


Office

ExH. #6

Missing Women Commission of Inquiry

Dr. Kate Shannon

Expert Report and Appendices

Missing Women Commission of Inquiry	
EXHIBIT No: 6	
Date:	October 17, 2011
	Registrar

Correction to Citation References at page 2, paragraph 2 of
Report by Dr. Kate Shannon

This paragraph replaces paragraph 2 on page 2 of Dr. Shannon's expert report.

2. The Gender and Sexual Health Initiative and BCCfE have provided affidavits as expert witnesses in a number of cases, including one currently before the Supreme Court of Canada. These include: *PHS Community Services Society v. Canada (Attorney General)*, [2011] S.C.J. No. 44, aff'g [2010] B.C.J. No. 57, aff'g [2008] B.C.J. No. 951, *Bedford v. Canada (Attorney General)*, [2010] O.J. No. 5155, *Downtown Eastside Sex Workers United Against Violence Society v. Attorney General (Canada)*, 2010 BCCA 439; rev'g [2008] B.C.J. No. 2447; 2011, leave to appeal to S.C.C. granted, [2010] S.C.C.A No. 457.

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DR. KATE SHANNON

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4.	Addendum A to Report re: MAKA Project Summary
5.	Addendum B to Report re: PHD Summary
6.	References Cited in Report
A.	Shannon, K., Bright V., Gibson, K., Tyndall, M.W., and Maka Project Partnership. "Sexual and drug-related vulnerabilities for HIV infection among women engaged in survival sex work in Vancouver." <i>Canadian Journal of Public Health</i> , 2007, 98(6): 465-9.
B.	Duff, P., Deering, K., Gibson, K., Tyndall, M.W., and Shannon, K. "Homelessness among a cohort of women in street-based sex work: The need for safer environment interventions." <i>BMC Public Health</i> , 2011, 11:643.
C.	Shannon, K., Strathdee, S.A., Shoveller, J., Zhang, R., Montaner, J.S., and Tyndall, M.W. "Crystal methamphetamine use among female street-based sex workers: Beyond individual-focused interventions." <i>Drug Alcohol Dependence</i> , 2011, 113(1): 76-81
D.	Duff, P., SHoveller, J., Zhang, R., Alexson, D., Montaner, J.S., and Shannon, K. "High lifetime pregnancy and low contraceptive usage among sex workers who use drugs: An unmet reproductive health need." <i>BMC Pregnancy Childbirth</i> , 2011, 11:61.
E.	Lazarus, L., Chettiar, J., Deering K, Nebess, R. and Shannon, K. "Risky health environments: Women sex workers' struggles to find safe, secure and non-exploitative housing in Canada's poorest postal code." <i>Social Science and Medicine</i> , 2011, In Press.
F.	Lazarus, L., Deering, K., Gibson, K., and Shannon, K. "Occupational stigma as a primary barrier to health service access among street-based sex workers in an urban Canadian setting." <i>Culture Health and Sexuality</i> , 2011, In Press
G.	Shannon, K., Kerr, T., Strathdee, S.A., Shoveller, J., Montaner, J.S., and Tyndall, M.W. "Prevalence and structural correlates of gender-based violence among a prospective cohort of female sex workers." <i>British Medical Journal</i> , 2008, 11:339:b2939.
H.	Shannon, K., Kerr, T., Allinott, S., Chettiar, J., Shoveller., and Tyndall., W.W.

	“Social and structural violence and power relations in mitigating HIV risk of drug using women in survival sex work.” <i>Social Science and Medicine</i> , 2008, 66(4): 911-21.
I.	Shannon, K., Rusch, M., Shoveller, J., Alexson, D., Gibson, K., and Tyndall, M.W. “Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among substance-using women in street-level sex work.” <i>International Journal of Drug Policy</i> , 2008, 19(2):140-7.
J.	Shannon, K., Strathdee, S.A., Shoveller, J., Rusch, M., Kerr, T., and Tyndall, M.W. “Structural and environmental barriers to condom use negotiation with clients among female sex workers; implications for HIV-prevention strategies and police.” <i>American Journal of Public Health</i> , 2008, 99(4): 659-65.
K.	Shannon, K., and Csete, J. “Violence, condom negotiation and HIV/STI risk among sex workers.” <i>Journal of the American Medical Associations</i> , 2010, 4:304(5):573-4.
L.	Shannon, K. “The hypocrisy of Canada’s prostitution legislation.” <i>Canadian Medical Association Journal</i> , 2010, 7:182(12):1388.

**MISSING
WOMEN
COMMISSION OF
INQUIRY**

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Kate Shannon
Director - Gender and Sexual Health Initiative
BC Centre for Excellence in HIV & AIDS
608 – 1081 Burrard Street
Vancouver, BC V6Z 1Y6

August 26, 2011

VIA EMAIL

Dear Dr. Shannon:

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 violence against women involved in street sex trade in the downtown eastside of Vancouver (DTES).

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 for or against a particular interest in the guise of opinions.

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

Questions

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

Violence Experienced by Women in Street Sex Trade

1. What are the common characteristics of the women involved in street sex trade in the DTES?
2. Describe the violence faced by women involved in street sex trade.
3. What personal and external indicators increase the risk of violence for women involved in street sex trade? If possible, rank the indicia.
4. List the locations where women involved in street sex trade engaged in sex trade in the DTES and explain the safety concerns for each location.
5. Describe the impacts of policing on the safety of women involved in street sex trade.

Bad Date Sheets

6. What is a bad date sheet? When were they first created and by whom? Are they still created? Who has access to bad date sheets?
7. Have you reviewed any bad date sheets produced between 1997 and 2002? If so, what was the source and what did they reveal about:
 - a. level and types of violence
 - b. locations where violence is most likely to occur
 - c. frequency of bad date sheet reporting
 - d. the extent to which women rely on bad date sheets to govern their behavior
 - e. the reasons STW report/do not report through bad date sheets
8. What self-protection strategies do women report using when engaged in street sex trade?

Relationship with Police

9. To what extent do women involved in street sex trade report the violence they experience to the police? Are there any statistics specific to the DTES? If they do not report, what reasons do they give?

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 for Faculty Members**

Date: Sept, 2011

Initial: _____

1. **SURNAME:** Shannon

FIRST NAME: Kate

2. **DEPARTMENT/SCHOOL:** Division of AIDS

MIDDLE NAME(S):

3. **FACULTY:** Medicine

JOINT APPOINTMENTS: School of Population and Public Health (Associate Faculty)

4. **PRESENT RANK:** Assistant Professor

SINCE: 2009

5. **POST-SECONDARY EDUCATION**

(a)

University or Institution	Degree	Subject Area	Dates
Queen's University, Kingston, ON	BSc & BA	Life Sciences, History	1996-2000
Centre for International Health, Curtin University, Perth, WA, Australia	Masters	Global Health	2002-2003
School of Population and Public Health, University of British Columbia, Vancouver, BC	PhD	Epidemiology, Public Health	2005-2008

(b) **Title of Dissertation and Name of Supervisor**

- | | | |
|---|--|-----------------------------------|
| 1 | PhD Dissertation: The social, structural and environmental production of HIV transmission risk among women in survival sex work. | Drs. Mark Tyndall and Thomas Kerr |
| 2 | Masters Dissertation: The social and environmental barriers to maternal malnutrition among pregnant women in rural Bangladesh: Implications for women's reproductive health. | Drs. Mohammed Ali and Zeba Mahmud |

6. EMPLOYMENT RECORD

Prior	University, Company or Organization	Rank or title	Dates
	Outlook Project, Youth At-Risk Kingston Youth Shelter	Executive & Program Leader	1998-2000
	Kingston District Association for Community Living	Outreach Support Worker	1999-2000
	Victoria Association for Community Living, Victoria BC	Community Support Worker/ Counselor	2000
	Mobile Medical Camps, Lion's Club, Gorkha District, Nepal; Partnership with Operation Eyesight Universal, Calgary AB	Consultant/ Medical Writer/ Photographer	2000-2001
	Child Haven International, Bhaktapur District, Nepal	Community Development Internship	2000-2001
	West Park French Immersion Program, Lester B Pearson School Board, Montreal QC	Integration Specialist	2001
	Mountain Designs, Perth, Australia	Customer Sales Representative	2001
	Tibetan Refugee Welfare Association, Dharmasala, Himachal Pradesh, India	Consultant/ Teacher	2001
	Early Intervention Centre, Western Australia Autism Association, Perth, Australia	Intervention Therapist	2002
	Reproductive Health and Disease Control Program, BRAC (Indigenous Health & Development NGO), Partnership with CARE International, Dhaka, Bangladesh	Researcher	2002-2003
	British Columbia Centre for Women and Children's Health, Vancouver BC	Research Consultant	2003
	British Columbia Centre for Women and Children's Health, Vancouver BC	Research Consultant	2003

Reproductive Health and Disease Control Program, BRAC (Indigenous Health & Development NGO), Partnership with Engender Health, Bangladesh	Research Consultant	2003
STI/HIV Program, UNFPA Consulting Association, Dhaka, Bangladesh	Translator/ Medical Writer	2003
British Columbia Centre for Excellence in HIV/AIDS, Vancouver BC	Research Associate	2003-2005
Centre for International Health, Curtin University, Perth, Australia	Global Health Consultant	2003-2005
Vancouver Area Network of Drug Users (VANDU), Vancouver BC	Research Consultant	2005
British Columbia Centre for Excellence in HIV/AIDS, Vancouver BC	Research Project Manager	2005-2008
Health and Wellness Centre, Simon Fraser University, Vancouver BC	Research Consultant	2006
Women's Health Research Initiative, British Columbia Centre for Excellence in Women's Health, Vancouver BC	Research Consultant	2007
BC Centre for Excellence in HIV/AIDS	Research Scientist	2008-2010

Present

University, Company or Organization	Rank or title	Dates
British Columbia Centre for Excellence in HIV/AIDS; Division of AIDS, Department of Medicine, University of British Columbia, Vancouver BC	Director, Gender & Sexual Health Initiative; Assistant Professor	2010-present
Avahan India AIDS Initiative of Bill and Melinda Gates Foundation; Centre for Global Public Health, Department of Community Medicine, University of Manitoba	Research Consultant (Mapping young women's initiation into sex work, and HIV prevention in Bangalore, India)	2008-present
Physicians for Human Rights, Cambridge, Boston, USA	Research Consultant (Gender equity, women's rights violations and HIV risk in Swaziland and Botswana)	2008-present

National Institutes of Health (NIH) Supplement Study
Global Health Division, University of California San
Diego School of Medicine

Research Consultant (Mujer Mas
Segura, Gender, power and HIV/STI risk
reduction among female sex workers
and their intimate partners in US-
Mexican border cities)

2009-present

7. LEAVES OF ABSENCE

University, Company Or Organization at which Leave was taken	Type of Leave	Dates
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8. TEACHING

(a) Areas of special interest and accomplishments

(b) Courses Taught at UBC:

Advanced Social Determinants of Health Inequities, SPPH 544, to be co-taught with Dr. Jean Shoveller, *proposed for Jan-April 2012*.

Undergraduate 4th Year Medical Elective, Sexual Health & HIV Research, Department of Medicine, 2011-present.

Quantitative Methods in Gender, Sex and Health, CIHR Institute of Gender and Health (IGH), Summer Institute, UBC, to be co-taught with Dr. Joy Johnson (IGH, Director), June 2011.

Guest Lecturer. "Criminalization and HIV globally", Guest Lecturer, HIV Prevention and Care (IHHS 402), Interdisciplinary College, University of British Columbia, Vancouver, BC, Canada, June 2011.

Guest Lecturer, "Criminalized sexual policies and the global HIV pandemic", General Rounds, School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada, April 2011.

Guest Lecturer, "Structural and gender dynamics of the global HIV pandemic", Guest Lecturer, Socio-Economic Determinants of Global Health (SPHH 521), School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada, February 2011.

Guest Lecturer. "Sexual empowerment, gender and HIV globally", Guest Lecturer, HIV Prevention and Care (IHHS 402), Interdisciplinary College, University of British Columbia, Vancouver, BC, Canada, June 2010; June 2009.

Directed Studies, Advanced Qualitative Methods in Applied Public Health, Jan-April 2010.

(c) Graduate Students supervised at UBC:

Student Name	Program Type	Year		Principal Supervisor	Co-Supervisors
		Start	Finish		
Cody Callon	Masters, Social Work Dept/ Interdisciplinary	2009	2011	Thomas Kerr	Kate Shannon
Andrea Krusi	PhD, Public health Interdisciplinary Program	2009	2013	Thomas Kerr/ Kate Shannon	
Katherine Muldoon	Masters, Global Public Health	2008	2010	Bob Hogg	Kate Shannon

Putu Duff	SFU PhD, Public Health SPPH	2010	2014	Kate Shannon/ Jeannie Shoveller	
Katherine Muldoon	PhD, Public Health SPPH	2010	2014	Kate Shannon/ Jeannie Shoveller	
Brittany Dixon-Bingham	PhD, Public Health, SFU	2010	2014	Cari Miller	Kate Shannon
Kathleen Deering	UBC, CIHR Postdoctoral & Bisby Fellowship	2011	2014	Kate Shannon	Steffanie Strathdee
Shira Goldenberg	UBC/UCSD Postdoctoral Fellow, Global Health	2011	2014	Kate Shannon/ Jay Silverman	
Laura Lee	PhD, Lui Institute Global Studies, Interdisciplinary Program	2009	2013	Erin Baines	Kate Shannon
Tara Lyons	UBC, Postdoctoral Fellow	2011	2014	Thomas Kerr/ Kate Shannon	
Kristen Hemrich	MSc, Public Health SPPH	2011	2013	Kate Shannon (incoming advisor)	
Jill Chettiar	MPH, SPPH	2011	2013	Kate Shannon	

(d) Continuing Education Activities

(e) Visiting Lecturer (indicate university/organization and dates)

"Feminization of HIV: Social and structural context of HIV/AIDS" Faculty of Health Sciences, Simon Fraser University, August 2009.

"Intersection of gender-based violence and HIV transmission risk among street-based sex workers: Towards evidence-based policy and prevention." Centre for Applied Research on Mental Health and Addiction (CARMHA) Rounds, Faculty of Health Sciences, Simon Fraser University, Vancouver, BC, Canada, July 2008.

"Working with communities on research", SPPH 607, School of Population and Public Health, University of British Columbia, Vancouver, Canada, September 2008

"Maximizing opportunities for academic funding: grants and scholarships", SPPH 607, School of Population and Public Health, University of British Columbia, Vancouver, Canada, September 2007

9. SCHOLARLY AND PROFESSIONAL ACTIVITIES

(a) Areas of special interest and accomplishments

(b)+(c) Research or equivalent grants/contracts (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))

05. Refereed Grants

Research or equivalent grants/contracts (indicate under COMP whether grants were obtained competitively (C) or non-competitively (NC))

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
Public Health Agency of Canada (AIDS Community Action Program)	Peer-led HIV prevention among women in survival sex work: The Maka project	C	\$50,000	2005-2007	Kate Gibson Kate Shannon	M Tyndall V Bright J Duddy
CIHR Operating Grant, Community-Based HIV Research Program	Maka Initiative: HIV prevention and care among survival sex workers	C	\$94,733	2005-2008	Mark Tyndall Kate Shannon	T Kerr E Wood A Palepu K Gibson J McGuire et al. C Patton N Press C Schooner
CIHR Operating Grant	Enhancing uptake and sustainability of HIV care and antiretroviral therapy among survival sex workers	C	\$125,074	2006-2009	Mark Tyndall	K Shannon E Wood T Kerr A Palepu K Gibson T Orchard V Bright
CIHR Knowledge Translation Grant	Responding to gaps in HIV prevention and access to care among survival sex workers	C	\$24,650	2008-2009	Kate Shannon Mark Tyndall	T Kerr E Wood A Palepu K Gibson J McGuire et al.

CIHR Operating Grant	Doing time: A time for incarcerated women to develop a health action strategy	C	\$150,000	2008-2010	Ruth Martin Patricia Janssen	K Shannon A Macaulay G Ogilvie J Frankish J Buxton V Ramsden et al.
CIHR Operating Grant	Highly active antiretroviral therapy as an additional prevention tool	C	\$150,000	2008-2011	David Moore Julio Montaner	K Shannon E Mills C Nabiryo R King et al.
National Institutes of Health (NIH)	Evaluating the natural history of injection drug use	C	\$433,866	2009-2014	Thomas Kerr Evan Wood	K Shannon JS Montaner SA Strathdee J Shoveller RS Hogg et al.
CIHR	CIHR Centre for REACH (Research Evidence into Action for Community Health) in HIV/AIDS	C	\$500,000	2009-2014	Sean Rourke Jacqueline Gahagan Robert Hogg Stephaine Nixon et al.	K Shannon E Mills R Elliott et al.
CIHR	Exploring the social and environmental context of injection drug use	C	\$100,000	2009-2012	Thomas Kerr Kate Shannon	E Wood J Shoveller W Small L Maher
CIHR, Institute of Gender, Sex and Health	Evaluating the role of structural inequities, violence, and power in shaping HIV/STI risk among adolescents and young women in sex work	C	\$150,000 (5 years)	2009-2014	Kate Shannon	J Shoveller JS Montaner E Wood T Kerr MW Tyndall M Rusch SA Strathdee

CIHR Community- Based HIV Catalyst Grant	Mapping and contextualizing public sex work spaces: A community-based pilot project	C	\$25,000	2009- 2010	Kate Shannon	J Shoveller T Kerr K Deering K Gibson J Chettiar
Global Health Research Initiative (IDRC, CIDA, CIHR, PHAC)	Canadian-African HIV Prevention Trials (CAPT) Network	C	\$500,000 (5 years)	2010- 2015	David Moore Bill Cameron Pontiano Kaleebu Guy De Bruyn	K Shannon E Mills J Kimani C Nabiryo A Coutinho et al.
NIH	Social and structural context of HIV/STI risk among FSWs	C	\$500,000 (5 years)	2010- 2015	Kate Shannon	J Shoveller J Montaner E Wood T Kerr MW Tyndall A Browne G Olgilvie S Strathdee S Aral
NIH	At-Risk Youth Study (ARYS)	C	\$400,000 (5 years)	2010- 2015	Evan Wood	K Shannon T Kerr JS Montaner MW Tyndall J Shoveller J Buxton E Roy
CIHR	Investigating and addressing injection drug use and other harms among street-involved youth: The ARYS Project	C	\$160,000 (5 years)	2010- 2015	Evan Wood	J Buxton S Hadland PR Harrigan B Marshall JS Montaner T Patterson E Roy K Shannon J Shoveller SA Strathdee MW Tyndall

CIHR Programmatic Grants (Under Review)	Evaluating population health interventions to reduce health inequities among vulnerable populations	C	\$400,000 (5 years)	2011-2016	Kate Shannon	T Kerr J Shoveller V Smye SA Strathdee J Blanchard S Moses L Lorway L Casey J Csete J Montaner K Deering
CIHR Team Grant on Gender, Violence and Health	Team grant on social and structural violence, gender inequities and HIV	C	\$300,000 (5 years)	2011-2016	Kate Shannon	T Kerr J Shoveller V Smye SA Strathdee J Blanchard S Moses L Lorway E Wood L Casey J Csete J Montaner
NIH (Recommended for Funding)	Ethno-spatial epidemiology of HIV risk environments among FSW and DU	C	\$450,000 (5 years)	2011-2016	Kate Shannon, Thomas Kerr	J Shoveller L Maher T Rhodes P Bourgois SA Strathdee H Cooper E Wood J Montaner W Small

Contracts

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co-Investigator(s)
Vancouver Coastal Health/ Canada BC Bid Contract	Evaluating a Women's Residential Treatment Program for Sex Workers (Rainier House)	C	\$100,000 (4 years)	2009-2013	Kate Shannon	

Salary Support Award

Granting Agency	Subject	COMP	\$ Per Year	Year	Principal Investigator	Co- Investigator(s)
CIHR	Doctoral Research Award	C	\$21,000	2005-2008	Kate Shannon (Supervisors: Mark Tyndall, Thomas Kerr)	
Integrated Mentorship Program in Gender, Women, Addictions, and Trauma (IMPART), Strategic Initiative of CIHR	Doctoral Fellowship	C	\$20,000	2005-2008	Kate Shannon (Mentor: Patricia Spittal)	
Michael Smith Foundation for Health Research (MSFHR)	Senior Graduate Trainee Award, Population Health	C	\$21,500	2006-2009	Kate Shannon (Supervisors: Mark Tyndall, Thomas Kerr)	
Canadian Association for HIV/AIDS Research	New Investigator Award, Epidemiology and Public Health	C	\$1,000	2007	Kate Shannon	
CIHR	Population and Public Health Intervention Research, CIHR Summer Institute	C	\$3,000	2007	Kate Shannon	
CIHR, Partnership with Canadian Coalition in Global Health Research	Fellowship (declined)	C	\$45,000	2008-2011	Kate Shannon	

CIHR	Bisby Award (Top-ranked CIHR fellow by peer-review committee) (declined)	C	\$10,000	2008-2011	Kate Shannon
CIHR	New Investigator Award (top-ranked new investigator in CIHR's annual competition)	C	\$60,000	2011-2016	Kate Shannon
MSFHR	MSFHR Scholar Award	C	\$100,000	2011-2019	Kate Shannon
CIHR	Peter Lougheed Prize (Top-Ranked New Investigator in Canada in 2010)	C	\$100,000	2011-2014	Kate Shannon

(d) Invited Presentations (Select of 47 total)

- 1 "Women and HIV: The feminisation of the HIV Pandemic", Panel Session: Emerging Diseases Among Women in BC, MSFHR Women's Health Research Network, Winter Institute, University of British Columbia. February 2007.
- 2 "Lessons learned from a participatory-action and intervention research project on HIV prevention and treatment among women in survival sex work." Panel Discussion and Workshop. 11th Annual BC Aboriginal HIV/AIDS Conference, Honouring the circle: Our ways, our traditions, Victoria, BC. March 2007.
- 3 "Gaps in HIV prevention and harm reduction among women in survival sex work: Maka Project Updates." Cfe Forefront Lecture Series, St Paul's Hospital rounds. May 2007.
- 4 "International perspectives on HIV disclosure laws", Centre for International Health, University of British Columbia. February 2008.
- 5 "Violence and Sex Work Policy." British Columbia Occupational Health and Safety Research Network Rounds, Michael Smith Foundation for Health Research, University of British Columbia. May 2008.
- 6 "Gender-based violence in driving HIV transmission among women." Summer Institute, Women's Health Research Network, BC. Victoria, BC. May 2008
- 7 "Violence, HIV, and Sex Work Policy." British Columbia Occupational Health and Safety Research Network Rounds, Michael Smith Foundation for Health Research, University of British Columbia, Vancouver, BC, Canada, May 2008.
- 8 "Evidence-based responses to improving the health and safety of sex workers", Public Forum, Feminists Advocating for Rights and Equality of Sex Industry Workers (FIRST), Vancouver Public Library, June 2008.
- 9 "Intersection of gender-based violence and HIV transmission risk among street-based sex workers: Towards evidence-based policy and prevention." Centre for Applied Research on Mental Health and Addiction (CARMHA) Rounds, Faculty of Health Sciences, Simon Fraser University. July 2008.

- 10 "Global overview of sex work and HIV prevention", HIV Prevention Programs with Female Sex Workers, XVII International AIDS Conference, Mexico City. August, 2008.
- 11 "Developing an evidence-based response to the HIV epidemic among marginalized populations: The Vancouver experience", HIV Symposium, Northern Health Authority & Positive Living North, Prince George, BC, Canada, October 2008.
- 12 "Gender-based violence and HIV transmission risk", UBC World AIDS Day, Vancouver, BC, Canada, November 2008.
- 13 "Women and HIV: Social and structural drivers and the female sex industry", Antiretroviral Update, Providence Health/ BC Centre for Excellence in HIV/AIDS, Vancouver, BC, Canada, May 2009.
- 14 "Evidence-based prevention among drug use and sex work populations", Special NIH-Sponsored Panel Discussion Session. 5th International HIV Pathogenesis and Treatment Conference, Cape Town, South Africa, July 2009.
- 15 "Criminalization, sex work and HIV", Presented to Dr. Richard Horton, Editor-In-Chief, Lancet, Vancouver, BC, September 2009.
- 16 Invited Discussant, CIHR Institute of Gender, Sex and Health - Gender, Violence & Health Roundtable, January 2010
- 17 "Female sex work and HIV prevention in Canada and globally", Presented to Honourable Kevin Falcon, Minister of Health Services of British Columbia, BC Centre for Excellence in HIV/AIDS, Vancouver, BC, January 2010.
- 18 "The feminization of the HIV pandemic", Presented to Michel Sidibe, Executive Director, UNAIDS, BC Centre for Excellence in HIV/AIDS, Vancouver, BC, January 2010.
- 19 "Gender and Sexual Health Initiative: The feminization the global HIV pandemic", Presented to Dr. Stefano Bertozzi, Chief of HIV/AIDS, Bill and Melinda Gates Foundation, BC Centre for Excellence in HIV/AIDS, Vancouver, BC, February 2010.
- 20 "Violence, criminalization and HIV among sex workers", AIDS Care Rounds, St Paul's Hospital, April 2010.
- 21 "Gender and Sexual Health Initiative: Opportunities to Monitor and Evaluate HIV/ART", Presented to Dr. Kolker, Chief of HIV/AIDS for UNICEF, BC Centre for Excellence in HIV/AIDS, Vancouver, BC, August 2010.
- 22 "Sex work vulnerable women and HIV: progress and challenges", Presented to Mayor Robertson, City Councillor Kerry Jang, BC Centre for Excellence in HIV/AIDS, Vancouver, BC, October 2011; June 2009.
- 23 "Sex work, violence and policy: UN Human Rights Council", University of Washington, Seattle, USA, February 2011.
- 24 "Women and HIV", Expert Panel, UNAIDS HIV Prevention Policing Meeting, co-hosted with Health Canada and PHAC, Ottawa, ON, Canada, February 2011.
- 25 "Sex work and public health", Four Pillars Event, City of Vancouver, BC, March 2011.
- 26 "Criminalized sexual policies and the global HIV pandemic", Grand Rounds, School of Population and Public Health, University of British Columbia, Vancouver, BC, April 2011.

(e) Other Presentations

(f) Other

(g) Conference Participation (Organizer, Keynote Speaker, etc.)

- 1 Scientific Organizing Committee, International Conference on Urban Health, 2007-2008
- 2 Co-Chair, "Sexual Risk and HIV Outcomes", Epidemiology and Public Health Track, Canadian HIV/AIDS Research Conference, Montreal, Canada, April 2008
- 3 Co-Chair, "HIV Prevention Programs with Female Sex Workers", XVII International AIDS Conference, Mexico City, August 2008
- 4 Chair, "Global Perspectives on Urban Health", International Conference on Urban Health, October 2008

- 5 Scientific Organizing Committee/ Track Co-Chair (Social Sciences), Canadian HIV/AIDS Research Conference, 2008-2009
- 6 Chair/ Moderator, HIV Update, Providence Health/ BC Centre for Excellence in HIV/AIDS, November 2009

10.1 SERVICE TO THE UNIVERSITY

(a) Memberships on committees, including offices held and dates

- 1 Working Group, Global Health & Vulnerable Populations Stream, School of Population and Public Health, UBC, 2008-2009
- 2 Department of Medicine, Research & Policy Taskforce, UBC, 2009-present

(b) Other service, including dates

10.2 SERVICE TO THE HOSPITAL

(a) Memberships on committees, including offices held and dates

(b) Other service, including dates

11. SERVICE TO THE COMMUNITY

(a) Memberships on scholarly societies, including offices held and dates

- 1 Member, Canadian Public Health Association, 2003-present
- 2 Member, Canadian Society for International Health, 2003-present
- 3 Member, International AIDS Society, 2004-present
- 4 Member, International Harm Reduction Association, 2004-present
- 5 Member, Canadian Association for HIV/AIDS Research, 2004-present

(b) Memberships on other societies, including offices held and dates

- 6 Chair, Epidemiology & Public Health Track, Scientific Review Committee, Ontario HIV Treatment Network, Epidemiology Track, 2008-2011
- 7 Scientific Review Committee, Canadian Institutes of Health Research, Community Based HIV Research Program, 2008-2010

(d) Memberships on other committees, including offices held and dates

- 8 Monitoring and Evaluation in Complex Disasters, OXFAM Professional Training Course, Sydney, Australia, 2002
- 9 Gender and Development throughout the Project Cycle, OXFAM Professional Training Course, Melbourne, Australia, 2002
- 10 Aboriginal Health Working Group, School of Public Health, WA, Australia, 2002
- 11 Working Group, Disaster Medicine Conference, UBC Medicine, St Paul's Hospital, Canada, 2003

- 12 Engender Health Workshops, STI/ HIV Needs Among Adolescents, Dhaka, Bangladesh, 2003
- 13 Member, Joint Board of Study/ Advisory Committee for Centre for International Health, Perth, Australia, 2004-2004
- 14 Member, Sex Trade Law Reform Committee, Pivot Legal Society, Vancouver, Canada, 2004-2005
- 15 Member, Policy and Programming Committee, Women's Information Safe Haven (WISH) Society, 2004-2005
- 16 Member, Fundraising Committee, Women's Information Safe Haven (WISH) Society, 2004-2005
- 17 Member, Women's Health Advisory, Downtown Community Health Clinic, Vancouver, Canada, 2005-2006
- 18 Member, Research and Policy Committee, National Blueprint for Action on Women and HIV in Canada, 2005-2007
- 19 Member, Canadian National Working Group on Women and Substance Use, 2007-2008
- 20 Member, Women's Health Research Institute, British Columbia Centre for Excellence in Women's Health, 2007-present
- 21 Member, Women's Health Research Network, Michael Smith Foundation for Health Research, 2007-present
- 22 Member, Oversight Committee, BC Women's Health Research Network (MSFHR), Canada, 2007-2009
- 23 Member, Working Group, "Switching Gears in HIV Research: HIV-Positive Women's Fertility Desires and Sexual Decision Making in the Era of HAART", Johannesburg, South Africa, April 2008
- 24 Expert Witness, Charter Challenge to Criminal Code Provisions Related to Prostitution, Pivot Legal Society, British Columbia Supreme Court of Canada, 2008-present

(e) Editor (journal, agency, etc. including dates)

Associate Editor, International Journal of Drug Policy, 2010-present

(f) Reviewer (journal, agency, etc. including dates)

- 25 Abstract Reviewer, International AIDS Conference, Toronto(2006), Mexico City(2008)
- 26 Abstract Reviewer, International Conference on the Reduction of Drug-Related Harm, 2006
- 27 Reviewer, AIDS Care, 2006-present
- 28 Substance Use Prevention, Treatment and Policy, 2006-present
- 29 Reviewer, International Journal of Drug Policy, 2006-present
- 30 Abstract Reviewer, International HIV Pathogenesis and Treatment Conference, Sydney(2007), Cape Town(2009)
- 31 Reviewer, American Journal of Public Health, 2007-present
- 32 Reviewer, Social Science and Medicine, 2007-present
- 33 Reviewer, SAHARA (Social Aspects of HIV/AIDS Research Alliance) for Sub-Saharan Africa, 2007-present
- 34 Reviewer, Drug and Alcohol Dependence, 2007-present
- 35 Reviewer, Harm Reduction Journal, 2007-present
- 36 Abstract Reviewer, International AIDS Conference, 2008
- 37 Abstract Reviewer, Canadian HIV/AIDS Research Conference, 2008, 2009
- 38 Abstract Reviewer, Canadian Public Health Association Conference, 2008, 2009
- 39 Reviewer, JAIDS, 2009-present

- 40 Reviewer, International Journal of STD and AIDS, 2009-present
- 41 Reviewer, BMC Public Health, 2009-present
- 42 Reviewer, Sexually Transmitted Infections, 2009-present
- 43 Reviewer, Culture, Health & Sexuality, 2009-present
- 44 Grant Reviewer, Canadian Institutes of Health Research (CIHR), HIV Infection and Immunity Panel, 2009; Population Health Milestones, 2010
- 45 Reviewer, CIHR Community-Based HIV Research Panel, 2009-2010
- 46 Reviewer, Epidemiology & Public Health Track, Ontario HIV Treatment Network, 2009-2011

12. AWARDS AND DISTINCTIONS

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

- 1 Dean's List, Health Sciences Program, Dawson College, 1995-1996
- 2 Senator Frank Carrel Upper Year Scholarship, Queen's University, Kingston, Canada, 1998-1999
- 3 International AIDS Society Scholarship, XV International AIDS Conference, Bangkok, Thailand, July 2004
- 4 International AIDS Society Scholarship, 3rd International HIV Pathogenesis and Treatment Conference, Rio de Janeiro, Brazil, July 2005
- 5 Canadian Scholarship – XVI International AIDS Conference, Toronto, Canada, August 2006
- 6 Canadian HIV/AIDS Research Scholarship, Social Sciences Track, Toronto, Canada, April 2007
- 7 BC Child and Youth Institute Scholarship, International Health Promotion & Education Conference, Vancouver, Canada, June 2007
- 8 International AIDS Society Scholarship, 4th International HIV Pathogenesis and Treatment Conference, Sydney, Australia, July 2007 – declined
- 9 AccolAIDS Award- Innovative Programs and Services (Maka Project, co-PI), British Columbia Persons With AIDS Society (BCPWA), Vancouver, Canada, April 2008
- 10 Canadian HIV/AIDS Research Scholarship, Epidemiology and Public Health Track, Montreal, Canada, May 2008
- 11 International AIDS Society Scholarship, XVII International AIDS Conference, Mexico City, Mexico, August 2008
- 12 International AIDS Society Scholarship, 5th International HIV Pathogenesis and Treatment Conference, Cape Town, South Africa, July 2009

University of British Columbia
Publications and Grants Record

Date: Sept, 2011

Initial: _____

FIRST NAME: Kate

1. SURNAME: Shannon

MIDDLE NAME(S):

01. Refereed Publications

(a) Journals

- 1 Shannon K, V Bright, J Duddy, MW Tyndall, Access and utilization of HIV treatment and services among women sex workers in Vancouver's Downtown Eastside. *Journal of Urban Health*, 2005; 82(3): 488-97.
- 2 Kerr T, E Wood, E Grafstein, T Ishida, K Shannon, C Lai, J Montaner, MW Tyndall, High rates of primary care and emergency department use among injection drug users in Vancouver. *Journal of Public Health*, 2005; 27(1): 62-6.
- 3 Shannon K, T Kerr, C Lai, T Ishida, E Wood, JS Montaner, RS Hogg, MW Tyndall, Non-adherence to antiretroviral therapy among a community with endemic rates of injection drug use. *J Int Assoc Physicians AIDS Care (JIAPAC)*, 2006; 4(3): 66-72.
- 4 Shannon K, T Kerr, R Morgan, A Bear, M Oleson, T Ishida, MW Tyndall. Potential community and public health impacts of a medically supervised safer smoking facility for crack cocaine users. *Harm Reduction Journal*, 2006; 3(1).
- 5 Shannon K, T Ishida, C Lai, A Palepu, MW Tyndall, The impact of unregulated single room occupancy hotels on health status of illicit drug users in Vancouver. *International Journal of Drug Policy*, Special Issue on City of Vancouver, 2006; 17(2): 107-14.
- 6 Shannon K, V Bright, K Gibson, MW Tyndall, Sexual and drug-related vulnerabilities to HIV infection among women engaged in survival sex work in Vancouver, Canada. *Canadian Journal of Public Health*. 2007; 98 (6): 465-9.
- 7 Shannon K, V Bright, S Allinott, D Alexson, K Gibson, MW Tyndall. Community-based HIV prevention research with substance-using women in survival sex work: The Maka Project. *Harm Reduction Journal*. 2007; 4 (20).
- 8 Beck K, K Shannon, K Li, JS Montaner, E Wood, T Kerr. Income generating activities of people who inject drugs. *Drug and Alcohol Dependence*. 2007; 91(1): 50-6.
- 9 Stoltz J-A, K Shannon, K Li, JS Montaner, T Kerr, E Wood. Associations between childhood maltreatment and sex work in a cohort of drug-using youth. *Social Science and Medicine*. 2007; 65(6): 1214-1221.
- 10 Bright V, K Shannon. A participatory-action and interventional research approach to HIV prevention and treatment among women in survival sex work. *Research for Sex Work*, 2008; 10.
- 11 Wood E, J Schachar, K Li, J-A Stoltz, K Shannon, C Miller, E Lloyd-Smith, MW Tyndall, T Kerr. Sex trade involvement is associated with elevated HIV incidence among injection drug users in Vancouver. *Addiction Research and Theory*. 2007; 15(3): 321-5.
- 12 Fielden S, M Rusch, A Levy, E Wood, K Shannon, JS Montaner, RS Hogg. Non-Adherence Increases the Risk of Hospitalization Among HIV Infected Antiretroviral-Naïve Patients Started on HAART. *J Int Assoc Physicians AIDS Care (JIAPAC)*. 2008; 7(5); 238-244.

- 13 Fairbairn N, W Small, K Shannon, E Wood, T Kerr. Seeking refuge from violence in street-based drug scenes: Women's experiences in North America's first supervised injection facility. *Social Science and Medicine*. 2008; 67(5): 817-23.
- 14 Shannon K, T Kerr, S Allinott, J Chettiar, J Shoveller, MW Tyndall. Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work. *Social Science and Medicine*. 2008; 66(4): 911-21.
- 15 Shannon K, T Kerr, V Bright, K Gibson, MW Tyndall. Drug sharing with clients as a risk marker for increased violence and sexual and drug-related harms among women in survival sex work. *AIDS Care*. 2008; 20(2): 235-41.
- 16 Shannon K, M Rusch, R Morgan, M Oleson, T Kerr, MW Tyndall, HIV and HCV prevalence and gender-specific risk profiles of crack cocaine smokers and dual users of injection drugs. *Substance Use and Misuse*. 2008; 43(3): 1-14.
- 17 Shannon K., M Rusch, V Bright, D Alexson, J Shoveller, MW Tyndall. Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among women in survival sex work. *International Journal of Drug Policy (IJDP)*, Special Issue on Women and Harm Reduction, 2008; 19(2): 140-7.
- 18 Shannon K., Z Mahmud, A Asfia, M Ali. The social and environmental factors underlying maternal malnutrition in rural Bangladesh: Implications for reproductive health and nutrition programs. *Health Care for Women International*. 2008; 29(8): 826-40.
- 19 Shannon K, A Kaida, B Rachlis, E Lloyd-Smith, G Gray, SA Strathdee. Reconsidering the impact of conflict on HIV transmission in the era of ART scale up in sub-Saharan Africa: a gender lens. *AIDS*. 2008; 22: 1705-7.
- 20 Kerr T, B Marshall, C Miller, K Shannon, JS Montaner, E Wood. Injection drug use among street-involved youth in a Canadian setting. *BMC Public Health*, 2009; 9: 171.
- 21 Shannon K, SA Strathdee, M Rusch, J Shoveller, T Kerr, MW Tyndall. Structural and environmental barriers to condom negotiation with clients among female sex workers: Implications for HIV prevention strategies and policy. *American Journal of Public Health (AJPH)*. 2009; 99(4): 659-65.
- 22 Shannon K, T Kerr, SA Strathdee, J Shoveller, JS Montaner, MW Tyndall. Prevalence and correlates of gender-based violence among a cohort of female sex workers. *British Medical Journal (BMJ)*. 2009; 339: b2939
- 23 Deering K, K Shannon, D Parsad, H Sinclair, MW Tyndall. Results of a pilot peer-driven intervention model to increase HIV care support and antiretroviral therapy adherence among HIV-positive women. *AIDS Patient Care & STDs*. 2009; 23(8): 603-9.
- 24 Fast D, Shoveller JA, Shannon K, Kerr T. Safety and danger in downtown Vancouver: Understandings of place among young people entrenched in an urban drug scene. *Health & Place*, 2009; 16(1): 51-60.
- 25 Shannon K, T Kerr, MW Tyndall, SA Strathdee, R Zhang, JS Montaner, E Wood. Survival sex work involvement as a primary risk factor for Hepatitis C acquisition among drug-using youth. *JAMA Archives of Pediatrics and Adolescent Medicine (APAM)*, 2010; 164(1): 61-5.
- 26 Marshall B, K Shannon, T Kerr, E Wood. Survival sex among sexual minority youth and elevated risk for HIV infection. *Journal of AIDS (JAIDS)*, 2009; 53(5):661-4.
- 27 Chettiar J, K Shannon, E Wood, R Zhang, T Kerr. Prevalence of youth engaged in sex work in a Canadian setting. *Journal of Public Health*, 2010: 32(3): 322-7.
- 28 Deering K, T Kerr, MW Tyndall, K Gibson, K Shannon. Mobile peer-led outreach is correlated with elevated use of detoxification and drug treatment services among street-based sex workers. *Drug and Alcohol Dependence*. 2011; 113(1): 46-54.
- 29 Montaner J, Wood E, Kerr T, Shannon K, Harrigan R. Expanded access to HAART among substance users. *Journal of AIDS (JAIDS)*. 2010 1;55 Suppl 1:S5-9.
- 30 Montaner JM, Lima V, Hogg R, Barrios R, Wood E, Yip B, Kerr T, Shannon K, Harrigan R, Daly P. Expanded HAART Coverage is Associated with Decreased Population-level HIV-1-RNA and Annual New HIV Diagnoses in British Columbia, Canada. *Lancet*. 2010; 376(9740): 532-9.
- 31 Shannon K, SA Strathdee, J Shoveller, JS Montaner, MW Tyndall. Crystal methamphetamine among sex

- workers: Beyond individual-focused interventions. *Drug and Alcohol Dependence*. 2011; 113(1): 76-8.
- 32 Shannon K. The hypocrisy of Canada's prostitution legislation. *Canadian Medical Association Journal (CMAJ)*, 2010; 182(12): 1388.
- 33 Shannon K, J Csete. Violence, condom negotiation and HIV/STI risk among sex workers. *Journal of the American Medical Association (JAMA)*, Special Issue on Violence and Human Rights. 2010; 4;304(5):573-4.
- 34 Khanakwa S, M Ngolobe, D Moore, Robert Mwesigwa, J Birungi, R King, K Shannon. Gendered sexual risk patterns among young women and men in polygynous HIV serodiscordant partnerships in Uganda. *Culture, Health and Sexuality*, Special Issue on HIV Serodiscordance, 2011, In Press.
- 35 Tsai A, K Shannon, S Weiser, K Leiter, LM Butler, Z Hlanz, M Heiser, V Iacopino. Prevalence of sexual violence against women in Swaziland and Botswana. *American Journal of Public Health (AJPH)*. Epub Ahead of Print.
- 36 Miller C, SJ Fielden, MW Tyndall, D Parsad, K Gibson, K Shannon. Are we failing our most vulnerable? Enhanced structural vulnerabilities among youth who exchange sex for survival. *Journal of Adolescent Health*. 2010, Epub Ahead of Print.
- 37 Deering K, K Shannon, BM Ramesh, J Blanchard, S Moses. Interpersonal factors and inconsistent condom use within longer-term partnerships of female sex workers in four districts in Karnataka, south India. *Sexually Transmitted Infections (STI)*, Special Issue on Avahan India AIDS Initiative, 2011, In Press.
- 38 Shannon K, S Weiser, K Leiter, LM Butler, Z Hlanz, M Heiser, JS Montaner, V Iacopino. Gender inequities elevate perpetration of rape and sexual HIV risk in a population-based probability sample in Botswana and Swaziland. *PLoS ONE*, 2011, Provisionally Accepted
- 39 Lazarus L, K Deering, R Nabess, K Gibson, K Shannon. Occupational stigma as a primary barrier to health access among street-based sex workers in an urban setting. *Culture, Health & Sexuality*, 2011, In Press.
- 40 Deering K, Shoveller J, Tyndall MW, JS Montaner, K Shannon. Street costs of drugs and drug use patterns: relationship to sex work income in an urban Canadian setting. *Drug Alcohol Dependence*, 2011, In Press.
- 41 Shannon K, T Kerr, M Milloy, A Anema, JS Montaner, E Wood. Food insecurity is associated with elevated unprotected sex among HIV-positive injection drug users independent of antiretroviral therapy use. *AIDS*. Epub Ahead of Print.
- 42 Duff K, K Deering, MW Tyndall, K Shannon. High rates of homelessness among street-based sex workers: The need for place-based, safer environment interventions. *BMC Pub Health*. Epub Ahead of Print.
- 43 Duff K, J Shoveller, D Parsad, R Zhang, JM Montaner, K Shannon. High rates of lifetime pregnancy and adverse pregnancy outcomes among female sex workers: Unmet reproductive health needs. *Reprod Health*.
- 44 Lazarus L, J Chettiar, K Deering, R Nabess, K Shannon. Women's search for safe, non-exploitative housing in Canada's poorest postal code: Gendered risk environments. *Soc Sci Med*. In Press.
- 45 Krusi A, J Chettiar, A Ridgeway, J Abbott, K Shannon. Negotiating safety and sexual risk reduction in unsanctioned quasi-brothels: A qualitative evaluation. *AJPH*. Provisionally Accepted.
- 46 Shannon K, S Weiser, K Leiter, LM Butler, Z Hlanz, M Heiser, JS Montaner, V Iacopino. Gender inequity norms and associations with perpetration of rape and sexual HIV risks in Botswana and Swaziland. *PLoS ONE*. Provisionally Accepted.

02. Non Refereed Publications

(a) Journals

- 1 Shannon K, V Bright, Giving women sex workers a voice: steps towards HIV prevention, treatment, and care, *Living Positive Magazine*, BCPWA, May/June 2005.
- 2 Shannon K, V Bright. Building a safety net: Maka Project updates. *Living Positive Magazine*, BC Persons With AIDS Society (BCPWA), January/ February 2007.

03. Books

(c) Chapters

- 1 Shannon K, PM Spittal, Thomas V. Intersections of trauma, substance use, and HIV vulnerability among Aboriginal girls and young women who use drugs: in *Highs and Lows: Canadian Perspectives on Women and Substance Use*, Eds. Lorraine Greaves and Nancy Poole. Canadian Centre for Addictions. 2007.
- 2 Chettiar J, L Pelletier, K Shannon. Voices from the street: Sex workers experiences as peer researchers in a community-based HIV prevention research project. *Feminist Methodologies in Community Research*, Eds. Gillian Creese and Wendy Krisby. UBC Press, 2010.
- 3 Rhodes T, S Strathdee, K Shannon, T Rhodes. Social epidemiology of structural vulnerability and HIV risk among sex workers and people who use drugs, *Social Epidemiology*, Eds. Patricia O'Campo. U of Toronto Press, 2011.
- 4 Aggleton P, J Shoveller, K Shannon, R Knight. Getting the balance right: Agency and structure in HIV prevention". *Structural Approaches in Public Health*, Eds. M Summer & R Parker. London Press, 2011.

04. Other Works

Peer-Reviewed Abstracts (Accepted/ Presented at Conferences)

- 1 Bright, V, K Shannon , J Duddy, T Seradis, MW Tyndall. Enhancing access to antiretroviral therapy among female sex workers in Vancouver. 15th International Conference on the Reduction of Drug Related Harm, Melbourne, Australia, April 2004.
- 2 Kerr T, T Ishida, C Lai, K Shannon, MW Tyndall, Primary Care Access and Emergency Room Use Among Injection Drug Users In Vancouver's Downtown Eastside. 15th International Conference on the Reduction of Drug Related Harm, Melbourne, Australia, April 2004.
- 3 Bright, V., K Shannon, F Ranville, B Hawkes, MW Tyndall. Health service delivery to female sex workers in Vancouver. XIII National Canadian Conference on HIV/ AIDS Research, Montreal, QC, May 2004. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 15 (Suppl A).
- 4 Ishida, T., T Kerr, C Lai, K Shannon, E Graftstein, MW Tyndall, The Community Health and Safety Evaluation (CHASE) Project Cohort. XIII National Canadian Conference on HIV/ AIDS Research, Montreal, QC, May 2004. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 15 (Suppl A).
- 5 Kerr, T., T Ishida, C Lai, K Shannon, E Graftstein, MW Tyndall. Primary care access and emergency room use among injection drug users in Vancouver's Downtown Eastside. XIII National Canadian Conference on HIV/ AIDS Research, Montreal, QC, May 2004. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 15 (Suppl A).
- 6 Shannon, K., V Bright, J Duddy, T Serasidis, T Ishida, MW Tyndall. Uptake and acceptance of antiretroviral medication among female sex workers in Vancouver, Canada. XIII National Canadian Conference on HIV/ AIDS Research, Montreal, QC, May 2004. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 15 (Suppl A). (Oral)
- 7 Tyndall, MW, C. Lai, T Ishida, K Shannon, D Cook, T Kerr. Continued high rates of HIV and Hepatitis C transmission among injection drug users in Vancouver, Canada. XIII National Canadian Conference on HIV/ AIDS Research, Montreal, QC, May 2004. *Canadian Journal of Infectious Diseases and Medical Microbiology*, 15 (Suppl A).
- 8 Bright, V., K Shannon, F Ranville, B Hawkes, MW Tyndall. Health service delivery to female sex workers in Vancouver. XV International AIDS Conference, Bangkok, Thailand, July 2004.

- 9 Ishida, T., T Kerr, C Lai, K Shannon, MW Tyndall. HIV infection and related risks among Aboriginal injection drug users in Vancouver, Canada. XV International AIDS Conference, Bangkok, Thailand, July 2004.
- 10 Kerr, T., T Ishida, C Lai, K Shannon, E Graftstein, MW Tyndall, The impact of HIV infection on primary care access and emergency room use in Vancouver, Canada. XV International AIDS Conference, Bangkok, Thailand, July 2004.
- 11 Shannon, K., V Bright, T Ishida, J Duddy, T Serasidis, MW Tyndall. Uptake and acceptance of antiretroviral medication among female sex workers in Vancouver's Downtown Eastside. XV International AIDS Conference, Bangkok, Thailand, July 2004.
- 12 Tyndall, MW., C Lai, T Ishida, K Shannon, E Wood, D Cook, T Kerr, Continued high rates of HIV and Hepatitis C transmission among injection drug users in Vancouver, Canada. XV International AIDS Conference, Bangkok, Thailand, July 2004.
- 13 Duddy, J., K Shannon, V Bright, M Oleson, MW Tyndall, Vancouver's caregivers have a responsibility to create socially relevant HIV/AIDS treatment for women sex workers. 16th International Conference on the Reduction of Drug Related Harm, Belfast, Ireland, March 2005.
- 14 Shannon, K., T Ishida, A Bear, R Morgan, M Oleson, MW Tyndall. Health related harms of crack cocaine use: a peer-led initiative. 16th International Conference on the Reduction of Drug Related Harm, Belfast, Ireland, March 2005.
- 15 Shannon, K., V Bright, J Duddy, M Oleson, K Gibson, MW Tyndall, HIV vulnerabilities among women survival sex workers in Vancouver's Downtown Eastside. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A). (Oral)
- 16 Shannon, K., T Kerr, C Lai, T Ishida, JS Montaner, RS Hogg, MW Tyndall, Low adherence rates to antiretroviral therapy among a community with endemic rates of injection drug use. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A). (Oral)
- 17 Shannon, K., T Kerr, C Lai, T Ishida, A Palepu, E Wood, MW Tyndall, Poor health status and intensive drug use among residents of unregulated single room occupancy hotels. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A).
- 18 Shannon, K., E Wood, CL Collins, K Li, MW Tyndall, T Kerr, Factors associated with crack pipe sharing among a cohort of injection drug users. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A).
- 19 Bright, V., K Shannon, J Duddy, M Oleson, K Gibson, MW Tyndall, Low frequency of condom use among survival sex workers. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A). (Oral)
- 20 Ishida, T., K Shannon, R Morgan, A Bear, M Oleson, MW Tyndall, Health related harms of crack cocaine smoking. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A).
- 21 Rusch, M., K Shannon, C Lai, T Ishida, MW Tyndall, Association of HIV serostatus and testing positive for syphilis, Chlamydia, and gonorrhoea among a population-based cohort from Vancouver's Downtown Eastside. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A).
- 22 Press, N., C Lai, K Shannon, T Ishida, T Kerr, JS Montaner, MW Tyndall, Rate of hospitalisation in HIV positive IDUs is not associated with access to primary care. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A).
- 23 Patton, C., D Culhane, K Shannon, I Goldstone, MW Tyndall. Patterns of housing and service access among actively injecting drug users. XV Annual Canadian Conference on HIV/ AIDS Research, Vancouver, BC, May 2005. Canadian Journal of Infection Diseases and Medical Microbiology, 16 (Suppl A).
- 24 Shannon, K., V Bright, J Duddy, M Oleson, K Gibson, MW Tyndall, Women survival sex workers in

- Vancouver's DTES: A hidden HIV epidemic. 3rd International Conference on HIV Pathogenesis and Treatment, Rio de Janeiro, Brazil, July 2005. (Oral)
- 25 Shannon, K., T Kerr, C Lai, T Ishida, JS Montaner, MW Tyndall. Low adherence to antiretroviral therapy among a community with endemic rates of injection drug use. 3rd International Conference on HIV Pathogenesis and Treatment, Rio de Janeiro, Brazil, July 2005.
- 26 Rusch M, K Shannon, T Ishida, C Lai, MW Tyndall. The impact of alcohol consumption on the incidence of STIs among HIV positive women. 3rd International Conference on HIV Pathogenesis and Treatment, Rio de Janeiro, Brazil, July 2005.
- 27 Rusch M, K Shannon, C Lai, T Ishida, MW Tyndall. Previous STDs fail to predict HIV seroconversion among individuals with high rates of injection drug use. 3rd International Conference on HIV Pathogenesis and Treatment, Rio de Janeiro, Brazil, July 2005.
- 28 Shannon, K., V Bright, M Oleson, K Gibson, MW Tyndall. Developing a comprehensive HIV Prevention, Treatment and Care Program for Survival Sex Workers. 5th Canadian HIV/AIDS Skills Building Symposium, Montreal, October 2005.
- 29 Shannon, K., T Ishida, R Morgan, A Bear, M Oleson, T Kerr, MW Tyndall. Community and public health impacts of a medically supervised safer smoking facility for crack cocaine users. 4th International Conference on Urban Health, Toronto, October 2005. (Oral)
- 30 Shannon K, V Bright, C Norris, M Oleson, K Gibson, MW Tyndall. Using illicit drugs with clients increases vulnerability among survival sex workers (Sex Work and Harm Reduction session). International Conference on the Reduction of Drug-Related Harm, Vancouver, May 2006.
- 31 Shannon K, T Kerr, R Morgan, M Oleson, MW Tyndall. HIV and HCV prevalence and risk behaviours among injection and non-injection drug using crack cocaine smokers. International Conference on the Reduction of Drug-related Harms, Vancouver, May 2006.
- 32 Bright V, K Shannon, M Oleson, C Norris, K Gibson, MW Tyndall. The Maka Project: A community-academic partnership to develop HIV prevention, treatment, and care strategies with and/ for survival sex workers. International Conference on the Reduction of Drug-related Harms, Vancouver, May 2006.
- 33 Shannon K, V Bright, M Oleson, K Gibson, M Rusch, MW Tyndall. Mapping HIV risk through places of violence, harassment, police presence and syringe access among street entrenched women engaged in sex work. XVI Annual Canadian Conference on HIV/ AIDS Research, Quebec City, QC, May 2006. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A). (Oral)
- 34 Shannon K, T Kerr, R Morgan, M Oleson, MW Tyndall. HIV and Hepatitis C Prevalence and related risk among crack cocaine smokers and dual users with a history of injection drug use. XVI Annual Canadian Conference on HIV/ AIDS Research, Quebec City, QC, May 2006. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A).
- 35 Bright V, K Shannon, M Oleson, C Norris, K Gibson, MW Tyndall. The Maka Project: A novel approach to informing the development of HIV programming strategies among survival sex workers in Vancouver's Downtown Eastside. XVI Annual Canadian Conference on HIV/ AIDS Research, Quebec City, QC, May 2006. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A).
- 36 Fielden S, M Rusch, B Yip, E Wood, K Shannon, A Levy, S Guillemi, JS Montaner, RS Hogg. Predicting hospitalization among HIV-infection antiretroviral naive patients starting HAART: Does non-adherence increase risk? XVI Annual Canadian Conference on HIV/ AIDS Research, Quebec City, QC, May 2006. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A).
- 37 Shannon K, M Rusch, V Bright, S Allinott, K Little, MW Tyndall. Exploring HIV Vulnerability through places of violence, harassment, police presence and syringe access among survival sex workers in Vancouver, Canada. XVI International AIDS Conference, Toronto, August 2006.
- 38 Shannon K, V Bright, J Malliga Chettiar, S Allinott, K Gibson, T Kerr, MW Tyndall. Linking violence, bad dates, and HIV risk among survival sex workers. XVI International AIDS Conference, Toronto, August 2006.
- 39 Bright V, K Shannon, J Malliga Chettiar, C Norris, K Gibson, MW Tyndall. The MAKa project: steps towards the development of a HIV treatment program for women in Vancouver's Downtown Eastside. XVI International AIDS Conference, Toronto, August 2006.

- 40 Fielden S, B Yip, M Rusch, S Guillemi, E Wood, K Shannon, JS Montaner, A Levy, RS Hogg. The impact of non-adherence on hospitalizations in a Canadian cohort of HIV-infected antiretroviral naive patients starting HAART: does it make a difference? XVI International AIDS Conference, Toronto, August 2006.
- 41 Rusch M, K Shannon, C Lai, T Ishida, MW Tyndall. STDs fail to predict HIV seroconversion among individuals with high rates of injection drug use. XVI International AIDS Conference, Toronto, August 2006.
- 42 Rusch M, K Shannon, C Lai, T Kerr, D Patrick, MW Tyndall. The impact of poly-drug use on the acquisition of sexually transmitted infections among female crack cocaine users. XVI International AIDS Conference, Toronto, August 2006.
- 43 Tyndall MW, T Kerr, C Lai, K Shannon, E Wood, JS Montaner. Persistently high rates of HIV transmission among illicit drug users in Vancouver, Canada. XVI International AIDS Conference, Toronto, August 2006.
- 44 Orchard T, Shannon K, V Bright, K Gibson, MW Tyndall. A frame work for process: Reflections on a community-based HIV prevention research project with women in survival sex work. International Applied Anthropology Conference, March 2007. (Oral)
- 45 Parsad D, K Shannon, V Bright, MW Tyndall. HIV point of care testing and pre/ post-testing counseling among women in survival sex work. Canadian Association of Nurses in AIDS Care (CANAC/ACIIS) 15th Annual Conference, Vancouver, BC, April 2007. (Oral).
- 46 Tyndall MW, K Shannon, D Parsad, E Wood, T Kerr. HIV rapid testing among women in survival sex work in Vancouver, Canada. XVII Annual Canadian Conference on HIV/ AIDS Research, Toronto, ON, April 2007. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A). (Oral).
- 47 DeBeck K, K Shannon, K Li, JS Montaner, E Wood, T Kerr. Prohibitive income-generating strategies among a cohort of injection drug users. XVII Annual Canadian Conference on HIV/ AIDS Research, Toronto, ON, April 2007. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A). (Oral)
- 48 Shannon K, T Kerr, V Bright, D Alexson, K Gibson, MW Tyndall. High rates of syringe sharing and crystal methamphetamine use among youth under 25 years of age in survival sex work. XVII Annual Canadian Conference on HIV/ AIDS Research, Toronto, ON, April 2007. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A). (Oral))* New Investigator Award Presentation.
- 49 Shannon K, T Kerr, V Bright, S Allinott, J Chettiar, J Shoveller, MW Tyndall. Social and structural violence and power relations in mitigating HIV risk among drug-using women in survival sex work. XVII Annual Canadian Conference on HIV/ AIDS Research, Toronto, ON, April 2007. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A). (Oral)
- 50 Bright V, K Shannon, D Parsad, K Gibson, MW Tyndall. Experiences of stigma and discrimination among HIV positive and sero-negative women in survival sex work. XVII Annual Canadian Conference on HIV/ AIDS Research, Toronto, ON, April 2007. Canadian Journal of Infection Diseases and Medical Microbiology, 17 (Suppl A).
- 51 DeBeck K, K Shannon, K Li, JS Montaner, E Wood, T Kerr. Prohibitive income-generating strategies among a cohort of injection drug users. International Conference on Reduction of Drug-Related Harm, Warsaw, Poland, May 2007.
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MISSING WOMEN'S INQUIRY

EXPERT REPORT BY DR. KATE SHANNON

I. Dr. Kate Shannon, of 1922 East 6th Avenue, in the City of Vancouver, in the Province of British Columbia, AFFIRM AS FOLLOWS:

1. I am an Assistant Professor in the Department of Medicine at the University of British Columbia, with a cross-appointment in the School of Population and Public Health. I am also Director of the Gender and Sexual Health Initiative (GSHI) with the British Columbia Centre for Excellence in HIV/AIDS (BCCfE). I hold a PhD in Epidemiology and Public Health and have published over 45 peer-review papers related to health outcomes among vulnerable populations, particularly sex workers, including studies in the Journal of the American Medical Association ("JAMA"), Canadian Medical Association Journal ("CMAJ"), and the American Journal of Public Health ("AJPH").

2. I am an international expert on sexual health and HIV prevention among sex workers and people who use drugs. For example, I am an Associate Editor of the International Journal of Drug Policy, and serve on scientific review committees for the US National Institutes of Health and Canadian Institutes of Health Research. I have been invited to speak on multiple international panels on sex work, violence and HIV, including UNAIDS HIV policy meeting, co-hosted with Health Canada and the Public Health Agency of Canada (March 2011). In 2008, I was invited to chair the scientific panel at the World AIDS Conference in Mexico City in 2008, entitled: "Global HIV Prevention Programmes for Sex Workers". On behalf of the GSHI of BC-CfE, I am currently acting as a consultant for the World Health Organization on a review of the evidence of violence against sex workers globally and development of best practices in reducing violence in the sex industry, together with UNFPA and Network of Sex Work Projects (NSWP). The publication of several of my peer-review papers on violence and HIV risk among sex

workers has been cited on several occasions by UNAIDS publications, and in one case, the study was introduced in parliamentary debates of the House of Lords over the Crime Bill on criminalizing sex buyers (“clients”).

3. I am Principal Investigator of An Evaluation of Sex Workers’ Health Access (“AESHA”, 2009-2015) funded by the Canadian Institutes of Health Research (“CIHR”) and the US National Institutes of Health (“NIH”). This is a longitudinal observational cohort study of the health outcomes and barriers to care of sex workers in Metro Vancouver region, working both on and off street. I am also a Principal Investigator of the Maka Project, a three-year CIHR-funded study of health access and barriers to care among women in street-based sex work in Vancouver (2005-2008).

BACKGROUND INFORMATION REGARDING THE BCCfE

1. The BC Centre for Excellence in HIV/AIDS (BCCfE) is Canada’s largest HIV/AIDS organization providing treatment, research and education across the Province of British Columbia. BCCfE is committed to improving the health of all vulnerable populations in British Columbians through the development and dissemination of comprehensive public health, clinical and laboratory research and treatment programs for HIV and related diseases. Since our establishment in 1992, we have become a world leader in cutting-edge HIV/AIDS research. Our internationally recognized team of interdisciplinary professionals is unique in North America for its integration of treatment, education, and research, and the procurement and distribution of life-saving antiretroviral medications for all residents of the Province, and continues to provide evidence-based guidance both locally and internationally.

2. The Gender and Sexual Health Initiative and BCCfE have provided affidavits as expert witnesses in a number of cases, including one currently before the Supreme Court of Canada. These include: 2011 R vs. PHS Community Services SCC 33556, 2010 BCSC R vs. PHS Community Services S075547, Bedford case in the Ontario Superior Court of Appeal (2011), R vs. Kiselbach, SWUAV case to BC Supreme Court of Canada (2009).

OVERVIEW OF BCCfE/ UBC RESEARCH STUDIES ON VIOLENCE AMONG STREET-BASED SEX WORKERS

1. DEMOGRAPHICS OF STREET-BASED SEX WORKERS IN VANCOUVER

REFERENCES

(Canadian Journal of Public Health, 2007, 98(6): 465-9)
Sexual and drug-related vulnerabilities for HIV infection among women engaged in survival sex work in Vancouver, Canada
Shannon K, Bright V, Gibson K, Tyndall MW, Maka Project Partnership

(BMC Public Health, 2011, 11:643)
Homelessness among a cohort of women in street-based sex work: The need for safer environment interventions.
Duff P, Deering K, Gibson K, Tyndall MW, Shannon K

(Drug Alcohol Dependence, 2011, 113(1): 76-81)
Crystal methamphetamine use among female street-based sex workers: Beyond individual-focused interventions
Shannon K, Strathdee SA, Shoveller J, Zhang R, Montaner JS, Tyndall MW

(BMC Pregnancy Childbirth, 2011, 11: 61)
High lifetime pregnancy and low contraceptive usage among sex workers who use drugs: An unmet reproductive health need
Duff P, Shoveller J, Zhang R, Alexson D, Montaner JS, Shannon, K

(Social Science and Medicine, 2011, In Press)
Risky health environments: Women sex workers' struggles to find safe, secure and non-exploitative housing in Canada's poorest postal code
Lazarus L, Chettiar J, Deering K, Nebess R, Shannon K

(Culture Health and Sexuality, 2011, In Press)
Occupational stigma as a primary barrier to health service access among street-based sex workers in an urban Canadian setting
Lazarus L, Deering K, Gibson K, Shannon K

Collectively, these studies summarize the demographics and lived experiences of women in street-based sex work in Vancouver's Downtown Eastside and surrounding communities, based on a community-recruited cohort of 255 street-based sex workers

(2006- 2008). At baseline, the median age of the sample was 36 years, with a median duration of engaging in sex work in this population of over 20 years suggesting that many women were working in and around Vancouver since/prior to 1996. Women of Aboriginal ancestry were highly overrepresented, accounting for over 40% of the sample. The vast majority of women (82%) lived in unstable living situations, of which 22% had no fixed address or were living on the street. Of the total, 88% reported having been homeless (sleeping on the street) at one point in their lives, with a median age of first living on the street of 17 years (14-23years). Over a two-year follow-up period, close to half (43%) reported absolute homeless (sleeping on the street) demonstrating the ongoing cycles in and out of homelessness among this population. Women in street-based sex work reported high rates of drug use, with the most common drug being non-injection stimulants (81% smoking crack cocaine, 24% crystal methamphetamine) and 59% reporting a history of injection drug use (most commonly heroin, followed by cocaine). One fifth reported having tried but been unable to access drug treatment over the two-year follow-up period, with long waiting lists being the primary reason for inability to access drug treatment (96%). One fifth reported one or more dependent children (median 2, IQR 1-3), with 32% reporting having had at least one child apprehended by social welfare services (median 3, IQR 1-4). Of the total of 255 women, 9% reported having ever been to Pickton's farm and 73% reported knowing women who had been to Pickton's farm.

2. VIOLENCE FACED BY WOMEN IN STREET-BASED SEX WORK

2a. Quantitative study of the prevalence and correlates of violence against street-based sex workers

REFERENCE

(British Medical Journal, 2008, 11;339:b2939.)

Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers.

Shannon K, Kerr T, Strathdee SA, Shoveller J, Montaner JS, Tyndall MW.

Aims: A recent review in the Lancet of the global magnitude of gender-based violence highlighted how rights violations and abuses against female sex workers are seldom

considered in discussions of violence against women. This longitudinal study sought to determine the a) prevalence of violence among women in street-based sex work over a two-year period and; b) to identify factors independently linked with increased risk of physical violence and rape (forced sex) of street-based sex workers.

Key Findings: Of the total of 255 women interviewed in the sex work cohort, this longitudinal study included 237 women who completed baseline and at least one follow-up visit over the 18month period (2006-2008). Over half (57%) of the women experienced physical and/or sexual violence at least once over the 18 month period, with 38% (90/237) reporting physical violence, 25% (60/237) rape, and 30% (70/237) client perpetrated violence. Table 1 (below) summarizes the types of client violence reported over the 18-month period.

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)).

2b. Qualitative study of women sex workers narratives discussing the commonplace 'everyday' nature of violence and delayed inaction surrounding the Missing Women

REFERENCE

(*Social Science and Medicine*, 2008, 66(4):911-21.)

Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work.

Shannon K, Kerr T, Allinott S, Chettiar J, Shoveller J, Tyndall MW.

The narratives of 46 sex workers (*italics below*) reveal 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 by police and criminalization of the abusive johns was seen to compromise women's sense of control with a date and ability to negotiate safety and sexual risk reduction. 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.

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 known as the Highway of Tears. A symbolic violence of women as 'disposable' was particularly illustrated in the narratives of Aboriginal women, and is reflective of the 'discourse of disposal' surrounding the missing women.

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.

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.

3. FACTORS ASSOCIATED WITH INCREASED RISK OF VIOLENCE AMONG STREET-BASED SEX WORKERS

3a. Longitudinal analyses of independent individual and structural associations with increased risk of violence among street-based sex workers

REFERENCE

(British Medical Journal, 2008, 11;339:b2939.)

Prevalence and structural correlates of gender based violence among a prospective cohort of female sex workers.

Shannon K, Kerr T, Strathdee SA, Shoveller J, Montaner JS, Tyndall MW.

Aims: As described above, this longitudinal study sought to determine the factors associated with increased risk for physical violence and rape (forced sex) among sex workers.

Key Findings: This study included 237 sex workers interviewed at baseline who completed at least one follow-up visit over 18month period (2006-2008). In statistical analyses, controlling for individual and interpersonal risks, prior police harassment was associated with a three-fold increased risk of client violence and a two-fold increased risk of rape in the previous six months. Further, displacement away from main streets due to policing and servicing clients in cars or public spaces (as compared to indoor settings) were both independently associated with increased odds of client violence. Other structural factors of homelessness, and poor availability of drug treatment remained independently associated with increased risk of violence against street-based sex workers.

Implications: These findings indicated the enforcement of criminalized prostitution laws were independently associated with increased risk of rape and physical violence against sex workers in Canada. 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.

4. RISK AND SAFETY CONCERNS BY LOCATION AND ENVIRONMENT

4a. See 3a above

4b. Displacement to isolated spaces due to violence and policing and associated health impacts

REFERENCE

(International Journal of Drug Policy, 2008, 19(2):140-7.)

Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among substance-using women in street-level sex work.

Shannon K, Rusch M, Shoveller J, Alexson D, Gibson K, Tyndall MW

Aims: This study involved mapping health access and displacement due to recent policing and violence among sex workers.

Key Findings: This study included baseline questionnaire data from 198 sex workers and geographic information system (“GIS”) mapping of health access and displacement due to violence and policing. The results demonstrate geographically how enforced displacement of sex workers due to violence and policing directly reduce their access to health and support resources. Youth and Aboriginal women were particularly vulnerable to displacement to isolated spaces away from health and support services.

Implications: These findings indicated how policing and violence push sex workers to isolated spaces and significantly reduce sex workers access to health and support services.

4c. Enforced displacement and increased risks of coercive unprotected sex among street-based sex workers

REFERENCE

(American Journal of Public Health, 2008, 99(4): 659-65.)

Structural and environmental barriers to condom use negotiation with clients among female sex workers: implications for HIV-prevention strategies and policy. Shannon K, Strathdee SA, Shoveller J, Rusch M, Kerr T, Tyndall MW.

Aims: This study sought to determine the factors associated with increased risk of HIV infection through coercive unprotected sex by clients among street-based sex workers using data from questionnaires and mapping.

Key Findings: Mapping revealed geographic clustering (or “hotspots”) of being pressured into unprotected sex by clients among sex workers working in isolated spaces and away from main streets. In statistical analyses, displacement to isolated spaces due to policing and zoning restrictions due to previous prostitution charges were both independently associated with a 3-fold increased likelihood of sex workers being coerced into unprotected sex by clients. Further, servicing clients in cars or public spaces (alleys, streets) statistically doubled the risk of being coerced into unprotected sex by clients.

Implications: These findings indicated the enforcement of criminalized prostitution laws are associated with increased risk of sex workers being coerced into unprotected sex, thus elevating the risk for transmission of HIV and other sexually transmitted infections.

5. IMPACTS OF POLICING ON SAFETY OF WOMEN IN STREET-BASED SEX WORK

5a. See 3a above

5b. Qualitative exploration of the unintended adverse impacts of policing on violence against street-based sex workers in Vancouver, Canada

REFERENCE

(Social Science and Medicine, 2008, 66(4):911-21.)

Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work.

Shannon K, Kerr T, Allinott S, Chettiar J, Shoveller J, Tyndall MW.

Key Findings: Qualitative interviews with 46 sex workers documents several ways in which the criminal prostitution laws and local policing are negatively impact violence and HIV prevention among sex workers: a) pervasive and unaddressed large scale violence and murder of sex workers reduced sex workers' ability to negotiate safety and sexual risk reduction with clients; b) adverse impacts of local policing both directly through harassment and indirectly through enforced displacement to isolated spaces;) c) current legal restrictions limited sex workers ability to create safer industry standards; d) through a lack of safe places to take dates due to current legal restrictions on working indoors in managed or cooperative settings.

Implications: These findings provide clear evidence of the unintended adverse impacts of current criminalized prostitution laws on sex workers' health and safety, including ability to negotiate safety and HIV prevention with clients.

Local policing and displacement

The narratives of sex workers (*italics below*) 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.

5c. Links between criminalization, enforcement and violence among sex workers globally

REFERENCE

(Journal of the American Medical Association, 2010, 4;304(5):573-4)
Violence, condom negotiation, and HIV/STI risk among sex workers.
Shannon K, Csete J.

This commentary reviews evidence globally on the links between criminalization of prostitution and risk of violence and HIV among sex workers. The paper reviews evidence that demonstrate how criminalization of sex work increases the risk of HIV transmission through results in sex workers being forced to prioritize the immediate threat of violence or threats of violence reduce sex workers ability to insist on condom use by clients. As stated: "Violence against sex workers by exploitive clients, police, or managers (including pimps) is enabled by a lack of legal protection for sex workers' rights in areas where sex work is criminalized. Understanding the link between violence against sex workers and condom use can be a key to understanding why some sex worker populations are particularly vulnerable to elevated rates of HIV/STI infection compared with the general population, a reality documented in both concentrated and generalized HIV epidemics"

5d. Evidence of unintended adverse impacts of criminalization and enforcement on violence among street-based sex workers in Canada

REFERENCE

(Canadian Medical Association Journal, 2010, 7;182(12):1388)
The hypocrisy of Canada's prostitution legislation.
Shannon K.

This commentary reviews the some of the key evidence in Canada on the unintended adverse impacts of criminalization of prostitution on sex workers' health and safety, particularly vulnerability to violence. The purpose of the paper was to increase public and medical expert scrutiny of the need for evidence-based sex work policies that promote the health and safety of some of the most vulnerable individuals in Canadian society

APPENDUM A- SUMMARY OF THE MAKA PROJECT

Beginning in late 2004/early 2005, researchers at the BC Centre for Excellence in HIV/AIDS/ University of British Columbia initiated a community-based research project, in collaboration with Women's Information Safe Haven (WISH) Drop-In Centre Society and other sex work organizations, funded by CIHR. The project aimed to understand the demographics and risks experiences by street-based sex workers in Vancouver (including health outcomes, violence and safety) and barriers to accessing care and support (including social support, housing, drug treatment). The Phase I research ('Maka Project', 2005-2008) included interview-administered structured questionnaires and mapping at baseline and 6monthly follow-up with a prospective cohort of 255 women in street-based sex work, with a sub-set of 40+ women who participated in in-depth qualitative interviews and focus group discussions. A team of 10 peer researchers (current/former sex workers from the community) were hired and trained to administer the questionnaires and co-facilitate the qualitative interviews, together with the research team. The project adhered to high ethical standards, including Tri Council Guidelines, and both the University of British Columbia/ Providence Health Ethics Review Board & PACE Policy Group provided ethical approval and policy review of this research. The project development, methods and results have been published in over 30 peer-reviewed journals, a book chapter and presented at national and international conferences, in addition to community and policy dialogues and expert witness testimony in BC and Ontario. Core topic areas are summarized below:

Demographics (age, ethnicity, education)

Housing/ Living situation (history, current)

Sex work history/ work environment (types/places of solicitation and servicing clients, # clients)

Bad dates (lifetime, current violence by abusive clients)

Other violence while working (police, pimps, dealers, partners, strangers)

Drug use (history, current)

Health service access (clinics, drug treatment, counseling, needle exchange/ harm reduction services)

HIV/ Hepatitis C screening (history/ current)

Stigma experiences

APPENDUM B – SUMMARY OF PhD

“The social, structural and environmental production of HIV transmission risk among women in survival sex work: Evidence from the Maka project partnership”
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Background: Given the limited contextual understanding of the HIV risk environment of women in street-based work in resource rich settings, the objectives of this thesis were to better understand how social (e.g. exposure to violence, access to social support) and structural factors (e.g. laws, local policing, work environment) shape street-based sex workers’ ability to negotiate HIV risks (e.g. sexual risks, male condom use, syringe sharing) and access to care (e.g. health services, needle exchange programs).

Methods: Qualitative and quantitative data were drawn from a community-based research project partnership in Vancouver, Canada (‘Maka Project’). Women engaged in street-based sex work were invited through targeted peer outreach and time-space sampling to participate in a prospective cohort (including interview-administered questionnaires and social mapping). Additionally, women were purposively sampled to participate in in-depth focus group discussions about the contextual factors shaping negotiation of HIV prevention.

Results: Analyses revealed the paramount role of violence, both at interpersonal and structural levels, in mediating women’s agency and access to resources and ability to practice HIV prevention. Structural and environmental barriers, including violence, enforced displacement and police harassment (without arrest), and servicing clients in public spaces compared to indoor settings, were found to independently reduce women’s ability to negotiate condom use with clients and access to care.

Sexual and Drug-related Vulnerabilities for HIV Infection Among Women Engaged in Survival Sex Work in Vancouver, Canada

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ABSTRACT

Background: Women engaged in survival sex work face multiple sexual and drug-related harms that directly enhance their vulnerability to HIV infection. Although research on injection-drug-using women has explored predictors of sex work and HIV infection, little information currently exists on the complex vulnerabilities to HIV transmission faced by survival sex workers in this setting. This analysis aimed to determine HIV prevalence among women engaged in survival sex work, and explore sexual and drug-related vulnerabilities associated with baseline infection.

Methods: Descriptive and univariate analysis were used to explore associations with baseline HIV infection. Variables found to be associated with baseline infection at the univariate level ($p < 0.05$) were entered into a fixed logistic regression model, adjusted for age.

Results: Of a total of 198 women, baseline HIV prevalence was 26%. In multivariate logistic regression, baseline HIV infection was associated with early age of sex work initiation (< 18 years) (aOR=1.8, 95% CI: 1.3-2.2), Aboriginal ethnicity (aOR=2.1, 95% CI: 1.4-3.8), daily cocaine injection (aOR=2.2, 95% CI: 1.3-3.5), intensive, daily crack smoking (aOR=2.7, 95% CI: 2.1-3.9), and unprotected sex with an intimate partner (aOR=2.8, 95% CI: 1.9-3.6).

Interpretation: Innovative and evidence-based strategies are urgently needed that address the sexual and drug-related vulnerabilities to HIV infection among survival sex workers and in particular, interventions targeting the precursors to early initiation into sex work.

MeSH terms: Prostitution; HIV infections; harm reduction

La traduction du résumé se trouve à la fin de l'article.

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The term "survival sex work" has been used to describe women who exchange sex for money, drugs, or shelter as a means of daily survival. The social context of survival sex workers' lives presents multiple barriers that place them at heightened risk for HIV transmission, including repeated episodes of violence and sexual assault,¹⁻⁴ entrenched poverty, social isolation, mental illness, and substance abuse.⁵⁻⁸

The association between survival sex and crack cocaine has been consistently documented,⁵⁻⁸ and raises significant concern for HIV transmission through dual sexual and drug risk pathways. Studies have also shown increased risk of both parenteral and sexual transmission among women injection drug users (IDU) engaged in sex work.^{6,9} In addition, women who exchange sex for money or drugs are significantly more likely to have experienced traumatic experiences during childhood, both physical and sexual abuse,^{4,10} and to be victims of violence and sexual assault in adulthood.¹⁻³ In the United States, a recent longitudinal study found the mortality rate among women actively engaged in sex work to be 17-fold higher than that of the age-matched general population.¹¹ Suicide, violence, and drug-related deaths were other primary causes of mortality.

In Vancouver, Canada, the disappearance of more than 60 women between 1995 and 2000, the majority of whom were women of First Nations' ancestry engaged in survival sex work, is only one illustration of the ongoing victimization faced by this population.^{12,13} In Vancouver, as in the rest of Canada, women of Aboriginal ancestry are over-represented in the HIV epidemic,¹⁴ and constitute the majority of women engaged in visible, street-level sex work.^{4,12,15} While the buying or selling of sex is not in itself illegal in Canada, the communication for purposes of transaction, or soliciting to sell or exchange sex in public places is prohibited.^{16,17} As a result, and as strolls are moved through displacement and police presence, women are pushed further from social supports, impeding their ability to negotiate their situation.^{16,17}

To date, the research on HIV vulnerabilities among survival sex workers in this setting has primarily focused on injection drug use, despite growing evidence of multiple sexual and drug-related harms faced

by women.¹⁸⁻²⁰ Given earlier evidence suggests that only approximately half of this population inject drugs,²¹ the following analysis was undertaken to describe the HIV prevalence of women in survival sex work and to identify sexual and drug-related harms associated with baseline infection.

METHODS

The Maka Project is a community-based research project that was created to explore the HIV-related harms and impact of current HIV prevention and harm reduction strategies among survival sex workers. The first phase of the Maka Project included a baseline questionnaire, HIV diagnostic testing, and pre-/post-test counselling in late 2004. Participants were recruited through targeted sampling at a drop-in centre for women in survival sex work. Participants received \$20 remuneration for their participation. The University of British Columbia/Providence Health Research Ethics Board provided approval for this study.

Variables considered in this analysis include age, ethnicity, health status, sexual and drug risk patterns. Drug use behaviours included: frequency of cocaine, heroin, and crystal methamphetamine injection, and crack cocaine smoking. Given the high levels of crack cocaine use, intensity of drug use was defined as smoking greater than ten rocks per day. A recent "bad date" was defined as having been verbally harassed, physically and/or sexually assaulted by a client in the last six months.

Descriptive and univariate analyses were used to determine associations between HIV infection and explanatory variables. Categorical and explanatory variables were analyzed using Pearson χ^2 , normally distributed continuous variables were analyzed using t-tests for independent variables, and skewed continuous variables were analyzed using Mann-Whitney U tests. Variables found to be associated with HIV infection at the univariate level ($p < 0.05$) were entered into a fixed logistic regression model. The model was adjusted for age and all reported p-values are two-sided.

RESULTS

A total of 198 women engaged in survival sex work completed a baseline questionnaire

TABLE I

Univariate Associations Between Socio-demographic Characteristics, Health Status, Drug Use Patterns, and HIV Infection Among Female Survival Sex Workers

Characteristic	HIV Infection		OR (95% CI)	p-value
	Positive (n=52) n (%)	Negative (n=146) n (%)		
Age				
Median [IQ range]	39 [32-44]	39 [35-44]		0.277
Age of sex work initiation				
Median [IQ range]	16 [13-20]	20 [15-27]		0.004
<14 years	13 (27)	29 (20)	1.33 (0.78-2.27)	0.313
<16 years	18 (38)	52 (36)	1.10 (0.56-2.19)	0.763
<18 years	30 (58)	63 (43)	2.29 (1.16-4.53)	<0.001
Aboriginal ethnicity	36 (32)	75 (68)	2.34 (1.20-4.55)	<0.001
Non-Aboriginal	16 (18)	71 (82)		
Unstable housing	42 (81)	121 (83)	0.82 (0.60-0.90)	0.488
Homeless/No fixed address	11 (21)	33 (23)	0.92 (0.43-2.18)	0.829
High school education	22 (42)	57 (39)	1.74 (0.90-3.36)	0.097
Recent incarceration	9 (17)	26 (18)	0.97 (0.42-2.23)	0.935
HCV infection	39 (75)	94 (64)	1.57 (1.16-2.29)	0.010
Other recent STI infections (gonorrhoea, syphilis, chlamydia)	5 (10)	15 (10)	1.05 (0.50-2.27)	0.892
Injection drug use	34 (65)	76 (52)	1.74 (0.90-3.36)	0.097
Daily cocaine injection	19 (39)	30 (21)	2.32 (1.64-2.89)	0.006
Daily heroin injection	14 (27)	40 (27)	1.04 (0.86-1.25)	0.686
Intensive, daily crack cocaine smoking (>10 rocks/day)	25 (48)	35 (24)	2.85 (2.19-3.25)	<0.001
Methadone maintenance therapy	23 (44)	37 (25)	1.82 (1.16-2.88)	0.011
Injection binge use	15 (29)	40 (27)	1.07 (0.53-2.20)	0.841
Need help injecting	8 (15)	37 (25)	0.54 (0.23-1.24)	0.141

TABLE II

Univariate Associations Between Sexual and Drug-related Vulnerabilities and HIV Infection Among Female Survival Sex Workers

Characteristic	HIV Infection		OR (95% CI)	p-value
	Positive (n=52) n (%)	Negative (n=146) n (%)		
Unprotected sex with intimate partners*	26 (50)	49 (32)	3.02 (1.87-4.15)	<0.001
Regular partner injects	11 (21)	38 (26)	0.82 (0.46-1.46)	0.482
Regular partner HIV positive	11 (21)	10 (7)	2.26 (1.39-3.68)	0.004
Inconsistent condom use by clients/johns*	23 (42)	42 (29)	2.35 (1.86-3.39)	0.002
Offered more money to not use a condom*	27 (52)	95 (65)	0.72 (0.61-0.88)	0.094
Agreed to more money to not use a condom*	5 (10)	18 (12)	0.81(0.36-1.83)	0.600
Use drugs with clients/johns*	30 (58)	87 (60)	0.89 (0.47-1.71)	0.076
Use injection drugs with clients*	10 (19)	16 (10)	1.25 (0.91-1.71)	0.097
Bad date (harassment/physical/sexual assault)*	15 (29)	35 (24)	1.92 (1.33-4.18)	0.012
Sexual assault by non-sex trade partner*	9 (17)	28 (19)	0.99 (0.81-1.21)	0.888

* Refers to the last 6 months at the time of interview

TABLE III

Logistic Regression Model of Factors Independently Associated with HIV Infection Among Female Survival Sex Workers

Characteristic	AOR	95% CI	p-value
Unprotected sex with intimate partners	2.8	1.9-3.6	0.001
Intensive, daily crack cocaine smoking	2.7	2.1-3.9	0.003
Daily cocaine injection	2.5	1.7-3.1	0.025
Aboriginal ethnicity	2.1	1.4-3.8	0.004
Age of sex work initiation <18 years	1.8	1.3-2.2	0.007

and HIV testing. Descriptive and univariate analyses of characteristics associated with baseline HIV infection are summarized in Tables I and II. The median age was 39 years (interquartile range [IQR] = 34-44) and the median age of sex work initiation was 19 years (IQR=15-26 years). In total, 111 (57%) self-identified as Aboriginal, of which 47% were of First Nations ancestry, 9% Metis, and 1% Inuit. Based on diagnosis

testing, 52 (26%) women tested positive for HIV. Women of Aboriginal ancestry had an HIV prevalence of 32% compared to 18% for non-Aboriginal women ($p < 0.001$). Of the total, a quarter of women (25%) had experienced harassment, physical and/or sexual assault violations by a client in the last six months, with one fifth reporting sexual assault by a non-sex trade partner in the same time period.

Among mobility patterns, 30% reported working in strolls outside of the Downtown Eastside (DTES) community, while 72% reported having some or all clients from other parts of Vancouver. The majority (82%) lived in unstable living situations, of which 22% had no fixed address or were living on the street.

In multivariate logistic regression analysis (Table III), the adjusted odds ratios for factors independently associated with baseline HIV infection included early age of sex work initiation (<18 years) (aOR=1.8, 95% CI: 1.3-2.2), Aboriginal ethnicity (aOR=2.1, 95% CI: 1.4-3.8), daily cocaine injection (aOR=2.2, 95% CI: 1.3-3.5), intensive, daily crack smoking (aOR=2.7, 95% CI: 2.1-3.9), and unprotected sex with an intimate partner (aOR=2.8, 95% CI: 1.9-3.6).

DISCUSSION

This study documents an HIV prevalence of 26%. Women who were HIV positive at baseline were more likely to report initiation into sex work during youth and/or adolescence, to self-identify as Aboriginal, to report daily cocaine injection, intensive/daily crack cocaine smoking, and unprotected sex with an intimate partner. Although the cross-sectional nature of this study precludes inference of causality, the findings offer important evidence of the vulnerabilities associated with HIV infection that require immediate address in public health and prevention efforts tailored to women in survival sex work.

Of particular concern, initiation into sex work during youth and/or adolescence (less than 18 years of age) was associated with a two-fold increase in baseline HIV infection. The younger age of sex work initiation is striking with a quarter of women less than 14 years of age and over half less than 18 years of age at their first sex work experience. While this study did not explicitly explore predictors for initiation into sex work, numerous investigators have examined the antecedents to sex work initiation, including key lifetime events of childhood violence, sexual abuse, homelessness, engagement in street economy, and drug addiction.²²⁻²⁶ The findings support a need for enhanced policy and program initiatives targeting factors that contribute to early initiation into sex work and

subsequent higher rates of HIV infection. In addition, given the illegalities of youth engaging in sex work, current organizations that offer support services and exit strategies for survival sex workers are exclusively targeted at adult sex work, leaving the most vulnerable population – youth – largely outside of HIV prevention and harm reduction services. More immediate support for health, counseling and outreach services for early sex work initiates needs to be expanded and programs integrated within existing youth services.

While Aboriginal people who inject drugs have been shown to have higher rates of HIV seroconversion than their non-Aboriginal counterparts, particularly women²⁰ and youth,²⁷ this study shows Aboriginal women engaged in sex work to be twice as likely to be HIV positive at baseline, independent of their injection status. Currently people of Aboriginal ancestry represent approximately 3% of the total population of Canada,²⁸ and 23% of new HIV positive cases between 1998 and 2003.¹⁴ Of the female Aboriginal reports with exposure category information, 66.9% were attributed to IDU and 31.5% to heterosexual transmission.¹⁴ In this study, Aboriginal women account for 57% of the study population and the majority of HIV baseline infections among survival sex workers. The particularly complex vulnerabilities facing women of Aboriginal ancestry, stemming from the multigenerational effects of discrimination, social dislocation, entrenched poverty and the residential school system,^{4,12,29,30} demand more immediate action at both local and national levels. Among Indigenous women in Canada and elsewhere, growing evidence highlights the need for public health strategies that facilitate community ownership and indigenous healing to help mitigate the matrix of lifetime trauma, substance abuse, and HIV vulnerability.³⁰⁻³²

While the role of cocaine injection in driving the HIV epidemic among IDUs has been previously described,³³ it should be noted that only 56% of women in our study were injection drug users compared with 90% active crack cocaine smokers. Further, daily use of both injection and oral cocaine use were among the strongest associations with HIV infection in this study with nearly a threefold higher HIV prevalence. The synergistic correlation

between survival sex and smokeable crack cocaine suggests a particularly alarming concern,⁶⁻⁸ given the high reported rates of intensive, daily crack smoking and drug sharing with clients. Addiction to crack cocaine has been suggested to progress more rapidly than addiction to other opiates or alternate forms of cocaine,⁷ and has been previously associated with heightened violence, crime, and exploitation of women through exchanging of sex to sustain their drug habit.⁷ Survival sex workers who smoke crack are placed in vulnerable situations and lack control in working conditions,⁵ and have been shown to have decreased ability to insist on condom use.³⁴

The finding that unprotected sex with regular partners is associated with a three-fold increase in HIV infection is consistent with previous work that suggests sexual transmission among survival sex workers is more reflective of unprotected sexual encounters with intimate partners rather than clients.^{18,35,36} However the notably high level of inconsistent condom use by clients/johns (32%) may be cause for caution when interpreting these findings. In particular, given sex work in this population serves as a means of daily survival and sustaining one's drug habit, the prevalence of clients offering more money for unprotected sex (61%) suggests an important need for public health efforts that enhance access to low-threshold employment and transitioning strategies out of "survival" sex work, as well as addictions treatments and harm reduction strategies among women. Finally, the high rates of harassment, physical and/or sexual assault violations by both clients and non-sex trade partners, coupled with previous evidence of violence in decreasing women's ability to insist on condom use,² highlight the urgent need for violence prevention for both working and intimate relationships as part of HIV prevention strategies for this population. As well, interventions targeting potential sexual transmission and safe sex negotiation need to be incorporated within the context of gender-focused harm reduction initiatives.

Several limitations of this analysis should be considered. First, the results are derived from a cross-sectional survey and thus the direction or causality of associations cannot be determined. Further follow-up will allow for prospective analysis of the causal

relationship between explanatory variables and HIV infection, and determine temporality. Second, all behavioural variables are self-reported and thus may be subject to social desirability bias. Previous studies have provided validation of self-reported information among drug user populations.³⁷ Third, although interviews were conducted offsite, all women were initially contacted through a low-threshold drop-in centre and thus this study may have failed to access the most marginalized women. However, given the hard-to-reach nature, illegal constructs of sex work, and ongoing challenges of trust and confidentiality among this hidden population, contact through a low-threshold community group is likely to have removed some of the barriers and facilitated connection with many high-risk women. Further participatory research and mapping will help to ensure that an increasing number of sex workers are reached. Finally, interviews were restricted to women in survival sex work, and thus results may not be generalizable to other levels of commercial sex work.

Innovative and evidence-based strategies are urgently needed that address the sexual and drug-related vulnerabilities to HIV infection among survival sex workers. In particular, given that initiation into sex work during adolescence was associated with close to a two-fold increase in likelihood of baseline HIV infection, interventions are desperately needed to target the multiple precursors to early initiation into sex work.

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RÉSUMÉ

Contexte : Les femmes qui dépendent du commerce du sexe pour leur survie sont exposées à de nombreuses pratiques risquées, liées au sexe et à la drogue, qui augmentent directement leur vulnérabilité aux infections à VIH. Des études sur les utilisateurs de drogue injectable se sont penchées sur les variables prédictives du travail du sexe et de l'infection à VIH, mais on en sait encore très peu sur les risques complexes de transmission du VIH auxquels s'exposent les femmes qui dépendent du commerce du sexe pour leur survie. Dans le présent article, nous cherchons à déterminer la prévalence du VIH chez ces femmes et nous analysons les pratiques risquées, liées au sexe et à la drogue, associées à la primo-infection.

Méthode : L'association de diverses variables à la primo-infection à VIH a été étudiée au moyen d'analyses descriptives et univariées. Les variables jugées significatives selon les analyses univariées ($p < 0,05$) ont été entrées dans un modèle de régression logistique fixe ajusté selon l'âge.

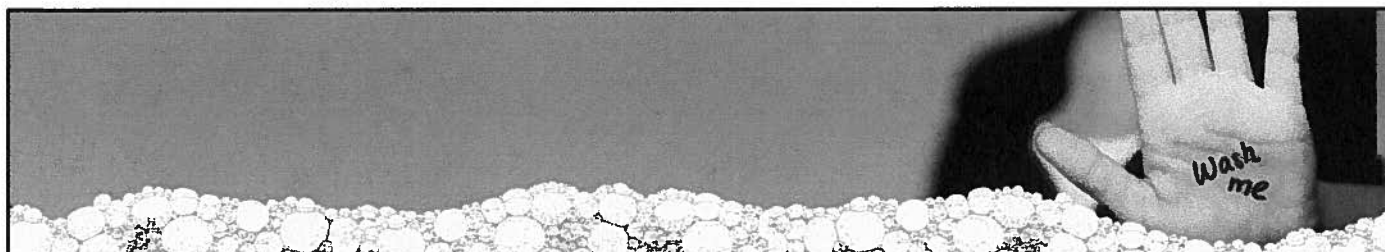
Résultats : Sur 198 femmes, 26 % étaient séropositives pour le VIH au départ. Selon l'analyse de régression logistique multivariée, la primo-infection à VIH était associée à l'initiation précoce (avant 18 ans) au travail du sexe (RCA=1,8; IC de 95 % = 1,3-2,2), à l'appartenance ethnique autochtone (RCA=2,1; IC de 95 % = 1,4-3,8), à l'injection quotidienne de cocaïne (RCA=2,2; IC de 95 % = 1,3-3,5), à l'habitude quotidienne et intensive de fumer du crack (RCA=2,7; IC de 95 % = 2,1-3,9) et aux relations sexuelles non protégées avec un partenaire intime (RCA=2,8; IC de 95 % = 1,9-3,6).

Interprétation : Il existe un urgent besoin d'instaurer des stratégies novatrices fondées sur les preuves pour combattre les pratiques risquées, liées au sexe et à la drogue, qui augmentent la vulnérabilité aux infections à VIH chez les femmes qui dépendent du commerce du sexe pour leur survie - et en particulier, des mesures d'intervention qui ciblent les précurseurs de l'initiation précoce au travail du sexe.

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PREVENT, PREPARE for and PROTECT YOURSELF from the next FLU PANDEMIC

The Canadian Public Health Association (CPHA) and the Pandemic Health Alert Network are informing Canadians about the basic public health steps we can all take to help prevent the spread of infection, prepare to cope in an emergency, and protect our health during a flu pandemic.

Around the world, governments are gearing up for the next flu pandemic. Websites, fact sheets and checklists abound. However, the language they use and level of information they provide can be overwhelming and technical. To address this, CPHA and the Pandemic Health Alert Network have created a toolkit of practical, evidence-based information that is communicated in plain language.

This simple and practical toolkit provides Canadians with the information they need to protect themselves in a flu pandemic. The tools are easy to use, with common sense measures Canadians can put into practice in their daily lives.

These simple public health steps fall into three action areas:

1. **PREVENT** – basic public health habits that reduce the chance of catching and spreading the flu, such as proper hand washing;
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3. **PROTECT** – crucial information on self-care during a flu pandemic.

The toolkit is designed to stimulate Canadians' interest to learn more and put that knowledge into action with simple measures that could stem the force of the next flu pandemic. The hope is that these steps will strengthen public resilience. That way we'll all be better prepared to cope in a flu pandemic, or other public health emergency.

The toolkit is available in English and French, online at www.pandemic.cpha.ca.

RESEARCH ARTICLE

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Homelessness among a cohort of women in street-based sex work: the need for safer environment interventions

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Abstract

Background: Drawing on data from a community-based prospective cohort study in Vancouver, Canada, we examined the prevalence and individual, interpersonal and work environment correlates of homelessness among 252 women in street-based sex work.

Methods: Bivariate and multivariate logistic regression using generalized estimating equations (GEE) was used to examine the individual, interpersonal and work environment factors that were associated with homelessness among street-based sex workers.

Results: Among 252 women, 43.3% reported homelessness over an 18-month follow-up period. In the multivariable GEE logistic regression analysis, younger age (adjusted odds ratio [aOR] = 0.93; 95%confidence interval [95%CI] 0.93-0.98), sexual violence by non-commercial partners (aOR = 2.14; 95%CI 1.06-4.34), servicing a higher number of clients (10+ per week vs < 10) (aOR = 1.68; 95%CI 1.05-2.69), intensive, daily crack use (aOR = 1.65; 95%CI 1.11-2.45), and servicing clients in public spaces (aOR = 1.52; CI 1.00-2.31) were independently associated with sleeping on the street.

Conclusions: These findings indicate a critical need for safer environment interventions that mitigate the social and physical risks faced by homeless FSWs and increase access to safe, secure housing for women.

Background

Emerging research suggests substantial health inequities exist among individuals without adequate, safe, and affordable shelter. Homelessness represents a unique social and physical environment that has been shown to substantially influence distribution of health inequities, risk taking and adverse health outcomes among marginalized populations [1,2]. "Absolute homelessness" is defined as "individuals living in the streets with no physical shelter of their own, including those who spend their nights in emergency shelters"[3]. Homelessness is a growing concern worldwide: according to a 2005 count, one billion people lack adequate housing, and approximately 100 million do not have housing at all [4]. In North America, homelessness is on the rise in many urban centres [5]. A 2005 homelessness count in the US

estimated that 744,313 people experienced homelessness nationwide, with homelessness heavily concentrated in the country's major cities [5,6]. In the greater region of Vancouver, Canada, the total number of homeless individuals is increasing; a 2008 homelessness count identified 2,660 homeless people, over double the 2002 estimate [6]. The high rates of homelessness in the greater Vancouver region suggests that current poverty-alleviation and housing interventions are inadequate in curbing homelessness in the city [6].

Of particular importance, despite a large body of research examining the individual, social and physical contexts of homelessness among injection drug users (IDU) to date [1,7], there remains limited research documenting the prevalence and correlates of homelessness among street-based sex work populations, or how patterns of risk compare with their housed counterparts. Furthermore, the few studies to date among female sex workers (FSWs) have been cross-sectional. For example, in Miami, Florida, a recent cross-sectional study among

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street-based FSWs documented a higher number of vaginal and oral sexual transactions with clients, increased odds of engaging in unprotected vaginal intercourse and more frequent accounts of exchanging sex while high on drugs among homeless sex workers [8]. Clients of homeless FSWs were also more likely to refuse to use condoms compared to clients of more stably housed FSWs. This study provides important cross-sectional data on the sexual risks among homeless FSWs. Given that work environment factors have been increasingly shown to play a critical role in shaping health risks among FSWs, including negotiation of sexual risks, and violence [1,8,9], the context of absolute homelessness warrants further investigation.

An array of health problems have been associated with being homeless, including mental illness, physical violence, and substance abuse [2,7,9]. The convergence of these factors may elevate an individual's risk for homelessness, leading to the concept of "hard to house" individuals. Higher rates of drug use and sharing of needles have been observed among homeless compared to non-homeless individuals [1,10,11]. Having a greater number of sexual partners, engagement in unprotected sex and involvement in sex work have also been linked to homelessness and/or housing instability [12,13]. Many homeless persons are confronted with environmental conditions that may further exacerbate drug and sexual practices, placing them at higher risk for HIV infection. For example, homelessness and unstable housing have been associated with sharing injection drug paraphernalia (rigs, needles) [11] and the use of shooting galleries [14]. Persons who are homeless or unstably housed have been found to have HIV rates that are up to nine-fold higher than those who are stably housed [15]. In addition, evidence suggests that homeless persons experience numerous barriers to accessing health care and harm reduction services [16].

In order to address the dearth of longitudinal research on the individual, interpersonal and work environment factors associated with homelessness among female sex workers (FSWs), our study aimed to evaluate the prevalence and correlates of absolute homelessness (sleeping on the street) among a prospective cohort of street-based FSWs in Vancouver, Canada.

Methods

Data were drawn from a community-based prospective cohort that has been described in detail previously [17]. Briefly, 252 street-based FSWs (response rate of 94%) were recruited and consented to participate in the study between 2006 and 2008. Based on the mapping of solicitation spaces ('sex work strolls'), a time-space sampling strategy was employed to recruit hard-to-reach populations by sampling at times and places where they often congregate. Unlike other sampling strategies, physical

spaces instead of persons are the primary sampling unit [18]. The outreach team of current/former FSWs recruited participants at staggered working hours and locations at sex work strolls, using vehicles for late-night outreach for safety and increased coverage [17]. The study's eligibility criteria included being female or transgender aged 14 years or older, actively engaging in street-level sex work and using illicit drugs within the past month (excluding marijuana). This analysis was restricted to three visits over an 18 month period; participants completed baseline and at least one of two semi-annual follow up visits which consisted of an interview-administered questionnaire by a peer researcher (current/former street-based FSW), a nurse-administered pre-test counseling questionnaire, and HIV screening. Respondents received \$25 honoraria compensation at each 6-monthly visit for their time and expertise. This research received ethical approval by UBC/Providence Health ethics review board.

Dependent variable

Our dependent variable was 'absolute homelessness' in the previous 6 months based on a 'yes' response to the survey item "Have you slept on the street for one night or longer over the previous 6-month period?" Interviewers were trained to ensure that only true cases of homelessness were coded as positive responses.

Explanatory variables

Individual, interpersonal and contextual/work environment factors were considered a priori based on our earlier qualitative research, and the homelessness literature. As previously [19], age was considered a continuous variable (years) and ethnicity was defined as Caucasian vs. non-Caucasian. Individual drug use patterns included daily cocaine and heroin injection, crystal methamphetamine use (injection/non-injection). As in our previous work [20], given the high rates of crack cocaine among street-based FSWs, we have stratified intensity of daily crack use at the median (10 or more rocks per day). Interpersonal variables of interest included servicing a higher number of clients per week (10+ vs less), inconsistent condom use by clients, being pressured into sex without a condom, having borrowed used syringes and pipes, and having experienced a 'bad date' (physical and/or sexual violence by a client), within the past 6 months. As homelessness has previously shown to be associated with sexual violence by non-commercial partners [20], we adjusted our model for this potential confounding effect. Work environment factors of interest included primary types of outdoor solicitation spaces (main streets/commercial corridors, alleys/industrial areas, residential communities), as well as servicing in outdoor public spaces (alleys, industrial settings) as compared to indoor spaces.

Statistical analysis

Data was analyzed longitudinally. Baseline variables of age, ethnicity and education were considered as fixed covariates. All other factors were treated as time-updated covariates that referred to experiences occurring during the previous six-month period. As previously [21], data from each participant's baseline and follow up were included and analyzed using generalized estimating equations (GEE), which accounted for each individuals' repeated measurements over the 18-month observation period; thus, data from each participant's follow-up visit was included. These methods provided standard errors adjusted by repeated observations per person using an exchangeable correlation structure. Missing data were addressed through the GEE estimating mechanism, which uses the all available pairs method to encompass the missing data from dropouts or intermittent missing data. All non-missing pairs of data are used in the estimators of the working correlation parameters. Given the cyclical nature of homelessness, this method allowed us to analyze factors associated with the outcome of sleeping on the street in each 6-month period.

Descriptive statistics (e.g. prevalence, medians and interquartile range [IQR]) of baseline individual, interpersonal and work environment factors were presented, stratified by homelessness. Bivariate and multivariable logistic regression with GEEs was used to examine the relationship between individual, interpersonal and work environment factors and being homeless in the previous six months. Bivariate analyses were used to examine associations and test for potential collinearity or effect modification. P-values were generated using the Fisher's test of exact probability when one or more observations was less than or equal to five. A multivariate logistic regression model was constructed using GEE and subsequently fitted with factors that were significantly associated with homelessness at a $p < 0.10$ -level to adjust for potential or known confounders. Variables were retained as significant in multivariable analyses at $p < 0.05$. The p-values reported are two-sided; bivariate and adjusted odds ratios (OR and aOR respectively) with 95% confidence intervals (95% CIs) were reported.

Results

This analysis was restricted to 252 sex workers who completed baseline and up to two follow-up surveys between 2006 and 2008. Just over half (51%) were Caucasian, and 49% were non-Caucasian (Indigenous/Aboriginal (including, being of First Nations, Metis, Inuit ancestry) or another visible minority). The median age of participants was 35 years [IQR: 25-41]. All participants self-identified as women, of whom sixteen participants (6.3%) were transgendered (male-to-female). The lifetime prevalence of absolute homelessness was 88%, with a median age of first

sleeping on the street of 17 years [IQR: 14-25]. Over 18-months follow-up period, 43% of participants reported being homeless (sleeping on the street) at least once, suggesting that many of these women cycle in and out of homelessness.

The unadjusted and adjusted odds ratios in the multivariate analysis are presented in Tables 1 and 2. In bivariate analysis, injecting heroin (OR = 1.49; 95%CI 1.03-2.15), injecting or smoking crystal methamphetamine (OR = 2.21; 95%CI 1.26-3.87), injecting cocaine (OR = 1.17; 95% CI 0.80-1.69) and intensive crack use (OR = 1.65; 95%CI 1.19-2.30) within the past six months, having borrowed a used syringe/pipe (OR = 0.32; 95%CI 0.02-0.66), number of clients per week (OR = 1.69; 95%CI 1.12-2.54), sexual violence (OR = 1.99; 95%CI 1.03-3.83) and servicing clients in outdoor spaces (OR = 1.81; 95%CI 1.29-2.54) were all found to be significant. In the multivariate GEE logistic regression analyses, sexual violence by non-commercial partners (aOR = 2.14; 95%CI 1.06-4.35), servicing a higher volume of clients (10+ per week vs < 10) (aOR = 1.68; 95% CI 1.05-2.69), intensive, daily crack use (aOR = 1.65; 95% CI 1.11-2.45), servicing clients in public spaces (aOR = 1.52; 95% CI 1.00-2.31), and younger age (aOR = 0.93; 95%CI 0.93-0.98), were independently correlated with sleeping on the street.

Discussion

This study is one of few that examines the prevalence and correlates of homelessness among street-based FSWs. The results demonstrate a staggering prevalence of both lifetime and recent homelessness among street-based FSWs, with a median age of first sleeping on the street during adolescence. Of particular concern, after adjusting for individual and interpersonal risks, homeless street-based FSWs were more likely to be younger, to experience sexual violence by non-commercial partners, to service a higher volume of weekly clients, to report intensive, daily crack smoking, and to exchange sex in outdoor spaces (as compared to indoor settings).

These findings collectively highlight the intersecting social and physical contexts of place in shaping health inequities among street-based FSWs. In our study, homeless street-based FSWs were 68% more likely to service a high number of clients (10+) per week compared to their housed counterparts, pointing to increased economic dependence on sex work for survival among impoverished women. This finding persisted even after adjustment for frequency and intensity of drug use, suggesting that lack of a basic necessity such as housing combined with the immediacy of sleeping on the street may confer additional need to exchange sex for basic resource needs, such as shelter or food. Our results extend earlier studies among homeless and marginally housed youth and IDU that found higher number of sexual partnerships than their

Table 1 Sample characteristics for individual, interpersonal and sex work environment factors among homeless and housed street-based FSWs

Characteristic	Absolute Homeless FSWs (last 18 months) 43.32 (%) n = 107	Housed FSWs (last 18 months) 56.68 (%) n = 140	p - value
Individual Sociodemographic Factors			
Age (years, Interquartile range)	27 [IQR ¹ :23-37]	38 [IQR: 32-42]	< .001
Ethnicity			
Caucasian	54 (50.94)	82 (58.99)	
Aboriginal	52 (49.06)	57 (41.01)	0.571
Education			
Less than high school	75 (42.61)	101 (57.39)	
High School Graduate	22 (48.89)	23 (51.11)	0.967
College/University	9 (36.00)	16 (64.00)	0.292
Drug Use Patterns			
Cocaine injection *	35 (44.30)	44 (55.70)	0.042
Heroin injection*	59 (49.17)	61 (50.83)	0.033
Crystal methamphetamine*	22 (68.75)	10 (31.25)	0.005
Intensive, daily crack cocaine smoking)*	47 (48.45)	50 (51.55)	0.003
Interpersonal Factors			
Receptive sharing of used syringes/pipes*	75 (75.00)	60 (60.00)	0.064
Number of clients per week (10+)	40 (49.38)	41 (50.62)	0.012
Consistent condom use by clients*	16 (55.17)	13 (44.83)	0.957
Physical/sexual violence by client*	25 (47.17)	28 (52.83)	0.596
Physical violence by an intimate partner*	31 (47.69)	34 (52.31)	0.119
Sexual violence by an intimate partner*	5 (45.45)	6(54.55)	0.039
Physical Work Environment Factors			
Primarily solicits clients on main streets/commercial areas*	27 (81.82)	6 (18.18)	0.453
Primarily services clients in outdoor public spaces (streets, alleys, parks)*	43 (84.31)	8 (15.69)	0.103

¹ IQR = interquartile range

* = last 6 months.

more stably housed counterparts [10,12], perhaps through commercial sex exchanges. Similarly, Surratt and Inciardi (2004) found significantly more frequent vaginal and oral sex acts among homeless FSWs compared to their housed counterparts. Sexual violence by non-commercial partners is higher among homeless street-based FSWs suggesting that lack of access to safe, affordable spaces may reduce street-based FSWs' capacity to negotiate safety and elevate their risk for exploitation and abuse by intimate partners and other sexual partners. Other studies in North America have observed heightened risk of physical and sexual violence among homeless women [22]. Qualitative studies have highlighted that women immersed in the street economy occupy a subordinate role in the male-centred street ideology, and are often the victims of exploitation, physical and symbolic violence [23]. Street-entrenched women often enter intimate partnerships as a strategy for protection from structural, symbolic and interpersonal violence intrinsic to life on the street, however the power imbalances arising from these partnerships sometimes trap women in abusive relationships [23].

Importantly, contrary to a recent study among homeless and unstably housed male and female IDUs that found increased risk of unprotected sex compared to their stably housed counterparts [12], there were no differences in condom use among homeless and housed street-based FSWs. Instead, in our study, homeless street-based FSWs were more likely to work in public spaces, a context previously shown to be correlated with geographic 'hotspots' for increased coercive unprotected sex by clients in this setting [24]. These findings suggest that factors relating to unsafe sex work environments may be more important in the context of condom use negotiation and violence among street-based FSWs. However, the social and physical context of the lack of availability of safe places to sleep for street-based FSWs may play a more distal role on the causal pathway to unprotected sex by removing options to service clients indoors, within a setting where criminalization and enforcement are already displacing much of the street-based sex market to outlying areas.

Finally, unlike earlier investigations that have focused exclusively on IDUs, slightly less than half of our sample

Table 2 Unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (95%CI's) for the relationship between individual-level, interpersonal and sex work environment factors and homelessness among street-based FSWs in Vancouver

Characteristic	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Individual Sociodemographic Factors		
Age	0.94 (0.92-0.97)	0.95 (0.93-0.98)
Aboriginal† (vs. non-aboriginal)	1.14 (0.73-1.76)	
Education		
Less than high school completion	Reference	
High school graduate†	1.32 (0.55-3.15)	
Education, any college/university†	1.70 (0.62-4.64)	
Drug Use Patterns		
Cocaine Injection*†	1.17 (0.80-1.69)	
Heroin Injection*	1.49 (1.03-2.15)	1.16 (0.76-1.79)
Crystal methamphetamine use *	2.21 (1.26-3.87)	1.57 (0.91-2.71)
Intensive, Daily Crack Cocaine Smoking*	1.65 (1.19-2.30)	1.65 (1.11-2.45)
Social/Interpersonal Factors		
Receptive sharing of used syringe/pipet	0.32 (0.02-0.66)	
Number of clients per week (10+)*	1.69 (1.12-2.54)	1.68 (1.05-2.69)
Consistent condom use by clients*†	1.01 (0.62-1.65)	
Physical/sexual violence by client *†	1.13 (0.72-1.79)	
Physical violence by intimate partner*†	1.34 (0.93-1.93)	
Sexual violence by intimate partner *	1.99 (1.03-3.83)	2.14 (1.06-4.35)
Physical Work Environment Factors		
Primarily solicits clients on main streets/commercial areas*†	1.18 (0.77-1.80)	
Primarily services clients in outdoor public spaces (streets, alleys, parks)*	1.81 (1.29-2.54)	1.52 (1.00-2.31)

* = last 6 months

†Variable not entered into logistic model.

of street based FSWs were injectors while the majority smoked crack cocaine. In our study we found that being homeless was significantly associated with intensive, daily crack smoking. Our findings suggest that the pressures of living on the street may contribute to heightened levels of crack use among homeless street-based FSWs. Since many of the women in our sample live in Vancouver's downtown eastside, an area characterized by homelessness, poverty and high levels of drug use, this setting may increase street-based FSWs' exposure to high-risk environments such as crack houses, public drug markets, and shooting galleries that may elevate their crack consumption. Furthermore, living on the streets may also facilitate the creation of social ties with other drug users, encouraging and/or exacerbating intensive daily crack use among homeless street-based FSWs. Given that drug use is often an antecedent of homelessness and exchanging sex for survival [25], increased drug use among homeless street-based FSWs in our study was not unexpected. However, given the growing concern that crack cocaine smoking has emerged as a risk factor for HIV acquisition among IDUs in our setting [26], replacing cocaine injection in the earlier phases of the epidemic, our results have

important public health implications. Further exploration of the contexts of homeless FSWs who smoke crack but do not inject is needed, combined with increased safer environment interventions targeting this population.

Collectively, our findings suggest that physical and social contexts of homelessness may contribute to or exacerbate violence, sexual- and drug- related risks and point towards the need for safer environment interventions that mitigate homelessness and associated risks. Safer environment interventions aimed at improving access and availability of safe, stable low-income housing for women in street-based sex work is particularly important in Vancouver, given the high costs of rental units and steady decreases in low income housing stock [27]. At the macro-level, policies that support expanding the continuum of safe, secure housing options for women are warranted, from low-threshold transitional shelters to supportive housing models. These housing options need to be coupled with higher rental subsidies and rental assistance programs that have proven effective elsewhere [28]. Furthermore, our results suggest that women- and sex work-only housing options need to be piloted and evaluated to reduce exposure to violence by intimate

partners, strangers and mitigate sexual risks among street-based FSWs. These types of interventions should be supported by removal of criminal sanctions targeting sex work, given growing evidence of the links between enforcement of criminalized policies and displacement of street-based FSWs away from health and support services [9,24]. At the micro-level, other safer environment interventions that have proven effective in modifying the immediate risk environment and should be scaled up include peer-led outreach strategies [21]. Mobile health and support outreach services continue to be a critical, low-threshold model of connecting street-involved women with health and support services, and should be expanded to isolated sex work spaces.

This study has a number of limitations that should be noted. The findings from this study may not be generalizable to off-street sex workers (e.g. exotic dance, escort) or male sex workers. Given the observational nature of this research, we cannot determine causality, though some potential temporal bias may be reduced due to the use of generalized estimating equations that account for repeated responses by the same respondent. This study used self-report data, and women's responses may be subject to social desirability bias. However, a number of studies have found sex workers and drug users to provide truthful accounts of their sex and drug use activities when questioned in a non-threatening environment [29]. Due to a low prevalence of transgender women (6.3%), we were unable to tease out differences in homelessness by sexual identity in our current analysis. Finally, due to a recall period of 6 months, our results may be susceptible to recall bias. To reduce this bias, strategies such as using an individual event six months prior were used to facilitate recall. These results contribute to the growing body of literature advocating the importance of addressing environmental conditions that increase HIV risks, as a means to stemming the epidemic.

Conclusion

In summary, this longitudinal study demonstrates a high prevalence of homelessness among street-based FSWs in an urban Canadian setting, with the median age of first sleeping on the street during adolescence. Of particular concern, 43% of women reported absolute homelessness over just 18-months of follow-up, suggesting women cycle in and out of housing. Homeless FSWs were younger, experienced higher exposure to violence by non-commercial partners, serviced a higher number of clients and were more likely to engage in sex work in public spaces as compared to their housed counterparts. Taken together, these findings support the need for safer environment interventions to modify the social and physical contexts of risk faced by homeless FSWs and increase access to safe, secure housing options for vulnerable women.

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Authors' contributions

KS had access to the data and takes full responsibility for the integrity of the data. PD and KS developed the analyses plan, and KD conducted the statistical analyses. PD wrote the first draft of the manuscript and integrated suggestions from all co-authors. 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.

Competing interests

The authors declare that they have no competing interests.

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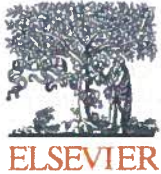
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Crystal methamphetamine use among female street-based sex workers: Moving beyond individual-focused interventions

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ABSTRACT

Given growing concern of the sexual risks associated with crystal methamphetamine use and the dearth of research characterizing the use of methamphetamine among street-based sex workers (FSWs), this study aimed to characterize the prevalence and individual, social, and structural contexts of crystal methamphetamine use among FSWs in a Canadian setting. Drawing on data from a prospective cohort, we constructed multivariate logistic models to examine independent correlates of crystal methamphetamine use among FSWs over a two-year follow-up period using generalized estimating equations. Of a total of 255 street-based FSWs, 78 (32%) reported lifetime crystal methamphetamine use and 24% used crystal methamphetamine during the two-year follow-up period, with no significant associations between methamphetamine use and sexual risk patterns. In a final multivariate GEE model, FSWs who used crystal methamphetamine had a higher proportional odds of dual heroin injection (adjOR = 2.98, 95%CI: 1.35–5.22), having a primary male sex partner who procures drugs for them (adjOR = 1.79, 95%CI: 1.02–3.14), and working (adjOR = 1.62, 95%CI: 1.04–2.65) and living (adjOR = 1.41, 95%CI: 1.07–1.99) in marginalized public spaces. The findings highlight the crucial need to move beyond the individual to gender-focused safer environment interventions that mediate the physical and social risk environment of crystal methamphetamine use among FSWs.

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1. Introduction

Close to 25 million people worldwide are estimated to use methamphetamine and amphetamine (United Nations Office of Drugs and Crime, 2007) and many urban centres across North America are experiencing a significant increase in use of crystal methamphetamine (CM) (Buxton and Dove, 2008). Methamphetamine use has been associated with multiple adverse health outcomes, and interpersonal risks such as self-harm and violence (Boddiger, 2005; Buxton et al., 2008; Newman et al., 2004; Semple et al., 2004b), which represent a heavy social burden to communities (Brouwer et al., 2006; Swanson et al., 2007). Unlike other illicit drugs, such as cocaine or heroin that are produced and/or refined outside North America, CM can be produced locally and inexpensively using easy-to-access precursor chemicals. Due to

the widespread availability of crystal methamphetamine, it has been suggested that conventional drug control strategies will likely prove ineffective at curbing its widespread use (Wood and Kerr, 2008). As such, evidence is urgently needed to help characterize the social context and risk environment of CM use in an effort to design tailored policies and interventions.

Importantly, while CM use has been well described among men who have sex with men (MSM) and lesbian, gay, bisexual and transgendered (LGBT) populations, less attention has been paid to female heterosexual users of crystal methamphetamine, particularly female sex workers (FSWs). Two recent reviews of methamphetamine use have documented a more equal sex ratio of female to male users as compared to other illicit drugs, as well as significant gender differences in the social context of methamphetamine use (Cohen et al., 2007; Dluzen and Liu, 2008). A few studies among women who use drugs have shown CM use to be associated with elevated concomitant sexual risks, including greater number of sexual partners, unprotected vaginal and/or anal sex, and exchanging sex for money or drugs (Lorvick et al., 2006; Semple et al., 2004a; Weiser et al., 2006).

The effects of CM have been shown to increase sexual desire, arousal, and pleasure (Patterson et al., 2005; Case et al., 2008;

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Cohen et al., 2007; Dluxen et al., 2008). CM used has been linked to heightened sexual performance, particularly among MSM populations. Dependent CM use is commonly associated with loss of inhibitory control of sexual behaviour and sexually compulsive behaviour, with increased risk for HIV and other sexually transmitted infections (STIs). Incidental or episodic psycho-stimulant methamphetamine use is also reportedly widespread among some populations and is frequently used to facilitate staying awake for extended periods of time and heightened periods of sexual activity and risk, including greater number of sexual partners and exchanges, risky sexual practices, and decreased condom use. Given the established links between CM use and sexual risk taking, it has been increasingly postulated that CM use may be an important and unique drug within sex work and client populations. A recent study in two Mexico–US border cities found a 3-fold elevated odds of HIV infection among FSWs who used methamphetamine, even after adjustment for direct injection risks (Patterson et al., 2008). The authors hypothesized that non-injection methamphetamine use was a proxy for increased HIV acquisition through unprotected sex. Qualitative work among the sex workers in these settings further suggested that CM use was used as an occupational stressor used to facilitate staying awake and to enhance sexual performance (Crux et al., 2006).

Despite the growing concerns of CM use among FSWs in many western cities across North America and the hypothesized links between CM use and sexual risk among FSWs who use drugs, there has been surprisingly limited attention paid to the use of CM among sex work populations. We therefore undertook this analysis to examine the prevalence and correlates of CM use among a prospective cohort of street-based FSWs. In doing so, we aimed to investigate the hypotheses that CM use would be associated with both enhanced sexual risks with clients and specific environmental–structural contexts among street-based FSWs.

2. Methods

2.1. Study population and sampling

Data are drawn from a community-based HIV prevention research partnership that has been described in detail elsewhere (Shannon et al., 2007a,b). Briefly, between 2006 and 2008, street-based FSWs were enrolled into an open prospective cohort and participated in baseline and six monthly follow-up visits, including an interview questionnaire and voluntary HIV screening. Based on previous research that identified 100% substance use among street-based FSWs in Vancouver (Shannon et al., 2007a,b), eligibility criteria was defined as being a woman (≥ 14 years) who used illicit drugs (excluding marijuana) and engaged in street-level sex work. Given the difficulties in accessing a representative sample of FSWs due to the unknown size and boundaries of this population, initial mapping of working areas with over 60 FSWs identified sex work 'strolls' for targeted outreach and recruitment. Time-space sampling (Stueve et al., 2001) has been developed as a recruitment strategy where the sampling unit is location and time where people congregate rather than individuals. Similar to earlier studies of time-space sampling among MSM in gay clubs, we systematically sampled all female sex workers (inclusive of transgender women) through outreach at staggered times and locations along the mapped sex work strolls over the baseline period.

2.2. Study instruments

At baseline and follow-up visits, a detailed semi-structured questionnaire administered by trained peer researchers (former/current FSWs) elicited responses related to demographics,

health service use, working conditions, violence, and sexual and drug risk practices. In addition, voluntary HIV screening using the point of care rapid INSTI test (Biolytical, Vancouver, Canada, specificity 99.3%, sensitivity 99.6%) was conducted by the project nurse, supported by pre/post-test counseling. HIV-positive tests were confirmed by Western blot.

2.3. Measures

Since we had repeated measures available over a two-year period, we analyzed data longitudinally. The dependent variable for all analyses was derived to capture any use of CM in the past six months (injection/smoking/snorting or other). In sub-analyses, initial experiences of CM use were examined, including median age of first use, person with whom they first used CM (e.g., partner, client, friend, family, dealer, pimp, stranger) and mode of first administration (injection/smoking/snorting or other).

The covariates of CM use were categorized as: (a) individual (e.g., non-modifiable characteristics; current behaviour patterns); (b) interpersonal (e.g., social relations and interactions); and (c) environmental–structural (e.g., socio-spatial features; regulatory/legal factors). Individual variables included: age (youth ≤ 24 years), HIV serostatus, and use of other injection/non-injection drugs (cocaine or heroin injection, or crack cocaine smoking). Given prior evidence of enhanced sexual and drug-related harms among Aboriginal women and youth who use drugs in this setting, Aboriginal ethnicity (e.g., First Nations, Metis or Inuit ancestry) also was considered as a covariate.

Interpersonal sexual and drug-related risk practices included physical violence, sexual violence, being pressured into unprotected sex, and borrowing a used crack pipe and/or syringe. Based on previous qualitative research (Shannon, 2008), we also examined correlates related to the interpersonal impacts of FSWs' intimate partners, including: having an intimate male partner who injects drugs; engaging in unprotected vaginal or anal sex with a primary partner; and having a male intimate partner procure drugs for FSWs. In addition, we examined risks specific to sex work transactions, including: median number of clients per week, unprotected sexual transactions, client-perpetrated violence, exchanging sex while high on drugs, and sharing drugs with clients.

Environmental–structural factors included: homelessness; working area (industrial area, main streets, residential setting); place of servicing client (car or outdoor public space as compared to indoor settings, including hourly rooms or saunas); harassment by police (reported as: 'jacked up' by police and/or confiscation of drug use paraphernalia without arrest); and displacement to outlying areas due to street policing (reported as: 'having moved working areas away from main streets due to policing').

2.4. Statistical analyses

Analyses included FSWs who completed baseline and at least one follow-up visit over the two-year period. Baseline variables considered included demographic variables (e.g., age, ethnicity). All other variables were treated as time-updated covariates that referred to experiences occurring during the previous six-month period. Fisher's exact test was also used to compute *p*-values when observations were ≤ 5 .

We examined bivariate associations and tested for potential collinearity or effect-modification between individual, partner, environmental–structural variables and CM use using generalized estimating equations (GEE) and a working correlation matrix. We used GEE for binary outcomes with logit link for the analysis of correlated data since the factors potentially associated with CM use during follow-up were repeated (time-dependent) measures. GEE models account for the correlation between repeated mea-

Table 1
Individual, interpersonal and contextual characteristics of street-based FSWs, stratified by crystal methamphetamine use over two-year follow-up.

Characteristic	Crystal methamphetamine use		
	Yes (<i>n</i> = 105) ^a		<i>p</i> -Value
	<i>n</i> (%)	No (<i>n</i> = 493) ^a <i>n</i> (%)	
<i>Individual factors</i>			
Cocaine Injection	42 (40)	130 (26)	0.030
Heroin Injection	68 (65)	195 (39)	<0.001
Crack Smoking	66 (63)	425 (86)	0.063
<i>Interpersonal factors</i>			
Pressured into sex without a condom	30 (29)	115 (23)	0.968
Borrowed use crack pipe and/or syringe	62 (59)	301 (61)	0.275
Experienced physical violence	24 (22)	127 (26)	0.221
Experienced sexual violence	20 (19)	83 (17)	0.418
<i>Intimate partner risk</i>			
Intimate partner who injects drugs	31 (30)	111 (26)	0.141
Intimate partner who procures drugs	31 (30)	52 (11)	0.007
Unprotected sex with an intimate partner	25 (22)	95 (19)	0.945
<i>Sexual transactions with clients</i>			
Median number of clients/week (IQR)	6 (2–14)	6 (3–15)	0.382
Unprotected sexual transactions	27 (26)	99 (20)	0.645
Shared drugs with clients	45 (43)	187 (38)	0.578
Exchanged sex while high	45 (43)	260 (53)	0.391
Experienced client-perpetrated violence	19 (18)	93 (19)	0.178
<i>Environmental–structural factors</i>			
Absolute homelessness (lived on the street)	50 (48)	183 (37)	0.010
Worked in an industrial area	28 (27)	73 (14)	0.002
Serviced clients in cars or public spaces	62 (59)	264 (54)	0.493
Moved working areas to outlying spaces due to street-policing	36 (34)	203 (41)	0.726
Experienced police harassment/confiscation of drug use paraphernalia (without arrest)	44 (42)	172 (35)	0.493

^a Refers to total number of reports over two-year follow-up period. Fisher's exact test was used to compare proportions if one or more counts was less than or equal to five.

tures for each subject, and data from every participant follow-up visit were considered in the analyses. We then fit multivariate logistic GEE models adjusting for known or potential confounders and variables that retained significance at $p < 0.01$ with CM use in bivariate analyses. The final multivariate model includes variables that retained significance at alpha level of $p < 0.05$. All reported p -values are two-sided, and are reported at 95% confidence intervals (CIs).

3. Results

A total of 255 street-based FSWs completed at least one follow-up visit and were therefore included in the analyses (median visits = 2, interquartile range [IQR]: 1–3). Approximately half (48%) self-identified as Aboriginal as compared to 43% Caucasian, 9% other minority (Hispanic, Asian), with no statistically significant differences in odds of CM use by ethnicity ($p = 0.24$). The median age at baseline was 36 years (IQR: 25–41) and the median age of sex work initiation was 15 years (IQR: 13–21). Twenty percent were youth 24 years of age or less, with 30% of youth reporting current CM use as compared to 18% of FSWs ≥ 25 years ($p = 0.04$). HIV prevalence among FSWs was 23%, with no statistically significant difference in likelihood of CM use by HIV status ($p = 0.83$). FSWs reported a mean of 12 and a median of 6 clients per week (IQR = 3–15). There was no statistically significant difference in number of clients by CM use among FSWs ($p = 0.38$).

Of the 255 women, 78 (32%) reported lifetime CM use and 24% used CM over the two-year follow-up period (12% by injection only, 9% by both injection and non-injection, 3% by non-injection only). Table 1 describes the portion of individual, interpersonal and environmental/structural risk events reported by FSWs, stratified by CM use over the two-year follow-up period.

Injection was the primary mode of administration of CM use over the follow-up period (85%), in addition to non-injection (48%). However, only 40% ($n = 31$) first used CM by injection, while 47%

($n = 37$) first smoked and 13% ($n = 10$) first snorted ('bumped') crystal methamphetamine. The median age of initiation of CM use was 22 years (IQR: 16–34 years) while the median age of first injecting drugs was 17 years (IQR: 15–23 years), reflecting the relatively recent introduction of CM use in this setting. The most frequently reported person with whom FSWs first used CM was a primary non-commercial sex partner (51%), followed by friend/acquaintance (22%) ($p < 0.001$).

In univariate GEE analyses (Table 2), FSWs who used CM in the prior six months had a higher proportional odds of injecting heroin (unadjOR = 3.11, 95%CI: 1.65–5.98), having an intimate sex partner who injects drugs (unadjOR = 2.03, 95%CI: 1.20–3.42), injecting cocaine (unadjOR = 2.00, 95%CI: 1.06–3.18), being ≤ 24 years of age (unadjOR = 1.91, 95%CI: 1.01–3.61), working in an industrial area (unadjOR = 1.68, 95%CI: 1.06–2.67), and living on the street (unadjOR = 1.53, 95%CI: 1.15–2.15). FSWs who used CM had a lower proportional odds of smoking crack cocaine (unadjOR = 0.58, 95%CI: 0.33–1.03).

In a final multivariate GEE model (Table 3), FSWs who used CM in the prior six months had a higher proportional odds of being a heroin injector (adjOR = 2.98, 95%CI: 1.35–5.22), having a primary male sex partner who procured drugs for them (adjOR = 1.79, 95%CI: 1.02–3.14), working in industrial areas (adjOR = 1.62, 95%CI: 1.04–2.65), and living on the street (adjOR = 1.41, 95%CI: 1.07–1.99).

4. Discussion

Close to one-third of our sample reported lifetime CM use, with one quarter using CM use over the two-year follow-up period. Over half of FSWs who use methamphetamine reported first using CM with a primary non-commercial sex partner, and we observed two fold increased odds of CM use among FSWs who had a primary sex partner who procured drugs for them. Further, CM use remained independently associated with working and living in marginalized public spaces.

Table 2

Bivariate GEE analyses for individual, interpersonal, and contextual factors correlated with crystal methamphetamine use among street-based FSWs ($n = 255$) over two-year follow-up.

Characteristics	Crystal methamphetamine use	
	Crude odds ratios	95% Confidence intervals
<i>Individual factors</i>		
Youth (≤ 24 years of age)	1.91	(1.01–3.61)
Aboriginal ethnicity	0.70	(0.38–1.27)
HIV seropositive	1.07	(0.55–2.09)
Cocaine injection	2.00	(1.06–3.18)
Heroin injection	3.11	(1.65–5.91)
Crack cocaine smoking	0.58	(0.33–1.03)
<i>Interpersonal factors</i>		
Pressured into sex without a condom	1.01	(0.65–1.58)
Borrowed use crack pipe and/or syringe	1.21	(0.86–1.71)
Experienced physical violence	1.03	(0.69–1.59)
Experienced sexual violence	1.36	(0.65–2.84)
<i>Intimate partner risks</i>		
Intimate sex partner who injects drugs	1.33	(0.91–1.97)
Intimate sex partner who procures drugs	2.03	(1.20–3.42)
Unprotected sex with intimate partner	0.99	(0.66–1.46)
<i>Sexual transactions with clients</i>		
Median number of clients/week	0.99	(0.97–1.01)
Unprotected sexual transactions	1.11	(0.72–1.72)
Shared drugs with clients	1.11	(0.72–1.61)
Exchanged sex while high	0.82	(0.52–1.29)
Experienced client-perpetrated violence	0.67	(0.38–1.19)
<i>Environmental-structural factors</i>		
Absolute homelessness (lived on the street)	1.53	(1.15–2.15)
Worked in industrial areas	1.68	(1.06–2.67)
Serviced clients in cars or public spaces	1.15	(0.78–1.70)
Moved working areas to outlying spaces due to street-policing	0.93	(0.61–1.42)
Experienced police harassment/confiscation of drug use paraphernalia	1.15	(0.77–1.71)

Importantly, our findings contrast with earlier hypotheses that CM use among FSWs may facilitate enhanced sexual risks, with no statistically significant associations observed between CM use and number of clients, or unprotected sex with clients or non-commercial partners among FSWs. These findings however do not

Table 3

Multivariate GEE analyses for individual, interpersonal, and contextual factors independently correlated with crystal methamphetamine use among street-based FSWs ($n = 255$) over two-year follow-up.

Characteristics	Crystal methamphetamine use	
	Adjusted odds ratios	95% Confidence intervals
Heroin injection ^a	2.98	1.35–5.22
Youth (≤ 24 years of age)	1.80	0.90–3.63
Intimate partner who procures drugs ^a	1.79	1.02–3.14
Worked in industrial areas ^a	1.62	1.04–2.65
Cocaine injection	1.50	0.87–2.51
'Absolute homelessness' (lived on the street) ^a	1.41	1.07–1.99
Crack cocaine smoking	0.67	0.40–1.15

^a Variables that retained significance at $p < 0.05$ in the multivariate GEE model.

discount the potential use of methamphetamine as an occupational stressor among sex workers, as observed in northern Mexican border cities, where methamphetamine use among FSWs is associated with occupational stressors, such as the need to stay awake (Cruz et al., 2007).

Instead, in this study of street-based FSWs, CM use appears to be more important within the context of intimate drug-using sexual partnerships suggesting a gendered pattern of risk colliding along the intersections of street-based sex and drug markets. These findings accord with the limited qualitative research (Cruz et al., 2007) suggesting that CM use among FSWs may be most closely tied to use with spouses and other trusted, non-commercial sex partners, who may act as pimps. In this study, the particularly nuanced relationship of drug procurement by primary male sex partners of FSWs may confer a gendered risk environment of CM use within sexual partnerships, as previously described among crack users over the last two decades (Maher, 1997). In particular, qualitative accounts of crack-using primary partnerships have consistently documented gendered risk environments, including risk of infectious disease transmission, among younger FSWs who work to obtain the money for drugs for both themselves and their partner and rely on older male partners (often serving as pimps or sugar daddies) to procure drugs for them (Shannon et al., 2008; Maher 1997). This emerging pattern of risk among FSWs who use CM rely on male sex partners to procure drugs for them extends earlier work suggesting that CM use may substitute cocaine as a cheaper or more easily accessible stimulant in settings with a proximal vulnerability to an established stimulant drug use pattern (Case et al., 2008). Further, though the results did not remain significant in multivariate analyses, FSWs who use CM in our study were marginally less likely to smoke crack cocaine suggesting a potential shift in stimulant use may be emerging in this population.

Qualitative research studies among heroin and cocaine-using couples have demonstrated how drug user's sexual relationships can act as key sites of risk management that directly modify individual drug use practices and facilitate positive social norms (Rhodes et al., 1998; Simmons and Singer, 2006). Specifically, the overtly gendered collusion among sexual partnerships to procure and use drugs was shown to reinforce and produce interpersonal risks, as well as protective mechanisms (Simmons and Singer, 2006). Among male-female intimate partners, drug involvement has been previously found to be directly associated with male psychological dominance, increased physical and sexual violence and concomitant sexual HIV risks (El-Bassel et al., 2005). Evidence also suggests that female IDUs tend to have greater overlap in their sexual and drug use networks relative to their male counterparts (Sherman et al., 2001; Strathdee et al., 2008), and drug sharing among IDU sexual partnerships has been shown to place women at increased risk of being "second on the needle" (Cruz et al., 2007; Harvey et al., 1998). Accordingly, women's lack of control over access and procurement of drugs, including cleaning of drug use paraphernalia and 'tasting' the strength of the drugs, may facilitate enhanced sexual and drug risk patterns. Women have also been shown to be more likely to: engage in syringe-mediated sharing processes such as frontloading (a method of distributing shared drugs through syringes); sharing other injection/non-injection paraphernalia (e.g., crack pipes); and trading unprotected sex directly for drugs (Fernando et al., 2003; Flinlinson et al., 2005; Grund et al., 1996; Koester et al., 2005). These findings underscore the need to scale up gender-sensitive and couple-focused harm reduction and treatment interventions, recognizing the nuanced importance of drug-using sexual partnerships in both maintaining risky and preventative practices.

Additionally, given that the majority of FSWs who use methamphetamine in this study were poly users of heroin injection,

interventions will need to account for dual opiate dependency in shaping risk patterns and environments. Evidence among methamphetamine-using MSM has shown CM to most be frequently used in combination with other drugs (Patterson et al., 2005), particularly heroin injection (Case et al., 2008). Users often combine drugs to minimize the adverse effects of a drug, such as countering the undesirable "crashing" effects of methamphetamine (Patterson et al., 2005). Anecdotal reports suggest that methamphetamine may be used to provide a 'kick' when heroin purity decreases. Poly-drug use has been shown to drastically elevate the potential for drug toxicity and overdose mortality, as well as transient immune suppression (Leri et al., 2003), which may help to further explain recent findings of elevated risk of non-fatal overdoses among CM injectors (Fairbairn et al., 2008).

Collectively, these findings suggest the potential for an emerging outbreak of a methamphetamine epidemic consistent with the "social equation of risk" of stimulant CM use previously conceptualized in other settings such as Tijuana, Mexico (Case et al., 2008). The established components of this social equation of risk have been postulated to include proximal vulnerability to established stimulant drug use patterns; social dislocation due to economic disparities, migration or poverty; an available supply and locally produced or manufactured drug; and geographic proximity to drug use environment (Case et al., 2008). Of particular importance, our findings suggest that CM use is closely linked to street-based sex work in marginalized public spaces, suggesting social dislocation and features of the physical and social environment may shape access and availability of CM use or specific social networks and socio-spatial patterns of CM use. While further exploration is needed of the contexts of space that may shape CM patterns among FSWs, their partners and clients, these findings point to the critical need for policies and interventions that modify the risk environment (Rhodes, 2002) and ensure safer sex work spaces in proximity to harm reduction and treatment resources. While CM use in our study was not associated with specific sexual risk patterns, the use of CM by FSWs in more marginalized public spaces may point to potential pathways to sexual risk. For example, we have previously observed elevated rates of coercive unprotected sex by clients among street-based FSWs displaced to working in industrial settings (Shannon et al., 2008). As such, structural interventions that mitigate the risk environment of street-based sex work (such as safer sex work sites and scaled up mobile outreach interventions to outlying and isolated spaces) may help to neutralize the gendered nature of drug acquisition and co-dependence in these sexual partnerships.

Strengths and limitations: the self-reported nature of responses may have been subject to social desirability biases that could have underestimated risky sexual and drug use practices and attenuated results towards the null. Secondly, the observational nature of this research precludes determining causality, although the longitudinal analyses using GEE may account for the impact of repeated measures and temporal bias. Thirdly, the relatively small sample size may have diluted our ability to detect associations, such as the association between methamphetamine use and younger age. Finally, our results may not be generalizable to FSWs working in indoor venues, such as massage parlours or escort agencies.

In summary, our findings suggest the potential of an emerging CM epidemic among street-based FSWs and their non-commercial partners with the that the greatest concentration of harms among FSWs working and living in marginalized public spaces. As such, this research highlights the critical importance of safer environment interventions that mediate the risk environment and context of CM use in reducing harms, including gender-sensitive and couple-focused interventions that tailored to FSWs and their intimate drug-using partners.

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Contributors

KS had full access to the data, conceptualized the paper and analyses, wrote the initial draft, and was responsible for integrating all co-authors feedback. RZ conducted the statistical analyses. All authors provided feedback on the manuscript and approved the final version.

Conflict of interest

Nothing declared.

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RESEARCH ARTICLE

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High Lifetime Pregnancy and Low Contraceptive Usage Among Sex Workers Who Use Drugs- An Unmet Reproductive Health Need

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Abstract

Background: The objective of this study was to describe levels of pregnancy and contraceptive usage among a cohort of street-based female sex workers (FSWs) in Vancouver.

Methods: The study sample was obtained from a community-based prospective cohort study (2006-2008) of 211 women in street-based sex work who use drugs, 176 of whom had reported at least one prior pregnancy. Descriptive statistics were used to estimate lifetime pregnancy prevalence, pregnancy outcomes (miscarriage, abortion, adoption, child apprehension, child custody), and contraceptive usage. In secondary analyses, associations between contraceptive usage, individual and interpersonal risk factors and high number of lifetime pregnancies (defined as greater than the sample mean of 4) were examined.

Results: Among our sample, 84% reported a prior pregnancy, with a mean of 4 lifetime pregnancies (median = 3; IQR: 2-5). The median age of women reporting 5+ pregnancies was 38 years old [interquartile range (IQR): 25.0-39.0] compared to 34 years [IQR: 25.0-39.0] among women reporting 4 or fewer prior pregnancies. 45% were Caucasian and 47% were of Aboriginal ancestry. We observed high rates of previous abortion (median = 1; IQR: 1-3), apprehension (median = 2; IQR: 1-4) and adoption (median = 1; IQR: 1-2) among FSWs who reported prior pregnancy. The use of hormonal and insertive contraceptives was limited. In bivariate analysis, tubal ligation (OR = 2.49; [95%CI = 1.14-5.45]), and permanent contraceptives (e.g., tubal ligation and hysterectomy) (OR = 2.76; [95%CI = 1.36-5.59]) were both significantly associated with having five or more pregnancies.

Conclusion: These findings demonstrate high levels of unwanted pregnancy in the context of low utilization of effective contraceptives and suggest a need to improve the accessibility and utilization of reproductive health services, including family planning, which are appropriately targeted and tailored for FSWs in Vancouver.

Background

To date, research on the sexual and reproductive health of female sex workers (FSWs) has primarily focused on vulnerability to sexually transmitted infections (STIs), particularly HIV infection [1]. However, FSWs also may be at high risk of pregnancy, as most are of reproductive age and many experience frequent vaginal intercourse without adequate access to contraceptives [2,3]. However, the broader reproductive health and pregnancy patterns of FSWs, particularly those who use drugs, have been largely neglected in research and public health interventions

globally. Understanding the availability and use of contraceptives as well as pregnancy patterns among FSWs who use drugs is essential to develop more comprehensive, women-centred reproductive health services that promote positive maternal and child health and reduce adverse outcomes such as maternal mortality, unsafe abortions, the vertical transmission of HIV/AIDS, and poor birth outcomes for children of FSWs.

Access to reproductive health services, including contraceptives, prenatal care and mothering services [4], are a basic human right [5,6], and are particularly important for marginalized, drug-using women who may experience higher rates of maternal morbidity, mortality and negative obstetric, fetal and child outcomes as a result of drug use during pregnancy [7-10]. While research about access

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to reproductive health services among drug-using FSWs is scarce, a number of studies report that substance-using mothers experience limited or no access to prenatal care because of the stigma attached to maternal substance use during pregnancy [11-13]. Current child-centred policies in Canada have also been found to pose significant barriers to accessing appropriate reproductive health and treatment programs among women who use substances during pregnancy; many women avoid these services for fear of losing custody of their children [14]. The lack of recognition of the reproductive health needs and rights of women who use drugs limits their access to appropriate and non-judgmental reproductive health care services [15,16]. In addition to barriers posed by their drug use, FSWs' involvement in sex work may further limit their access to reproductive health services. Police surveillance and crackdowns have been found to displace street-based FSWs to peripheral areas, away from health care services [17,18]. Elsewhere, a lack of targeted services, expensive travel costs, health care service hours and sex work stigma have been identified as barriers to health and social services among FSWs [19], and could potentially restrict access to reproductive health services and impact levels of pregnancy and contraceptive usage among women in our sample.

Most previous studies on reproductive health practices and outcomes of FSWs have been among FSWs living in developing countries. Our literature search yielded no studies that explicitly focused on the reproductive health needs of street-based FSWs who use drugs in industrialized countries. Thus, we undertook a study of street-based FSWs living in Vancouver, Canada, to: (1) describe levels of contraceptive usage, prior pregnancy and pregnancy outcomes (including abortion, adoption, child apprehensions, miscarriage, child custody arrangements); (2) examine the correlates of having a high number of prior pregnancies (defined as having greater than the mean number of pregnancies (5+)).

Methods

Data were obtained from a community-based prospective cohort of the BC Centre for Excellence in HIV/AIDS, in partnership with a local sex work agency, Women's Information Safe Haven (WISH) Drop-in Centre Society. The study approach has been described in detail previously [20]. Briefly, between 2006 and 2008, 252 street-based female sex workers were recruited using targeted outreach at solicitation spaces, based on mapping and time-location sampling. While this was not a random sample, time-location sampling has been increasingly used as a method for recruiting hard-to-reach populations at times and spaces where they congregate. The study's eligibility criteria included: self-identifying as a woman (including transgender), aged 14 years or older, actively engaged in street-

level sex work and having used illicit drugs within the past month (excluding marijuana). Participants who consented and were enrolled in the study completed a baseline and 6-monthly follow-up interview-administered questionnaires by trained peer researchers (current or former street-based sex workers). Additionally, nurse-administered pre-test counseling and HIV screening using Biolytical Laboratories INSTI™ Rapid HIV Antibody Test (specificity 99.3%, sensitivity 99.6%) were conducted. At baseline, a detailed semi-structured questionnaire covering demographics, health service use, working conditions, violence, sexual and drug risk practices was administered. Participants received \$25 remuneration for their time and expertise. Ethical approval for this research was received from the UBC/Providence Health Ethics Review Board.

Statistical Analyses

Given our interest in lifetime pregnancy, our analyses were restricted to responses of women of reproductive age (18-49 years) who provided a valid response to "have you ever been pregnant". In total, 211 women met the above criteria and were included in the analyses. For our analyses of contraceptive usage, the entire sample of 211 women was used, as contraceptive usage is a relevant measure for all FSWs in our sample. For our analyses of pregnancy outcomes (such as adoption, custody, apprehensions and abortions), we restricted our sample to the 176 women who reported prior pregnancy. We excluded women who had never been pregnant as they were not at risk for these outcomes.

Outcomes of interest

The following pregnancy outcomes were analyzed: prevalence of lifetime pregnancies; prevalence of abortion (a proxy of unwanted pregnancy); and miscarriage. Other pregnancy outcomes measured included adoption, child apprehension (defined as the removal of a child from his/her mother's custody by child protection services), has at least one child in her custody, and at least one child is in custody of family members. The analysis also examined the use of various types of contraceptives during the previous 6 months, including one or more of the following: barrier contraceptives only (male/female condom use); intrauterine device (IUD); hormonal contraceptives (birth control pill, Depo-Provera, Norplant); and, permanent contraceptives (tubal ligation, hysterectomy). We also accounted for FSWs' age (measured as a continuous variable), ethnicity, current drug use (any use of cocaine, crack cocaine, crystal methamphetamine), their exposure to 'social' factors (e.g., "having a partner who scores drugs for you"; having a regular partner that supports you financially). In bivariate analysis, associations between individual- and interpersonal- level variables and high number of lifetime pregnancies were examined. Higher number of

lifetime pregnancies was defined as 5+ (operationalized as greater than the mean number of 4 pregnancies, versus less than the mean). Pearson chi-squared test was used to compare dichotomous, categorical variables and one-way analysis of variance (ANOVA) was used for comparison of continuous variables. P-values were generated using the Fisher's test of exact probability when one or more observations was less than or equal to five. We stratified pregnancy outcomes and contraceptive use by high (5+) versus low number of lifetime pregnancies. Variables with p values of < 0.1 were considered statistically significant and entered into a multivariable model. Variables were considered significant in multivariable analyses with an alpha cut-off of $p < 0.05$.

Results

Of the 211 women eligible for this study, 176 (84%) women reported ever being pregnant. The median age of women reporting 5+ pregnancies was 38 years old [interquartile range (IQR): 25.0-39.0] compared to 34 years [IQR: 25.0-39.0] among women reporting 4 or fewer prior pregnancies. The median age of first sex work was 17 years of age [IQR:15-25]. Forty-five percent were Caucasian and 47% were of Aboriginal ancestry. Forty-seven (22%) reported being HIV positive, and 33(16%) were HIV positive, and taking Highly Active Antiretroviral Therapy (HAART). Approximately half (49%) of the women in our sample had non-commercial, intimate partners within the last 6 months of the interview.

Drug use was prevalent among our sample, with 103 (48.8%) having reported using heroin, 71 (33.7%) who used cocaine and 53 (25.1%) having reported intensive crack use (> 10 rocks per day) 6 months prior to the interview. The median age for initiation of injection drug use was 17.5 years [IQR = 15-23], and the median age of crack cocaine use was 20 years [IQR = 16-29.8].

Pregnancy and child outcomes

The mean number of lifetime pregnancies for the entire sample ($n = 211$) was 4, with a median of 3 [IQR = 2-5]. Among FSWs who reported a prior pregnancy ($n = 176$), the median age of participants having 5 or more lifetime pregnancies was 38 years, compared to 34 years among women who reported having 4 or less pregnancies. The pregnancy outcomes for the 176 FSWs who reported ever being pregnant are reported in Table 1. Among FSWs who reported at least one prior pregnancy, forty-five percent reported a previous miscarriage (median = 1, IQR: 1-3) and 43% reported having a previous abortion (median = 1, IQR: 1-3). The proportion of women who reported having a prior miscarriage or induced abortion among the entire sample ($n = 211$) was 37% and 36% respectively. Thirty-two percent of women had one or more of their children apprehended by Child Welfare Services (median

= 2, IQR: 1-4), while 20% currently had one or more of their children living with them (median = 2, IQR: 1-3). Twenty-eight percent of respondents said that they had one or more of their children being cared for by the child's father or another family member.

The median age of initiation into sex work was higher among women who had five or more lifetime pregnancies (median = 18; [IQR = 14-22]) compared to women who had four or less lifetime pregnancies (median = 17; [IQR = 14-25]), though they were not significantly different ($p = 0.92$). Participants who had five or more prior pregnancies had a higher number (median = 7) of clients per week, compared to women who had four or less pregnancies (median = 5).

Birth control practices

While consistent condom use by clients in our sample have previously been found to be high(72%) [21], only 14% of the 211 women included in our analysis reported relying on condoms alone as a method of birth control. There were no reports of female condom use in this sample. Nine percent reported having used injectable hormones (e.g., Depo-provera) and 1% reported that they had used the birth control pill. The median age of FSWs using any type of hormonal contraceptives (birth control pill, Depo-Provera, Norplant, injectable hormones) was 33 years [IQR:25-37]. Intrauterine devices (IUDs) were only reported by 1% of the women interviewed. Permanent contraceptives, including tubal ligation (16.6%) and hysterectomy (7.1%) were more common, though primarily among older FSWs (Median = 41 years; [IQR:36-45]) (Table 2). The median age among FSWs who did not use permanent contraceptives was 33.0 [IQR:25.0-38.0]. Older age (age was measured as a continuous variable), was significantly associated with permanent contraceptive use ($p < 0.001$).

In bivariate analysis, FSWs who reported tubal ligation had 2.5 greater odds of having a higher number of pregnancies (OR = 2.49; [95%CI = 1.14-5.45]). Similarly, FSWs who reported using permanent contraceptives (e.g., tubal ligation and hysterectomy) had 2.76 increased odds of having five or more pregnancies (OR = 2.76; [95%CI = 1.36-5.59]) compared to those who did not use permanent contraceptives. Alternatively, female-controlled contraceptives were not significantly associated with having five or more prior pregnancies (OR = 1.62; [95%CI = 0.86-3.03]). Individual-level drug risks and interpersonal risk factors for pregnancy (e.g., economic dependence on one's partner or having a partner who procures drugs) were not significantly associated with having five or more prior pregnancies (Table 3).

Discussion

Among this cohort of FSWs, we found a high prevalence of lifetime pregnancy, abortion and child apprehension,

Table 1 Pregnancy outcomes among Female Sex workers (FSWs) who use drugs and reported at least one prior pregnancy

Pregnancy history	n = 176
	Median, IQR
Median number of pregnancies (entire sample, n = 211)	3 (2-5)
Lifetime Pregnancy Outcomes among FSWs who reported prior pregnancy (n = 176)	n (%)
	Median, IQR
Miscarriage	79 (45) 1 (1-3)
Abortion	76 (43) 1 (1-3)
Adoption	33 (19) 1 (1-2)
Child Apprehension	56 (32) 2 (1-4)
Currently supporting a child	35 (20) 2 (1-3)
Child in custody of family/father	49 (28) 2 (1-2)

and low utilization of hormonal and insertive barrier contraceptives. On average, the women in this study reported four pregnancies during their lifetime, which is nearly three times the fertility rate of the general Canadian population [22].

Among our entire sample of 211 FSWs, 76 (36%) abortions were reported (median of 1, [IQR:1-3]). The self-reported prevalence of abortions among our cohort suggests a much higher level of unintended/unwanted pregnancy compared to the general Canadian population; the Canadian induced abortion rate is 14.1 per 1,000 women aged 15-44 [23]. Despite the lack of data on abortions among drug-using FSWs in resource rich countries, a few studies in low and middle-income countries have also reported high rates of abortion among FSWs [2,24]. For example, a study in Colombia found that 53% of FSWs interviewed reported having ever had an abortion [24]. Results from a Kenyan survey revealed an 86% prevalence of lifetime abortion among FSWs, with 50% of respondents

reported having more than one [25]. Abortion data amongst the women enrolled our study are comparable to those in low-resource settings and suggest that despite legalized abortion and universal health care access in Canada, many women, particularly marginalized women, could benefit greatly from improved uptake of effective contraception and improved access to reproductive and sexual health care, including abortion services. Since our study does not capture abortions post-interview, our findings likely underestimate the true rate of lifetime abortions among FSWs. Additionally, though abortion rates can be used as a proxy for unwanted pregnancy, our findings likely underestimate the true rate, since access to abortion services may be limited among this population.

While evidence of female-controlled contraception among FSWs in our setting is scant, the limited use of contraceptives in our study is comparable to findings in resource-poor settings [1,2,26], and may suggest low access to female-controlled contraceptives and reproductive health services in this setting [27]. Other studies in our setting have found low utilization of health care services in general, due to the marginalization of FSWs and drug users, and their reluctance to use health and social services [27,28]. Avoidance of police and individual zoning restrictions (resulting from previous drug or solicitation charges) restrict FSWs' access to health services [29]. The high rate of child apprehension observed in our sample may further act as a barrier to seeking health care and social services [14]. Such policies that restrict access to health and social services can deny FSWs of enabling environments necessary to exercise their reproductive rights. Low access to reproductive health and mothering services (including antenatal care) may be of concern, considering the high rates of pregnancy among FSWs in our study. Contextual factors, such as poverty and

Table 2 Contraceptive usage among 211 street-based Female Sex Workers (FSWs) who use drugs

Barrier Contraceptive	n (%)
Female condom	0 (0.0)
Condom only (for birth control)	30(14.2)
Condoms only with clients	139 (65.8)
Female-controlled Contraceptives (excluding condoms)	64 (30.3)
Hormonal Contraceptive	
Oral contraceptive pill	2 (1.0)
Intrauterine device (IUD)	3 (1.4)
Depo-provera/Injection	18 (8.5)
Permanent contraceptive	
Tubal ligation (sterilization)	35 (16.6)
Hysterectomy	15 (7.1)

Table 3 Individual- and interpersonal- level factors associated with greater number of pregnancies (5+) among street-based Female Sex Workers (FSWs) who reported prior pregnancy (n = 176), with crude Odds Ratios, 95% Confidence intervals (95% CI) and p-values

	5+ pregnancies n (%)	Odds Ratio (95% CI)	p - value
Demographic Characteristics			
Aboriginal			
yes	42 (50.0)	1.49 (0.8-207)	0.19
other	42 (50.0)	(ref)	
Caucasian			
yes	35 (41.7)	0.75 (0.4-1.4)	0.33
no	49 (58.3)	(ref)	
Contraceptive usage			
Condoms only for birth control*			
yes	14 (17.9)	1.39 (0.6-3.2)	0.45
no	64 (82.1)	(ref)	
Female Controlled Contraceptives *			
yes	35 (44.3)	1.62 (0.9-3.0)	0.13
no		(ref)	
Permanent Contraceptives (Hysterectomy, Tubal ligation)*			
yes	30 (38.0)	2.76 (1.4-5.6)	< 0.01
no		(ref)	
Hysterectomy*			
yes	8 (10.1)	2.37 (0.7-8.2)	0.16
no		(ref)	
Tubal Ligation*			
yes	22 (28.2)	2.49 (1.1- 5.5)	0.02
no	56 (71.79)	(ref)	
Intrauterine Device (IUD)*			
yes	0.0 (0.0)	-	0.25
no		(ref)	
Hormonal Contraceptives*			
yes	6 (7.7)	0.44 (0.2-1.2)	0.10
no		(ref)	
Birth Control Pills*			
yes	0 (0.0)	-	0.50
no	78 (100.0)	(ref)	
Depo-Provera*			
yes	6 (7.7)	0.73 (0.3-2.2)	0.60
no		(ref)	
Individual Level- Drug Use			
Cocaine†			
yes	29 (34.5)	1.04 (0.6-1.9)	0.91
no		(ref)	
Heroin†			
yes	37 (44.0)	0.94 (0.5-1.7)	0.83
no		(ref)	
Crystal Methamphetamin†			
yes	6 (7.1)	0.57 (0.2-1.6)	0.28
no		(ref)	
Crack cocaine†			
yes	23 (27.4)	1.32 (0.6-2.2)	0.72
no		(ref)	

Table 3 Individual- and interpersonal- level factors associated with greater number of pregnancies (5+) among street-based Female Sex Workers (FSWs) who reported prior pregnancy (n = 176), with crude Odds Ratios, 95% Confidence intervals (95% CI) and p-values (Continued)

Methadone†			
yes	18 (21.4)	0.92 (0.5-1.9)	0.82
no		(ref)	
Partner procures drugs			
yes	23 (27.4)	1.13 (0.6-2.2)	0.72
no		(ref)	
Economic dependence on partner			
yes	23 (27.4)	0.96 (0.5-1.9)	0.90
no		(ref)	

* Currently Using † Used within the last six month

homelessness, may reduce FSWs' ability to travel to clinics [19], or purchase hormonal contraceptives. Moreover, the instability arising from homelessness and illicit drug use may not be conducive to hormonal contraceptives such as the birth-control pill, which require routine and strict adherence, and annual or semi-annual prescription renewals. Homelessness has been associated with decreased access to health care services [30], and may also limit access to contraceptives. Illicit drug use may further exacerbate barriers to accessing contraceptives [24], although we found that illicit drug use and economic dependence on one's partner were not significantly associated with higher number of pregnancies. Additionally, perceptions of negative side effects (e.g., physical and emotional side effects; long-term health effects) of hormonal contraceptives may also contribute to their low uptake [31]. Additional studies are needed to elucidate the reasons for low use of hormonal and insertive contraceptives among FSWs.

The higher rate of condom use compared to hormonal contraceptives, particularly among younger FSWs, may reflect their knowledge of condoms' dual role in pregnancy and STI/HIV prevention. Low or no-cost condoms and their widespread availability also may contribute to the relatively higher use of condoms compared to other forms of contraceptives. Additionally, we found the rate of condom use (primarily by intimate/regular partners) to be much lower than the reported rate of consistent condom use by FSWs' clients from a previous study in our setting (72%) [21]. The low rates of condom use by intimate partners point to the need for dual protection from STIs/HIV and unwanted pregnancies. Long-lasting, female-controlled contraception methods, such as injectable hormones, may be effective in reducing unintended pregnancy. Permanent contraceptives usage was high among our sample, particularly tubal ligation and hysterectomy. The hysterectomy rate among our sample is exceptionally high when compared to the Canadian rate of 338 per 100,000 population [32]. The factors

contributing to this prevalence in our study are unclear and warrant further attention.

This study has a number of limitations. The findings from this study may not be generalizable to FSWs working in other venues, such as bars, massage parlours and/or escort agencies. Given the sensitive nature of the topic, and our reliance on self-report data, the responses obtained in this study may be subject to social desirability bias. However, previous studies suggest that sex workers and drug users provide truthful accounts of their sex and drug use activities when questioned in a non-threatening environment [33]. Additionally, our study may underestimate the true rate of lifetime pregnancy and abortion among FSWs, as pregnancies post-interview are not captured. In the absence of data about pregnancy intention/ desires, we used abortion rates as a proxy for unwanted pregnancy, which may limit our estimation of the true rate of unwanted pregnancy. However, induced abortion has been used as a proxy for unwanted pregnancy in other studies [34]. Finally, our small sample size (particularly our sample restricted to FSWs who had ever been pregnant) may have limited our statistical power to detect associations with high pregnancy levels.

Conclusions

The high levels of unwanted pregnancy and underutilization of effective contraception suggests that FSWs who use drugs may not have access to knowledge or resources, such as contraceptives or reproductive health services, that allow them to have full control over their reproductive health. It is imperative to develop targeted services for FSWs that extend beyond HIV/STI prevention and comprehensively address reproductive health needs. The core principles of women-centred care, which emphasize women's autonomy, empowerment, safety, diversity and complexity as well the importance of social context in shaping reproductive health [35], need to be considered in order to better attend to the specific reproductive health needs of FSWs. Efforts to improve access and utilization

of reproductive health services amongst this population also need to address other barriers, including the fear of child apprehension when help-seeking, particularly during pre- and post-natal periods. Comprehensive outreach services that include family planning and reproductive health services may hold promise for better serving this population [21,36].

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Authors' contributions

PD and KS designed the study. RZ conducted the statistical analysis. PD wrote the first draft of the manuscript and integrated suggestions from KS, JS and RZ. 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.

Competing interests

The authors declare that they have no competing interests.

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RISKY HEALTH ENVIRONMENTS: WOMEN SEX WORKERS' STRUGGLES TO FIND SAFE, SECURE AND NON-EXPLOITATIVE HOUSING IN CANADA'S POOREST POSTAL CODE

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ABSTRACT

This study explored low-income and transitional housing environments of women sex workers and their role in shaping agency and power in negotiating safety and sexual risk reduction in Vancouver, Canada. A series of 12 focus group discussions were conducted with 73 women currently involved in street-based sex work. These women were purposively sampled for a range of experiences living in low-income housing environments, including homeless shelters, transitional housing, and co-ed and women-only single room occupancy (SRO) hotels. Drawing on the risk environment framework and theoretical constructs of gender, agency and power, analyses demonstrate that women continue to be vulnerable to violence and sexual and economic exploitation and have reduced ability to negotiate risk reduction resulting from the physical, structural and social environments of current dominant male-centred housing models. Within the physical environment, women described inhabitable housing conditions in SROs with infestations of bedbugs and rats, leading women to even more transitional housing options such as shelters and couch-surfing. In many cases, this resulted in their economic exploitation and increased sexual risk. Within the structural environment, enforcement of curfews and guest policies forced women to accept risky clients to meet curfew, or work outdoors where their ability to negotiate safety and condom use were limited. Certain policies promoted women's agency and mitigated their ability to reduce risks when selling sex. These included flexible curfews and being able to bring clients home. The social environments of co-ed single-room occupancy hotels resulted in repeated violence by male residents and discrimination by male building staff. Women-only shelters and SROs facilitated 'enabling environments' where women developed support systems with other working women that resulted in safer work practices. The narratives expressed in this study reveal the critical need for public health interventions and safer supportive housing to account for the daily lived experiences of women sex workers.

INTRODUCTION

Housing has been identified as an important social determinant of health by the World Health Organization (WHO, 1986), the Public Health Agency of Canada (PHAC, 2004), and the Commission on the Social Determinants of Health (CSDH, 2008). A lack of affordable housing leads to health and social problems that make housing an urgent public health priority (Krieger & Higgins, 2002). Homelessness and unstable housing have been associated with increased risk of HIV infection (Aidala & Sumartojo, 2007; Corneil et al., 2006; Shannon et al., 2006), as well as with decreases in personal safety, higher rates of morbidity and mortality (Riley, Gandhi et al., 2007) and increased barriers to accessing health care (Lewis et al., 2003). Furthermore, research has shown that marginal housing is not evenly distributed across populations (Aidala et al., 2005). It has been recognized that factors such as poverty and racism keep individuals, and in particular women, living in high-risk neighborhoods; resulting in an increased risk of HIV infection regardless of their own individual risk behaviors (Zierler & Krieger, 1997). However, identifying the role of public health in creating housing policy and programs to mitigate health risks has proven difficult (Krieger & Higgins, 2002).

The definition of homelessness has often been described as a continuum, and has been expanded to include individuals who live in substandard accommodations (Echenberg & Jensen, 2008). Single room occupancy hotels (SROs) are often the last

resort for low-income individuals residing in urban centres across North America (Evans & Strathdee, 2006). While the development of SROs varies by city, the historical context and proliferation of SRO's are similar (Hopper, 1998; Foley, 1998; Gurstein & Small, 2005). The basic shelter of SROs were developed in the 1960s and 1970s for largely male migrant labour workers and the unemployed who would travel to cities in search of work on a short term, temporary basis.

In Vancouver, there are over 16,000 marginally housed individuals residing in over 6,000 SROs, 80% of which are located in Vancouver's Downtown Eastside neighborhood, known as Canada's poorest postal code (Shannon et al., 2006; Eby, 2007; Evans & Strathdee, 2006). As in most cities across North America, these buildings are often centuries old, unkept and unsanitary, with shared bathroom facilities, no kitchen space and rooms averaging 100ft². As average rents continue to increase and wait lists for social housing remain as long as 5 to 7 years in Vancouver, SROs are often the only housing option left for low-income groups, alongside emergency shelters and transitional housing (Eby, 2007; Gustein & Small, 2005). Yet, popular discourse continues to portray homelessness as a social problem affecting a certain type of person, rather than an economic one related to housing affordability (Pascale, 2005). In most cases, hotel owners are paid the maximum shelter allowance of CAN \$375 that welfare recipients are entitled directly by government offices (Shannon et al., 2006; Eby, 2007).

The majority of SROs are privately run and unregulated, and offer no services or building maintenance (Eby, 2007; Gurstein & Small, 2005).

The number of homeless and marginally housed males far outnumbered the number of homeless and marginally housed females (Hwang, 2001). In Vancouver, over 70% of the homeless population is male (Eberle Planning and Research, 2010; Hwang, 2001), creating a dominantly male street culture. Among homeless and marginally housed adults, biological sex and gender are among the strongest predictors of poor health (Wenzel et al., 2004; Zierler & Krieger, 1997), with men and women experiencing gendered patterns of risk (Riley, Weiser et al., 2007). Women-only shelters were first opened in the 1970s to meet the needs of women fleeing situations of domestic violence (Sev'er, 2002). However, there continues to be a lack of women-specific services targeting homeless and marginally housed women (Bukowski & Buetow, 2011). The plight of homeless women continues to receive little attention in the research literature, with women often included in male-centred homeless research (Bukowski & Buetow, 2011; Huey & Berndt, 2008).

The socio-economic and cultural environment of homelessness and marginal housing must be contextualized to understand how gender and power relations structure risk behaviours (Bourgois et al., 1997; Maher & Curtis, 1992). Unstable housing has been found to be independently associated with exchanging sex for money as a means of basic survival (Corneil et al., 2006). Epidemiological evidence suggests

risks may be amplified for women engaged in sex work in low-income and transitional housing environments (Shannon et al., 2009; Surratt & Inciardi, 2004; Duff et al., 2011). Cross-sectional studies in Miami, Florida found homelessness and marginal housing to increase sexual risks through higher levels of unprotected sex and a greater number of clients refusing to wear condoms (Surratt & Inciardi, 2004). Longitudinal research in Vancouver, Canada found homelessness to be independently associated with increased odds of both client violence (Shannon et al, 2009) and sexual violence by primary non-commercial partners (Duff et al, 2011). Yet the dangers produced by these housing environments faced by homeless and marginally housed women, and in particular sex workers, have largely been ignored (Huey & Berndt, 2008).

Moore (2004) has argued that what appear to be 'chaotic' practices of street-based sex workers and drug users are often responses to particular environments and that individual-level risk prevention strategies must be combined with approaches to addressing micro- and macro-level risks. With a shift towards a more neo-liberal governmentality in many settings, there has been an increased focus on health promotion and prevention, with the responsibility falling on the individual to stay healthy (Moore, 2004). However, this approach does not acknowledge potential constraints that individuals may face in making choices and negotiating risk (Bourgois, 1998; Moore, 2004). For example, Epele (2002) discusses how women's subordinate position in street economies leads them to adopt, negotiate and resist unequal gender

relations as a way to survive structural, symbolic and physical violence. However, women's focus on coping with immediate risks may place concerns surrounding HIV as a secondary priority, while simultaneously increasing their vulnerability to infection (Epele, 2002). In order to understand why individuals continue to make 'risky choices', it is important to contextualize the 'risk environment', defined as the physical, structural and social spaces where a variety of factors interact to increase or decrease the chances of harm (Rhodes, 2002).

To date, most studies evaluating current models of service delivery focus on improving outcomes, decreasing barriers to accessing services and maintaining client retention, while ignoring existing power dynamics between clients and service providers (Moore, 2009). Given the dearth of qualitative data on the lived experience of marginalized women sex workers in transitional and low-income housing, we undertook this study to explore the role of housing environments in shaping women's agency and power in negotiating safety and sexual risk reduction in Vancouver, Canada.

METHODS

This qualitative investigation was part of a larger community-based HIV prevention research project, in partnership with local sex work agencies, exploring the HIV risk environment of women in a street-based sex work market. The development,

process and methodologies of this partnership have been described in detail elsewhere (Shannon et al., 2007). Between May and August, 2009, a series of 12 focus group discussions were conducted with 73 women (6-8 participants in each) engaged in sex work. Participants were purposively sampled to reflect a range of lived experiences in different low-income and transitional housing environments that included homeless shelters, transitional housing, co-ed and women-only single-room occupancy (SROs) hotels.

All participants were residents of North American's poorest postal code, Vancouver Canada's Downtown Eastside (DTES) neighbourhood, known for its high concentration of poverty, homelessness and drug use. In the overall sample, the median age of women was 38 years (interquartile range: 29-45 years). Overall, 24 (34.3%) self-reported their ethnicity as White, 36 (51.4%) as Aboriginal (including First Nations, Metis, Inuit) and 13 (14.3%) as another visible minority, namely Asian, Black or Hispanic. While women reported significant mobility in housing over the previous six months, at the time of interviews, 33 (56.9%), reported currently living in social housing (e.g. government-subsidized apartments), 23 (13.8%) reported living in single room occupancy (SRO) hotels, 8 (13.8%) reported living in a shelter or hostel, 6 (10.3%) reported living in an apartment or house, 2 (3.5%) reported living in another type of housing and 1 (1.7%) living in a recovery house. All participants identified as women, of whom 6 (8.2%) were transgendered (male-to-female). Our thematic analysis drew on

all focus group discussions, with our results representing key emergent themes and narratives related to gendered risk environments.

As previously described elsewhere (Shannon et al., 2008), interview topic guides were developed through a collaborative process between sex workers and researchers. All focus groups were co-facilitated by a sex worker and community researcher. Discussion groups were audiotape recorded, transcribed verbatim and checked for accuracy. This research received ethical approval under the University of British Columbia/ Providence Health Research Ethics Review Board.

Transcripts were coded for key themes and emergent categories using ATLAS.ti 6 followed by thematic and content analyses, with a focus on the social, physical, and structural risk environments and their role in shaping, women's safety and agency in negotiation of sexual risk reduction with partners and clients. To interpret our findings, we drew on Rhodes' 'risk environment' framework, which is a heuristic developed to conceptualize the physical and social space in which factors external to the individual interact to produce and reproduce HIV risks among drug users (Rhodes, 2002) and has subsequently been adapted to conceptualizing the interplay within the risk environment of sex work (Shannon et al., 2008). Risk is a product of the *interplay* between factors operating across and within physical, social, economic and policy environments (Rhodes et al., 2005) at various levels: the micro-level (e.g., interpersonal dynamics, social norms); the meso-level of insitutional and organizational action (e.g.,

policies and regulations); and the macro-level of distal factors (e.g., laws, building standards, social inequalities).

We also drew on concepts of gender, agency and power in interpreting our results. Ethnographic field work with street-level drug users has demonstrated the importance of contextualizing how gender and power relations work to produce and structure negotiation of individual risks shaping HIV transmission (Bourgois et al., 1997; Shannon et al., 2008). Externally imposed power constraints have been shown to impact everyday practices resulting in different levels of risk among populations. Bourgois and colleagues (2004) define power as referring to the 'distribution of resources, the exercise of agency, and the institutional and social control in the production of social suffering'.

RESULTS

Analyses of the narratives demonstrate that women continue to be vulnerable to violence, exploitation and increased safety risks resulting from the physical, structural and social environments inherent in dominant 'male-centred' housing models. Poor physical housing conditions, strict enforcement of curfews, and existing guest policies failed to take into account the realities of women's daily lives. Gendered experiences of violence, exploitation and discrimination all negatively impacted women's abilities to negotiate safety and risk reduction. Certain housing policies, however, mitigated women's ability to negotiate risks when selling sex, such as flexible curfews and being

able to bring dates home. Living in co-ed buildings facilitated the development of support systems with other working women that resulted in safer sex work practices.

Micro-physical environments

'Uninhabitable Living Conditions'

All of the women in the study had current or previous experiences of living in housing that suffered from poor physical upkeep. Women described deplorable physical environments, including common infestations, and that they were forced to live with bedbugs, mice, rats and cockroaches.

I don't know how these other places are doing it, but I mean the more they sprayed the more, the more the bedbugs and his friends came. I'm serious. I caught two mice within two weeks under my door, the bedbugs kept multiplying, I swear to god, whatever they were spraying was making them multiply. It's just disgusting and I can't live like that. I mean nobody should have to and the mouse, the mouse droppings and stuff is a cause for illness (Participant residing in a women-only shelter referring to a women-only SRO where she previously lived).

Women described how their poor health status due to many years on the street was further compromised by high rates of infestations and unsanitary living conditions present in SRO buildings.

Um, I've always had a place until I lived in [name of SRO hotel]. There were rats, the place was being renovated and they, anyways, big huge rats in my bathroom, and in my

house and I was terrified. They [managers] wouldn't do anything about it (Participant residing in a women-only shelter referring to a co-ed SRO where she previously lived).

I said, "You got rats in your house? Fuck you. So you don't have rats in your house?"

He goes okay, pay rent then maybe I check the rats. I said "I'll pay you my rent when you get rid of the rats. Fuck you, I'm outta here". So I was staying in a hotel for two months in another person's room that didn't have rats (Participant residing in a women-only shelter referring to a co-ed SRO where she previously lived).

When building managers refused to address infestations, women were forced to leave their homes and cycle between homelessness and temporary accommodations. Most women initially 'couch surfed' to avoid homelessness, but shared common experiences of increased expenses and financial exploitation when staying with others, and eventually opted to return to the streets.

Participant: And when they drained you dry they want you out [friends/acquaintances].

I just don't choose to do that anymore, stay at peoples' places.

Interviewer: So when you're couch surfing or staying out, the cost of living goes up?

Participant: Way up (Participant residing in a women-only shelter).

Structural environment: Restrictive policies

Along with the poor physical environments of most available housing options, women's agency and power were largely impacted by the structural environments of

the buildings and management policies. Management policies, such as strict curfews and guest policies, sought to regulate women's social interactions with family, friends and clients.

'Curfews'

Housing policies varied across emergency shelters, transition houses and SRO hotels, but most had some regulations surrounding curfews and guests. The enforcement of strict curfews upheld by many residences minimized the abilities of women who sell sex to decide when to work. This also increased women's likelihood of accepting riskier dates in order to earn their target income before curfew, as well as servicing clients in outdoor areas, rather than in their homes, where their ability to negotiate safety and condom use were significantly reduced.

I think by them taking a, putting an eleven o' clock curfew, they're putting myself in jeopardy, so I can't do dates in my place [SRO room] where it's safe (Participant residing in a co-ed SRO).

In residences with strict curfews, women felt that their safety was placed at risk and the policies directly limited their ability to decide when and where to work, causing them to make decisions that negatively impacted upon their safety. Instead of enforced curfews, women favoured a model used by one of the shelters that required residents to check-in with support staff at least once during a 24-hour period. This type of flexible

check-in provided the women staying there with increased agency in deciding when to work and which dates to accept.

You just have to make yourself known. If you're gone for twenty-four hours, you can ring the buzzer and walk upstairs, grab a quick glass of juice and walk back out for another twenty-four hours (Participant residing in a women-only shelter).

But that's the only thing that makes sense to me for women who are working in survival sex trade (Participant residing in a women-only shelter).

The shelters that aren't (flexible), we don't last in, in my opinion, and other women I know, we don't last in those places (Participant residing in a women-only shelter).

'Guest policies'

Along with the enforcement of curfews, management also enacted policies related to guests visiting the building. Many SROs did not allow any guests at all, while others had complex regulations about who could visit, when, and how often, with many of the rules unclear to the residents.

I'm only allowed to have guests on Thursdays to Sundays from twelve to twelve and two days ago we're allowed to have overnights twice a month, two weeks after cheque day and two weeks after that and they don't need ID (Participant residing in a co-ed SRO).

Limited guest privileges in one's own home were seen by the women as a

violation of their rights as tenants and worked to regulate their private lives. These restrictive guest policies alienated women from their support networks, including friends, family and partners, as well as impacted their work with clients, forcing all of their social interactions onto the street.

Yeah, I just, I absolutely hate it, they've got this rule that people can't come in after eleven o'clock and this one little security guard, this was last week, my girlfriend wanted to come into my room, it's my room, I pay the rent, right? She brought her fellow up there or whatever, they were being quiet, I just stepped out for a little bit, well the security guard, came up to my room, I didn't know this, marched her out twenty minutes after she was there and then I came back and she was gone. He says, you can't have anymore guests for the rest of the night. Who the f-, pardon me, who died and made you god? (Participant residing in a co-ed SRO).

I say, "What I'm gonna have to see my kids (referring to the participant's children) on Hastings, outside the Bottle Depot at Columbia and Hastings [an intersection in Vancouver's Downtown Eastside community]? While I'm having a visit with one of my kids upstairs and the other two are waiting to visit with me? I don't fucking think so" (Participant residing in a co-ed SRO).

At times, enforcement of these policies explicitly violated women's safety, right to privacy and personal space.

Just last weekend I had a friend over and I was in the shower right, it was quarter to twelve and I hear somebody knocking at my door and my friend didn't get it and I kept hearing them bang on the door, and they're like [name] your guest is not signed out, I don't give a shit I said, I'm having a shower, can you respect me and come back in ten minutes, right? And they're just like no, you gotta get your guests outta here and they came into my place and escorted him out and then I was naked in my bathroom (Participant residing in a co-ed SRO).

More flexible guest policies, such as those that allowed women to bring dates home, improved women's abilities to reduce sexual risks by providing them with more control in negotiating condom use. Bringing dates home also increased women's sense of safety in the event of a 'bad date' (violent client) by knowing their neighbours could hear them call for help if needed.

I've never had one say no at my place, you can use a condom or you can get the fuck out, right, but I've never had anybody walk out (Participant residing in a co-ed SRO).

However, many managers/ building owners did not condone women openly bringing dates home and some went as far as refusing to house women known to be involved in sex work. This type of policy restriction is likely reflective of the quasi-criminalized nature of sex work in Canada, in which the buying and selling of sex are legal, but communicating in public spaces, working indoors in managed/supported environments, and living off the avails of prostitution are prohibited. While technically,

servicing clients alone in your own apartment would not contravene these laws, the ambiguity leaves much up to the discretion of managers and building owners in more marginalized housing environments.

'Evictions and limited housing options'

Some SROs -- often the only option for long-term low-income housing for many of these women-- were particularly known for refusing to house women involved in sex work.

I got two points to make. One is a lot of the SROs down here are like that, they don't want working women. They may not say that right out front, but no women live in the building (Participant residing in a women-only shelter referring to other SROs).

I know, they had me fill out a form here at [name of shelter], they had me fill out an application for the [name of SRO hotel] and I'm supposed to hand deliver it and I just remember they said they don't want drugs, no drugs or sex trade workers living there so I'm going to have to go back to [name of shelter] and tell them I'm not delivering that particular one because I'm not gonna hide the fact that I do this and have a home that I can't ... feel free to do what I want in (Participant residing in a women-only shelter referring to other SROs).

I, um, my landlord when he found out I was working he gave me an eviction notice. He said there's no workers allowed living here. Back then, they really put their nose up at you. They just didn't allow workers there, I had to go in a shelter (Participant residing in a women-only shelter referring to other SROs).

Women had difficulty in fighting unjust evictions because of their involvement in sex work. Due to the quasi-criminalized nature in which sex work occurs in Canada, under which sex work is largely unregulated and highly policed, many women feared losing their anonymity in a public battle and chose not to pursue legal action, instead returning to transient housing options.

Social environment

'Co-ed housing: Violence and exploitation'

Many of the shelters and SRO hotels available to women were co-ed residences, also housing men. Even when men slept on different floors of the buildings, interactions between residents were common. Women sometimes relied on emergency shelters to escape from unhealthy relationships and felt vulnerable to falling back into these same patterns of abuse and exploitation when staying in co-ed buildings.

Two people lonely, loneliness for me is huge, we're victims, we're needy, we're always looking for the same thing that has been hurting us time after time after time, again hoping the next time is gonna be the one, no matter what we always set ourselves up for

it, as simple as that (Participant residing in a women-only shelter referring to co-ed SROs and shelters).

Women felt vulnerable to violence and sexual assault when staying in co-ed residences and described feeling unsafe around male residents. These narratives of violence and sexual exploitation were associated with co-ed SRO environments.

I've never had anybody be violent with me, when I was at the [name of women-only SRO] or now, but when I lived at the [name of co-ed SRO], shit yeah (Participant residing in a co-ed SRO).

Well when I lived at the [name of SRO hotel], that was the only co-ed building I can think of, I had problems with guys coming to my door, I had one guy try to rape me in my place like just never ending, y'know (Participant residing in a co-ed SRO).

Women also described experiences of discrimination by male building staff, some who differentially enforced policies for men and women, particularly when women were suspected of being sex workers. These dominant male-centred housing models shaped gendered risk environments by placing women in positions of powerlessness and further reinforcing gender inequities. Policies enforced in attempts to prevent women from doing sex work, such as asking guests of female residents to display IDs, reinforce the stigmatization of sex workers and increase their vulnerability to violence and exploitation.

So you feel disrespected all the time like when I have friends in ... I just tell them if you guys don't like it you should put your rules up more instead of disrespecting my friend. They push this, we need picture ID, it's never been an issue before. Very ignorant and I don't bother any more right, I just try to keep it together. Y'know like not even bother
(Participant residing in a co-ed SRO).

'Women-only spaces: Mitigating gendered risk environments'

Women-only shelters and SROs, largely operated by women-only management, facilitated women's agency in negotiating sexual risk reduction and mitigated gendered risks of violence, sexual and economic exploitation described in the dominant male-centred housing models. The social contexts of these women-only spaces afforded the development of personal friendships and informal peer supportive networks with other working women. By living together in women-only spaces, women described getting to know each other on a more personal level than they were able to while working on the street. These peer support mechanisms also acted as informal safety strategies with women looking out for each other.

When we're all out there working, we are all kind of like, we're a little edgy about going up to the next one, it's kind of like when we walk by, we say, "Hey, how's it going" and we keep going. We don't know these women, we don't know where they've been, what they're like, what their story is, y'know what is gonna set them off, so getting to know

them running into them in the shelter you get to know them (Participant residing in a women-only shelter).

By developing peer support mechanisms in their living environment, women were then able to carry those relationships out to the streets when working. As women got to know and trust each other, they more freely exchanged information about bad dates and were more likely to work together in groups. While these peer support networks formed an important safety strategy, the majority of women were still forced to see clients on the street due to strict guest policies, and restrictions by management to bringing clients indoors.

I was just gonna say for me what I find is I'm going down to work with someone else.

"Oh what time are you going to work? Oh, I'm going down" and you end up going to work together...

Yeah, and it's safer that way, the buddy system (Participant residing in a women-only SRO).

While these women-only shelters and SROs provided largely temporary spaces that facilitated peer networks, women also described the critical need for removal of strict guest policies on bring dates indoors to support their agency and control in negotiating safety and risk reduction with clients in indoor environments. The lack of supportive guest policies and curfews in many of these buildings, coupled with the temporary

nature, limited the ability of these housing environments to fully mitigate the gendered risk environments faced by women sex workers in their daily lives.

DISCUSSION

The women in this study shared ongoing experiences of marginalization, sexual and economic exploitation and increased safety risks produced and reproduced by the gendered risk environments of the dominant male-centred housing models. The physical, structural and social environments of low-income and transitional housing worked to significantly limit women's abilities to secure safe and stable housing, exert agency and negotiate safety in terms of reducing sexual risks and violence. The narratives reveal the critical need for public health interventions and safer supportive housing to account for the daily 'lived experiences' of women sex workers.

At the macro level, there is an urgent need to ensure that available housing meets basic minimum standards. The United Nations has stipulated in the Universal Declaration of Human Rights that every person has the right to *safe and secure* housing, and that this housing must be *habitable* (United Nations, 2007). In recent years, epidemiological research has linked sub-standard housing to an increased risk of chronic illness, with dampness and pest infestations linked to asthma and other respiratory disease (Krieger & Higgins, 2002). Women in our study described a lack of options for habitable low-income housing in Vancouver and a lack of recourse for

management to improve these deplorable housing conditions. The poor physical environments that shaped risks were further compounded by the gendered risk environment of largely male-dominant housing models, in which women were vulnerable to sexual exploitation and violence by male building staff and residents, and feared disclosure of sex work due to current quasi-criminalized nature of prostitution.

When leaving uninhabitable spaces, women returned to situations of homelessness or temporary housing, such as couch-surfing. Research has shown that this pattern of unstable housing is associated with chronic stress, where daily survival is prioritized over efforts to reduce HIV risks (Aidala et al., 2005; Riley, Gandhi et al., 2007; Epele, 2002). Substance-using women entrenched in poverty, including women in this study, typically avoid absolute homelessness by finding places to stay, increasing their powerlessness and vulnerability to sexual and economic exploitation (Maher et al., 1996). Women who stayed with friends or acquaintances felt financially exploited, findings which have been mirrored in other research where women reported feeling pressured to provide drugs or sexual favours in return for temporary accommodation (Dickson-Gomez et al., 2009). In other qualitative studies, women often described these friends as older men, further reinforcing gender-power inequities (Shannon et al., 2008; Bourgois et al., 2004; Maher et al., 1996). These results highlight the human rights and public health imperative of ensuring access to safe and secure housing. Our study suggests the critical need for government policies that hold management and owners

accountable to basic minimum housing standards and legal mechanisms to protect women's rights against sexual exploitation from male staff and residents.

At the meso-level, strict management and building policies on guests and curfews limited women's ability to assert agency and negotiate safety and sexual risk reduction, reflecting the failure of the culture of male-centred housing models to account for women sex workers' 'lived experiences' (Moore, 2004). Coupled with current criminal sanctions on prostitution in Canada on working in more formal or cooperative indoor spaces (for example, indoor sex work establishments and brothels), the enforcement of strict curfews and guest policies within sex workers' own housing environments produced a gendered risk environment, placing women in positions of increased vulnerability to physical, sexual and emotional violence and limiting their ability to assert agency and negotiate HIV risk reduction with clients and partners. The narratives of the male-centred housing models describe a symbolic violence (Bourdieu, 2001) where female subordination to existing policies combined with pervasive messaging about individual-level harm reduction strategies work to reproduce risk and normalize violence (Bourgois et al., 2004). Women describe how these policies within their own homes force them to rush sexual transactions to meet curfew and service clients in outdoor public spaces, previously associated with elevated violence (Shannon et al., 2009) and reduced control over condom negotiation with clients (Shannon et al., 2008).

Strict curfews and guest policies represent an infringement of the individual freedom promised by a neo-liberal governmentality, instead excessively regulating women's private lives. This provides a clear example of how the 'liberalization' of neo-liberalism (see Moore, 2004) is selectively applied, and the promise of increased freedoms just as selectively delivered. Whereas a neo-liberal governmentality advocates for less government involvement, individuals living in poverty who seek government interventions, such as welfare and housing, actually face increased regulations (Pollack, 2010). Although it can be argued that building owners and managers refusal to allow women to bring dates home is due to a fear of prosecution under Canada's prostitution laws that prohibit operating a common bawdy house (e.g. managed indoor sex work establishment) (Pivot, 2004), higher income women continue to see clients at their homes ("in-call") without legal prosecution or restrictions by apartment owners throughout the rest of the city. Instead, the current ambiguity of the laws in Canada leave the door open to discretionary and exploitative policies adopted by managers and business owners and differentially applied to the most marginalized. Furthermore, many of the women in our study described how guest restrictions are broadly applied to include restrictions on bringing home other guests, such as boyfriends, family members and friends, or charging guest fees per visit, further exploiting women's rights to negotiating safety and alienating them from their support networks. These restrictions and bureaucratic arbitrations on women's movement, work and social

networks would be unthinkable in other socioeconomic contexts. The curfews and guest policies together with the threats of eviction and sexual exploitation point to how women's housing experiences are heavily mediated by gender and class.

Within dominant male-centred housing models, women in our study describe experiencing violence and sexual exploitation, as well as being more vulnerable to developing highly gendered relationships with other male residents. Normalized violence in street-based cultures often leads women to enter into relationships with older men for protection, as a rational, economic and safety strategy in the face of gendered and structural constraints (Shannon et al., 2008). These relationships can be physically abusive and economically exploitative, with romantic discourses surrounding love overshadowing gender-power imbalances (Bourgois et al., 2004). In dominant male-centred street ideology, women may be placed into subordinate positions (Epele, 2002), The choice becomes one of tolerating physical violence from a boyfriend or facing repeated sexual harassment and exploitation from other male acquaintances (Bourgois et al., 2004). Paradoxically, the protection sought from a partner may result in higher levels of physical violence, whereas single women often avoid the pervasiveness of domestic abuse while simultaneously facing greater risks from others by being alone (Epele, 2002). Qualitative interviews with homeless women have found that what women desire is both autonomy and protection from further victimization (Padget et al., 2006). The social environment of housing and access to a

safe and secure sense of 'place' should be emphasized as critical to supporting women's agency in negotiating health and safety.

The lived experiences of women-only spaces offer a critical opportunity to develop models that counter the gendered risk environment of the dominant male-centred housing models. Elsewhere, a secure sense of home has been found to lead to increased agency and resistance to risky behaviours (Aidala & Sumartojo, 2007; Dickson-Gomez et al., 2009). The narratives of the women's-only shelters and transitional housing describe a safety from the exploitation and violence from male residents and staff in co-ed SROs. Instead, the environment of women-only spaces fostered the development of peer relationships and informal support networks among sex workers. At the same time, the temporary nature of many of these shelters and continued policy restrictions and curfews regulating women's work and private lives meant that many of the gendered risk environments persisted, including rushing sexual transactions to meet curfews and seeing dates in isolated public spaces. Collectively, these results support the critical need for social and structural interventions informed by women's lived experiences. The development of women's-only housing models must counter the gendered risk environments both at macro and micro levels in shaping women's agency and ability to negotiate safety and risk reduction.

Limitations

There are several limitations to this study that should be taken into consideration. Although a purposive sample was used to ensure a representation of different ages and low-income and transitional housing models, the experiences represented in our sample may not be representative of all street-based sex workers in low-income, transitional housing. Recruitment for this study took place in Vancouver's most impoverished, inner city community, the Downtown Eastside, and may not represent the experiences of women in other low-income housing in other parts of Vancouver or elsewhere. This research was an initial exploratory study based on focus group discussions, co-facilitated by a researcher and sex worker. Further research that draws on other quantitative and qualitative methods, including in-depth interviews and ethnographic participant observation, would be beneficial to inform future housing policy and programs for women.

Conclusion

The results of this study point to the urgent need for collaboration between public health professionals, policy makers and urban planners in developing long-term, non-exploitative housing options for impoverished women. Furthermore, women's lived experiences and active inclusion of women sex workers' voices must be included in this process in order to mitigate the gendered risk environments of male-centred housing models and promote women's agency and ability to negotiate health, safety and risks of HIV infection. It must be widely acknowledged by all stakeholders that the

experiences of sexual exploitation and violence faced by women in these housing environments are absolutely intolerable. Eliminating these dynamics within existing housing models is imperative in order to effect immediate changes to gendered risk environments. These goals should be strongly considered when developing long-term housing strategies, in order to counter the dominant male-centered model that is currently prevalent in many of the affordable housing options available to women sex workers.

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Research highlights

- Explores transitional housing environments of street-based sex workers and role in shaping agency and power in negotiation of sexual risk
- Analyses draws on women's narratives in elucidating the physical, structural and social environments of housing in shaping risk negotiation
- Results reveal violence, sexual, and economic exploitation produced by the gender risk environments of dominant male-centred housing models
- The study supports critical need for safer supportive housing models that account for the daily lived experiences of sex workers

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4 **Occupational stigma as a primary barrier to health care for**
5 **street-based sex workers in Canada**
6

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16 Individuals working in the sex industry continue to experience many negative health
17 outcomes. As such, disentangling the factors shaping poor health access remains a
18 critical public health priority. Within a quasi-criminalised prostitution environment,
19 this study aimed to evaluate the prevalence of occupational stigma associated with sex
20 work and its relationship to barriers to accessing health services. Analyses draw on
21 baseline questionnaire data from a community-based cohort of women in street-based
22 sex work in Vancouver, Canada (2006–2008). Of a total of 252 women, 141 (58.5%)
23 reported occupational sex work stigma (defined as hiding occupational sex work status
24 from family, friends and/or home community), while 125 (49.6%) reported barriers to
25 accessing health services in the previous six months. In multivariable analysis,
26 adjusting for sociodemographic, interpersonal and work environment risks,
27 occupational sex work stigma remained independently associated with an elevated
28 likelihood of experiencing barriers to health access. Study findings indicate the critical
29 need for policy and societal shifts in views of sex work as a legitimate occupation,
30 combined with improved access to innovative, accessible and non-judgmental health
31 care delivery models for street-based sex workers that include the direct involvement of
32 sex workers in development and implementation.

31 **Keywords:** sex work; occupational stigma; barriers to health care; policy

32
33 **Introduction**

34 In many regions globally, sex workers experience an array of negative health outcomes,
35 including high rates of violence, HIV and other sexually transmitted infections, and yet
36 remain largely outside conventional health services. In criminalised and quasi-
37 criminalised sex work environments, sex work is largely unregulated and highly policed,
38 with sex workers experiencing high rates of violence, victimisation and police crackdowns
39 (Aitken et al. 2002; Day and Ward 2007; Goodyear and Cusick 2007; Shannon, Rusch,
40 et al. 2007). Although the buying and selling of sex is legal in the Canadian context,
41 communicating in public spaces for the purpose of sexual transactions, working indoors in
42 managed/supported environments and living off the avails of prostitution are all prohibited
43 under federal legislation. As such, sex work is highly criminalised and strict enforcement
44 strategies has resulted in the emergences of informal tolerance zones of street-based sex
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50 **Q1** work in outlying and industrial settings (Shannon et al. 2009). In criminalised and quasi-
51 criminalised sex work environments, access to non-judgmental, adequate health services
52 has been identified by UNAIDS (2002, 2009) as one of the fundamental pillars in ensuring
53 HIV prevention in the sex industry and remains key to effective harm reduction strategies
54 in the sex industry (Rekart 2005). As such, disentangling the factors shaping poor health
55 access remains critical to public health approaches tailored to sex workers.

56 Importantly, a growing number of research studies globally have postulated that
57 stigma may act as a key barrier to health access for sex workers (Cohan et al. 2006; Kurtz
58 et al. 2005; Scambler and Paoli 2008). Goffman (1963) defined stigma as an 'attribute that
59 is deeply discrediting', with the stigmatised individual possessing an 'undesirable
60 **Q2** difference' and a 'spoiled identity'. Stigma has also been defined as a social process
61 (Goffman 1963; Link and Phelan 2001). Stigmas are social labels that can have a profound
62 impact on the lives of the people to whom these labels are applied (Hallgrimsdottir et al.
63 2008). It is the process of labelling that leads stigmatised individuals to be linked to
64 undesirable character traits, experience status loss and discrimination (Link and Phelan
65 2001). Whereas *enacted* stigma can result in shunning, avoidance or physical and
66 emotional abuse, the impact of the stigmatised label alone can be internalised and cause
67 the stigmatised individual to develop a negative self-identity (Hallgrimsdottir et al. 2008).
68 This internalisation of the stigma process is what Goffman (1963) refers to as *felt* stigma.
69 A significant pathway has been found to exist from enacted stigma to felt stigma to
70 disclosure, pointing to the need to address stigma at both individual and community levels
71 (Liu et al. 2006).

72 It is important to move past individual-level approaches to conceptualising stigma in
73 order to understand the important role that power and structural conditions play in socially
74 excluding and devaluing certain groups of people (Kinsler et al. 2007; Link and Phelan
75 2001; Parker and Aggleton 2003). Stigma targets people with less power and is often
76 mediated by class, race, ethnicity and gender (Hallgrimsdottir et al. 2008; Link and Phelan
77 2001). In a study of media-enacted sex work stigma, Hallgrimsdottir et al. (2008)
78 conceptualised stigma as structurally mediated, constructed and disseminated through
79 discourse and emerging from structures of social stratification.

80 Sex workers often face discrimination and rejection and, when combined with the
81 perception of the illegal nature of sex work, the practice of sex work is often hidden
82 (Benoit et al. 2005). 'Whore stigma' has been conceptualised to predominantly
83 characterise street-based sex work and to shame women for transgressing gender norms,
84 such as asking fees for sex, satisfying men's lust and fantasies, being vectors of disease
85 and being a source of transmission of sexually transmitted infections, including
86 **Q3** HIV/AIDS, into mainstream society (Pheterson 1993; Scambler 2007). Sex workers come
87 up with strategies to hide their involvement in sex work from others due to felt stigma,
88 increasing their vulnerability to stress, depression and other diseases (Benoit et al. 2005).
89 Hiding their involvement in sex work also places sex workers at risk of abuse from those
90 who are more powerful, including the authorities (Benoit et al. 2005). Studies have cited
91 police employing shaming techniques of disclosing sex workers' identities to others
92 (Rhodes et al. 2008). In a study that looked at sex work in Australia, a setting where sex
93 work is legalised in some states, women still valued anonymity and expressed concern
94 about family and friends finding out their sex worker identity due to a fear of being
95 rejected or hurting their family (Groves et al. 2008).

96 Women involved in sex work often also face rejection from their home communities
97 (UNAIDS 2009). A qualitative study exploring the environment and power structures in
98 which sex work occurs in Vietnam found that sex workers attempted to hide their

99 profession from family, friends and their home community (Ngo et al. 2007). Perceptions
100 of stigma were found to influence the way these women represented themselves. Women
101 who reported positive self-images were better able to negotiate condom use, resist abusive
102 clients and attend to their personal well-being (Ngo et al. 2007).

103 Ethnographic and qualitative works reveal how sex work stigma may shape access to
104 health care services. Qualitative research from Dublin with drug users who engage in or
105 had engaged in sex work, found that participants tried to hide their drug use due to felt
106 stigma and that this stigma was reinforced by the language used by health care
107 professionals (Whitaker, Ryan, and Cox 2011). In the UK, the narratives of sex workers
108 reveal that fear of privacy and disclosure of their sex work status, including distrust of
109 authority and fear of prosecution, may prevent sex workers from accessing health services
110 (Day and Ward 1997) and yet rigorous epidemiological studies of this mechanism remain
111 limited. In a qualitative and descriptive study in Florida among street-based sex workers,
112 even when a woman located appropriate health care services, she was often stigmatised
113 due to her involvement in sex work, poor hygiene, appearance and drug use (Kurtz et al.
114 2005). This stigma exhibited by health providers may further entrench occupational sex
115 work stigma felt among sex workers. Qualitative research has shown that when contact
116 with health care professionals is high among female sex workers, non-disclosure of sex
117 work status may still contribute to poor health (Jeal and Salisbury 2004). Reasons for not
118 disclosing involvement in sex work to health care professionals have been suggested to
119 include fear of arrest and prosecution (Rekart 2005), negative past experiences with
120 disclosure, fear of disapproval, embarrassment and believing that sex work was not
121 relevant to their health needs (Cohan et al. 2006). Where women hide their involvement in
122 sex work in an attempt to increase the likelihood of receiving services, providers remain
123 unaware of all their care needs (Kurtz et al. 2005).

124 Despite these growing qualitative and ethnographic analyses of sex work stigma, the
125 prevalence of occupational sex work stigma and its empirical relationship to health access
126 remains poorly defined. To our knowledge, our study is the first to measure the prevalence
127 of occupational sex work stigma and model its association with barriers to health access.
128 This study therefore aimed to evaluate the prevalence of occupational sex work stigma,
129 defined as hiding involvement in sex work from friends, family or home community and
130 the association between experiencing occupational sex work stigma and barriers to
131 accessing health care services among women involved in street-based sex work in
132 Vancouver, Canada.

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Methods

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Data were drawn from a community-based HIV prevention research project, in partnership
with local sex work agencies. The development, process and methodologies of this
partnership have been described in detail elsewhere (Shannon, Bright et al. 2007). Briefly,
the community-based research partnership commenced in 2005 and draws on multiple
research methodologies, including qualitative research, social mapping and a prospective
cohort study. The present study focuses on measures from the quantitative research,
developed and piloted based on our initial qualitative research on stigma and barriers to
health access.

Between 2006 and 2008, street-based female sex workers were enrolled in an open
prospective cohort study and participated in baseline and six month follow-up visits that
included an interview questionnaire, pre-test counselling questionnaire and voluntary
screening for HIV. Eligibility criteria were defined as being a woman aged 14 years or

148 older who used illicit drugs (excluding marijuana) and engaged in street-based sex work.
149 Time-space sampling was used to systematically sample all women at staggered times and
150 locations in outdoor solicitation spaces. Trained peer researchers, all of whom were past or
151 current sex workers, administered detailed semi-structured surveys at baseline and follow-
152 up visits. The surveys included questions regarding participants' demographics, health
153 service use, working conditions, violence and sexual and drug risk practices. Detailed
154 health and violence questions were asked by the nurse in order to assure appropriate
155 counselling and referral to support services. Baseline survey data collecting information
156 on occupational sex work stigma were used in this analysis.

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Dependent variables

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Primary explanatory variable

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Covariates of interest

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189 Interpersonal variables included: coercive unprotected sex by clients, client violence,
190 recent and historical physical and sexual violence by non-commercial partners (including
191 family, intimate partners, friends, acquaintances and strangers).

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Individual demographic variables of interest included age (years, continuous),
education (none, high school graduate or any college/university) and ethnicity. As
Aboriginal identity has been linked to barriers to accessing culturally appropriate care
(Benoit et al. 2003), we examined potential differences in stigma and health access
between women of Aboriginal ethnicity, Caucasian and other visible minorities. Drug use

197 patterns included injection of cocaine, heroin or crystal methamphetamine in the last six
198 months. As previously, given high rates of crack cocaine smoking (Shannon, Rusch et al.
199 2007) among street-based sex workers in this setting, we considered intensive daily crack
200 use as smoking greater than 10 rocks per day (stratified at the median).
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202 *Statistical analyses*

203 We used bivariate and multivariable logistic regression to assess the relationship between
204 experiencing occupational sex work stigma and barriers to health care access. In
205 multivariable analysis, we adjusted for all potential confounders that were significantly
206 associated with barriers to health access on a $p < 0.10$ -level in bivariate analyses.
207 Variables were retained in the multivariable model with an alpha cut-off of $p < 0.05$.
208 Bivariate odds ratios (ORs) and multivariable adjusted odds ratios (AORs) and 95%
209 confidence intervals (CIs) were calculated for each and all p -values are two-sided. All
210 statistical analyses were performed using SAS software version 9.1 (2002–2003).
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212 **Results**

213 A total of 252 women completed the baseline interview-administered questionnaire and
214 responded to questions on occupational sex work stigma and were included in the
215 analyses. As indicated in Table 1, the median age of the sample was 35 years (interquartile
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219 Table 1. Individual, interpersonal and environmental-structural factors among street-based female
220 sex workers, stratified by barriers to accessing health care services.

222 Characteristic	223 Total (n)	224 Barriers to accessing care		225 p -value
		226 Yes (%)	227 No (%)	
228 Individual and sociodemographic factors				
229 Age (median, interquartile range)	35 (25–41)	36 (27–43)	34 (24–39)	< 0.001
230 Injection cocaine use	82	42 (51.22)	40 (48.78)	0.722
231 Injection heroin use	123	61 (49.59)	62 (50.41)	0.998
232 Injection crystal methamphetamine use	34	17 (50.00)	17 (50.00)	0.960
233 Intense crack cocaine smoking	99	53 (53.34)	46 (46.46)	0.316
234 Social and interpersonal factors				
235 Coercive unprotected sex by clients	61	36 (59.02)	25 (40.98)	0.091
236 Client violence	54	33 (61.11)	21 (38.89)	0.050
237 Physical violence	68	40 (58.82)	28 (41.18)	0.060
238 Sexual violence	11	6 (54.55)	5 (45.45)	0.704
239 Historical physical violence	165	89 (53.94)	76 (46.06)	0.059
240 Historical sexual violence	160	82 (51.25)	78 (48.75)	0.491
241 Occupational sex work stigma	141	79 (56.03)	62 (43.97)	0.033
242 Physical and structural environment factors				
243 Did not complete high school	178	81 (45.51)	97 (54.49)	0.039
244 High school graduate	47	24 (51.06)	23 (48.94)	0.327
245 Post secondary education (college/university) (versus less than)	26	19 (73.08)	7 (26.92)	0.024
246 Lives in Vancouver's inner city core	48	25 (52.08)	23 (47.92)	0.725
247 Homeless (slept on the street)	107	54 (50.47)	53 (49.53)	0.768
248 Work on main streets/commercial areas (versus alleys, industrial settings)	33	11 (33.33)	22 (66.67)	0.049
249 Used hospital emergency department	55	35 (63.64)	20 (36.36)	0.020

range [IQR] = 25–41 years). Close to half the sample ($n = 125$, 49.6%) had experienced barriers to accessing health care services in the previous six-month period. Of the total, 122 women (48.4%) were Caucasian, 111 (44.0%) were of Aboriginal ancestry (First Nations, Metis, Inuit, non-status First Nations) and 17 (6.7%) were of a visible minority, with no statistical differences in barriers to accessing health care by ethnicity ($p = 0.12$). Overall, 82 women (32.5%) had high school education or higher and women with high school education or higher were more likely to report barriers to health access. A total of 141 women (55.9%) reported occupational sex work stigma (defined as hiding sex work occupational status from family, friends and/or home community).

Table 2 shows the bivariate and multivariable logistic regression analyses of factors associated with experiencing barriers to health access. In bivariate analysis, occupational sex work stigma (OR = 1.76; 95% confidence interval [CI] = 1.05, 2.95) was associated with increased likelihood of experiencing barriers to accessing health care services. Women who worked on main streets and commercial areas as compared to alleys and industrial settings were less likely to experience barriers to accessing health services (OR = 0.46; 95% CI = 0.21, 1.00). Both accessing a hospital emergency room in the last six months (OR = 2.08; 95% CI = 1.12, 3.856) and having completed some college or university level education (OR = 3.25; 95% CI = 1.31, 8.12) were positively associated

Table 2. Unadjusted and adjusted odds ratios for associations between experiencing sex work stigma and barriers to accessing health services among street-based sex workers.

Characteristic	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Individual and socio-demographic factors		
Age, continuous	1.04 (1.01–1.06)*	1.03 (1.00–1.06)***
Aboriginal ethnicity (versus White or visible minority)	0.67 (0.41–1.11)	–
Inject cocaine, past 6 months	1.10 (0.65–1.87)	–
Inject heroine, past 6 months	1.00 (0.61–1.64)	–
Inject crystal methamphetamine, past 6 months	1.02 (0.49–2.10)	–
Intense crack cocaine smoking, past 6 months	1.30 (0.78–2.15)	–
Social and interpersonal factors		
Coercive unprotected sex by clients	1.67 (0.92–3.04)*	–
Client violence	1.86 (1.00–3.46)*	–
Physical violence	1.73 (0.98–3.06)*	–
Sexual violence	1.27 (0.38–4.27)	–
Historical physical violence	1.66 (0.98–2.81)*	–
Historical sexual violence	1.20 (0.72–2.00)	–
Occupational sex work stigma	1.76 (1.05–2.95)*	1.85 (1.07–3.20)***
Physical and structural environment factors		
Education, high school graduate	1.25 (0.66–2.38)	–
Education, any college/university	3.25 (1.30–8.12)*	2.24 (0.86–5.85)**
Live in Vancouver's inner city core	1.12 (0.60–2.10)	–
Homeless	1.08 (0.65–1.76)	–
Works on main streets/commercial areas (versus alleys, industrial settings)	0.46 (0.21–1.00)*	0.45 (0.19–1.03)**
Used hospital emergency department	2.08 (1.12–3.86)*	2.04 (1.06–3.90)**

Notes: *variables significant at $p < 0.01$ in bivariate analyses and entered into the multivariable model; **variables that remained significant at $p < 0.01$ in multivariate analyses; ***variables that remained significant at $p < 0.05$ in multivariate analyses.

295 with experiencing barriers to accessing health care services. Experiencing coercive
296 unprotected sex by clients, current and historical physical violence were associated with
297 increased odds of barriers to health access. In the final multivariable logistic regression
298 analyses, adjusting for potential confounders, occupational sex work stigma (AOR =
299 1.85; 95% CI = 1.07, 3.20) remained independently associated with experiencing barriers
300 to accessing health services.

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Discussion

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Our results reveal a high prevalence of occupational stigma among street-based sex workers, with close to half of sex workers reporting immediate barriers to health access. Of particular concern, occupational stigma remained significantly and independently associated with increased barriers to health access in the previous six months, irrespective of individual demographics, social and work environment factors. This study provides among the first empirical evidence that we are aware of the independent relationship between occupational sex work stigma and barriers to accessing health care among women in street-based sex work, extending narratives from previous qualitative studies.

The results support growing evidence of the critical need for policy and societal shifts in views of sex work as a legitimate occupation, in order to create conditions where women feel both safe to disclose their involvement in sex work to their support networks and able to access non-judgmental health care services. Social mobilisation has proved to be one of the most effective ways of combating stigma and oppression in the HIV/AIDS epidemic and evidence strongly suggests that models of community mobilisation must occur alongside structural and environmental interventions (Parker and Aggleton 2003). Shifting societal views of sex work can begin at the community level with collectivisation as an effective structural intervention (Blakenship et al. 2006). The success of sex work collectivisation and empowerment in reducing HIV risk in some developing country settings have been attributed in part to their ability to confront social stigma (Halli et al. 2006; Jana et al. 2004; Reza-Paul et al. 2008). Policy shifts combined with community-based empowerment models of care have been shown to be highly effective in increasing access to health services in other settings, including India (Ghoose et al. 2008; Jana et al. 2004). Notably, the Sonagachi Project in Kolkata, India, considered a WHO and UNAIDS best practice in HIV prevention among sex workers, has used a model of structural policy support combined with peer-based empowerment to decrease stigma, resulting in an increase in condom use and a decrease in HIV prevalence when compared to sex worker sub-populations in other Indian urban centres (Ghoose et al. 2008). Peer-based models can provide direct support to individuals in disclosing their involvement in sex work to family, friends and health care providers, resulting in increased access to appropriate care. The success of the Sonagachi Project has led to the development of similar combined structural and peer-based interventions in other parts of India (Reza-Paul et al. 2008) and Brazil (Murray et al. 2010), though challenges remain in adapting this model to settings without structural policy support.

In Canada, the largely criminalised and policed nature of the sex industry prevents sex work from being recognised as a legitimate occupation, leading individuals involved in sex work to hide their profession from friends, family and their home community. Current policy debates and legal cases are considering the role of decriminalising sex work in Canada as a means to improve health and safety of sex workers and this data supports the public health importance of the removal of criminal sanctions on sex work to reduce stigma and improve health access. Qualitative work in Canada suggests that this

344 occupational stigma increases vulnerability to stress and diseases (Benoit et al. 2005),
345 compounding health care needs while simultaneously acting as a barrier to health care
346 services. While more research and evaluation of the role of legislative and policy changes
347 (such as decriminalised approaches to prostitution, safer work environments) in shifting
348 societal perceptions of stigma is needed, existing evidence from decriminalised and
349 managed sex work environments suggest that the removal of criminal sanctions on the
350 collectivisation of sex work, safer indoor work spaces and reduced policing targeting the
351 sex industry can support health access and reduce societal stigma (Doominck and
352 Q4 Jacqueline 1998; Halli et al. 2006; Jana et al. 2004; Reza-Paul et al. 2008). Of note, in a
353 recent study in Australia, a setting where sex work is decriminalised in some states and not
354 others, women still valued anonymity and expressed concern about family and friends
355 finding out their sex worker identity due to a fear of being rejected or hurting their family
356 (Groves et al. 2008). This lack of shift in societal perceptions may be attributed to a
357 number of factors, including historically and culturally-embedded norms on 'acceptable'
358 displays of sexuality and sexual mores in many settings, the necessary decades of time to
359 shift public perceptions following legislative changes and/or the persistence of stigma in a
360 country where the sex industry remains prohibited in some states and debated regularly by
361 government and policy makers.

362 Alongside structural policy interventions and collectivisation that address stigma at the
363 societal level, there is an urgent need to improve access to innovative, accessible and non-
364 judgmental health care services for street-based sex workers. Examples of innovative
365 approaches to service delivery include the St. James Infirmary (SJI) in San Francisco,
366 which operates a free medical clinic that provides health care and social services to male,
367 female and transgendered sex workers. The majority of staff are former or current sex
368 workers and services encompass comprehensive biological, psychological and social care
369 (Cohan et al. 2006). A study looking at the characteristics of sex workers accessing care at
370 SJI found that the majority of participants had never previously disclosed their sex work
371 involvement to health professionals (Cohan et al. 2006). In lieu of experiential staff,
372 sensitivity training of health care professionals could also improve the acceptability of sex
373 work and sex workers health care needs, resulting in a more welcoming environment and a
374 higher uptake of services (Rekart 2005).

375 Furthermore, previous research has shown that flexible hours of operation and
376 geographic location of services is critical to promoting health access for sex workers (Jeal
377 Q5 and Salisbury 2004; Kurtz et al. 2005; Shannon et al. 2005, 2008). For example, a study in
378 the UK of sex workers' experiences in accessing health care found that integrated services
379 located close to places of work, with extended operating hours (evenings and nights) and
380 provision of condoms, showers, food, drinks and needle exchanges were overwhelmingly
381 preferred among participants (Jeal and Salisbury 2004). Previous research has shown that
382 policing strategies that displace sex workers to the margins of society increase health-
383 related harms and experiences of violence faced by women (Day and Ward 2007;
384 Goodyear and Cusick 2007), while simultaneously increasing barriers for women
385 attempting to access health care (Shannon, Rusch, et al. 2007). These earlier results concur
386 with our current findings herein that demonstrate that sex workers who work along main
387 streets and commercial shopping areas have improved access to health care and support
388 the removal of policy and enforcement approaches that displace sex work away from
389 health services. The lack of accessible and non-judgmental comprehensive health care
390 services for sex workers may also be responsible for an over reliance on emergency
391 departments for health care delivery noted in this study. High rates of emergency room use
392 among sex workers has been tied to the overall poor health status of the women, highly

393 unstable lifestyles and high rates of drug use, as well as to inaccessible clinic hours and a
394 lack of women-specific services (Palepu et al. 1999; Shannon et al. 2005). Persistent
395 barriers to care even among those sex workers accessing emergency care services supports
396 the need for more integrated and targeted approaches to health care delivery for sex
397 workers (Jeal and Salisbury 2004; Rekart 2005; UNAIDS 2009).

398 Finally, and somewhat unexpectedly, our findings were that participants who reported
399 higher levels of educational achievement (college, university versus less) were marginally
400 more likely to experience increased barriers to accessing health care services. While these
401 results differ from previous research showing that Canadians with higher educational
402 attainment have a significantly increased probability of visiting a physician or specialist
403 (Allin 2006), much of earlier research has been derived from the general population.
404 Instead, our study suggests that other underlying factors may play a more significant role
405 in determining health access than educational achievement among marginalised women
406 in the street-based sex industry. Alternatively, women with higher education levels may be
407 in different social and/or familial networks and face increased stigma at being engaged in
408 non-traditional occupations that increase compound barriers to accessing conventional
409 health services. Further research is needed to better understand the complex and
410 intersecting pathways of stigma and education in shaping experiences of health access for
411 sex workers.

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414 **Limitations**

415 Several limitations to the study must be considered. This study uses cross-sectional data
416 and thus causal relationships cannot be determined. The study relies on self-reported
417 information and thus more sensitive questions may have been subjected to social
418 desirability and underreporting. Similarly, the primary explanatory variable of
419 'occupational sex work stigma' only accounts for one definition of stigma, felt stigma,
420 and therefore other experiences of stigma are likely not represented here. As such, the
421 actual prevalence of both felt and enacted stigma are likely much higher. This bias would
422 have resulted in attenuating our effect size towards the null. Of note, our results are
423 supported by previous qualitative and theoretical work on this topic. Secondly, this cohort
424 was not a random sample of participants. However, our time-location sampling across sex
425 work strolls has been a standard for accessing more hidden populations and, combined
426 with close community partnerships and sex work involvement, is likely to have reached
427 some of the most marginalised. Finally, results of the study may not be generalisable to
428 male sex workers or sex workers working in other aspects of the sex industry, such as
429 escort agencies, exotic dance clubs or massage parlours. However, the results offer insight
430 into prevalence of occupational sex work stigma and barriers to health access among
431 women in street-level sex work and warrant further research on the experiences of
432 occupational stigma across other sectors of the sex industry, different legal environments
433 of sex work and with inclusion of male sex workers.

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435

436 **Conclusion and policy implications**

437 There is a critical need for policy and societal shifts in views of sex work as a legitimate
438 occupation in order to both decrease the stigmatisation of sex workers and improve access
439 to health care services. The quasi-criminalisation and stigmatisation of sex work leads sex
440 workers to hide their involvement in sex work from family, friends and their home
441 communities and acts as a major barrier to accessing health care services. Structural policy

442 support combined with the collectivisation of sex workers and community-based
 443 empowerment models of care have been shown to be highly effective both in decreasing
 444 stigma and promoting access to health services elsewhere and should be piloted and
 445 evaluated in the Canadian context. Further, consideration to the creation of innovative,
 446 accessible and non-judgmental health care delivery models is needed for street-based sex
 447 workers, including integrated and targeted approaches to care that include the direct
 448 involvement of sex workers.

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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 kidnap; 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, Méti, 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_{physicalviolence}) 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_{physicalviolence} 1.96, 1.03 to 3.43; adjusted odds ratio for client perpetrated violence (aOR_{clientviolence}) 2.13, 1.26 to 3.62), servicing clients in cars or public spaces (aOR_{clientviolence} 1.50, 1.08 to 2.57), prior assault by police (aOR_{rape} 2.61, 1.32 to 5.16; aOR_{clientviolence} 3.45, 1.98 to 6.02), 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).

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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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, boy-friends 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 a 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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Research paper

Mapping violence and policing as an environmental–structural barrier to health service and syringe availability among substance-using women in street-level sex work

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Abstract

Background: Within street-based sex work and substance-using populations, there is growing evidence to support the role of place, both physical setting and social meanings attached to place, in mediating the effectiveness and reach of health and harm reduction services.

Methods: Social mapping was used to explore how health service and syringe availability may be impacted at the geographic level by avoidance of physical settings due to violence and policing among women in street-level sex work. Through a community-based research partnership and extensive peer-led outreach over a 6-month period, women were invited to participate in interview-questionnaires and mapping of their community, working conditions, and access to resources. Results were compiled using ArcGIS software and GIS street maps. In secondary analysis, logistic regression was used to model the geographic association (using likelihood ratio and significance at $p < 0.05$) and stratified models were run to assess differential patterns of avoidance based on age, ethnicity and drug use.

Results: The findings reveal a significant geographic relationship between a heavily concentrated core area of health and syringe availability and avoidance of physical settings due to violence and policing by 198 women in street-level sex work in Vancouver, Canada. Of particular concern, this correlation is significantly elevated among younger and Aboriginal women, active injection drug users, and daily crack cocaine smokers, suggesting significant environmental–structural barriers to interventions among these vulnerable populations.

Conclusions: The resultant displacement of sex work to primarily industrial settings and side streets pushes women further from health and social supports and reduces access to safer injection and drug use paraphernalia. This study offers important evidence for environmental–structural level prevention and safer environment interventions, supported by legal reforms, that facilitate safer sex work environments, including spatial programming, peer-based prevention, outreach and mobile resources, and peer-supervised safer sex work settings.

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Introduction

There has been an increasing focus in public health on the environmental–structural context of health care access and HIV prevention. Mapping is a tool traditionally applied to understanding the distribution and geographic characteristics of diseases such as Lyme disease and tuberculosis, or trends in infant mortality (Glass et al., 1995; Hightower & Klein, 1995;

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Latkin, Glass, & Duncan, 1998), however there has been growing support for its application and consideration of place and context in the HIV and harm reduction realm (Ferguson & Morris, 2007; Fulcher & Kaukinen, 2005; Kaulkinen & Fulcher, 2006; Weir et al., 2003). In North America, mapping has been used to explore the location of HIV services and clustering of neighbourhood level characteristics with findings suggesting significant correlation between inaccessible neighbourhoods and socioeconomic disadvantage, such as immigrant and visible minority populations (Fulcher & Kaukinen, 2005; Kaulkinen & Fulcher, 2006). Similarly, among a young African American male population, mapping of HIV prevention services revealed that areas where young Black men who have sex with men (MSM) both reside and report high rates of unprotected sex corresponded to low HIV service density areas (Pierce, Miller, Morales, & Forney, 2007). While in Cape Town, mapping was used to identify condom availability, as well as sites of new sexual partners for targeted HIV prevention (Weir et al., 2003).

Within sex work populations internationally, mapping of transactional truck spots along the Northern Corridor Highway in Kenya revealed several geographic “hotspots” where sex work transactions were concentrated that supported programming for “vulnerable places” as well as vulnerable groups (Ferguson & Morris, 2007). In South Africa, mapping identified significant heterogeneity of HIV prevalence among pregnant women in Hlabisa health district that correlated with proximity of homestead in each clinic catchment to primary and secondary roads (Tanser, Lesueur, Solarsh, & Wilkinson, 2000). This finding suggested that communities with better access to transport routes were at higher risk for HIV transmission, potentially due to increased mobility and concentration of transactional sex along transport routes. Research among sex work populations in Mexico examined the mobility and spatial concentration of commercial sex workers by municipalities in relation to HIV and STD vulnerability and found more vulnerable groups of illegal immigrant women from Central America working in cities along the international border, while women from Mexico were working in cities more centrally located (Uribe-Salas, Conde-Glez, Juarez-Figueroa, & Hernandez-Castellanos, 2003). In Estonia, although sex work was traditionally concentrated spatially in red light districts, mapping revealed commercial sex work to have dispersed across the city and residential neighbourhoods (Aral, St. Lawrence, & Uruskula, 2006).

Within sex work and substance-using populations, understanding the role of place, both physical setting and social meanings attached to place, have important policy and intervention implications, with growing evidence suggesting the need to refocus harm reduction towards environmental–structural context and safer environment interventions, in addition to individual behavioural change (Kerrigan et al., 2006; Latkin & Knowlton, 2005; Parker, Easton, & Klein, 2000; Rhodes et al., 2006; Sherman, German, Cheng, Marks, & Bailey-Kloche, 2006; Zierler &

Krieger, 1997). In epidemiological analyses, among injection drug users (IDUs), unstable housing and homelessness have been shown to be associated with elevated rates of drug-related harms and vulnerability to HIV infection (Corneil et al., 2006). Within public injecting environments both in Vancouver and elsewhere, police presence has been associated with increased drug-related harms, including rushed injections and syringe sharing (Aitken, Moore, Higgs, Kelsall, & Kerger, 2002; Best, Strang, Beswick, & Gossop, 2001; Bluthenthal, Kral, Lorvick, & Watters, 1997; Csete & Cohen, 2003; Maher & Dixon, 1999; Small, Kerr, Charette, Schechter, & Spittal, 2005; Wood et al., 2003). In addition, enhanced surveillance and police crackdowns have been shown to deter access to syringe exchange programs and displace drug users to outlying areas, resulting in a redistribution of harms (Aitken et al., 2002; Bluthenthal et al., 1997; Maher & Dixon, 1999; Small et al., 2005; Wood et al., 2003). The adverse impacts of enforcement-based policies among IDUs have been consistently reported, including reports of unlawful harassment and confiscation of drug use paraphernalia, particularly among women (Cooper, Moore, Gruskin, & Krieger, 2004; Csete & Cohen, 2003). Furthermore, significant ethnographic work has focused on how the built environment is defined by both the social and physical meanings ascribed to place, such as the meaning a drug user attaches to a place due to previous adverse interactions with police (Rhodes et al., 2006).

In Canada and other settings with criminalised prostitution environments, substance-using women in street-level sex work experience multiple health and drug-related harms and are subject to heavy policing and high rates of violence and exploitation (Day & Ward, 2007; Goodyear & Cusick, 2007; Lowman, 2004) that likely mediate the impact of harm reduction and HIV prevention efforts through existing spatial relations. Similar to other prohibitive sex work environments, such as the United Kingdom (Hubbard & Sanders, 2003), while sex work itself is legal, enforcement strategies and prohibitive laws on communicating in public spaces for the purposes of sexual transaction have effectively concentrated sex work in defacto tolerance zones in outlying and industrial settings in Vancouver, Canada. These defacto tolerance zones operate under unwritten rules of engagement between police, sex workers, and clients, are exposed to periodic police crackdowns, high rates of violence, exploitation and harassment of sex workers (Day & Ward, 2007; Goodyear & Cusick, 2007; Lowman, 2004). Furthermore, the ‘bawdy house provisions’ (s210 and 211) and procuring provision (s212) prohibit operating a common bawdy house or living off the avails of prostitution thereby reducing the opportunities for sex workers to move indoors to supervised or cooperative settings (Goodyear, Lowman, Fischer, & Green, 2005; Lowman, 2004). Despite alarming rates of violence faced by women in street-level sex work in criminalised prostitution environments over the last decade, HIV prevention and harm reduction have largely focused on injection drug use, and current public health and policy responses both locally and

nationally have failed to develop targeted strategies aimed at reducing the harms faced by substance-using women in street-level sex work (Cler-Cunningham, 2001).

Elucidating the environmental–structural factors that act as barriers and facilitators to health and syringe availability is crucial in developing targeted interventions and policies that reduce the harms faced by sex workers. We therefore sought to explore the relationship between health service and syringe availability and avoidance of physical settings due to recent violence and policing at the geographic level.

Methods

The Maka Project is a community-based HIV prevention research partnership that has been described in detail elsewhere (Shannon et al., 2007). Both the community partner and peer research team (women with a lived experience of survival sex work) were involved in the conception, design and implementation of the research. Survival sex work refers to the exchange of sex for money, drugs, or shelter as a means of basic subsistence. Based on initial pilot mapping sessions, approximately 200 women were invited in 2006 to participate in interview-administered questionnaires and mapping through targeted outreach to sex work strolls and time-space sampling strategies (93% response rate). All women who use substances within the last 6 months (not including Cannabis) and were actively engaged in survival sex work were invited to participate. Interview-questionnaires, administered by trained peer researchers elicited responses related to demographics, health and addiction service use, violence and safety concerns, local policing and sexual and drug-related harms. All mapping and geographic analyses are based on data from 198 women who participated in both mapping and baseline interview-questionnaires.

Social mapping has been previously shown to be a successful participatory-action research tool that facilitates community access and highlights local expertise among young injection drug users in Australia (Coupland & Maher, 2005). At the time of interview visit, women were asked to map their community and access to resources, with the last 6 months as a reference point. Using a street map of Vancouver, women were asked to mark places where they: (a) lived and worked; (b) considered to be high and low risk to their personal safety; (c) avoided when working due to recent violence; (d) avoided when working due to local policing (inclusive of police presence and harassment); (e) accessed and disposed of syringes; (f) accessed health/support resources. In order to map health service and syringe exchange availability, women were asked to mark all services they were aware of and had used within the last 6 months. Results were compiled used ArcGIS software and GIS street maps provided by the City of Vancouver. Given significant overlap in mapping of avoidance areas due to violence and avoidance due to policing, avoidance areas were combined for the purposes of geographic analysis. Subse-

quent analysis at the individual level will help to elucidate the differential impact of avoidance of physical settings due to policing and violence on women's individual utilisation of health and syringe exchange programs.

The primary model for this analysis focused on geographical units defined by streets or blocks, rather than on individual participants. In order to elucidate environmental–structural level barriers, the outcome variable was areas of avoidance of a physical place due to recent violence and policing, measured by proportion of women identifying any one geographical unit as an area. The key explanatory variable of interest was a geographic region, operationalized as health and syringe availability core, compared to the inner/outer perimeter area, in addition to working areas mapped by women. The boundaries of the core area were derived based on concentration of reported health and syringe exchange availability and correspond to the high density area of Vancouver's Downtown Eastside (DTES) core encompassing 16 street sections and corners, running approximately 6 blocks by 2–3 blocks, although not in a defined rectangle. The DTES is an inner-city community that has become notorious for a highly concentrated area of low cost housing, poverty, health inequities, substance use and mental illness, as well as extensive prevention and harm reduction programming. The health and syringe availability core area encompasses the main health clinics, fixed site syringe exchange programs, pharmacies and methadone dispensation, a medically supervised injection facility, heroin maintenance trail, a drop-in centre for sex workers and a women's centre. The inner/outer perimeter area corresponds to primarily industrial settings to the north and east, loading docks along the waterfront to the north, and bordering residential areas.

In a secondary analysis, demographic and drug use variables from the interview-questionnaire were used to stratify models analysing the geographic relationship between health and syringe availability and avoidance of physical area due to violence and policing. Variables of interest included age (coded as younger (≤ 29 years) vs. older (≥ 30 years)), ethnicity (coded as Aboriginal, inclusive of First Nations, Metis and Inuit ancestry, vs. non-aboriginal) and drug use patterns (any and daily use of injection drugs, crystal methamphetamine and crack cocaine smoking).

The aim of the analysis was to map the geographic relationship between health service and syringe availability and the avoidance of a physical setting due to violence and policing using ArcGIS. In a secondary analysis, logistic regression was used to model this geographic association and obtain an adjusted effect. In order to minimize potential confounding due to overlap of working areas with the core area, the logistic regression model was adjusted for the proportion of women working in a given area. Stratified models were then run to assess different patterns of avoidance based on age, ethnicity and drug use. The generalised model was therefore adjusted for age and subsequent stratified models are presented. All models were adjusted for clustering within grid map regions so that streets within a given region were not

Table 1
Socio-demographic characteristics and syringe exchange services use among female survival sex workers

Characteristic	n (%)
Median age [IQ range]	37 (27–42 years)
Median age first exchange sex for money or drugs [IQ range]	16 (14–22 years)
Self-identified ethnicity	
Aboriginal (First Nations, Metis, Inuit, non-status)	80 (40)
Drug use patterns (last 6 months)	
Any injection use	116 (59)
Any crystal meth use	40 (20)
Any crack cocaine smoking	166 (81)
Daily crack cocaine smoking	121 (59)
Syringe exchange (n = 116 current IDU)	
Fixed NEP use (needle exchange, hotel exchange, clinics, pharmacies)	65 (56)
Medically supervised injection site	53 (47)
Mobile NEP use (core)	50 (43)
Mobile NEP use (core/perimeter)	20 (17)
Outreach workers	13 (11)
Family/friend/street	9 (8)

considered independent. ArcGIS (ESRI) and STATA statistical software (Statacorp, version 8.2, TX, USA) were used for analyses.

Results

The socio-demographic characteristics and use of fixed and mobile syringe exchange programs are reported for the 198 women (n = 116 for subset of IDU) who participated in social mapping sessions (Table 1). The median age of women was 37 years (27–42 years) and median age of sex work initiation was 16 years (14–22 years). Of the total, 80 (40%) self-identified as being of Aboriginal ancestry, and 56 (27%)

were less than 29 years of age. A total of 116 (50%) were active IDUs, while the vast majority smoked crack cocaine (81%), with 121 (59%) reporting daily crack cocaine smoking. Approximately half of current female IDUs (56%) had accessed syringes from a fixed site (56%) (including hotel exchange, pharmacy and clinic) and the medically supervised injection facility (47%). In terms of mobile resources, 50 (43%) had accessed syringes from a mobile van in the core area, 20 (17%) from a mobile van in either of core or perimeter areas, and 13 (11%) from outreach workers, while 59 (29%) had accessed a mobile van for other harm reduction resources and referral in either of core or perimeter areas.

In analyses of the mapping data, a total of 1105 observations were included from 198 women, representing geographical units of street sections or corners. As illustrated in Fig. 1, there is a significant geographic correlation between the health service and syringe availability core (compared to inner/outer perimeter) and physical settings avoided due to violence and policing. In a generalised logistic regression model (Table 2), adjusted for clustering of working streets within regions, the odds ratio (OR) for association between the health and syringe availability core and avoidance due to violence and policing was 6.53 (95% confidence interval (CI): 4.04–10.56). In a stratified model, the odds ratio for avoidance of the health and syringe availability core due to violence and policing increased for Aboriginal women (OR = 9.90, 95%CI: 5.46–17.96), daily crack cocaine smokers (OR = 9.23, 95%CI: 5.44–15.64), younger women (≤ 29 years of age) (OR = 7.60, 95%CI: 4.36–13.24) and injection drug users (OR = 6.8, 95%CI: 4.0–11.76), when compared to non-aboriginal women, less than daily crack smokers, older women, and non-injection drug users. In addition, when examining the relationship of working areas by age, working areas of older women (≥ 30 years) were significantly associated with the health and syringe availability core (OR = 1.31, 95%CI: 1.07–1.61), while among younger women (≤ 29 years), the odds ratio was reversed but non-significant (OR = 0.96, 95%CI: 0.87–1.62). When examining

Table 2
Logistic regression modelling of the geographic relationship between health and syringe exchange availability and avoidance due to violence and policing

Health/syringe availability core (vs. outer, inner perimeter)*	Avoidance due to violence and policing	
	Adjusted odds ratio	95% confidence interval
General model for all women	6.53	4.04–10.56
Stratified by Age		
Youth (≤ 29 years)	7.60	4.36–13.24
Stratified by ethnicity		
Aboriginal women	9.90	5.46–17.96
Stratified by crack use frequency		
Daily crack cocaine smokers	9.23	5.44–15.64
Stratified by injection drug use		
Any injection drug use	6.86	4.00–11.76
Crystal methamphetamine users		
Any crystal meth use	3.09	1.50–6.34

*Reference category is health and syringe exchange availability. **All models controlled for working street sections.

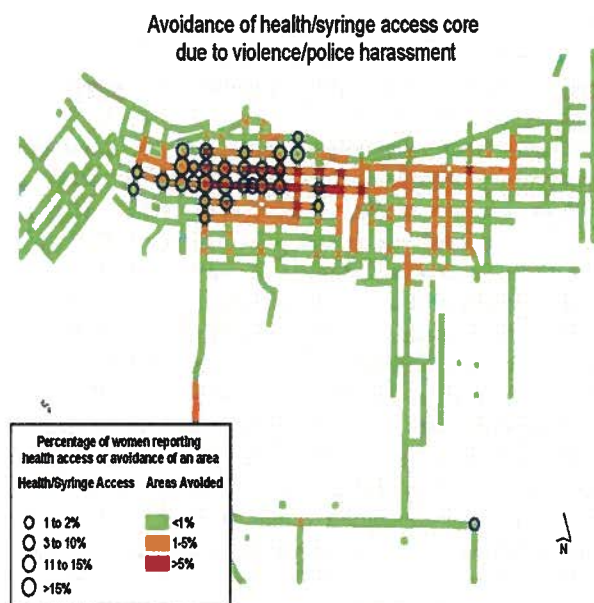


Fig. 1. Mapping the geographic relationship between avoidance of physical settings due to violence and policing and availability of health services and syringe exchange programs among women engaged in survival sex work.

the relationship of working areas by ethnicity, an association was only observed among non-aboriginal women (OR = 1.21, 95%CI: 1.13–1.31) with no association observed between the health and syringe availability core and working areas of Aboriginal women (OR = 1.12, 95%CI: 0.99–1.25).

Discussion

The findings reveal a significant geographic correlation between a heavily concentrated area of health and syringe availability and avoidance due to violence and policing by sex workers that requires immediate attention. Of particular concern, stratified models showed increased likelihood of this geographic correlation among younger and Aboriginal women, injection drug users and daily crack cocaine smokers, suggesting these populations may be particularly vulnerable to avoidance of the health and syringe availability core due to violence and policing. Furthermore, the lack of relationship observed between working areas and the health and syringe availability core among younger and Aboriginal women suggests displacement of working areas away from health and syringe exchange programs.

Previous research among women in sex work and drug-using populations has identified violence as a significant structural barrier to HIV prevention efforts (El-Bassel, Gilbert, Rajah, Foleno, & Frye, 2000; Pyett & Warr, 1997; Wojcicki & Malala, 2001), however far less is known about the avoidance physical settings due to violence that may mediate the availability of health and syringe exchange services. Given the extensive harm reduction and HIV prevention strategies currently operating in Vancou-

ver, and ample evidence of the positive impacts of needle exchange programs and medically supervised injection facility in reducing localized syringe sharing (Kerr, Tyndall, Li, Montaner, & Wood, 2005; Strathdee et al., 1997), the high concentration of avoidance of health service and syringe exchange availability core among women who inject drugs due to violence and policing is of major concern. Interruption of health service use among IDU due to heavily policed open drug markets and displacement have been shown to severely compromise prevention and outreach efforts (Aitken et al., 2002; Bluthenthal et al., 1997; Curtis et al., 1995; Kerr, Small, & Wood, 2005), with mapping supporting a significant environmental–structural gap in prevention efforts where open drug use and sex work markets coexist. In addition, evidence suggests that heavy policing and crackdowns, characterized by heightened surveillance and searches, are associated with increased risky injections, syringe sharing, reduced access to needle exchange and redistribution of harm both in Vancouver and elsewhere (Aitken et al., 2002; Best et al., 2001; Bluthenthal et al., 1997; Csete & Cohen, 2003; Maher & Dixon, 1999; Small et al., 2005; Wood et al., 2003). Given that previous research has identified adequate access to sterile syringes as one of, if not the single most, important factor in reversing an HIV epidemic among IDU, our findings suggest a major gap in service provision that requires immediate address. While outreach-led prevention efforts have consistently been shown to be effective in reducing syringe sharing and other drug-related harms (Coyle, Needle, & Normand, 1998), the highly displaced sex work environment in Vancouver and low reported availability of sterile syringes through mobile exchange and outreach in perimeter areas is of major concern. In addition, the increased vulnerability among young and Aboriginal women to avoidance of the health and syringe availability core due to recent violence and policing supports ongoing evidence of the immediate need for Aboriginal-led public health and prevention efforts (BC Aboriginal HIV/AIDS Task Force, 1999; Culhane, 2003; Farley, Lynne, & Cotton, 2005). In the past decade, young women and those of Aboriginal ancestry have experienced particularly elevated rates of new HIV infections and health-related harms (Craib et al., 2003; Miller et al., 2005), and are highly overrepresented in visible street-level sex work across Canada (BC Aboriginal HIV/AIDS Task Force, 1999; Culhane, 2003; Farley et al., 2005).

While further analyses at the individual level will help to determine the specific environmental and structural mechanisms at play, mapping the spatial relations of violence and policing that likely mediate harm reduction efforts can help to inform spatial programming and policy reforms aimed at promoting safer sex work environments. The findings offer evidence to support increasing calls for ‘safer environment interventions’ among drug users embedded within existing spatial relations, such as peer-based interventions and outreach that increase access to and disposal of drug use paraphernalia, evidence-based drug consumption rooms, and ‘peer-supervised’ places for injecting (Rhodes et al.,

2006). Of particular importance, in settings such as Vancouver where open sex work and drug use markets coexist, environmental–structural prevention and ‘safer environment interventions’ are desperately needed that aim to facilitate safer sex work environments within existing spatial relations, including peer-based prevention efforts, outreach and mobile resources and policy reforms to support peer-supervised safer sex work environments (such as sex work cooperatives). A key example of a ‘safer environment intervention’ currently being piloted in Vancouver for street-level sex workers is the mobile access project (MAP), a mobile outreach van that connects with sex workers in both the DTES and outlying areas and has been in operation for 3 years. While the MAP van has shown positive impacts in reducing harm and violence among women through provision of harm reduction and prevention resources (Gibson, Bowen, Janseen, & Spittal, 2006), our findings suggest that less than half of women engaged in street-level sex work had accessed a mobile resource (including the MAP van) within the last 6 months. The findings therefore suggest the need for long-term resources to help to sustain the capacity of MAP and expand mobile resources for sex workers, including mobile health services, to outlying areas. As well, the avoidance of a concentrated area of health and syringe availability due to violence and policing suggests a growing need for women specific-health and wellness in this setting, as well as a 24-h safe-space for sex workers.

Among sex work markets internationally, particularly establishment-based sex work environments (Kerrigan et al., 2006), environmental–structural interventions that combined peer-based sex work initiatives (such as sex work unions and cooperatives) and socio-legal policy reforms have increasingly shown to be effective in promoting safe sex work environments through the mediation of macro- and meso-level barriers. Of particular importance, evidence suggests that environmental–structural interventions that are supported by the decriminalisation of sex work facilitate reduced violence and harassment of sex workers by clients, police and third parties and increased access to health and support resources (Doorninck & Jacqueline, 1998; Jordan, 2005; West, 2000).

In a street-level sex work context, the production of sex work space has been discussed in urban planning and crime prevention literature, and yet spatial programming, supported by legal reforms, as a safer environment intervention for sex workers has received comparably less attention as a harm reduction strategy (Sanders & Campbell, 2007). In contrast to informal tolerance zones currently operating in criminalised prostitution environments such as Vancouver, emerging evidence suggests managed sex work zones, such as those operating in several European settings reduce violence and police harassment, promote sex worker’s ability to manage their risk environment and increase access and availability of health and support resources (Doorninck & Jacqueline, 1998). Furthermore, recent consultations on managed sex work zones in Liverpool, UK have highlighted the need for managed sex work zones that promote harm

reduction rather than enforcement-based drug strategies, are community rather than police patrolled, and work to support improved relationships between sex workers and police (Bellis et al., 2007).

Finally, harm reduction strategies and safer environment interventions among sex workers need to be tailored towards widespread crack cocaine smoking in this setting. High rates of violence, harassment and exploitation of women who use crack cocaine and engage in survival sex work have been extensively documented (Edlin et al., 1994). As well, increased confiscation of drug use paraphernalia without arrest has been reported among women who smoke crack and inject drugs in this setting (Shannon et al., 2008). Drug consumption rooms that accommodate non-injection use are currently operating in several European cities (Hendrich, 2004; Wolf, Linseen, & Graaf, 2003). However current reluctance for safer inhalation rooms persists in this setting, despite continued public drug use among crack and crystal meth users and recent feasibility studies demonstrating the potential community and public health impacts of drug consumption rooms that accommodate crack cocaine smokers (Collins et al., 2005; Shannon et al., 2006). In addition, peer-based outreach and mobile prevention efforts need to include widespread provision of safer crack use kits and mouth-piece exchange, not currently available in Canada (Haydon & Fischer, 2005).

It is important to interpret the results of mapping as evidence of a strong geographic relationship between health and syringe availability and avoidance of physical settings due to violence and policing that does not consider individual level associations. As mentioned, our findings support the need for more extensive analyses of the role of specific environmental–structural factors that mediate harm reduction and prevention efforts among women in survival sex work at the individual level. In particular, our findings map the displacement of sex work away from the health and syringe availability core that may be related to avoidance due to violence and policing. However, further analysis is clearly needed at the individual level to help elucidate the full range of factors that may impact displacement of sex work, such as increased client availability in outlying areas. Secondly, the low sample size across a large geographic area resulted in wide confidence intervals around some coefficients. However despite the wide confidence intervals, there was sufficient power to detect associations with results providing important exploratory findings not previously reported elsewhere. Finally, the results may not be generalisable to other venues of sex work, including male sex workers, or other sex work settings not operating under a prohibitive prostitution environment.

In summary, mapping of sex workers’ working environments highlighted how the avoidance of physical settings due to violence and policing may mediate health and syringe exchange availability at the environmental–structural level. This finding is further supported by the mapped displacement of sex work to outlying and industrial settings away

from health and harm reduction resources. Collectively these findings support the need for environmental–structural level prevention efforts and safer environment interventions, supported by legal reforms, that are embedded within existing spatial relations and facilitate safer sex work environments, including peer-based prevention, outreach and mobile resources, peer-supervised sex work environments (e.g. sex work cooperatives) and spatial programming.

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Structural and Environmental Barriers to Condom Use Negotiation With Clients Among Female Sex Workers: Implications for HIV-Prevention Strategies and Policy

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Women account for an increasingly disproportionate number of HIV infections worldwide.¹ United Nations' agencies use the term the "feminization" of the HIV pandemic to refer both to the highly gendered nature of the vulnerability to HIV infection and to women's increased biological susceptibility through sexual transmission. Women's risk of HIV infection is hypothesized to be mediated by macro- and micro-level factors exogenous to the individual that interact to increase vulnerability to HIV infection, factors such as gender, cultural and economic inequities, prohibitive government policies, and institutionalized racism and poverty.²⁻⁵

Recent public health calls highlight the need to move beyond a sole focus on individual-level risk to an understanding of risk as negotiated interactions,⁶ embedded in contextual factors, gendered power dynamics, and access to resources.^{5,7} As such, a conceptual shift from individual-focused HIV prevention, such as behavior change communication, to environmental-structural HIV prevention emerged in the 1990s, particularly among female sex workers and their male clients.²

Environmental-structural interventions aim to mediate macro- and microlevel factors that facilitate "enabling environments" for individual HIV risk reduction.^{2,8} Although several environmental-structural interventions targeting female sex workers and clients have shown significant promise in improving condom use in sex work establishments,^{2,9,10} most notably the Songachi model in West Bengal, India,¹¹ these interventions have proven difficult to translate to other settings¹² and, to date, have almost exclusively targeted indoor female sex workers in resource-poor settings. Furthermore, although some interventions, such as the 100% condom campaign, were initially heralded as model HIV prevention programs in Thailand,¹³ subsequent evidence suggests that not all sex workers may have experienced the same reductions in HIV

Objectives. We investigated the relationship between environmental-structural factors and condom-use negotiation with clients among female sex workers.

Methods. We used baseline data from a 2006 Vancouver, British Columbia, community-based cohort of female sex workers, to map the clustering of "hot spots" for being pressured into unprotected sexual intercourse by a client and assess sexual HIV risk. We used multivariate logistic modeling to estimate the relationship between environmental-structural factors and being pressured by a client into unprotected sexual intercourse.

Results. In multivariate analyses, being pressured into having unprotected sexual intercourse was independently associated with having an individual zoning restriction (odds ratio [OR]=3.39; 95% confidence interval [CI]=1.00, 9.36), working away from main streets because of policing (OR=3.01; 95% CI=1.39, 7.44), borrowing a used crack pipe (OR=2.51; 95% CI=1.06, 2.49), client-perpetrated violence (OR=2.08; 95% CI=1.06, 4.49), and servicing clients in cars or in public spaces (OR=2.00; 95% CI=1.65, 5.73).

Conclusions. Given growing global concern surrounding the failings of prohibitive sex-work legislation on sex workers' health and safety, there is urgent need for environmental-structural HIV-prevention efforts that facilitate sex workers' ability to negotiate condom use in safer sex-work environments and criminalize abuse by clients and third parties. (*Am J Public Health.* 2009;99:659-665. doi:10.2105/AJPH.2007.129858)

prevalence.¹⁴ In fact, the policy may have adversely impacted marginalized sex workers through increased corruption, police raids, and mandatory HIV testing. These challenges and limitations may reflect the inability of interventions to adequately address the dynamic ways in which environmental and structural factors interact with microlevel factors in producing individual HIV risk.¹⁵

Among street-level sex work markets both in Canada and worldwide, women have been subjected to alarming rates of violence and victimization over the past decades¹⁶⁻¹⁸ and to enhanced rates of health- and drug-related harms, including increased rates of HIV infection among women who smoke and inject drugs.^{19,20} A significant amount of research has identified individual-level factors that predict consistent condom use; however, there remains a paucity of evidence surrounding the role of prostitution

policies and work environment on sexual HIV risk in street-level sex work.

Government policies that prohibit solicitation in public spaces, including those in North America, the United Kingdom, and parts of Australia, have been shown to increase police presence and crackdowns and to displace street-based sex-work markets to outlying areas.^{16,17,21} As a direct result of displacement and legal restrictions on working indoors in managed or supported settings, more marginalized sex workers are pushed to work in dark and deserted alleys and isolated spaces with limited lighting, poor sanitation, lack of protections from violence and exploitation, and reduced access to health and social support services.

Given growing human rights and public health calls globally to address the failings of criminalized or quasi-criminalized prostitution on the health and safety of sex

workers,^{16–18,22,23} and recent charter challenges to Canada's federal prostitution laws, we aimed to examine the association between environmental–structural factors and the negotiation of condom use with clients among street-level sex workers.

METHODS

The Maka Project was developed as a community-based HIV prevention research partnership with the aim to examine the impact of current programs and policies on the health and safety of survival sex workers in Vancouver, British Columbia. The term *survival sex work* is used to refer to the exchange of sexual services for money, drugs, or shelter as a means of basic subsistence. A detailed description of the Maka Project methodology has been published elsewhere.²⁴ Briefly, between April and September 2006, 205 female sex workers were recruited and consented to participate in a prospective cohort (response rate of 93%), which included an interview questionnaire and voluntary HIV screening. Given the known difficulties in accessing a representative sample of sex workers because of the unknown size and boundaries of this population, initial mapping of working areas with more than 60 female sex workers was used to identify sex work strolls for targeted outreach and recruitment. Time–space sampling²⁵ was used to systematically sample all women (inclusive of transgender women) working at staggered times and locations along these strolls. Based on previous research that identified 100% substance use among street-based female sex workers in Vancouver,²⁶ eligibility criteria was defined as being a woman aged 18 years and older who smoked or injected illicit drugs (excluding marijuana) and actively engaged in street-level sex work.

Study Instruments

At baseline, trained peer researchers (former or current female sex workers) administered a detailed semistructured questionnaire to elicit responses from the participants related to demographics, health service use, working conditions, violence and safety, and sexual and drug-related harms. In addition, voluntary HIV screening with the new point-of-care rapid INSTI test (Biolytical, Vancouver, BC; specificity = 99.3%; sensitivity = 99.6%) was conducted by the project nurse and was supported

by extensive pretest and posttest counseling. Finally, at the time of the baseline visit, women were provided with a map of Vancouver and asked to indicate (using the past 6 months as a reference point) areas in which they (1) worked and lived, (2) considered high and low risk to their personal safety, (3) avoided because of violence and policing, and (4) accessed syringes and accessed health services. Results were compiled with ArcGIS version 8 (ESRI, Redlands, CA) software and Geographic Information System street maps were provided by the City of Vancouver.

The dependent variable for all analyses was reporting being pressured by a client into unprotected vaginal or anal intercourse in the past 6 months.

Explanatory Variables

The risk environment framework,⁸ which postulates that macro- and meso-level factors exogenous to the individual mediate negotiation of individual HIV risk, formed the theoretical basis for the selection of independent variables for all analyses. We considered specific environmental–structural factors based on literature about female sex workers and qualitative documentation of street-based sex workers' risk environment, as well as a priori hypothesized relationships.

Environmental–structural factors derived from questionnaires included harassment by security guards and place of servicing client (i.e., car or outdoor public space [park or alley] and indoor settings [hourly room, sauna, hotel]). In addition, environmental–structural factors derived from individual mapping variables for each woman included (1) type of working area (main street, residential setting, alley or side street, industrial setting), (2) having a “red zone restriction” (individual zoning restriction) prohibiting working in the Downtown Eastside core because of previous solicitation or drug charges, and (3) having moved working areas away from Downtown Eastside core or main street because of policing or police harassment. The Downtown Eastside core, considered among the poorest postal codes in North America, has become known for a highly concentrated open drug market, socioeconomic disadvantage, and health inequities, as well as extensive community and health resources. Importantly, the Downtown Eastside

core is bordered to the east by industrial areas and to the north by loading docks along waterfront that have become synonymous with “skid row.”

Based on qualitative evidence of intimate partners (noncommercial partners) limiting sex workers' ability to negotiate HIV risk reduction through reduced access to resources,^{27,28} we examined the microlevel practice of “having a male intimate partner who scores drugs for you” in bivariate analysis. Additionally, we examined the safety initiative of working with other women or having a “spotter” (i.e., another worker who takes down clients' information or license plates). Other microlevel drug practices previously shown to enhance sexual risk of HIV included borrowing a used crack pipe and exchanging sexual services while high on drugs. Finally, we defined client-perpetrated violence (i.e., a “bad date”) as emotional, physical, or sexual violence by a client. Respondents who answered yes to having experienced a bad date in the past 6 months were asked which of the following they had experienced from a client: verbal harassment, abduction or kidnapping, sexual assault, rape, strangulation, physical assault or beating, assault with a weapon, or being thrown out of a moving car.

Individual variables considered as potential confounders because of their known or a priori hypothesized relationship with negotiation of condom use and at least 1 or more independent variables included HIV status, type and frequency of drug use, pregnancy history, and early sexual and physical abuse. In light of recent evidence of enhanced rates of HIV seroconversion among Aboriginal people in this setting,²⁹ we examined Aboriginal ethnicity (e.g., First Nations, Metis, or Inuit) compared with non-Aboriginal ethnicity. Similar to previous analyses,²⁶ drug use patterns included any cocaine, heroin, or crystal methamphetamine injection in the past 6 months. Because all respondents reported smoking crack cocaine, we examined daily versus less-than-daily use. Finally, we adjusted all models for age because of previous evidence suggesting potential confounding with sexual HIV risk and 1 or more police enforcement strategies.²⁷

Statistical Analyses

We inputted mapping data into ArcGIS to provide a geographic representation of

women's working areas by clustering of "hot spots" for being pressured by clients into unprotected sexual intercourse. Specifically, we calculated hot spots by using the Getis-Ord G_i^* statistic and z scores (with standard deviations from the mean) and mapped them by the variable, women's working areas. To elucidate specific environmental-structural factors associated with the negotiation of sexual HIV risk, we used descriptive and univariate analyses to examine associations with being pressured by a client into unprotected sexual intercourse.

We analyzed categorical and explanatory variables with the Pearson χ^2 test, we analyzed normally distributed continuous variables with the t test for independent variables, and we analyzed skewed continuous variables with the Mann-Whitney U test. We used bivariate analysis to examine associations between each of the explanatory variables and to test for collinearity and effect modification. Given significant collinearity between displacement because of policing and working in industrial areas, we only entered displacement into the multivariate model. Similarly, exchanging sexual services while high on crack, and borrowing a used crack pipe were highly collinear, and thus, we only entered borrowing a used crack pipe into the model based on significance ($P < .05$) and likelihood ratio test.

We used the Pearson χ^2 test to verify associations between each independent variable and the outcome measure. Variables found at the univariate level ($P < .01$) to be associated with being pressured by a client into sexual intercourse without a condom were entered into the logistic regression model to obtain adjusted effects by using forward conditional procedures and the likelihood ratio test. We set $\alpha < .01$ because of the relatively small sample size. All reported P values are 2-sided and odds ratios (ORs) are reported with 95% confidence intervals (CIs).

RESULTS

As indicated in Table 1, of the 205 women eligible for analysis, 81 (40%) self-identified as Aboriginal, with no statistical differences in likelihood of being pressured into unprotected sexual intercourse by ethnicity ($P = .716$). The median age at the time of interview was 37 years (interquartile range [IQR] = 27-42 years)

and the median age of sex work initiation was 16 years (IQR = 14-22 years). A total of 68% of women had been pregnant in their lifetime with a median of 4 pregnancies (IQR = 2-5), and 31 (22%) had at least 1 child living with them, with no differences in likelihood of being pressured into unprotected sexual intercourse by number of pregnancies ($P = .131$) or support of a child ($P = .138$). Seventy-four women (36%) had been homeless in the past 6 months, with similar prevalence of homelessness among both groups ($P = .227$). One hundred fifty-two women (77%) reported ever having injected drugs, and the primary drug of choice was crack cocaine (81%). Importantly, no associations were observed between drug use practices and being pressured by a client into unprotected sexual intercourse.

Among 205 women who reported sexual transactions with clients, 25% reported having been pressured by a client into not using a condom for sexual intercourse in the past 6 months. Figure 1 provides a map of women's

working areas, by clustering of hot spots for being pressured into unprotected sexual intercourse, with standardized z scores of 1.96 or more. The positive z scores show an increased probability (or hot spot) of being pressured by a client into unprotected sexual intercourse among women working in areas both outside the Downtown Eastside core and in industrial public spaces along the northeast and south.

Table 2 shows the unadjusted and adjusted associations for being pressured by a client into unprotected intercourse. In the final multivariate logistic regression model, adjusted for age, being pressured by a client into sexual intercourse without a condom was associated with having a zoning restriction because of previous solicitation or drug charges (OR = 3.39; 95% CI = 1.00, 9.36), moving working areas away from the Downtown Eastside core or main streets because of policing (OR = 3.01; 95% CI = 1.39, 7.44), borrowing a used crack pipe (OR = 2.51; 95% CI = 1.06, 2.49), client-perpetrated violence (OR = 2.08;

TABLE 1—Characteristics of Female Street-Based Sex Workers, by Whether They Were Pressured by a Client Into Unprotected Sexual Intercourse: The Maka Project, Vancouver, British Columbia, 2006

Characteristic	Pressured by a Client Into Unprotected Sexual Intercourse		P
	Yes, No. (%) or Median (IQR)	No, No. (%) or Median (IQR)	
Total	51 (100)	154 (100)	
Median age, y	35 (28-41)	37 (27-42)	.759
Median age first exchanged sex for money or drugs, y	16 (15-22)	17 (14-23)	.592
Self-identify as Aboriginal	21 (41)	59 (38)	.716
Ever pregnant	39 (77)	100 (65)	.126
Median number of pregnancies	4 (2-7)	3 (2-5)	.131
Currently have at least 1 child living with them	11 (22)	20 (13)	.138
Homeless, past 6 mo	22 (43)	52 (34)	.227
Incarcerated, past 6 mo	10 (30)	24 (16)	.503
Screened and HIV-positive	15 (29)	30 (20)	.138
Self-reported HCV-positive	29 (57)	91 (59)	.780
Ever injected drugs	34 (67)	118 (77)	.159
Experienced childhood or adolescent abuse			
Sexual abuse ^a	41 (80)	112 (76)	.537
Physical abuse ^a	44 (86)	128 (83)	.595

Note. IQR = interquartile range. Total number of women reporting transactions with clients was 205. ^aSelf-reported abuse before age 18 years, excluding that associated with sex work.

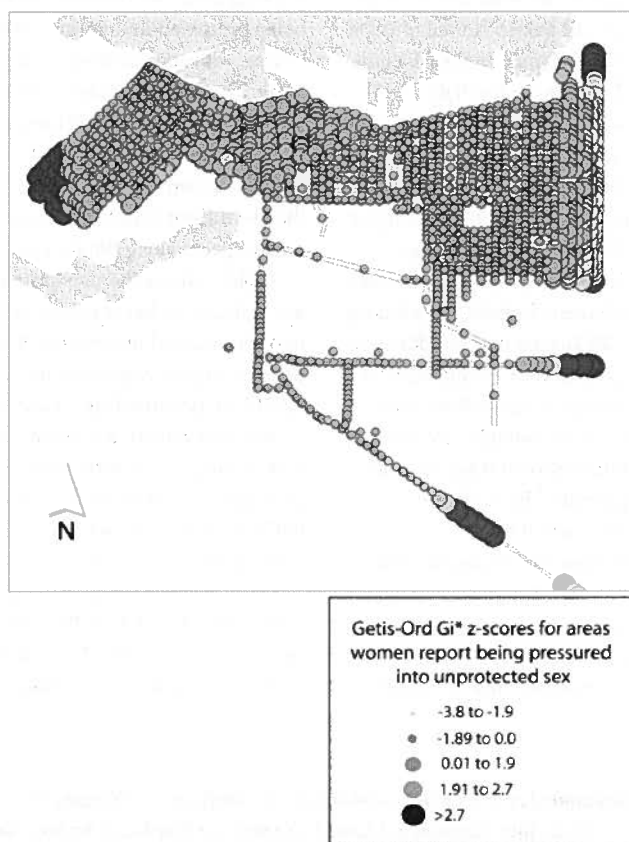


FIGURE 1—Working areas of female street-based sex workers and geographic clustering of “hot spots” for being pressured into unprotected sexual intercourse by clients: The Maka Project, Vancouver, British Columbia, 2006.

95% CI=1.06, 4.49), and servicing clients in cars or in public spaces (OR=2.00; 95% CI=1.65, 5.73).

DISCUSSION

Our results demonstrate several structural and environmental barriers that significantly elevate women's sexual HIV risk through being pressured by a client into unprotected sexual intercourse. Importantly, the mapping of hot spots for being pressured into unprotected sexual intercourse by working areas highlights the role of work conditions in shaping women's sexual HIV risk. At the macro- and microlevels, women who moved working areas away from main streets because of local policing and those with zoning restrictions (because of previous solicitation or drug charges) experienced a 3-fold increase in odds of being

pressured into unprotected sexual intercourse, and those servicing clients in cars or public spaces experienced a 2-fold increase in odds. Among microlevel practices, borrowing a used crack pipe and client-perpetrated violence both doubled the odds of being pressured by a client into unprotected sexual intercourse.

Sociolegal Policy Reform and Enforcement-Based Strategies

Our findings support the urgent need for structural- and environmental-level HIV-prevention efforts in street-level sex-work markets, including legal and policy reforms that facilitate sex workers' abilities to negotiate condom use in safer sex-work environments. The adverse impact of enforcement-based drug policies in facilitating drug-related HIV risk in open drug scenes have been well documented and include an increased

likelihood of risky injection practices (such as syringe sharing), confiscation of drug-use paraphernalia without arrest, and disruption of social networks.^{30–32}

Our findings further suggest that enforcement of prohibitive sex-work policies, alongside prohibitive drug policies, promote sexual risk of HIV infection in open street-level sex-work markets. These findings offer empirical evidence to support qualitative and ethnographic work, as well as legal policy analyses^{17,18,22} in both Vancouver and other criminalized or quasi-criminalized prostitution settings that document increased harms, including violence, exploitation, and drug-related HIV risk, in street-level sex work as a result of enforcement of prohibitive sex-work legislation.

Although the buying and selling of sexual services has never been illegal in Canada, the contradictory laws governing prostitution mean that sex work continues to operate in a highly prohibitive environment. In an effort to remove the visible presence of street prostitution, the federal government enacted the “communicating” provision in 1985²² that made it illegal to communicate in public spaces for the purposes of sexual transaction. In light of current legal challenges to the communicating code (s.13) in Canada, it is noteworthy that our findings suggest that enforcement of this provision may be increasing women's sexual risk of HIV infection.

Furthermore, the increased risk of being pressured into unprotected sexual intercourse among women servicing clients in public spaces and cars compared with those servicing clients in indoor settings highlights the public health imperative of reversing laws that restrict sex workers' ability to legally work indoors in managed or cooperative settings. The current “bawdy house” provisions (s.210 and s.211) in Canada broadly prohibit “keeping or transporting a person to a common bawdy-house,” and section 212 prohibits “procuring” or “living off the avails of prostitution” making it illegal for sex workers to work together indoors (e.g., in brothels) and extends “living off the avails” of sex work to partners, family members, friends, and coworkers.²²

The Joint United Nations Programme on HIV/AIDS supports the decriminalization of sex work in situations in which there is no exploitation as necessary to effective HIV

TABLE 2—Unadjusted and Adjusted Odds Ratios (ORs) for Associations Between Being Pressured by a Client Into Unprotected Sexual Intercourse and Individual and Contextual Factors Among Female Street-Based Sex Workers: The Maka Project, Vancouver, British Columbia, 2006

Characteristic	Pressured by a Client Into Unprotected Sexual Intercourse		Unadjusted OR (95% CI)	Adjusted OR ^a (95% CI)
	Yes (n=51), No. (%)	No (n=154), No. (%)		
Individual factors				
Cocaine injection	16 (31)	48 (31)	1.01 (0.51, 2.00)	...
Heroin injection	5 (49)	66 (43)	1.28 (0.70, 2.42)	...
Crystal methamphetamine injection	9 (18)	17 (11)	1.73 (0.72, 4.20)	...
Daily crack cocaine smoking	28 (55)	93 (63)	0.71 (0.37, 1.35)	...
Drug bingeing	18 (35)	43 (28)	1.41 (0.72, 2.76)	...
Microlevel factors				
Having an intimate male partner	17 (33)	54 (35)	0.93 (0.47, 1.81)	...
Having an intimate partner who obtains drugs for you	12 (24)	33 (21)	1.13 (0.53, 2.40)	...
Exchanging sexual intercourse while high ^b	35 (69)	80 (52)	2.02 (1.04, 4.00)	...
Borrowing a used crack pipe from a client	25 (49)	41 (27)	2.65 (1.38, 5.10)	2.51 (1.20, 4.98)
Working with other women or using a "spotter" ^c	10 (20)	21 (14)	1.55 (0.67, 3.55)	...
Experiencing client-perpetrated violence	14 (28)	23 (15)	2.16 (1.01, 4.60)	2.08 (1.06, 4.49)
Environmental-structural factors				
Having a zoning restriction because of previous solicitation or drug charges	9 (18)	9 (6)	3.45 (1.29, 9.25)	3.39 (1.20, 9.36)
Having moved working areas away from DTES or main streets because of policing	35 (69)	56 (36)	3.29 (1.42, 7.63)	3.10 (1.39, 7.44)
Experiencing harassment by security guards	21 (41)	44 (29)	1.75 (0.91, 3.38)	1.56 (0.85, 3.10)
Working on main, well-lit streets	15 (29)	48 (31)	0.90 (0.46, 1.84)	...
Working in industrial areas ^b	36 (77)	91 (59)	2.25 (1.10, 4.63)	...
Servicing clients in cars and in public spaces (alleys, parks)	39 (76)	91 (59)	3.03 (1.67, 6.14)	2.98 (1.59, 5.93)
Servicing clients in indoor settings (saunas, hourly rooms, hotels)	11 (21)	50 (32)	0.59 (0.23, 2.64)	...

Note. CI = confidence interval; DTES = Downtown Eastside Vancouver, BC.

^aVariables that were significant in bivariate analysis at $P < .01$ were entered into the multivariate model; adjusted ORs refer to variables significant at $P < .05$. Ellipses mean the bivariate variables were not significant.

^bVariable not entered into logistic model because of high collinearity with another variable.

^cA spotter is another worker who takes down clients' information or license plates.

prevention.¹⁶ In several countries in Europe, as well as most recently in New Zealand and parts of Australia, sex work is decriminalized with evidence suggesting that such policy efforts increase access to health services, autonomy, and personal safety, and reduce violence and exploitation. Health and safety strategies adopted in indoor sex-work establishments in decriminalized or regulated settings, such as occupational health and safety standards, have been suggested

to facilitate sex workers' ability to manage their environment and risk-reduction strategies including negotiation of positive sexual health practices.^{33,34}

Managed Sex-Work Zones as an HIV-Prevention Strategy

The significant public health implications of enforced displacement of sex work to outlying areas and individual red-zone restrictions on

HIV-transmission risk should also be considered in the context of current policy discussions surrounding "prostitution-free zones" in several urban settings,^{33,35} including Vancouver. Prostitution-free zones operate under a similar premise at the municipal level of removing the "visibility" of sex work (often advocated by business owners and residential communities) by making it illegal for sex workers to work in specific zones of public space and have been previously shown to lead to increased street policing and displacement of sex work to hidden and underground settings.

By contrast, managed sex-work zones as in several European settings³³ have been suggested to facilitate enabling environments for risk reduction and protection against violence and exploitation, although further research is needed both at the individual and ecological level of policies governing these zones. Unlike managed sex-work zones operating elsewhere that adopt a zero-tolerance drug policy, the significant overlap of sexual-exchange and drug-use partners in street-level sex work in this setting highlights the need for zones to be supported by harm-reduction policies, similarly documented in recent consultations in the United Kingdom.³⁶ Also, to ensure that policing in managed sex-work zones supports criminalizing exploitation by clients and third parties rather than further harming sex workers, policies should be developed with the direct involvement of sex workers.

Gender-Specific HIV-Prevention Strategies

In addition, gender-specific prevention and harm-reduction interventions are needed that consider power dynamics in the negotiation of HIV risk and the intersection of sexual- and drug-transmission risk in settings in which open drug use and sex-work markets coexist.³⁷⁻³⁹ Our findings suggest that the process of female sex workers borrowing used drug-use paraphernalia from clients is associated with elevated odds of sexual HIV risk through being pressured into unprotected sexual intercourse. The synergistic relationship between crack cocaine and survival sex work has been extensively documented and shown to elevate the likelihood of exploitation and violence for female sex workers.¹⁹ Although surveillance data suggest that injection drug use remains the primary route of HIV transmission

among substance users in Canada, a quarter of female sex workers in this setting were pressured into unprotected sexual intercourse within the past 6 months, suggesting increased potential for sexual transmission of HIV, which deserves attention.

The importance of elucidating microlevel negotiation of sexual HIV risk in epidemiological analysis, rather than individual-level practice of unprotected sexual intercourse, was further evidenced by an event analysis of female substance users' most recent sexual exchange transaction in which the male client's motivation to use condoms and worker-client discussions were key predictors of consistent condom use.⁴⁰ Similarly, the practice of clients offering more money to not use a condom and of female sex workers charging more money for unprotected intercourse has been documented in several settings with evidence suggesting that both drug use and poverty are driving these practices.^{26,41}

Limitations

There are several limitations that should be considered when one interprets these findings. First, this study is cross-sectional in nature, and therefore, causal relationships cannot be drawn. However, the direction of the association between enforcement of prohibitive sex-work policies and women's sexual HIV risk is supported by extensive legal policy analyses and qualitative and ethnographic work.^{17,18,22} Second, the relatively small sample size may have compromised power. Third, self-reported practices may be subject to social desirability bias, although it is likely that this would have served to underestimate associations toward the null.

Fourth, our findings may not be generalizable to indoor sex-work venues or other outdoor sex-work markets that do not operate under a similar legal framework. Additionally, this was not a random sample, and thus, generalizations to other sex-work settings may be limited. However, the mapping of working areas and time-space sampling strategies likely helped to ensure a representative sample and to minimize selection bias. Fifth, the mapping of hot spots for clustering of sexual HIV risk by working areas does not describe the environmental-structural characteristics of these areas. However, the multivariate logistic modeling

helps to disentangle the specific environmental and structural barriers to condom-use negotiation with clients that could be subsequently explored in further spatial analyses.

Conclusions

Given high rates of violence, murder, and adverse health-related outcomes among women in street-level sex work in Canadian cities over the past 2 decades²² and global calls to address the failings of legislation that criminalizes sex work on the health and safety of sex workers, our findings offer important empirical evidence to suggest that the current sex-work laws and enforcement-based policies may be directly increasing women's sexual HIV risk. In particular, our findings support the urgent need to move beyond a solely individual-level HIV-prevention approach, such as condom distribution, to structural-environmental HIV prevention that facilitates female sex workers' ability to negotiate their risk environment in safer sex-work settings and more actively criminalizes abuse and harassment by clients and third parties. ■

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Contributors

K. Shannon conceptualized and drafted the original article, integrated the coauthors' comments, and responded to the reviewer concerns. S. A. Strathdee, J. Shoveller, M. Rusch, T. Kerr, and M. W. Tyndall contributed to the writing and revision of the article. M. Rusch provided support with the Geographic Information System mapping analyses.

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Violence, Condom Negotiation, and HIV/STI Risk Among Sex Workers

Kate Shannon, PhD

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IN MOST PARTS OF THE WORLD, SOME OR ALL ASPECTS OF sex work are criminalized. Consequently, sex workers have few legal protections and may easily be exploited or abused by clients, coworkers, and law enforcement officials. The isolation and disempowerment of sex workers, enforced by the threat of violence, may create barriers to negotiating safe sex practices, thereby increasing the risk for human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs). Violence against sex workers by exploitive clients, police, or managers (including pimps) is enabled by a lack of legal protection for sex workers' rights in areas where sex work is criminalized. Understanding the link between violence against sex workers and condom use can be a key to understanding why some sex worker populations are particularly vulnerable to elevated rates of HIV/STI infection compared with the general population, a reality documented in both concentrated and generalized HIV epidemics.¹

Violence against sex workers is related to cultural and religious taboos associated with female sexuality and the sale of sex. Throughout the world, these cultural taboos have become institutionalized by defining sex work as criminal behavior, with enforcement of sanctions directed more often against sex workers than their clients.² Violence against sex workers is mediated by social, legal, law enforcement, and workplace factors, which vary across and within regions. For example, in North America, Central and Eastern Europe, and Central Asia, criminal laws prohibit communicating (ie, solicitation) for prostitution in public spaces and operating brothels.

Criminalization of this kind gives police broad latitude to arrest and threaten arrest of sex workers, which may cause street-based sex workers to move from town centers to more isolated spaces such as rural highways or industrial settings where arrest is less likely or there is some level of informal tolerance of sex work.^{2,3} The isolation of these settings, however, can enable violence with impunity as witnesses and places to flee violence are few. For sex workers who work in brothels or other indoor establishments, clients often negotiate the sexual services and fees directly with the management, and sex workers receive an hourly

rate with little to no control over selection of clients or negotiation of types of services. This lack of control may also increase the risk of episodes of violence. Where sex work is criminalized, sex workers may have to pay a fee or bribe to police or managers for some measure of protection from violence or arrest.

Population-based data on incidence of violence against sex workers remain scarce. Two studies of countries in Central and South Asia and Europe and North America have estimated a prevalence of physical and sexual violence of between 40% and 70% among sex workers over a 1-year period.^{4,5} Particularly where sex work is criminalized and police are not motivated to protect sex workers, violence and threats of violence can be ubiquitous in the daily life of a sex worker and may include verbal harassment and abuse, physical assault, forced confinement, violence with a weapon, and rape.

In addition to violence by exploitive clients, police, and managers, perpetrators of violence against sex workers can also include partners, illicit drug dealers, and exploitive business owners. Violence or the threat of violence may be used to coerce unprotected, unpaid, or risky sexual services (eg, anal sex); or to extort money or fees by exploitive managers or sex business owners. Incidents of violence by police are reportedly common in some settings, including excessive use of force, harassment, unlawful and invasive body searches, fines and detainment without arrest or formal charges, beatings, rape, and coerced sex for bribes.^{2,5,6} In a 2009 survey of sex workers in Central and Eastern Europe and Central Asia, 42% reported physical abuse by police, and 37% reported having been assaulted sexually by police, with the highest rates in Macedonia, Ukraine, and Kyrgyzstan.⁴

Although the link between intimate partner violence and condom negotiation has been well established in the general population, data on violence and condom negotiation in sex work has only begun to emerge. These data suggest that when violence against sex workers is pervasive and largely unaddressed, sex workers are forced to prioritize the

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immediate threat or fear of violence over attempts to insist on condom use with clients.⁶⁻⁸

Threats and intimidation by police are associated with fear of future violence and barriers to reporting subsequent violent episodes to authorities. In addition, police often use possession of condoms as grounds for arrest,^{4,6} a practice that undermines sex workers' ability to possess and carry condoms, and adds to their fear of police violence. In a prospective cohort study in Canada, "hotspots" or greater clustering of coercive sex in sex work transactions were found in isolated public spaces compared with main streets near services and stores.⁷ In this study, prior police violence—both physical violence and sexual coercion—was the strongest independent correlate of subsequent client-perpetrated violence and rape, irrespective of individual and interpersonal risk factors or other features of the work environment.⁴

Reducing the threat of violence can facilitate condom use and thus reduce HIV/STI transmission risk in the sex industry. Eliminating law enforcement practices that inhibit condom use (such as using condom possession as grounds for arrest) and protecting sex workers from violence are critical for the prevention of HIV/STI acquisition and transmission. Law enforcement should not entail displacing sex workers to isolated environments away from prevention resources. Some evidence suggests that removing legal restrictions on sex workers' ability to self-organize into collectives (ie, self-run networks) or work in cooperative indoor spaces (ie, self-managed) may make sex work safer with respect to violence prevention and condom promotion.

A systematic review of HIV prevention programs for sex workers in developing countries,¹ including randomized controlled trials and quasi-experimental designs, suggests greater efficacy of multipronged approaches that include policy support for condom use and organization of sex worker collectives. The model of sex worker collectivism exemplified by the Sonagachi Project in Kolkata, India, highlights the role of combining sex work self-organization (including the ability to form networks and have a voice in development of safe industry practices) with removal of environmental barriers to accessing resources in achieving increased condom use. The Sonagachi Project reports results of 3- to 5-fold reductions in prevalence of STIs and a low HIV prevalence compared with that in neighboring communities.⁹ Furthermore, a preintervention/postintervention study in the Dominican Republic suggests that positive workplace sexual health policies in brothels, including supportive management practices and access to condoms, is associated with

increased condom negotiation in sex work transactions, with improved effectiveness when combined with government support for 100% condom use policies.¹⁰ However, government-sponsored 100% condom use policies alone have been shown to be counterproductive,² as in Thailand and Cambodia, by inadvertently pushing more marginalized sex workers underground through police raids, surveillance, and mandatory testing, re-creating barriers to violence prevention and condom negotiation.

Research to date reveals a clear association between violence and condom negotiation among sex workers and thus risk of HIV and STI transmission, mediated by presence of restrictive laws, police practices, and features of the work environment. Without effective reduction of violence and the threat of violence against sex workers, HIV/STI prevention programs aimed at promoting safer sex in the sex industry are likely to be hampered. Public health interventions should promote and evaluate multipronged approaches that ensure removal of criminal sanctions inhibiting condom use, provide effective prevention of violence, and promote policy support and sex worker-run organizations to reduce risk for HIV and STI transmission.

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The hypocrisy of Canada's prostitution legislation

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Often described as the world's oldest profession, the exchange of sex for money has always existed and will continue to exist worldwide. For many, the sex industry evokes a sense of moral unease, and divides feminists and society alike on whether it is an oppression and commodification of women, or a woman's right and choice to sell her body. Canada's federal legislation reflects this divide: The buying and selling of sex among consensual adults has always been legal, yet criminal code provisions on communicating, procuring, bawdy houses and living off the avails of prostitution make it virtually impossible to work legally in safer indoor settings.

Against this backdrop, the numbers of missing and murdered women continue to swell in Canadian cities and street-involved women engaged in sex work experience some of the worst health outcomes in our society, including drug-related harms, trauma, and HIV and other sexually transmitted infections.¹⁻⁴ Standardized mortality rates among female street-based sex workers are higher than any other population of women in North America, with homicide being the most common cause of death.

Sadly, there are multiple examples of convictions of serial murderers of sex workers over the last decade in North America and the United Kingdom, and ongoing concerns remain of potential serial murderers in Edmonton, Winnipeg and along the "Highway of Tears" in Northern British Columbia. The recent convictions for the gruesome homicides of women on the streets of Vancouver and Seattle — the largest serial murders in Canadian and American history — should be a vivid and chilling reminder.

Importantly, growing peer-reviewed research published in some of the top medical journals now suggest that enforcement of criminal sanctions targeting sex work, including communicating in public spaces, displaces sex workers to isolated alleys and industrial settings

away from health and support services.¹⁻⁴ Enforced displacement and lack of access to safer indoor work environments independently increase sex workers' risk of physical violence and rape, and reduces their ability to safely negotiate condom use with clients,^{1,2} thereby protecting themselves from sexually transmitted infections and unwanted pregnancies. Qualitative evidence further describes how criminal sanctions limiting sex workers' ability to regulate safer industry practices (e.g., create unions, safer indoor work spaces, etc.) compound health-related risks.³



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Globally, evidence-based public health research is being used in calls to remove criminal sanctions targeting sex work; one such call even came from the United Nations Secretary-General Ban Ki-moon. Yet in Canada this public health policy gap has been met with scaled up enforcement-based efforts targeting sex workers and their clients. According to the Canadian Centre for Justice Statistics,⁵ following the enactment of the 1985 'communicating code' legislation designed to remove the visible presence of sex work, annual prostitution arrests increased nearly 10-fold from 1255 arrests in 1985 to 10 457 arrests in 1987. These rates have remained constant at about 10 000 arrests per year, with 97% occurring in Vancouver, Toronto and Montréal.

Despite three separate parliamentary sub-committees on prostitution since the mid 1980s, sex workers and human

rights experts are now being forced to challenge the criminal sanctions through the courts, as a violation of the Charter of Rights and Freedom.

Now, as we wait for the Ontario Supreme Court decision on one challenge, the federal government has taken another backward step, this time by reclassifying the Criminal Code on "keeping a bawdy house" (a place kept for the purpose prostitution) making it a serious crime with a maximum sentence of five years imprisonment.⁶ This new Criminal Code regulation, introduced without Parliamentary debate, is in blatant disregard of the evidence and has the concerning risk of pushing sex workers further underground and outside the public health umbrella. In perhaps the saddest reflection of this public health policy gap, in 2008 sex workers in Edmonton began giving samples of their DNA to a community agency and RCMP network to ensure their bodies would be identified in case of future harm.

While rigorous evaluation of legal policy approaches to sex work remains critical, it is also time for government and policy makers to take into account the evidence of the failures of the criminalized approach to sex work on health and human rights in Canadian society.

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