for inclusion in the multivariate model. A backward stepwise procedure was followed and the Aikake Information Criterion was used to determine which variables were included in the final model. All analyses were conducted using SAS version 9.2 (SAS Corporation, Cary, NC).

RESULTS

Of the 2,805 people asked to participant in the study, 1,169 (41.7%) completed the survey. A total of 1,115 (95.4%) participants answered the current smoking question and were included in this analysis. Eligible participants were recruited primarily from bars (53.5%), and lesbian, gay, bisexual, or transsexual (LGBT) events (25.3%). Additional participants were recruited from businesses (11.9%), LBGT associations (4.8%) and bathhouses (4.4%).

Participants included in this analysis had a median age of 34 years (inter-quartile range: 26-44). Most participants had more than a high school education (n = 880, 79.5%) and reported an income of < $40,000 per year (n = 601, 54.7%). Of the reported ethnicity, 858 (82.1%) identified as North American/European, 73 (7.0%) as Asian, 47 (4.5%) as Aboriginal/American Indian, and 67 (6.4%) as other minority ethnicities. Most participants reported being HIV-negative (n = 834, 74.8%) while 188 (16.9%) reported being HIV-positive and 93 (8.3%) did not know their status. The majority of participants, 925 (83.1%), reported gay or queer sexual orientation, whereas 123 (11.1%) self-identified as bisexual, 31 (2.8%) as straight or other and 34 (3.1%) as two-spirited.

The current smoking prevalence within the sample was 413/1115 (37.0%). The proportion of current smoking by all MSM recruited from bars was 37.9% compared with 36.1% from all venues other than bars ($p=0.545$). However, the prevalence of smoking among venues other than bars was highly variable, ranging from 12.2% of survey respondents at bathhouses to 68.5% at LGBT associations ($p<0.001$). Self-reported sexual orientation as gay or queer was associated with the lowest prevalence of smoking (33.2%) compared with bisexual (50.4%), straight or other participant (64.5%), and two-spirit (64.7%) ($p<0.001$). (Table 1)

Non-smokers tended to be older (median age 35 vs. 32 year old; $p<0.001$) and were more likely to have completed more than a high school education (69.3%

of non-smokers vs. 30.6% of smokers; p=0.011). Characteristics associated with a lower prevalence of cigarette smoking included personal income >$60,000 (19.4% prevalence); Asian ethnicity (20.5%); self-reported as HIV negative (33.8%) and as having a gay or queer identity (33.2%).

The smoking prevalence among the HIV-positive individuals was 50.0% and was 38.8% among HIV-negative men. The prevalence of smoking was significantly higher in those reporting being HIV-positive compared with those reporting being HIV-negative or unknown serostatus in all age groups (p<0.01 for all). Among HIV-positive men participants aged 19 to 29 years old, 65.4% reported they were current smokers (Figure 1).

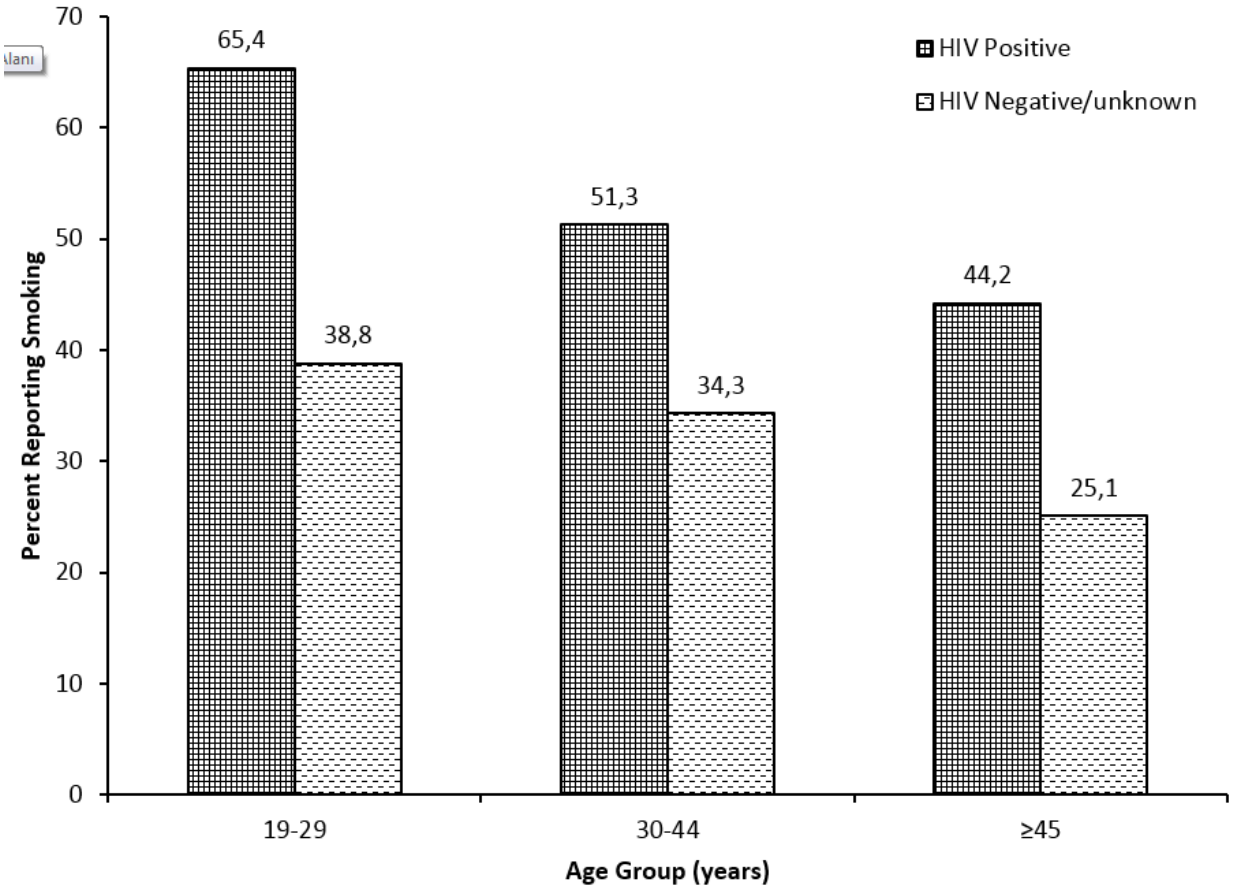

Figure 1. Smoking status by age category and HIV serostatus

Age (years)	19 - 29		30 - 44		≥45	
HIV status*	HIV+ Count (%)	Not HIV+ Count (%)	HIV+ Count (%)	Not HIV+ Count (%)	HIV+ Count (%)	Not HIV+ Count (%)
Non-smoker	9 (34.6)	237 (61.2)	37 (48.7)	239 (65.7)	48 (55.8)	131 (74.9)
Smoker	17 (65.4)	150 (38.8)	39 (51.3)	125 (34.3)	38 (44.2)	44 (25.1)
Total n	26	387	76	364	86	175
P-value†	0.007		0.005		0.002	

* Not HIV+ includes self-reported as HIV-negative or unknown HIV status

† P-value is for Chi square test of smoking status vs. HIV status within each age group

Table 1. Bivariate analysis of sociodemographic characteristics of smokers vs. non- smokers among 1115 participants in the ManCount Study.

	Non-smokers		Smokers		p-value
	n	Count (Row %) or median	n	Count (Row %) or median	
Age					
19-29	701	246 (59.6)	413	167 (40.4)	0.061
30-44		276 (62.7)		164 (37.3)	
≥45		179 (68.6)		82 (31.4)	
Median Age		35 (IQR*: 26-45)		32 (IQR: 26-42)	0.011
Education					
High school completion or less	700	89 (39.2)	407	138 (60.8)	<0.001
More than high school education		611 (69.4)		269 (30.6)	
Ethnicity					
Aboriginal/American Indian	662	17 (36.2)	383	30 (63.8)	<0.001
Asian		58 (79.5)		15 (20.5)	
North American/European		539 (62.8)		319 (37.2)	
Other		48 (71.6)		19 (28.4)	
Personal Income					
<$20,000	693	140 (48.4)	406	149 (51.6)	<0.001
$20,000-39,000		189 (60.6)		123 (39.4)	
$40,000-59,000		156 (65.0)		84 (35.0)	
≥$60,000		208 (80.6)		50 (19.4)	
Self-reported HIV serostatus					
HIV-negative	702	552 (66.2)	413	282 (33.8)	<0.001
HIV-positive		94 (50.0)		94 (50.0)	
Unknown serostatus		56 (60.2)		37 (39.8)	
Sexual orientation					
Bisexual	702	61 (49.6)	411	62 (50.4)	<0.001
Gay or queer		618 (66.8)		307 (33.2)	
Straight or other		11 (35.5)		20 (64.5)	
Two-spirit		12 (35.3)		22 (64.7)	
Venue of recruitment					
Association	702	17 (31.5)	413	37 (68.5)	<0.001
Bar		371 (62.1)		226 (37.9)	
Bathhouse		43 (87.8)		6 (12.2)	
Business		68 (51.1)		65 (48.9)	
Event		203 (72.0)		79 (28.0)	

*IQR: inter-quartile range

Substance use also differed substantially between smokers and non-smokers (Table 2). Smokers were more likely to have ever injected drugs (24.9% vs. 7.9%) and to ever have snorted drugs (77.5% vs. 47.7%). Smokers were also significantly more likely to have used all of the surveyed substances before or during sex within the past 6 months ($p<0.001$ for all). For example, 38.8% and 17.7% of smokers reported using cocaine and crystal meth, respectively, within 2 hours of sex compared with 12.5% and 3.9% of non-smokers.

In the adjusted logistic regression analysis (Table 3), age 19-29 years (AOR 1.54, 95% CI: 1.04-2.28) and 30 – 44 years, (AOR 1.55; 95% CI 1.06-2.25) and having less than a high school education (AOR 2.70, 95% CI: 1.91-3.80) were all associated with an increased odds of being a current smoker. In addition, reporting an annual income of $20,000 or less (AOR 2.93, 95% CI: 1.88-4.57), $20,000 – $39,000 (AOR = 2.24; 95% CI 1.47-3.42) and $40,000-$59,000 (AOR = 2.32; 95% CI 1.50-3.57) being HIV-positive (AOR 1.61, 95% CI: 1.10-2.34), and reporting a sexual orientation of straight or other (AOR 3.01, 95% CI: 1.26-7.20) were also associated with current smoking status. Asian ethnicity was associated with a reduced odds of being a current smoker (AOR = 0.43; 95% CI 0.23-0.79)

Table 2. Bivariate analysis of drug use by smokers vs. non-smokers (n=1115)

	Non-smokers		Smokers		p-value
	n	Count (Column %)	n	Count (Column %)	
Ever injected drugs other than steroids*					
Yes	668	53 (7.9)	402	100 (24.9)	<0.001
Ever snorted drugs					
Yes	682	325 (47.7)	405	314 (77.5)	<0.001
During the past 6 months ever used [substance] within 2 hours before sex or during sex (oral or anal) with a male partner?					
Alcohol					
Yes	681	506 (74.3)	403	324 (80.4)	0.026
Cannabis					
Yes	672	206 (30.7)	395	228 (57.7)	<0.001
Cocaine					
Yes	673	84 (12.5)	394	153 (38.8)	<0.001
Crystal meth					
Yes	670	26 (3.9)	396	70 (17.7)	<0.001
Poppers					
Yes	675	175 (25.9)	396	155 (39.1)	<0.001
Downers†					
Yes	672	27 (4.0)	392	40 (10.2)	<0.001
Party drugs‡					
Yes	673	116 (17.2)	394	136 (34.5)	<0.001

*Did not include steroids because some HIV-positive people inject steroids to treat cachexia
† 'downers' are depressant drugs
‡ We defined 'party drugs' as any of the following: ketamine/Special K, ecstasy/MDMA, crystal meth, amphetamines/speed, GHB and or psychedelics. Cocaine was excluded from this list because powdered cocaine was group together with crack cocaine/freebase, which is not a 'club drug.'

Table 3. Explanatory logistic regression model of current smoking status

	Unadjusted OR* (95 CI)	p-value	Adjusted OR (95 CI)	p-value
Age				
19-29	1.48 (1.07-2.06)	0.018	1.54 (1.04-2.28)	0.032
30-44	1.30 (0.94-1.80)	0.117	1.55 (1.06-2.25)	0.023
45+	1.00		1.00	
High school education or less	3.52 (2.60-4.76)	<0.001	2.70 (1.91-3.80)	<0.001
Ethnicity				
North American/European	1.00		1.00	
Asian	0.44 (0.24-0.78)	0.005	0.43 (0.23-0.79)	0.007
Aboriginal/American Indian	2.98 (1.62-5.49)	<0.001	1.38 (0.67-2.81)	0.381
Other	0.67 (0.39-1.16)	0.151	0.63 (0.36-1.11)	0.112
Personal Income				
<$20,000	4.43 (3.01-6.51)	<0.001	2.93 (1.88-4.57)	<0.001
$20,000-39,000	2.71 (1.85-3.97)	<0.001	2.24 (1.47-3.42)	<0.001
$40,000-59,000	2.24 (1.49-3.37)	<0.001	2.32 (1.50-3.57)	<0.001
≥$60,000	1.00			
Self-reported HIV seropositive	1.91 (1.39-2.62)	<0.001	1.61 (1.10-2.34)	0.014
Sexual orientation				
Gay or queer	1.00		1.00	
Bisexual	2.03 (1.39-2.97)	<0.001	1.54 (1.00-2.39)	0.051
Two-spirit	3.67 (1.79-7.50)	<0.001	2.08 (0.89-4.82)	0.090
Straight or other	3.63 (1.72-7.68)	<0.001	3.01 (1.26-7.20)	0.013

*OR: odds ratio

DISCUSSION

Our study found that 37.0% of a sample of more than 1000 MSM in Vancouver reported that they currently smoked cigarettes. This point estimate is more than double the smoking prevalence (16.0%) reported amongst the general male population over the age of 15 in BC for the same year (2009) when this study was completed. Across both genders, the prevalence of smoking among 20-25 year olds was approximately 18% in 2009 in BC [8].

The prevalence found in this study was similar to that found in the Toronto Rainbow Tobacco Survey (33%) in 2006 [4] but substantially lower than that found by a previous study conducted in Vancouver in 1999, known as the Vanguard Study [3]. However, Vanguard was limited to MSM 18 to 35 years old who had not previously tested HIV-positive. Among HIV negative participants in our study in that age-range, we found the prevalence of smoking to be 38.8%, substantially lower than the 54.5% reported by Vanguard. This suggests that while the prevalence of smoking among MSM in Vancouver is still much higher than in the general population, similar trends of declining prevalence may also occurring in this population.

In light of this finding, there is a continued need for targeted prevention and cessation programming for MSM in Vancouver. Such programming has been implemented in Vancouver in the past with positive outcomes. In the Proud to Quit campaign which ran in 2005 in Vancouver, about 20% of smokers reported attempts to quit as a result of the campaign [9]. Similarly, the Out to Quit program evaluation reported an overall cessation rate for at least 3 weeks of 23% [10]. These campaigns can be used as a framework for future MSM smoking cessation programs.

The reasons for the higher prevalence of smoking among MSM are not clear, although a recent systematic review suggested that the differences in tobacco use may be due to factors unique to sexual minorities, such as internalized homophobia (a negative concept of oneself due to the acceptance of negative societal beliefs about homosexuality), or due to higher rates of common risk factors among sexual minorities (e.g. stress, depression, alcohol use, victimization, and low socioeconomic status) [11]. Mood disorders have been shown to be more prevalent among LBGT Canadians than in the general population [12].Therefore, more general health promotion programs which address these issues may result in reduced uptake of cigarette smoking among younger MSM.

Notably, the prevalence of current smoking among HIV-positive participants in our sample was much higher than the HIV negative participants. Half of self-reported HIV-positive participants in our study reported being current smokers. While this is lower than most other studies of this sub-population where surveys have found the prevalence of cigarette smoking to be 54-70% [13-15], this is still alarmingly high. This again highlights the need to address cigarette smoking in this group of individuals, especially given the vulnerability of HIV infected individuals to cardiovascular disease [16,17]. Encouragingly, smoking cessation programs amongst HIV-positive individuals have been shown to be effective and to result in health benefits, including reduced HIV-related symptoms, cardiovascular risk, and bacterial pneumonia (reviewed in [18].

Substance use was also found to be associated with current smoking status. Substance use is a risk factor for acquiring HIV infection and is associated with riskier sexual practices [19]. The strong association of current smoking and substance use suggests that smoking may be a useful starting point for clinicians and patient to discuss other substance use, potential abuse, as well as the role of substances in terms of mediating HIV risk behavior. It is possible that patients may be more willing to disclose smoking status and thus, clinicians should take the opportunity to discuss substance use along with smoking cessation messages.

Our explanatory model explored correlates of smoking and found well-established predictors of smoking, such as low income, low educational attainment, were associated with smoking among MSM. Health promotion messages should therefore be continued to reduce the burden of smoking-related diseases among these more marginalized populations irrespective of sexual orientation and behavior.

In addition, we found that among MSM, self-identification of sexual orientation other than gay was associated with higher odds of smoking. Our results add to the body of evidence that bisexual men and women have higher rates of smoking compared with their homosexual and heterosexual counterparts [20,21]. However, the reasons for this difference have not yet been investigated and should be a priority for further research. Of note, our bivariate analyses found that the prevalence of smoking amongst individuals who reported their sexual identity as two-spirited (64.7%) and their ethnic/ cultural identity as Aboriginal or First Nations (63.8%) to be very high. However, we were unable to demonstrate an association with these variables and smoking in the multivariate model. This likely relates to the co-linearity of these identities among Aboriginal people, but should highlight the need for culturally appropriate tobacco reduction programs amongst aboriginal MSM, in particular.

The primary limitation of our study is that a venue-based time-place sampling method was used. Our

results may therefore not be generalizable to the entire MSM population in Vancouver, but only those men who attend the types of venues and events we sampled. Further, the majority of participants were recruited from bars, which may have led to an oversampling of smokers. However, the proportion of participants reporting current smoking recruited from venues other than bars was similar to the smoking rate amongst participants recruited from bars. As well, smoking in bars and restaurants has been banned in Vancouver since March 31, 2008 [8], four months before we began recruitment for this study, which may have limited this potential for oversampling smokers. Additional analyses which adjusted the prevalence of several parameters based on the frequency of attendance at the venues sampled found the point estimate for smoking prevalence to be almost identical (39%) to the crude prevalence [22]. Our study was cross-sectional in design, so we cannot determine the direction of the associations found here. As well, we had fairly small proportions of study subjects who did not report North American or European ethnicity or who did not identify as gay. This likely limited our ability to look for associations between these factors and smoking status. Lastly, we asked only a limited number of questions on current smoking status. Future studies should include questions on previous smoking, cessation attempts, and the perception of support from healthcare providers to quit smoking.

In summary, 37.0% of Vancouver MSM sampled in this survey reported current cigarette smoking, and among some sub-groups ranged as high as 60%. Smoking cessation programs targeted towards MSM are needed to reduce the burden of smoking among this population, particularly for HIV positive MSM.

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REFERENCES

1. Rehm J, Baliunas D, Brochu S, Fischer B, Gnam W, Patra J, et al. The costs of substance abuse in Canada 2002. Ottawa: Canadian Centre on Substance Abuse2006.
2. Health Canada. Canadian Tobacco Use Monitoring Survey (CTUMS) 2011. Ottawa [updated 17 Sept 2012; cited 2013 7 May 2013]; Available from: http://www.hc-sc.gc.ca/hc-ps/tobac-tabac/research-recherche/stat/ctums-esutc_2011-eng.php#taba.
3. Lampinen TM, Bonner SJ, Rusch M, Hogg RS. High prevalence of smoking among urban-dwelling Canadian men who have sex with men. J Urban Health. 2006 Nov;83(6):1143-50.
4. Clarke MP, Coughlin JR. Prevalence of smoking among the lesbian, gay, bisexual, transsexual, transgender and queer (LGBTTQ) subpopulations in Toronto--the Toronto Rainbow Tobacco Survey (TRTS). Can J Public Health. 2012 Mar-Apr;103(2):132-6.
5. Lifson AR, Neuhaus J, Arribas JR, van den Berg-Wolf M, Labriola AM, Read TR, et al. Smoking-related health risks among persons with HIV in the Strategies for Management of Antiretroviral Therapy clinical trial. Am J Public Health. 2010 Oct;100(10):1896-903.
6. Moore DM, Kanters S, Michelow W, Gustafson R, Hogg RS, Kwag M, et al. Implications for HIV prevention programs from a serobehavioural survey of men who have sex with men in Vancouver, British Columbia: the ManCount study. Can J Public Health. 2012 Mar-Apr;103(2):142-6.
7. Statistics Canada. Canadian Tobacco Use Monitoring Survey, Cycle 1, 2006. Ottawa, Canada: Statistics Canada,; 2006.
8. Reid JL H, Burkhalter R, Ahmed R,. Tobacco Use in Canada: Patterns and Trends 2011 Edition. Waterloo,ON: Propel Centre for PopulationHealth Impact, University of Waterloo.2011.
9. Lobdell J. The Proud to Quit Campaign: Report on a public evaluation survey. Vancouver: Vancouver Coastal Health Authority2006.
10. Dueck T. Out to Quit: A summary report of GBT men's smoking cessation groups for 2005/2006. Vancouver: Vancouver Coastal Health Authority2006.
11. Blosnich J, Lee JG, Horn K. A systematic review of the aetiology of tobacco disparities for sexual minorities. Tob Control. 2013 Mar;22(2):66-73.
12. Pakula B, Shoveller JA. Sexual orientation and self-reported mood disorder diagnosis among Canadian adults. BMC Public Health. [Research Support, Non-U.S. Gov't]. 2013;13:209.
13. Niaura R, Shadel WG, Morrow K, Tashima K, Flanigan T, Abrams DB. Human immunodeficiency virus infection, AIDS, and smoking cessation: the time is now. Clin Infect Dis. 2000 Sep;31(3):808-12.
14. Wallace JM, Rao AV, Glassroth J, Hansen NI, Rosen MJ, Arakaki C, et al. Respiratory illness in persons with human immunodeficiency virus infection. The Pulmonary Complications of HIV Infection Study Group. Am Rev Respir Dis. 1993 Dec;148(6 Pt 1):1523-9.
15. Tesoriero JM, Gieryic SM, Carrascal A, Lavigne HE. Smoking among HIV positive New Yorkers: prevalence, frequency, and opportunities for cessation. AIDS Behav.

2010 Aug;14(4):824-35.

16. D. A. D. Study Group, Sabin CA, Worm SW, Weber R, Reiss P, El-Sadr W, et al. Use of nucleoside reverse transcriptase inhibitors and risk of myocardial infarction in HIV-infected patients enrolled in the D:A:D study: a multi-cohort collaboration. Lancet. 2008 Apr 26;371(9622):1417-26.
17. Phillips AN, Carr A, Neuhaus J, Visnegarwala F, Prineas R, Burman WJ, et al. Interruption of antiretroviral therapy and risk of cardiovascular disease in persons with HIV-1 infection: exploratory analyses from the SMART trial. Antivir Ther. 2008;13(2):177-87.
18. Rahmanian S, Wewers ME, Koletar S, Reynolds N, Ferketich A, Diaz P. Cigarette smoking in the HIV-infected population. Proc Am Thorac Soc. 2011 Jun;8(3):313-9.
19. Lowry R, Holtzman D, Truman BI, Kann L, Collins JL, Kolbe LJ. Substance use and HIV-related sexual behaviors among US high school students: are they related? Am J Public Health. 1994 Jul;84(7):1116-20.
20. Balsam KF, Beadnell B, Riggs KR. Understanding sexual orientation health disparities in smoking: a population-based analysis. Am J Orthopsychiatry. 2012 Oct;82(4):482-93.
21. American Lung Association. Smoking out a deadly threat: tobacco use in the LGBT community: American Lung Association2010.
22. Gustafson P, Gilbert M, Xia M, Michelow W, Robert W, Trussler T, et al. Impact of Statistical Adjustment for Frequency of Venue Attendance in a Venue-based Survey of Men Who Have Sex With Men. Am J Epidemiol. 2013 May 15;177(10):1157-64.