

Missing Women Commission of Inquiry

Thomas Kerr

Expert Report and Appendices

Missing Women Commission of Inquiry	
EXHIBIT	No: 9
Date:	October 19, 2011
	Registrar

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DR. THOMAS KERR

Tab	Description
1.	Instruction Letter dated August 29, 2011
2.	Curriculum Vitae
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4.	References Cited in Report
A.	DeBeck, K., Shannon, K., Wood, E., Li, K., Montaner, J., & Kerr, T. (2007). Income generating activities of people who inject drugs. <i>Drug Alcohol Depend</i> , 91(1), 50-56.
B.	Debeck, K., Wood, E., Qi, J., Fu, E., McArthur, D., Montaner, J., & Kerr, T. (2011). Interest in low-threshold employment among people who inject illicit drugs: Implications for street disorder. <i>The International Journal of Drug Policy</i> , 22(5), 376-384.
C.	Fairbairn, N., Small, W., Shannon, K., Wood, E., & Kerr, T. (2008). Seeking refuge from violence in street-based drug scenes: women's experiences in North America's first supervised injection facility. <i>Soc Sci Med</i> , 67(5), 817-823.
D.	Fairbairn, N., Wood, E., Stoltz, J. A., Li, K., Montaner, J., & Kerr, T. (2008). Crystal methamphetamine use associated with non-fatal overdose among a cohort of injection drug users in Vancouver. <i>Public Health</i> , 122(1), 70-78.
E.	Fast, D., Shoveller, J., Shannon, K., & Kerr, T. (2010). Safety and danger in downtown Vancouver: understandings of place among young people entrenched in an urban drug scene. <i>Health & Place</i> , 16(1), 51-60.
F.	Fast, D., Small, W., Wood, E., & Kerr, T. (2009). Coming 'down here': young people's reflections on becoming entrenched in a local drug scene. <i>Soc Sci Med</i> , 69(8), 1204-1210.
G.	Hoda, Z., Kerr, T., Li, K., Montaner, J. S., & Wood, E. (2008). Prevalence and correlates of jugular injections among injection drug users. <i>Drug Alcohol Rev</i> , 27(4), 442-446.
H.	Urban Health Research Initiative, (2009). Drug situation in Vancouver: Vancouver: Urban Health Research Initiative.
I.	Johnston, C. L., Callon, C., Li, K., Wood, E., & Kerr, T. (2010). Offer of financial incentives for unprotected sex in the context of sex work. <i>Drug Alcohol Rev</i> , 29(2), 144-149.
J.	Kerr, T., Marshall, B. D., Miller, C., Shannon, K., Zhang, R., Montaner, J. S., & Wood, E. (2009). Injection drug use among street-involved youth in a Canadian

	setting. <i>BMC Public Health</i> , 9, 171. doi: 1471-2458-9-171 [pii] 10.1186/1471-2458-9-171
K.	Kerr, T., Stoltz, J. A., Marshall, B. D., Lai, C., Strathdee, S. A., & Wood, E. (2009). Childhood trauma and injection drug use among high-risk youth. <i>J Adolesc Health</i> , 45(3), 300-302.
L.	Lloyd-Smith, E., Rachlis, B. S., Tobin, D., Stone, D., Li, K., Small, W., . . . Kerr, T. (2010). Assisted injection in outdoor venues: an observational study of risks and implications for service delivery and harm reduction programming. <i>Harm Reduct J</i> , 7, 6.
M.	Lloyd-Smith, E., Wood, E., Li, K., Montaner, J. S., & Kerr, T. (2009). Incidence and determinants of initiation into cocaine injection and correlates of frequent cocaine injectors. <i>Drug Alcohol Depend</i> , 99(1-3), 176-182.
N.	Marshall, B. D., Fairbairn, N., Li, K., Wood, E., & Kerr, T. (2008). Physical violence among a prospective cohort of injection drug users: a gender-focused approach. <i>Drug & Alcohol Depend</i> , 97(3), 237-246. d
O.	Shannon, K., Kerr, T., Allinott, S., Chettiar, J., Shoveller, J., & Tyndall, M. W. (2008). Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work. <i>Soc Sci Med</i> , 66(4), 911-921.
P.	Shannon, K., Kerr, T., Marshall, B., Li, K., Zhang, R., Strathdee, S. A., . . . Wood, E. (2010). Survival sex work involvement as a primary risk factor for hepatitis C virus acquisition in drug-using youths in a canadian setting. <i>Archives of Pediatrics & Adolescent Medicine</i> , 164(1), 61-65.
Q.	Shannon, K., Kerr, T., Strathdee, S. A., Shoveller, J., Montaner, J. S., & Tyndall, M. W. (2009). Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers. <i>BMJ</i> , 339, b2939.
R.	Stoltz, J.-A. M., Shannon, K., Kerr, T., Zhang, R., Montaner, J. S., & Wood, E. (2007). Associations between childhood maltreatment and sex work in a cohort of drug-using youth. <i>Sol Sci & Med</i> , 65(6), 1214-1221.

**MISSING
WOMEN
COMMISSION OF
INQUIRY**

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Thomas Kerr
Co-Director - Addiction and Urban Health Research Initiative, VIDUS
BC Centre for Excellence in HIV & AIDS
608 – 1081 Burrard Street
Vancouver, BC V6Z 1Y6

August 29, 2011

VIA EMAIL

Dear Dr. Kerr:

Re: Missing Women Commission of Inquiry - Expert Report

I write to you on behalf of the Missing Women Commission of Inquiry to request your independent expert opinion with respect to drug dependency and women involved in street sex trade in the downtown eastside of Vancouver.

Your expert report relates to the Commission's mandate, in particular Term of Reference 4(a): "to conduct hearings, in or near the City of Vancouver, to inquire into and make findings of fact respecting the conduct of the missing women investigations."

The missing women investigations are defined as "the investigations conducted between January 23, 1997 and February 5, 2002, by police forces in British Columbia respecting women reported missing from the Downtown Eastside of the city of Vancouver."

We ask that your independent expert report be set out under the following headings:

1. Background (your name, address and area of expertise);
2. Qualifications (a detailed statement of your professional qualifications relating to your area of expertise and the subject matter of your opinion);
3. Opinion (your independent objective opinion including a description of the factual assumptions on which your opinion is based and a description of any research you conducted that led you to form your opinion); and
4. Appendices (a list of all documents, if any, you relied on including this letter).

Please be advised that as a qualified expert you are not permitted to:

- express opinions beyond the scope of your expertise;
- allocate fault or responsibility to a particular participant in the Inquiry; or
- advance arguments in the for or against a particular interest guise of opinions.

Unless otherwise indicated, please answer these questions as they relate to the time period 1997-2002.

1. Describe the research you have conducted in the DTES with respect to drug dependent women involved in street sex trade.
2. What were the common characteristics of the women involved in street sex trade in the DTES?
3. Which drugs were used by women involved in street sex trade in the DTES?
4. What is drug dependency?
5. What is the treatment and prognosis for drug dependency?
6. To what extent were women involved in street sex trade as a result of drug dependency?
7. What is drug withdrawal and what are the symptoms?
8. Does drug withdrawal increase the risk of violence for women involved in street sex trade? If so, how?
9. Is there any correlation between the type and level of drug use and the vulnerability to violence?

Please provide your written report by August 31st, 2011.

If you have any questions regarding the nature and scope of your engagement, please contact us.

Yours truly,



Missing Women Commission of Inquiry

Per:

Karey Brooks

Associate Commission Counsel

University of British Columbia	
Curriculum Vitae	
Date:	February 23, 2011
Initial:	

SURNAME:	Kerr	FIRST NAME:	Thomas
DEPARTMENT/SCHOOL:	Medicine / University of British Columbia		
FACULTY:	Division of AIDS		
JOINT APPOINTMENTS:	Director, Urban Health Research Initiative, British Columbia Centre for Excellence in HIV/AIDS		

PRESENT RANK:	Associate Professor	SINCE:	July 1, 2010
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POST-SECONDARY EDUCATION

University or Institution	Degree	Subject Area	Dates
Capilano College/Open University	BMT	Music Therapy	1994
University of Victoria	MA	Counselling Psychology	September 1997
University of Victoria	PhD	Health Psychology	April 2003

EMPLOYMENT RECORD

Present

University, Company or Organization	Rank or title	Dates
University of British Columbia, Department of Medicine, Division of AIDS	Assistant Professor	since July 2006
British Columbia Centre for Excellence in HIV/AIDS – Urban Health Research Initiative	Director	since September 2008

Prior

University, Company or Organization	Rank or title	Dates
The Dr. Peter Centre (Adult AIDS Day Program & Residence)	Coordinator of Practice Standards and Research/Counsellor	1997 - 2000
School District #40, New Westminster, Adult Continuing Education, Community Education	Counsellor	1998 - 1999
The Canadian Palliative Care Association, Health Canada	Research Consultant/Writer	1999

University, Company or Organization	Rank or title	Dates
Vancouver HIV/AIDS Care Coordinating Committee	Research Consultant	2000
Harm Reduction Action Society	Research Consultant/Writer	2000
HIV Social & Behavioural & Epidemiological Studies Unit, University of Toronto	Research Coordinator	2001 – 2002
Balfour Consulting Group (Victoria)	Research Consultant	2001 – 2002
Health Canada (HIV/AIDS Division)	Research Consultant/Writer	2001 – 2002
Vancouver Area Network of Drug Users (VANDU)	Research Consultant/Writer	2001 – 2003
University of Victoria	Instructor	2002
British Columbia Centre for Excellence in HIV/AIDS	Research Coordinator	2002 – 2003
Thai Drug Users' Network (Bangkok)	Research Consultant/Writer	2003
Canadian HIV/AIDS Legal Network	Director of Health Research & Policy	2003 – 2004
University of British Columbia, Department of Medicine	Clinical Assistant Professor	2004 - 2006
British Columbia Centre for Excellence in HIV/AIDS	Research Scientist	2004 - 2008
University of British Columbia, Department of Medicine, Division of AIDS	Assistant Professor	2006 - 2010

TEACHING

Courses Taught

Year	Session	Course Number	Scheduled Hours	Class Size	Hours Taught			
					Lecture	Tutorials	Labs	Other
2001	2001	Law and Ethics in Counselling, Antioch University	24	1				13

Year	Session	Course Number	Scheduled Hours	Class Size	Hours Taught			
					Lecture	Tutorials	Labs	Other
2002	2002	ED-D 417, Helping Relationships, Teaching Assistant, University of Victoria		32	60			50
2004	2004	HCEP 504, Advanced Epidemiological Methods, University of British Columbia		6	12			7
2007	2007	SPH & IMG R1s: EBM: Therapeutic Intervention & Clinical Guidelines, University of British Columbia	2	15				8
2008	Fall	Research Elective in Urban Health (Medicine), University of British Columbia	4 weeks	1	3	15	1	5
2008	Fall	Research Elective in Urban Health (Medicine), University of British Columbia	4 weeks	1	3	15	1	4
2009	Spring	Research Elective in Urban Health (Medicine), University of British Columbia	4 weeks	1	3	15	1	4
2010	Spring	Research Elective in Urban Health (Medicine), University of British Columbia	4 weeks	1	6	20	2	2
2010	Spring	Research Elective in Urban Health (Medicine), University of British Columbia	2 weeks	1	3	15		5
2010	Spring	Research Elective in Urban Health (Medicine), University of British Columbia	2 weeks	1	3	15		5
2010	Summer	Research Elective in Urban Health (Medicine), University of British Columbia	4 weeks	1	6	20	2	

Year	Session	Course Number	Scheduled Hours	Class Size	Hours Taught			
					Lecture	Tutorials	Labs	Other
2010	Summer	Research Elective in Urban Health (Medicine), University of British Columbia	6 weeks	1	6	20	2	
2011	Winter	Research Elective in Urban Health (Medicine), University of British Columbia	12 weeks	1	12	20	2	15

Students Supervised

Postdoctoral Fellows Supervised

Student Name	Program Type	Year		Principal Supervisor	Committee members
		Start	Finish		
Will Small	Postdoctoral fellow	2010	ongoing	T Kerr, L Maher	N/A
Brandon Marshall	Postdoctoral fellow	2010	ongoing	T Kerr, S Galea	N/A
Tara Lyons	Postdoctoral Fellow	2011	ongoing	T Kerr, K Shannon	N/A
Lianping Ti	Postdoctoral Fellow	2011	ongoing	T Kerr	N/A

Graduate Students Supervised – Doctoral or Masters Committee Membership

Student Name	Program Type	Year		Principal Supervisor	Committee members
		Start	Finish		
Elisa Lloyd-Smith	Epidemiology, PhD	2004	2009	R Hogg, Sheps	T Kerr, M Tyndall
Kate Shannon	Epidemiology, PhD	2005	2008	M Tyndall, T Kerr	J Shoveller
Beth Rachlis	Epidemiology, MSc	2005	2008	R Hogg	T Kerr, E Wood

Will Small	Interdisciplinary Studies Graduate Program, PhD	2005	2010	J Shoveller	E Wood, T Kerr, M Tyndall
Brandon Marshall	Epidemiology, MSc	2006	2008	T Kerr, J Shoveller	J Buxton, T Patterson
MJ Milloy	Epidemiology, MSc	2006	2008	T Kerr, R Mathias	J Buxton
Alan Wood	Nursing	2007	2010	P Rodney, T Kerr	V Smye
Dan Werb	School of Population and Public Health, MSc	2008	2010	J Buxton	T Kerr
Brandon Marshall	Epidemiology, PhD	2008	2010	T Kerr, J Shoveller	J Buxton, T Patterson
Cody Callon	Social Work, MSW	2008	ongoing	T Kerr, G Charles	K Shannon
Danya Fast	Interdisciplinary Studies Graduate Program, PhD	2009	ongoing	T Kerr, J Shoveller	D Culhane
Andrea Krusi	Interdisciplinary Studies Graduate Program, PhD	2009	ongoing	T Kerr, K Shannon	T Rhodes, V Smye
Kanna Hayashi	Interdisciplinary Studies Graduate Program, PhD	2009	ongoing	T Kerr, J Buxton	J Csete
Aranka Anema	Experimental Medicine Program, PhD	2009	ongoing	JS Montaner	B Hogg, S Weiser, T Kerr
Rachel McGovern	HIV/AIDS Research, PhD	2010	ongoing	R Harrigan	P Phillips, T Kerr, S Tebbutt

Michaela Montaner	Interdisciplinary Studies Graduate Program, Masters	2011	ongoing	T Kerr	
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Graduate and Undergraduate Students: Non-committee-based Supervision

Student Name	Program Type	Year		Description of Supervision Provided
		Start	Finish	
Courtney Collins	CIHR Translational Research in Infectious Disease, Undergrad	2004	2004	Supervised summer student research placement, including overseeing the preparation of two research manuscripts for peer review
Cody Callon	Psychology, Directed Undergrad Studies	2005	2005	Supervised single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Benjamin Maas	Summer Student	2005	2006	Supervised summer student research placement, including overseeing the preparation of two research manuscripts for peer review
Nadia Fairbairn	Biopsychology, Undergrad	2005	2006	Supervised single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Bruce McKnight	Medical Student (research practicum)	2005	2006	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Steven Petrar	Medical Student (research practicum)	2005	2006	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
David Blondin	Medical Student (research practicum)	2005	2006	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Zia Hoda	Medical Student (research practicum)	2006	2007	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Ian McKnight	Medical Student (research practicum)	2006	2007	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Ryan Blades	Undergraduate Student (biology)	2006	2007	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review

Kora DeBeck	Public Policy, MSc	2006	2007	Supervised single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Lindsey Richardson	Sociology, MSc	2006	2008	Supervised single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Nadia Fairbairn	Medical Student (research practicum)	2007	2007	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Liz Ainsworth	Epidemiology, Research Student	2007	2008	Supervised single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Kora DeBeck	Interdisciplinary Studies, PhD	2007	2010	Supervised, as a non-committee member, primary research undertaken for student's doctoral dissertation (Supervisor: J Montaner)
Caitlin Johnston	Health Science, MSc (Directed Research Studies – Simon Fraser University)	2008	2008	Supervised single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Andrea Krusi	Health Science, MSc (Directed Research Studies – Simon Fraser University)	2008	2008	Supervised, as a non-committee member, primary research undertaken for student's masters thesis
Brian Cho	Research Elective in Urban Health (Medicine)	2008	2008	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Christina Kim	Research Elective in Urban Health (Medicine)	2008	2008	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Justin Yeung	Research Elective in Urban Health (Medicine)	2008	2008	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Marla McKnight	Research Elective in Urban Health (Medicine)	2008	2009	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Lindsey Richardson	Sociology, PhD	2008	ongoing	Supervised, as a non-committee member, primary research undertaken for student's doctoral dissertation (Supervisor J Gershuny)

Steven Yau	Research Elective in Urban Health (Medicine)	2009	2009	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Nadia Fairbairn	Medical Student	2009	2010	Co-supervised (with Dr. E Wood) single-term directed research course, including overseeing the preparation of a research manuscript for peer review
Laura Kuyper	Research Elective in Urban Health (Medicine)	2010	2010	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Steven Co	Research Elective in Urban Health (Medicine)	2010	2010	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Georgia Walton	Research Elective in Urban Health (Medicine)	2010	2010	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Seonaid Nolan	Research Elective in Urban Health (Medicine)	2010	2010	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Nadia Fairbairn	Research Elective in Urban Health (Medicine)	2010	2010	Co-supervised (with Dr. E Wood) single-term medical research elective, including overseeing the preparation of a research manuscript for peer review
Stuart Kinner	Visiting Postdoctoral fellow, Burnet Institute	2010	2010	Directly supervised a single term internship including overseeing the preparation of a research manuscript for peer review
Sassan Sangari	Research Elective in Urban Health (Medicine)	2011	2011	Supervised a single-term medical research elective, including overseeing the preparation of a research manuscript for peer review

Visiting Lectures

- 1 "Music therapy with children & adolescents in mental health." Faculty of Education, University of Victoria. Victoria, British Columbia. August 18, 1996.
- 2 "Cognitive reframing in counselling." Faculty of Education, University of Victoria. Victoria, British Columbia. October 6, 1997.
- 3 "Ethical decision-making." Bachelor of Music Therapy Program, Capilano College, North Vancouver, British Columbia. February 2, 1999.
- 4 "Constructivism in psychology." Faculty of Education, University of Victoria. Victoria, BC. September 14, 1999.
- 5 "Ethical decision-making." Capilano College. North Vancouver, British Columbia. February 15, 2000.
- 6 "HIV/AIDS & ethics." IHHS 402, Interprofessional Elective in HIV Prevention and Care, University of British Columbia. Vancouver, British Columbia. June 16, 2001.

- 7 "Community-based research." Faculty of Education, University of Victoria. Victoria, British Columbia. November 27, 2002.
- 8 "Safe injection facilities as a harm reduction intervention." School of Social Work, University of British Columbia. Vancouver, British Columbia. November 21, 2002.
- 9 "Prisons, HIV/AIDS, and harm reduction." Concordia University. Montreal, Quebec. January 15, 2004.
- 10 "The scientific evaluation of supervised injection." IHHS 402, Interprofessional Elective in HIV Prevention and Care, University of British Columbia. Vancouver, British Columbia. June 17, 2005.
- 11 "Politics and public health: evidence from the scientific evaluation of Vancouver's supervised injection site". Simon Fraser University. Vancouver, British Columbia. February 27, 2007.
- 12 "Injection drug use, human rights and Vancouver's supervised injection facility". University of Ottawa. Ottawa, Ontario. March 19, 2007.
- 13 "Knowledge transfer, communications and working with media." SPPH 504 Applied Epidemiological Methods, University of British Columbia. Vancouver, British Columbia. November 13, 2007.
- 14 "The role of science and politics in the development of evidence-based public health policy: the case of Vancouver's supervised injection site". University of Ottawa. Ottawa, Ontario. November 20, 2007.
- 15 "Issues in public health." SPPH 525 Issues and Concepts in Public Health, University of British Columbia. Vancouver, British Columbia. October 6, 2008.
- 16 "The Evaluation of Insite and other stories: talking about public health." SPPH 504 Applied Epidemiological Methods, University of British Columbia. Vancouver, British Columbia. November 4, 2008.
- 17 "Evaluating Insite." IHHS 402, Interprofessional Elective in HIV Prevention and Care, University of British Columbia. Vancouver, British Columbia. June 17, 2009.
- 18 "The evaluation of Insite and other stories: talking about public health." SPPH 504 Applied Epidemiological Methods, University of British Columbia. Vancouver, British Columbia. November 3, 2009.
- 19 "The evaluation of Insite and other stories: talking about public health." SPPH 525 Issues and Concepts in Public Health. University of British Columbia. Vancouver, British Columbia. November 30, 2009.
- 20 "Evaluating new initiatives: the supervised consumption site." IHHS 402, Interprofessional Elective in HIV Prevention and Care, University of British Columbia. Vancouver, British Columbia. June 16, 2010.
- 21 "The science and politics of Insite: inside the evaluation of Vancouver's supervised injection site." Harm Reduction Continuing Education Course. York University. Toronto, Ontario. August 24, 2010.
- 22 "Harm reduction and public health - lessons learned from Insite." SPPH 525 Issues and Concepts in Public Health. University of British Columbia. Vancouver, British Columbia. October 4, 2010.
- 23 "Knowledge translation and research communications-lessons from Insite." SPPH 504 Applied Epidemiological Methods, University of British Columbia. Vancouver, British Columbia. November 9, 2010.

SCHOLARLY AND PROFESSIONAL ACTIVITIES

Grants

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
Canadian Music Therapy Trust Fund	Music-assisted Cognitive Reframing	C	\$1600	1996 - 1997	T Kerr	
Canadian Working Group on HIV/AIDS and Rehabilitation	Issues of Engagement in Rehabilitation Among Persons Living with HIV/AIDS	C	\$14,130	1999 - 2000	T Kerr	

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
Health Canada, Hepatitis C Division Research Grant	A Case Study of the Vancouver Area Network of Drug Users (VANDU)	NC	\$10,000	2000	T Kerr	
CIHR	Development and Preliminary Validation of a Quality of Life Instrument for Injection Drug Users	C	\$46,581	2002-2003	A Palepu	T Kerr, M Tyndall, A Hubley
CIHR	Feasibility study of safe injection facilities in Vancouver	C	\$36,446	2002 - 2003	M Tyndall	T Kerr, A Palepu, D Small, E Wood
Vancouver Coastal Health	Community Health and Safety Evaluation (CHASE) Project	C	\$100,000	2002-2005	M Tyndall	T Kerr, E Wood, JS Montaner
Health Canada	Needs Assessment for a Safer Injection Facility in Ottawa	C	\$46,236	2004-2006	L Leonard	T Kerr C Strike
Health Canada	Vancouver Supervised Injection Site Evaluation	NC	\$513,000	2003 - 2006	T Kerr, E Wood,	J Montaner M Tyndall
US National Institutes of Health (NIH) Operating Grant	Evaluating the natural history of injection drug use	C	\$515,408 (USD)	2004 - 2009	E Wood, T Kerr,	P Spittal, M Schechter, R Hogg, JS Montaner, R Harrigan, D Patrick
CIHR Operating Grant	The Vancouver Injection Drug Users Study: A Programme of study of HIV and hepatitis C and other harms related to injection drug use	C	\$158,000	2004 - 2009	E Wood	T Kerr, P Spittal, M Schechter, R Hogg, JS Montaner, R Harrigan, D Patrick
Canadian Foundation for AIDS Research	Investigating Barriers to HIV/AIDS Care Among Injection Drug Users	C	\$60,000	2005 - 2007	E Wood, T Kerr	R Hogg, JS Montaner, J Stoltz, S Strathdee, A Palepu, M Tyndall, R Harrigan
US National Institutes of Health	HAART use, methamphetamine exposure and HIV resistance among injection drug users	C	\$100,017 (USD)	2005 - 2007	E Wood	T Kerr, R Hogg, JS Montaner, J Stoltz, S Strathdee, A Palepu, M Tyndall, R Harrigan
CIHR	MAKA initiative: HIV prevention and care among women survival sex workers	C	\$94,733	2005 - 2008	M Tyndall	T Kerr, K Gibson, J McGuire, A Palepu, C Patton, N Press, C Schooner, E Wood

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
CIHR Operating Grant	Enhancing uptake and sustainability of HIV care and antiretroviral therapy among survival sex workers	C	\$125,074	2006	M Tyndall	V Bright, K Gibson, T Kerr, T Orchard, A Palepu, K Shannon, E Wood
Michael Smith Foundation for Health Research Establishment Grant	An investigation of injection drug use and HIV infection among drug using youth	C	\$46,406	2006 - 2009	T Kerr	
CIHR Operating Grant	Evaluating a peer-driven safer injecting education program	C	\$88,767	2006 - 2009	T Kerr	JS Montaner, J Stoltz, M Tyndall, E Wood, N Fairbairn, D Tobin, M Oleson, W Small
CIHR Operating Grant	Exploring the natural history of injection drug use: A qualitative study of social and environmental influences	C	\$29,233	2006 - 2009	T Kerr	E Wood, C Duff, W Small, JS Montaner, J Stoltz, J Shoveller
CIHR Operating Grant	The impact of antiretroviral care on the health and well being of persons infected with HIV/AIDS	C	\$173,246	2006 - 2009	R Hogg	T Kerr, JS Montaner, E Wood
CIHR New and Emerging Team Grant	Vancouver multi-disciplinary collaboration of injection drug use researchers	C	\$169,676	2006 - 2010	T Kerr	Wood E, M Tyndall, S Strathdee, D Marsh, J Stoltz, A Palepu
CIHR Operating Grant	Investigating and addressing barriers to human immunodeficiency virus (HIV) and hepatitis C virus (HCV) care among injection drug users	C	\$157,952	2006 - 2011	E Wood	T Kerr, R Harrigan, R Hogg, JS Montaner, A Palepu, J Stoltz, M Tyndall
CIHR	The Scientific Evaluation of Supervised Injecting (SEOSI) Cohort	C	\$239,140	2007-2010	T Kerr	E Wood, M Tyndall, JS Montaner
US National Institutes of Health	Impacts of universal access to HIV/AIDS care among HIV+ Injection Drug Users	C	\$433,866	2007-2012	E Wood	T Kerr, JS Montaner, A Palepu, R Harrigan, D Bangsberg, S Strathdee, J Stoltz
CIHR	Meetings, Planning and Dissemination Grant: Knowledge Translation	C	\$24,217	2008-2009	K Shannon, M Tyndall	K Gibson, T Kerr, A Palepu, C Patton, C Schooner, E Wood

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
CIHR Synthesis Grant: Knowledge Translation	Defining evidence-based strategies for HIV treatment in injection drug users	C	\$66,799	2008-2009	E Wood, T Kerr	
CIHR HIV/AIDS CBR Program Catalyst Grant	Mapping and contextualizing public sex work spaces and their impact on HIV transmission dynamics: a community-based pilot research project	C	\$24,870	2009-2010	K Shannon	K Deering, M Tyndall, J Shoveller, T Kerr
CIHR	Meetings, Planning and Dissemination Grant: Knowledge Translation	C	\$36,500	2009 - 2010	E Wood	K DeBeck, D MacPherson, W Small, R Harrigan, D Marsh, R Hogg, JS Montaner, T Kerr, J Shoveller
US National Institutes of Health	Loss of intestinal barrier function in HIV infection in IDU's	C	\$199,344	2009-2011	E Wood	T Kerr, R Harrigan, A Levine
CIHR	Exploring the natural history of injection drug use: a qualitative study of social and environmental influences	C	\$77,447	2009-2012	T Kerr	K Shannon, L Maher, J Shoveller, W Small, E Wood
National Health and Medical Research Council	The natural history of injecting drug use among IDU in Melbourne	C	\$177,089	2009-2013	P Dietze	C Aitken, D Jolley, M Hickman, T Kerr, M Stooze
US National Institutes of Health	Evaluating the natural history of injection drug use (VIDUS II)	C	\$472,850	2009-2014	T Kerr	E Wood, J Buxton, R Harrigan, R Hogg, JS Montaner, A Palepu, D Patrick, K Shannon, J Shoveller, M Tyndall
CIHR	Evaluating the role of structural inequities, gender-based violence, and power in shaping STI/HIV transmission dynamics in public place-based sex work	C	\$75,000	2009-2014	K Shannon	K Deering, T Kerr, JS Montaner, J Shoveller, M Tyndall, E Wood
US National Institutes of Health	HAART as a complementary prevention strategy to curb the HIV epidemic in the correctional system	C	\$92,152	2010	E Wood	T Kerr, V Lima, JS Montaner
M.A.C. AIDS Fund	A Scientific Initiative to Improve the Health of Drug Users Affected by HIV through Public Education about Harm Reduction	C	\$99,748	2010-2011	E Wood	T Kerr

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
CIHR	Research to action: a knowledge translation project addressing the harms of unsafe injecting	C	\$38,844	2010-2011	T Kerr	E Wood, C Callon, K DeBeck, W Small, D Tobin
CIHR	Measuring the impact of an ASO-based integrated model of HIV/AIDS healthcare on health outcomes	C	\$28,840	2010-2011	R Turje Baltzer	R Barrios, T Kerr, P McDougall, C Strike
National Health and Medical Research Council	Hepatitis C vaccine preparedness study: investing in infectious disease prevention	C	\$263,908	2010-2013	L Maher	M Hellard, M Prins, A Madden, T Kerr, K Page
CIHR	A partnership to improve health systems and prevent harms among crack cocaine users: The RECRUIT trial	C	\$116,666	2010-2013	E Wood	P Kendall, J Buxton, R Elliott, D MacPherson, D Marsh, JS Montaner, K DeBeck, B Fischer, G Guyatt, T Kerr, E Mills, K Shannon, S Strathdee, D Werb
CIHR	Investigating and addressing injection drug use and other harms among street-involved youth: The ARYS Project	C	\$197,947	2010-2015	E Wood	J Buxton, B Marshall, K Shannon, S Hadland, JS Montaner, J Shoveller, R Harrigan, T Patterson, S Strathdee, T Kerr, E Roy, M Tyndall
US National Institutes of Health (NIH)	Initiation of injection drug use and HIV risks among street-involved youth	C	\$415,115	2010-2015	E Wood	T Kerr, J Buxton, R Harrigan, B Marshall, JS Montaner, T Patterson, E Roy, K Shannon, J Shoveller, S Strathdee, M Tyndall
US National Institutes of Health (NIH)	Social and structural context of HIV/STI risk among FSWs	C	\$445,524	2010-2015	K Shannon	T Kerr, E Wood, S Strathdee, JS Montaner, J Shoveller, M Tyndall, G Ogilvie, A Browne, T Patterson, S Aral, M Rusch

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
The Open Society Institute	Mitsampan Community Research Knowledge Translation Project	C	\$57,340 (USD)	2011	T Kerr	K Hayashi
CIHR	The Vancouver Interdisciplinary Collaboration on Supervised Drug Consumption Research	C	\$154,316	2011-2016	T Kerr	B Fischer, JS Montaner, M Tyndall, K Shannon, E Wood

Contracts

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
Health Canada	"Reaching out" - An Evaluation of the Vancouver Area Network of Drug Users (VANDU)	C	\$15,000	2002	T Kerr, E Wood	
Vancouver Coastal Health	Continued Evaluation of Insite: North America's first SIF	C	\$497,000	2006-2010	T Kerr, E Wood	M Tyndall, JS Montaner
BC Centre for Disease Control	A Review of Harm Reduction Interventions	C	\$10,000	2006	T Kerr, E Wood	
Vancouver Coastal Health	Vancouver Urgent Response Centre (URT) Evaluation	C	\$90,000	2006-2007	T Kerr, E Wood	

Awards

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
Health Canada/ National Health Research & Development	Doctoral Fellowship	C	\$18,000	2000 - 2001	T Kerr	
University of Victoria	President's Research Award	C	\$2000	2001	T Kerr	
Canadian Institutes for Health Research (CIHR)	Doctoral Fellowship	C	\$18,000	2001 - 2002	T Kerr	
Canadian Association for HIV/AIDS Research	New Investigator Award – Social Science Track	C	\$1000	2002	T Kerr	
Michael Smith Foundation for Health Research	Scholar Award	C	\$45,000	2006 - 2011	T Kerr	

Canadian Institutes for Health Research (CIHR)	New Investigator Award	C	\$50,000	2006 - 2011	T Kerr	
University of British Columbia	President's Award for Public Education Through Media	C	\$3,000	2007	T Kerr	
Canadian Institutes for Health Research (CIHR)	National Award for Knowledge Translation	C	\$100,000	2007	T Kerr	
Providence Health Care	Research Mission Award (Investigator)	C	\$2,000	2008	T Kerr	

Invited Presentations

** Denotes CME/CPD accredited presentation

Keynote and Plenary Presentations

- 1 **Kerr T.** Peeace W. "Extending the reach: low threshold services for drug users" [Keynote speaker]. Annual Conference of the Canadian Association for Nurses in AIDS Care. Vancouver, British Columbia. April 5, 2002.
- 2 **Kerr T.** "Responding to a HIV epidemic driven by frequent cocaine injection: is there a role for safe injection facilities?" [Plenary Speaker] Canadian Harm Reduction Conference. Toronto, Ontario. November 24, 2002.
- 3 **Kerr T.** "HIV/AIDS, injection drug use, and harm reduction." [Keynote speaker]. HIV/AIDS Bureau of Ontario Annual Education Day. London, Ontario. December 6, 2002.**
- 4 **Kerr T.** "The natural history of injection drug use and the impacts of a supervised injection site." [Plenary Speaker] Canadian Society for Addiction Medicine, 2005, October 19.**
- 5 **Kerr T.** "The evaluation of the first legal safer injection facility in North America." [Plenary speaker]. 6th National Harm Reduction Conference. Oakland, California. November 11, 2006.
- 6 **Kerr T.** "What can San Francisco learn from the first legal safer injection facility in North America?" [Plenary speaker] Harm Reduction Coalition. San Francisco, California. November 13, 2006.
- 7 **Kerr T.** "Bridging the gap between evidence, policy and public opinion: lessons from the scientific evaluation of Vancouver's supervised injection site." [Plenary speaker] Canadian Health Libraries Association Conference. Winnipeg, Manitoba. June 2, 2009.
- 8 **Kerr T.** "Driving change: the researcher as advocate." [Plenary speaker] Ontario HIV Treatment Network (OHTN) Annual Research Conference. Toronto, Ontario. November 17, 2009.**
- 9 **Kerr T.** "The role of evidence in the development of drug policy: experiences with the scientific evaluation of Vancouver's supervised injection facility." [Plenary Speaker]. Joint Medical Grand Rounds/Putting Evidence into Practice Conference. Edmonton, Alberta. February 19, 2010.**
- 10 **Kerr T.** "The impacts of drug law enforcement on HIV-related outcomes among injection drug users." [Keynote speaker] ANRS French National Agency for Research on AIDS and Viral Hepatitis. Harm Reduction: Time to switch from repression to evidence. Vienna, Austria. July 19, 2010.
- 11 **Kerr T.** "When Best Evidence Isn't Enough: The Case of Vancouver's Safer Injection Site." [Plenary Speaker] RTNA Conference: Innovate, Influence, Integrate. Edmonton, Alberta. November 23, 2010.

Presentations to Government and Government Committees/Task Forces

- 12 **Kerr T.** "The Frankfurt drug help system: a coordinated approach." BC Provincial Task Group on Addiction. Vancouver, British Columbia. January 15, 2001.
- 13 **Kerr T.** "Safe injection facilities in Canada." Toronto Task Force on Harm Reduction. Toronto, Ontario. July 10, 2001.
- 14 **Kerr T.** "Safe injection facilities in Canada." Municipalities Meeting on Supervised Consumption Facilities, Health Canada. Ottawa, Ontario. March 25, 2002.
- 15 **Kerr T.**, Peeace W. "Reachin' out: low threshold services for injection drug users." Federal Roundtable Meeting on Injection Drug Use Research and Programming in Canada, Canada's Drug Strategy and Health Canada, Hepatitis C Division. Ottawa, Ontario. March 27, 2002.
- 16 **Kerr T.** "Safe injection facilities in Canada." Ministerial Council on HIV/AIDS. Montreal, Quebec. June 5, 2004.
- 17 **Kerr T.** "Vancouver's safer injection facility: results from the scientific evaluation of the supervised injection project". City of Victoria. Victoria, British Columbia. April 7, 2005.
- 18 **Kerr T.** "Conducting research with marginalized populations in Vancouver's downtown eastside." Meeting of the Vancouver Agreement Partners. Vancouver, British Columbia. June 12, 2006.
- 19 **Kerr T.** "Results from the three-year scientific evaluation of Vancouver's supervised injection facility". Federal, Provincial, Territorial Task Group on HIV/AIDS. Vancouver, British Columbia. February 21, 2007.
- 20 **Kerr T.** "Summary findings from the scientific evaluation of Vancouver's supervised injection facility". Ministerial Council on HIV/AIDS. Ottawa, Ontario. March 18, 2007.
- 21 **Kerr T.** "Vancouver's supervised Injection site research program". Council of Chief Medical Officers of Health. Toronto, Ontario. October 30, 2007.**
- 22 **Kerr T.** "Vancouver's supervised injection site". Roundtable discussion with Mr. Stephane Dion, Leader of the Official Opposition. St. Paul's Hospital. Vancouver, British Columbia. February 8, 2008.
- 23 **Kerr T.** [Invited Expert Testimony]. "The scientific evaluation of Vancouver's supervised injection site: evidence and politics." House of Commons Standing Committee on Health. Ottawa, Ontario. May 29, 2008.
- 24 **Kerr T.** "Homelessness, unstable housing and HIV treatment: evidence from Vancouver, British Columbia." Shayne Ramsay, CEO of BC Housing. Vancouver, British Columbia. January 22, 2009.
- 25 **Kerr T.** [Invited Expert Testimony- Bill C-15]. "An act to amend the controlled drugs and substances act and to make related and consequential amendments to other acts." Standing Senate Committee on Legal and Constitutional Affairs. Ottawa, Ontario. November 19, 2009.

Presentations to Academic and Clinically-oriented Audiences

- 26 **Kerr T.** "Injection drug use in Canada: implications for safe Injection facilities." Opening the Legal Doors Conference, Simon Fraser University. Vancouver, British Columbia. June 18, 2001.
- 27 **Kerr T.** "Responding to an HIV epidemic in Vancouver: barriers and facilitators." North American Treatment Action Forum. Vancouver, British Columbia. December 4, 2001.
- 28 **Kerr T.** "Reaching underserved populations." Canadian Association for HIV/AIDS Research Annual Conference, Community-based Research Workshop. Winnipeg, Manitoba. April 25, 2002.
- 29 **Kerr T.** "Safe injection facilities: examining the evidence." AIDS Care Rounds, St. Paul's Hospital. Vancouver, British Columbia. July 18, 2002.
- 30 **Kerr T.** "Safe injection facilities in Vancouver: their potential public health and community impacts." North American Harm Reduction Conference. Seattle, Washington. November 15, 2002.
- 31 **Kerr T.**, Tyndall M. "Injection drug use and HIV/AIDS in the downtown eastside." HIV/AIDS Update, BC Centre for Excellence in HIV/AIDS. Vancouver, British Columbia. November 30, 2004.**

- 32 **Kerr T.** "The impact of Vancouver's safer injection facility: preliminary results from the scientific evaluation of the supervised injection project". Centre for Addictions Research of BC, University of Victoria. Victoria, British Columbia. April 7, 2005.
- 33 **Kerr T.** "Involving marginalized communities in research." Vancouver Coastal Health Strategy Implementation Forum: Research and Innovation. Vancouver, British Columbia. September 12, 2005.
- 34 **Kerr T.** "Evaluating health services for drug users: lessons from the evaluation of Vancouver's supervised injection site." Vancouver Coastal Health Research Institute. Vancouver, British Columbia. January 11, 2006.
- 35 **Kerr T.** "The evaluation of Vancouver's supervised injection site." AIDS Update, St. Paul's Hospital. Vancouver, British Columbia. June 1, 2006.
- 36 **Kerr T.** "Adherence to antiretroviral therapy among marginalized populations." First International Seminar on Adherence to Antiretroviral Therapy: Experts meet Clinicians. Tuscany, Italy. June 23, 2006.**
- 37 **Kerr T.** "Harm reduction in Canada." Special session. XVI International AIDS Conference. Toronto, Ontario. August 14, 2006.
- 38 **Kerr T.** "The evaluation of Vancouver's supervised injection site." Forefront Lecture Series, St. Paul's Hospital. Vancouver, British Columbia. September 6, 2006.
- 39 **Kerr T.** "Results from the evaluation of Vancouver's supervised injection site." Family Medicine Rounds, St. Paul's Hospital. Vancouver, British Columbia. October 16, 2006.
- 40 **Kerr T.** "Summary findings from the scientific evaluation of Vancouver's supervised injection facility". BC CDC World AIDS Day. Vancouver, British Columbia. December 1, 2006.
- 41 **Kerr T.** "Summary findings from the scientific evaluation of Vancouver's supervised injection facility". Health and Epidemiology Rounds, University of British Columbia. Vancouver, British Columbia. January 26, 2007.
- 42 **Kerr T.** "Summary findings from the scientific evaluation of Vancouver's supervised injection facility". Ontario Harm Reduction Conference. Toronto, Ontario. March 6, 2007.
- 43 **Kerr T.** "Summary results from the scientific evaluation of the safe injection site". Innovative Addiction Research in Vancouver: Supervised Injection, Heroin Prescription and More. The 15th Annual David Berman Memorial Concurrent Disorders Conference. Vancouver, British Columbia. May 29, 2007.
- 44 **Kerr T.** "Getting to the point: the results from the three-year evaluation of Vancouver's supervised injection facility". Community Safety and Drug User Health: Exploring Safe Injection in San Francisco. San Francisco, California. October 18, 2007.
- 45 **Kerr T.** "Insights into the politicization of science." University of British Columbia Integrated Sciences Student Association. Vancouver, British Columbia. March 6, 2008.
- 46 **Kerr T.** "Scientific evaluation of Insite." Preventative Public Health, Northern Health Authority. Prince George, British Columbia. March 20, 2008.
- 47 **Kerr T.** "The role of science and politics in the development of evidence-based public health policy: the case of Vancouver's supervised injection site." Forefront Lecture, St. Paul's Hospital. Vancouver, British Columbia. March 26, 2008.
- 48 **Kerr T.** "Policy, the law, and the evidence for harm reduction programs for working with people who use injection drugs". Ontario HIV Outpatient Clinics Education Day. Toronto, Ontario. March 28, 2008.**
- 49 **Kerr T.** "Scientific evaluation of Insite." International Medical Graduates and St. Paul's Hospital Family Practice Residents, St. Paul's Hospital. Vancouver, British Columbia. April 3, 2008.
- 50 **Kerr T.** "HIV/AIDS and injection drug use: update on interventions and HAART use". Bi-Annual HIV/Antiretroviral Update. Vancouver, British Columbia. November 17, 2008.**
- 51 **Kerr T.** "Results from the scientific evaluation of Insite". CIHR/INMHA Institute Advisory Board Members. Vancouver, British Columbia. February 26, 2009.

- 52 **Kerr T.** "Navigating the politics and the results for the supervised injection site". The Norwegian Nursing Association. Vancouver, British Columbia. March 31, 2009.
- 53 **Kerr T.** "Results from the scientific evaluation of Insite". Beyond Enabling - A Workshop for Health and Social Service Providers on Integrating Harm Reduction into Practice. AIDS Vancouver Island. Victoria, British Columbia. April 7, 2009.
- 54 **Kerr T.** "The role of science and politics in the development of evidence-based public health policy: the case of Vancouver's supervised injection site". National Core for Neuroethics. Panel Discussion: The Neuroethics of Addiction - From the Laboratory to the Street. Vancouver. British Columbia. April 14, 2009
- 55 **Kerr T.** "Antiretroviral therapy as prevention". 5th European Conference on Clinical and Social Research on AIDS and Drugs. Vilnius, Lithuania. April 27, 2009.
- 56 **Kerr T.** "Seek and treat: integrated delivery of care and monitoring of an evolving epidemic". 5th European Conference on Clinical and Social Research on AIDS and Drugs. Vilnius, Lithuania. April 28, 2009.
- 57 **Kerr T.** "HIV/AIDS and injection drug use: opportunities for intervention." HIV/Antiretroviral Update, Sheraton Wall Centre. Vancouver, British Columbia. May 25, 2009.
- 58 **Kerr T.** "HIV risks and other drug-related harms among injection drug users in Thailand: evidence from the Mitsampan Community Research Project. Researchers Abroad Lecture Series, St. Paul's Hospital. Vancouver, British Columbia. June 18, 2009.
- 59 **Kerr T.** "Update on Insite." AIDS Care Rounds, St. Paul's Hospital. Vancouver, British Columbia. September 23, 2010.**
- 60 **Kerr T.** "Illicit Drug Use and Harm Reduction Evidence Against the War on Drugs." Integrated Science Students Association, University of British Columbia. Vancouver, British Columbia. March 2, 2011.

Presentations to Community Organizations and Public Audiences

- 61 **Kerr T.** "Reducing hospital utilization among people living with HIV/AIDS." Saving Money, Saving Lives Conference, Simon Fraser University Wosk Centre for Dialogue. Vancouver, British Columbia. September 18, 2002.
- 62 **Kerr T.,** Wilson D, Livingston A. "Methods of organizing drug users." Canadian HIV/AIDS Legal Network AGM. Montreal, Quebec. September 24, 2002.
- 63 **Kerr T.** "Safe injection facilities in Canada." Positive Gathering. Vancouver, British Columbia. October 12, 2002.
- 64 **Kerr T.** "The public health impacts of drug market policing." Vancouver Area Network of Drug Users' General Meeting. Vancouver, British Columbia. January 7, 2006.
- 65 **Kerr T.** "What's the harm?: a public forum on the future of harm reduction." Hosted by Libby Davies, MP for Vancouver East. Vancouver, British Columbia. October 28, 2007.
- 66 **Kerr T.** "How should public money be spent." UBC Public Forum - Drug Policy: A Public Health or Criminal Justice Issue. UBC Robson Square. Vancouver, British Columbia. February 27, 2008.
- 67 **Kerr T.** "HIV/AIDS, drug use and mental health – the way forward." Collaboration for Change Day Forum, Morris J. Wosk Centre for Dialogue. Vancouver. British Columbia. April 29, 2008.
- 68 **Kerr T.** "Injection drug use: HIV/AIDS politics and human rights." Pivot Legal Society. Vancouver, British Columbia. July 9, 2008.
- 69 **Kerr T.** "Harm reduction in Vancouver – the role of needle exchange and supervised injection." A Public Forum hosted by AIDS Vancouver Island. Victoria, British Columbia. April 7, 2009.
- 70 **Kerr T.** "Research summary of the results from the scientific evaluation of Insite." Canada School of Public Service, Living Leadership: The Executive Excellence Program. Insite. Vancouver, British Columbia. June 15, 2010.

- 71 **Kerr T.** "Research summary of the results from the scientific evaluation of Insite." Psychiatry department of Portland Hotel Society. Insite. Vancouver, British Columbia. June 15, 2010.
- 72 **Kerr T.** "Pairing community groups with researchers in Thailand." International Harm Reduction Development Program (IHRD) Advisory Group. Vienna, Austria. July 17, 2010.
- 73 **Kerr T.** "Harm Reduction in Vancouver, Canada: Responding to a Public Health Emergency." Harm Reduction Coalition. New York, USA. February 23, 2011.
- 74 **Kerr T.** "Research with the community, not on the community: experiences with Mitsampan drop in center for drug users in Bangkok." IHRD. New York, USA. February 24, 2011.
- 75 **Kerr T.** "Research from the Urban Health Research Initiative" Vancouver Public Library. Vancouver, British Columbia. March 7, 2011.

SERVICE TO THE UNIVERSITY

Memberships on committees

- 1 Member, Research Ethics Board, University of British Columbia/Providence Health Care (2004-present)
- 2 Internal Reviewer: Health Research Resource Office (HeRRO), University of British Columbia (2007-2008)
- 3 Division Member, Division of AIDS, University of British Columbia (2007-present)
- 4 Associate Member, School of Population & Public Health, University of British Columbia (2009-2014)

SERVICE TO THE HOSPITAL

Memberships on committees

- 5 Member, Research Ethics Board, University of British Columbia/Providence Health Care (2004-present)

SERVICE TO THE COMMUNITY

Memberships on scholarly societies

- 6 Member, Canadian Association for HIV/AIDS Research (2000 - 2005)
- 7 Member, International Harm Reduction Association (2001 - 2010)
- 8 Member, Canadian HIV/AIDS Legal Network (2002 – 2011)
- 9 Member, International AIDS Society (2006 - 2013)

Memberships on scholarly committees

- 10 Member, Scientific Review Committee, Ontario HIV Treatment Network (2004 - 2007)
- 11 Track Committee Member, Epidemiology, Prevention and Prevention Research, International AIDS Society Conference, Toronto, Ontario (2006)
- 12 Scientific Review Committee Member, CIHR Emerging Team Grant Program in HIV/AIDS Committee (2007)
- 13 Track co-chair, Biomedical Prevention, International AIDS Society Conference, Sydney, Australia (2007)
- 14 Social Justice, Human Rights, and HIV Prevention Think Tank, Sydney, Australia (2007)
- 15 Member, Organizing Committee, International Conference on Urban Health, Vancouver, British Columbia (2008)
- 16 Member, BC Mental Health and Addictions Research Network, Network Planning and Advisory Committee (NetPAC) (2008 – 2010)
- 17 Invited expert, U.S. National Institute on Drug Abuse (NIDA) and International AIDS Society (IAS) Consultation - Prevention and Treatment of HIV/AIDS among Drug Using Populations: A Global Perspective, Washington, DC (2010)
- 18 Member, STOP HIV/AIDS Leadership Committee, Vancouver, British Columbia (2010)

Memberships on other committees

- 19 Canadian Association for Music Therapy, Ethics Chair (1997 - 2000)
- 20 Elected member of the Board of Directors, Canadian HIV/AIDS Legal Network (2001 - 2003)
- 21 Member, Selection Committee, National Human Rights Awards of the Canadian HIV/AIDS Legal Network & Human Rights Watch (2002 - 2003)
- 22 Correspondent, Canadian News Section, Canadian HIV/AIDS Policy and Law Review (2002 - 2005)
- 23 Contributor/writer, Living Positive Magazine (BC Persons With AIDS Society) (2002 - 2005)
- 24 Chair, Vancouver Area Network of Drug Users (VANDU) Advisory Board (2004-2010)
- 25 Elected President of the Board of Directors, Canadian HIV/AIDS Legal Network (2007- 2009)
- 26 Advisory Board Member, International Harm Reduction Development Program, Open Society Institute (2009 - 2010)
- 27 Technical Advisor, International Centre for Science in Drug Policy (2010 - present)

Editorships

- 28 Editorial Board, HIV/AIDS Policy and Law Review (2005 - 2011)
- 29 Guest editor, International Journal of Drug Policy (2006), special issue "Cities and drugs: responding to drugs in the City of Vancouver, Canada"
- 30 Editorial Board, Delivering HIV Care and Treatment for People Who Use Drugs: Lessons from Research and Practice [book], International Harm Reduction Development Program (2007)
- 31 Guest editor, International Journal of Drug Policy (2007), special issue "Drug use settings."
- 32 Editorial Advisory Board Member, The Open Addiction Journal (2007-2010)
- 33 Editorial Board, International Journal of Drug Policy (2008 - 2011)
- 34 Associate Editor, Editorial Board of BMC Public Health (2009 - 2010)
- 35 Editorial Board, Journal of Addiction Research & Therapy--- Open Access journal (2010)

Reviewer: Journals/Books

- 36 Book Reviewer: Canadian Journal of Counselling (2002)
- 37 Reviewer: International Journal of Drug Policy (2003 - 2010)
- 38 Reviewer: The Lancet (2004 - 2011)
- 39 Reviewer: Drug and Alcohol Review (2004 - 2011)
- 40 Reviewer: AIDS Care (2005, 2007, 2008)
- 41 Reviewer: Medical Anthropology (2005)
- 42 Reviewer: Addiction, Research and Theory (2005)
- 43 Reviewer: Harm Reduction Journal (2005 - 2010)
- 44 Reviewer: International Health and Human Rights (2005)
- 45 Reviewer: AIDS and Behavior (2005 - 2009)
- 46 Reviewer: AIDS (2005-2008)
- 47 Reviewer: Addiction (2005 - 2009)

- 48 Reviewer: Drug and Alcohol Dependence (2005 - 2011)
- 49 Reviewer: Journal of Public Health (2005 - 2011)
- 50 Reviewer: Journal of Urban Health (2006)
- 51 Reviewer: Social Science & Medicine (2007-2010)
- 52 Reviewer: BMC International Health and Human Rights (2007)
- 53 Reviewer: AIDS Social Justice, Human Rights and HIV Prevention (2008)
- 54 Reviewer: Social Science & Medicine (2008- 2010)
- 55 Reviewer: Health and Place (2008 – 2009)
- 56 Reviewer: The Journal of Adolescent Health (2009 - 2010)
- 57 Reviewer: BMC Public Health (2009- 2010)
- 58 Reviewer: Journal of Youth Studies (2009)
- 59 Reviewer: The American Journal of Drug and Alcohol Abuse (2009)
- 60 Reviewer: Journal of Health Care for the Poor and Underserved (2009)
- 61 Reviewer: PLoS ONE (2009)
- 62 Reviewer: Substance Abuse Treatment, Prevention, and Policy (2010)
- 63 Reviewer: American Journal of Public Health (2011)
- 64 Reviewer: Journal of Substance Abuse Treatment (2011)

Reviewer: Granting Agencies

- 65 Scientific Review Committee Member (Epidemiology/Social Science Tracks), Ontario HIV Treatment Network (2004-2007)
- 66 Reviewer: Canadian Institutes of Health Research, International Opportunities Program (2005 - 2006)
- 67 Reviewer: BC Mental Health and Addictions, Seed Grant (2008 - 2009)
- 68 Reviewer: US National Institutes of Health – National Institute of Drug Abuse/International AIDS Society Joint Fellowship Programme Review Board (2009)
- 69 Reviewer: The Ontario HIV Treatment Network, Doctoral and Postdoctoral Fellowship Award Final Reports (2009)
- 70 Reviewer: Open Society Institute/International Harm Reduction Development Program (2009)
- 71 Review Board Member: IAS-NIDA Joint Fellowship Programme Encouraging HIV and Drug Abuse Research (2010)
- 72 Reviewer: NIDA Avant Garde Award for Drug Abuse and HIV/AIDS (2010)
- 73 Reviewer: National Institutes of Health, Behavioral and Social Consequences of HIV/AIDS Scientific Review (2011)
- 74 Reviewer: IAS-NIDA fellowship on HIV and drug use (2011)
- 75 Reviewer: Canadian Institutes of Health Research, Psychosocial, Socio-cultural & Behavioral Determinants of Health grants committee (2011)

Reviewer: Conferences

- 76 Abstract Reviewer: Canadian Conference on Harm Reduction (2003)

- 77 Programme Committee/Abstract Reviewer (Epidemiology): Canadian Association for HIV/AIDS Research (2005)
- 78 Abstract Reviewer (Epidemiology): The 3rd IAS Conference on HIV Pathogenesis and Treatment (2005)
- 79 Track Committee Member/Abstract Reviewer (Epidemiology, Prevention and Prevention Research), AIDS 2006 - XVI International AIDS Conference (2005)
- 80 Abstract Reviewer (Biomedical Prevention Research): The 4th IAS Conference on HIV Pathogenesis and Treatment (2007)
- 81 Abstract Reviewer: 7th International Conference on Urban Health (2008)
- 82 Abstract Reviewer (Social Sciences Track): Canadian Association for HIV Research (2008)
- 83 Abstract Reviewer (Epidemiology, Prevention and Prevention Research): AIDS 2008 - XVII International AIDS Conference (2008)
- 84 Abstract Reviewer (Epidemiology and Public Health): Canadian Conference on HIV/AIDS Research (2009)
- 85 Abstract Reviewer (Epidemiology): The 5th IAS Conference in HIV Pathogenesis, Treatment and Prevention (2009)
- 86 Abstract Reviewer: AIDS 2010 - XVIII International AIDS Conference (2010)
- 87 Abstract Reviewer: 20th Annual Canadian Conference on HIV/AIDS Research (2011)
- 88 Abstract Reviewer: IAS 2011 (2011)

Reviewer: External Academic Reviews

- 89 External Doctoral Dissertation Reviewer: Monash Research Graduate School (2008)
- 90 External Reviewer: Promotions Committee (Applicant: Full Professor), University of New South Wales. (2008)
- 91 Reviewer: Order of Australia (2008)
- 92 External Doctoral Dissertation Reviewer: The University of New South Wales, Australia (2009)
- 93 External Doctoral Dissertation Reviewer: Simon Fraser University (2010)
- 94 External Reviewer: University of British Columbia Department of Medicine External Research Review (2010)

AWARDS AND DISTINCTIONS

Awards for Scholarship or Distinction (indicate name of award, awarding organizations, date)

- 1 Graduate Scholarship, Dallas Society, 2001
- 2 Graduate Student Scholarship, International Harm Reduction Association, 2001
- 3 AccolAIDS Award (Science, Research & Technology), British Columbia Persons With AIDS Society, 2006
- 4 James M. Robinson Award for significant contributions to public health, University of British Columbia, 2006
- 5 International Journal of Drug Policy Award - Top 10 Cited Papers (2), 2006-2008
- 6 Canadian Institutes of Health Research, Institute of Population and Public Health, Canadian Public Health Association - Population and Public Health Research Milestones Award, 2010

OTHER RELEVANT INFORMATION

Current Principal or co-Principal Investigator:

- 1. Vancouver Injection Drug Users Study (VIDUS)
- 2. At-Risk Youth Study (ARYS)
- 3. Scientific Evaluation Of Supervised Injecting (SEOSI)

4. **AIDS Care Cohort to Evaluate access to Survival Services (ACCESS)**
5. **Ethnographic and Qualitative Research Project**
6. **The Mitsampan Community Research Project**
7. **Urban Health Research Initiative (UHRI)**
8. **Randomized Trial to Enrol Crack users into Treatment (RECRUIT)**

University of British Columbia
Publications Record

Date: March 11, 2011

Initial: _____

SURNAME: Kerr

FIRST NAME: Thomas

Refereed Publications

* Indicates publications of primary importance

Journals

- 1 Wood E, Tyndall M, Spittal P, Li K, **Kerr T**, Hogg R, Montaner JS, O'Shaughnessy M, Schechter M. Unsafe injection practices in a cohort of injection drug users in Vancouver: Could safer injecting rooms help? Canadian Medical Association Journal, 2001; 165(4): 405-410.
- 2 **Kerr T**, Palepu A. Safe injection facilities in Canada: Is it time? Canadian Medical Association Journal, 2001; 165(4), 436-437.
- 3 **Kerr T**, Walsh J, Marshall A. Emotional change processes in music-assisted reframing. Journal of Music Therapy, 2001; 38(3), 193-211.
- 4 **Kerr T**, Craib K, Gataric N, Hogg R. Assessing the impact of an adult day program on hospital utilization by persons living with HIV/AIDS. Journal of Acquired Immune Deficiency Syndromes, 2002; 31(1): 117-119.
- 5 Broadhead R, **Kerr T**, Grund J, Altice F. Safer injection facilities in North America: Their place in public policy and health initiatives. Journal of Drug Issues, 2002; 32(1): 329-356.
- 6 Wood E, Tyndall M, **Kerr T**, Spittal P, O'Shaughnessy M, Schechter M. Safer injection facilities for injection drug users: The debate continues. Canadian Medical Association Journal, 2002; 166(4): 422-424.
- 7 Wood E, Tyndall M, Spittal P, Li K, **Kerr T**, Hogg R, O'Shaughnessy M, Schechter M. Needle exchange and difficulty with needle access during an ongoing HIV epidemic. International Journal of Drug Policy, 2002; 13(2): 95-102.
- 8 **Kerr T**, Palepu, A. Safer injection facilities for injection drug users: The debate continues. Canadian Medical Association Journal, 2002; 166(4): 424.
- 9 **Kerr T**, O'Brian W. Drug policy in Canada: The way forward. Canadian HIV/AIDS Policy & Law Review, 2002; 7(1): 27-32.
- 10 * **Kerr T**, Wood E, Small D, Palepu A, Tyndall M. Potential use of safer injecting facilities among injection drug users in Vancouver's Downtown Eastside. Canadian Medical Association Journal, 2003; 169(8): 759-763. [Fast tracked]. Contribution: I was responsible for designing the larger study from which this manuscript was derived, and I led the planning of the analysis and the writing of the manuscript. This paper was fast-tracked at CMAJ due to the perceived importance of the study.
- 11 **Kerr T**, Wood E, Palepu A, Wilson D, Schechter M, Tyndall M. Responding to an explosive HIV epidemic driven by frequent cocaine injection: Is there a role for safer injecting facilities? Journal of Drug Issues, 2003; 33(3): 579-608.
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September 12, 2011

Missing Women Commission of Inquiry
1402 - 808 Nelson Street
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V6Z 2H2

RE: Expert report from Dr. Thomas Kerr

To Whom it May Concern:

Please find attached my independent expert report.

If there is any other information you require, please do not hesitate to contact me.

Yours sincerely,

Thomas Kerr, Ph.D. (Corresponding author)
Associate Professor, Division of AIDS, University of British Columbia
Director, Urban Health Research Initiative, BC Centre for Excellence in HIV/AIDS

EXPERT REPORT:

SUBMITTED BY: Dr. Thomas Kerr

DATE: September 12, 2011

1. Background:

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Area of Expertise: HIV/AIDS, illicit drug use, public health and related research methods

2. **Qualifications:** I have doctoral degree in educational psychology with a focus on health and counseling psychology. I have several years of experience working as a counsellor with people who use illicit drugs and are living with HIV/AIDS. I have been working with residents of Vancouver's Downtown Eastside neighbourhood, primarily as a researcher, since 1997. As the co-director of the Urban Health Research Initiative at the BC Centre for Excellence in HIV/AIDS, I oversee a large program of research focused on illicit drug use, HIV/AIDS and related health policies and programs. The primary research activities involve several large prospective cohort studies. Since 2001, I have co-authored over 280 peer-reviewed research publications, as well several book chapters and reports on the topics of illicit drug use and HIV/AIDS. A small proportion of these publications have focused on the topic of sex work. I am currently a co-investigator of a large study of sex workers in Vancouver (Principal investigator: Dr. Kate Shannon), however, sex work is not my primary area of expertise. My research work has focused primarily on the evaluation of health programs (e.g., Vancouver's supervised injection site), the epidemiology of drug use and related HIV infections, and the social and structural production of drug-related harms and HIV risk behaviour.

3. **Opinion:** The program of research that I oversee involves four large ongoing cohort studies of people who use illicit drugs. These studies, which are funded by the US National Institutes of Health and the Canadian Institutes for Health Research involve over 2000 unique individuals, including individuals who inject illicit drugs, individuals who use drugs and are living with HIV/AIDS, and street-involved drug using youth (ages 14-26 years). Research participants complete a baseline interview and semi-annual follow-up interviews, and provide blood samples for diagnostic testing (e.g., presence of HIV infection). Although the primary focus on my research has been on illicit drug use, women who use drugs and are involved in sex work make up a small proportion (approximately 10-15%) of the research participants (Johnston, Callon, Li, Wood, & Kerr, 2010). This has afforded the opportunity to examine the relationship between sex work, various behaviours, and health outcomes. For example, we have shown that sex work is associated with elevated risk for hepatitis C infection (Shannon et al., 2010), and the initiation of injection drug use (Kerr, Marshall, et al., 2009). We have also shown high rates of childhood trauma in our cohort (Kerr, Stoltz, et al., 2009), with sexual and emotional abuse being associated with the initiation of sex work (Stoltz et al., 2007). As well, sex work has been associated with high risk injecting practices, such as frequent cocaine injection (Lloyd-Smith, Wood, Li, Montaner, & Kerr, 2009), jugular injecting (Hoda, Kerr, Li, Montaner, & Wood, 2008), receiving assistance with injecting (Lloyd-Smith et al., 2010), and non-fatal overdose (Fairbairn et al., 2008). We have also investigated sex work as an alternative income generating behaviour among people who use drugs (DeBeck et al., 2007). Through this work we have found that 62% of women involved in sex work said they would give up sex work if they did not need money for drugs (DeBeck, et al., 2007). In a follow-up study, 63% of sex workers said they would no longer be interested in participating in sex work if they had access to low-threshold employment (Debeck et al., 2011).

I have also participated as a co-author of several studies led by Dr. Kate Shannon and team. These studies show that women involved in sex work are at extremely elevated risk for various forms of severe violence (Shannon et al., 2008; Shannon et al., 2009). Several factors, including the inability to access addiction treatment, displacement due to policing, and servicing clients in cars and public spaces were found to be associated with elevated risk for violence (Shannon, et al., 2008).

I have also participated as a co-author of several qualitative studies involving sex workers (Fairbairn, Small, Shannon, Wood, & Kerr, 2008; Shannon, et al., 2008). These studies are based on semi-structured in-depth interviews. These studies have generated a number of findings specific to sex work. For example, one of our

studies of street-involved drug using youth showed that upon arriving in the local drug scene, young people can quickly become entrenched there, and can soon end up participating in various income generating activities, such as sex work, that carry significant risk for violence (Fast, Small, Wood, & Kerr, 2009). For many young women, their participation in sex work is a result of male domination within the street drug scene (Fast, Shoveller, Shannon, & Kerr, 2010; Fast, et al., 2009). Our qualitative investigation of Vancouver's supervised injection facility documented the everyday violence that shapes the daily experiences of women who inject drugs in the DTES (Fairbairn, Small, et al., 2008). Women articulated a mistrust of others and a fear of violent confrontations that frequently arise over money or drugs in an economy of scarce resources. Many women described how survival on the streets is linked to the avoidance of everyday violence that characterizes the local street-based drug scene. In many cases, this violence occurs at the hands of male drug users who harass and threaten women in an effort to force them to give up or share their drugs (Shannon, et al., 2008).

At the simplest level, drug dependence can be defined as "a state in which the individual has a need for repeated doses of the drug to feel good or to avoid feeling bad" (WHO Expert Committee on Drug Dependence, 2003). Other features of substance dependence include: drug tolerance; withdrawal; need for taking larger amounts of the drug over time; persistent desire or repeated unsuccessful efforts to stop or attenuate substance use; a relatively large amount of time spent in securing and using the substance, or in recovering from the effects of the substance; important work and social activities reduced because of substance use; continued substance use despite negative physical and psychological effects of use (adapted from the Diagnostic Statistical Manual IV of the American Psychiatric Association).

Because an important aspect of drug dependence involves spending considerable time securing the substance of choice, it is not surprising that many people who use drugs in the DTES engage in various high-risk income-generating activities (DeBeck, et al., 2007), such as sex work and drug dealing. Indeed, as mentioned above, our research has shown that participation in sex work is for many individuals closely linked to their need to generate money for drugs (DeBeck, et al., 2007). In some cases, addicted male partners or associates coerce women into sex work activities, and in some cases control women's access to money, drugs, and even prevention tools such as condoms (Shannon, et al., 2008). In several studies, participating in income-generating activities such as sex work is associated with higher intensity drug use (e.g., frequent heroin and crack use), and in one study, the only factors that predicted levels of income from activities such

as drug dealing and sex work was injecting heroin and smoking crack on daily or more frequent basis (i.e., those who inject more frequently are more likely to earn larger amounts of money from these activities) (DeBeck, et al., 2007; Debeck, et al., 2011). Participation in sex work is also linked to the need to stave off withdrawal from drugs, which can be, particularly in the case of withdrawal from opiates such as heroin, extremely distressing and painful (e.g., anxiety, insomnia, fevers, abdominal cramping, diarrhea, vomiting, severe muscle aches and pains). When women are in withdrawal, they may be more likely to accept higher levels of risk in order to obtain income from sex work. For example, we found in one study, that higher intensity drug use (e.g., daily heroin and crack use) was associated with accepting financial incentives for sex without a condom (Johnston, et al., 2010). Likewise, when eager to earn money to acquire drugs and stave off withdrawal, sex workers may be less discriminating when accepting clients and may be more willing to enter cars and other potentially unsafe places with clients. Further, intensity of drug use has been associated with elevated risk for violence. Specifically, we found that among people who inject drugs in the DTES, individuals who injected heroin frequently ($\geq$ daily) and smoked crack frequently, were more likely to experience violence (Marshall, Fairbairn, Li, Wood, & Kerr, 2008).

Although there are a number of effective treatments for drug dependence, and access to addiction treatment has been associated with cessation of drug use in our setting, problems with access to such treatments remain. For example, in 1997 approximately 25% of drug users in our studies were in some form of addiction treatment, while approximately 14% of drug users reported difficulty accessing addiction treatment (UHRI, 2009). This situation has improved over time. In 2002, approximately 50% of drug users were in some form of addiction treatment, while 8% reported difficulty in accessing treatment (UHRI, 2009). A further complicating factor is that there is not one single effective treatment for all drug dependent individuals. Treatment usually needs to be long-term, individually tailored, and designed to address the many needs of the patient. Because addiction is a chronic relapsing condition by nature, most individuals require several attempts at addiction treatment before achieving sustained cessation of drug use.

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Income generating activities of people who inject drugs

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Abstract

Background: Injection drug users (IDU) commonly generate income through prohibited activities, such as drug dealing and sex trade work, which carry significant risk. However, little is known about the IDU who engage in such activities and the role of active drug use in perpetuating this behavior.

Methods: We evaluated factors associated with prohibited income generation among participants enrolled in the Vancouver Injection Drug Users Study (VIDUS) using logistic and linear regression. We also examined which sources of income respondents would eliminate if they did not require money to pay for drugs.

Results: Among 275 IDU, 145 (53%) reported engaging in prohibited income generating activities in the past 30 days. Sex work and drug dealing accounted for the greatest amount of income generated. Non-aboriginal females were the group most likely to report prohibited income generation. Other variables independently associated with prohibited income generation include daily heroin injection (AOR = 2.3) and daily use of crack cocaine (AOR = 3.5). Among these individuals, 68 (47%) indicated they would forgo these earnings if they did not require money for illegal drugs, with those engaged in sex trade work (62%) being most willing to give up their illegal source of income.

Conclusion: These findings suggest that the costs associated with illicit drugs are compelling IDU, particularly those possessing markers of higher intensity addiction, to engage in prohibited income generating activities. These findings also point to an opportunity to explore interventions that relieve the financial pressure of purchasing illegal drugs and reduce engagement in such activities, such as low threshold employment and expansion of prescription and substitution therapies.

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Keywords: IDU; Income generation; Sex trade work; Drug dealing

1. Introduction

Traditionally, society has attempted to discourage psychoactive drug use by employing a range of law enforcement tactics. These approaches have been shown to inflate the price of illegal drugs. The high costs associated with illegal substances may deter and regulate drug use among certain individuals (Benson et al., 2001); however, other drug users may resort to various forms of prohibited activities, including drug dealing, sex trade work and acquisitive crime to generate sufficient income to support

their preferred level of drug consumption (Casavant and Collin, 2001; Benson et al., 1992; Brochu et al., 1999; Haynes, 1998; Nurco, 1987).

Past investigations have established a strong link between drug dependency and prohibited income generating activities (Stevens et al., 2003; Sherman and Latkin, 2002; Fischer et al., 2001; Deschenes and Anglin, 1991; Silverman and Spruill, 1977). High levels of prohibited activity have also been found to coincide with periods of heavy drug consumption (Grapendaal et al., 1995; Nurco et al., 1985; Ball et al., 1983). Additionally a lack of employable job skills, past criminal histories and high profits derived from drug dealing have been identified as factors influencing substance dependent individuals to engage in prohibited income generating behavior (Sherman et al., 2006; Rothbard et al., 1999; Bretteville-Jensen and Sutton, 1996; Hammersley et al., 1989).

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Prohibited income generating activities have a number of potential negative impacts on individuals and society. In 2002 the Canadian Centre on Substance Abuse found that in Canada over 20% of federal inmates report that they committed their most serious offence in order to obtain illegal drugs (Pernanen et al., 2002). The costs of incarcerating substance addicted individuals for their criminal income generating acts is only one aspect of the negative social impacts of this phenomenon. Theft, fraud and other types of acquisitive crime financially burden society and activities that surround drug dealing have been associated with public nuisances and increased drug consumption by making illegal substances readily available (Bretteville-Jensen and Sutton, 1996). Additionally, confrontations related to the illegal drug market account for the majority of violent interactions involving drug users (Casavant and Collin, 2001; Erickson, 2001; Caulkins and Reuter, 1996), making drug dealing a dangerous activity.

Involvement in the sex trade industry is also associated with significant health risks and social costs. In Canada the sale of sexual services between consenting adults is legal; however, provisions regarding bawdy houses, procuring and communicating make many of the acts surrounding sex trade work illegal. In turn sex trade workers operate in an inherently dangerous unsanctioned environment, which threatens their health and safety (Goodyear et al., 2005; Blankenship and Koester, 2002).

The relationship between negative health outcomes and activities such as panhandling and salvaging recyclable materials (binning) may appear less direct. However, major urban cities, including the City of Vancouver, Canada, have identified such activities as potential economic threats to urban cores as some citizens report feeling unsafe around individuals engaging in these activities and therefore may avoid affected areas. Similarly, there are concerns that a high prevalence of panhandling and binning threatens the public image of affected cities and thereby has the potential to deter tourism and foreign investment (City of Vancouver, 2006). In a number of major cities in North America (e.g., Toronto, Atlanta, Baltimore, Cincinnati, New Haven, New York City, Philadelphia, Portland, San Francisco, and Seattle) policy makers have introduced legislation to increase the ability of law enforcement to arrest and prosecute individuals for panhandling and engaging in other undesirable behavior (New York State Law, 2006; Safe Streets Act, 1999).

While previous studies have identified prohibited income generation among injection drug users (IDU) (Sherman and Latkin, 2002), there have been few studies that have assessed the characteristics of IDU who engage in such activities. As well, there have been few studies that have detailed the amount of income derived from various prohibited sources and examined the role of ongoing drug use in perpetuating engagement in different prohibited income generating activities. Therefore, we sought to explore the prevalence of and factors associated with engaging in prohibited income generating activities among a community-recruited cohort of IDU. We also sought to shed light on the relationship between the costs associated with purchasing illegal substances and motivations for engaging in prohibited income generating activity among IDU.

2. Methods

Beginning in May 1996, persons who had injected illegal 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 (Tyndall et al., 2002; Wood et al., 2001). Briefly, persons were eligible for the VIDUS study if they had injected illegal 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 and completed an interviewer-administered questionnaire. Participants receive \$20 for each study visit. The questionnaire elicits demographic data as well as information about drug use, income sources, HIV risk behavior and drug treatment. The study has been approved by the University of British Columbia's Research Ethics Board. The present analysis is restricted to those participants who were actively injecting drugs and seen for follow-up during the period June, 2005 to December, 2005. Analysis variables are available only for this sample period.

Respondents were asked to identify all income sources over the past 30 days. Categories of income sources included: social assistance (including disability, pensions and other forms of government transfers), family and friends, paid work (including under the table employment), binning (includes salvaging recyclable materials), sex trade work, drug dealing, criminal activity (category encompasses remaining criminal activity including theft, break and entry, robbery, fraud, etc.) and panhandling. Respondents were then asked "If you didn't need the money to pay for your drug use, are there any sources of income in the last 30 days that you would eliminate?". Those who responded 'yes' were then asked to indicate the specific income sources they would choose to eliminate.

To assess the prevalence of, and determine factors associated with, participation in prohibited income generating activities the categories for sex trade work, drug dealing, criminal activity, binning and panhandling were combined into a separate category titled 'prohibited activities', which served as a dependent variable of interest for subsequent analyses. However, we also considered a second dependent variable, which consisted of only sex trade work, drug dealing and other criminal activity as a means of determining if there were meaningful differences when the less risky activities of binning and panhandling were excluded from the analysis.

Socio-demographic variables of interest considered in analyses included: age (per year older), gender (female versus male), ethnicity (aboriginal versus non-aboriginal) and homelessness (defined as having no fixed address for the last 6 months). Behavioral and drug use variables, based on activities in the last 6 months, included: frequent heroin injection (consistently injecting once or more per day), frequent cocaine injection (consistently injecting once or more per day), frequent crack use (consistently smoking once or more per day), syringe borrowing (at some time in last 6 months), syringe lending (at some time in last 6 months), enrolment in any addiction treatment program (at some time in last 6 months) and injecting in public spaces (defined as having at some time in the last 6 months injected on public streets, in alleys, public washrooms, parks and abandoned buildings). All definitions have been used previously (Wood et al., 2001).

For the primary analysis, univariate and multivariate statistics were used to determine factors associated with engaging in any prohibited activity. In univariate analysis categorical explanatory variables were analyzed using Pearson's χ^2 -test and continuous variables were analyzed using the Wilcoxon rank sum test. To evaluate factors independently associated with engaging in any prohibited activity, all variables of interest were entered into a fixed multivariate logistic regression model. Using the same independent variables of interest, a separate logistic regression model was constructed to examine factors associated with only the more restricted set of riskier prohibited activities (i.e., sex trade work, drug dealing and other criminal activities). We also assessed all two-way interactions.

In sub analyses, three separate linear regression models, which included the same independent variables of interest, were constructed to identify factors predicting the amount of income generated through prohibited activities, as well as predictors of the number of days in the last month spent involved in drug dealing and sex trade work, respectively. In further sub analyses, we constructed two separate logistic regression models seeking to identify predictors of willingness to give up sex trade work and willingness to give up drug dealing.

Table 1

Study participants' ($n=275$) sources of income in the last 30 days

Income source	<i>N</i> (%) reporting activity	Median income ^a (IQR)	Median days engaged in activity (IQR)	<i>N</i> (%) would give up activity ^b
Social assistance	231 (84)	800 (530–990)	–	–
Drug dealing ^{c,d}	74 (27)	1500 (400–4500)	17 (10–30)	30 (41)
Sex trade work ^{c,d}	50 (18)	1000 (220–2200)	10 (5–20)	31 (62)
Paid work	38 (14)	620 (225–1350)	6 (4–20)	–
Panhandling ^d	25 (9)	500 (110–1200)	20 (10–30)	10 (40)
Family and friends	21 (8)	275 (100–600)	–	–
Binning ^d	19 (7)	200 (70–400)	12 (5–20)	1 (5)
Criminal activity ^{c,d}	12 (4)	600 (300–1500)	20 (2–30)	6 (50)
All prohibited activities	145 (53)	1000 (300–3000)	16 (8–30)	68 (47)
Restricted prohibited activities	118 (43)	1000 (360–4000)	16 (8–30)	62 (53)

^a Amount of income generated in the last 30 days in dollars.^b Data recorded only for prohibited activities.^c Activities included in the 'restricted prohibited activities' category.^d Activities included in the 'all prohibited activities' category.

3. Results

During the study period, 465 individuals completed follow-up visits and 275 (59%) reported active injection drug use. Of the 275 active injecting participants eligible for this analysis 127 (46%) were women and the median age of participants was 39 (IQR = 30–47). As indicated in Table 1, a total of 145 (53%) study participants reported having generated income through prohibited activities in the last 30 days, while 118 (43%) reported engaging in at least one of the restricted set of riskier prohibited activities (i.e., sex trade work, drug dealing, and other criminal activity). The median number of prohibited activities that participants engaged in was 1 (IQR = 1). The median number of days spent participating in income generating activities (16 days, IQR: 8–30) was the same when the broader and more restricted set of prohibited income activities were considered.

Drug dealing was the most frequently reported prohibited source of income ($n=74$, 27%) followed by sex trade work ($n=50$, 18%). Of note, women were more likely than men to report sex trade work [$n=47$ (37%) versus $n=3$ (2%)]. The median monthly income earned through drug dealing was reported to be \$1500 (IQR: 400–4500) and \$1000 (IQR: 220–2200) for sex trade work. The category that encompassed all other criminal activity was the least frequently reported source of income among respondents ($n=12$, 4%). The majority of our sample ($n=231$, 84%) reported income from some form of social assistance in the last 30 days. The median income derived from social assistance was \$800 (IQR: 530–990). Other sanctioned income sources generated relatively less income, and only a small proportion of respondents reported earnings through paid work ($n=38$, 14%).

As indicated in Table 1, among individuals who reported income from any prohibited activity ($n=145$), 68 (47%) indicated they would no longer engage in the reported prohibited activities if they did not need money for drugs. Among those who reported income from sex trade work, 31 (62%) indicated they would no longer engage in sex trade work if they did not require money for drugs. Further, 30 (41%) respondents reporting income from drug dealing, 6 (50%) respondents reporting engaging in other criminal behavior, 10 (40%) respondents

Table 2

Univariate analyses of study participants' characteristics stratified by those who did and did not report prohibited income sources

Characteristics	Prohibited ^a income source			
	Yes, <i>n</i> (%)	No, <i>n</i> (%)	OR	95% CI
Median age (IQR) ^b	36 (16)	41 (13)	1.0	(0.9–1.0)
Frequent crack use ^c				
Yes	99 (70)	43 (30)	4.6	(2.6–7.2)
No	46 (35)	87 (65)		
Syringe lending ^c				
Yes	17 (81)	4 (19)	4.2	(1.4–12.8)
No	128 (50)	126 (50)		
Frequent heroin use ^c				
Yes	75 (68)	36 (32)	2.7	(1.7–4.6)
No	70 (43)	94 (57)		
Public injecting ^c				
Yes	34 (72)	13 (28)	2.7	(1.4–5.5)
No	111 (49)	117 (51)		
Gender				
Female	82 (65)	45 (35)	2.5	(1.5–4.0)
Male	63 (43)	85 (57)		
Homelessness ^c				
Yes	34 (71)	14 (29)	2.5	(1.3–5.0)
No	111 (49)	116 (51)		
Syringe borrowing ^c				
Yes	13 (62)	8 (38)	1.5	(0.6–3.7)
No	132 (52)	122 (48)		
Frequent cocaine use ^c				
Yes	33 (52)	30 (48)	1.0	(0.6–1.7)
No	112 (53)	100 (47)		
Addiction treatment ^c				
Yes	76 (50)	76 (50)	0.8	(0.5–1.3)
No	69 (56)	54 (44)		
Aboriginal ethnicity				
Yes	40 (48)	43 (52)	0.8	(0.5–1.3)
No	105 (55)	87 (45)		

OR: odds ratio; CI: confidence interval.

^a Prohibited income categories include; sex trade work, drug dealing, other criminal activity, panhandling, and binning.^b Age per year older.^c Activities or situations referring to previous 6 months.

Table 3

Logistic regression analysis of factors associated with partaking in prohibited income generating activities

Variable	Analysis of all prohibited activities ^a		Analysis of restricted prohibited activities ^b	
	AOR	95% CI	AOR	95% CI
Age (per year older)	1.0	(1.0–1.0)	1.0	(1.0–1.0)
Frequent cocaine inject ^c (yes vs. no)	0.6	(0.3–1.2)	0.7	(0.4–1.4)
Frequent crack use ^c (yes vs. no)	3.5	(1.9–6.2)	3.6	(2.0–6.4)
Frequent heroin inject ^c (yes vs. no)	2.3	(1.3–4.1)	2.6	(1.5–4.6)
Syringe borrowing ^c (yes vs. no)	0.9	(0.3–3.0)	0.8	(0.3–2.6)
Syringe lending ^c (yes vs. no)	2.7	(0.8–9.8)	2.3	(0.7–7.1)
Public injecting ^c (yes vs. no)	1.4	(0.6–3.4)	1.1	(0.5–2.5)
Homelessness ^c (yes vs. no)	1.6	(0.7–3.8)	1.1	(0.5–2.5)
Addiction treatment ^c (yes vs. no)	0.7	(0.4–1.2)	0.8	(0.4–1.4)
Non-aboriginal female (reference)	1.0	Ref	1.0	Ref
Aboriginal female (yes vs. reference)	0.3	(0.1–0.7)	0.5	(0.2–1.0)
Non-aboriginal male (yes vs. reference)	0.4	(0.2–0.7)	0.4	(0.2–0.7)
Aboriginal male (yes vs. reference)	0.2	(0.1–0.7)	0.3	(0.1–0.9)

AOR: adjusted odds ratio; CI: confidence interval.

^a All prohibited activities include the following categories: sex trade, drug dealing, other criminal activities, panhandling and binning.^b Restricted prohibited activities include the following categories: sex trade work, drug dealing, other criminal activities.^c Activities or situations referring to previous 6 months.

reporting panhandling and 1 (5%) respondent who reported binning stated that they would eliminate these respective income sources if they did not require money to pay for illegal substances.

The univariate analyses of associations between independent variables of interest and engagement in prohibited income generating activities are shown in Table 2. As indicated, frequent crack use (OR = 4.6, 95% CI: 2.6–7.2), syringe lending (OR = 4.2, 95% CI: 1.4–12.8), frequent heroin use (OR = 2.7, 95% CI: 1.7–4.6), public injecting (OR = 2.7, 95% CI: 1.4–5.5), female gender (OR = 2.5, 95% CI: 1.5–4.0) and homelessness (OR = 2.5, 95% CI: 1.3–5.0) were positively associated with engaging in prohibited income generating activities.

When examining potential interactions between variables of interest, an interaction effect was identified between gender and ethnicity. This interaction was driven by sex trade being dominated by non-aboriginal females. To account for this, a new class variable was defined to combine gender and ethnicity whereby the reference group was non-aboriginal females. These class variables were included along with all other variables of interest in the multivariate logistic regression models.

When all prohibited activities were considered (see Table 3), the group most strongly associated with reporting prohibited income generation were non-aboriginal females. Frequent crack use (adjusted odds ratio [AOR] = 3.5, CI: 1.9–6.2), and frequent heroin injection (AOR = 2.3, CI: 1.3–4.1) also remained positively associated with prohibited income generating activities in multivariate analyses. The results remained the same when the dependent variable was restricted to sex trade work, drug dealing, and other criminal activity. Both models are presented in Table 3.

In sub analyses, data representing the amounts of income earned through prohibited activities were converted for use in linear regression models through log transformation to address highly skewed data (range = \$40–\$30,000). In the resulting analysis presented in Table 4, frequent heroin injection and frequent

Table 4

Linear regression of factors associated with income generated from prohibited activities^a

Variable	Coefficient (β)	S.E.	t-Value	p-Value
Intercept	6.78	0.78	8.59	<0.01
Frequent heroin injection ^b	0.68	0.28	2.41	0.02
Frequent crack use ^b	1.09	0.32	3.37	<0.01

S.E.: standard error. Income data was logged. Model was adjusted for: age, gender, aboriginal ethnicity, frequent cocaine injection, syringe borrowing, syringe lending, public injecting, homelessness, and addiction treatment.

^a Prohibited activities include the following categories: sex trade, drug dealing, other criminal activities, panhandling and binning.

^b Activities or situations referring to previous 6 months.

crack use were found to be statistically significant predictors of amount of income earned ($p < 0.05$). Specifically, frequent heroin injectors reported earning 97.4% more income from prohibited sources, and frequent crack users reported earning 197.4% more income from prohibited sources. Other sub analyses attempting to model the predictors of the number of days spend in the last month engaging in drug dealing activities and sex trade work failed to produce significant results, due in part to low event counts. Models seeking to identify predictors of willingness to give up drug dealing and sex trade work also failed to produce significant findings, again due in part to low event counts.

4. Discussion

In the present study, we found that 53% of our active IDU sample reported generating income through prohibited activities, with drug dealing and sex trade work found to be the most prevalent sources of income. Factors independently associated with engaging in prohibited income generating activities were frequent crack use and frequent heroin injection. Non-aboriginal females were the group most strongly associated with prohibited

income generation; however, it is important to note that aboriginal females were also more likely than males (both aboriginal and non-aboriginal) to report prohibited income generation. This finding should not be interpreted to indicate that aboriginal females are not a high-risk group as previous research has identified an association between aboriginal females and risky drug use practices (Craib et al., 2003). In total, 67 (46%) individuals who reported obtaining income from prohibited sources said they would give up this source of income if they did not need money for drugs, with those who reported earning money through sex trade work being most likely to report that they would eliminate this source of income if they did not require money for drugs.

Consistent with previous studies, a substantial proportion of IDU generate income through prohibited activities (Fischer et al., 1999; Bretteville-Jensen and Sutton, 1996), and those engaging in such activities possess several markers of higher intensity addiction (Sherman and Latkin, 2002; Grapendaal et al., 1995). Also consistent with other studies (Bretteville-Jensen and Sutton, 1996; Grapendaal et al., 1995); social security was the most prevalently reported source of income followed by drug dealing and sex trade work, and women were more likely than men to engage in prohibited income generation; a finding largely driven by a much higher proportion of women engaging in sex trade work.

The rates of involvement in sex trade work and drug dealing found in our study are alarming given the previously identified health and social harms associated with these activities, including violence. Furthermore, participation in any of the prohibited activities explored in the current study increases the risk of arrest and incarceration, which has been shown to be a predictor of HIV infection among local IDU (Wood et al., 2005; Small et al., 2005). As indicated by our multivariate analyses, females and those involved in high intensity drug use appear to be most vulnerable to dangers associated with prohibited income generating activities.

A central implication of our findings is that a portion of the prohibited income generation of active IDU, and the harms associated with them, are a function of the costs associated with illegal drugs. By disrupting drug markets and increasing risks involved in producing and distributing illegal substances, prohibition-based drug enforcement policies play a role in inflating drug prices (Reuter and Kleiman, 1986; Caulkins and MacCoun, 2003; Boyum and Kleiman, 2001), which in turn induces active IDU with high intensity addictions to engage in prohibited income generating behavior to finance their drug use. While the ultimate objective of inducing high drug prices is to deter drug use (Caulkins and Reuter, 1996; Office of National Drug Control Strategy, 2006), this analysis and a growing body of research indicates that the unintended consequences of these enforcement-based policies produce significant harm for drug using individuals and broader society (Small et al., 2006; Cooper et al., 2005; Kerr et al., 2005; Wood et al., 2004; Aitken et al., 2002; Blankenship and Koester, 2002; Maher and Dixon, 1999). It is important that policy makers recognize these realities and balance the perceived benefits of criminal-prohibition with other associated outcomes, such as increased levels of crime

and IDU engagement in risky prohibited income generating activities.

While this analysis suggests that higher intensity addiction and the costs associated with purchasing illegal drugs are central factors influencing active IDU to engage in prohibited income generating activities, the lack of available alternative income sources is also an important aspect of this relationship. Many active IDU have difficulty finding sufficient legitimate paid work due in part to unstable housing, limited employable skills and low levels of education (Sherman et al., 2006). One alternative for these individuals is to obtain income assistance and other forms of social assistance; however, income analysis in the present study found the median income from social assistance to be \$800, which for most IDU is insufficient to support a secure living and habitual drug consumption (Casavant and Collin, 2001; Fischer et al., 1999). Furthermore, the current structure of social assistance in Canada is such that recipients will lose their income benefits if they begin to earn above \$400 per month through legitimate work, leaving this population with limited income generating options beyond resorting to prohibited sources.

Given the association between amount of prohibited income generated and high intensity addiction, the findings of the present study highlight the importance of introducing targeted interventions, which focus on individuals with higher intensity addictions. One method of trying to reduce engagement in prohibited income generation among drug user populations with severe addictions is to expand their economic opportunities. This would involve supporting the development of legitimate means of earning income through various low threshold employment opportunities and skill building measures. A recent intervention designed to economically empower drug addicted sex trade workers to develop alternative legitimate sources of income has been shown to have a positive influence on reducing involvement in the sex trade industry (Sherman et al., 2006). Alternatively, policy makers could intervene by providing addiction prescription and substitution therapies to individuals with markers of serious addiction to decrease their reliance on, and subsequent need to purchase, street drugs. This could be achieved in part through heroin prescription programs and by expanding substitution therapies including methadone maintenance. However, given the high prevalence of stimulant use both locally and globally (World Drug Report, 2006; Adlaf et al., 2005; Buxton, 2005), opiate substitution therapies will have a limited impact, and therefore continued exploration of stimulant replacement therapies is desirable. These types of interventions would both reduce criminal activity and remove profits from criminal organizations.

There are several limitations in this study to be noted. First, as with most other cohort studies of IDU, the VIDUS study is not a random sample, and therefore these findings may not generalize to other IDU populations. Secondly, this study relied on self-reported information concerning sources and amounts of income, as well as predictions of future behavior in theoretical situations and is hence susceptible to recall bias as well as socially desirable reporting. In the present study this may have led to an under-reporting of income derived through criminal

activities. Thirdly, reported income sources do not account for 'in-kind' transactions. A likely result is that the true monetary profits in the drug dealing category are under reported as many individuals purchase large quantities of drugs to offset the cost of their own consumption or are paid in drugs rather than money for drug dealing work (Bretteville-Jensen and Sutton, 1996). Similarly, sex for drugs exchanges are also not considered in this analysis. As the benefits from these informal exchanges are not reported as income our analysis likely underestimates the extent to which the costs associated with purchasing drugs encourage drug dealing and sex work to support illegal substance use.

In sum, our study suggests that the high costs associated with illegal drugs are particularly problematic for females (largely driven by the high proportion of female involvement in sex trade work) and those possessing markers of high intensity addiction, and these costs likely serve to encourage and perpetuate engagement in illegal income generating activities. Collectively these findings indicate an opportunity to explore the benefits of developing low threshold employment opportunities and prescription and substitution therapies.

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Authors' contributions

KD, TK and KS designed the study and wrote the protocol. Author KD managed the literature search and summaries of previous related work. Author KL undertook the statistical analysis and authors KD and TK wrote the first draft of the manuscript. KS, EW and JM contributed to the main content and provided critical comments on the final draft. All authors contributed to and have approved the final manuscript.

Conflict of interest

Dr. Julio Montaner has received grants from, served as an ad hoc adviser to, or spoken at various events sponsored by: Abbott, Argos Therapeutics, Bioject Inc., Boehringer Ingelheim, BMS, Gilead Sciences, GlaxoSmithKline, Hoffmann-La Roche, Janssen-Ortho, Merck Frosst, Pfizer, Schering, Serono Inc., TheraTechnologies, Tibotec, Trimeris. All other authors declare that they have no conflicts of interest.

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Research paper

Interest in low-threshold employment among people who inject illicit drugs: Implications for street disorder

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ABSTRACT

Background: Income generation opportunities available to people who use illicit drugs have been associated with street disorder. Among a cohort of injection drug users (IDU) we sought to examine street-based income generation practices and willingness to forgo these sources of income if other low-threshold work opportunities were made available.

Methods: Data were derived from a prospective community recruited cohort of IDU. We assessed the prevalence of engaging in disorderly street-based income generation activities, including sex work, drug dealing, panhandling, and recycling/salvaging/vending. Using multivariate logistic regressions based on Akaike information criterion and the best subset selection procedure, we identified factors associated with disorderly income generation activities, and assessed willingness to forgo these sources of income during the period of November 2008 to July 2009.

Results: Among our sample of 874 IDU, 418 (48%) reported engaging in a disorderly income generation activity in the previous six months. In multivariate analyses, engaging in disorderly income generation activities was independently associated with high intensity stimulant use, as well as binge drug use, having encounters with police, being a victim of violence, sharing used syringes, and injecting in public areas. Among those engaged in disorderly income generation, 198 (47%) reported a willingness to forgo these income sources if given opportunities for low-threshold employment, with sex workers being most willing to engage in alternative employment.

Conclusion: Engagement in disorderly street-based income generation activities was associated with high intensity stimulant drug use and various markers of risk. We found that a high proportion of illicit drug users were willing to cease engagement in these activities if they had options for causal low-threshold employment. These findings indicate that there is a high demand for low-threshold employment that may offer important opportunities to reduce drug-related street disorder and associated harms.

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Introduction

There are many established links between chronic illicit drug use and engagement in illegal income generation activities (Ball, Shaffer, & Nurco, 1983; Bretteville-Jensen & Sutton, 1996; Deschenes & Anglin, 1991; Fischier, Medved, Kirst, Rehm, & Kliksman, 2001; Hammersley, Forsyth, Morrison, & Davies, 1989; Nurco, Cisin, & Ball, 1985; Silverman & Spruill, 1977). People who use illicit drugs and are struggling with addiction are often unable to acquire and sustain formal employment, and yet the high costs associated with obtaining

illicit drugs requires individuals to find means of generating income (Bretteville-Jensen & Sutton, 1996; Cross, Johnson, Davis, & Liberty, 2001; McCoy, Comerford, & Metsch, 2007; Platt, 1995; Richardson, Wood, Zhang, Montaner, Tyndall, & Kerr, 2008; Richardson, Wood, Li, & Kerr, 2010). Given these constraints, the income generation opportunities available to illicit drug users frequently involve illegal activity and are often associated with street disorder (Bretteville-Jensen & Sutton, 1996; DeBeck, Shannon, Wood, Li, Montaner, & Kerr, 2007). For example, common income generation strategies include street-based sex work, drug dealing, panhandling and recycling/salvaging/vending which often take place on public streets and are generally considered to be undesirable activities from a community perspective (Bose & Hwang, 2002; Collins & Blomley, 2003; DeBeck et al., 2007; Kerr, Small, Johnston, Li, Montaner, & Wood, 2008; Shannon, Bright, Allinott, Alexson,

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Gibson, & Tyndall, 2007a). In Vancouver, Canada these types of disorderly income generation activities are a well-described feature of the city's drug use epicentre known as the Downtown Eastside [DTES] (DeBeck et al., 2007; Kerr et al., 2008; Shannon et al., 2007a).

To date, policy responses to address problems associated with illicit drug use, including street disorder resulting from the income generation activities of illicit drug users, typically rely on law enforcement to deter and manage undesirable practices and behaviours (Boyum & Reuter, 2005; DeBeck, Wood, Montaner, & Kerr, 2006; Maher, 2000; National Research Council, 2002). However, it has been documented that in many instances law enforcement initiatives seeking to reduce street disorder result in displacing disorderly activities to surrounding neighbourhoods (Aitken, Moore, Higgs, Kelsall, & Kerger, 2002; Maher & Dixon, 1999; Wood et al., 2004). This has been shown to negatively impact communities and separate vulnerable drug users from familiar health and social services (Aitken et al., 2002; Cooper, Wypij, & Krieger, 2005; Maher & Dixon, 1999; Wood et al., 2004). Given these harms and the limited effectiveness of law enforcement in this area, alternative approaches to managing street disorder are required.

A growing body of health research suggests that interventions, such as law enforcement, that primarily target the behaviour of individuals may be limited in their effectiveness and inadvertently produce harm because they fail to recognize and address the role that social and structural factors play in shaping behaviour (Blankenship, Friedman, Dworkin, & Mantell, 2006; Galea, Ahern, & Vlahov, 2003; Rhodes, 2002; Sumartojo, 2000). Rhodes' "Risk Environment Framework" has been used to illustrate the importance of considering factors exogenous to the individual when examining drug-related harm (Rhodes, 2002, 2009; Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005). According to this framework, social, structural, and environmental level factors create a context that shapes individual behaviour and decision-making (Rhodes, 2002; Rhodes, Lilly, & Fernández, 2003). From this perspective, "risk" is not only a product of individual behaviour, but is shaped and structured by laws, policies, and social relations that surround individuals. Targets for policy intervention, therefore, involve altering social and structural environments (Blankenship, Bray, & Merson, 2000; Des Jarlais, 2000; Heimer, Bray, Burris, Khoshnood, & Blankenship, 2002). The problem of disorderly income generation is therefore not solely a matter of individuals choosing to engage in undesirable practices; rather, disorderly income generation is shaped by environmental, social and structural conditions. In turn, one potential approach to reducing street disorder is to change the structural environment surrounding individuals who use drugs by creating sanctioned low-threshold employment opportunities.

The concept of 'low-threshold' is to create programs that are easily accessible for active drug users and a key component of low-threshold programs is that they do not require abstinence from drug use. A recent longitudinal analysis among Vancouver based IDU revealed low levels of regular employment among study participants and also demonstrated that high intensity drug use was negatively associated with regular employment, highlighting the need for alternative employment strategies for this population (Richardson et al., 2010). Initial research suggests that low-threshold programs can engage street-involved drug users and reduce their participation in some types of disorderly income generation activities. An evaluation of a jewellery making economic empowerment program for women who use illicit drugs demonstrated that the program was associated with reductions in sex work involvement (Sherman, German, Cheng, Marks, & Bailey-Kloche, 2006).

In Vancouver, Canada there are a small number of existing low-threshold employment opportunities available to individuals who actively use illicit drugs. For example, in the DTES of Van-

couver a community café and catering social enterprise company provides an estimated nine low-threshold employment positions (Lougheed-Green, 2004; Potluck catering, 2010), an organization that processes recyclable containers provides roughly 33 low-threshold positions (Dale & Newman, 2008; Lyotier, 2010), a local drug users group provides a small number of stipends for volunteer work undertaken by their members (Hayashi, Wood, Wiebe, Qi, & Kerr, 2010; Lloyd-Smith et al., 2010; VANDU, 2010) and a photo calendar project initiated by a social justice organization offers a program for residents of the DTES to become vendors and sell calendars and books (Grainger, 2008; Hope in Shadows, 2010; Moore & Pell, 2010). Despite the existence of these opportunities, the number of low-threshold employment positions is limited and there is little information available to determine whether there is a significant demand for this type of work among individuals who currently engage in disorderly income generation activities.

Therefore, we sought to characterize the prevalence and correlates of engaging in disorderly income generation activities among a community recruited cohort of injection drug users (IDU) in Vancouver. We then sought to identify whether there was a demand for low-threshold employment among those who were engaged in disorderly income generation to identify if this might be a suitable structural intervention to reduce one component of street disorder.

Methods

Data for this study was obtained from the Vancouver Injection Drug Users Study (VIDUS), which is an open prospective cohort that began enrolling IDU through street outreach and self-referral in May 1996. This study has been described in detail previously (Kerr et al., 2007; Wood et al., 2002). In brief, to be eligible participants at recruitment must reside in the Greater Vancouver Regional District, have injected illicit drugs in the previous month, and provide written informed consent. At enrolment and on bi-annual basis participants complete an interviewer-administered questionnaire and provide a blood sample for serologic testing. At each study visit participants are provided with a stipend (\$20 CDN) for their time. The study has received ethics approval from St. Paul's Hospital/University of British Columbia's Research Ethics Board. The present analyses are restricted to those participants seen for study follow-up during the period of November 2008 to July 2009 as the measure for our outcome of interest was available only for this period. If individuals were seen for multiple study follow-up visits during this study period, only data from their first visit was used.

All participants seen during our study period were asked to identify all their income sources (over the last six months) and to estimate the average number of hours per week they spent engaged in each income generation activity over the last 30 days. Categories of income sources included recycling (includes salvaging recyclable materials and unsanctioned street vending), panhandling, squeegeeing, sex trade work and drug dealing. Other categories of income sources included welfare (including disability, pensions and other forms of government transfers), family and friends, regular job, temporary work (including under the table employment) and criminal activity (category encompasses a range of criminal activities including theft, break and entry, robbery and fraud).

To help determine whether low-threshold employment might have a positive effect on reducing street disorder, we began by evaluating factors associated with engaging in disorderly income generation. In this initial analysis the outcome of interest was engaging in 'disorderly income generation activities' defined as reporting any of the following income sources: recycling, squeegeeing, panhandling, selling drugs and exchanging sex for money. Although we were unable to confirm that all reported drug deal-

Table 1Participation in disorderly income generation activities among injection drug users (last six months) ($n = 874$).

Income source	N (%) reporting activity		Median hours per week engaged in activity ^a (IQR)		N (%) would cease to engage in activity ^b	
Recycling	165	(19)	14	(8–30)	48	(29)
Panhandling	57	(7)	14	(4.5–40)	21	(37)
Squeegeeing	5	(1)	5	(2–10)	0	(0)
Drug dealing	220	(25)	20	(6–40)	97	(44)
Sex work	81	(9)	9	(3–21)	51	(63)

^a Refers to number of hours spent doing the activity in the average week over the last 30 days.^b Participants that would cease to engage in the activity if they had other opportunities for low-threshold employment.

ing and sex work activities occurred in public settings, a previous study among VIDUS participants found that both activities are independently associated with spending time in Vancouver's open drug scene suggesting that these activities are largely street-based (DeBeck et al., 2011). Reports in the 'criminal activity' category were not included in the 'disorderly income generation activities' category because the focus of our analysis was on street-disorder and the links between general criminal activities and street-disorder were unclear.

To characterize factors associated with engagement in disorderly income generation activities, we *a priori* selected a range of socio-demographic and behavioural variables based on previous literature on street disorder and income generation (DeBeck et al., 2007, 2011). We hypothesized that these variables would provide a profile of individuals engaged in disorderly income generation that could inform and direct policy interventions in this area. Variables included: age (per year older); daily expenditure on drugs (per additional \$10); gender (female vs. male); Aboriginal ancestry (yes vs. no); unstable housing, defined as currently living in a single occupancy room in a hotel, a treatment or recovery house, jail, shelter or hostel, or having no fixed address for the last six months (yes vs. no); high school education, defined as completing high school or obtaining equivalent diploma (yes vs. no); having regular employment, defined as having a regular or temporary job (yes vs. no); daily cocaine injection (yes vs. no); daily heroin injection (yes vs. no); daily crack cocaine smoking (yes vs. no); non-fatal overdose (yes vs. no); binge drug use, defined as a period of using drugs more often than usual (yes vs. no); encounters with police in the last month, defined as being questioned, searched or stopped by police (yes vs. no); being a victim of violence (yes vs. no); syringe sharing, defined as borrowing or lending syringes already used by someone else to inject drugs (yes vs. no); using injection drugs in public locations, such as city streets, parks and alleys (yes vs. no); engaging in any unprotected sex (yes vs. no); being recently incarcerated (yes vs. no); and current enrolment in methadone treatment (yes vs. no). Unless otherwise stated, all drug use and behavioural variables refer to the previous six month period.

In our primary analysis, we sought to assess whether a structural intervention in the form of low-threshold employment might have an impact on street disorder. To do this we measured demand for low-threshold employment and identified predictors of willingness to cease engagement in disorderly income generation activities if low-threshold employment was available. Our measures were based on the questions: "If you were offered casual work that did not interfere with your welfare, would you take it?" and "If yes, are there any income sources in the last 30 days that you would eliminate?" Participants were then asked to indicate which sources of income they would forgo. Variables of interest for this analysis included all variables from the primary analysis, in addition to engagement in specific disorderly income generation activities, including recycling, panhandling, squeegeeing, drug dealing and sex work. As in the initial analysis, unless otherwise stated, all

drug use and behavioural variables refer to the previous six month period.

For both our analyses, we used logistic regression to determine factors associated with our outcomes of interest. In univariate analysis categorical explanatory variables were analysed using Pearson's chi-square test and continuous variables were analysed using the Mann–Whitney test. Fisher's exact test was used when one or more of the cell counts was less than or equal to five. To evaluate factors independently associated with our outcomes of interest, we used Akaike information criterion (AIC) with the best subset selection procedure. This provided a computationally efficient method to screen all possible combinations of candidate variables and identify the model with the best overall fit as indicated by the lowest AIC value (Shtatland, Cain, & Barton, 2001). All statistical analyses were performed using SAS software version 9.1 (SAS, Cary, NC). All *p*-values are two sided.

Results

During the study period a total of 874 participants completed follow-up visits, including 310 (35%) women and 312 (36%) persons who identified as being of Aboriginal ancestry. The median age of participants was 45 years (interquartile range [IQR] = 39–51). Among our sample of 874 IDU surveyed between November 2008 and July 2009, a total of 418 (48%) reported engaging in disorderly income generation activities. The median number of disorderly activities that participants engaged in was 1 (IQR = 1–1). As displayed in Table 1, drug dealing ($n = 220$, 25%) and recycling ($n = 165$, 19%) were the most common types of disorderly income generation activity, and the median number of hours spent engaged in disorderly income generation activities each week was highest for drug dealing (20 h per week, IQR = 6–40). The characteristics of the study sample stratified by engagement in disorderly income generation activities are presented in Table 2.

Among individuals who reported engaging in disorderly income generation activities, 198 (47%) indicated they would cease engaging in this activity if they had access to low-threshold employment. As shown in Table 1, among those who reported income from sex trade work, 51 (63%) indicated they would no longer engage in sex trade work if they had access to low-threshold employment. Further, 97 (44%) respondents who reported income from drug dealing, 21 (37%) respondents who reported engaging in panhandling and 48 (29%) respondents who engaged in recycling reported that they would refrain from engaging in those disorderly income generation activities if they had access to causal employment opportunities.

The univariate and multivariate findings for our initial exploratory analyses of behavioral and socio-demographic variables associated with engaging in disorderly income generation activities are also presented in Table 2. Factors that remained independently associated with disorderly income generation activities included: regular employment (adjusted odds ratio [AOR] = 0.47, 95%CI: 0.32–0.69); daily cocaine injection (AOR = 2.11,

Table 2

Univariate and multivariate analyses of factors associated with engaging in disorderly income generation activities among injection drug users (n = 874).

Characteristic	Disorderly income generation ^a		p-Value	AOR ^b (95% CI)	p-Value
	Yes n = 418, n (%)	No n = 456, n (%)			
Age					
Per year older	43 (38–50) ^c	46 (41–51) ^c	0.97 (0.95–0.98)	<0.001	
Daily expenditure on drugs					
Per additional \$10	50 (30–100) ^c	30 (10–60) ^c	1.05 (1.03–1.07)	<0.001	1.02 (1.00–1.03)
Female gender					0.066
Yes	165 (39)	145 (32)	1.40 (1.06–1.85)	0.018	
No	253 (61)	311 (68)			
Aboriginal ancestry					
Yes	152 (36)	160 (35)	1.06 (0.80–1.39)	0.694	
No	266 (64)	296 (65)			
Unstable housing (current)					
Yes	110 (26)	58 (13)	2.45 (1.73–3.48)	<0.001	
No	308 (74)	398 (87)			
High school education					
Yes	199 (48)	248 (54)	0.76 (0.58–0.99)	0.045	
No	219 (52)	208 (46)			
Regular employment ^d					
Yes	55 (13)	137 (30)	0.35 (0.25–0.50)	<0.001	0.47 (0.32–0.69)
No	363 (87)	319 (70)			<0.001
Daily cocaine injection ^d					
Yes	49 (12)	18 (4)	3.23 (1.85–5.64)	<0.001	2.11 (1.13–3.96)
No	369 (88)	438 (96)			0.020
Daily heroin injection ^d					
Yes	110 (26)	43 (9)	3.43 (2.34–5.03)	<0.001	
No	308 (74)	413 (91)			
Daily crack smoking ^d					
Yes	213 (51)	74 (16)	5.36 (3.92–7.34)	<0.001	3.29 (2.32–4.66)
No	205 (49)	382 (84)			<0.001
Overdose (non-fatal) ^d					
Yes	20 (5)	7 (2)	3.22 (1.35–7.70)	0.006	
No	398 (95)	449 (98)			
Binge drug use ^d					
Yes	230 (55)	150 (33)	2.50 (1.90–3.28)	<0.001	1.57 (1.14–2.16)
No	188 (45)	306 (67)			0.006
Encounters with police ^d					
Yes	129 (31)	50 (11)	3.62 (2.53–5.19)	<0.001	2.49 (1.65–3.75)
No	289 (69)	406 (89)			<0.001
Victim of violence ^d					
Yes	84 (20)	42 (9)	2.48 (1.66–3.69)	<0.001	1.69 (1.07–2.68)
No	334 (80)	414 (91)			0.025
Syringe sharing ^d					
Yes	28 (7)	4 (1)	8.11 (2.82–23.33)	<0.001	4.42 (1.43–13.68)
No	390 (93)	452 (99)			0.010
Public injecting ^d					
Yes	148 (35)	52 (11)	4.26 (3.00–6.05)	<0.001	2.27 (1.51–3.39)
No	270 (65)	404 (89)			<0.001
Unprotected sex ^d					
Yes	113 (27)	98 (21)	1.35 (0.99–1.85)	0.056	
No	305 (73)	358 (79)			
Recent incarceration ^d					
Yes	65 (16)	30 (7)	2.61 (1.66–4.12)	<0.001	
No	353 (84)	426 (93)			
Methadone treatment (current)					
Yes	188 (45)	218 (48)	0.89 (0.68–1.16)	0.402	
No	230 (55)	238 (52)			

^a Disorderly income generation includes: recycling, squeegeeing, panhandling, selling drugs, and engaging in sex work measured in the last six months.^b OR = odds ratio, CI = confidence interval, AOR = adjusted odds ratio.^c Median and interquartile range.^d Denotes activities or situations referring to previous 6 months.

95%CI: 1.13–3.96); daily crack cocaine smoking (AOR=3.29, 95%CI: 2.32–4.66); binge drug use (AOR=1.57, 95%CI: 1.14–2.16); encounters with police (AOR=2.49, 95%CI: 1.65–3.75); being a victim of violence (AOR=1.69, 95%CI: 1.07–2.68); syringe sharing (AOR=4.42, 95%CI: 1.43–13.68); and public injecting (AOR=2.27, 95%CI: 1.51–3.39).

For our primary analysis, the univariate and multivariate results of factors associated with willingness to cease engaging in disorderly income generation activities are presented in Table 3. Factors that remained independently associated with willingness

to cease engaging in disorderly income generation included: sex work (AOR=2.32, 95%CI: 1.35–3.96); drug dealing (AOR=1.91, 95%CI: 1.22–2.99); binge drug use (AOR=1.55, 95%CI: 1.02–2.36); incarceration (AOR=2.03, 95%CI: 1.11–3.73); and current enrolment in methadone treatment (AOR=1.68, 95%CI: 1.11–2.56).

Discussion

Among our sample of 874 IDU, we found that 48% reported engaging in a disorderly income generation activity in the last six

Table 3Univariate and multivariate analyses of factors associated with willingness to cease engaging in disorderly income generation activities among injection drug users (*n* = 418).

Characteristic	Willing to cease engaging in disorderly income generation ^a			<i>p</i> -Value	AOR ^b (95% CI)	<i>p</i> -Value
	Yes <i>n</i> = 198, <i>n</i> (%)	No <i>n</i> = 220, <i>n</i> (%)	OR ^b (95% CI)			
Age						
Per year older	43 (37–49)	44 (38–51)	0.98 (0.96–1.00)	0.006		
Daily expenditure on drugs						
Per additional \$10	60 (30–100) ^c	50 (20–100) ^c	1.01 (1.00–1.03)	0.073		
Female gender						
Yes	88 (44)	77 (35)	1.49 (1.00–2.20)	0.049		
No	110 (56)	143 (65)				
Aboriginal ancestry						
Yes	81 (41)	71 (32)	1.45 (0.97–2.17)	0.067	1.52 (0.99–2.35)	0.058
No	117 (59)	149 (68)				
Unstable housing (current)						
Yes	63 (32)	47 (21)	0.73 (0.49–1.07)	0.105	1.50 (0.92–2.43)	0.103
No	135 (68)	173 (79)				
High school education						
Yes	86 (43)	113 (51)	0.76 (0.58–0.99)	0.045	0.73 (0.48–1.10)	0.136
No	112 (57)	107 (49)				
Regular employment ^d						
Yes	23 (12)	39 (18)	0.61 (0.35–1.06)	0.079		
No	175 (88)	181 (82)				
Sex work ^d						
Yes	52 (26)	29 (13)	2.34 (1.42–3.88)	<0.001	2.32 (1.35–3.96)	0.002
No	146 (74)	191 (87)				
Drug dealing ^d						
Yes	122 (62)	98 (45)	2.00 (1.35–2.95)	<0.001	1.91 (1.22–2.99)	0.005
No	76 (38)	122 (55)				
Recycling ^d						
Yes	67 (34)	98 (45)	0.64 (0.43–0.95)	0.025		
No	131 (66)	122 (55)				
Panhandling ^d						
Yes	27 (14)	30 (14)	1.00 (0.57–1.75)	1.000	1.66 (0.89–3.13)	0.114
No	171 (86)	190 (86)				
Daily cocaine injection ^d						
Yes	24 (12)	25 (11)	1.08 (0.59–1.95)	0.810		
No	174 (88)	195 (89)				
Daily heroin injection ^d						
Yes	61 (31)	49 (22)	1.55 (1.00–2.41)	0.048		
No	137 (69)	171 (78)				
Daily crack smoking ^d						
Yes	108 (55)	105 (48)	1.31 (0.89–1.93)	0.164		
No	90 (45)	115 (52)				
Overdose (non-fatal) ^d						
Yes	11 (6)	9 (4)	1.38 (0.56–3.40)	0.484		
No	187 (94)	221 (96)				
Binge drug use ^d						
Yes	125 (63)	105 (48)	1.88 (1.27–2.77)	0.002	1.55 (1.02–2.36)	0.041
No	73 (37)	115 (52)				
Encounters with police ^d						
Yes	69 (35)	60 (27)	1.43 (0.94–2.16)	0.094		
No	129 (65)	160 (73)				
Victim of violence ^d						
Yes	42 (21)	42 (19)	1.14 (0.71–1.84)	0.589		
No	156 (79)	178 (81)				
Syringe sharing ^d						
Yes	14 (7)	14 (6)	1.12 (0.52–2.41)	0.773		
No	184 (93)	206 (94)				
Public injecting ^d						
Yes	81 (41)	67 (30)	1.58 (1.06–2.37)	0.026		
No	117 (59)	153 (70)				
Unprotected sex ^d						
Yes	59 (30)	54 (25)	1.30 (0.85–2.01)	0.227		
No	139 (70)	166 (75)				
Recent incarceration ^d						
Yes	43 (22)	22 (10)	2.50 (1.43–4.35)	0.001	2.03 (1.11–3.73)	0.022
No	155 (78)	198 (90)				
Methadone treatment (current)						
Yes	103 (52)	95 (43)	1.43 (0.97–2.10)	0.071	1.68 (1.11–2.56)	0.015
No	95 (48)	125 (57)				

^a Disorderly income generation includes: recycling, squeegeeing, panhandling, selling drugs, and engaging in sex work measured in the last six months.^b OR = odds ratio, CI = confidence interval, AOR = adjusted odds ratio.^c Median and interquartile range.^d Denotes activities or situations referring to previous 6 months.

months. The most common activities reported were drug dealing and recycling (which included salvaging and unsanctioned street vending). In a multivariate analysis people who reported engaging in disorderly income generation activities were more likely to smoke crack cocaine on a daily basis and inject cocaine on a daily basis. This population was also more likely to engage in binge drug use, have encounters with police, be a victim of violence, share used syringes and inject drugs in public areas. Conversely, individuals with regular employment were significantly less likely to report engaging in disorderly income generation activities. We also found that among individuals who engaged in disorderly income generation activities, 47% reported that they would be willing to stop engaging in these disorderly activities if they were offered other opportunities for low-threshold employment. Individuals engaged in sex work, drug dealing, binge drug use, who were recently incarcerated or currently enrolled in methadone therapy, were most interested in ceasing their engagement in disorderly income generation activities.

These findings support the conclusions of previous studies indicating that disorderly income generation activities are common among illicit drug users (Bretteville-Jensen & Sutton, 1996; Cross et al., 2001; Deschenes & Anglin, 1991; Nurco et al., 1985). The significant associations between engaging in disorderly income generation activities and daily crack cocaine smoking and daily cocaine injecting are consistent with a growing number of studies linking frequent cocaine use with a greater likelihood of engaging in risky behaviours (Booth, Kwiattkowski, & Chitwood, 2000; Buchanan, Tooze, Shaw, Kinzly, Heimer, & Singer, 2006; Edlin et al., 1994) and illegal activities (Cross et al., 2001; DeBeck et al., 2007). These associations suggest that the compulsive drug acquisition behaviours associated with cocaine addiction may perpetuate the need to generate income through prohibited means. In particular the relatively short half-life of cocaine compared with opioids or methamphetamine may contribute to an increased frequency of drug use and pressure to purchase larger quantities of drugs (Jeffcoat, Perez-Reyes, Hill, Sadler, & Cook, 1989). In addition, the negative psychiatric effects of high intensity cocaine use may have destabilizing influences that present barriers to engaging in formal employment (Cross et al., 2001). Indeed, previous research found that frequent crack cocaine smoking was negatively associated with attaining formal employment among IDU in our study setting (Richardson et al., 2010).

Our findings further indicate that individuals who engage in disorderly income generation activities are a vulnerable population at risk for multiple negative health and social outcomes. Many of the behaviours associated with disorderly income generation activities including daily cocaine injection, daily crack cocaine smoking, binge drug use and syringe sharing, have all been independently linked with increased risk of HIV infection in this setting (DeBeck et al., 2009; Miller et al., 2006; Tyndall et al., 2003). Although many of these findings have been reported previously, they underscore the importance of identifying interventions to reduce engagement in disorderly income generation activities. Therefore, it is of particular importance that our primary analyses found a high demand for low-threshold employment among street-involved IDU and considerable willingness among this population to cease engaging in disorderly activities if they were provided with opportunities for casual low-threshold employment. Previously mentioned findings documenting low levels of regular employment among IDU support the need for alternative income generation interventions (Richardson et al., 2010). The potential for low-threshold employment to reduce engagement in disorderly income generation has already been demonstrated to be successful among women involved in sex work (Sherman et al., 2006). Our findings are also consistent with current literature in the drug use field that emphasizes the importance that structural factors, such as employment

opportunities, play in shaping risk behaviour (Blankenship et al., 2000; Des Jarlais, 2000; Heimer et al., 2002).

The association between current enrolment in methadone treatment and willingness to give up disorderly income generation is consistent with the well-documented positive effect of methadone treatment on reducing illegal income generation (Ball & Alan, 1991; Dole, Robinson, Orraca, Towns, Searcy, & Caine, 1969). This finding also suggests that substitution therapies may have an even greater beneficial role if more low-threshold opportunities were made available.

It is noteworthy that in our study participation in sex work was the strongest independent predictor of willingness to take low-threshold employment. Given the physical dangers and health risks associated with sex work, it is understandable that participants engaged in sex work were most likely to be willing to cease engaging in this behaviour if given other options to earn income (Shannon et al., 2007a; Shannon, Bright, Gibson, & Tyndall, 2007b). In addition to the inherent risks associated with sex work, numerous studies have also linked prohibitive sex-work legislation with increasing the vulnerability of sex workers and undermining their ability to protect their health and physical security (Maher, 2000; Maher & Dixon, 1999; Shannon, Kerr, Allinott, Chettiar, Shoveller, & Tyndall, 2008; Shannon, Strathdee, Shoveller, Rusch, Kerr, & Tyndall, 2009). Although the intention of prohibitive sex-work legislation is to deter engagement in the activity, it appears that the laws that are implemented to reduce the harms of sex work are actually increasing risks. The strong demand for low-threshold employment found in the current study among individuals engaged in sex works suggests that there are important opportunities to reduce the prevalence of this activity through means that do not criminalize sex workers and carry the unanticipated negative consequences of criminal justice interventions. It is important to note, however, that the income earned through sex work is often much greater than through other income generation opportunities. Despite the potential for sex workers to reduce their engagement in sex work if alternative low-threshold employment opportunities were made available, it is likely that the income will not be sufficient for some sex workers. In addition to supporting the development of low-threshold employment opportunities, amending laws that limit the ability of sex workers to protect their health and physical safety should be simultaneously considered and pursued.

IDU who engaged in drug dealing were also significantly more willing to cease this income generation activity if they were given alternative opportunities for low-threshold employment. Former studies of drug distribution networks suggest that many street-level drug dealers do not receive significant compensation for their work (Levitt & Venkatesh, 2000). These works support our findings suggesting that this group may respond well to low-threshold employment opportunities. This should be of particular interest to policy-makers given the high costs of drug law enforcement which attempt to deter illicit drug production and distribution with the threat of incarceration and legal penalties which, to date, have been limited in their ability to prevent engagement in drug dealing among IDU and other segments of the general population (Bewley-Taylor, Trace, & Stevens, 2005; National Research Council, 2002; Rehm et al., 2006).

It is clear from the high rates of engagement in disorderly income generation activities reported in our study that current direct and indirect prohibitions against practices such as drug dealing and sex work are not successfully deterring or preventing engagement in these activities. However, it is interesting to note that sex work and drug dealing, as well as recent incarceration, were all significantly associated with willingness to cease engagement in disorderly income generation activities. This may suggest that the deterrent influence of prohibitions against drug dealing and sex

work could be successful in situations where IDU were given opportunities to choose other less risk income generation opportunities. Unfortunately, it currently appears that the less risky generation opportunities available to most IDU remain limited (McCoy et al., 2007; Richardson et al., 2008, 2010).

A key implication of this study is that creating low-threshold employment opportunities and supporting existing initiatives that currently provide these positions has potential to reduce both street disorder and health risks currently faced by individuals who engage in disorderly income generation activities. Models of low-threshold employment for active illicit drug users already exist in our study setting and elsewhere (Hope in Shadows, 2010; Loughheed-Green, 2004; Lyotier, 2010; Potluck catering, 2010; VANDU, 2010); however, our study suggests that there is a high demand for this type of work and increasing their capacity and availability has potential to reduce both individual- and community-level harms.

There are a number of limitations with this study. Firstly, VIDUS is not a random sample of IDU and therefore these findings may not generalize to other drug using populations. However, the association between crack cocaine smoking and street-based income generation suggests that our findings are likely not specific to injection as the sole mode of cocaine use and may be relevant for crack cocaine smokers that do not have a history of injecting. It should also be noted that the median age of participants in VIDUS is 45 years, which is likely higher than the general population of IDU in Vancouver. This could be expected to result in an under-estimation of risks as younger drug users tend to be more likely to engage in riskier behaviours and practices (Kral, Lorvick, & Edlin, 2000). Secondly, there are limitations with combining different street-based disorderly income generation activities into one category as each of these activities is unique and likely attracts different populations. It is evident from our primary analysis that there are unique characteristics among each group. Although it is crude to combine these very different activities, from a policy perspective it is meaningful to provide a picture of the net factors associated with these activities, as well as direction as to whether a potential policy intervention will likely have an overall beneficial impact despite the differences among activities. While it would have been ideal to supplement our primary analysis with additional models that considered each individual income generation activity separately, low event counts precluded these additional comparisons. An additional limitation with our variable definition is our overly broad definition of 'recycling'. Recycling can constitute a public good when it involves removing litter from public areas; however, it could alternatively constitute a public harm if it involves destructively removing materials from buildings or structures, such as copper piping. We anticipate that the demand for low-threshold employment may be higher for those involved in destructive forms of recycling given the threat of legal repercussions. Unfortunately our survey instrument did not differentiate between these different forms of recycling and thus our results are limited in this regard. We believe the distinctions between different forms of recycling are important and warrant further investigation. A third limitation in our study is that many of our measures relied on self-reported information concerning practices and behaviours that are illegal and/or stigmatized, such as drug dealing, sex work and syringe sharing and are therefore vulnerable to social desirable responding. In this present study, this could have resulted in an under-reporting of engagement in disorderly income generation activities and associated risks resulting in conservative estimates of the prevalence of these activities and risks. There are other limitations with our measures of street-based income generation activities. Specifically, the amount of money earned through street-based disorderly income generation activities does not account for 'in-kind' transactions or non-monetary contributions (i.e., exchange-

ing sex for drugs, being paid in drugs rather than money for drug dealing, or receiving food when panhandling). This could have also led to an under-reporting of engagement in street-based disorderly income generation. Lastly, our study relied on willingness responses that do not represent actual changes in income generation practices. There are potentially a host of external factors that might influence income generation practices, some of which may involve complex social networks and power relations. Therefore, the provision of low-threshold employment cannot be expected to automatically translate into a reduction of street-based income generation among all participants who indicated a willingness to change their income generation practices. However, it is important to note that previous analyses evaluating the validity of reporting willingness to use a supervised injection facility on subsequent rates of use among illicit injection drug users found that willingness measures were reasonably accurate predictors of later behaviour among IDU (DeBeck, 2010).

In summary, we found that 48% of our sample of IDU recently engaged in disorderly income generation activities, and these practices were associated with high intensity stimulant drug use and various markers of risk. However, we also found that a high percentage of IDU reported being willing to cease engagement in disorderly income generation activities if they had options for causal low-threshold employment. These findings indicate that there is a high demand for low-threshold employment which may offer important opportunities to reduce drug-related street disorder and associated harms.

Competing interests

Authors declare no other competing interests.

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Seeking refuge from violence in street-based drug scenes: Women's experiences in North America's first supervised injection facility

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ABSTRACT

Supervised injection facilities are a form of micro-environmental intervention that aim to address various harms associated with injection drug use. Given the numerous threats faced by women who inject drugs and are street-involved, including heightened risks for violence, we sought to elucidate how North America's first supervised injection facility (SIF) mediates the impact of violence among women during the injection process. Semi-structured qualitative interviews were conducted with 25 women recruited from the Scientific Evaluation of Supervised Injecting (SEOSI) cohort of SIF users in Vancouver, Canada. Audio-recorded interviews elicited women's experiences using the SIF and the related impacts on experiences of violence. Interview data were transcribed verbatim and a thematic analysis was conducted. The perspectives of women participating in this study suggest that the SIF is a unique controlled environment where women who inject drugs are provided refuge from violence and gendered norms that shape drug preparation and consumption practices. Further, by enabling increased control over drugs and the administration of drugs, the SIF promotes enhanced agency at the point of drug consumption. Although this micro-environmental intervention serves to reduce risks common among women who inject drugs, additional interventions that address the structural forces producing and shaping violence and other risks are needed.

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Introduction

Injection drug use is associated with an array of extreme health and social harms, including elevated risk for infectious disease acquisition and fatal overdose. Many of the harms experienced by injection drug users (IDUs) can be traced back to economic, legal, and social forces which act to marginalize IDUs and shape the context of risk that characterizes street-based drug scenes. Violence is endemic to injection drug user populations, with exceptionally high documented rates of victimization among women who inject drugs (Braitstein et al., 2003; Cohen

et al., 2002; Vlahov et al., 1998). The illegal status of drugs places drug use in an unregulated sphere of street dynamics and frequently involves instrumental and interpersonal violence (Singer, Simmons, Duke, & Broomhall, 2001). The violence common within street drug scenes has been well documented and is further exacerbated by the subordinate role women are often forced to take within this culture (Epele, 2002). Violence is also known to be common within intimate drug-using partnerships and has been associated with increased sexual and drug-related HIV risk behavior among women IDUs (Castillo Mezzich et al., 1997; El-Bassel, Witte, Wada, Gilbert, & Wallace, 2001; Wechsberg et al., 2003). In turn, female IDUs in some settings have been found to be at heightened risk for HIV infection (Miller et al., 2005; Spittal et al., 2002).

A conceptual framework is necessary for delineating the complex intersections of violence and gender and can be

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described as consisting of everyday, symbolic, and structural levels of violence (Bourgois, Prince, & Moss, 2004; Shannon et al., 2008). Interpersonal or "everyday" violence describes the normalization of violence that renders it invisible because of its routine pervasiveness (Scheper-Hughes, 1996). Women's daily survival on the streets requires vigilance in coping with immediate dangers such as the threat of robbery, physical abuse, rape, murder, and arrest (Epele, 2002; Romero-Daza, Weeks, & Singer, 1998). Symbolic violence manifests as the subordination of women as a result of the male-centered street culture that situates men in dominant roles with respect to control of resources and protection/ownership of women (Bourdieu, 2001; Epele, 2002). For example, this symbolic violence can systematically exclude women from higher-level roles in the hierarchy of drug dealing and limit a woman's ability to control resources derived from the illicit drug trade (Maher & Daly, 1996). Structural violence refers to the broader political and economic inequality that functions to keep women IDUs in the margins of society and limits access to basic resources (Farmer, 1997).

Understanding the context of risk for women IDUs provides a greater appreciation for those factors that influence engagement in sexual and drug-related behaviors and affect a woman's ability to assert agency (Bourgois et al., 2004). Current conceptualization of HIV transmission among injection drug-using populations has moved beyond an individualist approach to risk and acknowledges the critical role factors exogenous to the individual play in HIV prevention practices (Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005). A "risk environment" framework is useful for conceptualizing the context of risk and describes how physical, social, economic, and policy factors intersect at two levels to structure the potential for drug-related harm: the micro (or, in other ecological approaches, the "proximal," "direct," or "local") and macro (or the "distal," "indirect," or "structural") levels. Micro-environments describe the immediate social settings of drug use and the local neighborhood, and include social networks, peer influences, and group norms, rules, and values (Rhodes et al., 2005). Macro-environments describe the political economy of health, and include the public and legal/policy context as well as economic, ethnic, and gender inequalities (Rhodes et al., 2005).

The extraordinary set of challenges faced by women, including concerns of daily survival under the threat of violence and HIV risks, points to the need for novel interventions with potential to mediate and modify the contextual and gendered factors which shape the negotiation of risks among women IDUs (Cler-Cunningham, 2001; Romero-Daza et al., 1998; Shannon et al., 2008). This is true of Vancouver's Downtown Eastside, where the intersecting epidemics of violence and HIV infection have been well documented. For instance, in Vancouver, women IDUs under the age of 30 are 54 times more likely to die prematurely, compared with the general female population, with the most frequent cause of death being homicide (Miller, Kerr, Strathdee, Li, & Wood, 2007; Spittal et al., 2006). The disappearance of more than 30 survival sex trade workers from Vancouver's Downtown Eastside (DTES) neighborhood also called attention to the extreme threat

of violence faced by street-involved women (Canadian Broadcasting Corporation, 2005; Cler-Cunningham, 2001).

Supervised injection facilities (SIFs) are one form of micro-environmental intervention that has been implemented to address a broad set of risks associated with injection drug use, especially those faced by IDUs who are homeless and who inject drugs publicly within street-based drug scenes (Kerr, Small, Moore, & Wood, 2007; Wood et al., 2005). At SIFs, IDUs may inject pre-obtained illegal drugs under the supervision of nurses or other individuals trained to provide an emergency response in the event of overdose. These facilities also seek to promote safer injecting and aim to refer IDUs to other health and social services.

Vancouver's SIF, known locally as "InSite," opened in September 2003 after years of community activism and political struggles related to the epidemics of HIV and overdose occurring in Vancouver's troubled Downtown Eastside (Small, Palepu, & Tyndall, 2006). The SIF was approved as a pilot study by the Canadian government, and operates under regulations that require participant registration and also prohibit the sharing of drugs and assisted injection. InSite is open 18 hours a day, 7 days a week, and includes 12 individual spaces for injection (Tyndall et al., 2006). On average, there are approximately 600 injections supervised there each day, and to date, more than 5000 unique IDUs have used the facility (Tyndall et al., 2006). The staff team includes nurses who work primarily in the injecting room and provide safer injecting education and emergency response in the event of overdose, as well as peer workers who work in the post-injection "chill-out" room.

Given the known impact of violence on reducing women IDUs' ability to safely negotiate risks within street-based drug scenes (Shannon et al., 2008), and given that SIFs are micro-environments with potential to mediate and modify the conditions that shape the context of risk (Kerr, Small, et al., 2007), we sought to evaluate the potential role of the Vancouver SIF in mediating the impact of violence on the risk environment of women IDUs at the time of injection.

Methods

This study presents analyses of data from qualitative interviews with women IDUs in Vancouver to investigate their reasons for using the SIF and the impacts of SIF use on violence and related risks. We draw upon data from 25 in-depth qualitative interviews conducted from November 2005 to March 2007. Interviewees were recruited from the Scientific Evaluation of Supervised Injecting (SEOSI) cohort, which is composed of more than 1000 randomly selected SIF users in Vancouver (Tyndall et al., 2006). As an initial step, 50 interviews involving female and male IDUs were undertaken by four different trained interviewers (two males and two females) and facilitated through the use of a topic guide to encourage discussion of reasons for SIF use, and the impact of the SIF. Recognizing that violence among women was emerging as a dominant theme in these initial sets of interviews, one of the female interviewers (Fairbairn) undertook an additional four

interviews with women in order to gain further insight into gender-based street dynamics, violence, and related risks, as well as women's experience with the SIF. The entire sample of women was purposively selected to include interviewees with varying levels of SIF use, and many study participants continued to frequently perform injections in other settings.

Interviews lasted between 30 and 60 minutes, were tape-recorded, and were later transcribed verbatim. The research team discussed the content of the interview data throughout the data collection process, thus informing the focus and direction of subsequent interviews as well as developing a coding scheme for partitioning the data categorically. Two members of the research team (Fairbairn and Small) separately catalogued the transcribed interview data using a coding framework, thus allowing for discussion of areas of agreement and instances of divergence. The following analysis explores themes that emerged in relation to gender and the potential impact of SIF use in mediating the experience of violence and gender relations as they apply to injection-related risks among women.

The sample of qualitative interview participants was composed of 25 women who ranged from 25 to 60 years of age. All IDUs interviewed through this current study had previously used the SIF. Interviewees provided informed consent to participate, and the study was undertaken with ethical approval granted by the University of British Columbia – Providence Health Care Research Ethics Board. There were no refusals of the invitation to participate in the qualitative interview and no drop-outs during the interview process. All interviewees received CAD\$20 for their participation.

Findings

Several key themes emerged from the qualitative interview data regarding women's experiences with use of the SIF that related to the social context within the site as working to mediate the adverse impacts of violence on women's risk environment and injection process. These themes included the provision of a refuge from the structural and interpersonal violence of the street that also serves to facilitate the safe preparation and injection of drugs, and the SIF offering environmental-structural support for women to assert greater agency and control over resources in the process of drug consumption.

Refuge from interpersonal and structural violence

Qualitative interviews documented the everyday violence that shapes the daily experiences of women IDUs. Women articulated a mistrust of others and a fear of violent confrontations that frequently arise over money or drugs in an economy of scarce resources. Many women described how survival on the streets is linked to the avoidance of everyday violence that characterizes street-based drug scenes. A central theme that emerged in discussions on women's reasons for seeking out the SIF was the diminished threat of violence within this controlled environment.

I mean, like, the safe site was more than just an injection thing, 'cause it was the only thing that was open, right? I'd get scared and go down there and, y'know... I need to get out of my room for a bit. I'd go down there, and...do my half point... And I think – I haven't been there a lot lately – but I think a lot of the women use it for that purpose, too. I'd hazard – I don't really know – but I'd hazard a guess to say that they have more women there at night than usual. 'Cause there's no place for women to go at night... Yeah, a personal safety thing, you bet. Interview participant # 21.

Yeah, yeah, it's looked after, and like I said I feel safe in there. Like, I don't have to worry about someone coming up and like, if I'm high and I'm sitting there, and fuckin' me around 'cause I'm high. They know they can take advantage of the situation. I know I don't have to worry about that... I don't feel rushed, I don't feel threatened or insecure by any means. Interview participant # 5.

And also, me not being predatorized. Like, you don't have to pay off somebody to watch your back. Interview participant # 21.

Some women emphasized their experience of exploitation for drugs or money in relationships with male "boy-friends." They described the intimate partner violence that often ensues following disputes over control of the resources generated by women. For many women, the SIF was a safe alternative environment that removed the threat of violence and potential loss of resources at the time of injection.

I: The times you went there, why did you go there?

R: Um, because something would be going on at home. Y'know, like if I was fighting with my partner or something like that. I'd use the InSite. Interview participant # 4.

R: He puts me down all the time, constantly. I go out there and grind all day long to get what I need and he just lies in bed and I can't afford him 'cause I took care of him for a long time and I can't do it now. I just don't feel like I have a space of my own at all. Like, I don't really feel comfortable there a lot of the time. Like, all my stuff is crammed in a corner of the room... I was supporting him for a long time, for like a year, and then I got life insurance from my husband's death and I took care of him with that too, a lot of money, and then... I'm not supporting him any more, I just can't do it. Maybe once a day I might give him a fix but I told him I can't do it, I just can barely take care of myself right now it's so hard out there.

I: How does he deal with that?

R: He calls me names. He starts pouting and calling me down and picking fights.

I: In those instances you might go down to the site?

R: Definitely. Definitely. Lots of times that's why I go there. Interview participant # 25.

The SIF was not only seen as a refuge for women from interpersonal violence, but was also viewed as providing relief from structural forms of violence experienced by IDUs, including encounters and confrontations with the police.

When the InSite wasn't there, you were fixing outside and you're worrying about if the cops are going to come or if someone's gonna attack or rob you. If you are at the InSite, you're comfortable because you know there's people around watching and everybody there respects each other's space – so they don't bug you. Interview participant # 7.

Improved control over resources and the injection process

Women's descriptions of gender relations depicted the subordinate position women are ascribed within the male-centered ideology of street culture. Women described how they are routinely hassled and exploited ("grinded") by men for drugs or money due to their perceived ability to access resources and generate income, such as through survival sex work.

I: Do you think women get grinded more?

R: They have more money, they have more access to being able to get more money. Interview participant # 23.

I: Do you think women get grinded more than guys do?

R: I think in a sense, yeah. 'Cause a lot of the women are working women, so to speak. Like, street workers. So, I think a lot of them get propositioned a lot more. Yeah, I do see they seem to be more vulnerable in men's eyes. Whether they are is another story, but... yeah.

I: Do you think that's more of a challenge for women?

R: I think so, definitely. Again, like a lot of the men assume, or presume, that they're willing to barter or negotiate with. And what better thing to negotiate than with drugs or money, or whatever. I think a lot of them assume that they're all street workers, and will give in at any – at, pretty much, a certain cost. So, for sure... On the street, no, I think definitely the women – y'know, like, men tend to sort of treat them... or some men treat them less respectfully. Like, proposition them, or assume that they have a price and they can be bought out, or manipulated easier, and... just that the men sort of tend to have more of a seniority on the street level, in a sense. Interview participant # 12.

Women described how the SIF provides a place where they are less likely to be "grinded", thereby enabling them to maintain control over drugs and money.

Sometimes I don't want it – y'know, people sometimes tend to see you come in the hotel, and right away they're trying to grind you to see if you have anything. Or, "Where you been? You got anything?" And you just don't want to go through the rigmarole, and you know at the safe site it's an unconditional acceptance. Like, people are there for the same reason, and people aren't going to grind people. I think we're all pretty much on the same level, which is one of the benefits of why I do go in there [SIF]... like, we're more equals with the men, rather than, sort of, assumed to be a certain stereotype, or whatever. Interview participant # 12.

R: It's... it's a homey atmosphere to me. Nobody asks for your dope, where if you're doing it on the street, people

want your dope, right? Yeah, they pretty much protect you in there, I guess is the word.

I: And so, it's a place – like, you feel safe there?

R: Yeah, exactly. That's one reason why I go there. 'Cause I get muscled [intimidated and forced to give up drugs] for dope lots out here, right?

I: Like, when you're out on the street?

R: Yeah, yeah, 'cause I'm so small, right? And my old man [boyfriend] is in jail. Interview participant # 10.

I like it. I like it 'cause ... it's safe there and women – working girls – don't get ripped off, robbed in other ways, man. 'Cause, like, I'm mad. I'm saying this in a really angry way because I used to get ripped off and robbed and... jacked... by the guys. Now, try and touch us. They can't get a break there, eh? Interview participant # 19.

Women described staff intervention to be an integral part of mediation in order to minimize "grinding" at the site. Several women described the role of the SIF in providing environmental and structural support that enables them to assert greater agency over their drug preparation and injection process, including where and when they inject. This in turn works to create a safe space that neutralizes the gendered norms that shape injecting processes within street culture.

I think men can be cruel at times. You know, the guys. They say ah well we need to get in there and quit putting your routine on and they try to sit down and everything. But the staff put an end to that. Interview participant # 24.

Although not widely reported, some women described their reliance on boyfriends for manual assistance with injections. For these women, the SIF afforded opportunities to develop competency in the self-administration of injections, which also enhances agency over drug preparation and the injection process.

R: Yep. So bevel up and I'm able to get myself almost every single time, and I always needed a doctor. Like, my partner always had to inject me, and that was really frustrating.

I: ...your boyfriend assists you?

R: Yeah, yep. He would jug me.

I: Jug you? Okay, um, and, but then you started going to InSite, and then you started fixing yourself?

R: Well, I learned how to fix myself properly in there... Like, y'know, I knew how to find a vein and that stuff, but I always had problems getting, y'know? But once I started doing that bevel-up thing that they showed me, I've had a lot less problems ... Interview participant # 11.

Interpretation

In this study, women regarded the threat of violence and sense of danger on the street as a primary concern in negotiating daily survival. These women also described the challenges faced in maintaining control over resources and the frequent "grinding" that occurs on the street. The SIF was described as an alternative to street-based injection and a place where these threats are reduced. It is

particularly significant that women's narratives include examples of how the micro-environment of the SIF affords women environmental and structural support to assert agency and control over resources and their injection process.

Conceptualizing three categories of violence (everyday, symbolic, and structural) allows us to better understand how a range of gendered power relations shape a context within which risky behavior may occur, and also allows us to move beyond the typical individualistic approach that views risky behavior as a failure of individual agency (Rhodes et al., 2005). Previous work has described how the omnipresent threat of violence and women's persistent struggle to avoid violence impinge on the ability to make protective health choices such as avoidance of HIV (Bourgois et al., 2004; Epele, 2002; Romero-Daza, Weeks, & Singer, 2003). This type of everyday violence likely contributes to the heightened rates of HIV and HCV infection occurring among women who inject drugs (Miller, et al., 2004; Shannon et al., 2008). The context of street-based injecting provides an example of a micro-risk environment that contributes to elevated risk for drug-related harm such as HIV and HCV, since the injecting of drugs in street-based drug scenes has been identified as a time of particular threat of violence (Klee & Morris, 1995; Latkin et al., 1994; Small, Rhodes, Wood, & Kerr, 2007; Suh, Mandell, Latkin, & Kim, 1997). Fear of physical confrontation, confiscation of drugs, and arrest by police, as well as the threat of assault and theft by "street predators" during the administration of drugs, are often of paramount importance, and safe injection strategies are relegated to secondary concern (Aitken, Moore, Higgs, Kelsall, & Kerger, 2002; Maher & Dixon, 1999; Small, Kerr, Charette, Schechter, & Spittal, 2006; Small et al., 2007). Therefore, interventions such as SIFs that specifically target the act of injecting and the context in which it occurs are particularly important. By providing a refuge for women from threat of everyday and structural violence on the streets during drug preparation and consumption (a time of particular vulnerability), they thereby afford women the opportunity to assert greater agency with respect to resources and negotiation of drug-related risks.

Drug-using intimate partner relations have been identified as a priority for harm reduction strategies because the unequal gender scripts within these relationships can directly affect a woman's ability to control sexual and drug-related practices (Amaro, 2000; Bourgois et al., 2004; Quina, Morokoff, & Saxon, 1997; Rhodes & Quirk, 1998; Simmons, 2006; Zierler, & Krieger, 1997). For example, women's first injecting experiences often involve an older male facilitating the injection, and information regarding proper injection techniques and potential vectors of infectious disease transmission are often not disclosed (Bourgois et al., 2004). Some women described how the SIF provided a place to inject as an alternative to injecting with a partner, particularly during times of conflict. By providing a safer space for injecting, SIFs offer environmental and structural support that enables women to assert agency and control over their injection practices and may mediate the potential adverse impacts of emotional and physical abuse by intimate drug-using partners around the process of injecting. This is of particular importance

given that extensive literature has documented the role of partner violence and the threat of violence in drug-using partnerships in increasing the risk of HIV transmission among female IDUs through reducing women's control over resources and drug preparation process at the time of injection (Bourgois et al., 2004; El-Bassel, Gilbert, Rajah, Folena, & Frye, 2000; Maher & Daly, 1996). Further, as a venue where safer injecting education is provided, the SIF also was described as fostering competency in self-administration of injections, and thereby served to reduce reliance on male partners for assistance with injections. The significance of acquiring this competency is considerable given that individuals requiring assistance with injections have been found previously to be at heightened risk for HIV infection, non-fatal overdose, and violence (Kerr, Fairbairn, et al., 2007; O'Connell et al., 2005).

Despite some women's improved ability to mobilize resources, ability to retain those resources that are acquired is often challenged. Women described the "grinding" that happens on the street as a result of men assuming that women are likely to be in possession of money and drugs. This type of symbolic violence works to keep women in a subordinate position in interpersonal relationships with men and within street-based drug scenes. Access to a SIF mediates this risk during the time of drug consumption; however, it is recognized that these risks likely persist or may potentially be exacerbated outside of the SIF when women return to the street. Further qualitative and ethnographic research needs to explore the potential impact of the micro-environment of SIFs in changing gendered social norms and power dynamics within street injection culture.

Amaro (1995, 2000) described the historical and cultural dimensions of structural power relations that manifest as disproportionate suffering among the poor, including higher infectious disease and mortality rates. Interventions that alter the structural power relations on the street, if only temporarily, have potential to mediate patterns of infectious disease and mortality, as well as to reduce the everyday violence perpetrated and experienced by the poorest of society. Women IDUs face extreme suffering because of their subordinated position within street culture, and interventions that mediate gendered power relations among IDUs are urgently needed. While the SIF appears to provide an alternative venue that diminishes risk for violence and exploitation during drug consumption, as well as refuge from some forms of structural violence (e.g., confrontations with police), any impacts of this intervention beyond the immediate environment remain to be determined.

Previous research indicates that individuals are more inclined to talk about violence at a distance by describing past violence, rather than by discussing present experiences of violence which could identify them as either current victims or perpetrators, and this may lead to under-reporting of violence (Singer et al., 2001). The routine pervasiveness of violence may also limit a woman's ability to conduct a critical self-analysis of the role violence and subordination play in current lived experience. In addition, women's day-to-day efforts to survive in the male-centered street culture may result in women normalizing violence without acknowledging the pivotal role their

subordinated position plays in lived experience. However, it is notable that the women in this study did describe various forms of violence occurring in several contexts, suggesting that violence may not have been under-reported in this study. As well, it may be that previous experiences with supervised injecting may have potentially precipitated interviewees to view other injection settings negatively. Further, it is evident that many male IDUs are also victims of violence and that the protection against violence afforded by the SIF may also extend to men. However, given the gendered nature of violence among IDUs and the exceptionally high level of violence experienced by women IDUs in our setting, we elected to focus this analysis on the experiences of women.

This study documents how the SIF acts as a micro-environmental intervention that helps provide reprieve for women IDUs from various forms of violence that structures their lived experience within street-based drug scenes. However, given that various economic, legal, and social forces continue to shape the contextual risks that characterize street-based drug scenes, additional interventions are necessary to more fully protect the health and safety of women who inject drugs.

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Original Research

Crystal methamphetamine use associated with non-fatal overdose among a cohort of injection drug users in Vancouver

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Summary Objectives: To evaluate the prevalence and correlates of non-fatal overdose among a polysubstance-using cohort of injection drug users (IDU) in Vancouver.

Study design/methods: We evaluated factors associated with non-fatal overdose among participants enrolled in the Vancouver Injection Drug Users Study (VIDUS) using univariate statistics. Self-reports of the awareness of drugs taken and drug potency, polysubstance use, and assistance received at the time of non-fatal overdose were also recorded.

Results: From 1 December 2003 to 1 June 2005, 551 participants who were active injectors were followed. In total, 37 (6.7%) individuals reported experiencing a non-fatal overdose in the previous 6 months. Factors positively associated with non-fatal overdose included public injecting (odds ratio (OR) = 4.74, 95% confidence interval (CI) 2.35–9.37, $P < 0.001$), crystal methamphetamine use (OR = 4.11) and injection (OR = 3.63), morphine injection (OR = 3.55), non-injection opiate use (OR = 3.30), frequent heroin injection (OR = 2.28) and sex trade work (OR = 2.12). Factors negatively associated with non-fatal overdose included participation in methadone maintenance therapy (OR = 0.31) and injecting alone (OR = 0.36). Sixty-two percent of individuals were unaware of drug potency, 64.9% of IDU were taking other drugs at the time of overdosing, with crack being the main drug (37.0%). Fifty-four percent were assisted by ambulance personnel, 56.8% were taken to accident and emergency or hospital, 38.1% left accident and emergency or hospital before being released, and 35.1% were given Naloxone.

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Conclusion: Structural interventions are needed that seek to modify the social and contextual risks for overdose, increased access to treatment programmes, and trials of novel interventions for crystal methamphetamine users.

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Introduction

Illicit injection drug use is associated with an array of social and health-related harms and healthcare expenditures.¹⁻³ A primary cause of mortality for injection drug users (IDU) is overdose, with overall rates of death attributable to overdose among IDU being 1-2% annually.⁴⁻⁷ High rates of non-fatal overdose have also been reported, with previous findings indicating that up to two-thirds of heroin users have experienced a non-fatal overdose at some point during their history of drug use.^{8,9} Non-fatal overdose is a common cause of morbidity for IDU, and can result in pulmonary conditions, muscular complications, renal failure and brain injury.^{8,10} This morbidity, combined with the high ambulance response and accident and emergency costs associated with frequent attendance at the scene of overdoses, underscores the human and fiscal costs of non-fatal overdose.

During the 1990s, an overdose crisis developed in British Columbia that was primarily attributable to overdose events in Vancouver, a port city with access to high purity cocaine and heroin.¹¹ At the peak of this crisis in 1998, overdose rates reached more than one overdose death per day in British Columbia.^{11,12} The high incidence of polysubstance use, including cocaine injection and use of diverted pharmaceuticals, characterizes the Vancouver drug-using scene and may have contributed to the high rates of fatal overdose in this setting.^{13,14} Polysubstance use, in particular the use of opiates in conjunction with other depressants such as alcohol and benzodiazepines, is known to increase the likelihood of overdose.^{10,15,16} The growing use of crystal methamphetamine also characterizes the Vancouver drug-using scene as well as many other urban settings.^{17,18} The pattern of intense and erratic use that often characterizes consumption of this drug may also increase the likelihood of overdose when used in conjunction with opiates.¹⁸

Although it has been recognized that Vancouver was home to an overdose crisis that led to many fatalities during the 1990s, the prevalence and correlates of non-fatal overdose in this setting remain unexplored. In addition, few investigations have been made of non-fatal overdose in settings where polysubstance use and crystal methamphe-

tamine use is prevalent. Therefore, in order to better inform appropriate public health responses, the present analyses were conducted to evaluate the prevalence of, and characteristics associated with, non-fatal overdose among a polysubstance-using cohort of IDU in Vancouver. In addition, we sought to examine self-reported details of the overdose incident, including awareness of drug potency, whether other drugs were involved, and assistance received at the time of the most recent non-fatal overdose.

Methods

Starting in May 1996, individuals who had injected illicit drugs in the previous month were recruited into the Vancouver Injection Drug Users Study (VIDUS), a prospective cohort study that has been described in detail previously.^{14,19} Briefly, people were eligible for VIDUS 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, participants provide blood samples and complete an interviewer-administered questionnaire. Participants receive \$20 CDN for each study visit. The questionnaire elicits demographic data as well as information about drug use, HIV risk behaviour, and drug treatment. The study has been approved by the University of British Columbia's Research Ethics Board. The present analyses are restricted to those participants who completed a follow-up visit during the period 1 December 2003 to 1 June 2005, and reported active injection drug use during the previous 6 months.

Socio-demographic and other risk characteristics considered in the analyses included age, ethnicity (Aboriginal versus other), gender, downtown east-side residence (i.e. Vancouver's illicit drug use and HIV epicenter), homelessness, recent incarceration, sex trade work, and history of sexual abuse. Given the common use of polysubstances and the recent increase in use of crystal methamphetamine in Vancouver,¹⁷ we also sought to examine associations between non-fatal overdose and various forms of drug use. Behavioural and drug use variables, all pertaining to activities in the past 6 months,

included frequent cocaine and heroin injection, speedball (heroin and cocaine) injection, morphine injection, crystal methamphetamine injection, non-injection crystal methamphetamine use, crack use, frequent alcohol use, benzodiazepine use, non-injection opiate use, public injecting, receiving help injecting, being in methadone treatment, injecting alone, and binge drug use. As in our previous work,^{19,20} frequent heroin injection was defined as use of the drug once or more per day, frequent alcohol use was defined as consuming more than four drinks per day, and binge drug use was defined as periods when drugs were injected more frequently than usual.

Univariate statistics were used to determine factors associated with non-fatal overdose. Categorical explanatory variables were analyzed using Pearson's Chi-square test and Fisher's exact test, and continuous variables were analyzed using the Wilcoxon rank sum test. Variables were considered statistically significant at $P < 0.05$. All reported P -values are two-sided. Owing to the low overall number of events, and collinearity between certain variables such as homelessness and public drug use ($P < 0.001$), multivariate analyses were not conducted.

Finally, all participants who reported non-fatal overdose in the past 6 months were asked to indicate if they were aware of (1) drugs taken before the overdose; (2) any drugs other than the substance believed responsible for the overdose; (3) the potency of drugs taken; and (4) assistance received during the overdose event.

Results

A total of 551 active IDU completed a follow-up during the period from 1 December 2003 to 1 June 2005, and were eligible for this analysis. Two hundred and twenty-five (43.8%) were women, 186 (36.2%) were individuals of Aboriginal ancestry, and the median age was 39 (IQR = 30–46). Among this population, 37 (6.7%) individuals reported experiencing a non-fatal overdose in the 6 months before their follow-up interview. The median number of non-fatal overdoses within this group was 1.0 (IQR = 1.5). The univariate analysis of socio-demographic and other risk characteristics of study participants is shown in Table 1. As shown here, younger age (odds ratio [OR] = 1.04, 95% confidence interval (CI) 1.01–1.09, $P < 0.01$) and sex trade work (OR = 2.12, 95% CI 1.03–4.26, $P = 0.03$) were positively associated with non-fatal overdose. We found no evidence of association

between non-fatal overdose and Aboriginal ethnicity, gender, downtown eastside residence, homelessness, recent incarceration, or history of sexual abuse.

Univariate analyses of drug-use-related variables are shown in Table 2. As shown here, frequent heroin injection (OR = 2.28, 95% CI 1.16–4.51, $P = 0.01$), morphine injection (OR = 3.55, 95% CI 1.73–7.31, $P < 0.001$), crystal methamphetamine injection (OR = 3.63, 95% CI 1.73–7.61, $P < 0.001$), non-injection crystal methamphetamine use (OR = 4.11, 95% CI 1.91–8.83, $P < 0.001$), non-injection opiate use (OR = 3.30, 95% CI 1.63–6.69, $P < 0.001$), and public injecting (OR = 4.74, 95% CI 2.35–9.37, $P < 0.001$) were positively associated with non-fatal overdose. Methadone treatment (OR = 0.31, 95% CI 0.13–0.71, $P = 0.004$) and injecting alone (OR = 0.36, 95% CI 0.17–0.78, $P = 0.007$) were negatively associated with non-fatal overdose. We found no evidence of association between non-fatal overdose and frequent cocaine injection, speedball injection, crack smoking, alcohol or benzodiazepine use, receiving help injecting, and binge drug use.

Self-reported details of the non-fatal overdose event are listed in Table 3. Most IDU were aware of the types of drugs taken (67.6%), but reported being unaware of the potency of these drugs (62.2%). Most of the individuals were taking more than one drug at the time of non-fatal overdose (64.9%), with crack (37.0%), alcohol (18.9%) and heroin (13.5%) being the drugs most commonly used in addition to the drug believed responsible for the overdose. Fifty-four percent were assisted by ambulance personnel, 56.8% were taken to accident and emergency or hospital, 38.1% left accident and emergency or hospital before being released, and 35.1% were given Naloxone.

Discussion

In the present analysis, experiencing non-fatal overdose in the previous 6 months was reported by 6.7% of participants. Non-fatal overdose was positively associated with younger age, involvement in sex trade work, frequent heroin injection, crystal methamphetamine use (injection and non-injection), morphine injection, non-injection opiate use, and public injecting. Being in methadone treatment and injecting alone were negatively associated with non-fatal overdose. On the basis of self-reported details of the overdose incidents, only a small proportion of IDU were aware of drug potency. There was also a high incidence of polysubstance use, with crack being

Table 1 Univariate analyses of study participants' socio-demographic characteristics stratified by those that did and did not report non-fatal overdose.

Characteristic	Non-fatal overdose		Unadjusted Odds ratio	(95% CI)	P-value
	N (n = 514; 93.3%)	Yes (n = 37; 6.7%)			
Age (years)					
Median	34	40	0.96	(0.92–0.99)	0.01
Interquartile range	29–39	30–47			
Aboriginal ethnicity					
Yes	178 (34.6)	8 (21.6)	0.52	(0.23–1.16)	0.11
No	336 (65.4)	29 (78.4)			
Gender					
Female	211 (41.1)	14 (37.8)	0.87	(0.44–1.74)	0.70
Male	303 (58.9)	23 (62.2)			
DTES residence					
Yes	316 (61.5)	17 (45.9)	1.89	(0.96–3.70)	0.06
No	198 (38.5)	20 (54.1)			
Homelessness					
Yes	73 (14.2)	8 (21.6)	1.67	(0.73–3.79)	0.22
No	441 (85.8)	29 (78.4)			
Recent incarceration^a					
Yes	78 (15.2)	9 (24.3)	1.80	(0.82–3.95)	0.14
No	436 (84.8)	28 (75.7)			
Sex trade work^a					
Yes	95 (18.5)	12 (32.4)	2.12	(1.03–4.26)	0.03
No	419 (81.5)	25 (67.6)			
History of abuse^{a,b}					
Yes	6 (1.2)	2 (5.4)	4.84	(0.94–24.86)	0.10
No	508 (98.8)	35 (94.6)			

DTES, downtown eastside residence.

^aRefers to the last 6 months at time of interview.^bFisher's exact test P-value.

the main secondary drug taken, and professional medical assistance was received in half of the cases (Table 3).

The frequency of non-fatal overdose (6.7%) is lower than other cross-sectional studies.^{7,12,21} The lower prevalence of non-fatal overdose in this context may be attributable to differences in measures. In previous studies, individuals were asked to report a loss of consciousness as a result of drug use and non-fatal overdose was inferred.^{7,12,21} In the present study, individuals were asked directly if they suffered a non-fatal overdose. Therefore, the prevalence of non-fatal overdose observed in the present study is likely to reflect overdose events that were easily definable and probably more severe. In addition, the low rate of overdose observed here may reflect recent declines in heroin supply globally and a related decline in heroin-related harms in this setting.²²

In the present study, rates of reported non-fatal overdose were the same for men and women. This

contrasts with local fatal overdose data indicating that men are at greater risk.²³ Further examination of reasons why women would be just as likely to experience non-fatal overdose but less likely to experience fatal overdose is necessary.

Crystal methamphetamine use (injection and non-injection) was the drug most strongly associated with overdose in this study. This finding is novel but not surprising in light of studies indicating an increase in crystal methamphetamine use in North America.^{18,24} One symptom of crystal methamphetamine use is insomnia and, for many individuals, use of this drug is characterized by long periods of wakefulness and intense drug use interspersed with periods of recovery.^{18,25} This intense pattern of crystal methamphetamine use may at times be physiologically difficult to sustain, particularly when combined with use of other drugs, which may help explain the strong association observed between crystal methamphetamine use and non-fatal overdose.

Table 2 Univariate analyses of study participants' drug use by those that did and did not report non-fatal overdose

Characteristic	Non-fatal overdose		Unadjusted Odds ratio	(95% CI)	P-value
	N (n = 514; 93.3%)	Yes (n = 37; 6.7%)			
<i>Frequent cocaine injection^a</i>					
Yes	165 (52.5)	11 (29.7)	0.89	(0.43–0.85)	0.76
No	349 (67.9)	26 (70.3)			
<i>Frequent heroin injection^a</i>					
Yes	313 (60.9)	22 (59.5)	2.28	(1.16–4.51)	0.01
No	201 (39.1)	15 (40.5)			
<i>Speedball injection^a</i>					
Yes	53 (25.9)	7 (33.3)	1.43	(0.55–3.74)	0.46
No	152 (74.1)	14 (66.7)			
<i>Morphine injection^a</i>					
Yes	68 (13.2)	13 (35.1)	3.55	(1.73–7.31)	0.001
No	446 (86.8)	24 (64.9)			
<i>Crystal meth injection^a</i>					
Yes	60 (11.7)	12 (32.4)	3.63	(1.73–7.61)	0.001
No	454 (88.3)	25 (67.6)			
<i>Crystal meth use^a</i>					
Yes	48 (9.3)	11 (29.7)	4.11	(1.91–8.83)	0.001
No	466 (90.7)	26 (70.3)			
<i>Crack use^a</i>					
Yes	147 (71.7)	18 (85.7)	2.37	(0.67–8.34)	0.17
No	58 (28.3)	3 (14.3)			
<i>Frequent alcohol use^a</i>					
Yes	235 (45.7)	18 (48.6)	1.13	(0.58–2.19)	0.73
No	279 (54.3)	19 (51.4)			
<i>Benzodiazepine use^a</i>					
Yes	86 (16.7)	6 (16.2)	0.96	(0.39–2.38)	0.94
No	428 (83.3)	31 (83.8)			
<i>Non-injection opiates^a</i>					
Yes	80 (15.6)	14 (37.8)	3.30	(1.63–6.69)	0.001
No	434 (84.4)	23 (62.2)			
<i>Public injecting^a</i>					
Yes	370 (72.0)	24 (64.9)	4.74	(2.35–9.37)	0.001
No	144 (28.0)	13 (35.1)			
<i>Received help injecting^a</i>					
Yes	124 (24.1)	14 (37.8)	1.91	(0.96–3.83)	0.06
No	390 (75.9)	23 (62.2)			
<i>Methadone treatment^a</i>					
Yes	222 (43.2)	7 (18.9)	0.31	(0.13–0.71)	0.004
No	292 (56.8)	30 (81.1)			
<i>Inject alone^a</i>					
Yes	242 (47.1)	9 (24.3)	0.36	(0.17–0.78)	0.007
No	272 (52.9)	28 (75.7)			
<i>Bingeing^a</i>					
Yes	114 (22.2)	10 (27.0)	1.30	(0.61–2.76)	0.50
No	400 (77.8)	27 (73.0)			

^aAll variables refer to behaviour in the last 6 months.

Frequent heroin injection was positively associated with non-fatal overdose in the present study and is consistent with previous findings.^{10,26} The mechanism of heroin intoxication via suppression of

respiratory function that results in hypoxia and potentially death has been well established.^{27,28} The strong association between both morphine and non-injection opiate use and non-fatal overdose

Table 3 Self-reported details of the non-fatal overdose incident

Characteristic	N	%
<i>Aware of drug potency</i>		
Yes	13	35
No	23	62
<i>Taking other drugs at time of overdose</i>		
Yes	24	65
No	13	35
<i>Other drugs taken at time of overdose</i>		
Crack	10	37
Alcohol	7	19
Heroin	5	13
Cocaine	3	8
Methadone	3	8
Crystal methamphetamine	2	5
Benzodiazepines	2	5
<i>Assistance received</i>		
Assisted by ambulance personnel	20	54
Taken to accident and emergency or hospital	21	57
Left accident and emergency/hospital before released (<i>n</i> = 21)	13	38
Given Naloxone	13	35

provides further support that diverted pharmaceuticals play a role in overdose locally. The association between morphine and non-fatal overdose may be in part due to the difficult route of administration. Morphine is often injected by crushing up and diluting tablets, and individuals who use this method of injection have been identified as at increased risk for harm, including increased risk for injection-related complications such as acute hand ischaemia following intra-arterial injection of narcotic tablets.²⁹ Injection of narcotic tablets has also been observed as a risk factor for fatal overdose because injection route of administration involves near instantaneous saturation of central opiate receptors compared with more gradual saturation when taken orally.^{30,31} Additionally, tablets intended for oral consumption are typically of higher doses than necessary to induce the same effects via injection, further increasing risk for overdose.^{30,31} The observed association between non-injection opiates and non-fatal overdose indicates that non-injectable opiates are a significant factor in overdose, and that non-fatal overdose does occur with opiate consumption via non-parenteral routes. Though opiate overdose has been observed via non-injection routes,¹⁵ previous research has suggested that non-injection opiates are primarily implicated in overdose when used in

combination with injection drugs, indicating that these findings probably represent polysubstance use among IDU.^{15,30,32}

Younger age was positively associated with non-fatal overdose in the present study. Although there is evidence that individuals who have been injecting for longer periods of time, typically of older age, are at increased risk for overdose,^{10,33–35} younger age has also been established as a predictor of non-fatal overdose.^{36,37}

The association between sex trade work and non-fatal overdose is worrisome given that sex workers in Vancouver are known to be at heightened risk for various adverse health outcomes, including extreme violence.³⁸ Previous studies conducted in Vancouver, indicating that sex trade workers are often frequent drug users,^{39,40} suggest that some IDU engage in sex work in order to support a habit of heavy drug use. This pattern of heavy drug use among sex trade workers may explain the increased risk of overdose observed in the present study.

The positive association between public injecting and non-fatal overdose is not surprising given the conditions present in this context that exacerbate risk for overdose. Because individuals injecting on the street are at increased risk of confrontation with other drug users and police, they will frequently rush injections and are therefore less likely to first 'taste' drugs to determine strength.⁴¹ This increases the chance of injecting too much of a drug, thereby increasing the risk for overdose.⁴¹ The observed negative association between injecting alone and non-fatal overdose is surprising given the fact that individuals who inject alone are at increased risk for harm in the event of an overdose, because bystanders are unavailable to come to their aid or to summon medical interventions in the event of an overdose.^{10,42} This finding may be attributable to random association.

The trade-off between the increased risk of overdose by injecting in public and the increased risk of fatal overdose by injecting alone has been described previously.⁴³ Safer injection facilities (SIFs), where individuals can inject pre-obtained illicit drugs under medical supervision, are one way to address concerns regarding public injecting and injecting alone because anxiety over potential confrontations with police or street predators is reduced, and because IDU are also under supervised care in the event of an overdose. An SIF recently opened in Vancouver but the effect of this facility on overdose has not yet been evaluated. However, findings from a recent German study suggest that the establishment of SIFs can lead to decreased rates of overdose.⁴⁴ Further, establishment of mobile SIFs may diminish risk for overdose for sex

trade workers, who tend to work in areas on the periphery of the open drug scene.

One particular form of treatment, methadone maintenance therapy, was found to be negatively associated with non-fatal overdose, supporting findings that drug treatment programmes are protective against non-fatal overdose.⁴⁵⁻⁴⁷ However, individuals may be at increased risk for overdose if re-initiating drug use after treatment. For example, one Canadian cross-sectional study found recent participation in drug treatment to be associated with an increased likelihood of non-fatal overdose.¹² Educational initiatives regarding the increased risk of overdose after a period of diminished drug consumption should therefore also be implemented for individuals exiting treatment programmes or prison, because drug tolerance is likely to have decreased.

Most individuals who experienced a non-fatal overdose reported polysubstance use at the time of overdose (64.5%). This is consistent with previous findings that the concomitant consumption of different drugs occurs in most overdose episodes and that 'polydrug toxicity' may be a more appropriate description of the toxicology of overdose.^{10,37,45} This may be especially relevant for crystal methamphetamine users; one study found that most individuals who use this drug use it in combination with other drugs.⁴⁸ The most common secondary drug used was crack cocaine for 37.0% of individuals. Both alcohol and benzodiazepine use were also identified as secondary drugs taken at the time of non-fatal overdose, and the combination of these drugs with heroin injection has been previously identified as exacerbating risk of overdose.^{7,49} Educational programmes aimed at informing IDU of the risks associated with polysubstance use, particularly the dangers associated with using crack cocaine, alcohol and benzodiazepines in combination with other drugs, may therefore be beneficial.

It should be noted, however, that several barriers compete with an individuals' desire to reduce harm. A financial advantage of supplementing more costly drugs, such as heroin, with less costly drugs, such as crystal methamphetamine or diverted pharmaceuticals, may provide motivation for polysubstance use that overrides concerns about the potential harms associated with this practice.⁵⁰ Unstructured days that characterize the lives of many IDU also make it difficult to monitor drug intake and ensure that only one drug is acting at any given time.⁵⁰ Further, ambivalence towards death, or a desire for intense intoxication for some IDU, are other factors that should be recognized as reasons for unmonitored and heavy drug use that

exacerbate risk for overdose.⁵⁰ In addition to educational initiatives, further examination of social and contextual factors that influence the desire of IDU to reduce harm and increase risk for overdose is also necessary.

Naloxone hydrochloride interventions have been recommended to reduce morbidity and mortality associated with overdose.^{9,10,51} Naloxone hydrochloride is a narcotic antagonist that reverses the effects of opiates that lead to overdose, including sedation and respiratory depression.¹⁰ Because many IDU report fear of calling an ambulance in the event of overdose, and ambulance personnel in the present study assisted only 57% of non-fatal overdose events, IDU may suffer less harm from overdose if other IDU can administer Naloxone. Advantages of Naloxone are that it has no abuse potential and it is easily administered.¹⁰ However, many IDU express concerns regarding use of Naloxone because of the extreme unpleasant withdrawal symptoms associated with it.^{9,51} Despite this, IDU in a study evaluating attitudes towards implementing overdose management training programmes expressed a strong desire to be trained in Naloxone administration, indicating that this emergency response intervention may indeed prove beneficial.⁵² Unfortunately, because Naloxone is only effective as a treatment for overdose that results from opiate use, this intervention will be ineffective for overdoses related to crystal methamphetamine use, the strongest drug predictor of non-fatal overdose in the present study. The expansion of treatment programmes and implementation of novel interventions that specifically target crystal methamphetamine users are therefore also urgently needed.

The present study has several limitations. First, VIDUS is not a random sample, and therefore these findings may not generalize to other IDU population. Second, we relied on self-report items, and therefore the findings may be susceptible to socially desirable responding, which in this instance may have led to an underestimation of the rate of non-fatal overdose. Further, because individuals were asked about overdose and not the symptoms of overdose, such as a loss of consciousness, convulsions, or both, as a result of too strong drugs, some IDU may not report overdose owing to a lack of recognition that the event occurred. Third, although self-report in the present study indicated that 64.9% of individuals who experienced a non-fatal overdose were unaware of drug potency, and previous studies have suggested that changing drug purity may play a role in predicting overdose, we were unable to consider this factor in the present study. Lastly, for reasons described above,

multivariate modelling approaches were not undertaken, although the present study would likely benefit from related qualitative work rather than additional quantitative approaches.

The findings in the present study indicate that non-fatal overdose remains an important source of drug-related harm, and targeted overdose interventions should be implemented to reduce the suffering and morbidity associated with non-fatal overdose. These include educational initiatives regarding risks for overdose, particularly polysubstance and crystal methamphetamine use, the expansion of drug treatment options, structural interventions that seek to modify the social and contextual risks for overdose, and trials of novel interventions for crystal methamphetamine users.

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Safety and danger in downtown Vancouver: Understandings of place among young people entrenched in an urban drug scene

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ABSTRACT

We undertook this qualitative study to examine young people's understandings of the physical and social landscape of the downtown drug scene in Vancouver, Canada. In-depth interviews were conducted with 38 young people ranging from 16 to 26 years of age. Using the concept of *symbolic violence*, we describe how one downtown neighborhood in particular powerfully symbolizes 'risk' among local youth, and how the idea of this neighborhood (and what happens when young people go there) informs experiences of marginalization in society's hierarchies. We also discuss the complex role played by social networks in transcending the geographical and conceptual boundaries between distinct downtown drug-using neighborhoods. Finally, we emphasize that young people's *spatial tactics* within this downtown landscape – the everyday movements they employ in order to maximize their safety – must be understood in the context of everyday violence and profound social suffering.

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Introduction

Popular imaginings of young, homeless drug users are often informed by their use of public space. Whether because they are viewed as children in need of protection or criminals bent on destruction, drug-using, street-dwelling young people are overwhelmingly considered 'out-of-place' in the public spaces of urban centers (Scheper-Hughes and Hoffman, 1998; Hecht, 1998; Mitchell, 2003). Accordingly, public health and policy efforts to address the 'street youth problem' have consistently aimed to exclude, relocate or forcibly remove 'deviant' youth from public space (Caldeira, 2000; Sandberg and Pedersen, 2008; Connell, 2003; Moore, 2004b). These strategies largely ignore the contextual factors – such as neighborhood deprivation and disadvantage, and ongoing experiences of social and economic suffering among youth (Rhodes et al., 2005) – that operate to rapidly isolate and push them towards harmful drug use practices and homelessness, until it becomes difficult or impossible for them to avoid 'risking risk' (Mayock, 2005; Lovell, 2002; Mitchell, 2003).

However, there is a growing body of work that focuses on how young people understand and experience place in their everyday lives (Gigengack, 2000; Beazley, 2002; Rhodes et al., 2007), where *place* is defined as the intersection between social and physical spaces (Massey, 1994). This research has illustrated that rather than being somehow 'placeless,' young people living on the margins of social and physical spaces may possess a heightened understanding of and attachment to the landscapes they inhabit. Survival on the streets often means navigating the 'geographies of power' (Caldeira, 2000) that limit these young people's uses of public space, and enacting 'geographies of resistance' (Beazley, 2002) in response to institutionalized spatial marginalization. A focus on how young people experience, understand and navigate urban space – how they may be simultaneously in-place as well as out-of-place on the streets of urban centers (Moyer, 2004; Scheper-Hughes and Hoffman, 1998) – has highlighted the problematic institutions and structures that contribute to their continued marginalization, as well as the strategies or *spatial tactics* (De Certeau, 1984) that they employ in order to appropriate public space according to their own needs, priorities and desires (Moyer, 2004; Eugene, 1999). For example, work with street-entrenched youth in Indonesia has illustrated how state ideological discourse about family values and gender roles has been used to justify 'clean up' efforts aimed at forcibly removing young people – and particularly young women – from the streets of Yogyakarta (Beazley, 2002). However, this research also illustrates the ways in which these young women have succeeded in rejecting conventional gender roles through

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spatial tactics (e.g., occupying a city park) aimed at carving out relatively safe, 'girl-only' geographical niches in the city center. Similarly, work from Tanzania has discussed the disjuncture between a state-sponsored project of modernization and the presence of hundreds of young men living and working on the streets of Dar es Salaam, which results in the frequent arrest of these informal street-based entrepreneurs and the destruction of their make-shift street stalls. At the same time, this research has shown how young people's appropriation of 'nowhere places' (such as street corners, abandoned lots or stretches of roadside) in the pursuit of financial gain in fact constitutes a spatial tactic aimed at securing a place in the *very same* modernizing project endorsed by the state (Moyer, 2004).

In downtown Vancouver, Canada, a growing number of street-entrenched and drug-using youth have emerged in a residential and business center of the city known as the Downtown South. While it is difficult to enumerate this highly transient population (The McCreary Centre Society, 2007), a local youth shelter reports that between 500 and 1000 youth are without housing each night in the Greater Vancouver area (Covenant House Vancouver, 2009). In addition to lacking shelter, intensive drug use – including the use of crystal methamphetamine, heroin, cocaine and crack – and alarming rates of HIV and hepatitis C infection have also been documented in this population (Lloyd-Smith et al., 2008; Werb et al., 2008; Wood et al., 2008; Miller et al., 2005). Although various youth services are now situated in the Downtown South (e.g., clinics and drop-in centers), decision makers and advocacy groups continue to struggle to address the 'street youth problem' in this setting (The McCreary Centre Society, 2002). To date, enforcement, arrest and removal of youth from public spaces have been the primary strategies aimed at this population, with a particular focus on 'cracking down on' the local drug scene.

Drug scenes have been described as inner-city areas characterized by high concentrations of drug users and drug dealing within a specific geographical area (Curtis and Wendel, 2000; Hough and Natarajan, 2000). These places vary considerably according to a number of factors, including the types of drugs available, who controls the sale of illicit substances, the specific locales in which drugs are sold and used, as well as the history of particular drug-use settings (Bourgois, 1996; Maher, 1997). Beyond drug procurement and dealing activities, everyday practices associated with securing basic necessities (e.g., meals, clean clothes, showers) as well as wider patterns of income generation activities are also embedded in the socio-spatial networks of these locales (Bourgois, 1996; Maher, 1997). As such, drug scenes powerfully shape drug use practices, the nature of social interactions between young people and range of social actors (including peers, older drug users, informal 'street' employers, police and service providers), as well as the formation of identity constructed and performed through spatial practices (De Certeau, 1984; Dovey et al., 2001; Butler, 1990; Robinson, 2000). Equally, these places are *shaped by* the practices and human interactions that take place within them.

In downtown Vancouver, the local drug scene (referred to by many youth as simply 'down here') is primarily comprised of two distinct neighborhoods: the Downtown South¹ and the Downtown Eastside (Map 1). Although these areas are geographically adjacent (within 20–30 min walking distance of each other), they are generally conceptualized as two distinct urban neighborhoods.

Among the general public, the boundary that exists between them is largely one of differential affluence; while the Downtown Eastside is widely recognized as Canada's poorest and most crime-ridden urban postal code (Strathdee et al., 1997; Wood et al., 2003), the Downtown South is a residential and entertainment district characterized by both high- and (limited) low-income housing and numerous thriving businesses. The respective drug-using populations within these neighborhoods are also distinct (although overlap exists); while the Downtown South is characterized by high rates of crystal methamphetamine sales and use primarily among youth (Bungay et al., 2006), the Downtown Eastside is characterized by a long-standing and well-established trade in crack cocaine, cocaine and heroin (Wood and Kerr, 2006). Furthermore, although the Downtown Eastside can accurately be characterized as a more 'open' drug scene in comparison to that of the Downtown South, in reality, a wide range of illicit substances are easily available on the streets of both locales. Both neighborhoods are characterized by thriving 'shadow economies' largely propelled by sex work activities, drug dealing and the exchange of stolen goods. The Downtown Eastside in particular has been subjected to intensive enforcement initiatives in recent years (Small et al., 2006), although police activities are also ongoing in the Downtown South (The McCreary Centre Society, 2002).

We undertook the present study in order to explore how youth who are currently 'street-entrenched' understand the physical and social landscape of the downtown drug scene in Vancouver's urban core. Given the geographical proximity of the Downtown South – a frequent destination for young people 'at-risk' – to the Downtown Eastside, there is a need to understand how young people experience and navigate these locales. Indeed, our observations indicate that many youth move frequently between the Downtown South and Downtown Eastside neighborhoods, whether on foot or via public bus (which they can often ride for free depending on the disposition of the driver). To date, however, the majority of research looking at the relationship between drug scene involvement and 'risk' among young people has largely focused on geographically confined inner-city areas characterized by ubiquitous 'open' drug use and crime – such as Vancouver's Downtown Eastside neighborhood (Bourgois et al., 2004; Bourgois, 1996; Small et al., 2005a,b, 2006; Maher, 1997). The intersection between experiences of place and experiences of risk and harm among young people existing *outside of* or *transcending* the boundaries of these inner-city communities remains less well understood. Furthermore, the ways in which young people's 'risk trajectories' – the sequences of transitions experienced by young people in relation to drug use and risk over time (Hser et al., 2007; Elder, 1985) – are shaped by *geographical* transitions (whether across countries, regions or adjacent drug-using neighborhoods) have yet to be explored in-depth. Finally, a focus on the meanings attached to places – and how these meanings inform spatial practices – has important implications for the development of appropriate interventions for youth who experience significant vulnerability while trying to make their homes in Vancouver's urban core.

Methods

In order to explore how young people conceptualized the Downtown South and Downtown Eastside neighborhoods (as well as the relationship between them), we drew upon data from 38 in-depth individual interviews conducted from May to October 2008, as well as ongoing ethnographic fieldwork (e.g., observations and informal conversations with youth) conducted in both the Downtown South and Downtown Eastside.

¹ In referring to the Downtown South area, youth occasionally include Vancouver's West End neighborhood, which contains some youth services and numerous outdoor 'hang outs' and sleeping spots for homeless young people. For this reason, we have included the West End in our map of the downtown Vancouver drug scene, while demonstrating that this area is technically separate from the Downtown South.



Map 1

Interviewees were recruited from within the At-Risk Youth Study (ARYS) cohort, a prospective cohort of drug-using and street-involved youth that has been described in detail elsewhere (Wood et al., 2006). Eligibility criteria for this study include being between the ages of 14 and 26 years and self-reported use of illicit drugs other than or in addition to marijuana in the past 30 days. A subgroup of the cohort was selected to complete qualitative interviews. Sampling was largely opportunistic, but aimed to attain variation in gender, ethnicity, age, and length of time having lived within the downtown Vancouver drug scene.

Interviews were undertaken by three trained interviewers (one male and two females) and facilitated through the use of a topic guide encouraging broad discussion of experiences and understandings of the Downtown South and Downtown Eastside neighborhoods. In particular, we asked youth to tell us about 'safe' and 'unsafe' places in the city, and probed for how these experiences might be shaped by gender as well as a young person's *social position* more generally. We use the terms safety and unsafety in order to distance ourselves from risk factor analyses that focus exclusively on the problematic characteristics of 'risky places,' 'risky people' and 'risky practices' (Shoveller and Johnson, 2006), and to underscore a commitment to young people's perspectives on staying safe 'on the streets' – a phrase that refers to numerous indoor and outdoor locales that go well beyond stretches of sidewalk. The concept of social positioning draws our attention to how young people *see themselves* in relation to the places they inhabit. It highlights the ways in which young people are able (or unable) to access and deploy resources in comparison to other social actors, illustrating how youth may be either privileged or disadvantaged within social-structural and physical environments.²

Interviews lasted between 30 and 120 min, were tape-recorded, transcribed verbatim and checked for accuracy. All participants provided informed consent, and the study was undertaken with ethical approval granted by the Providence Healthcare/University of British Columbia Research Ethics Board. Participants received a \$20 honorarium. There were no refusals of the invitation to participate in the interview, and no dropouts (i.e., the participant chooses to decline participation in the study) occurred during the interview process.

Data collection and analyses occurred concurrently and via ongoing engagement with participants, in order to continually re-evaluate the validity of research findings. While remaining cognizant of confidentiality issues (many of the participants of this study knew each other and it was therefore important to emphasize that what one person said in an interview would under no circumstances be repeated to another participant), evolving interpretations of the data were discussed with participants, both informally with those who had already been interviewed, and more formally in subsequent interviews. This process was used to inform the focus and direction of subsequent interviews (for example, through the addition of new questions and probes). In addition, the research team discussed the content of the interviews throughout the data collection and analysis processes, informing the development and refinement of a coding scheme for partitioning the data categorically. Interview data were initially coded based on key themes; substantive codes were then applied to categories/themes based on the initial codes. ATLAS.TI software was used to manage the coded data.

(footnote continued)

informed by gender, sexual orientation, ethnicity, age, and sense of 'connectedness' and/or experience within the local scene. We asked youth to reflect on how these hierarchies could affect a person's everyday interactions, movements and decisions within particular locales. We also asked youth what kinds of advice they would give to other youth regarding safe and unsafe places in the city, again probing for how this advice could change depending on the above factors.

² In order to elicit youth perspectives regarding 'social positioning,' we asked youth to discuss the diversity within 'street youth populations' by virtue of the social hierarchies that exist within them, probing for how these hierarchies may be

Results

Participants ranged from 16 to 26 years of age and included 18 women, 18 men and 2 transgender individuals. Sixty-seven percent of study participants were Caucasian, 28 percent self-identified as being of Aboriginal descent, and 5 percent were African Canadian. Half of interview participants reported being homeless at the time of the study, and the majority had experienced homelessness at some time over the course of their involvement with the local drug scene. The majority of participants reported that they had at one time engaged in or were currently engaging in drug use that *they defined* as problematic – including intensive (i.e., multiple times per day) crack cocaine, crystal methamphetamine and/or heroin use. Furthermore, approximately half of young people said they had been involved in these forms of intensive drug use within the local scene for more than 3 years. In sum, the majority of the young people reported being significantly entrenched in the downtown drug scene – in other words, they were largely consumed by the daily project of 'staying safe on the streets' in the context of homelessness, chronic poverty, and involvement in potentially harmful drug use practices and income generation activities, including drug dealing and sex work.

Evading danger: the Downtown Eastside as symbolic representation

Our results illustrate that, among study participants, a number of the perceived dangers that accompany prolonged drug scene involvement – including intensive involvement in the most problematic forms of drug use, risk of HIV and engagement in exploitative sex work – were all understood to be *situated* in Vancouver's Downtown Eastside neighborhood. Among youth, this neighborhood powerfully symbolized unsafety and the inevitable physical, psychological and moral 'demise' of young people who 'end up down there.' Although participants acknowledged that these dangers are by no means exclusive to the Downtown Eastside, and that dangers beyond these exist within the local scene (for example, the dangers that accompany drug dealing activities), participants consistently differentiated the Downtown Eastside from other urban locales according to a number of intersecting aspects of place.

Firstly, the Downtown Eastside was strongly differentiated from the Downtown South neighborhood in particular in terms of the types of drugs being used in each locale. Consistent with our earlier description, participants frequently described a crystal methamphetamine scene situated primarily in the Downtown South neighborhood, which could be contrasted with a crack cocaine, injection cocaine and heroin scene situated in the Downtown Eastside. Interestingly, this separation was often expressed through references to participants' own spatial practices. Transitions in drug use (for example, from crystal methamphetamine to crack cocaine or heroin use) were frequently associated with a *geographical transition* from elsewhere in the city to the Downtown Eastside. Such geographical/drug use transitions oftentimes carried a heavy moral judgment, as participants consistently equated 'problematic drug use' with frequent crack cocaine smoking and/or intravenous heroin use:

I: *What sort of areas [are you spending time in at the moment]?*
R: *Downtown Eastside, depending on how stupid I start to get with my craving for rock [crack cocaine]. I do a hoot [inhalation] and then I crave. Otherwise, if I do my speed [crystal methamphetamine], I'm usually here [in the Downtown South].* (Male Participant 7)

Secondly, participants articulated a negative association between the Downtown Eastside neighborhood and intensive heroin and crack cocaine use, again connecting their own experiences of accelerating and 'out of control' drug use with a geographical transition from other areas of the city to the streets of the Downtown Eastside:

P: *I just started using [heroin] heavily again... Now, I've moved on from Commercial [a district outside of the downtown core], down to Hastings [in the Downtown Eastside].* (Female Participant 37)

Thirdly, participants described the unsafety afforded by the *physical environment* of the Downtown Eastside. More specifically, participant accounts situated the risk of contracting HIV within the neighborhood's parks and alleyways, which they characterized as 'littered' with uncapped needles:

I: *Are there any places that you feel are particularly unsafe?*
P: *Pigeon Park [in the Downtown Eastside]... 'Cause of Blood Alley.*
I: *Why is that area unsafe?*
P: *Because there is a lot of needle usage. People don't pick up their rigs [needles]. They just leave them there without the cap on.* (Female Participant 17)

Interestingly, our ethnographic observations within the Downtown Eastside tell a different story; as a result of frequent needle sweeps in the neighborhood, we have observed relatively few discarded uncapped needles in the area. Furthermore, we have observed that many drug users are aware that a needle poke rarely results in HIV infection. As such, young people's references to an ever-present threat of contracting HIV within the Downtown Eastside via a needle poke may speak more to the symbolic power of the Downtown Eastside as a signifier of unavoidable danger, disease and shameful drug-using behaviors (such as discarding used needles on the ground, 'tweaking out,' and 'nodding off'), rather than to a pervasive problem that requires addressing:

P: *[The Downtown Eastside] is just not nice... I don't want HIV shoved in my face. And everyone's a crackhead... I don't need to see those people scratching the fucking pebbles on the ground [i.e. 'tweaking,' or repetitive fidgeting with objects in the surrounding environment as a result of stimulant use], like, the guy in the park with a needle hanging out of his arm [i.e. 'nodding off,' or falling asleep as a result of opiate use]... I'm sorry, I just really don't want to see that.* (Female Participant 3)

Finally, participants made a clear connection between the Downtown Eastside and involvement in sex work. Moreover, this association was clearly *gendered*; both male and female participants emphasized that young women who frequented the Downtown Eastside were particularly vulnerable to involvement in exploitative and dangerous sex work activities (even though sex work among young men is also common within the local scene and particularly the Downtown South):

P: *On Hastings [a street in the Downtown Eastside]... There are people walking like this, doing the 'Hastings shuffle' [does an imitation of someone high on crack cocaine and heroin]. A bad combination of crack and heroin, right? [It's unsafe because of] drugs and 'cause of the men. They [pimps] prey on little girls... It's recruiting season [for the local sex trade] right now. Warn girls to stay away.* (Female Participant 15)

Participants expressed the belief that prolonged involvement within the open drug scene of the Downtown Eastside inevitably results in the intensive use of problematic substances such as heroin or crack cocaine. Constant proximity to drug use via the

social-spatial networks of the Downtown Eastside was identified as an important factor in redefining the boundaries of acceptable drug use to include those substances that were previously morally unacceptable and 'off limits.' 'Out of control' drug use was in turn associated with a corresponding intensified need to accrue income, which participants indicated for young women in particular often meant heightened vulnerability to situations of sexual exploitation via involvement in sex work:

P: *On Hastings [in the Downtown Eastside]... There's a lot of active drug use, out in the open. And young girls might see that, and think that it's glamorous, or they'll think it's cool, and they'll start to get into it. And then they'll have to sell themselves for basically next to nothing because they don't know any other way to make money.* (Female Participant 21)

Thus, although participants acknowledged that the Downtown Eastside could present dangers to both young men and young women, and via involvement in activities beyond sex work, it seems to be the case that the Downtown Eastside neighborhood powerfully symbolizes the potential physical, psychological and moral 'demise' of young women in particular, and that this potential 'demise' is closely linked to the latter's potential for involvement in sex work activities.

The idea of the Downtown Eastside – and what happens once young people make the transition to this drug-using milieu – led a number of participants to emphasize the *social distance* (Sandberg and Pedersen, 2008) between themselves and this 'immoral' space of accelerating addictions, sexual exploitation, disease and extreme violence:

P: *I don't like any young person really saying their going to the Eastside. I threaten violence upon [young people who say they are going to the Downtown Eastside] all the time.*

I: *What are some of the bad things that happen – let's start with young women – what are some of the things that happen when young women go to the Downtown Eastside?*

P: *They go missing... They get pimped out... They start not caring about themselves. They start losing touch with humanity.*

I: *And what about young guys?*

P: *They learn very bad ethics. They become torture tacticians, and weird insane things.* (Male Participant 2)

The above narrative and others like it indicate that social norms prohibiting involvement in the Downtown Eastside do exist among local youth. Participants identified avoidance of the Downtown Eastside as an important *spatial tactic* aimed at reducing harms (even if this means avoiding crucial service locations):

P: *I've got a hole in my tooth that's like this big... I can see a dentist – You can go down to Hastings [in the Downtown Eastside] and get a free dental care but I'm just going to waste my time going down there, and probably end up relapsing.* (Male Participant 16)

Nevertheless, existing social norms are often not successful in preventing young people's physical and social initiation into the Downtown Eastside drug-using milieu – even when violence is used as a means of persuasion. Despite an interest in creating social distance between themselves and this neighborhood, and efforts to employ spatial tactics aimed at avoiding this locale, most of the young people with whom we spoke described in graphic detail first-hand accounts of various aspects of the social and physical environment of the Downtown Eastside, indicating that a large number of them had at one time or another spent a significant amount of time 'down there.' Participants' wider narratives indicated that many had internalized a 'mismatch'

between the *ideal* of distancing themselves from the Downtown Eastside, and a day-to-day reality that pushes them towards involvement in this unsafe place, whether because of a need to seek out increasingly lucrative income generation strategies (such as sex work) in the face of accelerating addictions, or the need to use increasingly harmful drugs (such as crack cocaine or heroin) in order to remedy 'dopesickness' and deal with the immense social suffering (Kleinman et al., 1997) that accompanies 'life on the street.' The result of this mismatch can be a crisis of identity and further social suffering, as young people struggle to reconcile transitions to increasingly harmful practices and places (that are themselves powerful symbolic representations of shame and demise) with personal dignity and a moral code 'of the street' that prohibits these transitions.

Safety and belonging in the Downtown South?

In contrast to the Downtown Eastside, a number of participants identified the Downtown South as a place of relative safety, and as such sought out more permanent residence in this area – oftentimes underneath bridges and other sheltered structures, and occasionally through the use of the area's shelters or renting a private residence. The Downtown South is where the vast majority of youth services are located, and a number of participants indicated that available services play an important role in allowing them to meet basic needs (such as showering, eating, and using the phone or internet), as well as keeping them safe from police arrest and street-related violence. However, more often participants emphasized that this area was relatively safe because their social position within this locale offered them certain advantages:

P: *Around here [in the Downtown South] I feel totally safe because everybody knows me. I could be walking around here at night by myself with a stack of money on me, right, [and not get into trouble]... People know my boyfriend, and then, you know, if they [did anything to me] then they know that they would get in trouble from him.* (Female Participant 9)

A young person's social position can be 'called upon' to provide protection from street violence; as such, it facilitates relative safety in those areas where young people 'know people' and have strong social connections. However, it was also frequently acknowledged by participants that social networks tied to place are also a part of what creates situations of unsafety on the streets and even within service locations. This is especially the case when social networks are called upon to 'track someone down' in a specific area, usually for the purposes of 'jacking someone up' (i.e., stealing from them) or for punishment related to altercations within romantic partnerships and/or drug dealing partnerships. As such, even service locations in the Downtown South could quickly become places that must be evaded to the detriment of other needs:

P: *Basically everybody knows a couple people around here [in the Downtown South]... Like out of a group of people, five people are like, 'Yeah, I saw that guy, aah, just like a couple of hours ago, he was on his way down to GP [a service location in the Downtown South], man. But he said he was leaving town, or something'... So everyone'll just go to the Greyhound [a bus station near to the Downtown Eastside]... Where's he gonna go?... Once somebody knows you... you'll be tracked down in, like, one day tops.* (Male Participant 18)

As a result of being frequently 'tracked down' and subsequently subjected to extreme acts of violence, a number of participants indicated that the Downtown South could feel like a

place from which there is 'no escape' (except, ironically, to streets of the Downtown Eastside):

I: Are there any places [in the Downtown South] that are particularly safe?

P: No. Everybody knows where everyone is... When I first came down here, right, this chick, she was like the same size as me. She used to intimidate me with bear spray and a knife... No matter where I went, she found me. No matter how hard I tried to run, she found me. (Female Participant 19)

Similarly, although a number of young women indicated that their boyfriends offer them some degree of protection in those places where the latter's 'street reputations' are particularly formidable, female participants also articulated numerous situations of unsafety that arise from these relationships in the places where their boyfriends maintain a strong drug dealing presence. Participants indicated that the loyalty demanded by romantic attachments was sometimes at odds with a lifestyle of addiction, in which a need or desire to score drugs quickly from wherever possible could outweigh a commitment to honor a boyfriend's sense of control over his girlfriend's drug use and associated drug procurement activities:

I: What can you tell me about unsafe places in the city?

P: Downtown Eastside. You always have to watch your back down there.

I: From?

P: My boyfriend. My boyfriend's friends, my boyfriend's workers [in relation to drug dealing activities], you know. Everywhere you go, you turn and look, to make sure none of his workers see what you're doing, or hear what you're saying. (Female Participant 15)

Thus, although all of the youth with whom we spoke made a clear distinction between the Downtown Eastside and Downtown South in terms of relative safety and danger, many youth emphasized that social networks can facilitate situations of danger within and across these drug-using milieus. Interestingly, a few of the youth with whom we spoke expressed concerns that the boundaries between these once discrete neighborhoods were weakening as a result of shifting social networks, resulting in elevated risk for young people experiencing vulnerability in the Downtown South. Participants reported that police intervention in the Downtown Eastside had caused a number of 'junkies' and 'crackheads' from the Downtown Eastside to move into the Downtown South area, where they were now acting to facilitate young people's geographical transition from the relative safety of the Downtown South to the relative danger of the Downtown Eastside:

P: [The Downtown South] has changed because the cops decided to start pushing everybody from Hastings [in the Downtown Eastside] up to Granville and Davie [in the Downtown South]... Most of the crackheads that end up down there [in the Downtown Eastside] are thirteen, fourteen years old... they started out this area [the Downtown South]... It starts out where a nice looking crackhead walks up and goes, 'Hey!' Starts talking to someone, eventually they'll be like, 'Hey, you want to try something? Here, put this in your pipe.' And you put it in your pipe, you smoke it, and it's like, 'Ooh! Wow!' And all of a sudden you're down on Hastings, selling your body. (Male Participant 14)

Again, our ethnographic observations tell a somewhat different story with respect to this data. Certainly, previous work has shown that older drug users can play a role in initiating younger drug users into more harmful forms of drug use (Fuller et al., 2003; Roy et al., 2003). Moreover, aggressive policing in the Downtown Eastside has resulted in the displacement of drug

using residents from that neighborhood (Wood et al., 2004). However, our observations do not support a scenario in which members of the Downtown Eastside drug-using community are actively seeking to recruit young drug users, initiate the latter into increasingly harmful drug using practices, and pave the way for their initiation into sex work activities. It is interesting to note that although we heard many stories about what happens when youth make a transition across drug-using milieus – such as the 'morally-reproachable' move from the Downtown South to the Downtown Eastside – there was a notable absence of narratives focused on what happens when and if youth are able to more permanently exit either of these locales.

In spite of the fact that most participants felt unable to envision a way out of the local scene in the present, youth consistently acknowledged exiting to be the most effective spatial tactic for extricating themselves from a dangerous and shameful cycle of accelerating addictions and an intensified need to generate income:

P: My drug problems are way different now... And that was because of, like, removing myself from Downtown, right?... Cause [downtown] I'd been doing like, like so many drugs. Like daily right?... Suddenly my [financial] resources are gone, or whatever, and I'm looking for drugs every day, I'm like, 'How am I gonna get them?' You know, like, so embarrassing. (Female Participant 11)

Ultimately, a number of participants were clear in emphasizing that, in fact, *nowhere* is safe for youth entrenched in the local scene due to frequent incidents of sexual exploitation and violence within peer groups and between themselves and various social actors including romantic partners, police, and informal 'street' employers. As a result, for many youth, the only viable spatial tactic available to them is to remain highly mobile (even if that means avoiding the regular use of service locations), so that one is difficult to 'track down.' Participants indicated that this could be crucial to staying safe on the streets:

P: I don't like anybody knowing where I am. It's like, I'm all over. I'm not in one place. I'm everywhere. (Male Participant 16)

Discussion

In sum, our results build on previous work to emphasize how marginal places like the Downtown Eastside can become symbols and how these symbolic representations inform the ongoing construction of identity among young drug users who reside in these places – or those in close proximity to them (Eugene, 1999; Ruddick, 1997). Participants went to great lengths to emphasize the social distance between themselves and the Downtown Eastside, most often by 'demonizing' (and thereby vehemently differentiating themselves from) the adult drug users of the Downtown Eastside (Pinderhughes, 1993). However, identifying older residents of the Downtown Eastside as the 'villains' in these and other 'stories-so-far' is perhaps best understood as a reflection of the sense of *powerlessness* youth experience when making the transition from the Downtown South to the Downtown Eastside (Pinderhughes, 1993). Indeed, over the course of interviews the majority of participants berated themselves for at one time inhabiting and *embodying* what was understood as a derelict, disgusting and morally-void 'junkie' space (Dovey et al., 2001; Rhodes et al., 2007). Although social norms prohibiting young people's involvement in the Downtown Eastside exist among local youth, there are clearly other contextual factors that 'push' young people towards involvement within this drug-using milieu, until it feels difficult or impossible to avoid this geographical and social transition.

There is growing awareness of the relationship between place, everyday experiences of marginalization, and the embodiment of social exclusion (Rhodes et al., 2007; Dovey et al., 2001). Place has been identified as the site of *symbolic violence* in which those experiencing marginalization internalize forces of exclusion, stigmatization and poverty, which are then understood and experienced as personal deficiencies or shortcomings (Bourgois and Schonberg, 2007; Bourdieu and Wacquant, 1992). Drawing on Bourdieu's concept of *habitus*, our data illustrates how youth's embodiment of (and perceptions regarding how others embody) social exclusion and economic suffering takes on symbolic power that is *naturalized*, obscuring the ways in which social structural power relations inform intimate ways of being at the level of individual interactions, as well as the spatialization of everyday life (Bourgois and Schonberg, 2007; Bourdieu and Wacquant, 1992). We can see this clearly in young people's narratives about the 'junkies' and 'crackheads' of the Downtown Eastside – the latter's physical, psychological and moral 'demise' is viewed as a natural and inevitable consequence of 'allowing' oneself to 'end up down there,' rather than as a result of same forces of inequality that largely shape young people's own marginal positions. Indeed, as young people become increasingly powerless in their efforts to secure education, employment and housing (largely as a result of inadequate supports for young people struggling with intensive drug use and the psychological effects of everyday violence), it becomes 'only natural' that they should end up in the Downtown Eastside. The embodiment of social, spatial and economic marginalization powerfully shapes how young people are able to envision their 'social destinies' from places like the Downtown Eastside and the Downtown South, both of which reflect youth's limited opportunities 'for escape' (Shoveller et al., 2007). In this way, occupying a marginal position in social and geographical space powerfully informs (and ultimately reproduces) experiences of social suffering and marginalization in contemporary urban society (Castro and Lindblad, 2004; Shoveller et al., 2007).

It follows that this study has implications for the ongoing debate regarding who has the 'right to the city' and its public spaces (Mitchell, 2003; Purcell, 2002). In the interest of enhancing the quality of urban life and protecting 'public safety,' young people experiencing homelessness (and other undesirable 'outsiders') have seen their rights to public space all but eliminated as a result of numerous state-sponsored initiatives that range from intensified surveillance and policing, to making park benches 'unsleepable' via the addition to metal bars to partition bench 'seats.' What this study illustrates is how the spatial segregation of a class of people who have *nowhere else to be but in public space* is internalized and comes to be viewed by young people themselves as the 'natural' order of things in the context of 'life on the street' – and therefore nearly impossible to transcend (i.e., in spite of their best efforts, youth inevitably move from the Downtown South to the Downtown Eastside, but would never be able to exit either of these areas).

At the same time, this study demonstrates some of the ways in which marginalized 'outsiders' make known their right to those few places still available them for the pursuit of work, rest and relaxation – such as the Downtown South. Interestingly, given their present circumstances (in which exiting the local drug scene was not an option), many participants were committed to maintaining their presence in the Downtown South as an explicitly *political project*, vowing that they would not be displaced and from this area – whether as a result of urban gentrification or 'clean-up' efforts on the part of the city – only to be marginally housed or homeless in another part of the city. We want to emphasize that even young people living on the margins are active in shaping experiences of place and the construction of

identity through social-spatial practices (De Certeau, 1984; Ruddick, 1997). Our results indicate that young people do carve out relatively 'safe' geographical niches (Beazley, 2002) within the downtown drug scene (e.g., residence in the Downtown South), and employ spatial tactics (De Certeau, 1984) aimed at reducing harm (e.g., avoidance of the Downtown Eastside in favor of the Downtown South, staying mobile). We employ the term *spatial tactics* in order to emphasize that local youth act within powerful structural constraints – including a lack of access to safe housing and drug treatment facilities (Rachlis et al., 2008), and social exclusion from mainstream employment and recreation opportunities – in order to maximize their safety within the immediate environment in which they operate. Moreover, this study builds on previous work that illustrates how marginal, 'nowhere' places (such the protected areas underneath bridges and inside car parkades) can be used by youth to confront spatial constraints on their own terms (Ruddick, 1997). By occupying these 'nowhere' places in the Downtown South, for example, young people claim a success – albeit a fragile one – in situating themselves *apart* from the Downtown Eastside and the 'demise' it symbolizes.

Nevertheless, our results illustrate how spatial tactics aimed at reducing harms may at times force youth to decide between frequenting crucial service locations and avoiding those places that powerfully symbolize danger (as exemplified by the potential for relapse into problematic substance use, or the likelihood of being 'tracked down' for punishment) – drawing our attention to the urgent need for *spatially-appropriate* interventions for youth. So long as young people feel that they have to be 'everywhere' and 'not in one place' in order to be safe, we will likely continue to struggle to maintain connections between young people, service locations, and by association, service providers. It is interesting to note the *absence* of stories regarding the 'people' who offer supports for youth (e.g., youth workers) as opposed to the 'places' where youth access services (e.g., drop-in centers, shelters). Our data provides further support for mobile outreach and service delivery programs (Shannon et al., 2008b), as it would seem that this approach (for example, the use of well-equipped and well-staffed vehicles to circulate through the downtown core and provide assistance 'on-the-spot' in back alleys and other indeterminate spaces) fits nicely with young people's existing spatial tactics for keeping themselves safe in the context of everyday violence. Moreover, our work speaks to the need for large scale structural interventions that go beyond service programs to provide additional housing and other structures that provide more than momentary refuge from street violence.

Paradoxically, our results illustrate the complex role played by social networks in both facilitating and undermining safety among young people across and *within* geographically and conceptually distinct drug-using milieus. As others have pointed out previously (Singer, 2006; Moore, 2004a, 2002), our work brings into question the notion of a 'street youth community' comprised of relatively stable social relationships and characterized by social solidarity and camaraderie. Our work directly contradicts those studies which draw on somewhat romanticized descriptions of 'gangs' or 'street families' of youth in order to emphasize young people's agency and resilience in spite of social suffering. What our results indicate is that everyday experiences of violence and exploitation *within* shifting social networks that include a range of social actors (including peers, romantic partners, pimps and older drug users) lead many youth to the conclusions that 'no one can be trusted' and 'nowhere is safe' within the local scene. While not discounting the importance of 'street families' among youth in our context (and also recognizing that the nature of youth social networks will vary according to context), our findings emphasize that we must continue to look critically at the ways in which social networks may simulta-

neously diminish and exacerbate experiences of unsafety among youth experiencing drug scene entrenchment. The oftentimes contradictory roles that social networks play in shaping experiences of safety must be taken into consideration when developing interventions that attempt to integrate 'community members' or 'peers' from within local drug scenes (Singer, 2006).

Consistent with previous work (Rhodes et al., 2005; Shannon et al., 2008a; Bourgois et al., 2004), the results of this study illustrate the need for immediate structural-environmental interventions for young people – namely, the creation of safer spaces of work, rest and recreation (Rhodes et al., 2006, 2007). Young people's 'right to the city' must not only refer to the right to choose whether to sleep on the streets of the Downtown South or the Downtown Eastside, but also the right to meaningfully inhabit the urban landscape (Purcell, 2002; Mitchell, 2003). Most basically, interventions should include the creation of accessible housing combined with treatment facilities, as well as modifications to the built environment of the downtown core – for example, the creation of discreet drop-in centers or 'safe zones' for young women and young men that facilitate refuge from street-based violence. Moreover, interventions and modifications to the built environment should be aimed not only at reducing harms, but also at facilitating the construction of alternate subjectivities and new identities that provide a challenge to the pervasive and often stigmatizing labels (e.g., drug addict, sex worker) attached to young people entrenched in drug use settings. In part, this could be achieved through enhanced access to low-threshold recreation and training programs that offer youth experiences apart from this setting – even if only for a brief period of time.

Young people's emphasis on the importance of ultimately exiting the downtown drug scene underscores the need for interventions that enable youth in their efforts to achieve this. Initially, programs situated *outside* of the geographical boundaries of the local drug scene (such as sport activities accompanied by accessible transportation to and from young people's places of primary residence) would fit with their existing tactics for beginning to distance themselves from unsafe locales. In the long term, providing enhanced support in finding safe housing, income support and *meaningful* education and work training placements for young people is crucial, as young people consistently expressed disillusionment regarding their future prospects even if they were to succeed in 'getting out of downtown.' Importantly, in seeking to offer young people a refuge or exits from the unsafety the downtown urban core, we do not want to inadvertently replicate efforts to remove 'unsightly' youth from public space. Working *with* youth towards the creation of safer spaces and the construction of alternate subjectivities must be distinguished from efforts that seek to 'clean up' the 'street youth problem' via programs and policies that allege to be in young people's best interests.

This study has several strengths and limitations that warrant acknowledgement. Firstly, we have attempted to frame this study in terms of young people's subjective experiences and meanings, while remaining sensitive to the need for continual reflexivity on the part of the researchers. We recognize that our own subjectivities and the interview/ethnographic process itself shaped our findings. In-depth interviews create opportunities for reflection on the part of participants that may not have been triggered before, and as such may constitute an intervention in the lives of participants in which new meanings emerge (alternatively, this may not be the case with 'hyper-researched' and 'hyper-serviced' youth, many of whom are highly adept at telling their stories to service providers and researchers). Furthermore, it is important to recognize that power relations are always embedded in the research process (particularly when working with young people), and this distribution of power ultimately favors the

researchers' interpretation. Nevertheless, we believe our data was (to a certain extent) co-constructed through interaction and negotiation that flows in all directions: between members of the research team, between researchers and participants, and between participants themselves through their conversations about this study 'on the streets' (Pool, 1994; Fabian, 1998).

Secondly, it is important to note that our findings are based upon interviews with local youth participating in the current study. While an effort was made to ensure that the study sample reflects the demographics of the local youth population, it is likely that our sample is more representative of young people who experience the *highest* risk in downtown Vancouver. Not all youth experiencing homelessness and intensive drug use in downtown Vancouver experience the Downtown Eastside as a symbol of unsafety and inevitable physical, psychological and moral 'demise,' or the Downtown South as a place from which there is 'no escape.' Future work should focus on how symbolic representations are continually made *and re-made* through social-spatial practices. Furthermore, the perspectives of lesbian, gay, bisexual, transgender and queer youth are underrepresented and under-explored in the present study, in spite of the fact that these youth experience significant vulnerability in our setting (Marshall et al., 2009). It is also interesting that the gendered dimensions of our finding (i.e., young women's positioning vis-à-vis the Downtown Eastside and in the context of romantic partnerships) vary considerably from those reported elsewhere (e.g., young women and the creation of 'girl-only' spaces in Indonesia). Overall, more work (e.g., engaging youth in social-spatial mapping activities) is needed to understand how various forms of diversity inform situated experiences of safety and unsafety in downtown Vancouver.

Nevertheless, it is hoped that this study represents a contribution towards understanding how the *meanings* attached to particular places are not only a subject of academic interest, but also have important implications for the development of interventions that resonate with young people's everyday, *situated* experiences and understandings of risk and harm. Furthermore, we have attempted to raise important questions regarding, on the one hand, young people's right to be *present* in public space, and on the other hand, their right to be *absent* from spaces characterized by unsafety and danger. This study speaks to the importance of restoring a more broadly envisioned *public* that includes those currently deemed to be 'outside' of what is aesthetically and morally acceptable in public space (Mitchell, 2003). This is arguably a crucial first step in identifying the social structures and institutions that contribute to a *narrowly-defined* public and deepening inequalities, as well as facilitating young people in the construction of alternative identities beyond 'homeless,' 'sex worker,' and 'drug-addicted.'

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Competing interests

The authors declare that they have no competing interests.

Authors' contributions

TK, JS and DF designed the study and conducted the analyses of the data. DF prepared the first draft of the article. All authors contributed to the revision of the manuscript.

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Coming 'down here': Young people's reflections on becoming entrenched in a local drug scene

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ABSTRACT

Recent research has highlighted the ways in which social structural processes and physical environments operate to push young drug users towards risk. We undertook this study in order to explore how young people who were currently street-entrenched characterized and understood their initiation into the local drug scene in downtown Vancouver, Canada. Semi-structured qualitative interviews were conducted with 38 individuals recruited from a cohort of young drug users known as the At-Risk Youth Study (ARYS). Participant narratives reflected an understanding among young people that they are simultaneously pulled and pushed towards the local scene. Push factors were understood as circumstances that propelled young people towards this setting, in some cases because of proximity to it from a very early age, and in other cases because of adverse situations experienced elsewhere and the need to find a new place to live that was both affordable and safe. Interwoven with accounts of how youth were pushed towards the local scene were stories that emphasized a high degree of autonomy and the factors that initially attracted them to this scene, including a desire for excitement, independence and belonging. Once young people were more permanently based in downtown Vancouver, participants identified several factors that accelerated their entrenchment in this locale, including increasingly 'problematic' drug use, an intensified need to generate income, experiences of chronic homelessness, and unstable social relationships. Our findings stress the need for early intervention with youth, before they are initiated into the social networks and processes that rapidly propel young people towards risk within these contexts. Once initiation has occurred, the boundary between safety and risk quickly becomes difficult to navigate, and young people become highly vulnerable to numerous harms.

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Introduction

The drugs took over when I got out here. I didn't realize that there was a drug scene like this out here. Nobody explained it to me. They told me it was a wild place, that it was gonna be fun. But, it was also a crazy place. They never told me the craziness of the place. Nobody ever takes that extra time to say, 'No, this is what you're getting into.' – Luke, age 23

Illicit drug use often results in severe harms among drug-using populations. The extent of drug-related harm varies considerably across individuals and populations, often in accordance with the types of drugs used, how they are administered, and the unique social and structural context of drug use in any given locale (Rhodes, 2002). However, various health and social harms among

select populations of young drug users have been documented in several urban settings, including elevated rates of homelessness (Gleghorn, Marx, Vittinghoff, & Katz, 1998; Rachlis, Wood, Zhang, Montaner, & Kerr, 2008), violence (Bourgois, Prince, & Moss, 2004; Surratt, Inciardi, Kurtz, & Kiley, 2004), and HIV and hepatitis C infection (DeMatteo et al., 1999; Miller et al., 2005; Roy et al., 2003, 2007). Perhaps most alarming are reports revealing elevated mortality rates among these youth (Cheung & Hwang, 2004; Roy et al., 2004; Shaw & Dorling, 1998), with one of the leading causes of death being drug-related overdose.

This body of research has led to calls for an updating of the risk prevention hierarchy, so that prevention of initiation into the most harmful forms of drug use among young drug users is given greater attention (Vlahov, Fuller, Ompad, Galea, & Des Jarlais, 2004). In particular, an increasing number of studies have focused on initiation into injection drug use among youth (Becker Buxton et al., 2004; Fuller et al., 2003; Harocopos, Goldsamt, Kobrak, Jost, & Clatts, 2009; Roy, Nonn, & Haley, 2008). However, particularly in North America, an emphasis on the circumstances surrounding

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injecting has meant that there have been relatively few studies that focus on the broader *risk trajectories* (Elder, 1985; Hser, Longshore, & Anglin, 2007) experienced by young drug users, which include but are not limited to experiences with injection drug use. A risk trajectory perspective emphasizes the sequences of transitions experienced by young people in relation to drug use and risk; furthermore, it recognizes that transitions are oftentimes shaped by 'critical moments' or life events that can greatly influence long-term patterns of risk and harm. Interestingly, ethnographic work which has focused on how young people 'script' risk over time has found that initiation into injection drug use often represents a decision point that was preceded by numerous 'critical moments' in a young person's risk trajectory where possibilities for the self-regulation or minimization of risk were greater (MacDonald & Marsh, 2002; Mayock, 2005). Research has shown that, among young people, the stigma of injecting can quickly be replaced by curiosity as a result of frequent exposure to injection drug use within drug-using milieus; the decision to inject is often made under non-exceptional or normalized circumstances, in which *acceptable* risk is constructed to include injection drug use (Harocopos et al., 2009; Mayock, 2005).

In general, growing awareness of the limitations of interventions that target individual risk behaviors has led to the development of ecological approaches, which emphasize the influence of *place* on health (Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005; Strathdee et al., 1997). An increasing focus on place (where place is understood to encompass both physical and social structural spaces) has generated interest in the role played by *drug scenes* in shaping 'risk' among drug-using populations (Curtis et al., 1995; Kerr, Kimber, & Rhodes, 2007; May, Harocopos, Turnbull, & Hough, 2000). More specifically, ethnographic and epidemiological evidence has begun to highlight the ways in which the structures, social processes and physical environments of drug scenes operate to rapidly isolate and *push* youth towards harm, until it becomes difficult or impossible for them to avoid 'risking risk' (Bourgois et al., 2004; Small, Kerr, Charette, Schechter, & Spittal, 2006). Drug scenes have been described as distinctive inner-city areas characterized by high concentrations of drug users and drug dealing within a specific geographical area (Hough & Natarajan, 2000). These locales vary considerably according to a number of factors, including the types of drugs available, who controls the sale of illicit substances, the specific venues in which drugs are sold and used, as well as the history of particular drug-use settings (Bourgois, 1996; Maher, 1997). In addition to drug use and drug procurement activities, these geographical areas anchor elaborate social and spatial networks, practices associated with the day-to-day realities of securing basic necessities, and wider patterns of income generation activities.

Despite growing interest in drug scenes, and the ways in which drug-using milieus shape the risk trajectories of young drug users, there are few studies that focus exclusively on how young people are first initiated into these settings. The present study sought to explore how youth who were currently entrenched in a local drug scene in downtown Vancouver, Canada, characterized and understood their initiation into this setting. In Vancouver, the local street-based drug scene (referred to by many youth as simply 'down here') includes two distinctive neighborhoods known as the Downtown Eastside and the Downtown South. Although these areas are geographically adjacent (and within easy walking distance of each other), they are consistently differentiated according to their history and a number of aspects of place. Among the general public, the boundary that exists between them is primarily one of differential affluence; while the Downtown Eastside is widely recognized as North America's poorest urban drug- and crime-ridden postal code (Strathdee et al., 1997; Wood et al., 2002), the Downtown South is a residential and entertainment district characterized by both high- and (limited)

low-income housing and numerous thriving businesses. The drug-using populations in these two neighborhoods are also distinctive (although overlap exists); while the Downtown South is characterized by high rates of crystal methamphetamine sales and use primarily among youth (Wood, Stoltz, Montaner, & Kerr, 2006), the Downtown Eastside is characterized by a trade in crack cocaine, cocaine and heroin bought and sold primarily by adult drug users, including many who inject drugs (Wood & Kerr, 2006). While the Downtown Eastside is a long-standing and well-established drug market that has been in operation for decades, the Downtown South drug market is a relatively recent development. Although the Downtown Eastside can accurately be characterized as a more 'open' drug scene (i.e. drug procurement and use is highly visible and few barriers to access exist) in comparison to that of the Downtown South, in reality a wide range of illicit substances are easily available on the streets of both locales. Furthermore, both neighborhoods are characterized by thriving 'shadow economies' largely propelled by sex work activities, drug dealing and the exchange of stolen goods. The Downtown Eastside in particular has been subjected to intensive enforcement initiatives in recent years (Small et al., 2006), although police activities are also ongoing in the Downtown South. Importantly, our ongoing ethnographic research in both neighborhoods indicates that a large number of young people move *between* them, and that the conceptual and geographical boundaries that separate the Downtown Eastside from the Downtown South are in fact highly permeable. Thus, both of these neighborhoods – and the interaction between them – were central to our investigation.

Methods

Interviewees were recruited from the existing At-Risk Youth Study (ARYS) cohort, a prospective cohort of drug-using and street-involved youth that has been described in detail elsewhere (Wood et al., 2006). Eligibility criteria for this study include being between the ages of 14 and 26 years and self-reported use of illicit drugs other than or in addition to marijuana in the past thirty days. Epidemiological research among this population indicates that they are vulnerable to intensive drug use – including the use of crystal methamphetamine, heroin, cocaine and crack (Lloyd-Smith, Kerr, Zhang, Montaner, & Wood, 2008; Werb, Kerr, Lai, Montaner, & Wood, 2008; Wood et al., 2008) – homelessness (Rachlis et al., 2008), and alarming rates of HIV and hepatitis C infection (Miller et al., 2005).

A subgroup of the cohort was selected to complete qualitative interviews. A first wave of interviews was conducted during April and May of 2008, followed up by a second wave of interviews conducted during September and October of that year. Sampling was largely opportunistic, but aimed to attain variation in gender, ethnicity, age, and length of time having lived within the downtown Vancouver drug scene. Interviews were undertaken by three trained interviewers (one male and two female) and facilitated through the use of a topic guide encouraging broad discussion of how participants came to be involved in the local drug scene and how various aspects of drug scene involvement (e.g., drug-use practices, income generation activities, social relationships) evolved over time. Interviews lasted between 30 and 120 min, were tape-recorded, transcribed verbatim and checked for accuracy. All participants provided informed consent, and the study was undertaken with ethical approval granted by the Providence Healthcare/University of British Columbia Research Ethics Board. Participants received a twenty-dollar honorarium. There were no refusals of the invitation to participate in the interview, and no dropouts occurred during the interview process.

Data collection and analyses occurred concurrently and via ongoing engagement with participants, in order to continually re-evaluate the validity of research findings. While remaining

cognizant of confidentiality issues (many of the participants of this study knew each other and it was therefore important to emphasize that what one person said in an interview would under no circumstances be repeated to another participant), evolving interpretations of the data were discussed with participants, both informally with those who had already been interviewed, and more formally in subsequent interviews. This process was used to inform the focus and direction of subsequent interviews (for example, through the addition of new questions and probes). In addition, the research team discussed the content of the interviews throughout the data collection and analysis processes, informing the development and refinement of a coding scheme for partitioning the data categorically. Interview data were initially coded based on key themes; substantive codes were then applied to categories/themes based on the initial codes. ATLAS.TI software was used to manage the coded data. All names in the paper have been changed.

Results

Participants ranged from 16 to 26 years of age and included 18 women, 18 men and 2 transgender individuals. Sixty-seven percent of study participants were Caucasian, 28 percent self-identified as being of Aboriginal descent, and 5 percent were African Canadian. Half of interview participants reported being homeless at the time of the study, and the majority had experienced homelessness at some time over the course of their involvement with the local scene. The majority of participants reported that they had at one time engaged in or were currently engaging in drug use that they defined as problematic – including intensive (i.e. multiple times per day) crack cocaine, crystal methamphetamine and/or intravenous heroin use. Furthermore, approximately half of young people said they had been involved in these forms of intensive drug use within the local scene for more than 3 years. Participants were involved in numerous income generation activities (oftentimes simultaneously) including street-level drug dealing, sex work, theft and the exchange of stolen goods. To a lesser extent, some youth also engaged in recycling activities (referred to as 'binning'), panhandling, and street performing (referred to as 'busking'). In sum, the majority of the young people with whom we spoke were significantly 'entrenched' in the downtown drug scene – in other words, they were largely consumed by the daily project of survival 'on the streets' in the context of homelessness, chronic poverty, involvement in harmful forms of drug use and/or dangerous income generation activities.

'Coming down here': entering the local scene

Stories about 'coming down here' reflected an understanding among young people that they were simultaneously *pulled* and *pushed* towards this drug-using milieu at the time of their entry into the scene. Interwoven with narratives that emphasized their limited autonomy in becoming involved with this setting were recollections of what initially *drew* them to the streets of downtown Vancouver. These recollections emphasized a high degree of autonomy in *choosing* to become involved in the downtown drug scene.

It is important to note that several participants described growing up 'on the streets' – a phrase that encompasses numerous indoor and outdoor locations that include but are not limited to stretches of sidewalk. Kaley and Jessica had both been involved in Vancouver's Downtown Eastside neighborhood for 'as long as they could remember.' Their accounts of when and how they were initiated into the social-spatial networks, income generation strategies and problematic drug use that characterize this neighborhood indicated that they were immersed in the local scene from an extremely early age:

Well, my parents grew up down here ... and they're drug addicts so therefore I watched my parents do it all my life, and I started doing drugs when I was like 10 years old ... Whatever. I've always been involved in the Downtown Eastside. (Kaley, age 20)

My mom decided to be a very big heroin user, she didn't pay attention to me anyway. My dad, he was an alcoholic ... I ended up being pimped out [in the Downtown Eastside] ... I was eleven years old when I moved over to [the Downtown South]. (Jessica, age 16)

In recalling their initial experiences within this setting, participants who had grown up 'on the streets' emphasized their limited autonomy, and understood their involvement in the drug scene to be the inevitable outcome of early childhood experiences. While their stories indicated that it was possible to exit or avoid some of the most destructive aspects of the drug scene (for example, involvement in sex work), or to carve out relatively 'safe' geographical niches within it (for example, by moving from the Downtown Eastside to the Downtown South), the notion of choice was notably absent from these narratives.

The majority of participants, however, did not grow up in Vancouver at all; their narratives emphasized several key themes. Firstly, a number of participants indicated that they moved to downtown Vancouver to escape negative situations with law enforcement in other Canadian cities. These participants were all heavily involved with drug scenes elsewhere and fled those locales in order to escape arrest or harassment by police. Interestingly, these participants all had prior knowledge of the Vancouver drug scene before arriving.

Luke – who was quoted at the beginning of this paper – arrived in Vancouver at 18 years old after hitchhiking across Canada from Kingston, Ontario. Before arriving, Luke had been told by other street-entrenched youth that downtown Vancouver was 'a wild place' and that 'it was going to be fun.' Similar to participants who had grown up within the downtown Vancouver drug scene, Luke had been heavily involved in heroin and crack cocaine use as well as drug dealing and crime from an extremely early age, reflecting that 'everyone in his family was a junkie' and 'everyone in his family sold drugs.' He ultimately fled to Vancouver in order to avoid arrest in Ontario:

I had warrants for my arrest from when I was thirteen. So that's why I was running. That's what drove me out here, because I had twenty-one outstanding warrants. (Luke, age 23)

Similarly, Laura had been living on the streets in Toronto with her long-time boyfriend for a number of years and was engaged in intensive crack cocaine use and various crime activities when the pressure from police finally motivated the pair to move to Vancouver:

My boyfriend was, like, starting to lose it and we were being watched by the cops a lot [in Toronto] ... So we left. And we came all the way out here – we just kind of just bought bus tickets. (Laura, age 25)

However, Laura also noted that she was also motivated by a strong desire to 'go West' and experience the excitement offered by the somewhat notorious Vancouver drug scene – a reputation Luke also alluded to. Indeed, many participants described the excitement and fun they experienced when they first arrived in downtown Vancouver from other cities. Almost always, this initial enjoyment was closely connected with heavy drug use. As Laura reflected:

The first time I came here I was like I was high on acid for a really long time ... I can remember almost every second of my trip ... [Vancouver] was, like, so alive, you know? (Laura, age 25)

Those participants who had previous experience with heavy drug use before becoming immersed in the downtown scene also

articulated the immediate sense of *belonging* that they felt when they were first exposed to the open drug scene of the Downtown Eastside neighborhood in particular. Natasha – a Russian-born immigrant who became homeless in downtown Vancouver when she was 16 years old – described an abusive relationship with her stepfather that coincided with her initiation into intensive crystal methamphetamine and heroin use. It was this situation that led her to begin frequenting the Downtown Eastside in order to obtain drugs. However, she noted that the sense of belonging she experienced in Vancouver's Downtown Eastside neighborhood was an equally powerful motivator to relocate permanently to this area:

Me and my friend, we used to come downtown to like pick up [buy drugs]. And we'd just like walk around ... I liked it downtown better just 'cause I just felt more at home kinda. You could walk around saying out loud, 'Fuck, you know? I need some heroin!' and no one is gonna look at you weird ... Eventually I just never ended up going back to my mom's place. (Natasha, age 19)

Many participants emphasized that they chose involvement in drug scenes – whether in Vancouver or elsewhere – in order to assert their independence and escape harmful, repressive or essentially non-existent care situations. Several participants commented that they had been 'on their own' without the support of family from an extremely early age, and that drug scene involvement afforded them this same degree of independence. Alternatively, a number of participants explained that they chose involvement in a drug scene over conforming to regulation-heavy foster care arrangements or group home living situations. Danny, who arrived on the streets of downtown Vancouver when he was 13 years old, recalled the foster care circumstances and his desire for independence that shaped his decision to move to Vancouver:

With my adopted parents, they had my Mom before me, so they kind of thought, 'Like mother like son.' They restricted me a whole lot more than they restricted anybody else [in my family] ... Well, I kinda got sick and tired of that ... So me and a buddy decided we were going to go to downtown Vancouver one day. (Danny, age 26)

While some participants commented on the inadequacy of their former living arrangements, a number of youth identified a *lack* of housing as the primary reason they were forced to relocate from elsewhere in greater Vancouver to the downtown core, where youth shelters and low-income housing are concentrated. Anna was 20 years old when she and her boyfriend became heavily involved in crystal methamphetamine use; as a result of falling behind in rent payments, the pair lost their place in Surrey (an outlying city that comprises part of the greater Vancouver area). Anna explained that she and her boyfriend decided to seek housing in the Downtown Eastside because they 'thought that it was cheaper down there.'

Indeed, upon arriving in downtown Vancouver, many participants were initially able to secure beds in shelters or low-income housing in single room occupancy hotels (SROs). However, difficulties in securing *stable* accommodation usually continued once youth had relocated downtown, resulting in eventual homelessness. Anna described how, upon arrival, she and her boyfriend initially secured a room in an SRO located in the heart of the Downtown Eastside's open drug market. The pair quickly transitioned from crystal methamphetamine to crack cocaine use, because the latter 'was easy to get and it was everywhere' in the Downtown Eastside. Again, Anna and her boyfriend fell behind in rent, this time resulting in homelessness.

In sum, stories about 'coming down here' speak both to the ways in which young people exercised agency in *choosing* to becoming involved in the local drug scene (and in shaping the nature of that involvement), and to the ways in which their choices were

powerfully constrained at the time of their entry into this drug-using milieu. The majority of participants envisioned themselves as becoming independent from undesirable, harmful or non-existent care situations, or other drug scenes in which heavy policing had resulted in a significant risk of arrest. They sought a sense of belonging and excitement in the 'opportunity structures' of the Vancouver drug scene – including, most notably, the escapism and pleasure facilitated by ubiquitous open drug use and procurement. However, the belonging and independence afforded by the local drug scene ultimately reinforced young people's *exclusion* from more mainstream opportunity structures such as stable housing, educational and recreational programs, and legal employment – a reality that was not lost on young people themselves in hindsight.

From 'weekend warriors' to addicts

Interestingly, a significant number of participants indicated that they had connections to people and places within the downtown drug scene before they relocated to this area (particularly if they were originally from somewhere else in the greater Vancouver area). Prior to having any direct exposure to the drug scene themselves, a number of participants indicated that they 'knew people' who spent periods of time 'hanging out', using drugs and/or accessing services in downtown Vancouver. Moreover, many participants initially *arrived* on the scene with friends or older siblings who were already connected and able to provide introductions. Danny – whose earlier account highlighted his desire for independence in the context of a repressive foster care living arrangement – described the suddenness of his transition to the streets of the Downtown Eastside, which was facilitated by a friend with prior connections to this neighborhood:

[My friend had] been downtown a couple times before I had, he was more known. I just went on a whim ... Next thing I know I'm living down there. (Danny, age 26)

Furthermore, a number of participants indicated that they *themselves* initially moved between 'hanging out' within the downtown Vancouver drug scene and living arrangements elsewhere before relocating more permanently to the downtown core. Consistent with other settings (Karabanow, 2006; Williams Boeri, 2004), young people who frequent the drug scene but do not permanently reside within it are often disparagingly labeled 'weekend warriors' or 'twinkies' by more experienced and street-entrenched youth – including many of the participants of this study. However, while they were eager to distance themselves from 'weekend warriors' at this later stage in their street careers, participants did reflect on their own naiveté upon first arriving 'on the streets', and recalled the sense of intimidation they felt when interacting with more experienced youth and older drug users at that time. It seems that many youth who originate in other parts of greater Vancouver go through a period of involvement with the drug scene during which they could be characterized as 'weekend warriors' or 'twinkies.' Only those participants who transitioned from drug scenes in other Canadian cities to the Vancouver scene described going from no exposure to immediate intensive involvement.

Regardless of whether youth had connections to people or places before relocating downtown, participants emphasized how quickly they were integrated into the social networks and processes of the local scene via acquaintances met through service locations or 'on the streets.' This event constitutes a 'critical moment' in young people's risk trajectories that can greatly influence long-term patterns of risk and harm. A number of participants recalled how, upon arriving in the downtown core, they were quickly approached and introduced to the people and places that, in turn, connected them with drugs and opportunities to generate income –

primarily through illegal activity. Drew arrived in Vancouver at age 18 from Alberta, where he had been living in what he described as a 'lock-up facility for high-risk youth.' In moving to downtown Vancouver, Drew recalled in hindsight that he was 'totally clueless' as to what he was 'getting himself into.' He vividly described his first day in town:

I got introduced to a crowd that was a gong-show [wild, out of control] ... I was looking for a hostel or whatever, and someone said, 'Look, I can take you downtown' ... So he shows me where this hostel is ... And he ends up taking me to his place, Nelson Park [in the Downtown South], and that's when I got introduced to crystal meth. And that's when I got hooked on crystal meth. (Drew, age 23)

Danny's story regarding his initiation into drug dealing – three days after he came downtown with his friend 'on a whim' – was also particularly striking, but not unlike scenarios described by other participants:

I was sitting on Hastings [in the Downtown Eastside], and some of the crack dealers go, 'oh, we see you a lot, what do you do?' 'Oh I pan [panhandle]. 'Well here, take this [cocaine], go make better money.' And I did! ... That was three days after I got into town. By the end of the week I was selling anywhere from an eight ball of coke to a quarter pound of coke a day. (Danny, age 26)

Young people's accounts of their initial experiences with drug use and availability in the Downtown South and the Downtown Eastside areas support the characterization of the Downtown Eastside as a highly open drug scene, in contrast to the more 'closed' drug scene of the Downtown South (although Drew's rapid initiation into crystal methamphetamine use in the Downtown South indicates that, given the appropriate and easily cultivated 'connections', drugs are also easily available in that locale). Anna's story from the previous section – in which she rapidly transitioned into crack cocaine use upon taking up residence in the Downtown Eastside because crack was 'easy to get and it was everywhere' – is reflective of many participants' early experiences in this neighborhood. Young people consistently identified the ubiquity of drug use in the Downtown Eastside in particular as an important factor in the re-defining of previously established 'risk boundaries' (Mayock, 2005), and motivating newcomer youth to engage in self-identified problematic forms of drug use that were previously 'off-limits':

On Hastings [in the Downtown Eastside] ... There's a lot of active drug use, out in the open. And young girls see that, and think that it's glamorous, or they think it's cool, and they'll start to get into it. (Tanya, 23 years old)

Not surprisingly, the majority of participants reported that as problematic drug use accelerates, the need to pursue various income generation activities also intensifies. However, it was interesting that several participants described the reverse of this relationship – recall Danny's initiation into drug dealing three days after arriving in the Downtown Eastside. A number of participants reflected that upon arriving in downtown Vancouver, they were first introduced to prohibited income generation strategies – most notably drug dealing – which quickly led to accelerating problematic drug use. For example, Danny had not used any drugs besides marijuana before he began dealing drugs in the Downtown Eastside. However, once he began dealing he quickly started 'doing his own product' and transitioned into heavy crack cocaine use.

Regardless of which came first (the drug use or the drug dealing), accelerating addictions meant that available income was increasingly allotted for drug procurement, making it difficult to pay rent even if housing was initially secured. Participants connected their early experiences of homelessness – and particularly sleeping outside – with further problematic drug use as a way of

dealing with emotional stress. Heavy drug use then became both a *reaction* to and a *cause* of diminished opportunities to secure housing and legitimate employment. As such, 'becoming homeless' likely represents another critical moment that can affect longer-term patterns of risk. Kim began sleeping on the streets in the Downtown South in her early twenties, and recalled how her use of crystal methamphetamine, cocaine, crack cocaine and ecstasy escalated at that time:

It became like this isolation of drug use. It started happening daily, and like, I remember wanting to get a job and wanting my own place ... I lost a lot of opportunities. (Kim, age 25)

As problematic drug use, the need to generate income via increasingly lucrative (i.e. illegal) means and homelessness all became more prominent, young people found themselves increasingly entrenched within the local scene. Furthermore, within this context, illegal income generation strategies result in frequent arrests and periods of incarceration, particularly among young men. As a result, social networks are constantly being destabilized, resulting in significant risk and emotional stress both within and outside of correctional facilities. Oftentimes, the arrest of young men contributes to the further entrenchment of those young women who are left behind 'on the streets' to 'fend for themselves' in the absence of a male partner. Natasha (whose earlier account emphasized the sense of belonging she experienced in the Downtown Eastside) described how she quickly transitioned from a situation of relative safety on the streets to one of significant danger when her partner was incarcerated:

[When I first came down here] I was with this guy that became my boyfriend, but then he went to jail. And when he went to jail, I really had no one to like, you know, show me the spots where you can sleep, and all that, right? ... Not long after that these two guys ended up taking me and pimping me out on Kingsway [in greater Vancouver]. (Natasha, age 19)

Natasha's story – which began with her recalling how she made the decision to leave home because she 'liked it better downtown', and ended with her reflections on 'being taken and pimped out' – is an appropriate (although deeply troubling) narrative to end on. Her story powerfully reflects the *interaction* between early childhood experiences, accelerating drug use, homelessness, destabilized social networks and involvement in illicit income generation activities in entrenching youth within a highly dangerous setting. Furthermore, it illustrates how quickly young people move from being willing players in the context of the local drug scene to circumstances where autonomy is severely limited – a theme that emerged (albeit in different forms) in each participant's story.

Interpretation

In the present study, participant narratives reflected an understanding among young people that they are simultaneously *pulled* and *pushed* towards the local drug scene. In employing a 'push/pull' framework, however, we do not want to imply a dichotomy between these terms. Indeed, our data illustrate that push and pull factors need to be understood *in relation* to one another. Young people's attraction to this drug-using milieu must be contextualized according to the myriad of circumstances that propelled them towards this setting *in particular*. Most often, participants made the decision to enter the downtown Vancouver drug scene as a viable alternative to unsafe and unsupported living situations experienced elsewhere. Social structural factors such as childhood experiences of addiction, prior criminal involvement, chronic poverty and social exclusion all powerfully shaped how young people were

able to envision and act upon opportunities for belonging, independence and excitement. As many of their stories about 'coming down here' make clear, *all* of the youth who participated in this study had experienced social exclusion and alienation from more mainstream opportunity structures (such as schools, families or recreational programs) over the course of their childhoods and early adolescence, limiting the extent to which they could envision or access alternative sources of excitement, freedom and belonging during the period of time in which they became initiated into the Vancouver drug scene (MacDonald & Marsh, 2001, 2004). Furthermore, our results emphasize that many youth who spoke of the excitement, independence and sense of belonging they felt upon first arriving in the city already had extensive exposure to drug use and drug-using contexts prior to entering the local drug scene. As such, drug scenes may represent a more normalized environment for these youth, who are already familiar with the 'opportunity structures' – including street-based social networks of other drug users, various prohibited income generating strategies, and drug-related escapism – these scenes have to offer (MacDonald & Marsh, 2002; Shildrick, 2002).

At the same time, we have chosen to highlight *both* push and pull factors as a way of acknowledging that – initially at least – young people view themselves as willing players in defining and shaping their place within drug scenes (Karabanow, 2006). Consistent with previous work, participants claimed a high degree of autonomy and largely rejected social determinants as explanations for their initiation into the local drug scene (Mayock, 2005). Furthermore, young people's wider narratives emphasized the ways in which they continued to exercise agency in defining their actions and decisions over the course of their involvement within this setting. Even those participants who 'grew up on the streets' indicated that it was possible to exit or avoid some of the most destructive aspects of the drug scene (e.g., involvement in sex work), or to carve out relatively 'safe' geographical niches within it (e.g., by moving from the Downtown Eastside to the Downtown South). Moreover, although we found that the majority of our participants engaged in prohibited and dangerous income generation activities such as drug dealing, sex work and/or the exchange of stolen goods soon after arriving in the downtown core, a small number consistently avoided these activities, opting to engage in panhandling, 'squeegeeing' [car window washing], or recycling activities that represent much safer – although less financially lucrative – alternatives. Given the role played by income generation activities such as drug dealing, sex work and other crime activities in accelerating drug scene entrenchment in our setting, further research should investigate the relationship between income generation and the construction of risk among young people at various points in their street 'careers.'

While we want to acknowledge young people's assertions of autonomy – and follow others in recognizing that agency is intimately associated with risk (Mayock, 2005) – our findings corroborate other ethnographic evidence indicating that once young people are integrated into the socio-spatial processes of the drug scene, the boundary between safe and destructive action becomes increasingly difficult to navigate, and many young people find themselves suddenly and unexpectedly entrenched within a drug scene of which they want no part (Mayock, 2005). Indeed, in hindsight the participants of this study expressed a *desensationalized* view of the downtown drug scene; they emphasized that, although street life does offer opportunities for excitement and income generation, these benefits are greatly outweighed by the accelerating negative consequences of 'life on the streets', including exposure to violence and blood-borne infections such as HIV and hepatitis C, and immense emotional suffering.

Our findings stress the need for early intervention with youth who experience significant vulnerability, long before these young

people relocate to the streets of an urban drug scene. Interventions – such as school-based programs that include enhanced access to counseling services and after-school activities that facilitate time away from harmful home environments – should be aimed at youth with extensive childhood and early adolescent exposure to addiction, as it would seem that the normalization of drug use and drug-using environments can accelerate immersion in drug scenes later in life.

Furthermore, consistent with previous work (Bourgois et al., 2004), our findings illustrate that although 'weekend warriors' are viewed disparagingly by more experienced and street-entrenched youth, there are clearly social actors within drug scenes (including peers, drug dealers, and pimps) who are willing to introduce newcomer youth to the people and places through which they can access drugs and opportunities for illicit income generation. The period of time during which young people are becoming immersed in the social-spatial processes of the drug scene – including patterns of drug use and drug procurement, income generation and residence – represents a particularly 'critical moment' (or cluster of 'critical moments') that can greatly influence long-term patterns of risk. Given the speed with which various social actors approach newcomer youth and readily supply connections to the people and places through which youth quickly become integrated members of the scene, it is essential that newcomer youth be targeted for specific interventions that aim to facilitate alternative opportunities to what 'the street' has to offer – including low-threshold access to safe and affordable housing (combined with addiction treatment facilities), and educational, vocational and recreational programs.

It is important to note that our findings are based upon interviews with local youth participating in the current study. While an effort was made to ensure that the study sample reflects the demographics of the local youth population, it is clear that our sample is more representative of the *highest* risk youth in downtown Vancouver. Not all youth who are initiated into this drug-using context make the rapid transition from 'weekend warriors' to 'addicts' described above; more research is needed to determine why some youth are able to exit the scene in spite of childhood and early adolescent experiences of social exclusion and marginalization.

Nevertheless, this study represents a contribution towards understanding how various individual and social structural factors interact to shape young people's initiation into the street-based drug scene in Vancouver, and foster subsequent entrenchment in this particular drug-using milieu. Our results emphasize the need for early intervention with youth who are likely to seek out involvement in drug scenes, and unlikely to identify 'risk' except in hindsight, once personal and structural circumstances have made it difficult to avoid 'risking risk' in such a setting. Lastly, given the many severe harms described herein, it is clear that additional interventions, including those that offset the harms of active drug use, are urgently needed for those youth already immersed in the local drug scene.

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BRIEF COMMUNICATION

Prevalence and correlates of jugular injections among injection drug users

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Abstract

Background. Jugular injection of drugs has been reported, although little is known about the prevalence of and risk factors associated with this behaviour. We evaluated factors associated with jugular injection among a cohort of injection drug users (IDU) in Vancouver, Canada. **Methods.** We used univariate statistics and logistic regression to examine factors associated with jugular injection among participants in the Vancouver Injecting Drug Users Study (VIDUS), a large prospective cohort study of IDU recruited through snowball sampling methods in Vancouver, Canada. **Findings.** Between December 2004 and November 2005, 780 IDU were followed up as part of VIDUS and 198 (25%) reported jugular injection in the previous 6 months. In multivariate analyses, factors associated independently with jugular injection included: being of the female gender [adjusted odds ratio (aOR) = 1.72, 95% confidence interval (CI): 1.14–2.59; $p = 0.010$], daily heroin use (aOR = 2.89, 95% CI: 1.93–4.34; $p < 0.001$), daily cocaine use (aOR = 1.76, 95% CI: 1.12–2.76; $p = 0.014$), requiring help injecting (aOR = 4.44, 95% CI: 2.64–7.46; $p < 0.001$), and involvement in the sex-trade (aOR = 2.71, 95% CI: 1.6–4.55; $p < 0.001$). **Interpretation.** Reporting a history of jugular injecting was alarmingly high in the cohort and was associated with several identifiable demographic and drug-using characteristics. Given previous reports demonstrating the risk of infection and vascular trauma due to this behaviour, these populations should be considered seriously as a target for safer injecting education. [Hoda Z, Kerr T, Li K, Montaner JSG, Wood E. Prevalence and correlates of jugular injections among injection drug users. *Drug Alcohol Rev* 2008;27:442–446]

Key words: HIV, injection drug use, jugular, public health.

Introduction

Injection drug use is currently producing blood-borne infection epidemics in many cities across the globe [1–3]. Arguably, the most pressing of concerns are with transmission of the human immunodeficiency virus (HIV) and hepatitis B and C viruses (HBV, HCV) [4]. In addition to viral infection, localized skin rashes and cutaneous and subcutaneous bacterial infections including abscesses, cellulitis and encephalitic infections have been reported extensively [5,6]. They have been associated with HCV or HIV infection, unsafe injection practices such as sharing needles, injection site injuries

due to poor or rushed injection technique, lack of anatomical knowledge of injection site and severe sclerosing, phlebitis or thrombosis of superficial veins, which prompt injection attempts at more risky sites of venous access [5–7]. Finally, injection drug use is also associated with a wider array of health-related harms other than infections, including overdose death and psychological dysfunction.

IDU are known to use various anatomical sites for injecting. Although few studies have examined why IDU select certain anatomical locations, earlier studies have noted limited venous access and the 'rush' from injecting in certain locations [4,8]. For instance, a risk

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behaviour of IDU that has received less attention is the injection of drugs into the jugular vein, although reported in a number of urban centres across the globe [9–13]. This is of particular concern, given that injecting in the jugular vein has the potential for significant health-related harms. For instance, a range of reports have described sequelae of jugular injecting including pneumothorax [14,15], needle foreign body infection [16] and recurrent laryngeal nerve injury [17]. Further, life-threatening and debilitating complications include jugular vein and subclavian and carotid artery thrombosis and aneurysm [18], emboli and paraplegia [19]. However, the majority of these reports describe individual cases or case series and little is known about the prevalence of this activity or risk factors for this behaviour within IDU populations. Therefore, the present study was conducted to evaluate the prevalence and correlates of jugular injection among IDU enrolled in a prospective cohort study in Vancouver, Canada.

Methods

Participant recruitment

The Vancouver Injection Drug Users Study (VIDUS) is a prospective cohort study of injection drug users that has been described in detail previously [20,21]. Briefly, at baseline and semi-annually, subjects gave blood samples for HIV serology and completed an interviewer-administered questionnaire. The VIDUS study is annually approved by the University of British Columbia's Research Ethics Board. The present study has been ethically approved by the Research Ethics Board at the University of British Columbia.

Variables assessed

In response to an earlier study that reported high rates of jugular injecting among local IDU [8], questionnaire items were added to the VIDUS survey to examine this behaviour. In the primary analysis, we examined self-reported behavioral data collected as part of the VIDUS questionnaire to examine factors associated with jugular injecting in the previous 6 months. Variables associated potentially with this outcome which were considered included: gender, age, Aboriginal ethnicity (yes vs. no), residence in the Downtown Eastside where the IDU problem is concentrated (yes vs. no), sex trade involvement (yes vs. no), recent incarceration (yes vs. no), current methadone treatment (yes vs. no), requiring help injecting (yes vs. no), cocaine injection frequency ($\geq$ daily vs. <daily) and heroin injection frequency ($\geq$ daily vs. <daily). Unless noted otherwise, all behaviours refer to activities in the previous 6 months and all variable definitions have been used extensively and were identical to earlier reports [20–23].

Statistical methods

Individuals who reported jugular injecting were compared to those individuals who did not report jugular injecting using univariate and logistic regression analyses. For univariate analyses, those who did and did not report jugular injecting were compared using Pearson's χ^2 test (dichotomous variables) and the Wilcoxon rank test (continuous variables). The multivariate model was prepared by including variables that were $p < 0.05$ in univariate analyses in a fixed multivariate logistic regression model. All statistical analyses were performed using SAS software version 8.0 (SAS, Cary, NC, USA). All p -values are two-sided.

Results

Since study initiation, 1603 IDU have been recruited into VIDUS and 780 participants returned for follow-up between December 2004 and November 2005. In comparison to those 823 individuals who were not followed during the study period due to loss to follow-up or death, those included in the present study were more likely to be female and Aboriginal/American Indian (both $p < 0.05$). Among the 780 individuals included in this analysis, 244 (31%) were Aboriginal and 323 (41%) were female. Among the sample, 198 (25%) reported jugular injecting drugs during the previous 6 months. The median age for those reporting jugular injecting was 39 [interquartile range (IQR) 31–46], and for those not reporting jugular injecting was 42 (IQR 33–48).

As shown in Table 1, univariate analyses demonstrated that participants who reported jugular injection at follow-up were more likely to be female [OR = 2.29, 95% confidence interval (CI): 1.65–3.18; $p < 0.001$], a Downtown Eastside resident (OR = 1.77, 95% CI: 1.27–2.46; $p < 0.001$), involved in sex trade work (OR = 5.19, 95% CI: 3.41–7.90; $p < 0.001$), require help injecting (OR = 7.47, 95% CI: 4.68–11.93; $p < 0.001$), injecting cocaine daily (OR = 2.70, 95% CI: 1.84–3.98; $p < 0.001$) and injecting heroin daily (OR = 4.56, 95% CI: 3.21–6.47; $p < 0.001$). Factors that were not associated with jugular injection at the $p < 0.05$ level were Aboriginal ethnicity (OR = 0.91, 95% CI: 0.64–1.29; $p = 0.602$) and being on methadone (OR = 1.27, 95% CI: 0.87–1.87; $p = 0.218$).

As shown in Table 2, in multivariate logistic regression factors which remained associated independently with jugular injection were being of the female gender (adjusted odds ratio (aOR) = 1.72, 95% CI: 1.14–2.59; $p = 0.010$), daily heroin use (aOR = 2.89, 95% CI: 1.93–4.34; $p < 0.001$), daily cocaine use (aOR = 1.76, 95% CI: 1.12–2.76; $p = 0.014$), requiring help injecting (aOR = 4.44, 95% CI: 2.64–7.46;

Table 1. Univariate comparisons of injection drug users (IDU) reporting and not reporting jugular injecting

Characteristic	Jugular injected		Unadjusted odds ratio	95% Confidence interval	p-value
	No, n (%)	Yes, n (%)			
Gender					
Male	371 (63.8)	86 (43.4)			
Female	211 (36.3)	112 (56.6)	2.29	(1.65–3.18)	<0.001
Age					
Median (IQR)	42 (33–48)	39 (31–46)	0.75	(0.64–0.89)	<0.001
Aboriginal					
No	397 (68.2)	139 (70.2)			
Yes	185 (31.8)	59 (29.8)	0.91	(0.64–1.29)	0.6021
DTES resident*					
No	299 (51.4)	74 (37.4)			
Yes	283 (48.6)	124 (62.6)	1.77	(1.27–2.46)	<0.001
Sex trade work*					
No	534 (91.8)	135 (68.2)			
Yes	48 (8.3)	63 (31.8)	5.19	(3.41–7.90)	<0.001
Recently incarcerated*					
No	519 (89.2)	167 (84.3)			
Yes	63 (10.8)	31 (15.7)	1.53	(0.96–2.43)	0.071
On methadone					
No	465 (79.9)	150 (75.8)			
Yes	117 (20.1)	48 (24.2)	1.27	(0.87–1.87)	0.218
Required help injecting*					
No	550 (94.5)	138 (69.7)			
Yes	32 (5.5)	60 (30.3)	7.47	(4.68–11.93)	<0.001
Cocaine injection					
<once daily	503 (86.4)	139 (70.2)			
≥once daily	79 (13.6)	59 (29.8)	2.70	(1.84–3.98)	<0.001
Heroin injection					
<once daily	479 (82.3)	100 (50.5)			
≥once daily	103 (17.7)	98 (49.5)	4.56	(3.21–6.47)	<0.001

*Refers to behaviours in the previous 6 months. DTES: Downtown Eastside.

Table 2. Logistic regression of factors associated with jugular injecting

Characteristic	Adjusted odds ratio	95% Confidence interval	p-value
Female gender (yes vs. no)	1.72	(1.14–2.59)	0.010
Daily heroin use (yes vs. no)	2.89	(1.93–4.34)	<0.001
Daily cocaine use (yes vs. no)	1.76	(1.12–2.76)	0.014
Help injecting (yes vs. no)	4.44	(2.64–7.46)	<0.001
Sex-trade involved (daily vs. <daily)	2.71	(1.62–4.55)	<0.001

Model was also adjusted for age and Downtown Eastside residence ($p > 0.05$).

$p < 0.001$) and involvement in the sex trade (aOR = 2.71, 95% CI: 1.62–4.55; $p < 0.001$).

Discussion

This study found an alarmingly high prevalence of jugular injecting among Vancouver injection drug users. Injectors who reported jugular injecting were at higher odds to be female, involved in the sex trade, higher intensity heroin and cocaine injectors and reporting requiring help injecting.

Although the harmful sequelae of jugular injecting have been described previously [14–19] prior to this study, there has been little known about the prevalence and risk factors for jugular injection of drugs. A study by Lewis *et al.* [19] described the consequences of neck injecting arising from attempted supra or subclavicular injections of drugs in the 'street' setting including:

unilateral pneumothorax, mycotic subclavian carotid artery aneurysm, neck abscesses and paraplegia. In another case report, Maggi *et al.* [7] highlighted risks and complications for an HIV-infected drug abuser who was using neck veins to inject cocaine and heroin. In the report the authors described a multitude of complications, the most serious being diffuse thrombosis and phlebitis to bacterial and viral infections. It is important to note that our study did not establish the harms of jugular injecting in our setting. However, in light of previous reports, and by demonstrating the high prevalence of this behaviour in IDU, the present study should encourage consideration of public health intervention to avoid potential complications of jugular injecting. This may be particularly important given the well-demonstrated association between unsafe injection techniques and subsequent medical intervention [14–19].

The association between daily drug injecting and jugular injecting may be due to the fact that higher-intensity IDU may have overused superficial veins requiring the use of less conventional routes of administration, as reported in other case reports [8,19,24,25]. It has also been reported that IDU inject into the jugular vein as a result of a desire to achieve an even more direct high than is obtained when injecting in a peripheral vein [8]. The independent association between requiring help injecting and jugular injecting suggests that those who require assistance with injections may be particularly vulnerable to this concern. Previous studies have demonstrated that requiring help injecting is associated independently with both syringe sharing and HIV incidence, and the present study demonstrates further that interventions are required to address the vulnerable population of those who require assistance in injecting [4,8,24,25]. We also found that sex trade work and female gender was associated with jugular injecting. Although further study will be required to explain these associations, these variables may be markers for reduced venous access, longer duration of drug use or higher-intensity drug use. Finally, it is interesting that jugular injecting was more common among younger IDU, given that this behaviour might be expected in older IDU with longer injecting careers and thus less remaining venous access. However, older IDU tend to use drugs more safely than younger IDU in our setting, which probably explains this association [26].

The present study has several limitations. First, as jugular injecting could be viewed a socially undesirable behaviour, it is possible that this behaviour was under-reported in the present study [27]. Secondly, it is possible that the participants in the present study may not be representative of Vancouver IDU, although it was not possible to evaluate the impact of this potential bias in the present study. Lastly, the present study

would be augmented by qualitative studies to examine reasons for jugular injecting among the populations at risk, which we have identified, and such studies may also be helpful to inform interventions to reduce this dangerous practice [24].

In summary, the present study demonstrated that approximately 25% of IDU sampled reported jugular injecting in the previous 6 months. Injection drug users who reported jugular injecting had higher odds to be female, involved in the sex trade, higher-intensity heroin and cocaine injectors and more likely to report help injecting. Given the high rate of this behaviour among IDU, and the significant health risks that may result from this activity [14–19], further research and subsequent interventions are required urgently to address this concern.

Acknowledgments

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British Columbia
Centre for Excellence
in HIV/AIDS



Drug Situation in Vancouver

Report prepared by the
Urban Health Research Initiative of the
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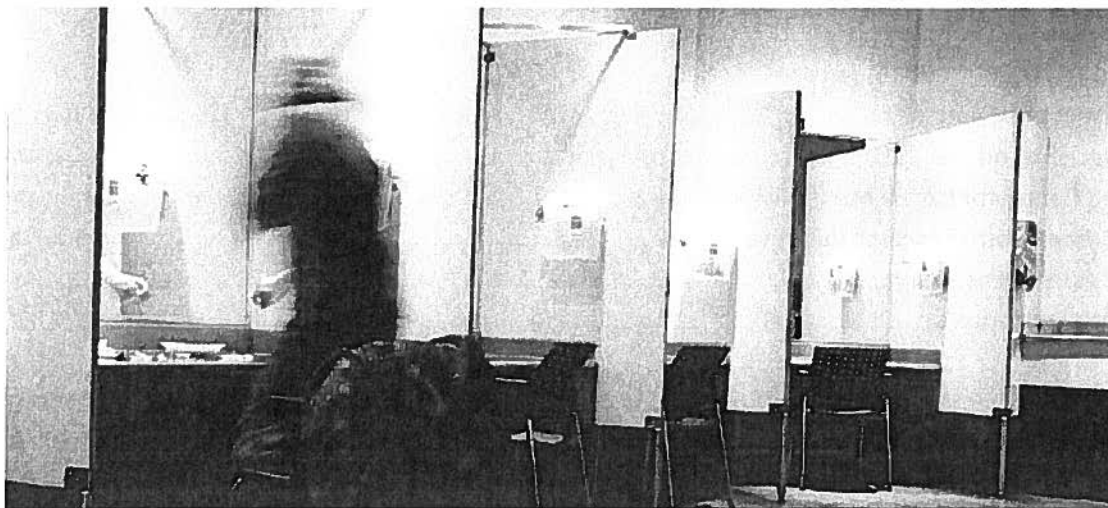


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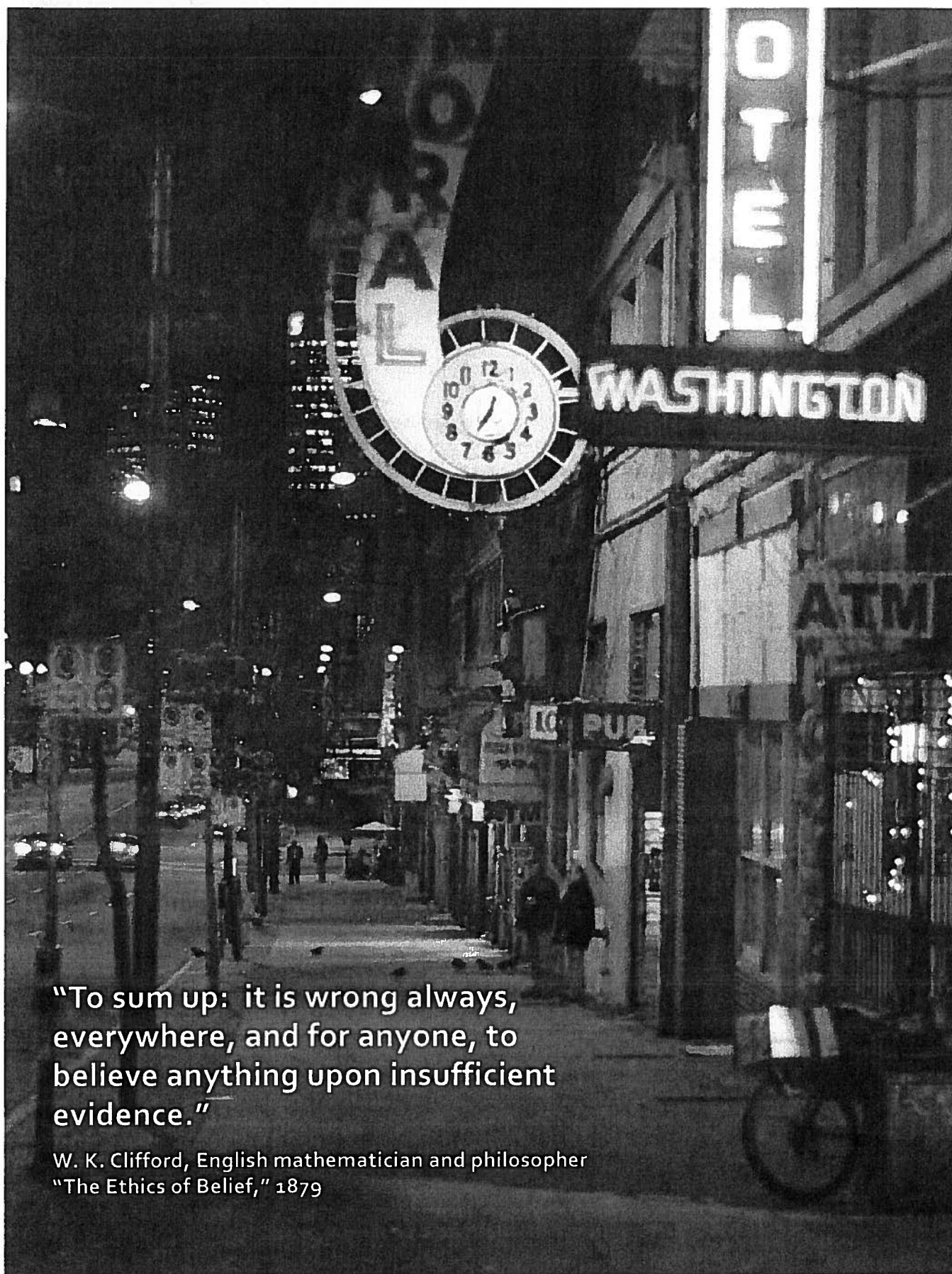
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"To sum up: it is wrong always,
everywhere, and for anyone, to
believe anything upon insufficient
evidence."

W. K. Clifford, English mathematician and philosopher
"The Ethics of Belief," 1879

EXECUTIVE SUMMARY

Health policies are increasingly being driven by the best available scientific data. However, there remain critical areas in public health where the gap between best evidence and public policies persists, and few areas suffer from this concern more than society's response to the problems posed by illicit drug use. This gap between research and practice is problematic, as an effective response to the health and community harms posed by illicit drug use will require the development of policies guided by the best available scientific evidence.

This concern is highly relevant to Vancouver, British Columbia, the epicentre of a longstanding illicit drug use epidemic. In 1997, Vancouver experienced an explosive outbreak of HIV infection that remains one of the fastest spreading HIV epidemics ever documented in the developed world. Until recently, British Columbia also recorded several hundred overdose fatalities every year. While Vancouver's Downtown Eastside is the area hardest hit by the drug use epidemic, the problem is not restricted to this neighbourhood. Drug-related health concerns, public disorder and crime are issues that affect most areas of the city. Over the past several years, Vancouver has also experienced an increase in severe drug-related gun violence.

Implementing appropriate policy responses to the illicit drug-related issues on Vancouver's streets will require that all stakeholders have access to comprehensive data regarding the scope and composition of the city's drug problems. Scientists from the Urban Health Research Initiative of the British Columbia Centre for Excellence in HIV/AIDS and the University of British Columbia's

Division of AIDS have therefore prepared this report in an effort to close the knowledge gap that currently exists. The report contains more than 10 years of prospective data on drug use and behavioural trends among some of the city's most vulnerable illicit drug users, with a focus on the so-called "hard" drugs: cocaine, heroin, crack and crystal methamphetamine. The report also seeks to directly inform the City of Vancouver's Four Pillars Drug Strategy, the province of British Columbia's response to illicit drug use and the Canadian federal government's new National Anti-Drug Strategy.

Key Findings

Drug Use Trends: Several large fluctuations in the use of specific drugs have occurred over the last decade. Specifically, among adult injection drug users, the rate of daily injection cocaine use decreased dramatically from a high of 38.1% in 1996 to 8.5% in 2007. This decrease has been accompanied by a large increase in the use of crack cocaine smoking, with 3.5% of study participants reporting daily crack cocaine smoking in the last six months in 1996 compared with 41.7% reporting such behaviour in 2007. There has also been a marked increase in the use of crystal methamphetamine (both injection and smoked) since 2001. Relative to older injection drug user populations in Vancouver, the daily drug use patterns of Vancouver-based street-involved youth for the years 2005 to 2007 indicate that injection cocaine and injection heroin use is less common among youth. However, the use of crystal methamphetamine, through both injection and by smoking, was highly prevalent. Levels of crack

cocaine use were also high among this vulnerable group, with approximately 18% of street-involved youth reporting daily use of crack cocaine in 2005 and 2006, and approximately 13% reporting use of crack cocaine in 2007.

Addiction Treatment: Over the past decade, there has been a steady increase in the rate of reported use of methadone maintenance treatment by injection drug users, from 11.7% in 1996 to 44.7% in 2007. This positive trend in access to methadone treatment has been accompanied by a decreasing proportion of injection drug users reporting difficulty accessing addiction treatment, from a high of 19.9% reporting difficulty in 1996 to 5.4% in 2007.

Harm Reduction: The expansion of harm reduction programs in the City of Vancouver has been associated with a steady decline in the reported level of used syringe sharing, a behaviour that constitutes the primary mode of HIV transmission among local injection drug users. In 1996, 39.6% of injection drug users reported recently injecting with a syringe that had previously been used by another drug user; this rate had dropped to 6.7% by 2007. At the same time, there appears to be a consistent reduction in the number of new HIV and hepatitis C infections occurring among injection drug users in the city. The number of new HIV infections has dropped from a high of 7.7 per 100 person-years in 1997 to 2.4 per 100 person-years in 2007. Despite these improvements, the number of new HIV infections remains high, and several subgroups of injection drug users, including Aboriginal persons, remain particularly vulnerable to HIV infection. Despite these

important public health gains and the fact that harm reduction programs are strongly endorsed by all international public health bodies, including the World Health Organization, harm reduction programming remains politicized in Vancouver and throughout Canada. Considering the public health gains attributable to harm reduction programs internationally and locally, the lack of support for harm reduction initiatives in the Canadian federal government's new National Anti-Drug Strategy requires greater public discussion.

Law Enforcement: Increasing investments in law enforcement have allowed the Vancouver police department to significantly increase its presence on the streets of the city. As a result of intensified enforcement activities, the majority of injection drug users have experienced periods of incarceration. Intermittent crackdowns have led to transient periods of reduced public drug use in the Downtown Eastside, although the evidence demonstrates that these reductions are offset by significant displacement of drug market activity outside of the Downtown Eastside. The impact of law enforcement on overall illicit drug use and availability is less clear. In 2007, drug users in Vancouver reported rapid access to crack as well as to cocaine, with approximately 90% of injection drug users reporting that they could obtain the latter within 10 minutes. Crystal methamphetamine was reportedly readily available to street-involved youth, with almost 60% of youth reporting being able to obtain the drug within 10 minutes. The reported availability of these so-called hard drugs is comparable to the reported availability of marijuana among these populations.

Our data suggest that drug prices on the city's streets have been unaffected by law enforcement efforts. Specifically, annual street-level data suggest the price of heroin, cocaine, crack cocaine and crystal methamphetamine have remained low and stable, placing doubt on assertions by the Royal Canadian Mounted Police that interdiction efforts have had an impact on the availability of illicit drugs at the street level.

Housing, Public Spaces, and Street-Based Sex Work: Over the last decade, at any one time, about 50% of injection drug users in Vancouver reported that they lived in unstable housing conditions, and approximately 10% reported that they lived on the street with no fixed address. Since 2003, more than 40% of injection drug users have reported recently injecting drugs in public. Additionally, a recent study found that, after controlling for other factors, injection drug users who frequently (at least daily) inject drugs are 6 times more likely to inject in public. Further, individuals who experience wait times to use Vancouver's supervised injecting facility are 3 times more likely to inject in public. In 2007, among street-involved youth in Vancouver, 11.3% reported engaging in street-based sex work in the previous six months. Additionally, 15.4% of HIV-positive injection drug users and 14.0% of HIV-negative injection drug users in Vancouver reported engaging in sex work.

Mortality Rates: Mortality rates remain high and are often driven by complications resulting from HIV infection. To put these rates in context, the rate of death among male injection drug users is 10 times higher than the general male population

in British Columbia, and the death rate for female injectors is 22 times higher than that of the general female population in the province. The strikingly high rate of mortality among female drug users demands an immediate response from policy makers. Overdose deaths are the second leading cause of death among our study participants, although in recent years there has been a dramatic decline in overdose deaths among illicit drug users in Vancouver, from 80 fatal overdoses in 1996 to 44 such overdoses in 2007 recorded by the British Columbia Coroners Service.

This report will aid in determining how well British Columbia is responding to Vancouver's illicit drug problem. Since federal drug policies directly affect the available responses to Vancouver's drug problems, the publication of these data will also allow for an independent assessment of the impacts of the federal government's new National Anti-Drug Strategy. As well, since drug market violence is known to be the primary driver of the Vancouver region's recent upsurge in gun violence, the data presented in this report should help inform debates regarding the optimal strategies to manage this problem and allow for future policy evaluation.

BACKGROUND

Illicit drug use presents an urgent and growing threat to community and public health. Unfortunately, the majority of resources aimed at addressing the illicit drug problem have been directed towards interventions that either have demonstrated little evidence of benefit or have been scientifically proven to result in net community harm and/or harm to public health.¹ A 2001 Auditor General's report on Canada's former illicit drug strategy concluded that "of particular concern is the almost complete absence of basic management information on spending of resources, on expectations, and on results."² In 2007, under the leadership of Prime Minister Stephen Harper, Canada's federal government established a new National Anti-Drug Strategy. Freedom of Information requests have shown that senior bureaucrats in the Bush White House played a key role in helping draft the strategy,³ which has been widely criticized for following a US 'war on drugs' approach and which allocated significant public resources to interventions that have been scientifically evaluated and found to be ineffective.⁴ The National Anti-Drug Strategy has also excluded support and funding for evidence-based harm reduction programs. The federal government's efforts to close Vancouver's supervised injecting facility have also generated controversy.⁵

Among the greatest concerns for public health researchers and health authorities is the high prevalence of injection drug use. In Canada, conservative estimates suggest that there are now more than 100,000 people who inject illicit drugs.⁶ Injection drug use is associated with an array of adverse outcomes, including fatal overdoses, infectious disease transmission,

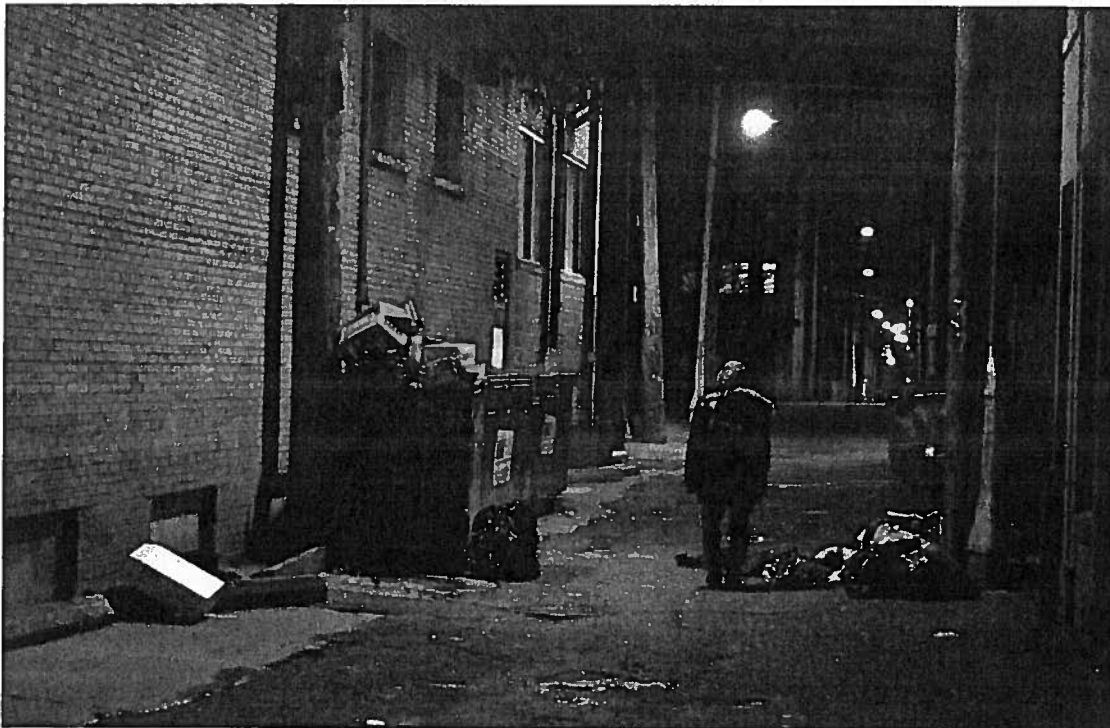
loss of social and economic functioning, and engagement in criminal activity.⁷ Vancouver has been the epicentre of one of North America's most dire and longstanding illicit drug use epidemics. In 1997, an explosive HIV epidemic was documented among injection drug users in Vancouver.⁸ The high transmission of HIV and hepatitis C (HCV) resulted in an estimated 25% of the city's approximately 15,000 injection drug users becoming HIV-infected, and more than 85% of the city's injection drug users becoming infected with HCV.⁹ In addition to the spread of infectious diseases, large numbers of citizens have died of drug overdoses in the last decade, with up to one death per day in British Columbia being documented in recent years.¹⁰ However, the illicit drug problem is not restricted to the Vancouver area; illicit drug-related HIV and HCV infection have been documented in virtually all settings in British Columbia where injection drug use is prevalent, including the cities of Prince George, Kelowna, Victoria, Nanaimo and elsewhere.¹¹ Like Vancouver, these settings suffer from drug-related crime and other community harms.

More recently, the use of crack cocaine and methamphetamine has increased in Western Canada, with Vancouver again representing the epicentre of this particular drug use epidemic.¹² Coinciding with this change, Vancouver has developed one of North America's worst property crime rates, though it should be noted that this rate has been dropping continuously since 1996.¹³ As in other settings, addiction to illicit drugs in Vancouver has also been intimately linked to a burgeoning survival sex trade industry,¹⁴ which has received international

attention as a result of the disappearance of more than 60 women involved in street-based sex work in the city's Downtown Eastside.¹⁵

Throughout most of the world, the primary response to the health and social impacts of illicit drug use has been to intensify the enforcement of drug laws in an effort to limit the supply and use of illicit drugs.¹⁶ The unintended consequences of this policy approach include an unprecedented growth in prison populations and increasing concerns regarding drug-related harms within prisons.¹⁷ Promises to enact tougher sentencing for illicit drug users, however, remain politically popular because of the widespread belief that this policy will reduce the use and trafficking of illicit drugs,¹⁸ a belief reflected in the composition of the Canadian federal government's National Anti-

Drug Strategy.¹⁹ However, despite a large body of research from a variety of settings, no evidence exists that tougher penalties and increased incarceration rates reduce the prevalence of illicit drug use or drug supply.²⁰ Instead, this approach may actually worsen illicit drug problems in several ways. For instance, it has long been recognized that the incarceration of injection drug users has major consequences for public health because of the potential for infectious disease transmission among drug-using inmates.²¹ This may be particularly relevant to HIV, which has been shown to be efficiently transmitted through syringe sharing between incarcerated injection drug users. A recent study demonstrated that the number of known HIV cases in Canadian prisons has risen by 35 percent in the last five years,²² and it is suspected that HIV may be spreading rapidly in this setting.²³



In addition to the social costs, such as loss of productivity, legal and prison costs, and crime, there are also substantial costs related to the burden that untreated illicit drug use places on the medical system. A recent “cost of illness” analysis based on data from a cohort of untreated opiate addicts in Toronto estimated that each drug-dependent opiate user incurs \$45,000 in societal costs per year.²⁴ In addition, it is known that the average lifetime medical costs of each case of HIV infection are approximately \$250,000, suggesting that the medical costs of injection-related HIV and HCV epidemics may place a large burden on Canada’s health care system.²⁵ Based on current HIV prevalence estimates, a recent study estimated that the economic burden on the health care system stemming from the HIV epidemic in Vancouver’s Downtown Eastside will exceed \$215 million.²⁶ However, this same study estimated that approximately \$130 million could be saved through the implementation of effective interventions aimed at curbing HIV rates.²⁶ Because the prevalence of HCV is much higher than that of HIV among injection

drug users, the medical costs for addressing HCV infection among injection drug users are expected to substantially exceed those for HIV. In addition to HIV and HCV, bacterial infections acquired through non-sterile injection techniques often result in lengthy and expensive acute hospitalizations among injection drug users.²⁷

Over the last several years, Vancouver has faced increasing drug-related gun violence. A recent escalation in this violence in the Greater Vancouver region has refocused attention on the city’s drug problem, and it is hoped that the data in this report will help inform this debate. From a scientific perspective, it is important for policy makers to be reminded that research has shown that gun violence is a natural consequence of drug prohibition. The Health Officers Council of BC has recently recommended regulating illicit drugs as a strategy to reduce health-related harms as well as gun violence.

BC CENTRE FOR EXCELLENCE IN HIV/AIDS

Beginning in 1996, the British Columbia Centre for Excellence in HIV/AIDS initiated an HIV outbreak investigation in Vancouver’s Downtown Eastside.⁸ This involved the creation of a prospective cohort study of Vancouver-based injection drug users, which would later receive funding from the US National Institutes of Health and become known as the Vancouver Injection Drug Users Study

(VIDUS). The VIDUS study, which is ongoing, involves semi-annual follow-up interviews with more than 1,400 of the city’s injection drug users, at which time a blood sample is drawn for evaluation of HIV and HCV incidence and a detailed interviewer-administered questionnaire is provided to evaluate a range of issues facing the city’s drug users.

Since the launch of VIDUS, the British Columbia Centre for Excellence in HIV/AIDS has initiated a number of other studies related to illicit drug use, including studies of street-involved youth and evaluations of the health needs and behaviours of HIV-infected injection drug users.^{28, 29} Each of these individual studies, described in detail below, is funded through a range of scientific peer-reviewed granting agencies, and the scientists involved are also affiliated with the Division of AIDS in the Department of Medicine at the

University of British Columbia. In 2006, the British Columbia Centre for Excellence in HIV/AIDS received a grant from the Canadian Institutes of Health Research to create an urban health and addictions research program to combine all of these data sources and allow for a comprehensive analysis of the illicit drug situation in Vancouver.

URBAN HEALTH RESEARCH INITIATIVE

The Urban Health Research Initiative (UHRI) was established in 2007 by the British Columbia Centre for Excellence in HIV/AIDS at St. Paul's Hospital in Vancouver, Canada. Led by principal investigators Drs. Evan Wood and Thomas Kerr, UHRI is based on a network of studies that were developed to help identify and understand the many factors that affect the health of urban populations, with a focus on substance use, infectious diseases, the urban environment and homelessness. UHRI's mission is to achieve excellence in health research and research training with the ultimate goal of improving the health of individuals and communities. UHRI's research focuses on issues that affect the health of urban populations, with special emphasis placed on infectious diseases such as HIV and HCV, substance use and addiction, health care and social services access, and policy that has a direct bearing on public health, well-being and safety.

Part of UHRI's mandate is to help inform policy decisions using the best available scientific evidence regarding the illicit drug problems in the City of Vancouver. With the city's proposed Four Pillars Drug Strategy³⁰ and the implementation of the Canadian federal government's National Anti-Drug Strategy,¹⁹ it was recognized that closing the gap between the public health emergency on Vancouver's streets and the policy response requires that all stakeholders have access to comprehensive data on the extent of the city's drug problem. In an effort to close this gap, scientists from the University of British Columbia's Division of AIDS and the British Columbia Centre for Excellence in HIV/AIDS have prepared this report, which contains more than ten years of prospective data on drug use and related trends among the city's illicit drug users, with a focus on so-called "hard" drugs, including cocaine, heroin, and crystal methamphetamine.

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DATA SOURCES

Cohort Studies

Large longitudinal prospective cohort studies represent the most reliable method of obtaining detailed information on the health of communities, and such studies form the basis of the research contained within this report. All of the cohort studies listed below are made up of representative samples of vulnerable populations in Vancouver. Recruitment strategies employ street-based outreach. After initial contact is made, the nature of the study is explained to potential participants, and informed consent is obtained from those who wish to enroll. All studies are approved by the University of British Columbia's Research Ethics Board at its St. Paul's Hospital site.

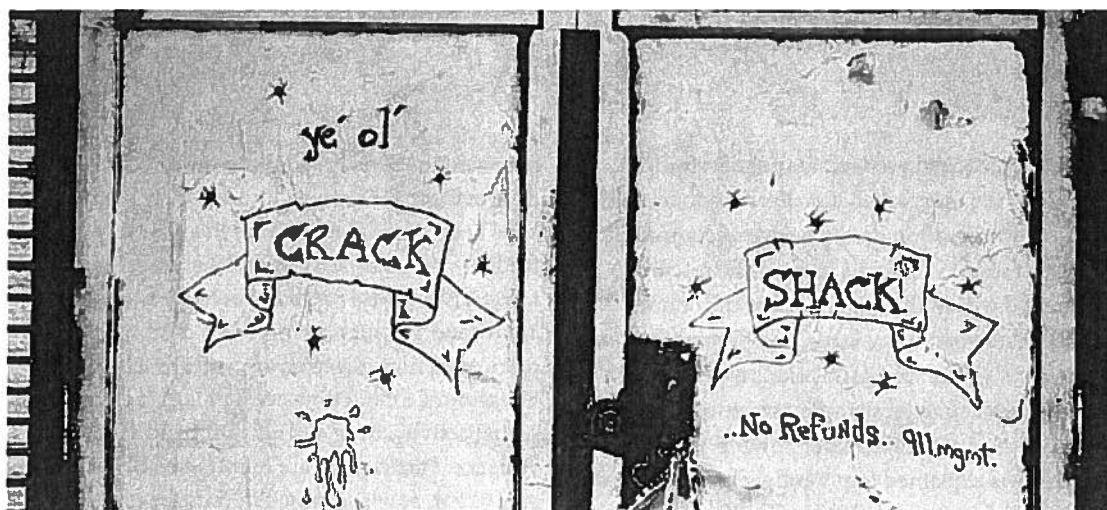
Participants in all studies provide blood samples and complete interviewer-administered questionnaires at baseline and semi-annually. The survey instruments for all of the cohort studies are largely based on validated international research

instruments developed for the measurement of drug-related behaviours. These survey instruments have been coordinated across the cohorts to facilitate the examination of the natural history of injection drug use from adolescence through to adulthood. All surveys include sections on sources of income, non-injection and injection drug use behaviours, interactions with police, incarceration, sexual activity, drug and alcohol treatment, and violence. Participants are reimbursed \$20 for each study visit, at which time referrals are provided for any needed medical care (including HIV/AIDS care) and available drug and alcohol treatment. The individual studies that comprise the bulk of UHRI research are described below, with the exception of the Scientific Evaluation of Supervised Injecting (SEOSI) cohort; this study is specifically dedicated to the evaluation of Insite, the city's supervised injecting site, and is the subject of other reports available at <http://uhri.cfenet.ubc.ca>.

VIDUS

The Vancouver Injection Drug Users Study (VIDUS) is UHRI's longest-running cohort study. Beginning in May 1996, persons who had injected illicit drugs at least once in the previous month, resided in the Greater Vancouver region and provided informed consent were recruited into VIDUS. Currently, the VIDUS cohort includes approximately 1,400 individuals. Data from this cohort have been the basis for more than 100 published scientific studies and have contributed to a number of policy developments. The VIDUS study documented an explosive HIV outbreak

in the Downtown Eastside in 1997, which led to the declaration of a public health emergency in Vancouver. In addition to the valuable data gained through VIDUS, the study also performs an important public health function by providing regular HIV and HCV testing (including pre- and post-test counselling) to local injection drug users. Recently, VIDUS was modified to include only HIV-negative injection drug users and operates as the sister cohort to ACCESS, a cohort that includes only HIV-positive drug users.



ACCESS

ACCESS (AIDS Care Cohort to Evaluate access to Survival Services) is a cohort study of HIV-positive drug users based in the Greater Vancouver area, the majority of whom are based in Vancouver's Downtown Eastside. The primary goal of the ACCESS cohort is to determine the health needs of HIV-positive injection drug users and to investigate behaviours that may contribute to, or prevent, the ongoing transmission of HIV among this population. ACCESS is made up of more than 500 participants. Studies have demonstrated that

the health and social service needs of HIV-positive drug users are unique. Data from the ACCESS and VIDUS cohorts allow UHRI investigators to monitor the incidence of HIV disease and identify the impact of policies and programs on uptake and effectiveness of HIV treatment among this population. Aside from generating data to inform the delivery of HIV treatment services, a central objective of the ACCESS cohort is to connect study participants with HIV care and other services when needed.

ARYS

Youth can be defined as "at risk" as a result of a variety of factors, including their socioeconomic situation, mental or physical health, drug use practices, social or physical environment, and family situation. The At-Risk Youth Study (ARYS, pronounced "Arise") was established in late 2005 in order to investigate factors associated with the

initiation of injection drug use and the impacts of methamphetamine use among street-involved youth aged 14 to 26. The semi-annual follow-up of ARYS participants allows for longitudinal evaluation of the health and social situations of street-involved youth.

KEY INDICATORS

A number of key indicators of the magnitude and severity of drug-related problems have been identified in research undertaken in Vancouver and in many settings internationally. This report seeks to describe these key indicators to provide policy makers with hard data on the existing trends in Vancouver's illicit drug problems. The publication of these indicators will help to ensure that the City of Vancouver's Four Pillars Drug Strategy and the province's addiction strategies are guided by the best available evidence.^{30, 31} Similarly, since federal laws and policies shape the nation's response to

the illicit drug problem, the report also aims to inform the ongoing implementation of the federal government's new National Anti-Drug Strategy.¹⁹ It is also hoped that this report will be valuable to researchers, community-based organizations, and policy makers in other settings. Vancouver is the host of the 2010 Winter Olympic Games, and this report will also facilitate an evidence-based evaluation of the municipal response to the illicit drug problem in preparation for this event. Key indicators in this report are described below.



Demographic Characteristics

Major knowledge gaps exist regarding the characteristics of people who use hard drugs in Vancouver. For instance, research has shown that injection drug users who self-identify as Aboriginal are often more vulnerable than other injection drug users to certain health risks.³² Similarly, young drug users and street-involved youth may face unique health concerns.²⁸

To help inform these issues, UHRI cohort studies collect detailed demographic information on study participants, including age, gender, sexual identity, and ethnic background. UHRI researchers also seek to help inform policy makers of the specific health needs of Aboriginal populations and attempt to make relevant data available to community members, community-based organizations and policy makers.

Unstable Housing

Housing is recognized internationally as a key determinant of health. The presence of unstable housing among drug-using populations has the potential to aggravate the public health and community harms associated with illicit drug use. Living on the street, in unstable housing situations such as shelters, and in certain single-room occupancy environments has been shown previously to be strongly associated with a number of harms, including elevated risk of mortality.³³ Housing is often lost as a result of instability related to illicit drug use, resulting in increased rates of individuals living on the streets.³⁴ Alternatively,

the availability of supportive housing can be a key determinant in transitioning individuals off the street and may reduce health harms associated with illicit drug use.³⁵

The UHRI cohorts utilize a standardized questionnaire to track several measures of unstable housing. Specifically, rates of outright homelessness and rates of residing in unstable housing (defined as living in a single room occupancy hotel, shelter, recovery or transition house, jail, on the street, or having no fixed address) are evaluated among all cohort participants at each study visit.

Public Disorder

Public drug use is associated with a range of issues, including unsafe syringe disposal. Unsafe syringe disposal poses a public health hazard and creates anxiety among affected communities. Public injecting environments also increase the potential for violent interactions between drug users, street predators and police. Consequently, individuals who inject illicit drugs in public spaces are more likely to rush their injections and engage in activities, such as using puddle water to inject, that place them at heightened risk of bacterial infections and venous injury.³⁶ Rushing injections can also increase the risk of fatal drug overdose.^{37, 38} Furthermore, individuals who inject in public may be more likely to share used syringes, since the risk of incarceration often acts as a deterrent against carrying sterile injecting equipment.^{38, 39}

Equally important is the fact that public drug use and related disorder can be highly intimidating and threaten the viability of Vancouver's tourist economy. This is of particular concern given the City of Vancouver's role as host of the upcoming 2010 Winter Olympic Games.

All UHRI cohort questionnaires contain standardized measures of public drug use. Public drug use is defined as drug use that takes place in public washrooms, streets, alleys, parks, abandoned buildings and other public settings. Individuals were grouped by response as follows: occasionally or sometimes injected in public, usually or always injected in public, or never injected in public. Responses refer to activity in the six months prior to the interview.

Addiction Treatment

One of the most effective responses to drug-related problems is the provision of drug treatment to addicted individuals. Research has shown that addiction treatment such as methadone maintenance treatment for opiate users can play a key role in reducing illicit drug dependence among certain individuals.^{40, 41} By reducing drug dependence, treatment may also reduce levels of drug-related public health risks (for example, sharing used syringes) and may also reduce drug-related crime.^{42, 43} Access to addiction treatment among populations of illicit drug users is a strong mediator of health outcomes. Research across a wide range of settings internationally has demonstrated that injection drug users with ready access to drug treatment subsequently engage in

lower levels of drug use and high-risk drug use behaviours such as injecting with used syringes. Conversely, those subpopulations that report barriers to accessing addiction treatment are often at higher risk of a range of health harms.^{40, 44}

All UHRI cohort interviewer-administered questionnaires solicit detailed data regarding access to different types of addiction treatment, where and how such access takes place, and whether barriers exist that may reduce the ability of injection drug users to access such treatment. Specifically, rates of enrolment in methadone maintenance and other types drug treatment, specific reasons for an inability to access treatment and history of treatment among cohort participants are measured.

Syringe Sharing and HIV/HCV Incidence

The sharing of used syringes is the behaviour that places injection drug users at highest risk of acquiring or transmitting HIV and other blood-borne diseases such as HCV,⁴⁵ because blood serum can be transferred easily from person to person on injecting equipment. Rates of syringe sharing, therefore, are a reliable indicator of the risk of blood-borne disease transmission that exists among populations of injection drug users. The presence of HIV and HCV infection among vulnerable populations can place a massive burden

on health care systems, as providing treatment for these conditions may require a large redistribution of resources. Additionally, HIV and HCV infection may be more prevalent among certain subpopulations, such as different ethnic groups.^{46, 47} The success of interventions that aim to reduce the harm posed by injection drug use, such as needle and syringe distribution programs and supervised injection facilities, can be evaluated directly by their capacity to reduce the sharing of used syringes among their target populations.

In all UHRI cohorts, rates of syringe lending and borrowing are measured using a standardized interviewer-administered questionnaire. Because difficulty accessing sterile syringes has been identified as a key indicator of syringe sharing in Vancouver,⁴⁸ all UHRI cohort questionnaires also solicit detailed data regarding barriers to

sterile syringe acquisition. The cohorts also measure HIV and HCV incidence by testing cohort participants' HIV and HCV status at each semi-annual study visit through serological testing (i.e., blood samples). Unless otherwise stated, data regarding syringe sharing refer to behaviour in the six months prior to the interview.



Incarceration

While most Vancouver drug users have historically been incarcerated as a result of drug-related crimes, it is well recognized that illicit drug problems fuel Vancouver's crime rates. As a result, many of Vancouver's injection drug users have a history of incarceration. Injection drug users reporting recent incarceration in a number of settings may be at higher risk for other serious public health risks. Specifically, the continued availability of illicit drugs and a lack of sterile syringes within correctional institutions can result in a high rate of syringe sharing and infectious disease transmission among incarcerated injection drug users.⁴⁹⁻⁵¹ Additionally, in jurisdictions that do not provide methadone or other drug treatment

in correctional institutions, the incarceration of injection drug users may result in a disruption of methadone treatment.⁵² As well, HIV-positive injection drug users who are incarcerated are often at risk of experiencing a disruption in the use of antiretroviral medication.⁵³

All UHRI cohort interviewer-administered questionnaires collect detailed data at study enrolment (baseline) and at each study follow-up concerning the experiences of study participants while incarcerated. Questions include type and prevalence of drug use, prevalence of injection- and sex-related health risks, and access to drug treatment such as methadone during incarceration.

Cocaine Injection

Because of the short half-life of cocaine, heavily dependent cocaine injectors may inject up to 20 times a day, as opposed to heavily dependent heroin injectors who, because of heroin's longer half-life, may inject only 2 to 4 times a day.⁵⁴ Consequently, cocaine injection has been associated with high levels of used syringe sharing as a result of the large volume of syringes needed daily and the psychoactive effects of cocaine.⁵⁵ Additionally, because of the high number of syringes that heavily dependent cocaine injectors require, this behaviour can result in a high level of publicly discarded syringes and subsequently may negatively affect the local economy, deter tourist traffic, increase the potential for public health

harms, and increase public disorder.⁷ These harms are exacerbated by the lack of effective treatment options for heavily dependent cocaine users.

UHRI cohort studies collect data on several measures related to cocaine injection among cohort participants at study enrolment and during study follow-up through interviewer-administered questionnaires. These data can be used to determine the prevalence of injection cocaine use, factors associated with the initiation of cocaine use, geographic location of injection, and frequency of cocaine injection. Unless otherwise indicated, data in this report regarding injection cocaine use refer to use of this drug in the six months prior to the interview.

Heroin Injection

Despite efforts to reduce supply, heroin continues to be readily available in Vancouver at low cost and at a high level of purity.⁵⁶ We have previously observed associations between frequent heroin use and a host of risk behaviours among Vancouver injection drug users.^{36, 57} However, incidental data suggest that the prevalence of injection heroin use may be decreasing among Vancouver injection drug users, and that the prevalence of crystal methamphetamine and crack use may be rising among this population. Despite this shift, a 2002 survey of illicit drug use in Canada's major urban centres found that the majority of injection drug users in Vancouver reported injecting heroin in the last 30 days.⁷ While a network of interventions aimed at reducing the harm of injection drug use

exists in Vancouver's Downtown Eastside, heroin injection continues to negatively affect public health and public order.

UHRI's cohort studies collect data on several measures related to heroin injection. These data, collected through interviewer-administered questionnaires, cover many factors related to the circumstances surrounding heroin injection, the sociodemographic variables that may make individuals more likely to inject heroin, and specific injecting practices that may increase health risks. Unless otherwise indicated, data in this report regarding injection heroin use refer to use of this drug in the six months prior to the interview.

Crystal Methamphetamine Use

Rates of crystal methamphetamine use appear to have risen among many injection and non-injection drug-using populations.²⁸ A British Columbia Coroners Service report found that deaths involving methamphetamine increased from 3 in 2000 to 33 in 2004, and the vast majority of these deaths occurred among men living in Vancouver.⁵⁸ One recent study that investigated crystal methamphetamine use among VIDUS participants confirmed that between May 1996 and December 2004, the proportion of participants reporting crystal methamphetamine injection increased significantly.¹²

All UHRI cohorts also solicit detailed data regarding crystal methamphetamine to fully investigate the potential public health and public order harms of this drug across various life stages. Specifically, detailed data regarding the impact of crystal methamphetamine on overdose events, polydrug use behaviours, and other potential health harms among Vancouver's illicit drug-using population are collected through interviewer-administered questionnaires. Unless otherwise indicated, data regarding crystal methamphetamine use refer to use of this drug in the six months prior to the interview.

Street-Based Sex Work

Street-based sex workers who exchange sex for money, drugs, shelter or other commodities as a means of daily survival are highly vulnerable to adverse health outcomes, including violence, exploitation, and sexually transmitted infections. These risks are further compounded by use of injection and non-injection drugs.¹⁴ Recent events suggest that current legislation and enforcement efforts have not only failed to address but may inadvertently have elevated the health and social harms experienced by sex workers.¹⁵ Consequently, there are increasing calls for policy and prevention strategies that promote the health of sex workers and reduce adverse risks. One primary goal of the

UHRI cohort studies is to investigate the correlates of sex work among Vancouver's injection drug-using population, to help inform interventions or policies that may reduce the vulnerability of such individuals as well as the negative affects on communities.

Using serologic testing and interviewer-administered questionnaires, UHRI cohort studies are able to collect data regarding blood-borne disease transmission, drug use practices, and many other indicators of health specific to street-based sex work among drug users. Involvement in the sex trade is evaluated at each semi-annual follow-up visit.

Mortality

Prior research in a variety of settings has consistently observed high mortality rates among illicit drug-using populations. Many health harms, such as elevated HIV incidence and a high rate of fatal overdose, can contribute to this increased mortality rate.⁵⁹ Potentially fatal sequelae of illicit drug use, such as overdose events, also often require emergency interventions (i.e., ambulance response and emergency care) that may place a significant strain on health care systems and incur a high economic cost.⁶⁰

To investigate the mortality rate and causes of death among our study populations, a variety of data sources were used. In particular, data from the British Columbia Vital Statistics Agency are used to track mortality rates, and the cause of death was coded in accordance with the International Classification of Diseases, Tenth Revision (ICD-10).

Figure 1a: Gender distribution across all UHRI cohorts

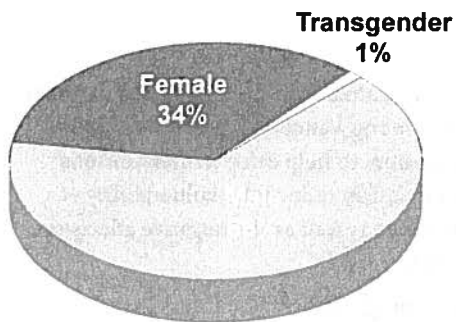


Figure 1b: Ethnic distribution across all UHRI cohorts

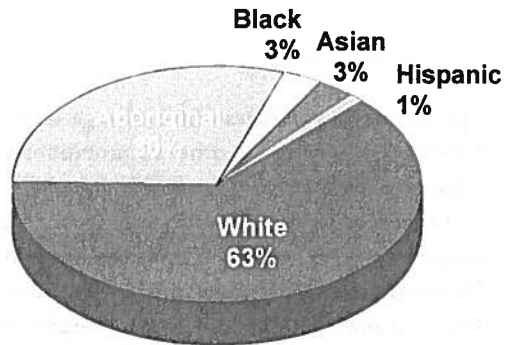
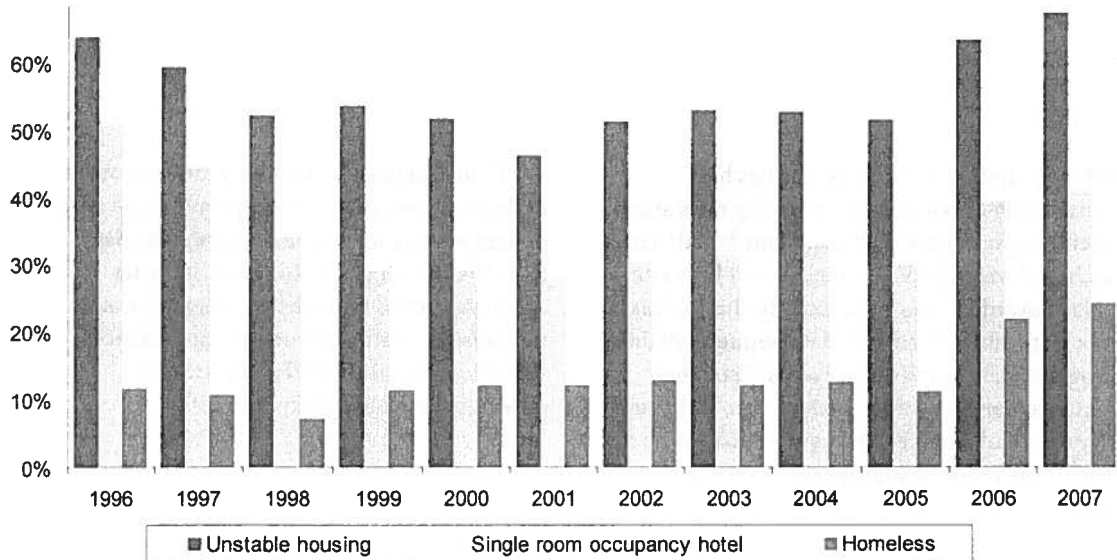


Figure 2: Patterns of unstable housing, single room occupancy hotel use, and homelessness among Vancouver injection drug users, 1996–2007



Note: 'Unstable housing' includes living in a shelter/hostel, treatment/recovery house, jail, single room occupancy hotel, or on the street.

FINDINGS

Cohort Demographics

VIDUS, the longest running of UHRI's prospective cohort studies, began recruitment in 1996. By the end of 2007, there were 1,048 unique individuals enrolled in VIDUS, all of whom were current or former injection drug users. VIDUS includes 343 (33%) female participants, 698 (67%) male participants, and 7 (1%) transgender participants. Six hundred sixty-three (63%) participants self-identify as Caucasian and 302 (29%) individuals self-identify as Aboriginal. At study enrolment, the mean age of VIDUS participants was 41 (interquartile range [IQR] = 35–48) and the total age range for all VIDUS participants was 19 to 66. Throughout this report, we refer to VIDUS participants as "injection drug users."

The ACCESS cohort is made up of HIV-positive injection drug users. By the end of 2007, 422 participants were enrolled in the study. Compared to the VIDUS cohort study, the ACCESS cohort has a lower percentage of Caucasian participants (220, 52%) and a higher percentage of participants who self-identify as Aboriginal (176, 42%). At baseline, the mean age of ACCESS participants was

42 (IQR = 36–47), and the total range for all ACCESS participants was 17 to 65. Throughout this report, we refer to ACCESS participants as "HIV-positive injection drug users."

ARYS, UHRI's at-risk youth cohort study, began recruitment in 2005. By the end of 2007, 560 unique individuals were enrolled in ARYS. Three hundred ninety-six (71%) study participants self-identify as Caucasian and 132 (24%) participants self-identify as Aboriginal. At study enrolment, the mean age of ARYS participants was 22 (IQR = 20–24), while the total age range for all ARYS participants was 14 to 32. Throughout this report, we refer to ARYS participants as "street-involved youth."

The total number of individuals enrolled in UHRI cohorts is 2,030, including 686 (34%) women and 16 (1%) transgender individuals. Overall, 1,279 participants self-identify as Caucasian (63%) and 610 (30%) participants self-identify as Aboriginal. At baseline, the mean age of UHRI cohort study participants was 36 (IQR = 25–45), and the age range was 14 to 66. These results can be seen in Figures 1a and 1b.

Housing

Trends in outright homelessness, living in a single room occupancy hotel, and unstable housing among Vancouver injection drug users between 1996 and 2007 are presented in Figure 2. Unstable housing is defined as living in a shelter/hostel, treatment/recovery house, jail or a single room

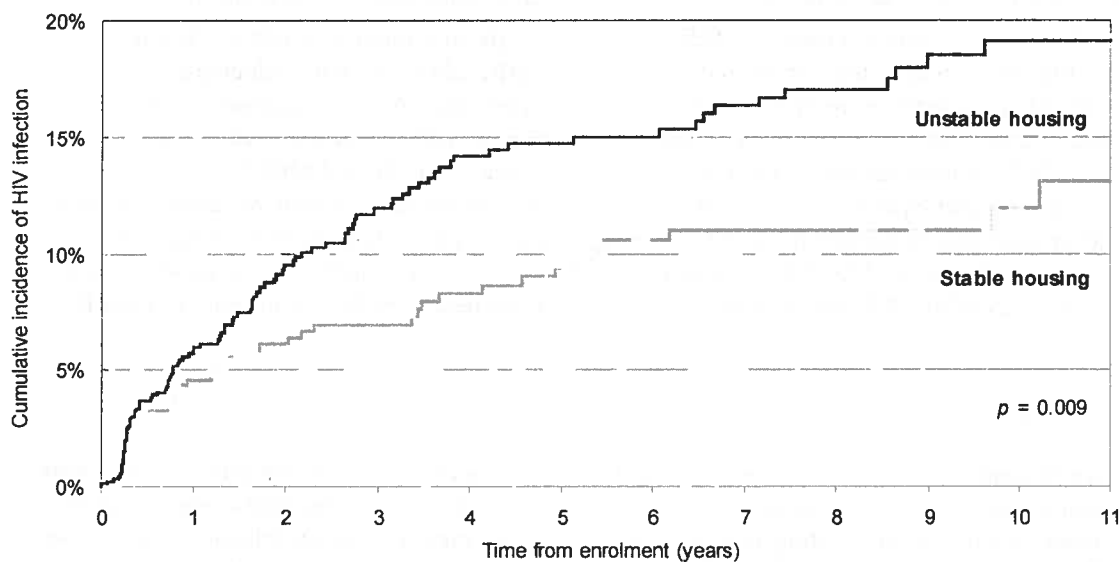
occupancy hotel. As shown here, rates of outright homelessness have remained at approximately 10% during the study period, although there is evidence of an increase beginning in 2006. Single room occupancy housing has declined from a high of 51.0% in 1996 to a low of 30.2% in 2005, although

a recent increase to over 41.1% is also noted in 2007. The level of unstable housing has remained relatively consistent at approximately 50% of injection drug users throughout the study period, though this has increased to almost 67.5% in 2007. Note: The percentages add up to greater than 100% because of overlap between the above definitions.

Figure 3 shows the relationship between unstable housing and HIV incidence among injection drug users in Vancouver. As shown here, after 10 years of recruitment into VIDUS, the HIV

incidence rate was 13.1% among those injection drug users living in stable housing (i.e., living in an apartment or house) at baseline, in comparison to an HIV incidence rate of 19.1% among those without stable housing at baseline. Among street-involved youth, approximately 55% reported homelessness, with most living either at no fixed address, on the street, or in a hostel or shelter.

Figure 3: Cumulative incidence of HIV infection among Vancouver injection drug users from 1996 to 2007, stratified by housing status



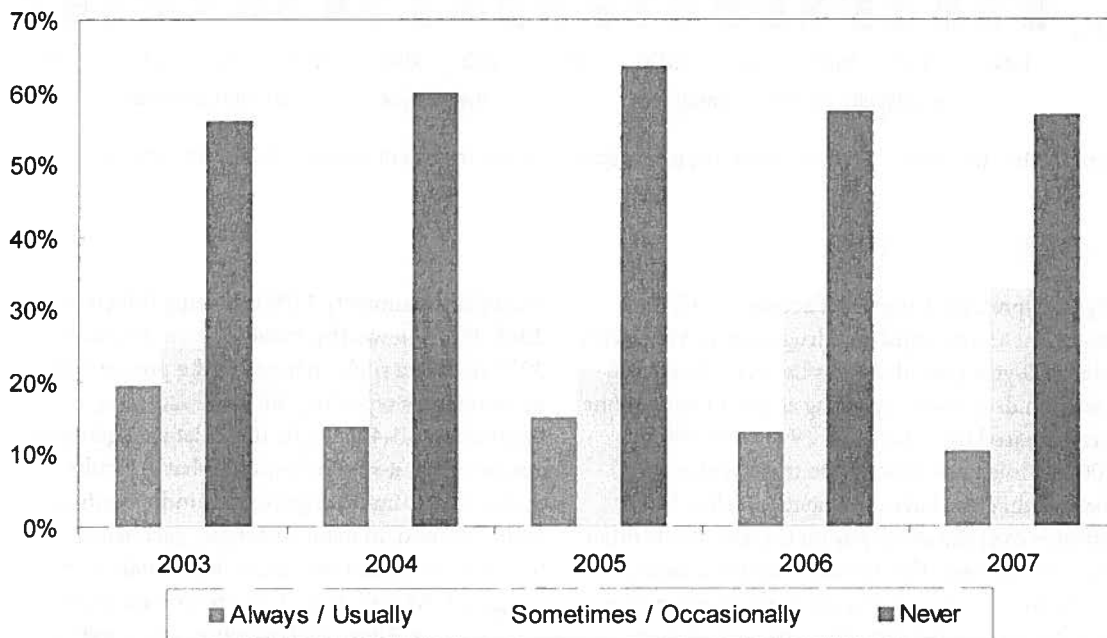
Note: 'Unstable housing' includes living in a shelter/hostel, treatment/recovery house, jail, single room occupancy hotel, or on the street. 'Stable housing' is defined as living in an apartment or house.

Public Disorder

Among Vancouver injection drug users, over 40% report injecting in public in the last six months, and this rate has remained stable since UHRI began measuring this indicator in 2003 (Figure 4). Among frequent injection drug users, homeless individuals are more than six times more likely to inject in public.⁶¹ Individuals who experience wait times to use the Insite supervised injecting

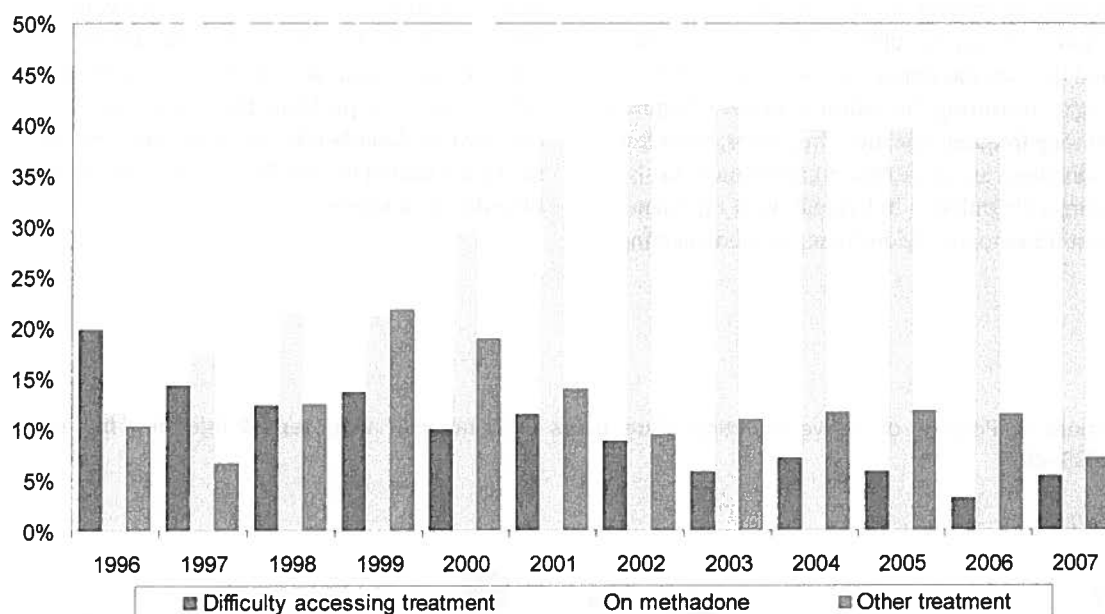
facility are three times more likely to inject in public. Homelessness is also associated with public drug use among street youth. In addition to the homelessness problem, the increase in crack cocaine use, described below, is also responsible for a great deal of the public drug use and public disorder in Vancouver.

Figure 4: Percent of active injection drug users in Vancouver who report injecting in public, 2003–2007



Note: 'Public' is defined as spaces such as streets, alleys, public washrooms, parks, abandoned buildings, parking lots, etc.

Figure 5: Patterns of access to addiction treatment among Vancouver injection drug users, 1996–2007



Note: 'Other treatment' includes detox, daytox, recovery house, treatment centre, NA/CA/AA, and counselling.

Addiction Treatment

Figure 5 presents patterns of access to addiction treatment among injection drug users in Vancouver over a 10-year period. As can be seen, the rate of injection drug users reporting access to methadone has increased from 11.7% in 1996 to 44.7% in 2007. While rates of access to treatment other than methadone have fluctuated, no clear trend emerges over the study period for treatments other than methadone. The positive trend in access to methadone treatment has also been accompanied by a decrease in the rate of injection drug users reporting difficulty accessing treatment, from a high of 19.9% reporting difficulty in 1996 to a

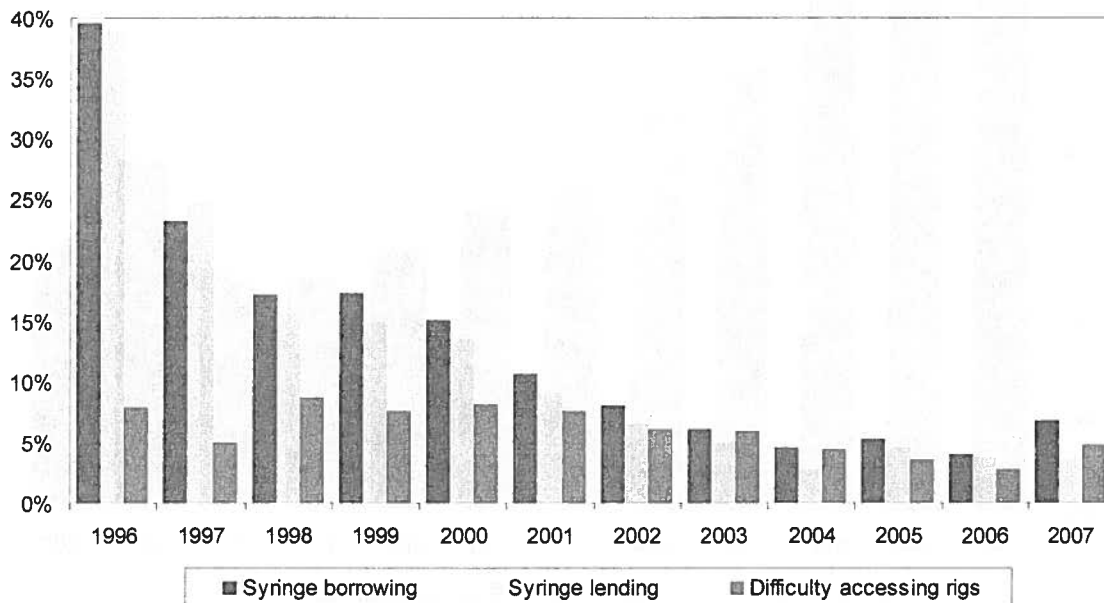
low of approximately 3.6% reporting difficulty in 2006. It is noteworthy, however, that data from 2007 denote a slight increase in the proportion of individuals reporting difficulty accessing treatment, to 5.4%. While these data are generally encouraging, it should be noted that difficulty accessing treatment requires that individuals seek treatment and, in many instances, past inability to access treatment may deter individuals from seeking it. As well, strong trends have emerged showing that Aboriginal drug users have reduced access to addiction treatment, such as methadone maintenance therapy.

HIV Risk Behaviour

Figure 6 demonstrates trends in injection-related HIV risk behaviour among injection drug users in Vancouver over the last 10 years. Specifically, the graph displays a steady decline in the level of used syringe sharing reported by injection drug users throughout the study period. At baseline (study enrolment), 39.6% of injection drug users reported syringe borrowing in the prior six months, though this rate had dropped to 6.7% by the close of the study period. Similarly, at baseline 39.2%

of injection drug users reported lending syringes, and by the close of the study period this rate had dropped to 3.8%. With respect to sterile syringe availability, levels of difficulty accessing sterile syringes reported by injection drug users have declined from 8.0% in 1996 to 5.0% in 2007 among injection drug users, though this trend has not been as marked, and the rate of difficulty accessing sterile syringes fluctuated throughout the study period.

Figure 6: Patterns of injection-related HIV risk behaviour among Vancouver injection drug users, 1996–2007

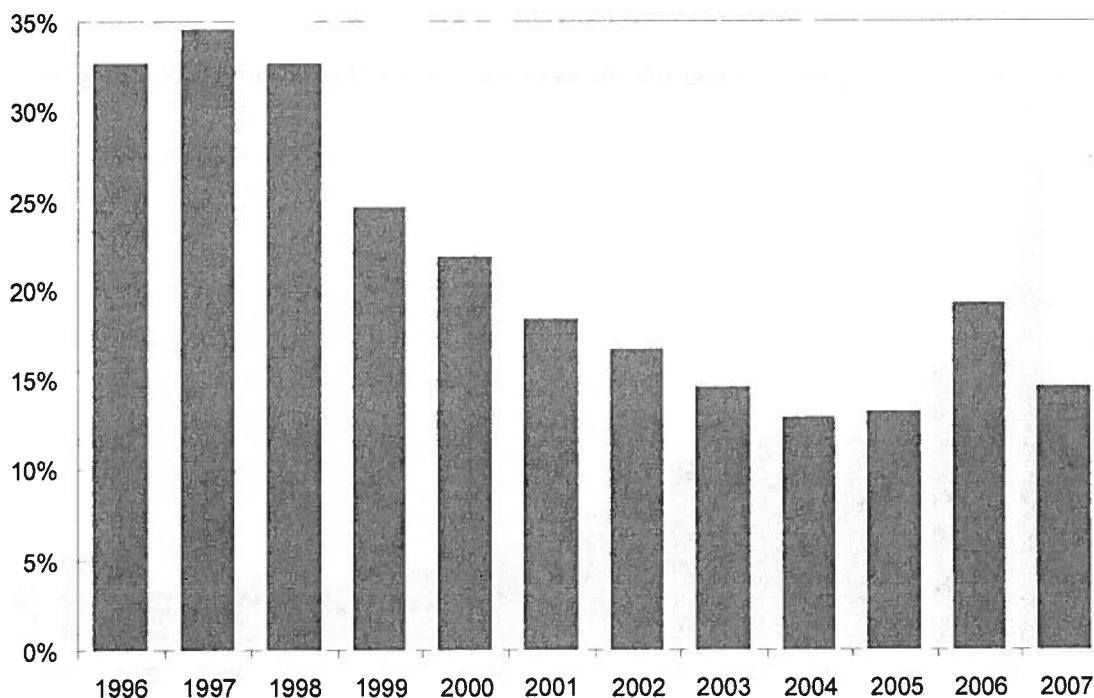


Law Enforcement and Incarceration

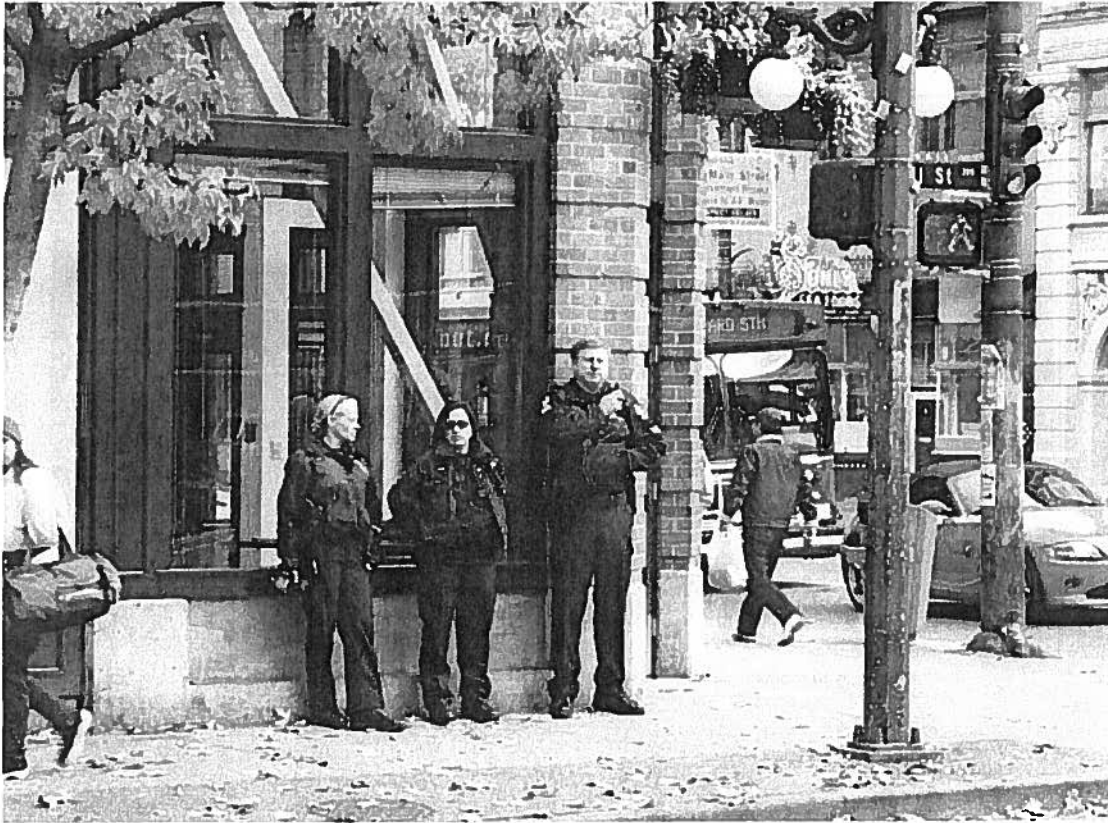
The majority of injection drug users have experienced periods of incarceration. Unfortunately, among Vancouver injection drug users, these periods are associated with both HIV risk behaviour and HIV incidence. Among VIDUS participants, over 70% report a history of incarceration. The percentage of injection drug users in Vancouver reporting being recently incarcerated (i.e., held in detention, prison or jail

overnight or longer in the last six months) between 1996 and 2007 is shown in Figure 7. As can be seen, between 1997 and 2004 the percentage of injection drug users reporting recent incarceration dropped from a high of 34.6% in 1997 to a low of 12.9% in 2004. Between 2005 and 2006, a small increase in the rate of recent incarceration, from 13.2% to approximately 18.5%, was observed, though at the close of the study period in 2007,

Figure 7: Percent of Vancouver injection drug users reporting recent incarceration, 1996–2007



Note: 'Incarceration' is defined as being in detention, prison, or jail overnight or longer.



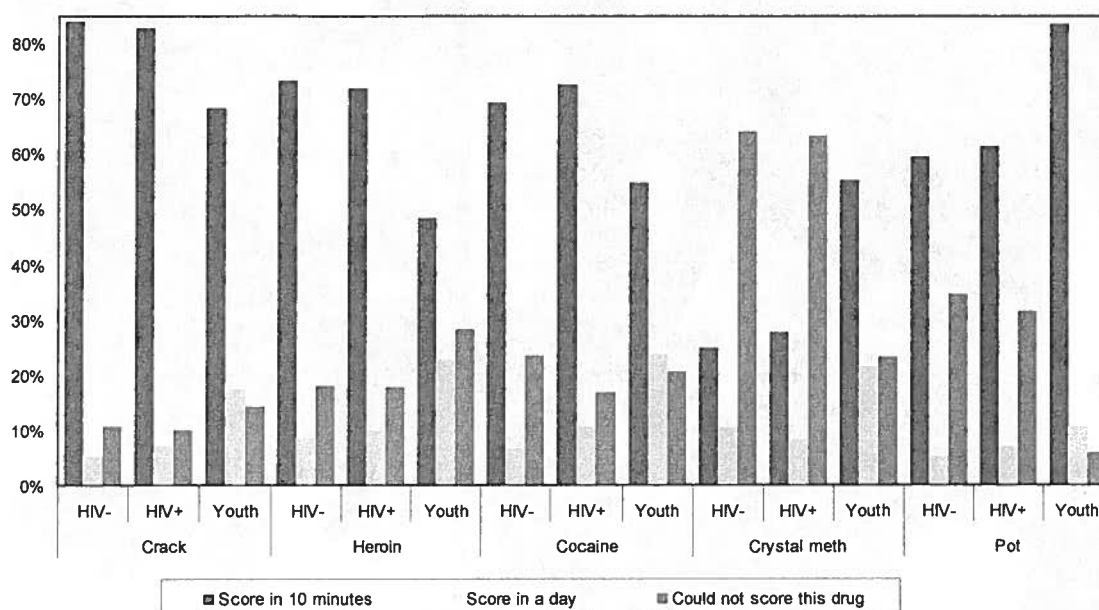
this rate had decreased to 14.6%. A limitation of these data is that when individuals are incarcerated they are often lost to follow-up from the study. As a result, the declines in incarceration rates may reflect a cohort effect whereby individuals who commit crimes are removed from the study and those who remain in the study are less likely to engage in behaviours (e.g., drug dealing) that may place them at risk of incarceration. Aging of the cohort may also play a role.

Patterns of street-based law enforcement have changed markedly over the last 10 years

in Vancouver. Increased investments have allowed the Vancouver police department to significantly increase its presence on the streets of the city. Periodic intensifications have also resulted in transient disruptions in the Downtown Eastside, but these disruptions lead to significant displacement of the illicit drug market to other areas of the city.

Data also indicate that police officers have worked well with the operators of the Vancouver supervised injecting facility and have referred street-based injectors to the program.

Figure 8: Availability of illicit drugs among HIV-negative and HIV-positive injection drug users and street-involved youth in Vancouver in 2007



Illicit Drug Availability

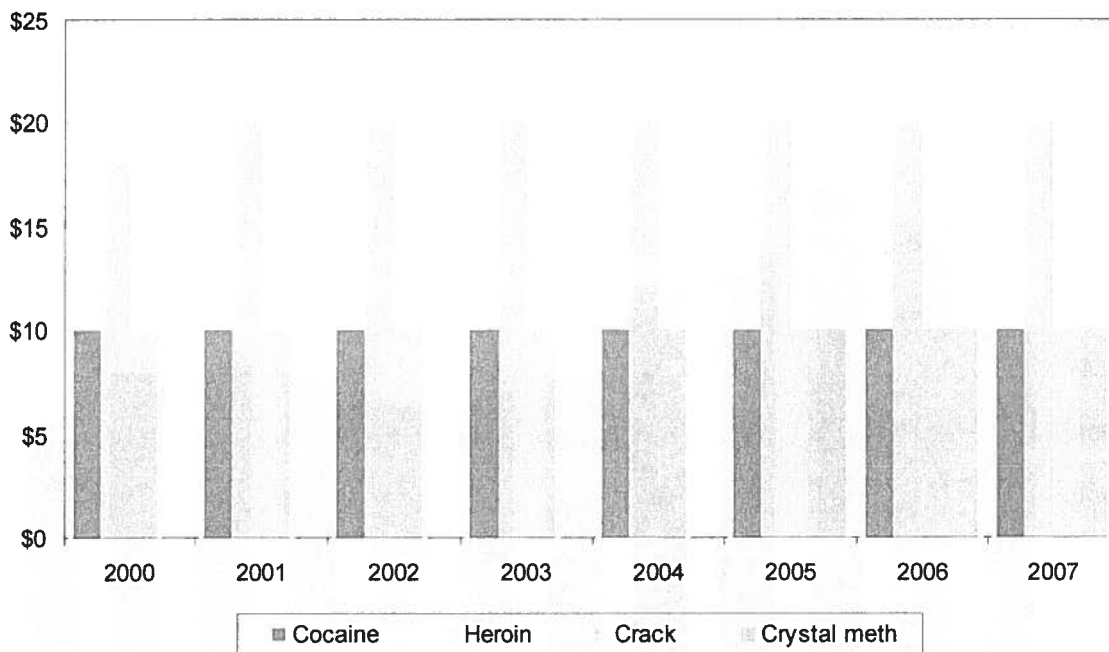
Figure 8 presents the availability of illicit drugs reported by HIV-negative injection drug users, HIV-positive injection drug users, and street-involved youth in Vancouver in 2007. As can be seen, a large majority of respondents in all three subpopulations reported rapid access to crack, with approximately 90% of injection drug users and approximately 70% of at-risk youth reporting access to crack within 10 minutes. Additionally, all three subpopulations reported relatively rapid access to heroin, with over 50% of street-involved

youth and approximately 80% of injection drug users reporting that they could obtain this drug within 10 minutes. Slightly reduced access to crystal methamphetamine by injection drug users was reported, although it is worrisome that crystal methamphetamine was most available to street-involved youth, with over 50% of youth reporting being able to obtain the drug within 10 minutes. The reported availability of these so-called hard drugs is comparable to the reported availability of marijuana among these subpopulations.

Figure 9 presents longitudinal data on reported street prices of illicit drugs in Vancouver from 2000 to 2007. These data suggest that illicit drug prices have remained extremely stable and low. As can be seen, the median reported street price of one “paper” (0.1 gram) of cocaine was consistently \$10 from 2000 to 2007, while the median reported street price of one “point” (0.1 gram) of heroin was

consistently \$20 from 2001 to 2007. The median reported street price of one “rock” (0.1 gram) of crack cocaine and crystal methamphetamine remained at \$10 from 2000 to 2007. The stability of the street price of these drugs appears to contradict assertions that interdiction efforts have meaningfully interrupted drug supply.

Figure 9: Median drug prices reported by injection drug users in Vancouver, 2000–2007



Note: Adjusted unit cost (per ‘point’ [0.1 gram] for cocaine, heroin, and crystal meth, per ‘rock’ [0.1 gram] for crack). Data on crystal meth prices only available for 2005–2007.

Drug Use Patterns

Drug use patterns were observed over an 11-year period among injection drug users in Vancouver, and these results are shown in Figures 10a-e. In the figures, “cocaine” and “heroin” refer to injection cocaine and injection heroin use, while “crack” refers to crack cocaine smoking. As can be seen, while rates of overall drug use remained relatively constant, large fluctuations in the use of specific drugs occurred over the study period. Specifically, the rate of participants reporting having injected cocaine daily in the last six months decreased from a high of 38.1% in 1996

to 8.5% in 2007. This decrease was accompanied by a large increase in crack cocaine use among this cohort, with 3.5% of participants reporting smoking crack cocaine daily in the last six months in 1996, compared with 41.7% reporting such behaviour in 2007. While fluctuations in injection heroin use can be seen in Figure 10a, these are less pronounced, with 27.7% of participants reporting having injected heroin daily in the last six months in 1996, compared with 25.2% of participants reporting such behaviour in 2007.

Figure 10a: Percent of Vancouver injection drug users reporting daily heroin injection, 1996–2007

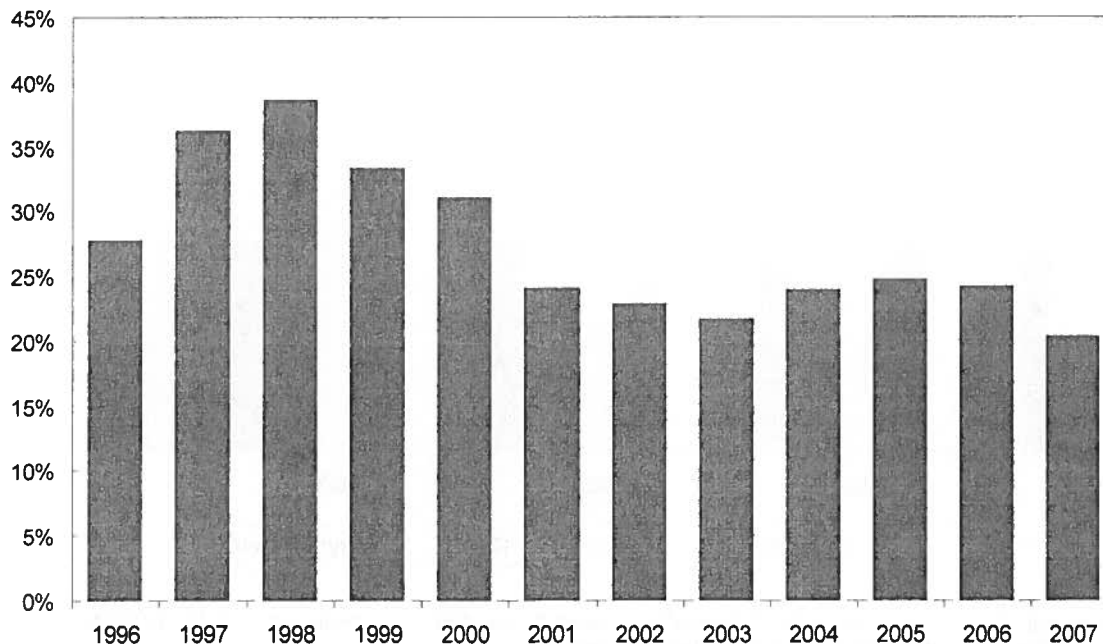


Figure 10b: Percent of Vancouver injection drug users reporting daily cocaine injection, 1996–2007

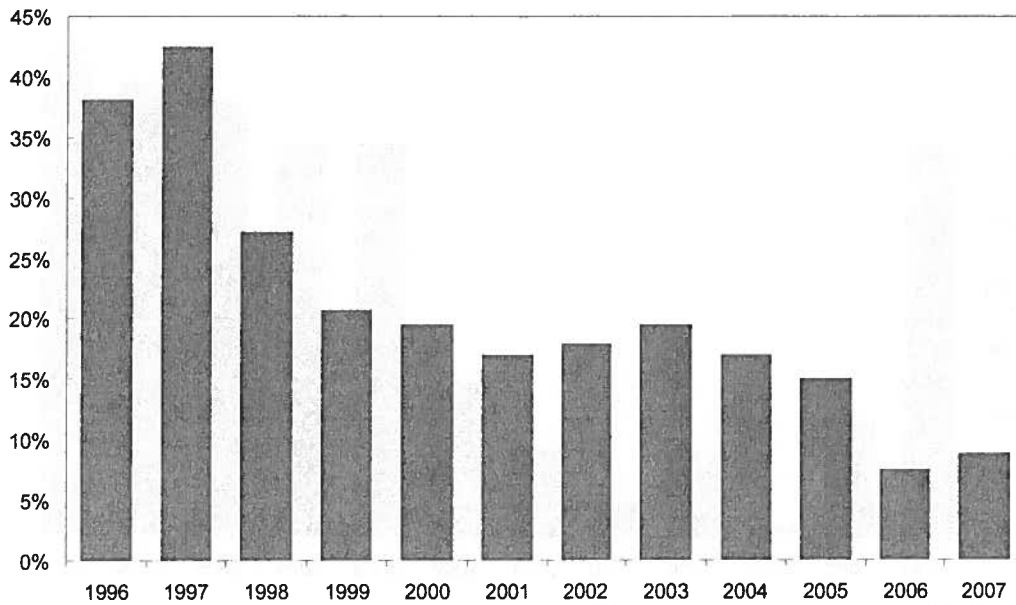


Figure 10c: Percent of Vancouver injection drug users reporting daily crack smoking, 1996–2007

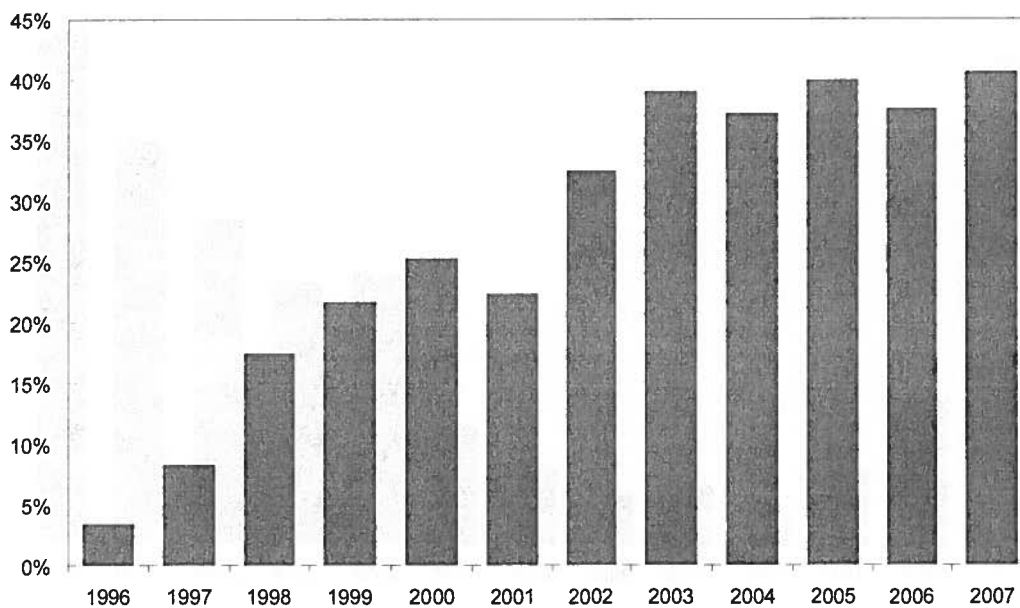
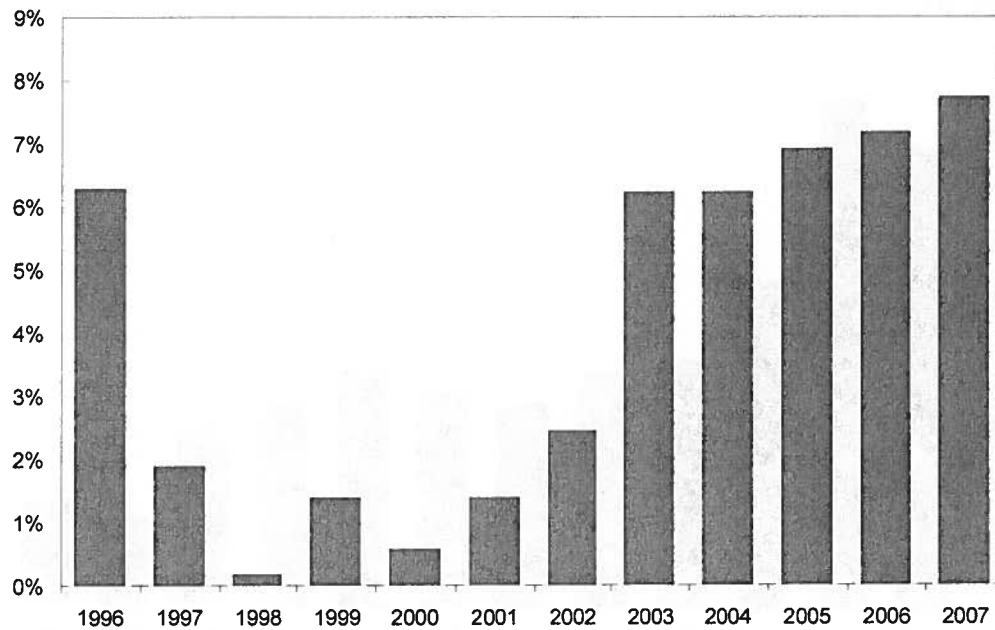
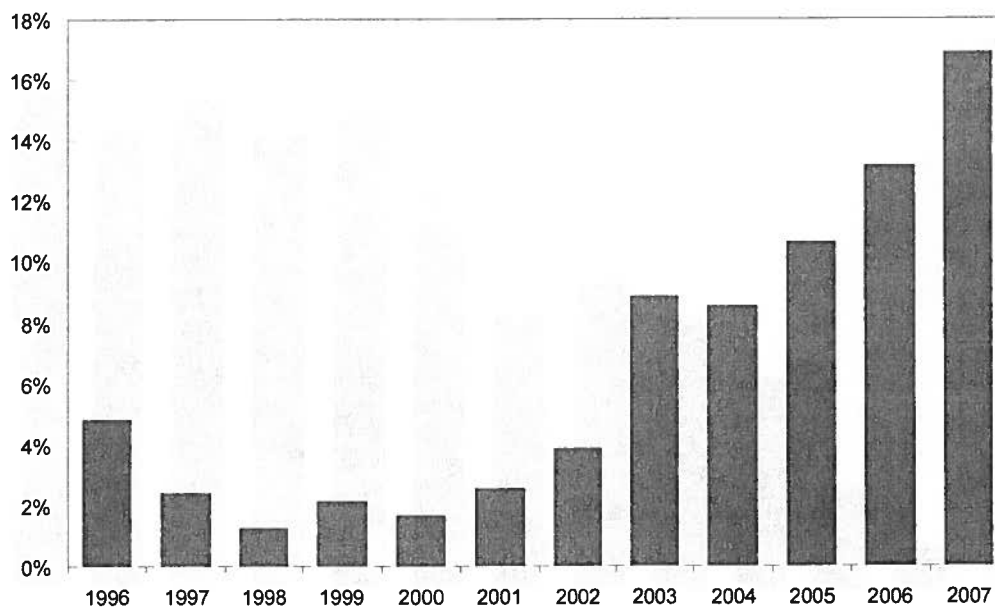


Figure 10d: Percent of Vancouver injection drug users reporting recent non-injection methamphetamine use, 1997–2007



Note: 'Recent' is defined as within the past six months.

Figure 10e: Percent of Vancouver injection drug users reporting recent methamphetamine injection, 1997–2007



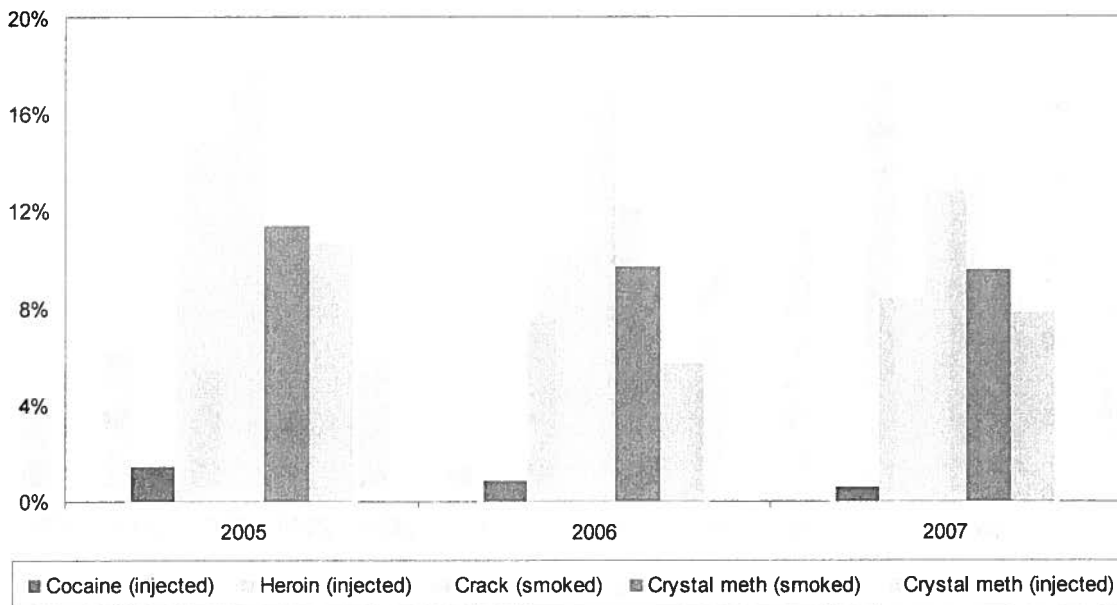
Note: 'Recent' is defined as within the past six months.

As can be seen in Figures 10d and 10e, while the rate of crystal methamphetamine use is much lower compared with the use of other drugs among this cohort throughout the study period, there is an identifiable increase in rates of both injection and smoked crystal methamphetamine use since 2001.

The drug use patterns of street-involved youth for the years 2005 to 2007 are presented in Figure 10f. Crystal methamphetamine, both through injection and smoking, is much more popular among street-involved youth in

Vancouver than it is among injection drug users, while injection cocaine and injection heroin use appear to be much less common. Crack cocaine use was, however, highly prevalent, with approximately 18% of street-involved youth reporting use of this drug in 2005 and 2006, and approximately 13% reporting use in 2007.

Figure 10f: Percent of Vancouver street-involved youth reporting daily use of cocaine, heroin, crack, and crystal methamphetamine, 2005–2007

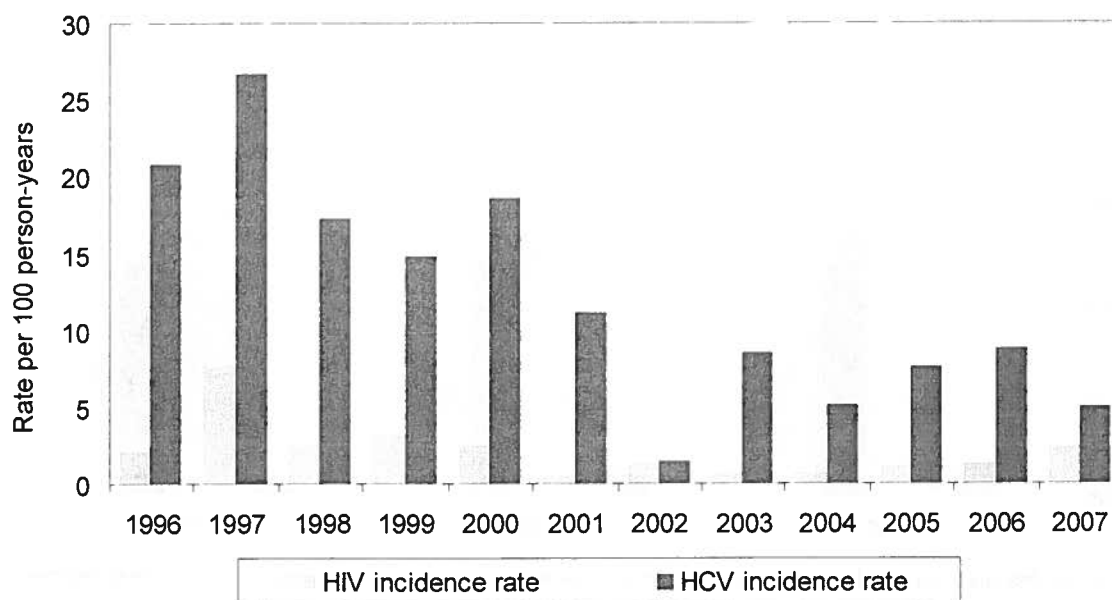


HIV and Hepatitis C Incidence and Prevalence

As can be seen in Figure 11, between 1996 and 2007, there appears to be an overall decrease in HIV and hepatitis C (HCV) incidence (i.e., the number of people newly infected) among injection drug users in Vancouver. While HCV incidence reached a high of 26.8 cases per 100 person-years in 1997, by the end of the study period the

incidence rate had decreased to 13.2 cases per 100 person-years. A similar decrease was observed with respect to HIV incidence, which dropped from a high of 7.7 per 100 person-years in 1997 to 2.4 cases per 100 person-years at the end of the study period in 2007.

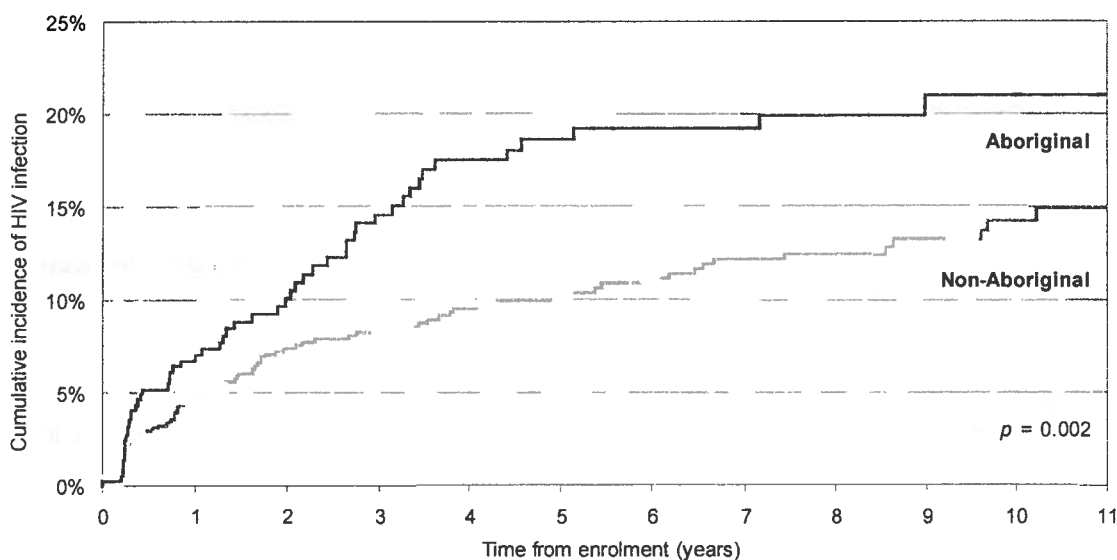
Figure 11: Incidence of HIV and hepatitis C (HCV) infection among Vancouver injection drug users, 1996–2007



The cumulative incidence (i.e., the number of new cases among a specific population during a specific period of time) of HIV infection was measured between 1996 and 2007 among Aboriginal and non-Aboriginal injection drug users, to investigate whether individuals who self-identified as Aboriginal were more likely

than non-Aboriginals to become infected with HIV. As can be seen in Figure 12, the cumulative incidence of HIV infection among individuals who self-identified as Aboriginal was 21.0% compared to 15.0% among non-Aboriginal injection drug users after 11 years.

Figure 12: Cumulative incidence of HIV infection among Vancouver injection drug users from 1996 to 2007, stratified by ethnicity

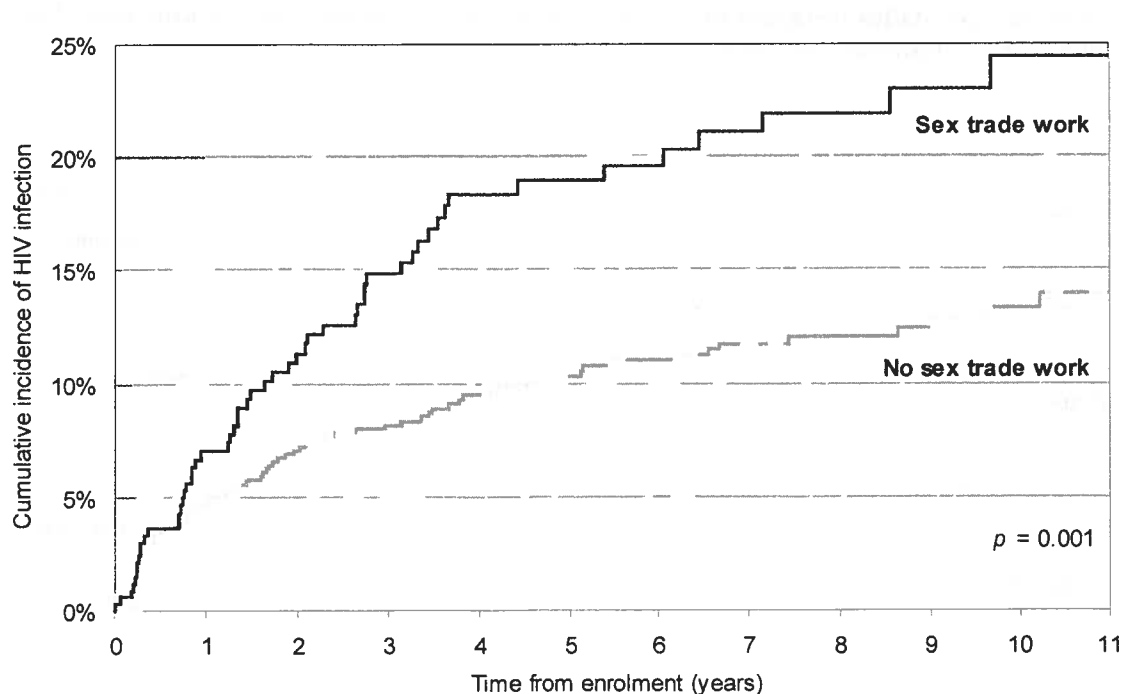


Street-Based Sex Work Involvement

Among street-involved youth in Vancouver, 11.3% reported engaging in sex work in 2007. Additionally, 15.4% of HIV-positive injection drug users and 14.0% of HIV-negative injection drug users in Vancouver reported engaging in sex work. Figure 13 presents data regarding the association between sex work and the cumulative incidence of HIV among injection drug users in Vancouver,

measured over an 11-year period (1996–2007). As can be seen, the cumulative HIV incidence rate was 24.4% among injection drug users who engaged in sex work at baseline versus 13.9% among injection drug users who did not engage in sex work.

Figure 13: Cumulative incidence of HIV infection among Vancouver injection drug users from 1996 to 2007, stratified by engagement in sex trade work

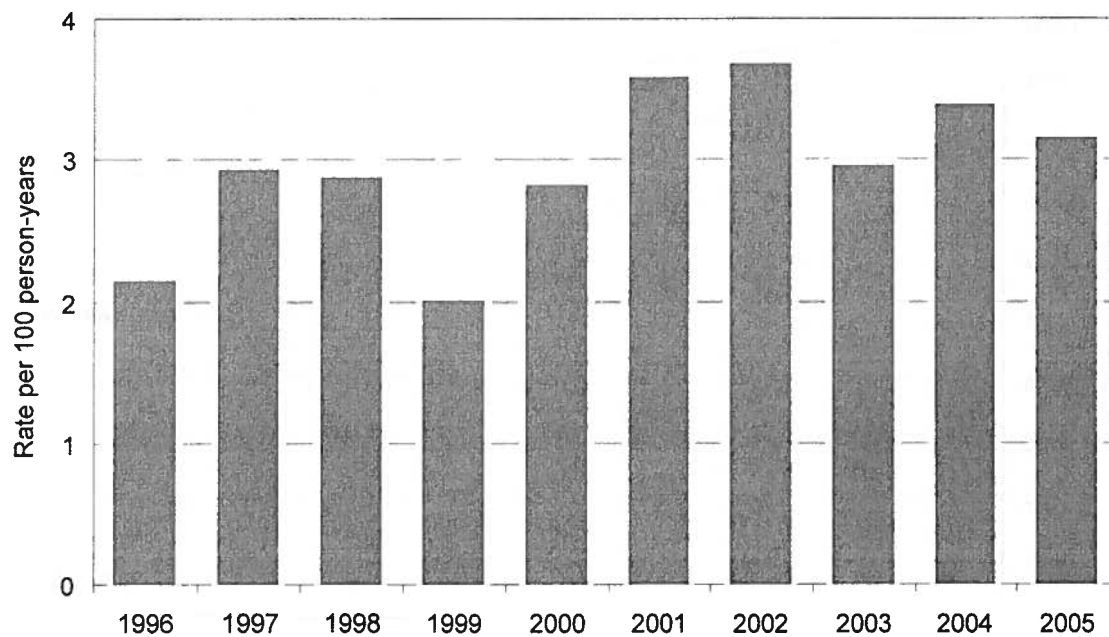


Mortality

Figure 14 presents data regarding the mortality rate among a cohort of injection drug users in Vancouver between 1996 and 2005. While fluctuations in the mortality rate can be seen, there is no clear or identifiable trend in the data throughout the study period. Primary causes of

death among study participants are HIV infection and overdoses. However, overdose deaths among Vancouver injection drug users have declined markedly in recent years.

Figure 14: Mortality rate among Vancouver injection drug users, 1996–2005

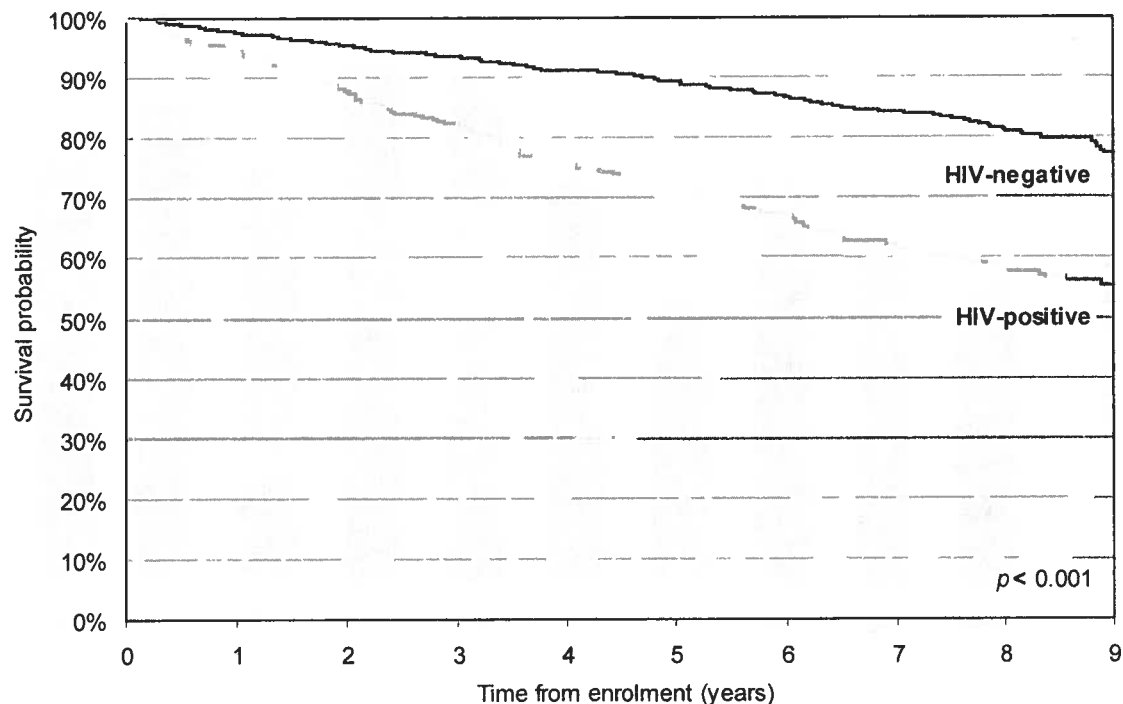


The cumulative probability of mortality among injection drug users in Vancouver over a 9-year period, stratified by HIV-status, is shown in Figure 15. As can be seen, baseline HIV-positive injection drug users were significantly more likely to die during the study period than were injection drug users who were HIV-negative at baseline. Specifically, among 1,123

baseline HIV-negative individuals, 167 (14.9%) died during 9 years of follow-up. Among 314 baseline HIV-positive individuals, 121 (38.5%) died during 9 years of follow-up.

When indirect standardization was used to compare the death rate of injection drug users to the male population of British Columbia aged 20 to 64, the crude rate of death was 10.4 (95%

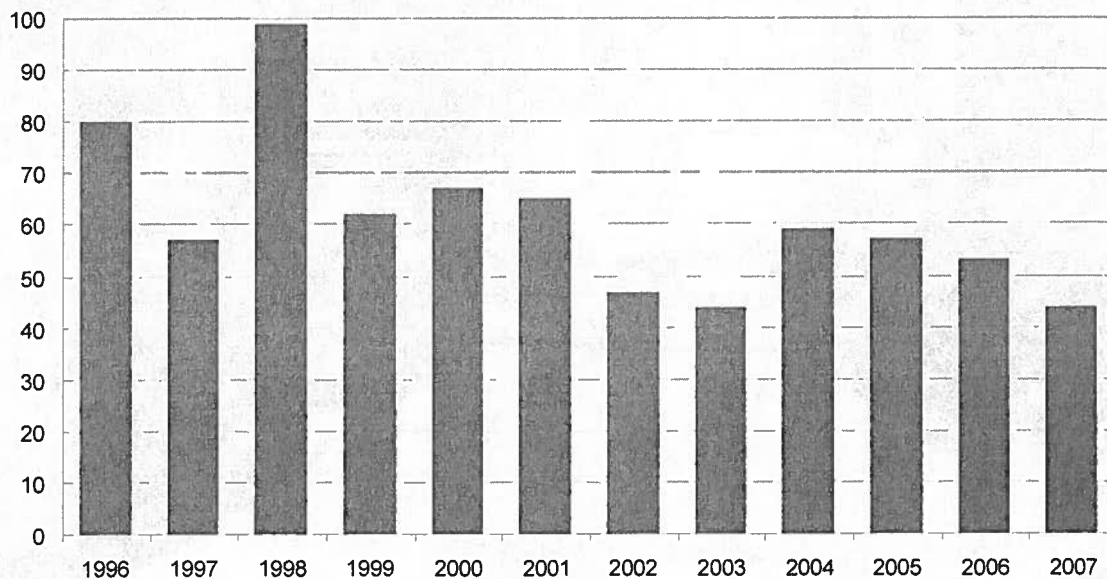
Figure 15: Probability of survival among Vancouver injection drug users from 1996 to 2006, stratified by HIV status



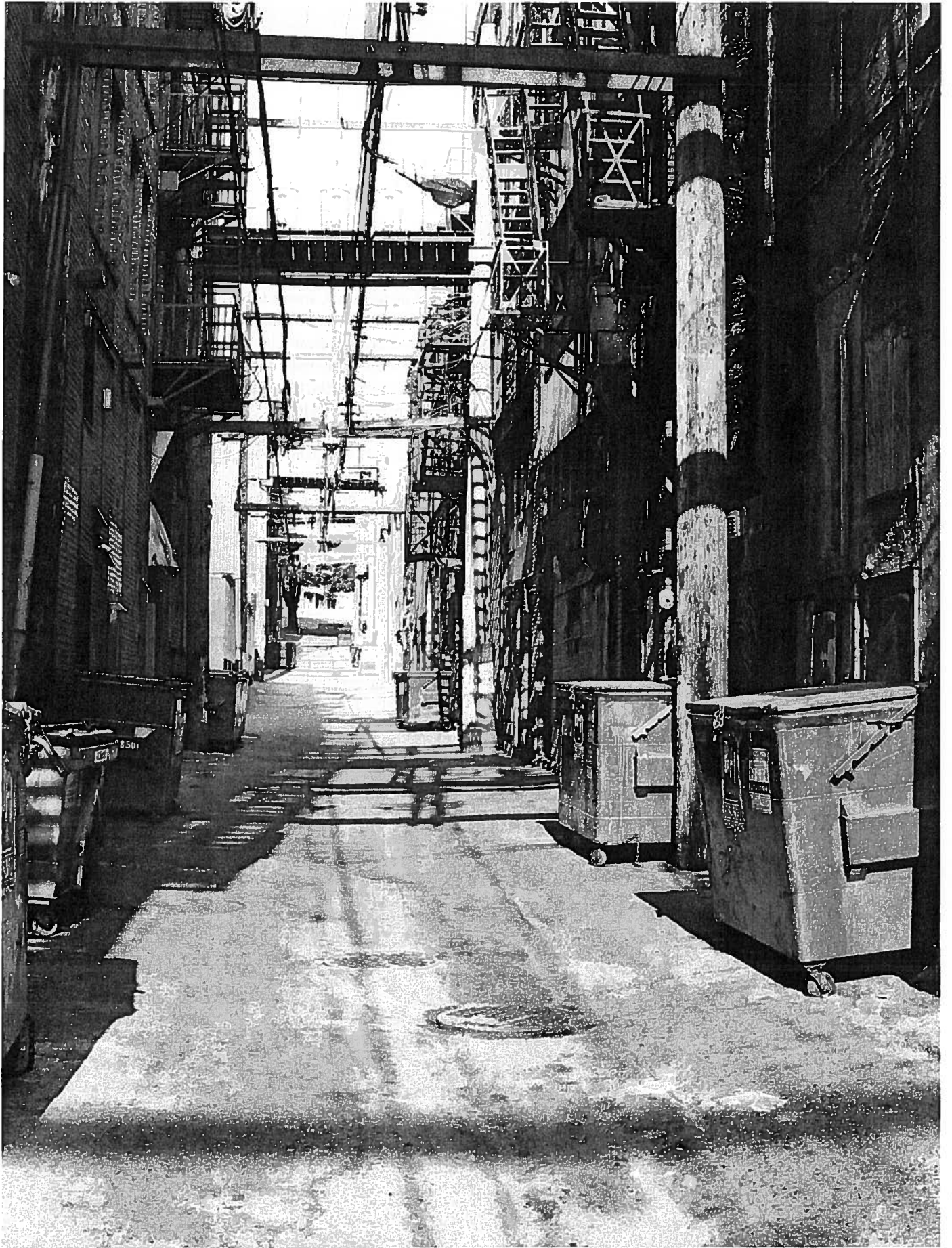
confidence interval: 9.0–12.0) times higher among male injection drug users in comparison to the male British Columbia population aged 20 to 64. Similarly, the death rate among female injection drug users was 22.4 (95% CI: 18.4–26.9) times higher than the female population of British Columbia aged 20 to 64. The markedly elevated rate of mortality among female drug users deserves immediate response from policy makers.

Data from the British Columbia Coroners Service suggest that there has been a marked decline in the number of fatal overdoses in Vancouver. Specifically, 80 fatal illicit drug overdoses were recorded for the city of Vancouver in 1996, though by 2007 this number had dropped to 44.⁶² The annual prevalence of fatal illicit drug overdoses between 1996 and 2007 is shown in Figure 16.

Figure 16: Number of fatal illicit drug overdoses in Vancouver, 1996–2007



Source: BC Coroners Service



DISCUSSION

This report summarizes the situation on the streets of Vancouver with respect to hard drug use over the last decade. It is useful to consider these findings in the context of the city's Four Pillars Drug Strategy, the upcoming 2010 Winter Olympic Games and the federal government's National Anti-Drug Strategy.

First, with respect to housing, over the past 10 years there have been high numbers of drug-using individuals living in unstable housing, in shelters or on the street in Vancouver.³⁴ The data collected in this report do not demonstrate significant improvements in this area over the last decade. Obviously, improving public order will require a considerable investment in assisted and non-market housing. While the province has done a commendable job in addressing the need for non-market housing units, much of the investment has involved preserving the existing low income housing stock rather than increasing its supply.⁶³

With respect to public disorder, homeless individuals are more likely to inject in public and to contribute to a sense of insecurity and danger on city streets.⁶⁴ While Insite, Vancouver's supervised injecting facility, has helped to reduce public drug use among some individuals, particularly homeless individuals, it must be acknowledged that Insite remains a pilot program with limited resources and the capacity to accommodate only 12 injectors at any given time. Although reports funded by the RCMP have been critical of Insite's limited impact on public order,⁶⁵ the program can only accommodate a small fraction of the neighbourhood's estimated 5,000 injection drug users and cannot be expected to

contribute to substantial and neighbourhood-wide improvements in public order. In this context, it is noteworthy that European cities that have employed supervised injecting facilities as a strategy to reduce public drug use generally have not limited these efforts to one pilot program, but rather have employed multiple supervised injecting facilities to address community need.

An additional critical issue is the large proportion of drug users who live in single room occupancy hotels. These hotels typically have shared bathroom facilities, and the rooms can generally accommodate little more than a single bed. As a result, individuals living in the Downtown Eastside's hotel rooms often have little or no social space other than the street corners and parks of the Downtown Eastside. In public spaces, homeless individuals and individuals who reside in the city's single room occupancy hotels interact with various elements of the street-based economy (e.g., illicit drugs, sex trade, bottle recycling). Investments in policing, housing, and harm reduction interventions have been proposed to address public drug use, and this dialogue should continue.³⁰ This discussion must take into consideration the fact that single occupancy hotel housing units in Vancouver's Downtown Eastside provide little social space; hence, until structural changes are made, the individuals who inhabit these units will continue to congregate outdoors in the parks and on the street corners of the Downtown Eastside. There has also been some policy discussion regarding the potential value of supervised inhalation facilities, as employed in Switzerland, where users can smoke crack cocaine

under supervision of medical personnel.⁶⁶ Given the massive increase in crack cocaine use and its association with public disorder and blood-borne disease transmission, this dialogue should be continued. In particular, an evidence-based review of strategies to address public disorder among this population is urgently needed. Street-based sex work is common among both HIV-positive and HIV-negative drug users in Vancouver, and evidence-based strategies to address the individual and community harms associated with this practice are also urgently needed.

Trends in access to addiction treatment in the city have generally been positive over the last decade, with drug users reporting increases in the use of methadone and a reduction in difficulty accessing addiction treatment. These changes likely reflect investments in addiction treatment. Over the past few years, Vancouver Coastal Health has also realized opportunities for investment in addiction treatment, with the annual budget doubling from \$16.4 million in 2002–2003 to \$33 million in 2008–2009.⁶⁷ Most recently, funding has been allocated to Onsite, the detoxification facility located above, and closely affiliated with, Insite.⁶⁸ Nevertheless, experts acknowledge that gaps persist, and novel strategies for the treatment of heroin and cocaine addiction are urgently required.^{69, 70}

The data suggest that HIV risk behaviour and HIV incidence are decreasing among Vancouver's injection drug users. Coinciding with the expansion of harm reduction programs, particularly the expansion of the city's syringe

exchange programs, there has been a reduction in syringe sharing. This has also been accompanied by declines in HIV and HCV incidence. However, in comparison to other North American cities, the HIV incidence rate found among illicit drug users in Vancouver remains high.⁷ Causes for this increased rate are likely multi-factorial and may include high rates of homelessness and mental illness, and incomplete coverage of HIV prevention programs. Also necessary are novel strategies to address these ongoing health-related concerns, with particular emphasis given to the needs of vulnerable populations such as street-involved youth and Aboriginal persons. With respect to the Canadian federal government's National Anti-Drug Strategy, it is noteworthy that despite the large body of scientific evidence regarding the effectiveness of harm reduction interventions in reducing HIV rates internationally and in Vancouver, this approach is excluded from the new strategy.⁵ This policy decision should be of local and national concern.

Patterns of law enforcement have changed markedly over the last decade. Increasing investments have allowed the Vancouver Police Department to significantly bolster its presence on the streets of the city. Periodic intensifications have also resulted in transient disruptions and significant displacements of the illicit drug market from the Downtown Eastside to other areas of the city.⁷¹ Studies also indicate that police officers have worked well in conjunction with the operators of the Vancouver supervised injecting facility in referring street-based injectors to this program. As

a result of intensified enforcement activities, a large number of injection drug users have experienced periods of incarceration.⁷² The troubling fact, though, is that these periods are associated with increased HIV risk behaviour and HIV incidence.⁷²

Unfortunately, the impact of law enforcement efforts on reducing illicit drug availability in Vancouver appears to be inconsequential. Although there has been a shift from injection cocaine to crack cocaine use and an increase in crystal methamphetamine use, these shifts are consistent with data collected in other west coast cities. Among Vancouver drug users, a large majority report rapid access to crack, heroin and crystal methamphetamine, with most individuals able to obtain these drugs within 10 minutes. Additionally, reported street prices of heroin, cocaine, crack cocaine and crystal methamphetamine have all remained stable and low from 2000 to 2007, suggesting a limited impact of strategies to decrease Vancouver's supply of illicit drugs. The federal government's National Anti-Drug Strategy will redouble efforts to reduce supply through law enforcement efforts.⁵ However, research from many settings around the globe and particularly the US suggests that this investment of public dollars will be unlikely to produce measurable reductions in drug supply.^{56, 73} The UHRI cohorts are well positioned to evaluate the impact of these investments on future drug availability. With respect to current trends, street-involved youth in Vancouver consume substantially more crystal methamphetamine compared with injection drug users, both

through injection and smoking, and engage in much less injection cocaine and heroin use.

Mortality rates among illicit drug users remain remarkably high. In comparison to the British Columbia population, the mortality rate among male injection drug users is 10 times higher, and the mortality rate among female injection drug users is 22 times higher. Although there have been substantial reductions in overdose deaths, strategies to reduce overdose remain an urgent priority. Harm reduction and expanded addiction treatment are the evidence-based modalities of choice among experts in the field and, again, the federal government's decision to withdraw support from harm reduction interventions is therefore of concern.

Similarly, HIV continues to contribute to high mortality among the city's illicit drug users. Since these deaths are preventable through the expanded delivery of highly active antiretroviral therapy (HAART), efforts to expand HAART should be initiated. This may be particularly important given the potential capacity of expanded HAART access to reduce HIV incidence by reducing the infectiousness of HIV-positive individuals.⁷⁴

It is our aim to update UHRI's *Drug Situation in Vancouver* report regularly to inform the ongoing evolution of the city's drug problem, in an effort to provide a comprehensive portrait of the ways in which various policies affect drug use patterns and related concerns.

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More information about the Urban Health Research Initiative is available at:
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Offer of financial incentives for unprotected sex in the context of sex work

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Abstract

Introduction and Aims. Commercial sex workers (CSW) are often portrayed as vectors of disease transmission. However, the role clients play in sexual risk taking and related decision making has not been thoroughly characterised. **Design and Methods.** Participants were drawn from the Vancouver Injection Drug Users Study, a longitudinal cohort. Analyses were restricted to those who reported selling sex between June 2001 and December 2005. Using multivariate generalised estimating equation, we evaluated the prevalence of and factors associated with being offered money for sex without a condom. **Results.** A total of 232 CSW were included in the analyses, with 73.7% reporting being offered more money for condom non-use, and 30.6% of these CSW accepting. Variables independently associated with being offered money for sex without a condom included daily speedball use [adjusted odds ratio (AOR) = 1.21, 95% confidence interval (CI): 0.23–0.62], daily crack smoking (AOR = 1.51, 95% CI: 1.04–2.19), daily heroin injection (AOR = 1.76, 95% CI: 1.27–2.43) and drug use with clients (AOR = 3.22, 95% CI: 2.37–4.37). Human immunodeficiency virus seropositivity was not significant (AOR = 0.98, 95% CI: 0.67–1.44). **Discussion and Conclusions.** Findings highlight the role clients play in contributing to unprotected sex through economic influence and exploitation of CSW drug use. HIV serostatus has no bearing on whether more money is offered for sex without a condom. Novel interventions should target both CSW and clients. [Johnston CL, Callon C, Li K, Wood E, Kerr T. Offer of financial incentives for unprotected sex in the context of sex work. *Drug Alcohol Rev* 2010;29;144–149]

Key words: sex work, injection drug use, condom use, HIV risk.

Introduction

Commercial sex work is generally regarded as being associated with heightened risk for sexual transmission of the human immunodeficiency virus (HIV) and other sexually transmitted infections (STI). While commercial sex workers (CSW) are often depicted as being risky in terms of the spreading of HIV and/or STI, research from North America and Europe shows that, under certain social and economic conditions, CSW often practise safer sex during commercial encounters [1,2].

Despite evidence to the contrary, public perception of sex work continues to view CSW as a major source of

disease transmission [3,4]. As such, there has been an increase in the number of CSW being targeted and 'morally charged' [5] by the media and enforcement community as vectors of disease transmission to the general population. For example, in Canada, Crime Stoppers recently issued an alert requesting information regarding a CSW who was known to be HIV positive and who had unprotected sex with men in the Vancouver area [6]. This alert was subsequently picked up by various news agencies who published the particular CSW's photograph. Given that commercial sex transactions involve at least two persons, it is important to consider the potential role that CSW clients play in

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determining sexual risk-taking behaviour and decision making [7]. Because of the complex nature of such sexual relationships, it is critical to examine the social and contextual factors that may influence commercial sex transactions and the associated risk behaviour. Canadian data examining encounters between CSW and their clients are limited. However, recent findings from a prospective cohort study of CSW in the Downtown Eastside (DTES) of Vancouver highlighted high levels of inconsistent condom use by CSW, and high rates of violence against CSW [8,9].

To date, most sex work-focused HIV prevention strategies work to empower CSW to take a more dominant role in sexual decision making, especially in the negotiation of condom use. Consistent condom use is considered to be one of the most efficacious and cost-effective strategies available to prevent HIV and STI transmission [10–12]. That said, it is important to consider the complexity of sex roles and sexual relationships within commercial sex transactions. It is imperative that programs aimed at increasing the acceptability and use of condoms target the sex buying population [12]. The limited focus on clients in discussions of HIV and STI transmission with regard to sex renders the client behaviour as normative and invisible, thus perpetuating the responsibility for safe sexual behaviour on CSW [13].

In order to gain a greater understanding of sexual decision making related to condom use in the context of commercial sex, we undertook the present analysis involving CSW in Vancouver, Canada to examine offerings of financial incentives by clients in exchange for unprotected sex. We also sought to evaluate the characteristics of CSW that were associated with having been offered more money to have sex without a condom, and to identify the proportion of CSW who accepted money for sex without a condom.

Methods

The Vancouver Injection Drug User Study (VIDUS) is a prospective study of injection drug using individuals who have been recruited through self-referral and street outreach from Vancouver's DTES since May 1996. The cohort has been described in detail previously [12,14–16,9,17,18]. Briefly, persons were eligible if they had injected illicit drugs at least once in the previous month, and resided in the greater Vancouver region. At baseline and semi-annually, subjects provide blood samples for HIV and Hepatitis C (HCV) serology and complete an interviewer-administered questionnaire. The questionnaire elicits demographic data as well as information about drug use, HIV risk behavior, including sexual practice and risks related to sex work. All participants provide informed consent, and are given a stipend (\$20

CDN) at each study visit. The study has been approved by the University of British Columbia's Research Ethics Board.

The present analyses included all participants who reported having sold sex between June 2001 and December 2005. Selling sex was defined as an exchange of sex for money, drugs, housing or other goods for services. Because of the nature of the instrument, variables related to incentives for non-condom use were limited to the examination of monetary exchange only. Using a multivariate generalised estimating equations (GEE) analyses, we evaluated the prevalence of and factors associated with being offered money for sex without a condom. We also identified the proportion of CSW who accepted money for sex without a condom. In total, 232 individuals (197 women and 35 men) in the VIDUS cohort were identified as eligible for this analysis.

The primary endpoint in this analysis was self-reported being offered more money not to use a condom. Explanatory variables of interest in this analysis included socio-demographic information: sex, Aboriginal ethnicity (yes/no) and unstable housing. As in previous analyses [14,15,19,20], unstable housing was defined as living in hotels, hostels, recovery houses or being homeless. Drug use variables considered refer to behaviours in the past 6 months and included: daily heroin and cocaine injection, daily crack cocaine smoking, daily speedball use, binge drug use, non-fatal overdose, borrowing and lending used syringes. Other risk characteristics considered included: experiencing a bad date in the last 6 months, incarceration in the past 6 months, drug dealing, alcohol use, drug use with clients and HIV serostatus.

As a first step, we examined rates of being offered money for sex without a condom during follow up. Since analyses of factors potentially associated with being offered money for sex without condom use during follow up included serial measures for each participant, we used GEE for binary outcomes with logit link for the analysis of correlated data to determine which factors were independently associated with having been offered money for sex without a condom [21]. These methods provided standard errors adjusted by multiple observations per person using an exchangeable correlation structure. Therefore, data from every participant follow-up visit were considered in this analysis. For instance, an individual participant may have been offered money for sex without a condom during one follow-up period, but not the next, or vice versa. This approach serves to examine behaviors and characteristics that correlated with times when offers of money for sex without a condom were and were not received within individuals and between individuals. This approach is commonly used for studies in which a

Table 1. Bivariate and multivariate GEE of factors associated with being offered more money for sex without a condom (n = 232)

Characteristic	Unadjusted odds ratio (95% CI)	<i>P</i> value	Adjusted odds ratio (95% CI)	<i>P</i> value
Older age (per year older)	0.97 (0.95–0.99)	0.009	0.99 (0.96–1.01)	0.229
Sex (male vs. female)	2.33 (1.27–4.29)	0.006	2.26 (1.14–4.48)	0.019
Aboriginal ethnicity (yes vs. no)	0.84 (0.57–1.24)	0.389		
HIV positivity (yes vs. no)	0.98 (0.67–1.44)	0.924		
Homelessness (yes vs. no)	1.09 (0.75–1.59)	0.63		
Unstable Housing (yes vs. no)	0.95 (0.68–1.33)	0.79		
Incarceration ^a (yes vs. no)	1.59 (1.04–2.43)	0.031	1.19 (0.74–1.92)	0.469
Binge drug use ^a (yes vs. no)	1.42 (0.99–2.03)	0.055		
Dealing ^a (yes vs. no)	1.28 (0.90–1.83)	0.163		
Borrowed syringes ^a (yes vs. no)	1.13 (0.73–1.76)	0.581		
Lent syringes ^a (yes vs. no)	1.08 (0.67–1.77)	0.74		
Daily speedball use ^a (yes vs. no)	1.66 (1.11–2.49)	0.013	1.21 (0.79–1.85)	0.379
Daily heroin injection ^a (yes vs. no)	2.22 (1.64–3.00)	<0.001	1.76 (1.27–2.43)	<0.001
Daily cocaine injection ^a (yes vs. no)	1.30 (0.93–1.83)	0.123		
Crack cocaine smoking ^a (yes vs. no)	2.16 (1.55–3.04)	<0.001	1.51 (1.04–2.19)	0.031
Non-fatal overdose ^a (yes vs. no)	1.36 (0.91–2.06)	0.133		
Alcohol use ^a (yes vs. no)	0.63 (0.30–1.29)	0.208		
Bad date ^a (yes vs. no)	2.82 (1.68–4.73)	<0.001	2.67 (1.49–4.76)	<0.001
Drug use with client ^b (yes vs. no)	3.37 (2.52–4.73)	<0.001	3.22 (2.37–4.37)	<0.001

^aDenotes activities/events in the previous 6 months; ^bDTES, downtown eastside. CI, confidence interval; GEE, generalised estimating equation.

repeated measure binary dependent variable is used in longitudinal studies, and has been used successfully in previous cohort studies of IDU [22,23].

Variables potentially associated with being offered money for sex without a condom were examined in bivariate GEE analyses. In order to adjust for potential confounding, we also fit a multivariate logistic GEE model using an a priori defined model building protocol of adjusting for all variables that were statistically significant at the $P < 0.10$ level in bivariate analyses. We also identified the proportion of participants who accepted more money for sex without a condom. This GEE modeling was done by using GENMOD procedure in SAS [24,25]. All statistical analyses were performed using SAS software version 8.0 (SAS, Cary, NC, USA). All P values are two-sided.

Results

In total, 232 VIDUS participants reported selling sex between December 1, 2001 and December 31, 2005 and were therefore eligible for inclusion in this analysis. The final sample included 197 (84.9%) women, 35 men (15.1%) and 89 (38.4%) individuals of Aboriginal ancestry. The median age at baseline was 27 [interquartile range (IQR): 22–34] years. Overall, these participants contributed to 796 observations during the follow-up period and the median number of follow-up visits was 3 (IQR: 1–5). CSW being offered more money

to engage in unprotected sex was reported for 481 (60.4%) of all observations, and by 171 (73.7%) of individuals. Of these 71 (30.6%) reported agreeing to have sex without a condom in exchange for more money.

The bivariate GEE analysis shown in Table 1 displays the socio-demographic and drug use factors that were significantly associated with being offered more money to have sex without a condom. Factors positively associated with being offered more money to have sex without a condom included: daily speedball use [odds ratio (OR) = 1.66; 95% confidence interval (CI): 1.11–2.49], daily heroin injection (OR = 2.22; 95% CI: 1.64–3.00), daily crack cocaine smoking (OR = 2.16; 95% CI: 1.55–3.04) and using drugs with a client (OR = 3.37; 95% CI: 2.52–4.73).

In the multivariate GEE analysis shown in Table 1, factors that were positively and independently associated with being offered more money to have sex without a condom included: female sex [adjusted odds ratio (AOR) = 2.26, 95% CI: 1.14–4.48]; daily speedball use (AOR = 1.21, 95% CI: 0.79–1.85), daily crack cocaine smoking (AOR = 1.51, 95% CI: 1.04–2.19), daily heroin injection (AOR = 1.76, 95% CI: 1.27–2.43), experiencing a bad date (AOR = 2.67, 95% CI: 1.49–4.76) and using drugs with a client (AOR = 3.22, 95% CI: 2.37–4.37). There was no significant relationship between being offered more money to have sex without a condom and HIV seropositivity (OR = 0.98, 95% CI: 0.67–1.44).

Discussion

In the present study, 171 (73.7%) individuals engaging in sex work reported being offered more money to have unprotected sex during a 48 month period. Female sex, daily speedball use, daily heroin injection, crack cocaine smoking, having experienced a bad date and using drugs with clients were independently and positively associated with being offered more money to have sex without a condom. Among those offered more money for sex, 71 (30.6%) accepted. Notably, HIV seropositivity was not associated with being offered more money to have sex without a condom. Given the number of individuals of Aboriginal ancestry in the study and extant literature pointing to the general marginalisation of Aboriginal people in British Columbia, the DTES and the sex industry, it was surprising to discover that there was no significant relationship between being offered more money to have sex without a condom and Aboriginal ethnicity [26,27].

Our finding that nearly 75% of CSW reported being offered more money to have unprotected sex suggests that client behaviour contributes significantly to the risk behaviour of CSW. Our results suggesting that vulnerable CSW are more likely to be offered money for unprotected sex is consistent with previous work documenting how clients can exploit economic vulnerability of CSW by influencing sexual decision making through financial incentives [8,9].

Female CSW were more than twice as likely to be offered more money to have sex without a condom compared with male CSW, pointing to greater HIV/STI vulnerability for female CSW. It is not uncommon for women to initiate into prostitution by exchanging sex for money and/or drugs as a means of supporting drug use [28,29]. Indeed, the findings from this study suggest that indicators of higher intensity addiction were common among the female CSW in this study, and frequent drug use was associated with increased vulnerability and risk taking.

British researchers charge that offering drugs has replaced physical coercion as the predominant form of manipulation and control over sex work [17]. Findings from another prospective cohort study of CSW in our setting additionally suggest that 'dope sickness' and the need to suppress withdrawal impairs CSW ability to make decisions around commercial sex transactions and HIV prevention measures [9]. In the current study, this is indicated by the high prevalence of daily heroin injection among CSW who are offered more money not to use a condom for commercial sex. Discourse focused on risk-taking behaviour in various sex work environments suggest that clients looking for unprotected sex go to the street market to find individuals who are desperate for drugs and thus willing to negotiate higher

prices in exchange for non-condom use [17]. In the present analysis, this is demonstrated by high rates of daily crack use and daily speedball use associated with CSW who are offered more money to perform sex without a condom. The high prevalence of drug use with clients also speaks to the fact that clients may not only be aware of CSW drug use, but that they also exploit the associated vulnerability to manipulate sexual transactions.

The high proportion of CSW who accepted more money for sex without a condom is concerning and consistent with previous studies. For example, a study of clients conducted in Vancouver between 1995 and 1998 demonstrated that while it appears that condom use during commercial sexual contacts is common among clients, especially when intercourse is involved, it is not consistent [30,31]. In 10% of cases, married male clients did not use a condom when they engaged in sexual intercourse commercially, and over 20% of the men did not use a condom when receiving oral sex [30,31]. These results echo those found in prior studies on condom use in the commercial sex trade, suggesting that clients influence condom use as a result of the economic power they hold in the relationship [32–35]. Current prevention strategies focusing on the empowerment of CSW by suggesting CSW take a dominant role in sexual decision making, especially in the negotiation of condom use, do not fully address the complex nature of commercial sex transactions. Given the power dynamic evident in this study, it is clear that clients need to not only be included in prevention strategies, but should be encouraged to take greater responsibility for their role in the prevention of HIV and STI transmission.

Despite power differentials within commercial sex relationships, the media and enforcement community, as exemplified in recent local Crime Stoppers alerts, continue to put sole responsibility for HIV transmission on the CSW [6]. There is an assumption that CSW, because of the nature of their work, are a primary source of HIV infection. Although it is commonly known that there is a higher prevalence of HIV among CSW who use injection drugs [20,36], results from this analysis show that HIV seropositivity was not associated with being asked to exchange sex for more money. This further indicates that CSW should not bear sole responsibility for HIV transmission within commercial sex transactions. Future research should seek to gain a better understanding of the decision making and risk reduction practices of CSW and their clients. Additional consideration should be given to contributing factors related to the nature of CSW work and their environment, especially in the context of drug use. It is also necessary to explore how CSW choose the venue they work in, how they choose their clients, and to examine the related transactions that ensue. Prevention

strategies and additional research will serve to better inform the public, the media, and law enforcement around the complex nature of street level commercial sex transactions and the associated health risks.

There are limitations to this study. Perhaps most importantly are issues related to self-report and recall bias. Socially desirable responding is always a possibility in studies that rely on self-report, and reporting stigmatised behaviours, such as not using a condom, may have been underestimated because of this tendency [37]. With respect to this issue, study interviewers are trained to ensure confidentiality in an effort to minimise socially desirable responding. It is also noteworthy that our study was restricted to injection drug using CSW and may not be generalisable to other populations. Finally, we did not specifically study CSW clients. Further, this analysis was limited to an investigation of offers of money for unprotected sex. Future research should also consider offers of drugs, as well as other materials and services.

In summary, the present study indicates that a high proportion of CSW are offered financial incentives by clients for sex without condom use and that this is associated with female sex, daily speedball use, daily heroin injection, daily crack cocaine smoking, having experienced a bad date and using drugs with clients. Commercial sex work at the street level is naturally a high-risk environment, where there is limited opportunity to negotiate sexual transactions. As a result, interventions should to be designed and informed in collaboration with the affected community and inclusive of CSW and clients. Such interventions informed in conjunction with community will allow for more context-specific programs that will put the onus of responsibility for HIV risk behaviour on all parties. It is imperative that programs aimed at increasing the acceptability and use of condoms for the purposes of reducing HIV and STI risk should be targeted equally towards the sex buying and sex selling population. Given the results of this study highlighting the high-risk environment in which commercial sex transactions take place, interventions should also focus on HIV risk factors beyond condom use. Harm reduction related to drug use and treatment options for CSW should address the economic and social exploitation of street-involved substance using CSW. Interventions should be mindful of the environment in which CSW work, and should address issues that include drug use with clients, violence, and access to health and social services.

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Research article

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Injection drug use among street-involved youth in a Canadian setting

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Abstract

Background: Street-involved youth contend with an array of health and social challenges, including elevated rates of blood-borne infections and mortality. In addition, there has been growing concern regarding high-risk drug use among street-involved youth, in particular injection drug use. We undertook this study to examine the prevalence of injection drug use and associated risks among street-involved youth in Vancouver, Canada.

Methods: From September 2005 to November 2007, baseline data were collected for the At-Risk Youth Study (ARYS), a prospective cohort of street-recruited youth aged 14 to 26 in Vancouver, Canada. Using multiple logistic regression, we compared youth with and without a history of injection.

Results: The sample included 560 youth among whom the median age was 21.9 years, 179 (32%) were female, and 230 (41.1%) reported prior injection drug use. Factors associated with injection drug use in multivariate analyses included age ≥ 22 years (adjusted odds ratio [AOR] = 1.18, 95% CI: 1.10–1.28); sex work involvement (AOR = 2.17, 95% CI: 1.35–3.50); non-fatal overdose (AOR = 2.10, 95% CI: 1.38–3.20); and hepatitis C (HCV) infection (AOR = 22.61, 95% CI: 7.78–65.70).

Conclusion: These findings highlight an alarmingly high prevalence of injection drug use among street-involved youth and demonstrate its association with an array of risks and harms, including sex work involvement, overdose, and HCV infection. These findings point to the need for a broad set of policies and interventions to prevent the initiation of injection drug use and address the risks faced by street-involved youth who are actively injecting.

Background

Street-involved youth are increasingly common in North American cities and are a population at heightened risk for an array of health and social problems [1]. In Canada

and the United States, it is estimated that between 4% and 7% of youth between the ages of 14 and 26 are absolutely, periodically, or temporarily without safe and stable shelter [2,3]. Since the definition of "street youth" is often

extended to individuals who may be housed but who are heavily involved in the street economy [4], the proportion of youth who fall into this category may be significantly greater.

Compared to the general population, street-involved youth contend with a variety of health-related risks and challenges [1], including elevated rates of mental illness [5], blood-borne infections [5-7], sexually transmitted infections [8], and violence [9,10]. Recent evidence from Montreal, Canada suggests that street-involved youth, in comparison to the general population, face an 8 to 11 times higher risk of mortality [11].

There have also been persistent concerns regarding high-risk substance use among street-involved youth in settings throughout the world [12-14]. In particular, in light of the associated risks for human immunodeficiency virus (HIV) and hepatitis C infection (HCV), increasing attention has been paid to the initiation of injection drug use within this population. This has led to calls for an updating of the risk hierarchy so that the prevention of injection drug use is given greater attention [15]. However, the prevalence of injecting and associated harms among street-involved youth has not been studied in many urban areas in North America [13,16,17], and, outside of Montreal [18], little is known about the epidemiology of injection drug use among street-involved youth in Canada. Past estimates suggest there are at any time upwards of 150,000 young people in Canada who are absolutely, periodically or temporarily without shelter [2]. However, there remain many challenges associated with estimating the size of this population given the transitory nature of street youth and lack of reliable counts of street youth (e.g., Census data, etc).

Vancouver, Canada has been the site of co-occurring epidemics of injection drug use, HIV, overdose, and HCV. However, while much study has been devoted to adult injection drug users (IDU) in this setting, little is known about the prevalence and associated risks of injection drug use among the city's growing street youth population [19]. Although reliable estimates are lacking, it has been suggested that there are between 500 to 1000 street youth living on Vancouver streets each day [20]. While an increasing number of studies have described the predictors of the initiation and cessation of injection drug use [18,21-23], there have been few studies that have compared the characteristics of drug-using street youth who have and have not injected. Therefore, we undertook this study to assess the prevalence and related risks and harms of injection drug use among a cohort of drug-using street-involved youth in Vancouver.

Methods

The At-Risk Youth Study (ARYS) is a prospective cohort study of Vancouver street-involved youth that has been

described in detail previously [19]. Briefly, participants were recruited through snowball sampling and extensive street-based outreach. Persons were eligible for the study if they were between 14 and 26 years of age, had used illicit drugs other than or in addition to marijuana in the past 30 days, and provided informed consent. At baseline and at semi-annual follow-up visits, participants complete an interviewer-administered questionnaire and provide blood samples for HIV and hepatitis C (HCV) serology. The questionnaire elicits demographic data and information regarding injection and non-injection illicit drug use, HIV risk behaviors, income generation, encounters with police, health service utilization, and sexual activity. The questionnaire is based on a previous instrument developed for adult drug users, and has been found to reliably identify factors associated with HIV infection, mortality, and other harms [24-26]. All participants received a monetary stipend of \$20 after each visit. The study has been approved by the University of British Columbia/Providence Health Care Research Ethics Board.

The present study was conducted to evaluate the prevalence of injection drug use and related risks and harms among street-involved youth who completed baseline study visits between September 2005 and November 2007. Although ARYS is a prospective cohort study, given the low incidence of initiation into injection drug use, a longitudinal study of injection drug use initiation among ARYS participants was not possible at this time. The primary outcome of interest was reporting any history of injection drug use (i.e., lifetime prevalence of injection drug use). Other self-reported variables of interest were selected based on a review of the documented harms associated with injection drug use, and included: age; gender; Aboriginal ethnicity; history of incarceration; history of sex work involvement (defined as exchanging sex for money, drugs, shelter, or gifts); history of drug dealing; currently having a warrant for one's arrest; and history of non-fatal overdose. Variable definitions were consistent with prior studies involving the ARYS cohort [27,28]. Serologic outcomes considered included HIV- and HCV-positive status.

As a first step, we conducted a univariate analyses in which those who did and did not report a history of injection drug use were compared using Pearson's Chi-square test and the Wilcoxon rank test. Fisher's exact test was used when one or more of the cells contained values less than or equal to five. As a second step, a multivariate model was then prepared using an *a priori* defined statistical approach whereby variables that were $p < 0.05$ in univariate analyses were included in a fixed logistic regression model. Variables that remained significant at $p < 0.05$ were regarded as factors significantly associated with the outcome of interest. All statistical analyses were per-

formed using SAS software version 9.1 (SAS, Cary, NC), and all *p*-values are two sided.

Results

In total, 560 participants were recruited and included in the present analyses. Of these participants, 179 (32%) were female and 131 (23.4%) were of Aboriginal ancestry. The median age was 21.9 years (interquartile range = 19.8–23.9). In total, 230 (41.1%) participants reported injection drug use. Factors associated with injection drug use in univariate analyses are presented in Table 1 and include: age ≥ 22 year (odds ratio [OR] = 2.67, 95% confidence interval [CI]: 1.89–3.79, $p < 0.001$); history of incarceration (OR = 2.04, 95% CI: 1.31–3.18, $p < 0.001$); sex work involvement (OR = 2.86, 95% CI: 1.89–4.32, $p < 0.001$); drug dealing (OR = 1.61, 95% CI: 1.10–2.42, $p = 0.023$); having a warrant for one's arrest (OR = 1.56, 95% CI: 1.03–2.33, $p = 0.037$); non-fatal overdose (OR = 2.76, 95% CI: 1.92–3.97, $p < 0.001$); and HCV infection (OR = 29.51, 95% CI: 10.55–82.53, $p < 0.001$).

As shown in Table 2, factors found to be independently associated with injection drug use in multivariate logistic regression analyses included: age = 22 years (adjusted odds ratio [AOR] = 1.18, 95% CI: 1.10–1.28, $p < 0.001$); sex work involvement (AOR = 2.17, 95% CI: 1.35–3.50, $p = 0.001$); non-fatal overdose (AOR = 2.10, 95% CI: 1.38–3.20, $p < 0.001$); and HCV infection (AOR = 22.61, 95% CI: 7.78–65.70, $p < 0.001$).

Discussion

In the present analysis, we found that injection drug use was common among street-involved youth in Vancouver, with approximately 40% of the cohort reporting a history of injection drug use. In a multivariate analysis, reporting a history of injection drug use was associated with older age, sex work involvement, non-fatal overdose, and hepatitis C infection.

The high prevalence of injection drug use among street-involved youth in Vancouver is slightly lower than observed in Montreal, Canada (41% versus 60%) [18], although somewhat higher than observed in some US cities [17]. Injection drug use among street-involved youth in this study was associated with several markers of risk, including sex work involvement. This is consistent with previous studies from various settings demonstrating a relationship between injection drug use and sex work among street-involved youth [29–32], studies which have also suggested that the co-occurrence of injection drug use and sex work places street-involved youth at elevated risk for HIV infection and other sexually transmitted infections. The association between sex work and injection drug use observed in the present study is also consistent with previous research demonstrating that injection drug

users (IDU) frequently resort to high-risk income generating activities, such as sex work [33], to support their drug use and basic survival needs [34], and that sex work is often linked to drug scene exposure [35]. However, previous studies from our setting have also suggested a strong relationship between the initiation of sex work among street-involved youth and childhood emotional and sexual abuse [36]. While the forces that prompt the co-occurrence of sex-work involvement and injection drug use will require further elucidation, the finding of an association between sex work and injection drug use among street-involved youth in this settings is of immediate concern, given evidence suggesting that sex work involvement is a strong predictor of premature mortality among young IDU in Vancouver [25].

Injection drug use was also associated with non-fatal overdose in this study. This is consistent with other studies indicating a high rate of prior non-fatal overdose among IDU [37,38] and a relationship between elevated risk for overdose and injecting as a route of drug administration [39]. Although non-fatal overdose among IDU is typically associated with heroin use [39], it is notable that crystal methamphetamine use is highly prevalent among street-involved youth in Vancouver and has been associated with non-fatal overdose among this population and adult IDU [27,40].

The finding that injection drug use was strongly associated with an elevated risk for HCV infection among youth in this study is consistent with a previous study of street-involved youth in Montreal and is not surprising, given the high prevalence of HCV infection among adult IDU in Vancouver [41] and the fact that injection drug use is an efficient mode of HCV transmission. Indeed, previous studies undertaken within North America suggest that many young IDU acquire HCV soon after initiating injecting, with the estimated time to HCV infection among this population being 1 to 2 years [42,43].

These findings reinforce previous calls for an updating of the risk prevention hierarchy so that the transition to injection drug use receives greater attention [15]. Indeed, studies have shown that the risk for acquisition of blood-borne infections is high after the onset of injecting [44], and therefore interventions that prevent the initiation of injecting among street-involved youth are needed, including those that target individuals (e.g., addiction treatment), as well as those that address the broader social, structural, and environmental determinants of injection drug use [45]. Unfortunately, few evidence-based approaches of this kind have been described. Given that older age (> 22 years) was associated with injection drug use in this study, future efforts should include delivering prevention interventions to high-risk street youth not yet

Table 1: Factors associated with injection drug use among street-involved youth (n = 560).

Characteristic	Yes n = 230 (41.1%)	No n = 330 (58.9%)	Odds Ratio (95% CI)	p - value
Median age				
≥ 22 years	82 (35.6)	197 (59.7)	2.67 (1.89–3.79)	<0.001
< 22 years	148 (64.4)	133 (40.3)		
Gender				
Female	67 (29.1)	112 (33.9)	0.80 (0.56–1.15)	0.233
Male	163 (70.9)	218 (66.1)		
Aboriginal ethnicity				
Yes	51 (22.2)	80 (24.2)	0.89 (0.60–1.33)	0.570
No	179 (77.8)	250 (75.8)		
Incarceration				
Yes	197 (85.7)	246 (74.5)	2.04 (1.31–3.18)	<0.001
No	33 (14.3)	84 (25.5)		
Sex work				
Yes	74 (32.2)	47 (14.2)	2.86 (1.89–4.32)	<0.001
No	156 (67.8)	283 (85.8)		
Drug dealing				
Yes	187 (81.3)	241 (73.0)	1.61 (1.10–2.42)	0.023
No	43 (18.7)	89 (27.0)		
Warrants*				
Yes	60 (26.0)	61 (18.5)	1.56 (1.03–2.33)	0.037
No	170 (74.0)	269 (81.5)		
Overdose				
Yes	107 (46.5)	79 (23.9)	2.76 (1.92–3.97)	<0.001
No	123 (53.5)	251 (76.1)		
HCV-positive†‡				
Yes	62 (26.9)	4 (1.2)	29.51 (10.55–82.53)	<0.001
No	167 (72.6)	318 (96.4)		

Table 1: Factors associated with injection drug use among street-involved youth (n = 560). (Continued)

HIV-positive†‡				
Yes	7 (3.0)	8 (2.4)	1.64 (0.58–4.61)	0.427
No	221 (96.1)	319 (96.7)		

* Warrants refers to having a warrant for arrest

† HCV refer to hepatitis C virus

‡ HIV refers to human immunodeficiency virus

§ Values do not add up to 100% due to missing tests results

exposed to injecting. Further, because these findings indicate that street-involved youth are at heightened risk for an array of harms through both drug use (e.g., overdose and HCV infection) and related activities (e.g., sex work involvement), interventions that reduce harm among street-involved youth who have taken up injecting are also needed. These include conventional harm reduction interventions [46], such as youth-friendly needle exchange programs, but also social and structural interventions that aim to mediate the risk environment of youth who inject drugs and exchange sex, including mobile service delivery and socio-legal reforms that facilitate safe sex work settings [47,48].

Our study has several limitations. First, like most other cohort studies involving high-risk youth, ARYS is not a random sample, and therefore our study findings may not be generalize well to the larger population of street youth in Vancouver. Further, given the differences across settings, including differences in the types of drugs used in different urban environments, our findings may not generalize well to street youth in other settings. Second, we relied on several measures of self-report, and therefore some response biases may have affected our results. In particular, we may have underestimated some sensitive behaviors and experiences, including injection drug use and sex work involvement. Lastly, this study design is

Table 2: Logistic regression analysis of factors associated with injection drug use among street-involved youth (n = 560).

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval (95% CI)	p - value
Age			
(≥ 22 vs. < 22 years)	1.18	(1.10 – 1.28)	<0.001
Incarceration			
(yes vs. no)	1.54	(0.88 – 2.70)	0.124
Sex work			
(yes vs. no)	2.17	(1.35 – 3.50)	0.001
Overdose			
(yes vs. no)	2.10	(1.38 – 3.20)	<0.001
Drug dealing			
(yes vs. no)	1.20	(0.73 – 1.97)	0.472
Warrants*			
(yes vs. no)	1.18	(0.73 – 1.93)	0.498
HCV-positive			
(yes vs. no)	22.61	(7.78 – 65.70)	<0.001

* Warrants refers to having a warrant for arrest

cross-sectional in nature, and therefore causal relationships cannot be inferred.

Conclusion

In summary, we found a high prevalence of injection drug use among street-involved youth in Vancouver. Importantly, injection drug use was associated with several markers of elevated risk and harm, including sex work involvement and overdose, as well as hepatitis C infection. These findings point to the need for continued efforts to reduce the initiation into injection use, as well as efforts to minimize the risks and harms experienced by street-involved youth who already inject.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

TK and EW designed the study. RZ and TK conducted the statistical analyses. TK and EW drafted the manuscript and incorporated all suggestions. All authors made significant contributions to the conception and design of the analyses, interpretation of the data, and drafting of the manuscript, and all authors approved the final manuscript.

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Adolescent health brief

Childhood Trauma and Injection Drug Use Among High-Risk Youth

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Abstract

We examined the association between five types of childhood maltreatment and initiation of injection drug use among a cohort of high-risk youth in Vancouver, Canada. Among 560 participants, 230 (41.1%) had injected drugs previously. In multivariate logistic analyses, only physical abuse (adjusted odds ratio = 1.91, 95% confidence interval: 1.29–2.83) was associated with injection drug use. These findings highlight the impact of childhood physical abuse on subsequent initiation into injection drug use among high-risk youth. © 2009 Society for Adolescent Medicine. All rights reserved.

Keywords:

Youth; Injection drug use; Initiation; Trauma

Childhood maltreatment, including sexual and physical abuse, can lead to various adverse health outcomes [1,2]. It has been suggested that the negative impacts of early trauma can reduce ability to cope in later life, rendering those exposed to abuse in childhood more prone to engage in various high-risk behaviors, including sex work and injection drug use [3,4].

Although recent work has linked sexual abuse to the initiation of injection drug use [4,5], we know of no studies that have sought to assess the differential impact of distinct forms of childhood maltreatment on initiation of injection drug use among high-risk youth. The present study was therefore conducted to assess the relationship between five forms of childhood maltreatment and injection drug use initiation among high-risk youth.

Methods

The At-Risk Youth Study (ARYS) is a prospective cohort study of street-involved youth in Vancouver, Canada, that has been described previously [6]. We define street youth as youth

between the ages of 14 and 26, who are absolutely, periodically, or temporarily without access to safe and stable shelter, or youth who are heavily engaged in the street economy. Other eligibility for study enrollment included recent use of illicit drugs other than marijuana. Study participants completed a lengthy interviewer-administered questionnaire. All individuals who were recruited between September 2005 and November 2007 were included in this analysis. ARYS has been approved by the University of British Columbia's Research Ethics Board.

Participants were asked to complete the Childhood Trauma Questionnaire (CTQ), which uses 25 items to assess five forms of childhood maltreatment, including physical, sexual, and emotional abuse and physical and emotional neglect [7]. Using a five-point scale, participants provide ratings for statements such as "When I was growing up I had to wear dirty clothes" and "I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor" (all questions refer to events occurring during childhood). Each scale yields a total score for that type of maltreatment. The CTQ has been shown to be valid and reliable when applied with substance users and adolescents [7].

Other self-reported variables of interest included: age; gender, Aboriginal ethnicity, level of education (< high school vs. ≥ high school), exposure to foster care or an orphanage, and having a parent who used illicit drugs.

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In univariate analyses, those who did and did not report a history of injection drug use were compared using Pearson's chi-square test or Wilcoxon rank test, as appropriate. To assess for an independent association between different forms of childhood maltreatment and initiation into injection drug use, a multivariate logistic regression model was fitted using an *a priori* defined approach whereby variables that attained a value of $p < .05$ in univariate analyses were considered.

Results

Of 560 participants, 179 (34%) were females. The median age was 21.9 years (interquartile range = 19.8–23.9). In total, 230 (41%) had ever injected drugs. Prevalence of childhood maltreatment was as follows: 200 (35.7%) reported emotional neglect, 278 (49.6%) reported emotional abuse, 256 (45.7%) reported physical neglect, 228 (40.7%) reported physical abuse, and 150 (26.8%) reported sexual abuse.

Factors associated with injection drug use in univariate analyses included older age, having a parent who used illicit

drugs, physical abuse, and sexual abuse (all $p < .05$; Table 1). Factors found to be independently associated with initiating injection drug use in multivariate analyses included: older age (adjusted odds ratio [AOR] = 1.24, 95% confidence interval [CI]: 1.16–1.33), having a parent who used drugs (AOR = 0.63, 95% CI: 0.43–0.92), and physical abuse (AOR = 1.92, 95% CI: 1.30–2.83) (Table 2). In a subanalysis, we ran a second model that included gender. Our model remained virtually unchanged, and gender was not associated with initiating injection drug use (data not shown).

Discussion

In our study involving high-risk youth, physical abuse was independently associated with having initiated injection drug use after adjustment for various sociodemographic and psychosocial factors, and four other types of childhood maltreatment. It has been well established that childhood maltreatment, including physical abuse, can result in a number of emotional and psychological consequences, such as depression, anxiety, suicidality, low self-esteem,

Table 1
Characteristics associated with injection drug use among street involved youth (n = 560)

Characteristic	Injection drug use		Odds ratio (95% CI)	p value
	No (%)	Yes (%)		
Age				
≥22 years	133 (47.3)	148 (52.7)	2.67 (1.89–3.79)	<.001
<22 years	197 (70.6)	82 (29.4)		
Gender				
Female	112 (62.6)	67 (37.4)	0.80 (0.55–1.15)	.230
Male	218 (57.2)	163 (42.8)		
Aboriginal ancestry				
Yes	80 (61.1)	51 (38.9)	0.89 (0.59–1.33)	.578
No	250 (58.3)	179 (41.7)		
Education level				
<high school	218 (56.9)	165 (43.1)	1.30 (0.90–1.88)	.156
≥high school	112 (63.3)	65 (36.7)		
Ever in foster care				
Yes	160 (56.9)	121 (43.1)	1.18 (0.84–1.65)	.337
No	170 (60.9)	109 (39.1)		
Parent used illicit drugs				
Yes	165 (63.9)	93 (36.1)	0.67 (0.48–0.95)	.031
No	165 (54.6)	137 (45.4)		
Emotional neglect				
Yes	113 (56.5)	87 (43.5)	1.16 (0.82–1.65)	.400
No	210 (60.2)	139 (39.8)		
Emotional abuse				
Yes	159 (57.2)	119 (42.8)	1.20 (0.85–1.69)	.299
No	165 (61.6)	103 (38.4)		
Physical neglect				
Yes	154 (60.2)	102 (39.8)	0.94 (0.67–1.32)	.729
No	172 (58.7)	121 (41.3)		
Physical abuse				
Yes	116 (50.9)	112 (49.1)	1.82 (1.28–2.57)	.001
No	209 (65.3)	111 (34.7)		
Sexual abuse				
Yes	79 (52.7)	71 (47.3)	1.49 (1.02–2.17)	.041
No	243 (62.3)	147 (37.7)		

Note: Some cells do not add up to 560 as participants may refuse to answer sensitive questions.

Table 2

Multivariate logistic regression analysis of factors associated with injection drug use among high-risk youth (n = 560)

Characteristic	Adjusted odds ratio (95% CI)	p value
Age (≥ 22 years)	1.24 (1.16–1.33)	<.001
Parents used drugs	0.63 (0.43–0.92)	.018
Sexual abuse	1.26 (0.83–1.93)	.282
Physical abuse	1.91 (1.29–2.83)	.001

Note: CI = confidence interval. Model was adjusted for all variables found to be associated with injection drug use in univariate analysis at $p \leq .05$.

and personality disorders [8]. These psychological effects may combine to create a vicious circle for many youth, wherein coping skills and a resources are not adequate for the high-risk situations in which they find themselves, thereby increasing their vulnerability to engage activities such as injection drug use.

Sexual abuse was not associated with injection drug use initiation. These findings differ from a recent study reporting an association between sexual abuse and injection drug use initiation [4,5]. However, this study did not include a measure of physical abuse, and it is notable that physical and sexual abuse were strongly associated in our study ($r = 0.28$, $p < .001$). It may be, therefore, that physical abuse is already accounting for a portion of the variance in the outcome that is also shared by sexual abuse. Regardless, our study and the aforementioned study are cross-sectional in nature, and therefore future studies should seek to evaluate prospectively the unique contributions of each form of childhood maltreatment on injection drug use initiation. Our finding that having a parent who used illicit drugs was negatively associated with having initiated injection drug use stands in contrast to earlier studies reporting elevated risks among individuals who reported having a parent who used drugs [9]. It may be that observing the consequences of injection drug use by one's parents serves to foster negative outcomes expectancies associated with injecting drugs, and hence, reduces the likelihood that injection drug use is initiated later in life.

Collectively, our findings point to the need for programs that seek to reduce the incidence of childhood maltreatment, as well as the adverse impacts of childhood maltreatment on future high-risk behavior. The available evidence suggests that home-visit programs and in-hospital programs have shown promise in terms of preventing abuse, whereas cognitive behavioral therapy and enhanced foster care have found to be effective in addressing various sequelae associated with child maltreatment [10].

Our study has several limitations. First, ARYS participants were not randomly selected. Second, our study was restricted to drug-using youth, and therefore our findings may not generalize to youth who have not used illicit substances. Third, we relied on self-report measures, and therefore, some response biases may have affected our results. In particular, we may have underestimated some sensitive experiences, such as childhood maltreatment.

However, we know of no reason why childhood maltreatment would be differentially reported by youth who had and had not injected drugs. Further, we feel that our use of a well-validated measure of childhood trauma is an important strength of our study [7].

In summary, we found that initiation of injection drug use among high-risk youth was associated with childhood physical abuse. Importantly, childhood sexual abuse did not remain associated with injection drug use initiation in multivariate analyses. These findings point to the need for continued efforts to reduce the incidence of childhood maltreatment as a means of preventing the initiation into injection use and other adverse health outcomes.

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RESEARCH

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Assisted injection in outdoor venues: an observational study of risks and implications for service delivery and harm reduction programming

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Abstract

Background: Assisted injection and public injection have both been associated with a variety of individual harms including an increased risk of HIV infection. As a means of informing local IDU-driven interventions that target or seek to address assisted injection, we examined the correlates of receiving assistance with injecting in outdoor settings among a cohort of persons who inject drugs (IDU).

Methods: Using data from the Vancouver Injection Drug Users Study (VIDUS), an observational cohort study of IDU, generalized estimating equations (GEE) were performed to examine socio-demographic and behavioural factors associated with reports of receiving assistance with injecting in outdoor settings.

Results: From January 2004 to December 2005, a total of 620 participants were eligible for the present analysis. Our study included 251 (40.5%) women and 203 (32.7%) self-identified Aboriginal participants. The proportion of participants who reported assisted injection outdoors ranged over time between 8% and 15%. Assisted injection outdoors was independently and positively associated with being female (Adjusted Odds Ratio (AOR) = 1.74, 95% Confidence Intervals (CI): 1.21-2.50), daily cocaine injection (AOR = 1.70, 95% CI: 1.29-2.24), and sex trade involvement (AOR = 1.44, 95% CI: 1.00-2.06) and was negatively associated with Aboriginal ethnicity (AOR = 0.58, 95% CI: 0.41-0.82).

Conclusions: Our findings indicate that a substantial proportion of local IDU engage in assisted injecting in outdoor settings and that the practice is associated with other markers of drug-related harm, including being female, daily cocaine injecting and sex trade involvement. These findings suggest that novel interventions are needed to address the needs of this subpopulation of IDU.

Background

The injection of illicit substances is associated with an array of harms. The transmission of bacterial and viral infections and risk of overdose persists in a range of settings despite considerable differences in drugs consumed and local injecting practices [1]. In response, a range of interventions have been developed to target unsafe injecting [1]. However, unsafe injection often continues despite a growing availability of interventions that specifically target these problems.

Supervised injection facilities (SIF) are a novel form of intervention that typically involve providing a hygienic environment where persons who inject drugs (IDU) can inject under the supervision of health care professionals [2]. North America's first SIF is situated in Vancouver, Canada's Downtown Eastside (DTES) [2], a neighbourhood characterized by extreme poverty, high crime, homelessness, poor housing, and high rates of alcohol and drug abuse [3]. Research on the SIF has demonstrated success in attracting high-risk injectors [4], as well as improvements in safer injecting practices such as reduced levels of syringe sharing [5]. However, as with many other interventions that target unsafe injecting,

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concerns regarding barriers to SIF use remain. In particular, assisted injection, or being physically injected by someone else, is prohibited [6]. The prohibition on assisted injection at the SIF is structured by the federal guidelines governing supervised injecting, as well as the stipulations of the exemption granted to the SIF [7] and stems from the potential for criminal and civil liability from assisted injection [8]. Therefore, IDU who require assistance with injection, including IDU with physical disabilities, are unable to benefit from this service. In turn, there is concern that these individuals are left to obtain assistance with their injections in unsafe injecting environments, including public and unhygienic settings such as alleyways [9]. Furthermore, research has consistently demonstrated the high risks associated with assisted injection such as increased syringe sharing [10,11], non fatal overdose [12], and elevated HIV incidence [10,13].

In an effort to address the severe harms experienced among IDU who continue to require assistance with their injections in public settings, the Vancouver Area Network of Drug Users (VANDU), a drug-user led organization, formed the Injection Support Team (IST). The IST responds to the unique needs of this population by providing peer-based education and support on safer injection practices, referring IDU to nearby social and health-related services, as well as distributing sterile injecting paraphernalia via conventional outreach methods. To inform the activities of the IST, a community-based research partnership was developed between VANDU and the British Columbia Centre for Excellence in HIV/AIDS. As part of this collaborative effort, we undertook the following analyses to examine the prevalence of assisted injection in outdoor venues, as well as the characteristics associated with those engaging in this practice.

Methods

Community-based research project

Since 2005, the VANDU IST has engaged with individuals who require assistance with injection or who are injecting unsafely outdoors. All IST members have been injecting for at least 10 years and have experience providing assisted injections (i.e., "hit doctors") in the DTES. There are no medical personnel on the IST. Through monthly meetings with the IST, our research team engaged in face-to-face discussions with IST to help define our study question and select variables for examination. Several members nominated by the IST were subsequently consulted to provide their expertise regarding the interpretations of the study findings, which helped navigate our selection of supporting literature for the discussion.

Vancouver Injection Drug Users Study (VIDUS)

The following analyses are derived from the Vancouver Injection Drug Users Study (VIDUS). VIDUS is an open prospective study that has followed 1603 IDU recruited through self-referral or street outreach from Vancouver's DTES since May 1996. The cohort has been described previously in detail [14,15]. Briefly, individuals were eligible for participation if they were 14 years of age or older, had injected illicit drugs at least once in the month prior to enrolment, resided in the Greater Vancouver area and provided written informed consent. At baseline and semi-annually, participants complete an interviewer-administered questionnaire, which elicits demographic data, and information regarding drug use, injection practices, sexual risk behaviours, and enrolment into addiction treatment. Participants also provide venous blood samples, which are tested for HIV and HCV antibodies. All subjects receive a \$20 stipend at each visit to compensate for their time and cover transportation costs to the facility. This study has been approved by the University of British Columbia's Research Ethics Board.

Statistical Analysis

Our analyses examined the prevalence and correlates of reporting assisted injection in outdoors settings. Our outcome was based on the question "In the past 6 months, has anyone ever helped you to inject outdoors (i.e., street or alley)?" All participants who were currently injecting and had at least one follow-up visit between January 2004 and December 2005 were eligible for inclusion in the present analysis. Independent variables of interest included socio-demographic information: age (per year older), sex (female vs. male), Aboriginal ethnicity (yes/no), DTES residence (yes/no), homelessness (yes/no) and HIV status (yes/no). Homelessness was defined as having no-fixed address (NFA) or living on the street, in a shelter or hostel. Drug use variables of interest included: years injecting (per year), police presence (yes/no), daily heroin injection (yes/no), daily cocaine injection (yes/no), incarceration (yes/no), and involvement in the sex trade (yes/no). Police presence refers to being affected in terms of where an individual buys or uses drugs. Unless otherwise noted, all behavioural variables, both dependent and independent, refer to the six-month period prior to the interview.

We examined the prevalence of receiving assistance with injection outdoors and examined factors potentially associated with reporting this practice during follow-up. As the analyses of factors correlated with assisted injection outdoors during the study period included numerous observations per participant, generalized estimating equations (GEE) were used for binary outcomes with a

logit link to determine factors independently associated with our outcome throughout the follow-up period (i.e., January 2004–December 2005). These methods provided standard errors adjusted by multiple observations per person using an exchangeable correlation structure [16]. This approach also accommodates changes in predictor variables over time. As a first step, variables potentially associated with reporting assisted injection outdoors was examined in bivariate GEE analyses. To determine independent predictors of this outcome, we fit a multivariate logistic GEE model using an *a priori* defined model building protocol that involved adjusting for all explanatory variables that were found to be statistically significant at the $p < 0.05$ in bivariate analyses. All statistical analyses were performed using SAS software version 8.0 (SAS, Cary, NC).

Results

In total, 620 participants were actively injecting and had at least one follow-up visit between January 2004 and December 2005 and thus were eligible for inclusion in the present analysis. The median age of the sample was 31.9 (Interquartile range 25.4–39.3), 251 (40.5%) participants were female, and 203 (32.7%) self-identified as Aboriginal.

The proportion of VIDUS participants who reported assisted injection outdoors varied with each follow-up between 2004 and 2005 and ranged between 8% and 15%. Univariate and multivariate results are displayed in Table 1. In multivariate analyses, assisted injection outdoors was positively associated with being female (Adjusted Odds Ratio (AOR) = 1.74, 95% Confidence Intervals (CI): 1.21–2.50), daily cocaine injection (AOR = 1.70, 95% CI: 1.29–2.24), and sex trade involvement (AOR = 1.44, 95% CI: 1.00–2.06). Aboriginal ethnicity remained negatively associated with the outcome (AOR = 0.58, 95% CI: 0.41–0.82).

Discussion

In our study, between 8 and 15% of local IDU reported receiving assistance with injecting in outdoor settings and this practice was independently and positively associated with being female, daily cocaine injection, and sex trade involvement. Aboriginal ethnicity was negatively associated with reporting assisted injection outdoors. Given that assisted injection has been shown to be independently associated with syringe sharing [10,11] and is a risk factor for HIV infection [10,13] and overdose [12], these findings indicate that novel programs are needed to target the distinct needs of this subpopulation of IDU who engage in this practice in outdoor venues.

In the present study, we demonstrated that being female was associated with receiving assistance with injecting in outdoor settings. This finding is consistent

Table 1 Socio-demographic and behavioural factors associated with reporting requiring help injecting outdoors among participants of the Vancouver Injection Drug User Study

Variable	Requiring help injecting outdoors n = 163	
	Odds Ratio (OR) (95% CI)	Adjusted OR (95% CI)
Age		
(year older)	1.06 (1.04–1.09) **	0.98 (0.95–1.01)
Years injecting		
(per year)	0.97 (0.95–0.99)**	1.00 (0.98–1.01)
Sex		
(female vs. male)	2.80 (1.87–4.20)**	1.74 (1.21–2.50)*
Aboriginal ethnicity		
(yes vs. no)	1.07 (0.70–1.64)	0.58 (0.41–0.82)*
DTEs residence		
(yes vs. no)	1.40 (0.96–2.06)	-
HIV		
(yes vs. no)	1.02 (0.67–1.57)	-
Homeless		
(yes vs. no)	1.88 (1.22–2.90)**	1.24 (0.75–1.79)
Daily heroin		
(yes vs. no)	2.35 (1.65–3.34)**	1.25 (0.95–1.66)
Daily cocaine		
(yes vs. no)	1.45 (1.05–2.01)*	1.70 (1.29–2.24)*
Sex trade		
(yes vs. no)	2.85 (1.91–4.26)**	1.44 (1.00–2.06)*
Incarceration		
(yes vs. no)	1.82 (1.18–2.80)**	1.24 (0.87–1.77)
Police presence		
(yes vs. no)	2.35 (1.64–3.37)**	1.22 (0.91–1.65)

Note: * $p < 0.050$ ** $p < 0.001$, CI = Confidence Interval

with previous literature that demonstrates females are overrepresented among those that require assistance with their injections [10,13,17]. Females likely require help with injecting for different reasons than men; specifically, females are more likely to report that they do not know how to inject themselves [18]. Based on this finding, a gender-sensitive approach may be needed to ensure that when members of the IST approach females injecting outdoors, they are offered effective and appropriate education and advice on how to self-inject safely.

In the present study, reporting assisted injection outdoors was associated with daily cocaine injection. There is a dearth of information on the relationship between assisted injection outdoors and frequent cocaine injection. However, the aspect of binge drug use as it relates to daily cocaine injection may offer some insight. Due to cocaine's short half-life, there is a need to inject more often (e.g., 20 times a day) in order to maintain a high [15]. During periods of binge drug use, individuals can become highly stimulated, be more likely to hang out in

the open drug scene, and experience sleep deprivation [19], and therefore may have reduced ability to self-administer injections. Often individuals have preference about who provides assisted injection but preferences shift during periods of drug withdrawal or availability [18], which may result in a variety of people providing assistance with injections. Further, cutaneous injection-related infections (CIRI), such as abscesses and cellulitis, can result in vascular damage, which may impair the ability of IDU to administer their own injections. Such infections have been also associated with frequent cocaine injection [20,21]. In addition, daily cocaine injection remains a strong predictor of HIV risk among IDU highlighting vulnerability in this population [15,22].

Importantly, sex trade involvement was associated with reporting assisted injection outdoors, and this association was independent from the association of female sex. When drugs are shared among sex workers and their clients, some clients are assuming responsibility for the preparation and administration of drugs [23]. Further, in our setting, Shannon *et al.* recently demonstrated that individuals involved in sex trade work are being pushed to work and inject in remote outdoor locations due to heavy police presence and laws that prevent sex workers from working in regulated indoor sex work venues [24]. The displacement of sex work into outdoor settings may explain the association between sex work and outdoor assisted injection locally.

Our results support further development of gender-based interventions that build personal capability to self inject. These initiatives are currently supported by the SIF and the IST, but their role could improve if the capacity of these services was increased. The SIF has been described as a setting in the DTES where IDU can obtain safer injection education [25]. Further, the SIF has been able to attract female injectors and individuals who require assistance with injection for CIRI care [25,26]. Importantly, drug user led organizations have been emerging globally and have demonstrated that drug users can organize themselves and make valuable contributions to their communities [27]. In particular, VANDU (all IST members are VANDU members) performs a critical education function by exposing outsiders to the realities of daily life for drug users in Vancouver's DTES [27]. Drug related harm, including risk of bacterial and viral infections, overdose, theft, and missed injection has been extensively documented among those who require assistance with injection [10,11,13,18]. Therefore, increasing number and types of services offered by the IST, who do not receive compensation for the injection related support they provide, could reduce the drug related harm in this setting. In the absence of round the clock SIF operation and to ensure remote outdoor access to clean injection supplies, injection

paraphernalia vending machines may be considered as further novel intervention. In addition, the dynamic of ingrained injection routines and assisted injection by intimate partners or clients of sex trade workers [17,18,23] need to be acknowledged and considered when developing interventions (e.g., education material or individual instruction of safer injection practices) specific to females and sex trade workers. Importantly, further research is required to elucidate why Aboriginal ethnicity was the only variable negatively associated with requiring assistance with injection in outdoor settings.

There are limitations of this study to be considered. VIDUS is not a random sample. Therefore, findings from this analysis are not necessarily generalizable to the wider population of IDU in our setting or elsewhere. However, research has suggested that the VIDUS cohort is representative of IDU in the DTES community [28]. Our finding may also not be generalizable to cities with different climates from Vancouver. Additionally, since our study relied on self-report data regarding drug and injecting practices, our analysis could be subject to social desirability bias. However, other studies have suggested self-report among IDU to be valid [29]. Finally, unmeasured factors predictive of high-risk activity among IDU, including social network dynamics and membership in a large socio-metric risk network [30], may have also contributed to the observed findings but are not incorporated into our analysis. Other potential explanatory factors specific to the outdoor injecting environment, such as lack of a physically clean space and inadequate lighting [9], were not considered and may be better understood through qualitative investigation.

Conclusions

There are important implications of the findings from the present study. It is recommended that the regulations at the SIF be changed to allow individuals who require assistance with their injection to inject at the SIF. These findings highlight the importance of ensuring that peer-based outreach programs have strong female representation as a means of ensuring that the unique needs of female IDU are addressed. It may also be important for the IST to target more remote outdoor areas that are frequented by sex workers. Furthermore, given the binge nature of cocaine injection, it would be valuable to offer SIF and IST services 24 hours a day.

Receiving assistance with injecting in outdoor settings was reported by 8 to 15% of local IDU over time. In the present study, individuals who reported assisted injection outdoors were more likely to be female, daily cocaine injectors, and individuals involved in the sex trade, and were less likely to be Aboriginal. Our findings have implications for the role of peer education and

outreach programs run by drug users. This study points to the need for a broad set of interventions, such as housing and treatment initiatives, which complement current harm reduction services to reduce the levels of unsafe injecting occurring outdoors in our setting.

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Authors' contributions

ELS, BR and TK conceived the study. ELS and BR coordinated and designed the study. KL analyzed the data. ELS drafted the manuscript. All authors assisted in interpretation of findings or revisions for intellectual content and have given final approval of the manuscript.

Competing interests

The authors declare that they have no competing interests.

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Incidence and determinants of initiation into cocaine injection and correlates of frequent cocaine injectors

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Abstract

Purpose: To investigate the incidence and correlates of cocaine injection initiation and the impacts of daily cocaine injection among a cohort of injection drug users.

Methods: Among 1603 participants, from May 1996 to December 2005, risk factors for initiation of cocaine injection among baseline heroin users were determined by Cox proportional hazards regression and correlates of daily cocaine injection by generalized estimating equations.

Findings: Of the 238 individuals who had never injected cocaine, 200 (84%) had at least one follow-up visit and 121 (61%) consequently initiated into cocaine injection, yielding an incidence density of initiation into cocaine injection of 21.9% (95% confidence interval (CI): 17.9–25.8) per 100 person-years. In a multivariate model, Downtown Eastside (DTES) residence (adjusted hazard ratio (AHR) = 2.46, 95% CI: 1.68–3.60), incarceration (AHR = 1.50, 95% CI: 1.01–2.24), requiring help injecting (AHR = 1.57, 95% CI: 0.99–2.49), and binge drug use (AHR = 1.82, 95% CI: 1.22–2.73) remained associated with initiation into cocaine injection. DTES residence (adjusted odds ratio (AOR) = 1.99, 95% CI: 1.62–2.46), unstable housing (AOR = 1.28, 95% CI: 1.04–1.53), incarceration (AOR = 1.29, 95% CI: 1.04–1.60), sex trade involvement (AOR = 1.46, 95% CI: 1.15–1.85), requiring help injecting (AOR = 2.11, 95% CI: 1.73–2.58), borrowing syringes (AOR = 1.81, 95% CI: 1.35–2.43) and binge drug use (AOR = 2.16, 95% CI: 1.81–2.58) were independently associated with daily cocaine injection.

Conclusions: The baseline prevalence and subsequent incidence of initiation into cocaine injection was high. Daily cocaine injection was independently associated with a number of health and social harms, including elevated HIV risk behavior.

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Keywords: Cocaine; Injection drug use; Risk factors; HIV

1. Introduction

The use of injection cocaine has recently increased in a number of settings around the world. For example, a documented increase in cocaine use among injection drug users (IDU) in New South Wales, Australia, occurred following a heroin drought that began at the beginning of the year 2001 (Topp et al., 2003; Degenhardt et al., 2005). This trend is of concern given that cocaine injection has been shown to be a potent

risk factor for HIV acquisition (Chaisson et al., 1989; Kral et al., 1998; Spittal et al., 2002; Tyndall et al., 2003), and more recently HCV (Maher et al., 2006) and overdose (Galea et al., 2006).

To date, the vast majority of public health research specific to injection drug use has focused primarily on heroin-using populations. In contrast, the growing use of injection cocaine has received significantly less attention. As a result, risk factors for initiation into cocaine injection and correlates of cocaine injection have not been well described. The present study was therefore undertaken to examine initiation into cocaine injection and correlates of frequent cocaine injection among a cohort of IDU in Vancouver, Canada.

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2. Methods

2.1. Study sample

Beginning in May 1996, persons who had injected illicit drugs in the previous month were recruited into the Vancouver Injection Drug Users Study (VIDUS), a cohort study that is presently ongoing and has been described in detail previously (Tyndall et al., 2003). In short, persons were eligible for VIDUS if they had injected illicit drugs at least once in the previous month, resided in the greater Vancouver region, and provided written informed consent. Participants were recruited through self-referral or street outreach from Vancouver's Downtown Eastside (DTES). For participants who moved away from the area or were living outside of the city during follow-up, phone interviews were undertaken. Alternatively, VIDUS staff are able to travel to locations throughout the Greater Vancouver area to conduct face-to-face interviews. At baseline and semi-annually, study participants completed an interviewer-administered questionnaire on socio-demographic and behavioral factors, as well as a nurse-administered questionnaire on health status. Participants also provided blood samples for diagnostic testing. Participants received \$20 for each study visit. The questionnaires elicited socio-demographic data as well as information about drug use and behaviors associated with risk of blood-borne viruses. The study has been approved on an annual basis by the Providence Health Care/University of British Columbia Research Ethics Board.

2.2. Initiation into cocaine injection

2.2.1. Variables of interest. The primary outcome of the first analysis was initiation into cocaine injection. Study participants who had not injected cocaine at baseline, but had injected other illicit drugs (e.g., heroin, amphetamine, talwin and ritalin, tranquilizers, barbiturates, steroids, crystal methamphetamine, and methadone), were followed prospectively to examine subsequent rates of initiation into cocaine injection either alone or in combination with heroin in what is often referred to on the street as a "speedball". As in prior analyses (Tyndall et al., 2003), the date of initiation was treated as the mid-point between the last injection cocaine-naïve and the first post-cocaine injection visit.

Socio-demographic variables included in this analysis included: sex (female vs. male), age, ethnicity (Aboriginal vs. other), DTES residence (yes vs. no) unstable housing (yes vs. no), and incarceration (yes vs. no). Risk behavior information included sex trade involvement (yes vs. no), requiring help injecting (yes vs. no), syringe borrowing (yes vs. no), syringe lending (yes vs. no), binge drug use (yes vs. no), daily heroin injection (yes vs. no), having a casual sex partner that injects drugs (yes vs. no) and ever being in drug treatment (yes vs. no). Variables considered referred to activity that occurred in the last six months. Unstable housing was defined as living in a single-room occupancy hotel, shelter or being homeless (Corneil et al., 2006). Binge drug use refers to using drugs more often than usual (Miller et al., 2006).

2.2.2. Statistical analysis. To examine changes in socio-demographic and behavioral variables over time, the unadjusted and adjusted relative hazards of initiation into cocaine injection were calculated using Cox proportional hazard regression. All behavioral variables were treated as time-updated covariates based on semi-annual follow-up data. For each participant, relevant socio-demographic and behavioral variables were examined in the questionnaire prior (i.e., questionnaire directly before reporting initiation) to when the individual reported initiating cocaine injection. Ties were handled using Breslow's method. To be eligible for this analysis, baseline injection cocaine-naïve participants had to have at least one follow-up visit to assess subsequent cocaine injection.

2.3. Correlates of frequent cocaine injection

2.3.1. Variables of interest. The primary outcome in the second analysis was frequent cocaine injection. As in our previous work (Tyndall et al., 2003), frequent injection was defined as injecting a drug once or more daily. This cut-off was defined based on prior literature showing that daily use of cocaine was among the strongest determinants of HIV seroconversion (Tyndall et al., 2003). In addition to examining predictors of initiating into cocaine injection, we also were interested in gaining an understanding of correlates of frequent cocaine

injection, as this behavior is considered to be an important risk factor for infectious disease spread in our setting (Tyndall et al., 2003). Socio-demographic and behavioral variables included in this analysis were identical to those considered in the primary analysis and described above.

2.3.2. Statistical analysis. Generalized estimating equations (GEE) for the binary outcomes with a logit link for the analysis of correlated data were used to determine the factors independently associated with frequent cocaine injection over time. These methods provided standard errors adjusted by multiple observations per person using an exchangeable symmetry correlation structure (Diggle et al., 1996).

In both analyses described above, multivariate models were fit using an *a priori* defined model-building protocol involving adjustment for all variables that were statistically significant at the $p < 0.05$ level in the univariate analyses. All statistical analyses were conducted with SAS software version 8.0 (SAS, Cary, NC) and p -values were two-sided. We considered all participants recruited between May 1996 and December 2005.

3. Results

During the study period, 1603 IDU were enrolled into the VIDUS cohort. The median number of follow-up visits was 10 (inter-quartile range (IQR): 4–16) for a median of 60 months (IQR: 24–96). The median age of the cohort at baseline was 30 years (IQR = 22–41). The proportion of study participants reporting daily cocaine injection declined from approximately 40% in 1996 to approximately 20% in 1999, and then remained fairly stable. The proportion of VIDUS participants at baseline who reported heroin injection was 1196 (75%), and 553 (35%) reported at least one injection per day of heroin. Among VIDUS participants at baseline, 658 (41%) reported injection of speedball, 107 (7%) reported injection of amphetamine, and less than 5% reported injection of talwin and ritalin, tranquilizers, barbiturates, steroids, crystal methamphetamine, or methadone. The proportion of VIDUS participants at baseline who reported a casual sex partner also being a person who injected drugs was 787 (49%).

3.1. Initiation into cocaine injection

Among 1603 participants, the proportion of individuals who reported *ever* injecting cocaine at baseline was 81% ($n = 1299$), with 41% ($n = 658$) reporting injecting of speedballs and 15% ($n = 238$) reporting that they had never injected cocaine or speedballs. Of the 238 individuals who had never injected cocaine, 200 (84%) had at least one follow-up visit and 121 (61%) consequently initiated into cocaine injection yielding an incidence density of initiation into cocaine injection of 22% (95% confidence interval (CI): 18–26) per 100 person-years. To investigate the potential loss to follow-up bias between the 38 VIDUS participants who did not return for follow-up and the 200 that did, we examined baseline differences of sex, Aboriginal ethnicity, unstable housing and age. Age was the only socio-demographic variable that differed significantly between the 38 VIDUS participants who did not return for follow-up and the 200 that did (median age 24 (IQR: 22–31) vs. 31 (IQR: 22–41), $p < 0.001$, respectively). The proportion of study participants reporting daily cocaine injection declined from approximately 40% in 1996 to approximately 20% in 1999, and then remained fairly

Table 1

Univariate and multivariate Cox proportional hazard analyses of the time to cocaine initiation among injection drug users who did not inject cocaine at baseline ($n = 200$).

Variable	Unadjusted relative hazard (RH)			Adjusted** relative hazard (RH)		
	RH	(95% CI)	p-Value	RH	(95% CI)	p-Value
Sex						
(Female vs. male)	0.94	(0.66–1.35)	0.744			
Age						
(Per year older)	0.99	(0.98–1.01)	0.504			
Ethnicity						
(Aboriginal vs. other)	1.16	(0.76–1.76)	0.491			
DTES residence ^a						
(Yes vs. no)	2.38	(1.65–3.44)	<0.001	2.46	(1.68–3.60)	<0.001
Unstable housing ^a						
(Yes vs. no)	1.00	(0.70–1.45)	0.987			
Incarceration ^a						
(Yes vs. no)	1.66	(1.11–2.47)	0.013	1.50	(1.01–2.24)	0.045
Sex trade involved ^a						
(Yes vs. no)	1.37	(0.84–2.26)	0.212			
Require help injecting ^a						
(Yes vs. no)	1.94	(1.25–3.03)	0.003	1.57	(0.99–2.49)	0.055
Syringe borrowing ^a						
(Yes vs. no)	2.00	(1.27–3.16)	0.003	1.70	(0.92–3.17)	0.093
Syringe lending ^a						
(Yes vs. no)	1.77	(1.12–2.81)	0.015	1.35	(0.73–2.51)	0.346
Binge drug use ^a						
(Yes vs. no)	2.17	(1.46–3.24)	<0.001	1.82	(1.22–2.73)	0.004
Daily heroin injection ^a						
(Yes vs. no)	1.30	(0.90–1.88)	0.160			
IDU casual sex partner ^a						
(Yes vs. no)	1.47	(0.98–2.18)	0.059			
Ever in drug treatment						
(Yes vs. no)	0.76	(0.52–1.11)	0.152			

^a Refers to previous six months, DTES = Downtown Eastside, IDU = injection drug user.

stable. Table 1 displays the results of the unadjusted and adjusted Cox proportional hazard regression regarding initiation into cocaine injection. In the unadjusted model, DTES residence, incarceration, requiring help injecting, borrowing and lending of syringes, and binge drug use were associated with initiation into cocaine injection. In the adjusted model, DTES residence (adjusted hazard ratio (AHR) = 2.46 (95% CI: 1.68–3.60)), incarceration (AHR = 1.50 (95% CI: 1.01–2.24)), and binge drug use (AHR = 1.82 (95% CI: 1.22–2.73)) remained independently associated with subsequently initiating cocaine injection. Requiring help injecting (AHR = 1.57 (95% CI: 0.99–2.49)) was marginally associated with initiating into cocaine injection.

3.2. Correlates of frequent cocaine injection

Overall, 77% ($n = 1237$) of IDU reported injecting cocaine at least once during the follow-up period. Approximately one third of VIDUS participants reported daily cocaine injection at baseline (34%, $n = 549$). As displayed in Table 2, baseline

socio-demographic and behavioral variables associated with frequent cocaine injection included female sex, DTES residence, unstable housing, incarceration, syringe lending, binge drug use, and sex trade involvement. The results of the univariate and multivariate GEE analyses of factors associated with frequent cocaine injection over time are shown in Table 3. In unadjusted analyses, younger age, DTES residence, incarceration, unstable housing, sex trade involvement, requiring help injecting, syringe borrowing, syringe lending and binge drug use were significantly associated with frequent cocaine injection. Also it is shown in Table 3 that in adjusted analyses DTES residence (adjusted odds ratio (AOR) = 1.99, (95% CI: 1.62–2.46)), incarceration (AOR = 1.29 (95% CI: 1.04–1.60)), unstable housing (AOR = 1.28, (95% CI: 1.07–1.53)), sex trade involvement (AOR = 1.46 (95% CI: 1.15–1.85)), requiring help injecting (AOR = 2.11 (95% CI: 1.35–2.58)), syringe borrowing (AOR = 1.81, (95% CI: 1.35–2.43)), and binge drug use (AOR = 2.16, (95% CI: 1.81–2.58)) remained significantly associated with frequent cocaine injection over time.

Table 2

Baseline socio-demographic and behavioural variables associated with frequent cocaine injection ($n = 1603$).

Variable	Not freq. cocaine injected, $n = 1054$ (%)	Freq. cocaine injected, $n = 549$ (%)	Odds ratio (95% CI)	p -Value
Sex				
Female	361 (34)	223 (41)	1.31 (1.06–1.62)	0.012
Male	693 (66)	326 (59)		
Age				
Median (IQR)	33 (24–40)	33 (26–40)	1.00 (0.99–1.01)	0.834
Ethnicity				
Aboriginal	270 (26)	162 (30)	1.25 (0.99–1.58)	0.058
Other	784 (74)	384 (70)		
DTES residence ^a				
Yes	550 (52)	369 (67)	1.88 (1.51–2.33)	<0.001
No	504 (48)	180 (33)		
Unstable housing ^a				
Yes	602 (57)	395 (72)	1.93 (1.54–2.41)	<0.001
No	452 (43)	154 (28)		
Incarceration ^a				
Yes	318 (30)	218 (40)	1.52 (1.23–1.89)	<0.001
No	736 (70)	331 (60)		
Syringe borrowing ^a				
Yes	378 (36)	212 (39)	1.13 (0.91–1.39)	0.278
No	676 (64)	337 (61)		
Syringe lending ^a				
Yes	356 (34)	216 (39)	1.27 (1.03–1.57)	0.027
No	698 (66)	333 (61)		
Require help injecting ^a				
Yes	439 (42)	228 (42)	1.00 (0.81–1.23)	0.963
No	615 (58)	321 (58)		
Binge drug use ^a				
Yes	478 (45)	294 (54)	1.39 (1.13–1.71)	0.002
No	572 (55)	255 (46)		
Sex trade involved ^a				
Yes	259 (25)	201 (37)	1.77 (1.42–2.22)	<0.001
No	795 (75)	348 (63)		

^aRefers to previous six months, DTES = Downtown Eastside residence, Freq. = frequent.

4. Discussion

In this study, the prevalence and incidence of cocaine injection was high and associated with a number of aspects of social harms and risk behaviors that elevate the possibility of infectious disease transmission. Over three quarters (81%) of study participants at baseline reported ever injecting cocaine and among those who had not, the majority (61%, $n = 121$) subsequently initiated into cocaine injection (incidence density of 22% per 100 person-years). In time to event analyses, DTES residence, incarceration, requiring help injecting and binge drug use were associated with subsequently initiating into cocaine injection. In multivariate GEE analyses, DTES residence, unstable housing, incarceration, sex trade involvement, requiring help injecting, syringe borrowing and binge drug use were independently associated with frequent cocaine injection over time.

To our knowledge, this is the first study that has examined risk factors for initiation into cocaine injection using longitudinal methods. Among the most interesting findings is that incarceration predicted subsequent initiation of cocaine injection.

Although high rates of drug use in Canadian prisons has been reported (Wood et al., 2005a,b), further research is required to shed light on this association. However, it is possible that incarceration as well as DTES residence in this model were acting as proxies for marginal lifestyle and are not directly related with our outcome variables. Future qualitative research could help discern whether the association between recent incarceration and cocaine injection was directly related to the outcome or whether incarceration was acting as a proxy for other factors related to lifestyle.

Of particular concern is that most factors associated with frequent cocaine injection in this analysis, such as borrowing syringes (Durante et al., 1995), requiring help injecting (Kral et al., 1999; Wood et al., 2003) and sex trade involvement (Tyndall et al., 2002; Wood et al., 2007) are also behaviors that have been shown to increase the risk for HIV infection in our setting and others (Bux et al., 1995; Kral et al., 2000; Wood et al., 2002; Tyndall et al., 2006). Cocaine injectors, when compared to heroin injectors, are known to exhibit elevated sexual risk behavior (Hudgins et al., 1995). Social cognitive theory-based,

Table 3

Univariate and multivariate GEE analysis of frequent cocaine injection ($n = 1603$).

Variable	Unadjusted odds ratio (OR)			Adjusted odds ratio (AOR)		
	OR	(95% CI)	<i>p</i> -Value	AOR	(95% CI)	<i>p</i> -Value
Sex						
(Female vs. male)	0.97	(0.84–1.12)	0.698			
Age						
(per year older)	0.99	(0.98–1.00)	0.037	1.00	(0.99–1.01)	0.985
Ethnicity						
(Aboriginal vs. other)	1.13	(0.97–1.31)	0.107			
DTES residence ^a						
(Yes vs. no)	2.10	(1.88–2.32)	<0.001	1.99	(1.62–2.46)	<0.001
Unstable housing ^a						
(Yes vs. no)	1.62	(1.49–1.77)	<0.001	1.28	(1.07–1.53)	0.006
Incarceration ^a						
(Yes vs. no)	1.81	(1.63–2.00)	<0.001	1.29	(1.04–1.60)	0.022
Sex trade involvement ^a						
(Yes vs. no)	2.37	(2.07–2.70)	<0.001	1.46	(1.15–1.85)	0.002
Requiring help injecting ^a						
(Yes vs. no)	2.18	(1.96–2.42)	<0.001	2.11	(1.35–2.58)	<0.001
Syringe borrowing ^a						
(Yes vs. no)	2.11	(1.90–2.36)	<0.001	1.81	(1.35–2.43)	<0.001
Syringe lending ^a						
(Yes vs. no)	2.09	(1.88–2.32)	<0.001	1.10	(0.78–1.55)	0.605
Binge drug use ^a						
(Yes vs. no)	2.36	(2.16–2.57)	<0.001	2.16	(1.81–2.58)	<0.001

^aNote: Refers to previous six months, DTES = Downtown Eastside Residence.

individually catered interventions have been found to be feasible and effective at reducing high risk sexual behaviors (Patterson et al., 2005). Collectively, these results suggest that both sexual and injection risk behavior should be incorporated into interventions geared towards cocaine injectors.

In addition, location (e.g., DTES residence and incarceration) was associated with frequent cocaine injection. There is growing recognition of the important role that place and location plays in mediating the harms associated with injection drug use (Darke et al., 2001). Our findings reinforce the reported need to expand our understanding of risk by moving beyond analyses of individual factors to investigations of the broader 'risk environment' of IDU (Rhodes, 2002; Rhodes et al., 2006). Integrating harm reduction services into the DTES, such as North America's first supervised injection facility (SIF), may play a role in mediating the risk environment in the DTES, as it has been reported to have reached high-risk injectors, including daily cocaine injectors (Wood et al., 2005a,b). This may occur by providing not only a safer place to inject with clean injecting paraphernalia, but also by putting these injectors in contact with health service providers who can provide safer injecting education (Wood et al., 2004). Further, use of the SIF has been independently associated with reduced syringe sharing (Kerr et al., 2005). The DTES is Vancouver's HIV epicenter (Kerr et al., 2003). Since there has been an elevated risk of HIV seroconversion among frequent cocaine injectors (Tyndall et al., 2003), it is not particularly surprising that cocaine injection is associated with DTES

residence. To further clarify the role of DTES residence, Vancouver's IDU HIV epicenter, in relation to cocaine injection, future studies could employ multi-level analyses comparing rates of frequent cocaine injection in the DTES and other surrounding neighborhoods. In light of our findings and given the elevated risk of HIV transmission among cocaine injectors, safer routes of drug administration may be a viable harm reduction message to prevent the initiation into injection drug use. Further research is also needed to determine the factors that lead an individual to initiate into injection cocaine, given the known elevated risk for infectious disease.

Currently, there are few existing interventions for cocaine use and there are no well-described "gold standard" substitution treatments for injection cocaine use (de Lima et al., 2002). Pharmacotherapies investigated as potentially beneficial in the management of cocaine dependence include antidepressants, anticonvulsants and dopaminimetics (de Lima et al., 2002). However, the evidence concerning pharmacotherapies for cocaine dependence has been equivocal (Shearer et al., 2003). It has also been suggested that due to the intrinsic medical danger of pharmacotherapy, prescriptions should be limited to individuals with serious cocaine dependence (Shearer and Gowing, 2004). In addition, considering pharmacotherapy within a larger comprehensive addiction treatment strategy is vital to improving the lives of individuals dependent on cocaine (de Lima et al., 2002). There has been some research on the role of cognitive behavioral therapy with or without contingency management to

treat individuals with cocaine addiction, but these results are not conclusive (Epstein et al., 2003). It is evident that continued developments of new interventions for cocaine users combined with rigorous evaluation are warranted. In our setting, a supervised injecting facility has recently been opened and high utilization by cocaine injectors has been observed (Tyndall et al., 2005). Given existing evidence (Kerr et al., 2005), it may be that the supervised injection facilities have potential to address the elevated risk of syringe sharing observed among cocaine injectors in this study. Similarly, there is debate regarding the initiation of stimulant maintenance trials, and it is hoped that these data may help to inform this debate and reinforce the need for the ongoing development of novel interventions for cocaine injectors.

Our study has limitations inherent to working with large observational cohort data. First, regarding the self reporting bias, while some studies have suggested that self reports of IDU are valid (Latkin et al., 1993), the risk behaviors measured are stigmatized behaviors, and therefore it is possible that some of these behaviors were underestimated in the present study (Greenfield et al., 1995). However, we do not know of a reason why this concern would be differentially distributed among cocaine users and non-cocaine users. Second, regarding sampling bias, VIDUS is not a random sample, although we have previously shown that VIDUS is representative of IDU in the community (Tyndall et al., 2003). Third, this study focused on cocaine injection, although we appreciate that physical and psychological harm among injecting and non-injecting cocaine users occurs irrespective of route of administration and frequency of use (Kaye and Darke, 2004). Fourth, we did not have more precise information on the date of transitioning into injection cocaine, which is why the midpoint between the last non-cocaine injecting visit and the first cocaine injecting visit was used. However, our follow-up period was over a decade; therefore, we do not believe that this limitation has largely impacted our results.

In summary, the prevalence and incidence of cocaine injection was high and associated with a number of well-known risks for HIV infection and other adverse health outcomes, including syringe borrowing, requiring help injecting, binge drug use, sex trade involvement, and incarceration. In light of our findings and given the elevated risk of HIV transmission among cocaine injectors, safer routes of drug administration may be a viable harm reduction message. Further research is needed in determining the factors that lead an individual to initiate into injection cocaine, given the known elevated risk for infectious disease.

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Contributors

ELS, EW and TK conceptualized and designed the study. KL analyzed the data. ELS wrote the first draft of the manuscript. All authors contributed to and approved the final manuscript.

Conflict of interest

All authors have no conflicts of interest to declare.

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Physical Violence Among a Prospective Cohort of Injection Drug Users: A Gender-Focused Approach

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Abstract

Although dramatically heightened rates of violence have been observed among injection drug users (IDU), little is known about the gender differences associated with violence among this population. Employing a risk environment framework, we performed an analysis of the factors associated with experiencing violence among participants enrolled in a prospective cohort study of IDU during the years 1996-2005 using generalized estimating equations (GEE). Among 1114 individuals, 291 (66%) of females and 470 (70%) of males reported experiencing violence during the study period. In multivariate analyses, mental illness, frequent alcohol use, frequent crack use, homelessness, Downtown Eastside residency, and requiring help injecting were positively associated with experiencing violence for both sexes (all $p < 0.05$). For females, binge drug use (AOR = 1.30) and drug dealing (AOR = 1.42) were positively associated with violence, while younger age (AOR = 1.02), frequent heroin injection (AOR = 1.24), and incarceration (AOR = 1.50) were significant for males. Women were more likely to be attacked by acquaintances, partners, and sex trade clients, while men were more likely to experience violence from strangers and the police. These findings indicate that susceptibility to violence among IDU is structured by environmental factors such as homelessness and drug-related factors such as frequent alcohol use and involvement in drug economies. Furthermore, important gender differences with respect to the predictors and characteristics of violent attacks do exist. These findings indicate an urgent need for the development of comprehensive programs and structural interventions that take a gender-focused approach to violence among IDU.

Keywords

Violence; Gender; Injection Drug Use; HIV; Canada

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1. Introduction

Violence is a major cause of morbidity and mortality among injection drug users (IDU) that often manifests at the everyday, structural and symbolic levels (Bourgois et al., 2004; Kohli et al., 2005). Many studies have documented drastically elevated rates of physical violence among IDU recruited from both drug treatment programs and street-based settings (Chermack and Blow, 2002; Farris and Fenaughty, 2002; Vlahov et al., 1998). For example, a study of partner violence among women in methadone treatment found that over three-fourths reported ever experiencing violence, while over one quarter reported physical violence in the past year (El-Bassel et al., 2000). Beyond the direct physical injury that results from violence is a range of other health-related harms. Impairments in mental and emotional health resulting from violent encounters include depression, anxiety, suicidal ideation, posttraumatic stress disorder, mood and eating disorders, and substance dependence (Farley and Barkan, 1998; Fischbach and Herbert, 1997; Taylor and Jason, 2002).

The experience of violence among IDU has also been associated with an array of HIV-related risk behaviours (Braitstein et al., 2003; El-Bassel et al., 2000; Gilbert et al., 1997; Vlahov et al., 1998). The majority of these studies have focused on the past traumatic experiences and current social- and individual-level factors that result in a concomitant relationship between violence and HIV risk among marginalized, injection drug using women. For example, one study examining violence and HIV risk behaviours among female partners of male IDU observed that almost half had been physically assaulted by their sex partners; furthermore, those who had experienced physical violence were more likely to engage in unprotected anal intercourse (He et al., 1998). A study of IDU living in Vancouver found historical sexual abuse to be associated with sex trade work, sharing syringes with HIV-positive people, and other health-related harms such as accidental overdose (Braitstein et al., 2003). Intimate partner violence among women in methadone treatment has been associated with visiting shooting galleries, living with someone with drug or alcohol abuse problems, and exchanging sex for money or drugs (El-Bassel et al., 2000). Other risk factors and correlates of physical violence that have been documented among populations of drug-using women include: younger age (Vlahov et al., 1998); being separated or divorced (Gruskin et al., 2002); inconsistent condom use (El-Bassel et al., 2005); having multiple sex partners (Wenzel et al., 2004a); unstable housing (Wenzel et al., 2004b); marijuana use (Burke et al., 2005); and frequent alcohol use (Chermack and Blow, 2002). Childhood sexual and physical abuse is also commonly found to be a strong and independent predictor of adult physical violence among women currently using illicit drugs and among those enrolled in drug treatment programs (Gilbert et al., 1997).

Although few studies have examined the risk factors for received violence among male substance users, the prevalence of physical violence among this population is also strikingly high (Finlinson et al., 2003). One study examining received violence in a sample of individuals participating in substance abuse treatment found no gender difference in the proportion of participants reporting violence from partners (61% versus 65% among men and women, respectively), while males reported higher rates of violence from non-partners (75% versus 45% among men and women, respectively) (Chermack et al., 2001). Although the *expression* of violence has traditionally been associated with masculine gender roles, which in turn are at least partially responsible for the linking of partner violence perpetuation and sexual risk behaviours (Santana et al., 2006), *received* violence among male IDU is also common and likely underreported. As noted by Chermack et al. (2001), studies that do not include both male and female participants and do not examine violence outside of the partner or marital context result in a limited understanding of the gender-related issues that influence physical violence. Furthermore, studies that examine primarily individual-level factors (e.g., age, ethnicity, education) cannot account for the gendered structures and social relations within the drug

economy and street environment that perpetuate everyday violence experienced by IDU (Epele, 2002).

Over the past several decades, numerous theoretical models have been developed to guide our understanding of the complex relationship between drugs, alcohol and violence (Parker and Auerhahn, 1998). One of the most commonly used frameworks is that first proposed by Goldstein, in which three categories are used to describe the factors that link drugs and violence (Fagan, 1993; Goldstein, 1985; Goldstein et al., 1989): (1) pharmacological (i.e., pharmacological effect of substances enhance violent behaviour and individuals under the influence of drugs are less aware of surroundings making them vulnerable to violence); (2) economical compulsive (i.e., engagement in economically oriented violent crime to sustain drug use behaviours); and (3) systemic (i.e., the endemicity of violent interactions within the system of drug distribution and use). Although this framework is often used as a theoretical explanation for the observed link between violence, crime and substance use, several authors have noted that only limited empirical evidence exists to support all three components of the conceptual model (Martin and Bryant, 2001; Parker and Auerhahn, 1998). For example, in a review of illicit drug use and violence, Martin and Bryant (2001) found only limited evidence of a pharmacological basis for an association between illicit drug use and violence, and go on to suggest that most researchers emphasize a social rather than psychopharmacological basis for the link between cocaine use and violence. We hypothesize that "risk environment" theory may provide a more appropriate theoretical approach to understanding the multilevel factors which influence exposure to physical violence among IDU. Risk environment theory posits that the physical, social, economic, and policy environments in which drug use takes place structures and shapes the production and re-production of HIV risk (Rhodes, 2002). Given that this theory has been used effectively to conceptualize the multifactorial influences that produce HIV risk among IDU (Rhodes et al., 2005), a similar approach may be useful for describing the "risk environment" factors that structure susceptibility to physical violence among this population.

Although it has been shown in various settings that epidemics of HIV and violence are closely linked (Maman et al., 2000; Quinn and Overbaugh, 2005), little is known about the experiences of physical violence among IDU in the Downtown Eastside area of Vancouver, the city's drug scene epicenter. Given that an HIV epidemic among IDU in this area has persisted since the mid 1990s, with HIV prevalence rates estimated to be greater than 30% (Kuyper et al., 2004), characterizing physical violence and its potential association with HIV risk production may be useful for informing programs, policies and interventions targeting this population. Furthermore, there is a lack of information regarding the gender differences associated with experiencing physical violence among individuals who inject drugs. In response to these concerns, the present study was conducted to examine physical violence, both partner violence and other types of assault, among a prospective community-recruited cohort of male and female IDU. Thus, the objectives of this study were to: (1) determine the prevalence of experiencing physical violence among this cohort of IDU; (2) examine the gender differences associated with risk factors for physical violence; and (3) compare the characteristics of experiencing violence, including the perpetrator and type of attack (beating, attack with a weapon, etc.) experienced by men and women in this setting.

2. Methods

The Vancouver Injection Drug Users Study (VIDUS) is an ongoing prospective cohort study of injection drug using individuals recruited through self-referral and street outreach from Vancouver's Downtown Eastside since May 1996. The study has been described in detail previously (Tyndall et al., 2003; Wood et al., 2001). Briefly, persons were eligible to participate in VIDUS if they had injected illicit drugs at least once in the previous six months, resided in

the Greater Vancouver region at time of enrolment, and provided written informed consent. At baseline and semi-annually, subjects provide blood samples and complete an interviewer-administered questionnaire. The questionnaire elicits demographic data as well as information regarding drug use, HIV risk behaviours, sexual activity, and drug or alcohol treatment. Participants receive \$20 (CDN) for each study visit. The study has been approved by the University of British Columbia's Research Ethics Board.

Reports of experiencing violence among men and women were identified by examining responses to the question, "Have you been attacked, assaulted, or suffered any kind of violence in the past six months?" Since this question has been asked consistently for over 5 years of follow-up, we were able to analyse these data longitudinally. In order to obtain more detailed information regarding the perpetrator and type of attacks, responses to the following questions were also examined for those who reported received violence during the last six months: 1) "Who has attacked you?" and 2) "What type of attack was it?" These questions were used to differentiate between partner and non-partner violence, as well as the many different forms of violent attack (i.e., beating, attack involving a weapon or gun, strangling, robbery, or being physically threatened). Participants were able to provide more than one answer to these additional questions. We restricted our analysis to reports of physical violence since a study examining the characteristics and predictors of sexual violence among this cohort of IDU has been reported previously (Braitstein et al., 2003).

Risk environment theory was used as the theoretical basis for the selection of primary predictors of interest in this study. Factors such as homelessness, Downtown Eastside (DTES) residency (i.e., Vancouver's epicenter of injection drug use and HIV and HCV outbreaks), current enrolment in any drug or alcohol treatment program, recent incarceration, requiring help injecting, sex trade involvement, and drug dealing were included to assess the potential impact of the social, environmental and economic conditions in which injection drug use and exposure to violence are situated. Other drug-related variables of interest included: years injecting, frequent cocaine injection, frequent heroin injection, frequent crack use, alcohol use of greater than four drinks per day, and binge drug use. Finally, factors that were included as potential confounders due to their known or *a priori* hypothesized relationship with both violence and one or more independent variables listed above included a range of socio-demographic and behavioural variables: age, ethnicity (Aboriginal versus other), marital status (married versus other), mental illness, and sexual abuse. To be consistent with our previous work (Craib et al., 2003; Wood et al., 2005; Wood et al., 2001), we defined: "mental illness" as self-reported depression, anxiety and/or other mental health illness in the past 6 months; "frequent use" to be daily injection of cocaine or heroin or daily smoking of crack; "binge drug use" to be self-reported periods when drugs were injected more frequently than usual; "sexual abuse" to be ever having been forced to have sex against one's will; and "incarceration" as being in detention, jail or prison overnight or longer. All drug use variables along with homelessness, DTES residency, recent incarceration, and sex trade involvement were treated as time-updated covariates that refer to activities or situations occurring during the past six months.

Initially, we examined bivariate associations between the risk environment, drug-related, and potentially confounding variables and reported violence using generalized estimating equations (GEE). We used GEE for binary outcomes with logit link for the analysis of correlated data since the factors potentially associated with violence during follow-up were serial (time-dependent) measures. GEE models account for the correlation between repeated measures for each subject, and as such data from every participant follow-up visit was considered in the analysis. Therefore, this technique permitted the determination of which factors were associated with received violence prior to the six-month follow-up interview throughout the 60-month observation period. The GEE method is commonly used for studies in which a repeated measure binary dependent variable is analysed longitudinally, and has been

described in our work previously (Kerr et al., 2005a). In order to construct gender-specific explanatory models for experiencing violence and to adjust for potential confounding, we also fit multivariate logistic GEE models adjusting for all variables that were found to be significantly associated ($p < 0.05$) with violence in bivariate analyses. To compare the characteristics of physical violence by sex, Chi-square tests were conducted. Fisher's exact test was also used to compute p -values when one or more of the observations was less than or equal to five. The Wilcoxon rank sum test was used to compare between men and women the median number of follow-up visits and the median number of violent experiences reported over the study period. All statistical analyses were performed using SAS software version 8.0 (SAS, Cary, NC), and all reported p -values are two-sided.

3. Results

A total of 1114 participants completed at least one follow-up interview during the period from December 2000 to December 2005 and were eligible for this analysis. Out of 10 interview periods, the median number of follow-up visits was 8 (interquartile range [IQR]: 4 – 10), with no significant difference in follow-up between men and women ($p = 0.99$). The median age was 36.8 (IQR: 28.3 – 44.2), 444 (40%) were women, and 346 (31%) were of Aboriginal ancestry. At baseline, we observed several gender differences with respect to the primary variables of interest. Men were more likely to report recent incarceration (22% vs. 14%, $p = 0.003$), while women were more likely to report recent sex trade involvement (31% vs. 4%, $p < 0.001$), drug dealing (34% vs. 21%, $p < 0.001$), enrolment in drug or alcohol treatment (56% vs. 49%, $p = 0.047$), and requiring help injecting (23% vs. 13%, $p < 0.001$). At baseline, 98 (22%) females and 138 (21%) males reported having suffered physical violence in the last six months ($p = 0.56$). Over the follow-up period, a further 193 (43%) females and 332 (50%) males reported experiencing physical violence. Therefore, over the entire study period, a total of 291 (66%) females and 470 (70%) males reported experiencing violence at least once ($p = 0.11$). Of those who reported at least once incident of violence, the median number of reports of violence over the study period was 2 (IQR: 1 – 3) for both men and women.

The bivariate GEE analyses of associations between variables of interest and self-reported violence are shown in Tables 1 and 2 for females and males, respectively. For females, the following variables were positively associated with experiencing violence: younger age (odds ratio [OR] = 1.03, 95% confidence interval [CI]: 1.01 – 1.05); mental illness (OR = 1.64, 95% CI: 1.34 – 2.00); sexual abuse (OR = 1.36, 95% CI: 1.10 – 1.69); alcohol use (OR = 1.51, 95% CI: 1.25 – 1.83); frequent heroin injection (OR = 1.64, 95% CI: 1.29 – 2.10); frequent cocaine injection (OR = 1.28, 95% CI: 1.02 – 1.62); frequent crack smoking (OR = 1.85, 95% CI: 1.48 – 2.33); binge drug use (OR = 1.60, 95% CI: 1.28 – 2.02); homelessness (OR = 1.93, 95% CI: 1.43 – 2.62); Downtown Eastside (DTES) residency (OR = 1.96, 95% CI: 1.56 – 2.46); incarceration (OR = 1.68, 95% CI: 1.28 – 2.21); sex trade involvement (OR = 1.59, 95% CI: 1.24 – 2.04); drug dealing (OR = 2.04, 95% CI: 1.62 – 2.58); and requiring help injecting (OR = 1.91, 95% CI: 1.47 – 2.49). Being married or common-law (OR = 0.76, 95% CI: 0.61 – 0.94) and current enrolment in a drug or alcohol treatment program (OR = 0.78, 95% CI: 0.63 – 0.99) were negatively associated with experiencing violence. Among women in the study, Aboriginal ethnicity and years injecting were not statistically associated with experiencing violence in bivariate analyses.

For males, the following variables were positively associated with experiencing violence: younger age (OR = 1.03, 95% CI: 1.02 – 1.04); mental illness (OR = 1.56, 95% CI: 1.33 – 1.83); alcohol use (OR = 1.39, 95% CI: 1.17 – 1.64); frequent heroin injection (OR = 1.57, 95% CI: 1.30 – 1.88); frequent cocaine injection (OR = 1.25, 95% CI: 1.04 – 1.51); frequent crack smoking (OR = 1.65, 95% CI: 1.39 – 1.96); homelessness (OR = 1.86, 95% CI: 1.48 – 2.35); DTES residency (OR = 1.59, 95% CI: 1.33 – 1.91); incarceration (OR = 1.77, 95% CI:

1.45 – 2.17); drug dealing (OR = 1.57, 95% CI: 1.29 – 1.91); and requiring help injecting (OR = 1.67, 95% CI: 1.36 – 2.06). Being married or common-law (OR = 0.79, 95% CI: 0.64 – 0.97) and years injecting (OR = 0.99, 95% CI: 0.97 – 1.00) were negatively associated with reported violence. Among men in the study, Aboriginal ethnicity, sex trade work, sexual abuse, binge drug use, and enrolment in any drug or alcohol treatment program were not statistically associated with experiencing violence in bivariate analyses.

The results of the multivariate GEE analyses are also shown in Tables 1 and 2 for females and males, respectively. For both sexes, mental illness (adjusted odds ratio for females [AOR_f] = 1.69, 95% CI_f: 1.35 – 2.10; adjusted odds ratio for males [AOR_m] = 1.54, 95% CI_m: 1.29 – 1.82), alcohol use (AOR_f = 1.49, 95% CI_f: 1.22 – 1.82; AOR_m = 1.42, 95% CI_m: 1.20 – 1.69), frequent crack smoking (AOR_f = 1.34, 95% CI_f: 1.04 – 1.73; AOR_m = 1.38, 95% CI_m: 1.15 – 1.65), homelessness (AOR_f = 1.43, 95% CI_f: 1.03 – 1.98; AOR_m = 1.53, 95% CI_m: 1.20 – 1.94), DTES residency (AOR_f = 1.48, 95% CI_f: 1.18 – 1.87; AOR_m = 1.38, 95% CI_m: 1.15 – 1.66), and requiring help injecting (AOR_f = 1.51, 95% CI_f: 1.15 – 1.99; AOR_m = 1.51, 95% CI_m: 1.22 – 1.87) were positively and independently associated with received violence. Predictors that were unique to females included binge drug use (AOR_f = 1.30, 95% CI_f: 1.03 – 1.65) and drug dealing (AOR_f = 1.42, 95% CI_f: 1.11 – 1.81). Predictors that were unique to males included: younger age (AOR_m = 1.02, 95% CI_m: 1.00 – 1.03); frequent heroin injection (AOR_m = 1.24, 95% CI_m: 1.02 – 1.51); and recent incarceration (AOR_m = 1.50, 95% CI_m: 1.22 – 1.84).

Acquaintances and strangers were the most commonly reported perpetrator of physical violence. As shown in Table 3, women were more likely than men to report being attacked by acquaintances (43.5% versus 37.0% of reports, $p = 0.017$), partners (5.2% vs. 2.6%, $p = 0.010$), and sex trade clients and workers (4.6% vs. 0.9%, $p < 0.001$), while men were more likely to report being attacked by strangers (40.7% vs. 31.7%, $p < 0.001$) and by the police (8.7% vs. 3.8%, $p < 0.001$). The most commonly reported type of attack for both genders was a beating (65.1% of reports from women and 61.1% of reports from men). Women were more likely to report being strangled (2.0% vs. 0.5%, $p = 0.014$) and physically threatened (2.4% vs. 0.4%, $p = 0.002$), while men were significantly more likely to report being attacked with weapons (22.6% versus 10.8%, $p < 0.001$).

4. Discussion

In the present study, we observed a very high prevalence of received physical violence among both male and female IDU. Similar proportions of men and women reported experiencing a recent violent attack at baseline (21% vs. 22%) and over the follow-up period (50% vs. 43%). These results are consistent with previous studies that have observed comparable overall rates of received violence among drug-using men and women (Chermack et al., 2001; Finlinson et al., 2003). In longitudinal multivariate analyses examining the risk factors associated with received violence, many similarities between sexes were observed. Mental illness, alcohol use, frequent crack smoking, homelessness, DTES residency, and requiring help injecting were positively and independently associated with experiencing violence for both sexes. Although many of the risk factors examined did not vary considerably by sex, several significant differences were observed. Factors that were positively and independently associated with violence for females included binge drug use and drug dealing, while risk factors unique to males included frequent heroin injection and recent incarceration. Several important gender differences were also observed when the perpetrator and nature of the violent experience were examined. Men were more likely to report being attacked by strangers and the police, while a greater proportion of women reported violence from acquaintances, partners, and individuals involved in the sex trade. Furthermore, men were significantly more likely to report being attacked with weapons, while women were more likely to report being strangled or physically threatened.

Consistent with other studies examining illicit drug use and violence (Martin and Bryant, 2001; Parker and Auerhahn, 1998), the frequent consumption of cocaine and heroin (i.e., the direct pharmacology of these substances) were poor predictors of experiencing violence among IDU. However, other drug-related factors more closely linked to the social and environmental characteristics of drug economies and substance use (e.g., drug dealing, requiring help injecting) were independently associated with experiencing violence and thus may play a larger role in the perpetuation of violence among IDU. An exception is the frequent smoking of crack, which was positively and independently associated with violence among both males and females. The association between daily women's crack use and violence has been noted in previous studies (Brewer et al., 2005; Vlahov et al., 1998; Wechsberg et al., 2003). Our results also suggest that frequent crack use is an equally strong predictor of experiencing violence among male IDU. Frequent alcohol use was also one of the strongest predictors of experiencing physical violence, with an adjusted odds ratio higher than that for frequent heroin, cocaine, or crack consumption. This finding is consistent with a previous study of HIV positive drug-using individuals that observed an association between recent received violence and alcohol use severity (Liebschutz et al., 2005).

Although the Goldstein tripartite model has been used extensively to understand the interaction of drugs and the expression of violence, we propose that the above results are better explained using a "risk environment" approach that accounts for the social, environmental and structural influences on violence and illicit drug use. Many factors that were associated with violence in our study appear to be closely related to the characteristics of the neighbourhood, physical environment, and social and economic context in which IDU are situated. For example, Downtown Eastside (DTES) residency was strongly and independently associated with received violence for both sexes. The DTES in Vancouver is one of the most economically disadvantaged neighbourhoods in Canada, and as such has the lowest per capita income of any urban region in the country (Statistics Canada, 1996). Homelessness, a common feature of this and many other impoverished neighbourhoods, has been recognized as a major determinant of poor health among IDU, including an elevated risk of HIV infection (Fisher et al., 1995; Rhodes et al., 2005; Zolopa et al., 1994). The observed association between homelessness and violence may be attributed to a variety of factors. First, individuals who are homeless are more susceptible to violence due to a lack of protective shelter. Second, homeless individuals may have to engage in income generation activities that carry increased risk for violence (e.g., petty crime, sex work) (Erickson, 2001; Johnson et al., 1985). Finally, homeless individuals are more likely to participate in the street-based drug economy (Fisher et al., 1995; Wechsberg et al., 2003), a culture which has been associated with the normalization of extreme levels of violence (Bourgois et al., 2004). Further research must be conducted to elucidate the multi-level factors that perpetuate both homelessness and violence within disadvantaged and drug using populations.

Risk environment theory also accounts for violence attributed to gender constructs which operate within unregulated drug-based cultures and economies (Rhodes et al., 2005). In elucidating the complex intersections of gender, HIV risk, and violence in the lives of injection drug using women, Epele (2002) has argued that gender inequality promotes HIV vulnerability as a consequence of multidimensional violence. The author argues that gender inequality results in both subordinated positions of women within the street-involved drug economy and precarious subsistence strategies such as sex trade work (Epele, 2002). In our study, we observed that drug dealing and binge drug use were positively associated with violence for women but not for men. These findings can be explained in terms of the social, economic, and structural gender inequalities described by Epele. For example, women are known to be systematically excluded from higher-level roles in the hierarchy of drug dealing due to a male-centered street ideology that enforces the perception that women should be denied power over resources derived from the illicit drug trade (Maher and Daly, 1996). Recent evidence has

suggested that this relegation of women to lower-level roles puts them at increased risk of violence and even death (Miller et al., 2007). We also postulate that the physical harms associated with sex trade work and its association with binge drug use may explain the connection between bingeing and exposure to violence among women in the cohort. Miller et al. (2006) have suggested that women on a binge may be more likely to encounter violence with “bad dates” due to lower selectivity of clients in an attempt to generate income quickly. Further research should be conducted to examine the multiple gender inequalities that perpetuate violence and HIV risk among injection drug using women who trade sex or deal drugs.

The finding that IDU who experience violence are more likely to require assistance injecting is of particular concern because violence may serve to compound the many other well-known harms associated with assisted injection, including risk for HIV infection (O’Connell et al., 2005; Wood et al., 2003). Recently, requiring assistance injecting has also been associated with injection in public (McKnight et al., 2007). Individuals injecting in public may be more distressed and agitated due to increased pressure to inject quickly in order to avoid police and other threats (Darke et al., 2001; Wood et al., 2004). Since IDU who inject in public are susceptible to and feel threatened by street violence from police and other street predators (Small et al., 2007), our results provide further evidence that heavy enforcement in areas where public and assisted injection is known to occur may only serve to increase the likelihood of violence and assault against IDU. Additionally, requiring assistance injecting often involves compensation to the individual who assists with the injection (i.e., a “hit doctor”), and disputes over what constitutes appropriate compensation may explain why assisted injection is associated with experiencing violence (Fairbairn et al., 2006).

The finding that almost 4% of violent attacks reported by women and 9% of attacks reported by men were attributed to interactions with police indicates that police presence is a contributing factor to violent experiences among IDU in this setting. This finding is consistent with previous reports of police-related violence in the DTES (Human Rights Watch, 2003; Pivot Legal Society, 2004). Beyond the direct result of violent interactions with police, the presence of heavy enforcement within unregulated drug market environments may indirectly impact the incidence of violence through a number of mechanisms (Erickson, 2001; Kerr et al., 2005c). For example, although increased policing (“crackdowns”) has been a common tactic aimed at upsetting illegal drug markets and restoring public order, the success of such interventions are often time-limited and can be completely offset by displacement of drug markets into non-public locations or neighbouring areas (Kerr et al., 2005c). As a result of the displacement of established relationships within the drug economy, drug market enforcement has also been associated with increased violence and volatility among drug users and dealers (Brownstein et al., 2000; Goldstein, 1989; Maher and Dixon, 1999; Small et al., 2006). These results provide further support to the notion that heavy drug market enforcement interacts with and transforms various practices and social dynamics within the broader risk environment of IDU (Rhodes et al., 2005), and thereby constitutes a potential source of violence that adversely affects the health of this population.

These findings have significant implications for education and prevention initiatives, harm reduction programs, and the development of policies and laws. Principally, our results suggest that structural and other non-individual level interventions may be effective in reducing the risk of violence among both male and female IDU. For example, an important way to diminish the risk of violence associated with the consumption of illicit drugs within dangerous environments such as the street is the provision of monitored enclosed spaces where individuals may use pre-obtained illicit drugs under the supervision of health care providers, (e.g., supervised injection facilities). Within such facilities, the risk of physical violence is diminished because injections take place in a supervised environment free of threats posed by

police and street predators. Since our results also indicate that frequent crack use is associated with experiencing violence, the implementation of safer smoking facilities, where individuals may smoke crack while supervised by health care providers, is an additional micro-environmental intervention that may reduce the risk of experiencing violence (Shannon et al., 2006). Furthermore, since requiring assistance injecting was associated with experiencing violence for both sexes, permitting assisted injection at these facilities may also provide an opportunity for IDU to learn to self-inject, or to receive injections in an environment where the harms associated with this dangerous practice are reduced (Kerr et al., 2005b; Wood et al., 2003). In light of the observed association between violence and homelessness, increased programming to provide supportive housing and emergency shelters are urgently needed to diminish the risk of violence among IDU who lack affordable housing. Since severity (frequency and duration) of homelessness has in itself been associated with experiencing violence among homeless women (Wenzel et al., 2001), access to safe and stable shelter is likely a necessary component of any intervention seeking to address this issue. Furthermore, since involvement in the drug trade and street economy appears to carry greater risks for women, gender-focused programming that addresses the economic and educational disadvantage of injection drug using women should be a priority. Given that improved economic status and decreased financial dependence on male partners have been associated with reduced HIV-related risks among women elsewhere (Blankenship et al., 2006), we suggest that income support and vocational programming would carry other benefits in terms of reducing women's exposure to violence. And finally, given the evidence indicating that escalated prohibition and police enforcement increases the level of violence between police and drug users and between individuals within the street-based drug market (Erickson, 2001; Kerr et al., 2005c), continued reliance on such measures to minimize drug-related violence is not recommended. Health-focused policies, interventions, and evidence-based harm reduction programming that addresses the social, structural, and environmental inequalities so pervasive in the lives of injection drug users may ultimately be more successful in reducing the high levels of physical violence observed in this setting.

There are several limitations to the present study. First, we have restricted our analysis to experiencing violence among IDU and have therefore not considered violence perpetuated by women or men. Second, as with many other prospective cohort studies of IDU, VIDUS is not a random sample, and as such these findings may not generalize to other IDU populations. Third, this study relied on self-reported information and is hence susceptible to socially desirable reporting. In the present study, this may have led to an underestimation of the prevalence of violence or other stigmatized activities among either male or female IDU. Previous studies have indicated that in certain settings violence against women and/or violence against men can be underreported (Koss, 1992; Watkins and Bentovim, 1992; Watts and Zimmerman, 2002).

In summary, the results of our study suggest that violence is a common experience among male and female IDU in Vancouver. Susceptibility to violence among this population is moderated by gender, and is driven by a combination of factors. Although mental illness, frequent alcohol use and crack use were associated with violence, structural and environmental factors such as homelessness, DTES residency and recent incarceration were also strong predictors of experiencing physical violence in this population. We have argued that such results support the adoption of a risk environment approach, which posits that the *interaction* of environmental factors with individual-level determinants structures susceptibility to physical violence among IDU. Furthermore, we recommend that frameworks which seek to describe violence among IDU should be updated to reflect the gendered influences on the social and structural production of violence. These results also indicate that IDU who experience physical assault are among the most marginalized, and as such violence should be a primary area of focus for prevention and support services. Such interventions include safe and stable housing options, educational

and economic programming, reforms to drug enforcement strategies, and the expansion of harm reduction programs such as supervised injecting facilities.

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Table 1
Bivariate and multivariate GEE^a analysis of factors associated with received violence for females during follow-up (n = 444)

Characteristic	Unadjusted Odds Ratio (95% CI ^b)	p - value	Adjusted Odds Ratio (95% CI ^b)	p - value
Age (per year younger)	1.03 (1.01 – 1.05)	0.001	1.02 (1.00 – 1.03)	0.084
Aboriginal ethnicity (yes vs. no)	0.75 (0.56 – 1.01)	0.059		
Married (yes vs. no)	0.76 (0.61 – 0.94)	0.012	0.82 (0.66 – 1.03)	0.083
Mental illness [†] (yes vs. no)	1.64 (1.34 – 2.00)	< 0.001	1.69 (1.35 – 2.10)	< 0.001
Sexual abuse [†] (yes vs. no)	1.36 (1.10 – 1.69)	0.006	1.25 (0.99 – 1.58)	0.057
Years injecting (per year older)	0.99 (0.97 – 1.01)	0.271		
Alcohol use [†] (yes vs. no)	1.51 (1.25 – 1.83)	< 0.001	1.49 (1.22 – 1.82)	< 0.001
Frequent heroin injection [†] (> daily vs. < daily)	1.64 (1.29 – 2.10)	< 0.001	1.03 (0.78 – 1.36)	0.842
Frequent cocaine injection [†] (> daily vs. < daily)	1.28 (1.02 – 1.62)	0.037	0.91 (0.71 – 1.18)	0.483
Frequent crack smoking [†] (> daily vs. < daily)	1.85 (1.48 – 2.33)	< 0.001	1.34 (1.04 – 1.73)	0.023
Binge drug use [†] (yes vs. no)	1.60 (1.28 – 2.02)	< 0.001	1.30 (1.03 – 1.65)	0.027
Homelessness ^{††} (yes vs. no)	1.93 (1.43 – 2.62)	< 0.001	1.43 (1.03 – 1.98)	0.034
DTEs ^c residency ^{††} (yes vs. no)	1.96 (1.56 – 2.46)	< 0.001	1.48 (1.18 – 1.87)	0.001
Incarceration [†] (yes vs. no)	1.68 (1.28 – 2.21)	< 0.001	1.28 (0.96 – 1.72)	0.097
Sex trade involvement [†] (yes vs. no)	1.59 (1.24 – 2.04)	< 0.001	1.02 (0.78 – 1.33)	0.880
Drug dealing [†] (yes vs. no)	2.04 (1.62 – 2.58)	< 0.001	1.42 (1.11 – 1.81)	0.005
Any treatment ^{††} (yes vs. no)	0.78 (0.63 – 0.99)	0.037	0.82 (0.65 – 1.03)	0.089
Require help injecting [†] (yes vs. no)	1.91 (1.47 – 2.49)	< 0.001	1.51 (1.15 – 1.99)	0.003

^aGEE = Generalized Estimating Equation;

^bCI = Confidence Interval;

^cDTEs = Downtown Eastside;

[†]Denotes activities in the previous 6 months;

^{††}Denotes current activities;

^{*}Denotes lifetime history; all variables significant at $p < 0.05$ in bivariate GEE analyses were included in the multivariate GEE analysis.

Table 2

Bivariate and multivariate GEE^a analysis of factors associated with received violence for males during follow-up (n = 670)

Characteristic	Unadjusted Odds Ratio (95% CI ^b)	p - value	Adjusted Odds Ratio (95% CI ^b)	p - value
Age (per year younger)	1.03 (1.02 – 1.04)	< 0.001	1.02 (1.00 – 1.03)	0.015
Aboriginal ethnicity (yes vs. no)	0.79 (0.60 – 1.04)	0.090		
Married (yes vs. no)	0.79 (0.64 – 0.97)	0.025	0.84 (0.68 – 1.03)	0.098
Mental illness [†] (yes vs. no)	1.56 (1.33 – 1.83)	< 0.001	1.53 (1.29 – 1.82)	< 0.001
Sexual abuse [†] (yes vs. no)	1.23 (0.95 – 1.60)	0.109		
Years injecting (per year older)	0.99 (0.97 – 1.00)	0.011	1.00 (0.99 – 1.02)	0.960
Alcohol use [†] (yes vs. no)	1.39 (1.17 – 1.64)	< 0.001	1.42 (1.20 – 1.69)	< 0.001
Frequent heroin injection [†] (> daily vs. < daily)	1.57 (1.30 – 1.88)	< 0.001	1.24 (1.02 – 1.51)	0.029
Frequent cocaine injection [†] (> daily vs. < daily)	1.25 (1.04 – 1.51)	0.017	0.92 (0.75 – 1.13)	0.424
Frequent crack smoking [†] (> daily vs. < daily)	1.65 (1.39 – 1.96)	< 0.001	1.38 (1.15 – 1.65)	0.001
Binge drug use [†] (yes vs. no)	1.15 (0.94 – 1.42)	0.171		
Homelessness ^{††} (yes vs. no)	1.86 (1.48 – 2.35)	< 0.001	1.50 (1.20 – 1.94)	< 0.001
DTES ^c residency ^{††} (yes vs. no)	1.59 (1.33 – 1.91)	< 0.001	1.38 (1.15 – 1.66)	< 0.001
Incarceration [†] (yes vs. no)	1.77 (1.45 – 2.17)	< 0.001	1.50 (1.22 – 1.84)	< 0.001
Sex trade involvement (yes vs. no)	1.08 (0.71 – 1.63)	< 0.728		
Drug dealing [†] (yes vs. no)	1.57 (1.29 – 1.91)	< 0.001	1.20 (0.97 – 1.48)	0.099
Any treatment ^{††} (yes vs. no)	1.01 (0.85 – 1.20)	0.909		
Require help injecting [†] (yes vs. no)	1.67 (1.36 – 2.06)	< 0.001	1.51 (1.22 – 1.87)	< 0.001

^aGEE = Generalized Estimating Equation;

^bCI = Confidence Interval;

^cDTES = Downtown Eastside;

[†]Denotes activities in the previous 6 months;

^{††}Denotes current activities;

^{*}Denotes lifetime history; all variables significant at $p < 0.05$ in bivariate GEE analyses were included in the multivariate GEE analysis.

Table 3

Physical abuse characteristics by gender

Characteristic	Female (n = 501) [†]	Male (n = 929) [†]	p - value
Perpetrator of attack			
Stranger	159 (31.7%)	378 (40.7%)	< 0.001
Acquaintance	218 (43.5%)	344 (37.0%)	0.017
Partner	26 (5.2%)	24 (2.6%)	0.010
Friends/Family	22 (4.4%)	33 (3.6%)	0.431
Drug Dealer	18 (3.6%)	43 (4.6%)	0.355
Police	19 (3.8%)	81 (8.7%)	< 0.001
Sex trade client/worker	23 (4.6%)	8 (0.9%)	< 0.001
Other/Refused	16 (3.2%)	18 (1.9%)	0.137
Type of attack			
Beating	326 (65.1%)	568 (61.1%)	0.143
Attacked with weapons	54 (10.8%)	210 (22.6%)	< 0.001
Strangled	10 (2.0%)	5 (0.5%)	0.014
Attacked with a gun	4 (0.8%)	6 (0.6%)	0.747
Robbery	62 (12.4%)	110 (11.8%)	0.767
Physically threatened	12 (2.4%)	4 (0.4%)	0.002
Other/Refused	33 (6.6%)	26 (2.8%)	0.001

[†] Total number of reports of received violence over follow-up period. Fisher's exact test was used to compare proportions if one or more counts was less than or equal to five.

Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work[☆]

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Abstract

High rates of violence among street-level sex workers have been described across the globe, while in cities across Canada the disappearance and victimization of drug-using women in survival sex work is ongoing. Given the pervasive levels of violence faced by sex workers over the last decades, and extensive harm reduction and HIV prevention efforts operating in Vancouver, Canada, this research aimed to explore the role of social and structural violence and power relations in shaping the HIV risk environment and prevention practices of women in survival sex work. Through a participatory-action research project, a series of focus group discussions were conceptualized and co-facilitated by sex workers, community and research partners with a total of 46 women in early 2006. Based on thematic, content and theoretical analysis, the following key factors were seen to both directly and indirectly mediate women's agency and access to resources, and ability to practice HIV prevention and harm reduction: at the micro-level, boyfriends as pimps and the 'everyday violence' of bad dates; at the meso-level, a lack of safe places to take dates, and adverse impacts of local policing; and at the macro-level, dopesickness and the need to sell sex for drugs. Analysis of the narratives and daily lived experiences of women sex workers highlight the urgent need for a renewed HIV prevention strategy that moves beyond a solely individual-level focus to structural and environmental interventions, including legal reforms, that facilitate 'enabling environments' for HIV prevention.

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Introduction

"Well there's how many dead Native women? What do you think, right? I would think a lot of people think we're shit, right? Disposable" Aboriginal Sex Worker (SW) Respondent.

Alarming high rates of assault and victimization of street-level sex workers have been described across the globe (Goodyear & Cusick, 2007). In Vancouver,

Canada, the disappearance of over 60 women in street level sex work from the Downtown Eastside community, a larger number of whom were of First Nations' ancestry, and the current serial murder trials have garnered international attention, while in cities across Canada, the assault, violence and predation of sex workers is ongoing (Amnesty International, 2004; Cler-Cunningham & Christensen, 2001; Bowen, 2006). More recently, discussions at local, federal and international levels have focused on environmental and legal approaches to addressing the harms faced by sex workers (Goodyear & Cusick, 2007). In January of 2005 a Canadian parliamentary sub-committee traveled across the country speaking with various sex work groups and advocates in an effort to address Canada's prostitution laws (Betteridge, 2005). However the final report has been met with significant criticism for failing to provide recommendations that promote the safety of sex workers.

Although sex work itself has never been illegal in Canada, the contradictory laws governing prostitution mean that sex work operates within a largely prohibitive environment. In particular, the "communicating" provision, passed by the Federal Government in 1985 and designed to reduce the visible presence of street prostitution, prohibits the communication or solicitation for the purposes of sexual transaction in public spaces (Goodyear, Lowman, Fischer, & Green, 2005; Lowman, 2000, 2004). As well, the "bawdy-house" provisions (s.210 & 211) and procuring provision (s.212) prohibit living off the avails of prostitution, or operating a brothel, thus limiting survival sex workers' ability to work indoors in safer and quasi-supervised settings (PIVOT, 2004).

In Vancouver's Downtown Eastside, a community known for the largest and most heavily concentrated open illicit drug use scene in North America (Strathdee et al., 1997; Wood et al., 2002), female injection drug users, and in particular, Aboriginal women and youth, account for an overwhelming burden of new HIV infections (Craib et al., 2003; Miller et al., 2005). As well, women of Aboriginal ancestry are highly overrepresented among women in visible sex work across Canada (Amnesty International, 2004), with estimates in 2000 suggesting that close to 70% of women working in the lowest paying tracks in Vancouver were young, Aboriginal women (Culhane, 2003; Farley, Lynne, & Cotton, 2005). The complex vulnerabilities of Aboriginal women stem from a legacy of oppression and colonization and the multigenerational effects of social isolation, discrimination, entrenched poverty, and the residential school system (Culhane, 2003; Farley et al., 2005). Although several harm reduction and HIV prevention interventions have been adopted as part of the city's

drug policy response, including fixed site and mobile syringe exchange programs, a heroin maintenance trial and a medically supervised injection facility (City of Vancouver, 2005), gender-focused harm reduction and violence prevention targeting sex workers are largely absent (Cler-Cunningham & Christensen, 2001).

While several individual-level factors have been shown to elevate HIV and sexually transmitted infections (STI) risk among female substance users, such as requiring assistance to inject and unprotected sex with intimate partners (O'Connell et al., 2005; Spittal et al., 2002), a focus on individuals fails to elucidate the social, environmental and structural factors that mitigate HIV risk (Amaro & Raja, 2000; Quina, Harlow, Morokoff, & Saxon, 1997; Zierler & Krieger, 1997). In particular, research on substance use and violence suggests women are particularly vulnerable to transmission of HIV through gendered violence and power relations with their drug-using intimate partners that directly impact their ability to negotiate sexual and drug risk reduction. Despite extensive documentation of violence among substance-using women in their relations with intimate partners, there is limited contextual understanding of how gendered violence and power relations facilitate HIV risk among women in sex work transactions. Of particular importance are ethnographic works that have examined the lives of sex workers and experiences of violence (Maher, 1997; Nencel, 2001; Pyett & Warr, 1997), and yet the link to HIV prevention efforts has not been clearly delineated. In order to re-conceptualize a public health response beyond individual-level approaches, we need to consider how the 'lived experiences' of sex workers are mediated by and respond to structural and social level violence and power relations in the negotiation of sex work transactions.

Drawing on theoretical frameworks of HIV risk that move beyond an individual-level focus, a risk environment framework outlined by Rhodes (2002) is particularly useful for understanding the broader risk environment and re-conceptualizing public health responses (Latkin & Knowlton, 2005; Moore, 2004; Parker, Easton, & Klein, 2000). Rhodes, Singer, Bourgois, Friedman, and Strathdee (2005) define the risk environment as 'factors exogenous to the individual that interact to increase vulnerability to HIV infection', referring to space – both physical and social – in which risk is produced and reproduced. Environmental factors exogenous to the individual that interact to increase vulnerability to HIV are said to be operating at three levels; the micro- or interpersonal level, such as social norms; the meso-level of institutional or organizational responses; and the macro-level of core or distal causes

such as laws, policies and social inequalities that may interplay with micro- and meso-level factors to produce HIV risk.

Given the pervasive and escalating levels of violence faced by sex workers over the last decade (Amnesty International, 2004; Cler-Cunningham & Christensen, 2001), and the extensive harm reduction and HIV prevention efforts operating in this community (City of Vancouver, 2005), this research aimed to explore the role of social and structural violence and power relations in shaping the HIV risk environment and prevention practices of women in survival sex work through a participatory-action research (PAR) project. Through the co-construction of knowledge between sex workers, community and research partners, guided by feminist-driven PAR, we consider the way in which the narratives of the 'lived experiences' of sex workers can inform a renewed HIV prevention and policy strategy with this population.

Methods

The Maka Project is a community-based HIV prevention research partnership between the BC Centre for Excellence in HIV/AIDS and the Women's Information Safe Haven (WISH) Drop-In Centre Society. A detailed discussion of the development, process and methodologies of this partnership has been published elsewhere (Shannon et al., in press). Adhering to the principles of PAR (O'Neil, Elias, & Wastesicoot, 2005; Park, 1993), a team of survival sex workers were hired, trained and supported to play a key role in the project, from conceptualization to implementation and dissemination. Discussion group topic guides were developed through a collaborative process between sex workers and researchers, and all groups were co-facilitated by a sex worker.

A total of 46 participants participated in focus groups between December 2005 and March 2006. The mean age of women was 34 years and 57% self-identified as being of Aboriginal ancestry. In order to address concerns of anonymity and sensitivities surrounding the issues expressed by sex workers, further demographic information was not collected. Based on social mapping sessions facilitated by and with sex workers, strolls (working areas) were identified for recruitment and purposive sampling was used to invite women through experiential-led outreach (women with a lived experience of sex work). Sampling aimed to attain variation in sex, ethnicity, age, and sex work strolls. Although significant variation exists in both sex and gender of sex workers, in keeping with the mandate of the

community partner, the project works explicitly with self-identified women who engage in survival sex work and therefore only female and transgender women (male to female) were invited to participate. The topic guide was used to ensure that all relevant areas of experience were explored, including: definitions of sex work and boundaries of intimate and client relationships; how women define a "bad date"; what a safe environment for a date looks like; what circumstances most affect women's power and control with commercial partners; strategies women use to protect themselves; and the effectiveness of current HIV prevention and harm reduction programs. This research received ethical approval under the University of British Columbia/ Providence Health Research Ethics Review Board. Discussion groups lasted approximately 2 h, and all participants received Can\$25 for their expertise and time.

Participatory-action research (PAR) in public health and the co-construction of knowledge

Similar to recent literature of public health partnerships, this work was developed through a process of co-construction of knowledge in the negotiated space of sex workers, community and academic partners. This negotiated space, the "sociosanitary space", is a process inherent in participatory-action research and public health partnerships with marginalized populations as it seeks to confront and reduce power imbalances (Bernier, Rock, Roy, Bujold, & Potvin, 2006). This work is both guided and theoretically influenced by feminist-driven PAR, confronting conventional understanding of power and power relations through empowerment, knowledge co-construction, and the validation of 'lived experiences' of sex workers as knowledge (Reason, 1994). Bernier et al. (2006) argue that this transdisciplinary dialogue can propose new ends to public health, rather than applying standardized solutions to health disparities by outside experts.

Analysis of qualitative data

Discussion groups were audio-taped, transcribed verbatim and checked for accuracy. All data collected were analyzed to identify thematic content and patterns as they emerged, and the co-construction of women's narratives were validated by sex workers throughout the data collection phase, with initial findings from earlier interviews further explored in subsequent data collection/analysis. Discussion group data were initially coded based on key constructs, and a codebook was used to keep track of the coding scheme. Substantive

codes were then applied for categories/themes based on the initial codes. Transcripts were read through several times by sex workers, community, and research partners to ensure that codes and subsequent categories reflected the data accurately, as well as to examine any negative evidence.

To advance beyond thematic and content analysis and interpret our findings, we subsequently drew on the risk environment framework (Rhodes, 2002) and additional theoretical constructs of violence and power relations that emphasize the interconnectedness of various forms of violence — interpersonal, structural and symbolic. Interpersonal violence is also described as ‘everyday violence’ to describe the normalization of violence that renders it invisible due to its routine pervasiveness (Scheper-Hughes, 1996), such as the ongoing sexual and physical abuse faced by street-entrenched women (Bourgois, Prince, & Moss, 2004). Structural violence refers to political and economic inequality (Farmer, 1997), while symbolic violence refers to more silent female subordination imposed by male-centered street ideology (Epele, 2002; Bourdieu, 2001). In addition, against the dominant discourse of powerlessness and more traditional concepts of power, we subscribe to a broad understanding of power that considers micro-level decision making and individual agency, similar to that used in recent sex work studies (Kempadoo & Doezema, 1998; Nencel, 2001; Wojcicki & Malala, 2001). We explore the ways in which women’s micro-level decision-making practices are rational economic and coping strategies adopted in the face of social and structural level violence, and implications for policy and prevention efforts. As illustrated by Wojcicki’s and Malala’s (2001) ethnographic account of sex workers’ bargain for survival in Johannesburg, South Africa, this re-thinking of power does not discount structural inequities and disempowerment, but instead accords agency where it has been assumed to be absent. In doing so, we indirectly draw on a broad understanding of power described by Foucault (1981, p.91) as the ‘distribution of resources, the exercise of agency, and the institutionalization of social control in the production of social inequality’, as in Bourgois’ (1998) discussion of HIV risk among homeless heroin users in San Francisco. This relational understanding of power is developed in post-structural feminist critiques of institutionalized forms of social control that discipline bodies and govern individuals and the discursive production and control of sexuality (Foucault, 1981; Nencel, 2001; Weedon, 1987). This analysis is also well situated within post-structural critiques of public health and drug policy that consider the ways in which individuals

are governed through messages of self-regulation and risk-avoidance as a form of neoliberal governmentality (Moore, 2004; Peterson & Lupton, 1996).

Results

The following five key themes emerged from the narratives of sex workers and were seen to both directly and indirectly compromise women’s agency and control with dates and ability to practice HIV prevention and harm reduction: at the micro-level, boyfriends as pimps and the ‘everyday violence’ of bad dates; at the meso-level, a lack of safe places to take dates, and adverse impacts of local policing and; at the macro-level, ‘dope-sickness’ and the need to sell sex for drugs.

Micro-level

‘Boyfriends as pimps’

At the interpersonal level, women’s narratives documented gendered power relations of intimate partners in mitigating women’s working environment and self-protection with clients. Several women described their intimate partners as “glorified pimps”. While women described these relationships as intimate, attached to comfort, emotions and a sense of trust, these men also were seen to hold significant power over women’s sex work environment and transactions with clients. These relationships were all with drug-involved partners, particularly crack-using partnerships, with the male partner supplying the drugs and controlling supply and the women working to sustain the drug habit of both herself and her partner.

I would classify it as there are just three steps to going that way. First they [male partners] invite you in, they feed you...start giving you drugs and slowly, pretty soon you’re out there making drugs. And you have nowhere else to go because this person...comforts you. And, next thing you know, you’re working on the street for them. You know they’re there for you, you can sleep, there’s food in the fridge. And then, you’re sick [drugsick], [they] bring you some dope. And you know it just leads on...and the [next] thing you know you’re owned...No matter where you go they’ll be right there to find you.

For other women, these partners were initially more traditional boyfriends who transitioned to taking on more of a role of a pimp in their lives, either putting women on the streets or controlling their working behaviours.

A pimp will be somebody that takes your money away from you after you get it. But then you know, my boyfriend, I consider him a pimp now. Because I don't consider him a boyfriend anymore. It's past that... Because you know he's just there, waiting, pipe in hand, and then if you want to go home because you're tired, he's like, well maybe we should [wait for] the ugly blue van, he'll be by real quick, we can get another fifty bucks and we can go home... But then, I'm standing out there in the cold on the corner. While he's sitting, comfy [and] cozy in the bank machine watching me. And... it's like he's not a boyfriend any more. It's like a pimp.

While some women's drug-using intimate partners control the drug supply and related equipment, including when and how often women access and use drug use paraphernalia (pipes, cookers, syringes), there are also examples of how the partners would try to control aspects of their working environment and thereby limit women's agency, from waiting on the street for a woman, trying to keep track of a woman's income, to controlling HIV prevention practices by limiting the number of condoms available to a woman while working.

Yeah, it's like, he said he's in control of the condoms now. It was like, "Oh I got lots of condoms now you don't have to take any". It's like, "No I got some in my pocket." He said, "No, I'll take them here. You don't want to carry too many in your pocket." So he knows how many condoms I've got in my pocket. And, I'll come back and say, "Oh I'm out of condoms." "No, but you had two extra ones. What happened to the other ones?" You know, it's like "Well, what did you do between, or, where's the money?" It's like, "Come on man, give me a break, just". So it's like, you know, he's in control of the condoms.

While these narratives illustrate the role of boyfriends as pimps in reducing women's autonomy over their risk reduction practices and working environment with clients, these relationships are also emotional and economic coping strategies adopted by women for companionship and acquiring resources in the face of structural inequities.

'Everyday violence' of bad dates

The pervasiveness and commonplace sense of violence and victimization of women by clients, referred to as 'bad dates', and the feeling of a lack of response to, or criminalization of the abusive johns (unknown/one time clients) was seen to compromise women's

sense of control with a date and ability to practice HIV prevention. While bad dates may involve emotional harassment, fear and/or experience of physical or sexual violence, for many women in this community, bad dates are frequent and go largely unreported (Cler-Cunningham & Christensen, 2001).

The goal is the same [working on high track versus skid row]. So whether you get out of there alive, the violence doesn't matter.

I hear about so many women who have been infected with HIV during a bad date or been raped or molested...And these people, they get away with it.

I was raped five years ago. And he [a john] didn't use a condom...The trial took eighteen months. He was picked up immediately, so he stayed behind bars...He'd caught HIV, and he was trying to blame me. And his lawyer was trying to say I gave it to him. Yeah, he raped me and, yeah, it was my fault [sarcastic]. Sexist. It was just senseless. Because it wasn't a trial of rape, it was a trial of me being a heroin addict, me being on methadone... It got thrown out of court... they begged me to stay through with the trial and I couldn't do it anymore. I was just being looked at by everybody.

Women spoke of the inaction and delayed response taken in reference to over 60 women from Vancouver's Downtown Eastside who have gone missing during the last decade. This is in addition to the alarming number of women, primarily of First Nations' ancestry, who have gone missing in Northern region of the province, along a highway that runs between Prince George and Prince Rupert and has become known as the Highway of Tears. A symbolic violence of women as 'disposable' was particularly illustrated in the narratives of First Nations' women, and is reflective of the 'discourse of disposal' surrounding the missing women described by Lowman (2000).

There are so many girls going missing. Yeah, they're getting away with it.

We're the bottom of the barrel. Nobody will miss us.

Look at what happened to all the girls from the Pickton farm [the local farm where it is suspected that over 30 missing women were murdered]. Like you know that shouldn't have happened and, maybe if some of the resources would have been out there... I think these guys are way behind.

The everyday violence and ongoing fear of violence, feelings that abusive johns were frequently not criminalized,

and lack of protections offered by current policing, meant that women's ability to insist on condom use was severely compromised.

I think just going out there [working] takes a big risk whether you use a condom or not, I mean, gambling every time you go out.

If he don't want to use a condom, we're in extreme danger. I want to try to use one [condom], but the violence might ensue.

Within this intersection of everyday violence and HIV prevention practices, some women report prioritizing harm reduction practices by types of clients, asserting agency and control of resources on the one hand, and resulting in a trade-off of harms on the other. Other women described a sense of trust and comfort that was associated with a decreased fear of violence in their relations with regulars compared to johns. At the same time, this sense of trust, even intimacy, with regular clients, often men they have seen for several years was associated with decreased condom use. Other women reported not getting high with johns, while only using drugs with regular clients in an attempt to maintain control and decrease the risk of violence by johns.

Interviewer: *And is there any difference in sexual exchanges between a regular client and john?*

Yeah. You're more open, trust them [regulars] more right?...You know what your regular wants, right? You know what he likes. You know what turns him on. That's a regular, but a john. Just a stranger that picks you up and you just want to get it over and done with. But a regular you're comfortable with...

Interviewer: *Is there a difference in condom use between a regular client and a john?*

Yeah, you just use [condoms] with johns.

Yeah, they [regulars] figure you've already known them for years.

Interviewer: *So you won't get high with johns?*

No. Regulars I could, but somebody I don't know. Fuck that. I wouldn't allow them to give me a drink.

Meso-level

A lack of safe places to take dates

A lack of safe places to take dates due to the current legal framework was described by several women as

a direct structural barrier to HIV prevention by limiting their control with dates, increasing the risk of violence and reducing their ability to negotiate condom use. The most consistent theme documented in discussion groups was that once women enter a car, their ability to control their situation was severely compromised.

Well a good date is someone that you can get out of the car with after. We don't know how lucky we are. When they drive us back. You know and we take it for granted a little bit I think.

It just seems that once you're taken away in a car, your power and control are gone.

Some sex workers attempt to manage their risk environment through both, informally and formally, working in pairs or using another worker to 'spot' for them. Recent sex worker-led efforts in this community have advocated the practice of 'spotting' as a safety initiative, in which a 'spotter' takes down information about the john, description of the car and license plate number, as well as having their presence act as a deterrent for violence.

And you know how sometimes you can go in pairs. Right? Like the two of you, and like you have one keeping six [watching for cops]...And then you write the license [plate number]. And whoever breaks first, right, you know they'll be gone and they'll do theirs, and then you can switch.

Despite the positive aspects of spotting described by some women, another woman described the limitations of using a spotter within the current working environment, as once a woman enters a car her means of self-protection is severely limited.

They [spotters] can take the license plate down and the car make, but once buddy gets you two blocks away, how are they going to stop the guy from shooting or stabbing you? They might prevent it from happening to the next girl, cause they got his plate number, but for you, there's no protection. None at all.

Local policing and displacement

Frequent police crackdowns and enforcement-based policies on drug use have been documented in this setting and shown to have adverse effects on syringe acquisition and safer drug use practices (Amnesty International, 2004; Small, Kerr, Charette, Schechter, & Spittal, 2005; Wood et al., 2003), including rights violations and unlawful harassment by police, particularly

women (Amnesty International, 2004; Csete & Cohen, 2003). The narratives of sex workers document the adverse impacts of local policing strategies and enforcement of the “communicating” provision; pushing women to work in dark and deserted areas, alleys and industrial settings, severely limiting women’s means of self-protection with clients and acting as a direct structural barrier to HIV prevention practices.

You know, you get all these asshole cops and security kicking us off... pushing us into darker and darker areas, you know. That has got to stop.

Well industrial areas are kind of scary, because no one’s really around and you’ve got to go there with dates that were like, [let’s go] into a residential neighbourhood, and I’m like, ‘No, I don’t want to go into the neighbourhood, where you’re gonna park in front of someone’s house and they got kids. It just don’t feel right, So I’m like ‘Come down to the dock’.

In this instance, the industrial areas are part of the loading docks along the waterfront in Vancouver. In addition to displacement, women describe three sets of distinct experiences with police that spoke of a heterogeneity in women’s experiences with police. While some women reported direct harms and power imbalances in relations with police, others reported indirect harm through displacement of working areas, and a dispassion or apathy for sex worker’s experiences, and in a third instance, women described attempts by police to help through a safety initiative.

And down here...believe me the cops are assholes too, man. They’ll pick [you] up... and then they’ll make you do something for them just so you can stay there to work. And that’s more or less their turf...

And if girls complain to the cops...they’ll pick you up and take you somewhere else and fucking leave you there.

And certain women will have a line with the police that they worked on over the years.

Yeah. It’s ...never mentioned in the paper, never mentioned in the bad date sheets or nothing, you know, it’s just all through mouth. And a lot of these girls are just scared to speak up. So it’s, like. The cops got a lot of power...Early mornings, that’s when they really get out there.

For some women the interactions with police, and in particular the gendered power dynamics that characterized

these interactions, were a direct threat to women’s safety, while other women spoke of a lack of concern for women. As well, the practice of “being jacked up” by police and having equipment confiscated was reported by some women as a deterrent to carrying condoms, pepper spray, syringes, or other drug use paraphernalia.

The police never do anything. They don’t really give a shit. They’re not out to get us, but they don’t really have any compassion or concern about us. A lot of us girls start carrying pepper spray or bear spray. But you have to be careful too, because as soon as the cops search you, jack you up, they take away what you can to protect yourself with, even rigs.

In reference to a safety initiative piloted in the community mobile phones were distributed (by the police) to women with a direct line to emergency services. This safety initiative followed widespread concern and scrutiny surrounding the delayed response to the missing women of Vancouver and the inception of the Missing Women’s Task Force in 1999.

Like the cops were handing out those phones that, they only had one number and it was 911 [emergency services]. Just one button. And it had a homing device or something like that, but that didn’t really work that good either. Cause once buddy’s got you in the car, you’re fucked.

Macro-level

Dopesickness and the need to sell sex to obtain drugs

Women spoke of sex work as a means of daily survival and in particular, the role of dopesickness and the need to alleviate withdrawal symptoms that severely compromised their ability to control the situation and ensure the practice of HIV prevention behaviours. As described in the narratives, sex work in this population is a rational, economic strategy adopted by women to meet basic subsistent needs in the face of large scale social and structural inequities. Recent welfare cuts, and loss of low cost housing through demolition, urban renewal and gentrification, have led to increased rates of homelessness in this city. In addition, current welfare regulations only allow a person to legally earn up to Can\$500 a month before they are cut off social assistance.

And, like I said, we put ourselves in shitty situations when we’re sick, or we’re hungry, or we’re homeless.

Some of us women end up with diseases, 'cause we've gotta do what we do, to survive. I mean there's women out there who don't even do drugs and they're out there, you know, turning tricks, 'cause they can't afford to live... and they're collecting DBII [Disability Benefits]... It's pretty obvious there's not enough money, on social assistance. But if you have an addiction..it's just way worse, I mean, you got to put up with a lot of shit you wouldn't normally to support your habit. You know, especially if you're down sick or something, and you know what's gonna make you better. You'll do, just about anything to get better...With heroin it's way worse, when you're dopesick.

In addition to dopesickness among women who were opiate dependent, drug-induced vulnerability was also described within the context of disorientation and lack of control due to intensive cocaine use that impeded women's self-protection and ability to insist on condom use.

You're working and you don't have HIV. And a date goes, I don't want to use a condom. I'll pay you more money. The girl's at risk. And she doesn't know what he has. He could have gonorrhea or anything like that. And often they'll [johns] ask the ones [women] that are vulnerable. The ones that are out there, that are on coke. And that are obviously discombobulated, you know they can't control their bodies. Or you know, they're just scared...you can feel the fear. So, they usually prey, on those girls... 'Cause they're ruining somebody's body just to have sex without a condom. Just for one time.

Dopesickness and the need to sell sex for drugs were also seen to mediate the negotiation process of fees for dates, resulting in a decreased ability to practice HIV prevention. Fees for dates were largely driven by shifts in drug markets and in particular the introduction and widespread availability of smokeable crack cocaine (sold in smallest quantities of one rock or approximately Can\$5–10) over the last decades that significantly decreased the price women could charge for dates and increased competition between workers. The attempt to assert a minimum for sexual services or safer sex practices and maintain control of the negotiation process with clients was an important assertion of individual agency by one woman, while at the same time, described by others as mediated by macro-level factors of drug market prices and laws.

If I stick to my price, I am in control, but if I drop my price, he's in control.

Interviewer: How have prices of dates changed over the years then?

[It used to be] Ninety bucks of coke right? Now it's ten dollars [a rock] so girls do [dates] for ten bucks... So shifts in the drug market.

From when I started, five years, it's [prices] gone down big time, you know, and if you ask, you won't get more, right? Because they [clients] know they can get it down there, right? And sometimes I would be out for four or five hours and you'll take that twenty dollar date. Tell me you won't. You have to.

This shift in drug market prices and resulting decrease in fees for dates was also tied to a reduced ability among sex workers to regulate each other around prices and safe sex negotiation. This was particularly manifested in the growing numbers of women working, and in particular younger women and those new to the community who were often seen to be "undercutting" prices of dates. A more experienced worker described a sex worker protocol and regulation between workers that was no longer enforced due to drug market prices driving up competition for dates.

Years back now, workers used to keep each other in check, in line, especially people who were new.... They used to send them [new girls] regulars to make sure they didn't undercut or do dates without condoms, but the money was way better then.

Interviewer: How does being new to the community affect a woman's working environment?

You really don't know the protocol. You don't know the territory. You don't know who's who.

And nobody knows you right? And, whatever the john says, you do it, what he tells you to do, cause you don't know the ins and out of it.

And it's getting cheaper and cheaper throughout the years...I think if the girls started charging more then the guys wouldn't be asking, you know.

Well actually I am on one side and then there's this girl like less than ten feet away from me and she's saying two bucks. You know, right almost beside me.

Within the synergistic dynamic between sex work and addiction, and the immediacy of dopesickness, women highlighted the need for violence prevention and harm reduction initiatives specifically tailored to sex workers, as well as the need to consider alternative regulatory frameworks for illicit drugs.

Interviewer: *What does a safe environment look like for a date?*

If there was more safety set up and a controlled area, the girls would be safe.

And also, you have to realize that most of the girls are not going to quit drugs. They're going to be drug-addicted. If something is set up, you have to accommodate drug use, also. Like I said, in Amsterdam.

If heroin is legalized, it [would be] like dirt cheap. The only reason it's so expensive is cause it's illegal. Right, you know, and it's very unfortunate if somebody has to go sell their body just to support their drugs, right?

Interpretation

HIV prevention among substance-using sex workers in Canada has focused almost exclusively on individual-level strategies, including syringe exchange, condom distribution, and scaling up of HIV testing. However, this solely individualized prevention strategy assumes an autonomous agent is 'free' to choose to change a risky behaviour, described in post-structuralist critiques as a form of neoliberal governmentality (Moore, 2004; Weedon, 1987). Instead, the present study documents how pervasive, everyday violence and structural power relations experienced by women engaged in survival sex work mediate the negotiation process of risk reduction strategies, resulting in a heightened risk of HIV transmission. At the same time, the lived experiences and narratives of sex workers articulate how certain risky sexual and drug use practices are rational coping strategies in the face of large scale social and structural violence and as such, highlight the importance of active inclusion of sex workers experiences in redefining prevention policies and programs.

Adopting the risk environment framework helps us to understand how the daily lived experiences of sex workers can inform a re-conceptualized HIV prevention response that moves beyond individual-level strategies. Similar to a renewed drug policy (Moore, 2004; Rhodes, 2002), sex work policy needs to facilitate 'enabling environments' for HIV prevention through the removal of micro- (e.g., 'everyday violence' of bad dates), meso- (e.g., local policing strategies) and macro- (e.g., structural and economic inequities such as the need to sell sex for drugs) level barriers.

At the micro-level, the lived experiences of sex workers document several important attempts to assert

individual agency in the face of meso- and macro-level inequities and pervasive social and structural violence. In one important example, a younger worker spoke of the vulnerability of being new to the community and unaware of worker protocols, and thus agreeing to whatever a john would request. At the same time, however, other women discussed the importance of informal peer networks in managing their risk environment through regulating each other on prices charged for dates and safer sex practices, as well as working in pairs and spotting other workers. Women are inherently aware of the competition for prices, and the impact of other workers agreeing to provide sexual services at a lower price or without condoms. As such, the importance of public health policy that advocates and supports peer networks in regulating sex worker protocol and safe sex practices cannot be overstated. Environmental—structural support for sex worker networks (including sex worker unions and cooperatives) has been shown to play a key role in increasing condom use and reducing incidence of STI/HIV among commercial sex work populations in several developing countries through enhanced social capital and access to resources (Jana, Baus, Rotheram-Borus, & Newman, 2004; Parker et al., 2000).

At the meso-level, the lack of safe places to take dates and local policing resulted in displacement of sex workers to outlying areas increasing the risk of violence and reducing women's ability to practice risk reduction. As articulated by one sex worker, controlled areas should be set up and need to accommodate drug use. Regulated or managed sex work zones in Germany and the Netherlands have been shown to reduce rates of violence, increased access to health services, and support police targeting exploitation and violence (Sanders, 2007; Van Doorninck & Campbell, 2006), though the role of zero tolerance drug policies in these zones have not been investigated to date. Given significant evidence of the adverse impacts of zero tolerance drug policies in increasing concealment of drug use, risk practices, and redistribution of harm (Aitken, Moore, Higgs, Kelsall, & Kerger, 2002; Best, Strang, Beswick, & Gossop, 2001; Csete & Cohen, 2003; Maher & Dixon, 1999; Small et al., 2005), consideration of managed zones in this setting would need to build in support for reducing drug-related harms, rather than enforcement, and bridge communication between sex workers and police to ensure effective HIV prevention.

At the macro-level, the findings support the urgent need for legal policy reforms to Canada's prostitution laws and consider the negative impacts of continued

neglect (Goodyear et al., 2005; Lowman, 2000). Several countries have variations of decriminalized sex work environments that place the safety of sex workers first and have shown positive impacts in reducing the harms faced by sex workers (Doornick & Jacqueline, 1998; Jordan, 2005). Given the Canadian government's investment in the parliamentary sub-committee solicitation laws, and a recent legal report released in this community outlining a legal framework for a decriminalized sex work environment, decriminalization of sex work deserves greater attention and consideration (PIVOT, 2006). The striking overrepresentation of women of Aboriginal ancestry among those engaged in survival sex work in Canada, and the historical oppression and ongoing violence faced by this population, including symbolic violence of First Nations' women as 'disposable', highlights the need for Aboriginal-led interventions that mitigate trauma and support indigenous health strategies (Culhane, 2003; Walters & Simoni, 2002). Finally, as documented by women in this study, sex work in this population is a direct result and economic response to entrenched poverty, homelessness and addiction, and for many women, sex work serves as the only viable means to daily survival. Interventions need to address the paramount role of adequate and supportive housing, and access to detoxification and other drug treatment services. Interventions should also consider offering long-term, alternative economic opportunities to support transition out of survival sex work to sustain one's drug habit, as well as the potential benefits of expanded drug-maintenance therapy for this population.

There are several limitations of this study that should be taken into consideration when interpreting these findings. First, we recruited women who self-identified as having engaged in survival sex work and therefore, the experiences of women who exchange sex for money, drugs, shelter or other commodities, but do not identify as sex workers are not represented here. Second, although purposive sampling was used to attain a variation in background and demographics, the experiences of some women, in particular youth less than 19 years of age and transgendered women, were not adequately represented in the discussion groups.

This account of the daily lived experiences of survival sex workers highlights the intersections of micro-, meso- and macro-levels in producing and reproducing HIV risk among women. The findings suggest that public health strategies that fail to address social and structural violence and gendered power relations will continue to fall short in stemming the multiple harms, including a heavy HIV burden, faced by women. Environmental and structural approaches are urgently needed supported

by legal reforms to Canada's prostitution laws that put the safety of sex workers first and facilitate 'enabling environments' for HIV prevention.

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Survival Sex Work Involvement as a Primary Risk Factor for Hepatitis C Virus Acquisition in Drug-Using Youths in a Canadian Setting

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Objective: To examine whether there were differential rates of hepatitis C virus (HCV) incidence in injecting drug-using youths who did and did not report involvement in survival sex work.

Design: Data were derived from 2 prospective cohort studies of injecting drug users (May 1, 1996, to July 31, 2007). Analyses were restricted to HCV antibody-negative youths who completed baseline and at least 1 follow-up assessment.

Setting: Vancouver, British Columbia, Canada.

Participants: Of 3074 injecting drug users, 364 (11.8%) were youths (aged 14-24 years) with a median age of 21.3 years and a duration of injecting drug use of 3 years.

Main Exposure: Survival sex work involvement.

Main Outcome Measure: The Kaplan-Meier method and Cox proportional hazards regression were used to

compare HCV incidence among youths who did and did not report survival sex work.

Results: Baseline HCV prevalence was 51%, with youths involved in survival sex work significantly more likely to be HCV antibody positive (60% vs 44%; $P = .002$). In baseline HCV antibody-negative youths, the cumulative HCV incidence at 36 months was significantly higher in those involved in survival sex work (68.4% vs 38.8%; $P < .001$). The HCV incidence density was 36.8 (95% confidence interval [CI], 24.2-53.5) per 100 person-years in youths reporting survival sex work involvement at baseline compared with 14.1 (9.4-20.3) per 100 person-years in youths not reporting survival sex work. In multivariate Cox proportional hazards analyses, survival sex work was the strongest predictor of elevated HCV incidence (adjusted relative hazard, 2.30; 95% CI, 1.27-4.15).

Conclusion: This study calls attention to the critical need for evidence-based social and structural HCV prevention efforts that target youths engaged in survival sex work.

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ACCORDING TO RECENT World Health Organization estimates, more than 170 million people are infected with hepatitis C virus (HCV) worldwide,¹ with injecting drug use contributing to more than 90% of new infections. The HCV itself is associated with significant morbidity and mortality^{1,2} and has also recently been shown to be an important biomarker for evolving human immunodeficiency virus (HIV) epidemics in injecting drug users (IDUs).³ Sharing of used syringes remains the primary mode of HCV transmission.^{1,2} There is also some evidence to suggest that sharing of other injection and noninjection paraphernalia, such as filters and cookers, may increase the risk of transmission.^{4,7}

It is estimated that most HCV infections occur early in an IDU's career due to high transmissibility of the HCV and increased risky drug use practices in young

IDUs.⁸⁻¹¹ Among street-involved youths who inject drugs, the HCV incidence ranges from 10 to 36 per 100 person-years.^{8,12} Although youths who inject drugs represent a crucial window for targeted prevention efforts, the epidemiologic features of HCV among this population remain poorly defined.

As a highly marginalized population, street youths experience heightened rates of homelessness, mental illness, drug-related harms, violence, sexual exploitation, and premature mortality.^{13,14} Recent evidence¹⁵⁻¹⁷ suggests significant potential for increased drug-related harm in street youths who exchange sex for survival due to heightened risk environments, poorer access to services, and increased concurrency of sex and drug use partners. Research in female and transgender sex workers in Vancouver, British Columbia, Canada, has demonstrated that enforcement of criminalized prostitution

legislation, including prohibitions on soliciting in public spaces, displaces younger sex workers to more isolated spaces away from health services and syringe exchange programs,¹⁸ reduces sex workers' ability to negotiate condom use,¹⁹ and increases the odds of physical and sexual violence.²⁰ Given the rapid acquisition of HCV and the urgent need to identify highly susceptible subgroups of youths and new injecting initiates,^{8,11,12} coupled with growing concern of harms in young IDUs who exchange sex, we sought to prospectively examine the HCV incidence during a 10-year period in youths who did and did not report involvement in survival sex work.

METHODS

Data were derived through a collaboration between 2 prospective cohort studies of IDUs in Vancouver: (1) the Vancouver Injection Drug Users Study (VIDUS), an ongoing open prospective cohort study initiated in 1996 through snowball sampling methods and targeted outreach at local services (eg, syringe exchange programs),²¹ and (2) the Scientific Evaluation of Supervised Injecting (SEOSI) cohort, an ongoing open prospective cohort study initiated in 2003 through random sampling methods from Vancouver's supervised injecting facility.²² Both studies involved HCV antibody testing and interviewer-administered questionnaires at baseline and semi-annual follow-up. As previously reported,^{23,24} the follow-up procedures and questionnaire items were identical in both studies to allow for merging of the data sets. Both studies received ethical approval from the University of British Columbia/Providence Healthcare Research Ethics Board.

Analyses were restricted to youths (aged 14-24 years) recruited between May 1, 1996, and July 31, 2007. The definition of youth was based on Centers for Disease Control and Prevention guidelines for HCV prevention.²⁵ For these analyses, and consistent with previous work,^{23,24} youths who were recruited into both cohorts were retained only in the cohort in which they were first enrolled. Because these 2 cohorts share research office space and outreach staff, there were no cases in which youths were lost to follow-up in one study but maintained in the other.

The HCV incidence rates were compared in youths who did and did not report involvement in survival sex work. Survival sex work was defined as exchanging sex for money, drugs, shelter, or other commodities in the previous 6 months.⁶ Analyses were restricted to youths who were HCV antibody negative at baseline and who had at least 1 follow-up visit. Variables considered based on an a priori-defined statistical protocol for HCV incidence were age; sex; ethnicity; unstable housing; residency in the IDU epicenter (Vancouver's Downtown Eastside); daily heroin, cocaine, and crystal methamphetamine injection; daily crack cocaine smoking; receptive syringe sharing; and unprotected sex (inconsistent condom use for vaginal or anal sex). Given evidence of an elevated burden of HIV infection in individuals of Aboriginal ancestry,²³ ethnicity was categorized as self-identified as Aboriginal vs non-Aboriginal. All variable definitions were consistent with those used in earlier studies^{21,23} and refer to the 6 months before the interview.

KAPLAN-MEIER ANALYSES

Cumulative HCV incidence was calculated for youths who did and did not report survival sex work at baseline. As previously noted,⁶ the date of HCV seroconversion was estimated to be the midpoint between the last negative and the first positive

antibody test results. Participants who remained persistently HCV seronegative were right censored at the time of their most recent available HCV antibody test result before July 31, 2007. Time zero for all prospective analyses was the date of recruitment into the respective cohorts.

COX PROPORTIONAL HAZARDS REGRESSION ANALYSES

Unadjusted and adjusted relative hazards (RHs) of HCV seroconversion were calculated using Cox proportional hazards regression. All variables, including survival sex work, were treated as time-updated covariates on the basis of semiannual follow-up data. Kuyper et al^{26,27} demonstrated that less than 5% of IDUs engaged in sex work in this cohort had ceased sex work at a subsequent follow-up visit, suggesting that sex work is a persistent resource acquisition strategy for this population. For the multivariate model, a fixed model was built that adjusted for all variables that retained statistical significance at $P < .05$ in unadjusted analyses and for cohort of recruitment. Given the concern of differences in risk for HCV acquisition by age, we conducted stratified models by age group (14-19 years and 20-24 years) to calculate RHs of HCV seroconversion using Cox proportional hazards regression.

RESULTS

During the study, 3074 IDUs were recruited into either the VIDUS or the SEOSI, of whom 364 (11.8%) met the Centers for Disease Control and Prevention definition of youth (14-24 years old).²⁵ No differences were noted in the demographic characteristics or risk factors between youths included in the analyses and those lost to follow-up. Baseline HCV prevalence was 51%. Youths reporting survival sex work at baseline were significantly more likely to have positive HCV test results compared with those not reporting survival sex work (60% vs 44%, $P = .002$). Median participant age was 21.3 years (interquartile range, 19.5-22.7 years), with no differences in age by survival sex work involvement ($P = .35$). No differences in survival sex work were observed by sex, consistent with earlier work^{26,27} demonstrating close to identical risk factors for survival sex work in male and female IDUs in this cohort.

Of the 179 youths who were HCV negative at baseline, 127 (70.9%) had at least 1 follow-up visit. As of July 31, 2007, 56 HCV seroconversions were observed, yielding an incidence density of 20.1 (95% confidence interval [CI], 15.2-26.1) per 100 person-years. There was no difference in duration of IDU by HCV seroconversion ($P = .19$).

The Kaplan-Meier cumulative HCV incidence after 36 months of follow-up was 68.4% in those who reported survival sex work at baseline compared with 38.8% in those who did not (log-rank $P < .001$) (**Figure**). As of July 31, 2007, the HCV incidence density in youths engaged in survival sex work at baseline was 36.8 (95% CI, 24.2-53.5) per 100 person-years compared with 14.1 (9.4-20.3) per 100 person-years in those not engaged in survival sex work.

In unadjusted Cox regression analyses, the RH of HCV seroconversion for youths engaged in survival sex work was 3.04 (95% CI, 1.73-5.32) (**Table 1**). In analyses stratified by age group, the RH of HCV seroconversion

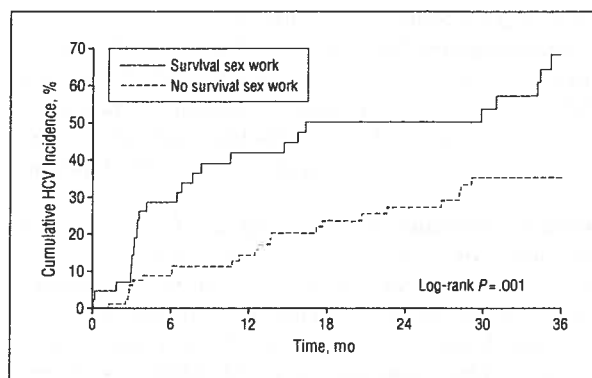


Figure. Cumulative hepatitis C virus (HCV) incidence in young injecting drug users (14-24 years old) by survival sex work involvement at baseline in Vancouver, British Columbia, Canada, 1996-2007.

for youths aged 14 to 19 years engaged in survival sex work was 2.94 (95% CI, 1.23-7.05) and for youths aged 20 to 24 years was 2.94 (1.28-6.74) (**Table 2**). In the final model, after adjustment for all variables significant at $P < .05$ in univariate analyses and for cohort of recruitment, survival sex work (RH=2.30; 95% CI, 1.27-4.15) and receptive syringe sharing (1.80; 1.00-3.24) remained significantly associated with time to HCV infection (Table 1).

COMMENT

This study demonstrates a drastically elevated HCV incidence in youths engaged in survival sex work in a large Canadian city. Of particular concern, the cumulative HCV incidence reached 50% at 18 months of follow-up and close to 70% after 36 months of follow-up in HCV antibody-negative youths involved in survival sex work.

Although there is conflicting evidence regarding the potential for sexual HCV transmission, it remains a relatively ineffective mode of transmission.²⁸ Instead, the elevated HCV incidence in youths engaged in survival sex work herein likely reflects differing social networks or risk environment of injection whereby barriers to accessing clean syringes or HCV prevalence in those lending syringes is higher. For example, ubiquitous interpersonal relationships among IDUs, including the formation of drug-using sexual partnerships and the collusion of money for drug procurement with sex partners, have been shown to elevate the HCV incidence.¹² Evidence suggests that drug-using youths involved in survival sex work have even greater overlap in their sexual and drug use networks and are more likely to have older intimate partners who control access to and preparation of drugs, thereby reducing their ability to negotiate safer injecting practices.²⁹⁻³⁴ These findings warrant consideration of HCV interventions that target sexual partnerships and transactions as key sites of drug risk management in youths.³¹

This study offers the first longitudinal analysis demonstrating survival sex as a primary risk factor for HCV acquisition in drug-using youths. Of concern given the established synergistic link between HIV and HCV epidemics,³ the Bush administration's legal ban on access

Table 1. Cox Proportional Hazards Regression Analysis of Time to HCV Infection in Young IDUs (Aged 14-24 Years) in Vancouver, British Columbia, Canada

	Relative Hazard (95% Confidence Interval)	
	Unadjusted	Adjusted ^a
Age	0.94 (0.84-1.05)	NA
Female sex	1.39 (0.79-2.45)	NA
Aboriginal ethnicity	0.91 (0.45-1.82)	NA
Survival sex work ^b	3.04 (1.73-5.32)	2.30 (1.27-4.15)
Unstable housing ^b	1.99 (1.10-3.59)	1.34 (0.72-2.51)
Residing in IDU epicenter ^b	2.53 (1.42-4.49)	1.75 (0.93-3.26)
Unprotected sex (inconsistent condom use) ^b	0.98 (0.56-1.70)	NA
Receptive syringe sharing ^b	2.02 (1.14-3.57)	1.80 (1.00-3.24)
Daily heroin injection ^b	1.99 (1.12-3.55)	1.34 (0.73-2.45)
Daily cocaine injection ^b	2.18 (1.18-4.02)	1.52 (0.80-2.86)
Daily crystal methamphetamine injection ^b	0.45 (0.06-3.26)	NA
Daily crack cocaine smoking ^b	1.28 (0.71-2.33)	NA

Abbreviations: HCV, hepatitis C virus; IDU, injecting drug user; NA, not applicable.

^aAdjusted for cohort of recruitment and variables significant at $P < .05$ (ie, unstable housing, residing in an IDU epicenter, daily heroin injection, and daily cocaine injection).

^bRefers to behaviors and patterns in the past 6 months. All analyses were restricted to HCV-negative youths ($n=179$) who had at least 1 follow-up visit ($n=127$).

Table 2. Relative Hazards of Time to HCV Infection in Young IDUs Stratified by Age Group

	Unadjusted Relative Hazard (95% Confidence Interval)	
	Youths Aged 14-19 y	Youths Aged 20-24 y
Age	1.17 (0.78-1.75)	0.91 (0.65-1.28)
Female sex	0.63 (0.26-1.57)	2.11 (0.96-4.67)
Aboriginal ethnicity	0.44 (0.10-1.87)	1.61 (0.69-3.74)
Survival sex work ^a	2.94 (1.23-7.05)	2.94 (1.28-6.74)
Unstable housing ^a	2.14 (0.88-5.21)	1.46 (0.63-3.36)
Residing in IDU epicenter ^a	2.09 (0.86-5.04)	4.06 (1.59-10.36)
Unprotected sex (inconsistent condom use) ^a	1.67 (0.70-3.98)	0.80 (0.36-1.79)
Receptive syringe sharing ^a	2.75 (1.07-7.10)	1.75 (0.76-4.02)
Daily heroin injection ^a	1.32 (0.52-3.37)	1.90 (0.85-4.25)
Daily cocaine injection ^a	1.23 (0.47-3.20)	3.00 (1.19-7.40)
Daily crystal methamphetamine injection ^a	1.21 (0.16-9.19)	0.38 (0.05-2.80)
Daily crack cocaine smoking ^a	0.85 (0.29-2.54)	1.52 (0.67-3.47)

Abbreviations: HCV, hepatitis C virus; IDU, injecting drug user.

^aRefers to behaviors and patterns in the past 6 months. All analyses were restricted to HCV-negative youths ($n=179$) who had at least 1 follow-up visit ($n=127$).

to global HIV research and intervention funding targeting individuals engaged in sex work, known as the "antiproststitution pledge," was retained in Congress' renewal of the President's Emergency Plan for AIDS Relief in August 2008.³¹ The failure to base public health policy on scientific evidence continues to challenge prevention and resource capacity targeting blood-borne transmission in vulnerable youths.^{35,36} Furthermore, al-

though growing evidence demonstrates the critical role of social and structural interventions in promoting risk reduction in sex workers in developing country settings and indoor sex work establishments,^{15,37,38} there continues to be limited evaluation of these strategies in street-involved sex workers and those in developed country settings. Evidence-based strategies to mitigate harms among sex workers, supported by World Health Organization best practices,^{15,37,39} include the removal of criminal sanctions that target sex workers and clients, structural support for peer sex work networks that regulate safer industry practices (eg, occupational health and safety standards), and safer-environment interventions, such as managed indoor spaces and regulated nonharassment zones close to health and harm reduction services.

The present longitudinal evaluation of HCV incidence extends earlier trends observed in younger adult IDUs (18-30 years old) between 2000 and 2001¹² and in older, longer-term IDUs.⁴⁰ A preliminary HCV incidence study⁸ (1996-2000) in young IDUs in the VIDUS cohort found no relationship with engagement in survival sex work in this setting. Similarly, although survival sex work predicted HIV acquisition in earlier unadjusted analyses, we found no significant relationship in the final model.⁴¹ Subsequent longitudinal follow-up during an additional 7 years supported by the merging of 2 IDU cohorts has enabled further prospective analyses of factors that predict HCV seroconversion in street-involved youths who inject drugs.

Several limitations need to be considered. First, self-reported practices, particularly stigmatized behaviors, may be subject to social desirability bias. However, any underestimation of survival sex work would likely have attenuated the effect size toward the null. Second, although there are always concerns of generalizability because of the inability to recruit a random sample of IDUs, sample demographics between the cohorts were consistent with the general IDU population in Vancouver.^{23,24} Third, differing recruitment methods and times of initiation were used to derive the VIDUS and SEOSI cohorts,^{21,22} and there is a possibility that risk factors for HCV changed across time. Consistent with earlier work,^{23,24} we sought to address this by adjusting for cohort of recruitment. Fourth, our reliance on HCV antibody testing may have overestimated rates of chronic HCV infection. Fifth, it is possible that in some cases, HCV RNA was present at the visit before antibody seroconversion due to the 60-day delay in detectable HCV RNA antibody. If this were the case, time to HCV incidence would have been shorter than we reported. However, there is no reason to suggest that either of these cases would be different for youths who do and do not exchange sex.

In summary, this study demonstrates markedly elevated baseline HCV prevalence and subsequent HCV incidence in youths involved in survival sex work. Given the brief window of opportunity for HCV prevention in highly susceptible youths, this study calls attention to a critical need for evidence-based social and structural prevention, including evaluation of legal policy reforms, that targets youths engaged in survival sex work and suggests that legal barriers to intervention be reconsidered.³¹

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Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers

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ABSTRACT

Objective To examine the prevalence and structural correlates of gender based violence against female sex workers in an environment of criminalised prostitution.

Design Prospective observational study.

Setting Vancouver, Canada during 2006-8.

Participants Female sex workers 14 years of age or older (inclusive of transgender women) who used illicit drugs (excluding marijuana) and engaged in street level sex work.

Main outcome measure Self reported gender based violence.

Results Of 267 female sex workers invited to participate, 251 women returned to the study office and consented to participate (response rate of 94%). Analyses were based on 237 female sex workers who completed a baseline visit and at least one follow-up visit. Of these 237 female sex workers, 57% experienced gender based violence over an 18 month follow-up period. In multivariate models adjusted for individual and interpersonal risk practices, the following structural factors were independently correlated with violence against female sex workers: homelessness (adjusted odds ratio for physical violence (aOR_{physicalviolence}) 2.14, 95% confidence interval 1.34 to 3.43; adjusted odds ratio for rape (aOR_{rape}) 1.73, 1.09 to 3.12); inability to access drug treatment (adjusted odds ratio for client violence (aOR_{clientviolence}) 2.13, 1.26 to 3.62; aOR_{physicalviolence} 1.96, 1.03 to 3.43); servicing clients in cars or public spaces (aOR_{clientviolence} 1.50, 1.08 to 2.57); prior assault by police (aOR_{clientviolence} 3.45, 1.98 to 6.02; aOR_{rape} 2.61, 1.32 to 5.16); confiscation of drug use paraphernalia by police without arrest (aOR_{physicalviolence} 1.50, 1.02 to 2.41); and moving working areas away from main streets owing to policing (aOR_{clientviolence} 2.13, 1.26 to 3.62).

Conclusions Our results demonstrate an alarming prevalence of gender based violence against female sex workers. The structural factors of criminalisation, homelessness, and poor availability of drug treatment independently correlated with gender based violence against street based female sex workers. Socio-legal policy reforms, improved access to housing and drug treatment, and scale up of violence prevention efforts, including police-sex worker partnerships, will be crucial to stemming violence against female sex workers.

INTRODUCTION

Rights violations and abuses experienced by female sex workers are seldom considered in discussions of violence against women, as shown by a review of the global scope and magnitude of gender based violence.¹ The United Nations Convention on the Elimination of All Forms of Discrimination against Women defined the term "gender based abuse" as "any act of gender based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion, or arbitrary deprivation of liberty, whether occurring in public or in private life."² This definition encompasses rape, torture, mutilation, sexual slavery, forced impregnation, and murder, and distinguishes male perpetrated violence against women from other non-gender based forms of violence. Gender based violence has been recognised as a global public health and human rights problem that leads to high rates of morbidity and mortality, including gynaecological problems, sexually transmitted infections, depression, post-traumatic stress disorder, substance dependence, suicide, and mortality.³⁻⁵

Despite extensive evidence documenting the severe adverse health outcomes associated with gender based violence, our understanding of the magnitude of violence against women has been largely drawn from data on partner violence.^{1,4,5} Additionally, although individual and interpersonal correlates of gender based violence have been well described, there are no empirical models that account for larger structural inequities that could promote gender based violence.

Of particular concern is the fact that gender based violence and gender inequity have increasingly been cited as important determinants of a woman's risk of HIV infection.^{4,6,7} Among drug involved and sex work populations, violence has been associated with an elevated likelihood of acquiring sexually transmitted infections or HIV through unprotected sex, the exchange of sex for drugs or money, multiple concurrent sex partnerships, and sex with a risky partner (for example, a partner positive for antibodies to HIV or a partner who has multiple sex partners).^{8,9} Furthermore, the synergistic relationship between crack cocaine smoking and survival sex among female sex workers

has been shown to exacerbate violence and exploitation against women and increase the risk of acquiring sexually transmitted infections or HIV, resulting in reduced control of female sex workers over the negotiation of HIV risk reduction practices with clients.¹⁰

In 2002, the Joint United Nations Programme on HIV/AIDS (UNAIDS) called for the decriminalisation of sex work, recognising the longstanding promotion by public health advocates and sex workers of safer working conditions and protection from violence.¹¹ Although UNAIDS retreated from this endorsement in 2007,¹² the UN secretary general, Ban Ki-moon, reconfirmed the organisation's position against punitive sanctions targeting sex workers at the UN High-level Meeting on HIV/AIDS in June 2008. Despite these policy statements, many countries, including Canada and the UK, continue to promote conflicting sex work regulations that maintain the buying and selling of sexual services as legal but criminalise soliciting for sexual services in public spaces, living off the benefits of prostitution, and working indoors in managed or cooperative settings (for example, brothels).¹³⁻¹⁶ Enforcement of these criminal sanctions has been shown to create "tolerance zones" in outlying and isolated public spaces that are then subject to police crackdowns and unwritten rules of engagement between police, clients, and sex workers. Importantly, a growing body of qualitative evidence has documented the adverse impact of street policing strategies on the health and safety of female sex workers¹⁷⁻²¹; and yet, there has been no empirical investigation to date evaluating the relationship of criminalisation and enforcement based policing strategies with the likelihood of violence against female sex workers.

In Canada over the past two decades, urban centres have experienced epidemics of violence against street based female sex workers that have been posited to coincide with prohibitive policy changes and enforcement based strategies, such as police crackdowns.¹³⁻¹⁵ A study in Vancouver, British Columbia, of women who used injection drugs between 1996 and 2002, the majority of whom were in street based work, showed a 47-fold higher likelihood of mortality in this group compared with an age matched sample of the general population, with homicide being the most common cause of death.²² Widespread scrutiny over the delayed response by police and the judicial system to the deaths of female sex workers led to an extensive police investigation of over 69 women missing from the streets of Vancouver and the inception of the Missing Women's Task Force in 1999, which was estimated to have cost more than \$C116 million (£65 million; €75 million; \$107 million) by the end of 2007.²³

This study aims to identify the prevalence and structural correlates of violence against female sex workers by using longitudinal data derived from a prospective cohort of street based female sex workers in Vancouver, Canada. Given that sexual and physical violence have been shown to be conceptually different,⁶ we further hypothesised that client perpetrated violence would be conceptually unique owing to the specific

context of a sexual transaction; therefore, three separate violence experiences—physical, sexual, and client perpetrated—were modelled separately.

METHODS

The Maka Project is a community based HIV prevention research partnership that has been described in detail elsewhere.²⁴ Briefly, between 2006 and 2008, street based female sex workers were enrolled in an open prospective cohort and participated in baseline and six monthly follow-up visits that included an interview questionnaire and voluntary screening for HIV. On the basis of previous research that identified 100% substance use among street based female sex workers in Vancouver,²⁵ eligibility criteria were defined as being a woman aged 14 years or older who used illicit drugs (excluding marijuana) and engaged in street level sex work. Determining a representative sample of female sex workers is difficult owing to the unknown size and boundaries of this population; therefore, we mapped areas with over 60 female sex workers and identified solicitation spaces for targeted outreach and recruitment. Time space sampling was used to systematically sample all women (inclusive of transgender women) at staggered times and locations in these solicitation areas.²⁶

At baseline and follow-up visits, trained peer researchers (that is, former and current female sex workers) administered a detailed semistructured questionnaire with questions related to demographics, health service use, working conditions, violence, and sexual and drug risk practices. In addition, voluntary HIV screening using the new point of care rapid INSTI test (bioLytical Laboratories, Richmond, BC, Canada; specificity 99.3%, sensitivity 99.6%) was conducted by the project nurse, supported by pre-test and post-test counselling. Tests positive for HIV antibodies were confirmed by Western blot. Detailed health and violence questions were then asked by the nurse in order to facilitate counselling and referral to support services.

Modelling

Dependent variables

Given that serial measures over three follow-up visits were available, we were able to analyse the data longitudinally. The following three categories of violence experiences perpetrated by men were considered at each six month interval and modelled separately: (a) physical violence ("Have you been physically abused by someone (excluding clients) in the last six months? This may include partner, pimp, dealer, police, security guard, stranger, or other"); (b) rape ("Have you been forced to have sex (penetrative) against your will (excluding clients) in the last six months?"); and (c) client perpetrated violence ("Have you experienced a 'bad date' in the last six months?"). Respondents who answered "yes" to having experienced a "bad date" in the past six months were asked to classify the incident (s) of violence into the following categories: verbal harassment; abduction or kidnapping; sexual assault; rape; strangling; physical assault or beating; assault with a weapon; being thrown out of moving car; or other.

Independent variables

Specific environmental and structural factors collected at baseline and follow-up visits were considered on the basis of evidence in the literature and relationships hypothesised *a priori*. These factors were: homelessness; having tried but been unable to access drug treatment; place of servicing client (car or outdoor public space compared with indoor settings (for example, hourly room, sauna)); and current and historical street policing strategies. Current policing variables (reported at baseline and at each six monthly follow-up visit) included confiscation of drug use paraphernalia without arrest and moving working areas away from main streets as a result of policing. Historical police assault was recorded as self reported police assault before first baseline visit (defined as self reported physical assault and/or having been forced to provide sexual favours to police). Although the majority of police officers in Canada are male, the interactions could have involved female police officers.

Individual variables considered as potential confounders owing to their known or hypothesised relationship with gender based violence and one or more independent variable(s) included age (defined as ≤ 24 years *v* > 24 years of age); ethnicity; HIV antibody status; and drug use patterns. Aboriginal ethnicity (for example, First Nation, Métis, Inuit) compared with non-Aboriginal ethnicity was considered owing to evidence of an elevated prevalence of trauma among Aboriginal people. HIV antibody status was based on HIV screening results at each study visit. Similar to previous analyses,²⁵ drug use patterns included any cocaine or heroin injection, crystal methamphetamine use (injection or non-injection), or crack cocaine smoking.

Five risky interpersonal practices were also considered as potential confounders owing to their known or hypothesised relationship with gender based violence and one or more independent variable(s): (a) having a male sex partner who injects drugs; (b) exchanging sex while high on injection or non-injection drugs; (c) having unprotected sex; (d) being pressured into sex (vaginal or anal) without a condom; and (e) having a male intimate partner who procures drugs for use by the sex worker. Consensual unprotected sex was reported as inconsistent condom use for vaginal, anal, or oral sex with regular clients ("regulars"), one time clients ("johns"), and primary partners. Given the different risks associated with penetrative sex compared with oral sex, only unprotected vaginal and anal sex were considered in our analyses. The micro level practice of relying on a male intimate partner to procure drugs was considered on the basis of our qualitative research documenting female sex workers' experiences of having a primary partner limit their ability to negotiate violence prevention strategies through reducing access to material resources.¹⁸ All models were adjusted for childhood sexual abuse owing to its known confounding relationship with experiences of violence in adulthood, criminal behaviour, and negotiation of sexual risk reduction.

Statistical analyses

Analyses were restricted to female sex workers who attended a baseline visit and at least one follow-up visit. The baseline variables considered were demographic variables, childhood sexual abuse, and historical assault by police. All other variables were treated as time updated covariates that referred to experiences occurring during the previous six month period.

We examined bivariate associations and tested for potential collinearity or effect modification of individual, interpersonal, and environmental and structural variables with experiences of each type of violence by using generalised estimating equations and a working correlation matrix. Fisher's test of exact probability was also used to compute P values when one or more of the observations was less than or equal to five. We used generalised estimating equations for binary outcomes, with logit link for the analyses of correlated data because the factors potentially associated with violence during follow-up were serial (time dependent) measures. In addition, models generated from generalised estimating equations take into account the correlation between repeated measures for each subject. Data from every participant follow-up visit was considered in the analyses. Given the conceptual differences in the types of violence episodes, we then fitted separate multivariate logistic generalised estimating equation models for each of the three violence outcomes (physical violence, rape, and client perpetrated violence), adjusting for known or potential individual and interpersonal confounders and variables that retained significance with violence in bivariate analyses at $P < 0.10$. Variables were considered significant in multivariate analyses if they retained significance at $P < 0.05$. All reported P values are two sided with 95% confidence intervals. Given that each violence outcome was modelled separately, unadjusted and adjusted odds ratios of associations between independent variables and outcome measures are reported separately for each specific violence outcome.

RESULTS

Of 267 female sex workers invited to participate, 251 women returned to the study office and consented to participate (response rate of 94%). A total of 237 women completed a baseline visit and at least one follow-up visit, with a total of 575 observations available over three visits (median visits 2, interquartile range (IQR) 2-3). Approximately half (113/237 (48%)) of the women self identified as Aboriginal and 43% (102/237) as white. The median age at baseline was 36 years (25-41 years) and the median age of sex work initiation was 15 years (13-21 years). Twenty per cent (47/237) were young women aged less than 24 years. The prevalence of HIV infection was 23% (55/237). The majority of women (206/237 (87%)) reported "absolute homelessness" (living on the street) at least once in their lifetime, with approximately half (104/237 (48%)) reporting homelessness over the 18 months of follow-up. One fifth (47/237) reported having tried but been unable to access drug treatment,

Table 1 | Type of client perpetrated violence reported by the 70 (30%) street based female sex workers who experienced client perpetrated violence over 18 months of follow-up

Type of client perpetrated violence	Total number female sex workers (n (%))
Verbal harassment	70 (100)
Physical assault or beating	47 (67)
Rape or sexual assault	34 (49)
Assault with a weapon	31 (44)
Strangling	19 (27)
Abduction or kidnap	18 (26)
Attempted sexual assault	15 (21)
Thrown out of a moving car	14 (20)
Other*	11 (16)

In total, 70/237 (30%) of the female sex workers reported client perpetrated violence. Median number of incidents: 1 (interquartile range 1-2).

*Other responses included being robbed; being held against will or locked in car; and being assaulted under the influence of a date rape drug (for example, flunitrazepam (Rohypnol)).

with long waiting lists being the primary reason for inability to access drug treatment (45/47 (96%)). One fifth (48/237) reported one or more dependent children (median 2, IQR 1-3), with 32% (76/237) reporting having had at least one child apprehended by social welfare services (median 3, IQR 1-4).

A total of 57% (136/237) of women experienced violence at least once over the 18 month follow-up period, with 38% (90/237) reporting physical violence, 25% (60/237) rape, and 30% (70/237) client

perpetrated violence. Table 1 describes the specific incidents of client perpetrated violence reported by female sex workers.

Tables 2, 3, and 4 show the unadjusted and adjusted associations in the multivariate models for each violence outcome (physical violence, rape, and client perpetrated violence). In multivariate models that adjusted for individual and interpersonal risk practices, the environmental and structural factors independently associated with violence against female sex workers were homelessness (adjusted odds ratio for physical violence ($aOR_{physical\,violence}$) 2.14, 95% CI 1.34 to 3.43; adjusted odds ratio for rape (aOR_{rape}) 1.73, 1.09 to 3.12), inability to access drug treatment ($aOR_{physical\,violence}$ 1.96, 1.03 to 3.43; adjusted odds ratio for client perpetrated violence ($aOR_{client\,violence}$) 2.13, 1.26 to 3.62), servicing clients in cars or public spaces ($aOR_{client\,violence}$ 1.50, 1.08 to 2.57), prior assault by police (aOR_{rape} 2.61, 1.32 to 5.16; $aOR_{client\,violence}$ 3.45, 1.98 to 6.02), confiscation of drug use paraphernalia by police without arrest ($aOR_{physical\,violence}$ 1.50, 1.02 to 2.41), and moving working areas away from main streets owing to policing ($aOR_{client\,violence}$ 2.13, 1.26 to 3.62).

DISCUSSION

Our results demonstrate an alarming prevalence of gender based violence among a sample of street based female sex workers. Furthermore, we found that the environmental and structural factors of homelessness, inability to access drug treatment, servicing

Table 2 | Bivariate and multivariate models for individual, interpersonal (partner level), and environmental and structural factors correlated with physical violence against street based female sex workers

	Physical violence during 18 months of follow-up	
	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Individual factors		
Youth (≤ 24 years of age)	1.25 (0.72 to 2.19)	—
Aboriginal ethnicity	0.83 (0.52 to 1.33)	—
HIV positive status	0.56 (0.31 to 1.01)	—
Cocaine injection	1.20 (0.73 to 1.95)	—
Heroin injection	1.34 (0.85 to 2.10)	—
Crystal methamphetamine use	1.25 (0.73 to 2.16)	—
Crack cocaine smoking	1.00 (0.56 to 1.82)	—
Interpersonal (partner level) factors		
Unprotected sex	1.24 (0.77 to 1.98)	—
Pressured into sex without a condom	2.40 (1.53 to 3.77)*	2.23 (1.40 to 3.61)
Primary sex partner injects drugs	1.54 (0.86 to 2.75)	—
Primary partner procured drugs for female sex worker	1.67 (0.94 to 2.71)	—
Exchanged sex while high	1.00 (0.66 to 1.51)	—
Environmental and structural factors		
Homeless	2.13 (1.36 to 3.35)*	2.14 (1.34 to 3.43)
Unable to access drug treatment	2.43 (1.33 to 4.41)*	1.96 (1.03 to 3.43)
Serviced clients in cars and public spaces	1.87 (1.06 to 3.02)*	1.56 (0.97 to 2.75)
Prior assault by police	2.65 (0.95 to 3.87)*	2.23 (0.78 to 3.65)
Police confiscated drug use paraphernalia (without arrest)	1.96 (1.23 to 3.12)*	1.50 (1.02 to 2.41)
Moved working areas away from main streets owing to local policing	1.87 (0.89 to 3.05)	—

*Significant at $P < 0.10$ and entered into the multivariate model.

Table 3 Bivariate and multivariate models for individual, interpersonal (partner level), and environmental and structural factors correlated with rape experienced by street based female sex workers

	Rape during 18 months of follow-up	
	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Individual factors		
Youth (≤ 24 years of age)	1.81 (0.98 to 3.36)*	1.67 (0.82 to 2.97)
Aboriginal ethnicity	1.07 (0.61 to 1.89)	—
HIV positive status	0.53 (0.26 to 1.11)	—
Cocaine injection	0.98 (0.56 to 1.74)	—
Heroin injection	1.47 (0.86 to 2.54)	—
Crystal methamphetamine use	1.23 (0.71 to 2.16)	—
Crack cocaine smoking	1.42 (0.69 to 2.92)	—
Interpersonal (partner level) factors		
Unprotected sex	2.13 (1.30 to 3.42)*	1.82 (1.01 to 3.25)
Pressured into sex without a condom†	1.82 (1.06 to 3.13)	—
Primary sex partner injects drugs†	1.75 (1.02 to 2.97)	—
Primary partner procured drugs for female sex worker	2.00 (1.09 to 3.67)*	1.63 (1.03 to 2.82)
Exchanged sex while high	0.80 (0.51 to 1.26)	—
Environmental and structural factors		
Homeless	1.81 (1.10 to 3.36)*	1.73 (1.09 to 3.12)
Unable to access drug treatment	1.66 (0.95 to 2.90)	—
Serviced clients in cars and public spaces	1.38 (0.78 to 2.46)	—
Prior assault by police	3.12 (1.61 to 6.04)*	2.61 (1.32 to 5.16)
Police confiscated drug use paraphernalia (without arrest)	1.21 (0.73 to 2.00)	—
Moved working areas away from main streets owing to local policing	1.42 (0.89 to 2.27)	—

*Significant at $P < 0.10$ and entered into the multivariate model.

†Variable not entered into logistic model owing to high collinearity with another variable.

clients in cars or public spaces, and enforcement based policing strategies were independently associated with gender based violence, even after adjustment for the potential confounding effects of individual and interpersonal risk practices. Although previous research samples suggest that the lifetime prevalence of violence among female sex workers is between 50% and 100%,^{27,28} many such estimates have been based solely on reports of client violence.^{29,30} In comparison, over half of the women in this sample experienced physical and/or sexual violence over an 18 month period.

Comparison with other studies

The persistent relationship between enforcement, both of policies on prostitution and those on drug use (for example, confiscation of drug use paraphernalia without arrest and enforced displacement of sex workers to outlying areas), and violence against female sex workers points to the role of criminalisation in enhancing the likelihood of violence against street based female sex workers. Of particular concern, prior assault by police had the strongest correlation with both sexual and client perpetrated violence against female sex workers. In 2000, the World Health Organization classified police officers' excessive use of force as a form of violence,³¹ and yet there is scant empirical evidence with which to characterise the public health impact of police violence.^{30,32} Police contact with street involved populations can be pervasive, and evidence suggests that excessive use of force, including violence, can be

a characteristic of "police crackdowns" that target street populations.^{32,33}

A growing body of qualitative evidence documents the multitude of negative outcomes of street policing strategies for female sex workers, including displacement of street based sex markets, disruption of peer networks and informal safety structures, and increased risk of violence and sexually transmitted infections.^{17,21} Police violence against female sex workers has been reported to include excessive use of physical force, forced removal and subsequent abandonment in outlying areas, and coerced sex provided to police in exchange for freedom from detainment, fine, or arrest.^{16,21,32} Qualitative evidence suggests that prior police perpetrated assault could increase fear of violence among female sex workers and reduce the likelihood that female sex workers will access police and judicial support as a means of averting future violence by partners, clients, or other third parties.²⁰ Epidemiological analyses among street based injecting drug users have consistently linked enforcement strategies with adverse health outcomes, including an elevated likelihood of practices that increase the risk of HIV infection, such as syringe borrowing.^{34,36} Taken together with recent findings from our study mapping geographical "hot spots" in which female sex workers working in outlying and industrial areas are pressured into unprotected sex by clients,³⁷ this study demonstrates the potential unintended adverse consequences of enforcement based approaches to sex work. The findings provide new evidence to support global calls

Table 4 | Bivariate and multivariate models for individual, interpersonal (partner level), and environmental and structural factors correlated with client perpetrated violence against street based female sex workers

	Client perpetrated violence during 18 months of follow-up	
	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Individual factors		
Youth (≤24 years of age)	1.42 (0.78 to 2.58)	—
Aboriginal ethnicity	0.69 (0.41 to 1.51)	—
HIV positive status	0.52 (0.27 to 1.00)	—
Cocaine injection	0.89 (0.53 to 1.52)	—
Heroin injection	1.04 (0.63 to 1.73)	—
Crystal methamphetamine use	0.69 (0.33 to 1.45)	—
Crack cocaine smoking	1.12 (0.57 to 2.24)	—
Interpersonal (partner level) factors		
Unprotected sex	1.40 (0.83 to 2.37)	—
Unprotected sex with a client†	1.98 (1.15 to 3.42)	—
Pressured into sex without a condom	2.31 (1.45 to 3.69)*	1.85 (1.10 to 3.10)
Primary sex partner injects drugs	1.18 (0.62 to 2.23)	—
Primary partner procured drugs for female sex worker	1.23 (0.71 to 1.92)	—
Exchanged sex while high	1.10 (0.69 to 1.76)	—
Environmental and structural factors		
Homeless	1.63 (0.86 to 2.67)	—
Unable to access drug treatment	2.50 (1.46 to 4.28)*	2.13 (1.26 to 3.62)
Serviced clients in cars and public spaces	1.87 (1.16 to 3.02)*	1.50 (1.08 to 2.57)
Prior assault by police	4.16 (2.35 to 7.36)*	3.45 (1.98 to 6.02)
Police confiscated drug use paraphernalia (without arrest)	1.34 (0.89 to 2.17)	—
Moved working areas away from main streets owing to policing	2.15 (1.36 to 3.40)*	2.13 (1.26 to 3.62)

*Significant at $P < 0.10$ and entered into the multivariate model.

†Variable not entered into logistic model owing to high collinearity with another variable.

for the removal of criminal sanctions targeting sex workers, including statements by UNAIDS, and further support the need for systematic evaluations of the effects of legal strategies on health outcomes among female sex workers and clients.

Of major concern, and to our knowledge not previously documented, is the fact that an inability to access drug treatment was associated with a twofold increase in the odds of both physical and client perpetrated violence. A review of Canada's drug strategy showed that of the \$C368 million targeted at illicit drug use, 73% were spent on enforcement based initiatives and only 14% spent on addiction treatment.³⁸ Accordingly, the demand for addiction treatment far outweighs availability.³⁹ As of 2008, an estimated 176 detoxification beds and 326 long term treatment beds were available in the province of British Columbia (12.11 beds per 100 000 population), with a wait time of four to 12 weeks and only 14 beds allocated for mothers with children.⁴⁰ Canada's policy makers have been slow to respond to the shortage of beds in drug treatment facilities. In addition, evidence of the harms of enforcement based strategies is mounting both locally and internationally.^{41, 42} This research suggests that the failure of the current drug strategy to support women's ability to access treatment may compound experiences of violence among female sex workers. The observational nature of this study precludes determining causality. Nevertheless, qualitative accounts document the role of binge drug use and drug

withdrawal in reducing female sex workers' ability to negotiate HIV risk reduction practices with primary partners and clients, which supports our evidence of the potential enhanced vulnerability to violence that results from an unsuccessful attempt to access drug treatment.^{18, 19} This research underscores the urgent need to improve and scale up access to and availability of drug treatment facilities for female sex workers, including programmes that support pregnant and parenting mothers.

Furthermore, the extremely high prevalence of rape experienced by female sex workers over the 18 month follow-up period points to the immediate need to scale up violence prevention strategies, including increasing support for female sex workers accessing legal and victim services and improving the monitoring of and legal responses to violence against female sex workers. The 63% elevated likelihood of rape among women who reported reliance on a male partner to procure drugs supports evidence elsewhere of the adverse impact of gender inequities in access to economic or material resources on women's health outcomes.⁶ Rape has been associated with an increased likelihood of acquiring sexually transmitted infections and/or HIV owing to the high likelihood of vaginal and/or rectal trauma;⁵ therefore, the prevention of sexual violence against female sex workers needs to be integrated into HIV prevention efforts. In addition, the independent correlation between rape and consensual unprotected sex with a primary

WHAT IS ALREADY KNOWN ON THIS TOPIC

Gender based violence has been identified as a global public health and human rights priority, and leads to high morbidity and mortality

A recent review of gender based violence highlighted how rights violations and abuses against female sex workers are seldom considered in discussions of violence against women

There is a growing body of qualitative evidence documenting the adverse effects of street policing strategies on the health and safety of sex workers

WHAT THIS STUDY ADDS

Homelessness and inability to access drug treatment were independently correlated with gender based violence against female sex workers, even after adjustment for potential confounding individual and interpersonal risk factors

This study is among the first epidemiological investigations to demonstrate an independent association between criminalisation of and enforcement based approaches to sex work and raised odds of both physical and sexual violence against female sex workers

Our findings support global dialogues on preventative approaches to sex work, including removing criminal sanctions that target female sex workers

partner highlights the risk of sexual transmission of HIV infection and the need for gender transformative and couple focused prevention efforts that target partner violence and sexual decision making.⁴³

Finally, the observed relationship between living on the street and the enhanced likelihood of both rape and physical violence highlights the need for structural level responses that focus on poverty and housing, including innovative models of supportive housing that have a harm reduction perspective. Our findings are consistent with previous studies demonstrating an increased likelihood of physical violence among homeless women in substance using populations.⁴⁴ In one study, homeless female sex workers in the United States were more likely than non-homeless female sex workers to report servicing clients who refused to use condoms.⁴⁵ In addition, poverty and drug dependency have been associated with both clients offering and female sex workers accepting more money for unprotected sex.^{25 46 47}

Strengths and limitations

Several potential limitations of our analyses should be considered. Although the observational nature of this research precludes determining causality, our longitudinal analyses using generalised estimating equations and accounting for repeated responses by the same respondent may have reduced some potential temporal bias. Additionally, the use of self reports to measure violence episodes could subject the data to social desirability or response bias. Given the highly stigmatised and criminalised nature of sex work and our qualitative work to date, however, under-reporting of violence episodes would be more likely than over-reporting and thus any misclassification would have attenuated estimates towards the null. Furthermore, the use of direct wording in questions on experiences of violence—for example, “have you been physically assaulted in the last 6 months?”—has been shown to underestimate the incidence of violence against

women by failing to account for more ubiquitous episodes of violence, such as slapping.³ Similarly, in qualitative work on client perpetrated violence, we have shown that physical violence perpetrated by clients is so commonplace that many women only define “bad dates” as episodes of extreme violence, such as rape. However, we cannot discount the possibility that some variables could be over-reported. In addition, there are always limitations to measuring police violence as it is not possible to distinguish between excessive use of force and legitimate use of force. Finally, given the multiple types of both indoor and outdoor sex work environments—such as establishment sex work venues (for example, bars and massage parlours) or escort agencies—and the differing legal frameworks of prostitution around the world, it might not be possible to generalise our results to other sex work environments or countries.

Conclusions and policy implications

Our findings document an extremely high prevalence of both sexual and physical violence against female sex workers that persists because of large scale structural inequities. This research provides important empirical evidence demonstrating the adverse public health effects of enforcement based policing approaches to sex work and drug use, and supports global calls to remove criminal sanctions targeting sex workers. Furthermore, our findings suggest that evidence based structural interventions that promote improved access to housing and increased availability of drug treatment will be crucial to stemming the epidemic of violence against street based female sex workers.

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Associations between childhood maltreatment and sex work in a cohort of drug-using youth

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Abstract

Although research has examined the impacts of childhood maltreatment among various marginalized populations, few studies have explored the relationship between child abuse and subsequent involvement in sex work among drug using street-involved youth. In the present study, the relationships between the level of childhood maltreatment and involvement in sex work were examined using the Childhood Trauma Questionnaire (CTQ) as part of an extensive interview protocol in an ongoing prospective cohort study of street-involved youth in Vancouver Canada. Between September 2005 and June 2006, 361 youth were recruited using extensive outreach methods and snowball sampling. The prevalence rates for abuse in the sample were 73% for physical abuse; 32.4% for sexual abuse; 86.8% for emotional abuse; 84.5% for physical neglect; and 93% for emotional neglect. Univariate and logistic regression analyses demonstrated that not only was sexual abuse independently associated with sex work, but emotional abuse was as well. These findings have implications for early intervention efforts aimed at vulnerable, high risk youth populations as well as intervention strategies for active sex trade workers.

Keywords

child abuse; sex work; street youth; substance abuse, Canada

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INTRODUCTION

Childhood maltreatment is pervasive and known to be associated with a variety of adverse effects on health and social functioning (Allen, Simpson, Lalonde, & Phaneuf, 1998; Briere & Elliott, 2003; Doyle, 2001). Recently, the United Nations released the findings of its first comprehensive, global study of violence against children (Pinheiro, 2006), in which 131 governments worldwide participated. The report states that although many forms of violence against children have long been noted, the magnitude of the problem is only just coming to light. Among the strongest findings is that although some violence in children's lives is unexpected and isolated, the vast majority is experienced at the hands of those closest to them, namely parents, caregivers, teachers, schoolmates, employers.

Within the general North American population, recent prevalence estimates for sexual and physical abuse stand at 14% for men and 32% for women, and 22% for men and 20% for women respectively (Briere & Elliot, 2003). Early sexual abuse alone has been linked to sexual risk behavior among the general population (Steel & Herlitz, 2005), to sexual HIV-risk behaviors among adult females (Parillo, Freeman, Collier, & Young, 2001), and to drug use among youth populations (Perkins & Jones, 2004; Swanston, Plunkett, O'Toole, Shrimpton, Parkinson, & Oates, 2003).

Research has shown that childhood sexual and/or physical abuse significantly predicts engagement in sex work among selected populations, including: adult females (Bagley & Young, 1987; Farley & Cotton, 2005; Potter, Martin, & Romans, 1999; Simons & Whitbeck, 1991); men who have sex with men (Kalichman, Gore-Felton, Benotsch, Cage, & Rompa, 2004; O'Leary, Purcell, Remien, & Gomez, 2003); female adolescent populations (Bagley, 1999; Simons & Whitbeck, 1991); drug using men and women (Braitstein, Tyndall, Spittal, O'Shaughnessy, Schilder, Johnston, et al., 2003); and male/female adolescent populations (Seng, 1989). These findings are of concern given the well-known risks associated with sex work among drug-using populations, including high rates of violence and assault, homelessness, social isolation, and sexual and drug-related harms. For example, in Canada, the largest ever serial killer investigation is currently underway, with most of the victims involved being drug addicted sex workers from Vancouver's notorious Downtown Eastside neighborhood. Many more women from the Downtown Eastside have still not been accounted for—in all, there are sixty-one unsolved cases of disappearances of women since 1982 (CBC News, 2006), most of whom were known to be drug users and sex workers. Although there are many known risks involved for both male and female sex workers such as sexually transmitted disease, transmission of blood-borne pathogens such as HIV and Hepatitis C (Medrano, Desmond, Zule, & Hatch, 1999), and potential victimization and violence (Farley & Cotton, 2005), the Vancouver tragedy underscores the most severe harms involved in sex work within heavy drug using communities.

Despite what is known about the potential link between prior abuse and engagement in sex work, a number of gaps remain. First, while the definition of child maltreatment in reporting legislation in many jurisdictions has expanded in recent decades to include not only sexual and physical but emotional abuse and physical and emotional neglect, few studies separate out these types of childhood maltreatment among participants (Medrano et al., 1999; Rodgers, Lang, Laffaye, Satz, Dresselhaus, & Stein, 2004; Spatz Widom & Kuhns, 1996). Although evidence shows a high co-occurrence of multiple types of childhood maltreatment, typically studies focus on single types, usually either sexual or physical abuse (Bernstein, Stein, Newcomb, Walker, Pogge, Ahluvalia, et al., 2003). Second, research looking at childhood abuse as a predictor of sex work involvement has primarily focused on sexual abuse within adult female populations. Much less is known about associations between childhood abuse and sex work among males, and among vulnerable populations such as street-involved youth and

drug users. Lastly, research on childhood maltreatment is often limited by legal reporting requirements. In most North American jurisdictions, researchers are required to report disclosures of childhood abuse of legal minors to authorities, which can pose a challenge to establishing trust relationships with youth research participants and can result in limited abuse research with this population. However, because youth who are involved in sex work represent an especially vulnerable population, and because of the need for research that can inform early intervention efforts, studies looking at childhood abuse among vulnerable youth populations are particularly important. The present study was therefore conducted to evaluate how various types of childhood maltreatment (sexual, physical, and emotional abuse, and physical and emotional neglect) may be associated with subsequent engagement in sex work within a population of high-risk street-involved youth.

METHODS

Study Population

The At Risk Youth Study (ARYS) is a prospective cohort study of street-involved youth in downtown Vancouver, Canada. As described elsewhere (Wood, Stoltz, Montaner, & Kerr, 2006), snowball sampling and street-based outreach were employed to recruit a sample of street-involved drug using youth. Youth were enrolled if they were between 14 and 26 years of age, and had used illicit drugs other than marijuana in the past 30 days. Data collection procedures for the ARYS cohort involve semi-annual blood sampling for measurement of HIV and Hepatitis C (HCV) antibodies, along with completion of an interviewer-administered questionnaire.

Measures

As part of the interview, participants complete the Childhood Trauma Questionnaire (CTQ), a 28-item instrument developed to retrospectively assess trauma resulting from child abuse and neglect (Bernstein & Fink, 1998). The Trauma Questionnaire yields a trauma severity category for each of five types of childhood maltreatment: physical, sexual, and emotional abuse, and physical and emotional neglect. The Questionnaire has been validated with substance abusing populations and adolescent clinical populations, and has shown excellent convergent and discriminant validity with measures of trauma (Bernstein et al., 2003; Fink, Bernstein, Handelsman, Foote, & Lovejoy, 1995). During the consent process, participants were informed of the researcher's duty to report child abuse when participants under age 19 (the legal age of majority in British Columbia) disclose abuse in the course of answering survey questions, and all interviewers were trained in the reporting protocol. In cases where reporting was required, efforts were made to report with the participant's full knowledge, consent, and cooperation; participants were also offered referrals to free and available community counseling services. Pre- and post-test HIV counselling and referral to health services were also provided as part of the study. The current analysis includes youth who were enrolled between September 2005 and June 2006, and the University of British Columbia's Research Ethics Board provided ethical approval for the study.

Statistical Analysis

First, we explored history of childhood abuse using the Trauma Questionnaire. Twenty-five items measure physical, sexual, and emotional abuse and physical and emotional neglect as scores on five subscales. Using a five-point scale, participants provide ratings for statements such as 'When I was growing up I had to wear dirty clothes' and 'I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor'. Each scale yields a total score for that type of maltreatment. The measure then provides predetermined cut-off scores for translating the scores from the five scales into a trauma level for each type of maltreatment (Bernstein & Fink, 1998). The four levels of trauma are none (to minimal), low (to moderate),

moderate (to severe), and severe (to extreme). For the analysis, we chose to collapse these four trauma levels into two: none/low, and moderate/severe. We justified this decision based on previous studies involving drug-using populations which have shown that dichotomizing abuse into 'abuse' versus 'no abuse' produces few significant findings (Medrano, Hatch, Zule, & Desmond, 2002). There is also a three-item minimization and denial scale used to detect underreporting of maltreatment, and participants were excluded from analysis if they scored above pre-determined cut-offs.

Univariate associations were then tested between each of the five abuse variables and a number of socio-demographic variables. Among these, ethnicity was dichotomized as Aboriginal vs. all other due to concerns about the large number of Aboriginal youth involved in sex work in downtown Vancouver. The socio-demographic variables included: age; gender; ethnicity (Aboriginal vs. all other; Aboriginal included First Nations, Aboriginal, Métis, and Inuit; all other included Caucasian, Chinese, South-Asian, Other Asian, Latin American, Middle Eastern, and Black-African, Black-Caribbean, and other Black); homeless in past six months (yes vs. no; homeless was defined as having no fixed address or sleeping on the street); having spent more than one month in an alternative care situation (such as foster care, group home, ward of the state, etc. [yes vs. no]); having ever dropped out of school (yes vs. no); average daily amount of money spent on drugs (less than \$50.00 daily vs. \$50.00 or more daily); having ever injected drugs (yes vs. no), and ever having traded sex for money or gifts (yes vs. no; gifts also included food, shelter, clothes, and drugs). All variable definitions had either been used extensively in prior research, or were conceptually derived from the literature.

Consistent with prior studies using the Childhood Trauma Questionnaire (Paivio & McCulloch, 2004; Yehuda, Halligan, & Grossman, 2001), we fit five separate multivariate logistic regression models for each of the five types of abuse. Variables that were associated with the relevant abuse scale at the $p < .05$ level in univariate analyses were included in a fixed regression model. In this way, we could assess the strength of association between each type of abuse and sex work while controlling for the socio-demographic variables. This approach also avoided the issue of collinearity between the various measures of abuse. Lastly, Pearson correlations were conducted between all pairs of variables to show the degree of overlap.

All statistical analyses were performed using SAS software version 8.0 (SAS, Cary, NC), and all p -values are two sided.

RESULTS

Between September 2005 and June 2006, 361 street-involved youth were recruited into the ARYS cohort. The mean age of the sample was 22 (Interquartile range 20.3-24.1), 106 (29%) were female, and 86 (24%) were Aboriginal. Eighty-four (23%) of the participants reported trading sex for money or gifts at least once in their lives. For analyses involving the Trauma Questionnaire subscales, 20 participants were excluded due to their scores on the minimization/denial scale. Possible scores on this scale are 1, 2, or 3, and participants were excluded if they scored higher than 1. The prevalence of abuse in the sample (based on scores higher than 'none' for each subscale on the Questionnaire) was as follows: 73% reported physical abuse; 32.4% reported sexual abuse; 86.8% reported emotional abuse; 84.5% reported physical neglect; and 93% reported emotional neglect. Only six participants out of 341 (2%) reported no abuse at all on all five subscales combined. Cronbach's alpha for the five abuse scales was good, ranging from .75 - .83.

Table 1 shows univariate associations between five types of childhood maltreatment and the socio-demographic variables, including sex work involvement. As shown, moderate to severe trauma scores were associated with sex trade at the univariate level for sexual abuse (OR =

3.74, 95% CI: 2.17-6.46, $p < .001$); physical abuse (OR = 2.31, 95% CI: 1.37-3.90, $p = 0.002$); emotional abuse (OR = 2.23, 95% CI: 1.30-3.82, $p = 0.003$); and for emotional neglect (OR = 1.71, 95% CI: 1.02-2.88, $p = 0.041$). Physical neglect was not associated with sex work.

Table 2 shows the multivariate logistic regression analyses examining the associations between five types of childhood maltreatment and sex work after adjusting for relevant socio-demographic variables. As indicated, sex trade remained independently associated with sexual abuse (AOR = 2.88, 95% CI: 1.60-5.17, $p < .001$); and with emotional abuse (AOR = 2.26, 95% CI: 1.31-3.89, $p = 0.003$) after adjusting for all variables that were associated with the given form of maltreatment at $p < 0.05$ in univariate analyses. Physical abuse, physical neglect, and emotional neglect were not independently associated with sex trade.

Lastly, Table 3 shows the degree of overlap between the five abuse variables. All correlations were significant at $p < .0001$. Note, however, that sexual abuse was the most weakly associated of all variables in relation to emotional abuse, and that emotional abuse was similarly correlated with all other types of abuse in relation to sexual abuse.

DISCUSSION

The present study examined the association between five types of childhood maltreatment and sex work involvement among drug using street-involved youth. A high prevalence of abuse was found, with rates ranging from 32.4% to 93%. These rates are similar to a recent, methodologically comparable study of adult drug users (Medrano et al., 2002). Further, two types of childhood maltreatment, sexual abuse and emotional abuse, were found to be independently associated with sex work after controlling for socio-demographic variables. Because we were not able to assess the additive burden of abuse due to collinearity of variables, we restricted the analysis to the relationship between each of the separate types of abuse and sex trade involvement.

In terms of the separate associations between sexual abuse and sex work, and emotional abuse and sex work, a number of points can be made. First, a possible explanation for the association between childhood sexual abuse and later sex work involvement may be that children who are sexually victimized develop psychologically and emotionally in ways that make them vulnerable to continuing sexual predation. Conversely, childhood sexual abuse may create a propensity in the victim toward risk taking behaviours (substance use, running away from home [Kingree, Braithwaite, & Woodring, 2001; Tyler, Hoyt, & Whitbeck, 2000]) that in turn lead to situations in which survival sex work is one of few remaining options.

The connection between childhood emotional abuse and later sex work involvement may involve similar factors. Emotional abuse has been defined as "acts of omission and commission committed by parent figures, which are judged to be psychologically damaging on the basis of a combination of community standards and professional expertise" (Doyle, 2001, p. 388). A review by Spertus, Yehuda, Wong, Halligan, and Seremitis (2003) lists a number of emotional and psychological effects of emotional abuse, including depression, anxiety, suicidality, low self-esteem, personality disorders, poor body image, sexual dysfunction, and compromised physical health. These psychological effects may combine to create a vicious circle for many youth, wherein poor coping skills and resources are not adequate for the high-risk situations in which they find themselves, thereby increasing their dependence on strategies such as trading sex for survival. This in turn would compound risks for which they are poorly equipped, perpetuating a downward spiral from which it is difficult to break free without external intervention.

The finding that trauma associated with emotional abuse was independently associated with sex work among street-involved youth was unexpected. Although severe emotional abuse in

childhood using the Childhood Trauma Questionnaire was recently found to interact with Black ethnicity in independently predicting involvement in sex work among an adult female drug-using population (Medrano et al., 2003), this is the first study of its kind to show an independent relationship between childhood emotional abuse and youth involvement in sex work. The finding has important implications for intervention programs that address high risk behaviors such as sex work among youth. Not only do interventions need to address childhood sexual abuse as a risk factor—for which there has been evidence for some time—but attention also needs to be paid to experiences of emotional abuse as a potential determinant of high risk behavior.

Challenges to service delivery models that address childhood emotional abuse need to be considered, however, as emotional abuse can be more difficult to assess than sexual or physical abuse or physical neglect. When situated within the context of sex work involving drug using populations, a number of implications emerge for working with vulnerable populations who have experienced childhood emotional abuse. Sex work takes place within a complex interaction of contextual, social, structural, and psychological factors that mediate negotiations regarding condom use, selection of partners, sexual and drug-related practices, and health seeking behaviors. Given that childhood emotional abuse has been previously associated with lifetime exposure to trauma and increased vulnerability in high-risk situations (Spertus et al., 2003), and in this study was found to predict engagement in sex work among street-youth, the current absence of prevention and harm reduction strategies that screen for emotional abuse among drug-using youth and adolescent initiates of sex work is of particular concern. Harm reduction strategies targeting street-involved youth need to consider the impacts of unaddressed emotional abuse on negotiation of sexual and drug-related risk behaviors and the potential impact of power dynamics on youths' ability to protect themselves. Interventions effective at reducing harms associated with early emotional abuse will need to be situated within the larger social, structural and environmental context of sex work among drug-using youth. The current prohibitive framework of sex work in the Canadian setting has been shown to displace sex workers to dark and deserted areas and further from social supports, thereby decreasing sex workers' ability to protect themselves and increasing vulnerability to violence and assault (Goodyear, Lowman, Fischer, & Green, 2005). Previous studies have shown that enhanced social support and reduced social isolation are important protective mechanisms against past emotional abuse (Doyle, 2001). Socio-legal policy reforms that reduce harms and the social isolation faced by sex workers and that facilitate sex workers' ability to negotiate their situation may be crucial in engaging this population and countering the adverse impacts of past emotional abuse. In addition, given the increased distrust among those with a history of emotional abuse (Doyle, 2001; Medrano, et al., 2003) coupled with high levels of stigma and criminalization of sex work, innovative strategies and policy reforms that actively engage drug using youth in the development and implementation of interventions will likely be effective in facilitating access to social support and building trust among emotionally-abused drug-using youth. Finally, childhood emotional abuse has been shown to result in low self-efficacy and self-care (Spertus, et al., 2003), suggesting that capacity-building and low threshold employment and skills training may help to mediate the adverse impacts of past emotional abuse among this population of street youth. Ultimately, of course, the goal of such interventions would be to help youth transition out of the high-risk environments of the street and the sex trade completely. It is recognized, however, that a multi-systemic approach is required to meet this objective, which goes beyond front-line interventions and addresses the root causes of dysfunction in families and society at large.

Lastly, high linear correlations between the five types of abuse were statistically confirmed for this population, and the specific correlations say something about how different types of abuse combine. Of specific interest is that, when examining the correlations with emotional abuse, sexual abuse was in fact more weakly correlated in comparison to physical abuse, emotional

neglect, and physical neglect. This offsets somewhat our concerns that the prevalence of trauma associated with emotional abuse may have been inflated due to confounding with sexual abuse.

Limitations

The present study is limited first by the fact that despite extensive street-based outreach efforts and snowball sampling methods, the sample is not representative. Of note, despite recruitment efforts, females and younger youth (ages 14 to 18) may be under-represented, and the study may not fully reflect issues specific to these groups. Having said that, the demographics of the ARYS cohort are consistent with other studies of street-involved youth conducted in the same locale (Ochnio, Patrick, Ho, Talling, & Dobson, 2001). Nevertheless, the findings should be interpreted with caution and limits to generalizing to other street-involved youth populations recognized.

Next, it is acknowledged that samples involving marginalized populations are vulnerable to socially desirable responding (Des Jarlais, Paone, & Milliken, 1999). This bias may be compounded in this sample among participants under age 19 who were warned in the consent process about the researcher's duty to report abuse to authorities. However, with regard to self-reporting of abuse, there is previous evidence indicating that false-negative reports of abuse are more common than false-positive reports (Bernstein & Fink, 1998). Other behaviors explored in the study may be underestimated, such as injection drug use and sex work involvement, despite reassurances of confidentiality and interviewer efforts to build trust and rapport with participants. Therefore, due to a possible bias toward under-reporting in the sample, findings should be considered as likely conservative estimates.

It is also possible that the prevalence of trauma associated with emotional abuse has been inflated due to confounding with sexual abuse. Due to the high correlations found between variables in the study we were unable to examine the independent effect of the various forms of abuse. As such future research should explore the potential association between childhood emotional abuse and sex work involvement, in the absence of childhood sexual abuse.

Conclusion

In summary, the study extends the literature on associations with childhood maltreatment among vulnerable populations in a number of ways. First, it parses different types of childhood maltreatment experienced by those who engage in sex work, and the level of trauma associated with each. It also focuses on those who may be especially vulnerable to the type of tragic consequences described at the beginning of this paper—young people who use drugs and engage in sex work. We found that separating types of childhood maltreatment into physical, sexual and emotional abuse, and physical and emotional neglect yields a more precise contextual description of associations with sex work among street-involved youth than previous studies. The finding that not only childhood sexual abuse, but also childhood emotional abuse independently associated with sex work has important implications for intervention efforts with high risk youth. In order for early intervention efforts to be successful with youth, they must have an evidence-based foundation and be relevant to youth's life experiences. As we are currently witnessing in the Downtown Eastside Vancouver, the cost of neglecting early intervention efforts is too high in too many sectors—public health, the justice system, civil society, and personal lives.

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Table 1
Odds ratios (95% CI) for Bivariate Associations Between the Five Types of Childhood Maltreatment and Socio-demographic and Drug Use Characteristics.

Characteristic	Childhood Maltreatment at Moderate-Severe Levels				
	Sexual Abuse	Physical Abuse	Emotional Abuse	Physical Neglect	Emotional Neglect
Age (Per year older)	1.07 (0.98-1.17)	1.06 (0.97-1.14)	0.98 (0.91-1.06)	0.98 (0.91-1.06)	0.92 (0.85-1.00)*
Gender (Male vs Female)	2.58** (1.55-4.31)	1.02 (0.63-1.65)	1.33 (0.82-2.15)	1.20 (0.75-1.94)	1.62 (1.00-2.62)*
Ethnicity (All other vs Aboriginal)	1.72* (1.01-2.95)	1.17 (0.70-1.94)	0.63 (0.38-1.05)	0.94 (0.57-1.56)	0.79 (0.47-1.33)
Homeless last 6 months (No vs Yes)	1.08 (0.61-1.90)	1.92* (1.13-3.26)	1.52 (0.92-2.52)	1.21 (0.73-1.99)	1.23 (0.73-2.09)
Separated from parents (No vs Yes)	1.82 (1.11-2.98)*	2.74** (1.74-4.31)	1.19 (0.77-1.85)	1.780* (1.15-2.76)	1.89 (1.21-2.97)*
Dropped school (No vs Yes)	1.47 (0.78-2.78)	2.19* (1.22-3.93)	2.08 (1.20-3.62)*	2.056 (1.18-3.58)*	2.29 (1.24-4.24)*
Spend on drugs (< \$50.00 daily vs > \$50.00 daily)	1.87 (1.13-3.07)*	1.71 (1.10-2.68)*	1.43 (0.92-2.24)	1.36 (0.87-2.11)	1.68 (1.07-2.64)*
Ever injected drugs (No vs Yes)	1.21 (0.75-1.97)	2.08 (1.34-3.24)*	1.44 (0.93-2.22)	0.81 (0.53-1.25)	0.97 (0.63-1.52)
Sex Trade (No vs Yes)	3.7** (2.17-6.46)	2.31* (1.37-3.90)*	2.23 (1.30-3.82)*	1.47 (0.88-2.45)	1.71 (1.02-2.88)*

* $p < .05$ ** $p < .001$

Table 2

Adjusted Odds Ratios (95% CI) for Multivariate Associations Between Five Types of Childhood Maltreatment and Socio-demographic and Drug Use Characteristics.

Characteristic	Childhood Maltreatment at Moderate-Severe Levels				
	Sexual Abuse	Physical Abuse	Emotional Abuse	Physical Neglect	Emotional Neglect
Age (Per year older)	—	—	—	—	0.89 (0.82-0.99)*
Gender (Male vs Female)	2.09 (1.20-3.65)*	—	—	—	1.29 (0.75-2.23)
Ethnicity (All other vs Aboriginal)	1.54 (0.85-2.78)	—	—	—	—
Homeless (No vs Yes)	—	1.79 (1.01-3.19)*	—	—	—
Separated from parents (No vs Yes)	1.61 (0.94-2.76)	2.67 (1.65-4.33)**	—	1.66 (1.06-2.59)*	1.70 (1.10-2.73)*
Dropped school (No vs Yes)	—	1.64 (0.86-3.13)	2.12 (1.21-3.71)*	1.96 (1.12-3.45)*	1.96 (1.03-3.74)*
Spend on drugs (< \$50.00 daily vs > \$50.00 daily)	1.64 (0.96-2.79)	1.55 (0.96-2.51)	—	—	1.69 (1.04-2.74)*
Ever injected drugs (No vs Yes)	—	1.82 (1.13-2.95)*	—	—	—
Sex Trade (No vs Yes)	2.88 (1.60-5.17)**	1.59 (0.90-2.81)	2.26 (1.31-3.89)*	—	1.59 (0.90-2.83)

— Indicates variables not associated with the dependent variable at $p < 0.05$ in bivariate analyses

* $p < .05$

** $p < .001$

Table 3
Pearson Correlation Coefficients of Associations among Five Abuse Variables (n=308)

	Emotional Abuse	Physical Abuse	Sexual Abuse	Emotional Neglect
Emotional Abuse				
Physical Abuse	0.67			
Sexual Abuse	0.37	0.36		
Emotional Neglect	0.62	0.43	0.33	
Physical Neglect	0.52	0.47	0.42	0.60

Note: all coefficients are $p < .0001$

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