

INVESTIGATING THE ROLE OF STRUCTURAL DETERMINANTS IN SHAPING SEX
WORKERS' REPRODUCTIVE HEALTH ACCESS AND OUTCOMES

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES
(Health Care and Epidemiology)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

October 2014

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Abstract

Background and objectives: While sex workers are disproportionately impacted by reproductive health inequities, a significant knowledge gap regarding the contextual drivers of sex workers' broader reproductive health access and outcomes remains. This dissertation therefore sought to disentangle the role of multiple, and intersecting structural factors on sex workers' ability to exercise their reproductive rights. Specifically, this dissertation's objectives were to: explore the structural correlates of sex workers' pregnancy intentions; investigate the influences of community organization and venue-based features on indoor sex workers' ability to negotiate and use contraceptives; and examine the structural correlates of accessing cervical screening.

Methods: This dissertation drew on data collected from AESHA (An Evaluation of Sex Workers' Health Access), an open prospective cohort of street- and off-street sex workers across Metro Vancouver, Canada. Bivariable and multivariable regression methods, using generalized estimating equations for longitudinal data, were employed to examine the associations between intersecting structural, community organization, venue-based, interpersonal and individual-level factors and various reproductive health access and outcomes. Spatial analysis using geographical information systems (GIS) were used to examine geographical correlates of reproductive health services access.

Results: This dissertation found that sex workers exhibited pregnancy desires similar to that of the general population, with access to off-street venues, inconsistent condom use by clients and intimate partner violence among the important factors shaping these desires. The availability of supportive indoor work features and increased social cohesion increased sex workers' ability to negotiate for and use condoms. Finally, this dissertation documented suboptimal cervical cancer screening access among HIV seropositive and sero-negative sex workers. While barriers to health care services in general reduced odds of cervical cancer screening, access to screening via outreach models increased odds of screening.

Conclusion: Structural factors play a pivotal role in shaping access to reproductive health services and sex workers' negotiation of their sexual and reproductive health. Given the Canadian government is in the process of revising its sex work legislation, this study offers critical insights into how structural interventions including safer workplace models, sex worker-led integrated HIV/sexual and reproductive health services within a decriminalized legal framework can promote positive sexual and reproductive health.

Preface

This statement certifies that the work presented in this dissertation was conceived, conducted, written and disseminated by Putu Duff (PD). All research described in this dissertation was conducted under the University of British Columbia/ Providence Health Care Research Ethics Board approval (H0902803). The co-authors of the manuscripts, including Dr. Kate Shannon (KS), Dr. Jean Shoveller (JS), Dr. Gina Ogilvie (GO), Dr. Julio Montaner (JM), Dr. Cindy Feng (CF), Sabina Dobrer (SD), Jill Chettiar (JC), Dr. Paul Nguyen (PN), Ofer Amram (OA) made contributions only as is commensurate with committee, collegial, or co-author duties. The principal investigator of the larger research program from which the studies in this dissertation were derived (the AESHA project) was KS; therefore she had access to all of the data and as a collaborating author takes full responsibility for the integrity of the results and accuracy of the data. With substantive input from co-supervisors KS, JS and committee member GO, PD designed the studies and wrote research protocols. With the guidance from KS, SD, PN, CF and OA, PD performed the research and conducted all statistical analyses described in Chapters 3 and 4. The statistical analyses in Chapter 2 was conducted by PD in collaboration with CF. KS, JS, CF, GO and provided scientific input and approved the final version of the manuscript presented in Chapter 2. KS, JS, GO, JM, JC, SD, KS provided scientific input and approved the final version of the manuscript presented in Chapter 3, and KS, GO, JS, OA, JC, PN and JM provided scientific input and guidance and approved the final version of the manuscript presented in Chapter 4. All manuscripts contained in this thesis were prepared, written and edited by PD. Final drafts of the manuscript were prepared following the inclusion of material

based on comments from all co-authors listed above, the journal editors and external peer reviewers.

The analysis presented in Chapter 2 has been accepted for publication. The analyses presented in Chapters 3-4 are currently under review:

Chapter 2

Putu Duff, Jean Shoveller, Cindy Feng, Gina Ogilvie, Julio Montaner, Kate Shannon. Pregnancy Intentions Among Sex Workers: Recognizing the Rights and Wants of Sex Workers as Mothers. *Journal of Family Planning and Reproductive Health Care. (Published in the Journal of Family Planning and Reproductive Health Care)*

Chapter 3

Putu Duff, Jean Shoveller, Gina Ogilvie, Julio Montaner, Jill Chettiar, Sabina Dobrer, Kate Shannon. The Impact of Social, Policy and Physical Venue Features and Social Cohesion on Negotiation of Barrier Contraceptives Among Sex Workers: A Safer Indoor Work Environment Scale. *(Accepted for Publication).*

Chapter 4

Putu Duff, Gina Ogilvie, Jean Shoveller, Ofer Amram, Jill Chettiar, Paul Nguyen, Julio Montaner, Kate Shannon. Barriers to Cervical Screening Among Sex Workers in Vancouver: The Importance of Social and Structural Factors in Shaping Access to Reproductive Health Services. *(Under Review).*

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Acknowledgments

My enduring gratitude goes to Dr. Kate Shannon, who, from the beginning, has provided excellent direction and support, both in my academic and career pursuits. My co-supervisor, Dr. Jean Shoveller, whose exceptional mentorship, generosity and kindness never ceases to amaze me. Many thanks to my committee member, Dr. Gina Ogilvie, for always encouraging me to take a step back and understand how my research fits into the bigger picture. I am grateful for this dream team of a committee for preparing me well for a career as an independent investigator.

My sincerest thanks to AESHA participants, who generously shared their time and expertise as part of the AESHA study. Without you, this work would not have been possible. I would also like to thank the AESHA interviewers, outreach team and nurses, particularly Jill Chettiar for her insight and invaluable advice. I am also grateful for the advice and tremendous support I received from the Gender and Sexual Health Initiative (GSHI) staff at the BC Centre for Excellence in HIV/AIDS (BCCfE), particularly Sabina Dobrer, Peter Vann, Dr. Cindy Feng, Ofer Amram, Dr. Paul Nguyen, Dr. Shira Goldenberg, Dr. Tara Lyons, Gina Willis, Sarah Allan, as well as the study co-investigators and my co-authors.

I'd like to thank my thesis committee, Dr. Ruth Elwood Martin, Dr. Sam Sheps, Dr. James Ponzetti and my external examiner Dr. Stefan Baral for their meticulous review, thoughtful questions and unique contributions that have strengthened this thesis and associated manuscripts. I would also like to acknowledge the peer-reviewers whose comments significantly improved the quality of my published work.

To my friends and colleagues at SPPH and GSHI: your guidance and friendship have been invaluable. To Katie Muldoon, thanks for the laughter, support and encouragement; your friendship has truly enriched my life. My profound thanks to Dr. Kathleen Deering, for contributing immensely to my growth as a researcher, and acting as my mentor and friend throughout this whole process. A special thanks to Andrea Krusi, for your friendship, astute observations and unique insights that helped me better understand my data. I'd also like to shout-out to my SPPH peeps: Basia Pakula, Allison Watts, Saskia Sivananthan, Ruth Lavergne, Alexis Crabtree, Stephen Pan, Brenda Sawatzky-Girling, Gareth Mercer, Katie Muldoon, Chelsea Himsworth and Bonnie McCoy. I am grateful to have had such a great group of people to learn and grow together with- we are a formidable team!

Support for this dissertation was generously provided by: the Population Health Interventions Research Network (PHIRNET), an initiative of Canadian Institutes for Health Research (CIHR); the Liu Institute for Global Studies; and the University of British Columbia. AESHA receives funding from CIHR and the National Institute of Health. Additionally, I'd like to thank the GSHI of the BCCFE for salary support provided throughout my PhD studies.

Last but not least, I would like to express my sincerest and heartfelt thanks to my family. To Mom and Dad you have been a constant source of love. Thank you for always being there for me as an endless source of wisdom and guidance. Thank you for believing in me and supporting me

in whatever it is I choose to do. I am fortunate to have such wonderful parents. To Cindy and Jack, thank you for your encouragement, support and humour. Terima kasih banyak! To Dean, thank you for your unwavering love, support and encouragement- you've been my rock throughout this endeavor, and for that I will be forever grateful.

Dedication

*To my parents,
Komang and John Duff*

Chapter 1: Introduction

1.1 Reproductive justice and sex work

Women's reproductive health and reproductive rights have steadily been gaining attention since the 1994 International Conference on Population and Development (ICPD), a landmark meeting where 'reproductive rights' were brought to forefront of the global agenda (1). The ICPD conference marked a critical shift, from viewing reproductive health exclusively through a population control lens; subsequent to the ICPD conference, reproductive health emerged on the global agenda as an important human rights issue (2), with the notion of reproductive justice becoming firmly situated in future discourse surrounding reproduction and reproductive health. In 1995, the United Nations World Conference on Women in Beijing reconfirmed women's reproductive health as an international priority, highlighting reproductive rights as among the human rights critical to achieving the complete empowerment of all women (3).

The reproductive rights agenda has advanced significantly since the 1994 ICPD conference (4) to more fully encompass a 'reproductive justice framework' that integrates elements of social justice and reproductive rights to acknowledge the wide range of intersecting oppressions that constrain or enable women's ability to fulfill their reproductive rights (4,5). The framework acknowledges numerous structural barriers, sometimes referred to as "oppressions" that shape women's reproductive health, including poverty, stigma, discriminatory laws, race and gender. Furthermore, this framework defines reproductive health more broadly and posits that all women and girls have the right to: a safe pregnancy (e.g., access to perinatal services and reproductive technologies); prevent pregnancy and control birth spacing of children (e.g., access to family

planning and full range of modern contraceptives); access comprehensive reproductive health services (e.g., STI testing, pap testing); and, safely parent their children (e.g., access to child care, affordable housing) (5).

There also has been renewed international commitment to reproductive health and family planning, with reproductive rights at the core of many of these initiatives. For example, the Millennium Development Goal (MDG) aims to ensure access to universal reproductive health by 2015, (2), including MDG Goals #3 and #5 which together aim to increase women's empowerment and equity, meet targets of increasing contraceptive usage, reducing the adolescent birth rate, increasing antenatal care coverage, and addressing unmet needs for family planning, particularly among marginalized populations (6,7).

1.2 Sex work and reproductive health

1.2.1 Sex workers' right to pregnancy and pregnancy prevention

Despite over two decades of international commitment to supporting women's ability to exercise their reproductive rights, significant reproductive health inequities remain, particularly among marginalized populations. A small, but growing body of evidence suggests sex workers are disproportionately impacted by reproductive health inequities (1–5). A number of emerging studies of sex workers primarily from low and middle income (LMIC) settings have shown high levels of unintended pregnancies and abortions. For example, 86% of sex workers in Kenya and 58% in Colombia reported at least one induced abortion (6,7). Studies from Colombia found lifetime abortion prevalence of 25.5% and 25.1% among sex workers attending mobile and government services, respectively(8). In Uzbekistan, approximately one-fourth (24.3%) of sex

workers reported three or more abortions in their lifetime (9). A growing number of studies have revealed unintended pregnancies often occur alongside low use of modern contraceptives. In Karnataka, India, 20.1% of sex workers reported a previous abortion, and very few had used modern contraceptives (e.g., only 0.3% and 0.5% using intrauterine devices and hormonal contraceptives, respectively) (5). Similar patterns have been observed elsewhere, such as in Russia, where Decker and colleagues found that only 12% of female sex workers used modern contraceptives (3). In Vancouver, a study among street-based sex workers documented a high rate of unwanted pregnancies (43% reported a previous abortion) and low use of modern contraceptives among street-based female sex workers (10).

1.2.2 Sex workers and reproductive rights- pregnancy intentions and parenting

While pregnancy rates and to a lesser extent, contraceptive usage for STI prevention are increasingly being documented among sex workers (3,21), few studies have looked beyond the use of condoms for HIV prevention among sex workers; leaving an information gap regarding sex workers' needs, preferences and use of other forms of modern contraception (21). There is some work described in the peer-review literature that focuses on avoiding pregnancy (e.g., unintended or unwanted pregnancy) (11). However, there are very few reports in the literature that quantitatively examine sex workers' experiences as mothers, or their intentions or desires to become pregnant or to engage in parenting. Unlike women in the general population, the pregnancy needs and desires are complex, and may hinge on the type of sexual partner (e.g., intimate partner, regular or one-time clients) and relationships they find themselves in(12). Specific attention and programming need to consider the complex reproductive health decisions and barriers faced by sex workers. Furthermore, most existing studies frame motherhood as a

risk factor for HIV transmission, rather than examining the barriers and challenges faced by sex workers in the context of criminalization and stigma, including within the health care system. For example, quantitative evidence from Andhra Pradesh, India, found that sex workers with more children had higher odds of engaging in unsafe sex, and were more likely to accept clients' offers to pay more for sex without a condom (13). Sex workers who reported child health concerns among their children also had higher odds of an STI in the past 6 months(13). Similar findings are echoed in qualitative work in Kolkata that documented that parenting sex workers' dual roles have also been found to influence HIV risk; while sex workers in Kolkata strived to 'stay clean' for their children, the immediate need to earn money sometimes compromised sex workers' ability to negotiate for safe sex(14). The lack of evidence on sex workers' need and wants as parents is an important knowledge gap, in light of emerging qualitative research that sheds light on the complex interrelatedness between parenting and sex work. For example, qualitative studies suggest parenting may play an important role in sex work entry and risk behaviors(13,15). Qualitative research from Mexico found that 40% of women interviewed were single mothers whose primary motivation for sex work entry was to support their children and family members to pay for their children's education(15). Similar narratives emerged from qualitative interviews with Indian sex workers, who highly valued their roles as mothers and viewed sex work as a way to sustain their family's livelihood(14). While sex work often represents a viable way to financially support ones' family, a number of qualitative studies suggest this work may also present challenges. Stigma-related stress, was a common theme reported among sex workers in India and the United States (14,16). In Vancouver, a large proportion (36.5%) of sex workers report having their child(ren) apprehended by the State (e.g., child welfare authorities), with apprehension levels significantly higher among sex workers of

Aboriginal ancestry(17), indicating that many structural and social changes are required to better support sex workers in their right to safely parent their children. Together, these studies begin to highlight the importance of examining the broader reproductive health needs of sex workers, including the role of pregnancy and motherhood in shaping sex work patterns and health.

1.2.3 Sex workers' right to access reproductive health services

In the context of HIV prevention, sex workers' access to HIV/STI services have been well documented in the literature (18). However, research on sex workers' access to other essential reproductive health services has lagged behind (5,19). This includes a lack of research on sex workers' access and utilization of: antenatal and postnatal care; family planning services; fertility services; and routine care such as breast cancer and cervical cancer screening (20). To date, only one study has been identified that examined access to health care services during pregnancy, though this study was focused on antenatal HIV testing specifically (5). Additionally, to my knowledge, despite a high burden of HPV among sex workers, only one study has examined Papanicolaou (pap) testing among this population (21).

1.3 Theoretical orientation

The conceptual framework used in this dissertation (see Figure 1.1) is an adaptation of a *Structural Determinants* for sex work and HIV (22), with key contributions from the *Reproductive Justice* Framework, a perspective that merges the principles of both social justice with reproductive rights (23). The aim of adapting these complementary theoretical approaches is to provide a comprehensive understanding of the intersecting and dynamic environments that enable or constrain sex workers' ability to exercise their reproductive rights.

1.3.1 Overview of the reproductive justice framework

The *Reproductive Justice* movement was born in the late 1980's with roots in the reproductive rights movement that focused almost exclusively on women's 'reproductive choice' for pregnancy prevention, particularly the right to access abortion services and contraception (24). While the reproductive rights movement has made important strides in advancing women's 'reproductive choice', this view has been critiqued as largely reflecting a position of privilege and overlooking numerous social, political and economic oppressions that constrain many women's ability to choose (25). Additionally, 'reproductive choice' was largely interpreted as women's choice to have a safe and legal abortion, which proponents of the *Reproductive Justice* framework argue represents but one of the many reproductive rights that women should be afforded (26). The *Reproductive Justice* framework expands the reproductive rights focus, advocating for women's right to pregnancy prevention (e.g., contraceptive usage, abortion), safe pregnancy (e.g., access to fertility treatment and reproductive health services), and the right to parent with dignity (27). The *Reproductive Justice* framework also emphasizes the importance of multiple and overlapping structural factors or 'oppressions', such as gender, poverty, social class, interpersonal violence, stigma, workers rights and women's individual-level characteristics such as age and ethnicity in shaping reproductive choice (28). The notion that women and girls have the right to supportive structural environments, also known as 'enabling environments', is central to the *Reproductive Justice* framework. Adopting this perspective, it is therefore important that reproductive health research and interventions move beyond individualistic approaches and adopt a wider perspective that considers and addresses the overlapping physical, social economic

and policy structural environments and their interactions with individual factors that shape girls' and women's reproductive health (8).

1.3.2 A structural determinants framework

A *Structural Determinants Framework* (22) for sex work and HIV is strongly aligned with the guiding principles of the *Reproductive Justice* framework. A *Structural Determinants Framework* draws on a number of earlier socio-ecological approaches, both theoretical influences and conceptual frameworks, in an effort to better disentangle the dynamic and intersecting influences of structural determinants (e.g. external factors outside the locus of control of individuals that mitigate or potentiate risks), alongside interpersonal (e.g. partner/dyad factors) and individual behavioural and biological factors shaping health risks (22). A number of key contributions of a *Structural Determinants Framework* for sex work and HIV provide critical conceptual groundwork to guide this thesis and conceptual work on reproductive health in the context of sex work: 1) integration of the theory of gender, and power (29), largely ignored in much of the research to date on both HIV and sex work; 2) moving beyond linear and binary perspectives of traditional epidemiology to disentangle more complex, non-linear, dynamic and iterative pathways between social and biological processes (30) (e.g. drawing on key theorists such as Diez Roux, Blanchard, Aral) (30–32). For example, much previous work has examined condom use as an individual-level behaviour, ignoring the influential gendered power dynamics, such as condom negotiation and potential violence resulting from refusing unprotected sex with a client, often encountered by sex workers (33,34). Additionally, the shift away from traditional linear cause-and-effect approach allows for a better understanding of the multi-level factors that influence sex workers' reproductive health (both risks and protective). Finally, a *Structural*

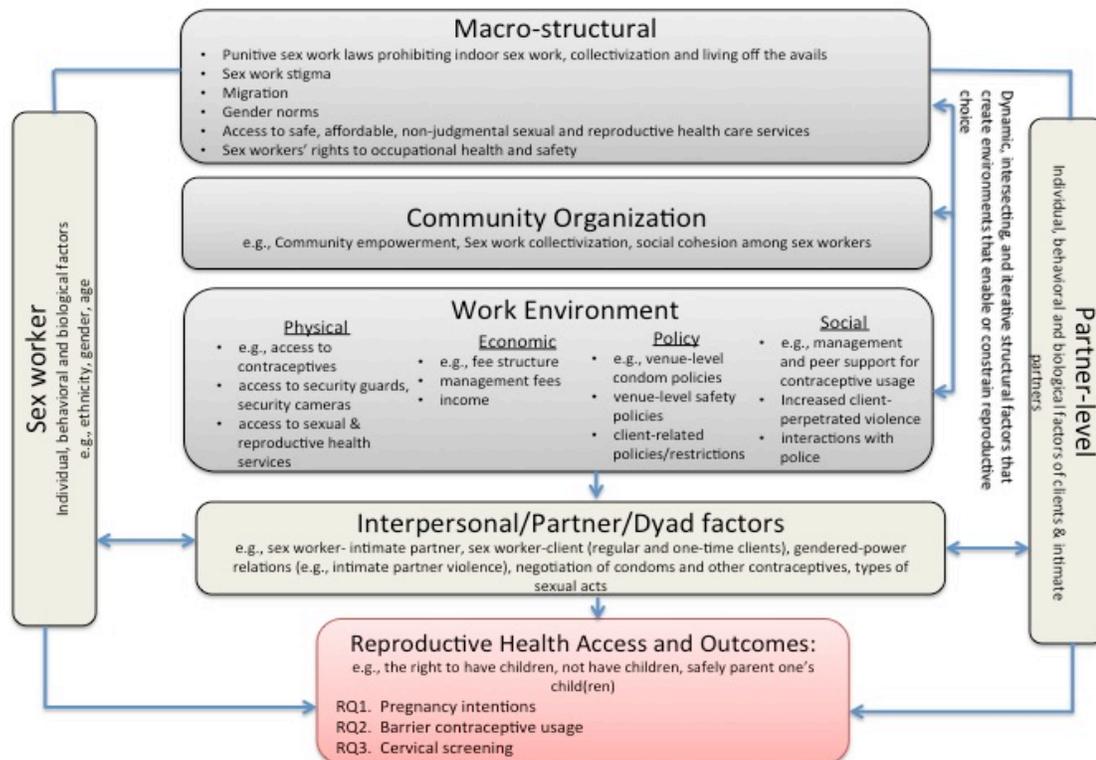
Determinants Framework moves beyond the traditional risk-factor approach and acknowledges the potential role of structural determinants (e.g., community organization, sex work venues) as enabling factors to promote positive sexual and reproductive health outcomes among sex workers.

1.3.3 A conceptual model for reproductive health & sex work

Drawing on these two theoretical contributions, this thesis is guided by a conceptual model (Fig 1.1) that maps the known and hypothesized pathways by which intersecting structural influences in each domain (e.g., macro-structural, community organization and work environment) intersect with interpersonal (e.g., partner-level factors) and individual behavioural and biological factors to shape reproductive health outcomes for sex workers. Macro-structural factors, often termed ‘oppressions’ within the *Reproductive Justice* framework, are more upstream influences such as sex work laws and policies, geography, and access to appropriate health services, gender and race. To date, few studies have examined the impact of more distal macro-factors or their intersections with other levels in shaping sex workers’ reproductive health outcomes. These macro-structural factors act iteratively with community organization (e.g., social cohesion among sex workers) and intersect with the physical, social, economic and policy features of the work environment (e.g. venue policies, managerial practices, policing). Community organization is considered a crucial element of the *Reproductive Justice* framework, particularly as a means to empower women to gain control over their reproductive health. However, given the role of community empowerment on reproductive health among sex workers is not well understood, exploration into the impact of social cohesion among sex workers (a component of community organization) on sex workers’ negotiation of their reproductive health is warranted. Community

organization factors intersect with more upstream macro-level structural determinants (e.g., sex work laws, stigma), the work environment features they engender (e.g., police enforcement, venue-level features, client violence) as well as more proximal, interpersonal risk or protective factors (e.g., intimate partner violence or condom negotiation), individual behaviour (e.g., drug use, duration of sex work) and biological factors (e.g., age, STI co-infection) of sex workers, clients, and their intimate or non-paying partners. The framework also aims to better map the intersecting features of the work environment, including the physical features (e.g., venue-type, physical access to reproductive health services, HIV/STI testing, contraceptives, harm reduction supplies), social features (e.g., managerial- and peer-support for harm reduction and HIV prevention, client violence), policy features (e.g., workplace policies surrounding condoms or violence) and economic features (e.g., payment schemes, sex-work income) (27). The macro-structural, community organization and work environment factors intersect and dynamically interact to create ‘enabling environments’ or ‘intersecting oppressions’ (5), which support or constrain sex workers’ ability to exercise their reproductive rights. Based on key gaps in the literature on reproductive health and sex work, this thesis and conceptual model sets out to disentangle the intersecting pathways of key macro-structural-, community-, workplace-, interpersonal- and individual-level factors. Finally, consistent with both a *Structural Determinants Framework* and the *Reproductive Justice* framework, the conceptual model used in this dissertation moves beyond the traditional risk-factor approach, and acknowledges the potential of structural factors (e.g., sex work organization, work environment) as enabling environments to promote positive reproductive health among sex workers.

Figure 1.1 Conceptual framework for investigating the structural determinants of sex workers' reproductive health access and outcomes



Conceptual Framework for RQ 1,2,3. Adapted from: The Reproductive Justice Framework, Structural Determinants of HIV Framework

1.4 Literature review of the structural determinants of sex workers' sexual and reproductive health

1.4.1 Individual factors and sex workers' sexual and reproductive health

Given the high levels of HIV and STIs among sex workers globally, existing studies on sex workers' reproductive health have been within the context of HIV prevention, with few examining the broader reproductive health of sex workers (2), such as pregnancy prevention, childbearing, parenting and access to broader reproductive health services. The majority of quantitative studies related to sex workers' reproductive health have been purely cross-sectional, descriptive (e.g., reporting frequencies and proportions), detailing levels of pregnancy, abortion, contraceptive usage among sex workers, often in the context of HIV prevention (6,9,12,35,36). Additionally, akin to traditional HIV research, the majority of empirical studies examining sex workers' reproductive health have placed emphasis on biological and behavioural factors. For example, Bautista and colleagues' study identified associations between younger age and drug use and inconsistent condom use on sex workers' abortion rates (37). Similarly, Feldblum et al.'s study among sex workers in Madagascar focused on individual-level sexual behaviors, and found that non-use of effective contraceptives and inconsistent condom use were associated with higher incidence of pregnancy (38).

While cross-sectional, descriptive studies shed light on the high burden of negative reproductive health outcomes among sex workers, they do not account for the numerous and overlapping structural factors that constrain or enable choice, or the dynamic interaction between them – de facto rendering these important considerations invisible within the broader research discourse. Over the past decade, there has been increasing agreement on the importance of structural factors

in shaping sex workers' health outcomes, resulting in a call for a shift in focus towards structural-level interventions to improve female sex workers' health (22,39–41). Despite substantial evidence demonstrating the success of existing structural interventions (e.g., community empowerment programmes, workplace-level interventions) targeting HIV and STIs among female sex workers in Low and Middle Income Countries (LMIC) (40,42,43), little is known about how such interventions impact female sex workers' ability to exercise their reproductive rights, particularly in a North American setting.

Furthermore, the majority of these studies have adopted a 'risk factor' approach, overlooking protective 'enabling environments' or structural interventions (22) that are central to the *Reproductive Justice* framework and a *Structural Determinants Framework*. Risk-factor approaches fail to account for contextual factors that drive risk patterns (44), and tend to reinforce conventions that rely on individual-level interventions – which have in general failed to reduce reproductive health inequities at the population level (45). Emerging qualitative and ethnographic studies (46,47), as well as a handful of quantitative studies from LMICs (43,48,49), underscore a critical need to investigate their impacts on sex workers' broader reproductive health.

1.4.2 Macro-level factors and sex workers' sexual and reproductive health

1.4.2.1 The socio-legal context of sex work in Vancouver

Some of the first accounts of sex work in Vancouver emerge from descriptions situated in the late 19th century. In the 1870's, Vancouver had a flourishing brothel-style red light district on Dupont Street, where Chinatown is now located (50). The sex work landscape shifted over time,

in response to changes to the urban landscape, newly introduced legislation, and societal perceptions surrounding sex work. In 1975, the ‘bawdy house’ laws criminalizing indoor sex work resulted in a decentralized outdoor model of sex work, dramatically increasing the presence of street-based sex work. The tightened enforcement on sex work laws continued into the 1980’s, increased the presence of street-based sex workers and their displacement into Vancouver’s Downtown Eastside (DTES), accompanied by a wave of violence against sex workers (50). The continued violence against sex workers led to the 2002 ‘Missing Women’s Investigation’ into the disappearances and murders of roughly 60 women, primarily Aboriginal sex workers from the Downtown Eastside (51,52).

The Missing Women’s Inquiry into the murders and disappearances of women from Vancouver’s Downtown Eastside (many of whom were sex workers) highlighted the failure of current sex work laws in protecting marginalized women engaged in sex work. During the period of the current study, sex workers in Vancouver operated within a political context of prohibitive sex work laws and policies. Though the buying and selling of sex itself is legal, the Criminal Code of Canada prohibited the operation of a ‘bawdy house’, ‘living off the avails’, and the ‘communication’ for the purposes of selling sex. These provisions have been shown to prevent sex workers from working indoors, working collectively, and/or having management/staff and soliciting clients in most locations.

1.4.2.1.1 The changing legal landscape of sex work in Canada

In December 2013, a landmark decision was made by the Supreme Court of Canada to strike down all the harmful criminal code provisions brought forward in the Bedford vs. Canada Case.

Specifically, sex workers Terri Jean Bedford, Amy Lebovitch and Valerie Scott challenged the Bawdy house law (section 210), the living off the avails law (section 212), and the communicating in a public place for the purposes of prostitution (section 213) law, on the grounds that they contradict sex workers' rights to liberty and security of the person (section 7), and freedom of expression (section 2b) as outlined in the *Canadian Charter of Rights and Freedoms* (53). In June 2014, the Canadian government tabled new legislation, known as the 'Protection of Communities and Exploited Persons Act' (Bill C-36), which are expected to reproduce harms seen in the previous legislation (54,55), by modifying previous unconstitutional laws and adding new, potentially harmful ones. The new 'Commodification of Sexual Activity' section includes provisions that criminalizes: the communicating for or purchase of sexual services; 'advertising sexual services' (provision 286.4), which impairs women's ability to effectively work in indoor settings; and 'material benefit from sexual services' (provision 286.2), which will may prevent sex workers from working with managers who often provide sex workers with protection from violent clients (52). The proposed legislation also introduces the 'Stopping or impeding traffic and communicating to offer or provide sexual services for consideration' provision, a slightly narrower version of the previous 'Communication' law, which criminalizes soliciting clients anywhere where a person under the age of 18 is "reasonably expected to be present". Though these laws have been tabled, there remains an opportunity to modify the existing legislation to better protect sex workers' human rights, including through informing Parliamentary and Senate debates and the legal implementation of structural interventions to improve sex workers' health and safety.

1.4.2.2 Macro-level factors: mobility and migration

Mobility and migration are also strongly shaped by macro-level laws and have been shown to profoundly influence sex workers' ability to negotiate for their health and safety, and has been linked to increased sexual risk and violence among migrant female sex workers in the UK (56) and India (57–59). The mechanism by which migration and mobility shape health risk have been described as a product of dynamic interactions between multiple factors, including sex work and immigration laws, poverty, stigma, community organization and individual-level factors. For example, sex workers' immigration status (e.g., fear of arrest or deportation) (56), limited English proficiency, gender norms, gender-based violence, and poverty have been found to intersect to reduce women's ability to negotiate and use condoms in the context of sex work, in both the Vancouver and UK settings (60). Similarly, a qualitative study among female sex workers in Moscow found that migrant workers had elevated HIV risk, driven by an intersection of gender power dynamics (e.g., fear of violence, intimidation by male clients), financial need and a lack of access to health care services(61). Internalized stigma, such as shame, social isolation and emotional distress compounded these risks (61). Many sex workers face discrimination and rejection related to sex workers' involvement in the sex industry, transgression of traditional gender norms, and the criminalized nature of sex work (56,57).

1.4.2.3 Macro-level factors: stigma and discrimination

Stigma is a cross-cutting macro-level force that acts dynamically and iteratively at all levels. For example, criminalization of sex work has been posited to fuel sex work stigma (58), which in turn trickles down to the community-organization level to discourage sex workers from organizing and advocating for their rights. The lack of sex workers' voices and advocacy

perpetuate violence and discrimination against sex workers at the interpersonal level. As well, sex work stigma has been postulated to impede sex workers' right to health services access (63,64), and has been linked to barriers to health services access in Vancouver (65). In Guatemala, sex workers report avoiding sexual and reproductive health care services due to perceived judgment and discrimination by health care providers (66). Structural interventions in India to increase sex worker involvement and leadership in health care programming, and reframe sex work as an occupation has proven to reduce internalized stigma, and increase sex workers' sexual and reproductive health care access and health care seeking (67).

1.4.3 Community organization factors and sex workers' sexual and reproductive health

Sex worker-led programming, sex work organization, and social cohesion, social participation and social inclusion are community empowerment processes that fall under the broad umbrella of 'community organization' (27). At the core of community organization models and interventions is the concept of social capital, related to connectedness within social networks, the value of relationships with others, including increased access to social support, and material resources (59). Community organization interventions have garnered increased international attention, largely owing to the Sonagachi and Avahan projects which have been successful in HIV and violence prevention, including increasing condom use (68–71). Similar interventions with community empowerment initiatives at their core have been conducted in Brazil and the Dominican (41, 42, 48,72), echoing trends of increased condom use and enhanced condom negotiation. Specifically, research in Brazil suggests that social cohesion (e.g., perceived mutual aid, trust and connectedness) among sex workers working in indoor settings, can significantly reduce levels of unprotected sex by clients (73). More recently, social cohesion has been

examined among sex workers in Swaziland and found positive associations with condom use, reduced stigma and HIV/STI testing (59). Given community empowerment has primarily been examined in LMICs (42), there is a need to investigate the impact of community organization among sex workers in high income settings, as this community-based process has been postulated to enable sex workers advance their own priorities, and collectively challenge oppressive structures that prevent them from realizing their rights (74).

1.4.4 Work environment and sex workers' sexual and reproductive health

Macro-level factors, including sex work legislation and community empowerment both shape and interact with the social, policy, physical and economic features of sex workers' work environments. Though a considerable number of researchers have examined the heterogeneous effects of venue-type on sexual health (60–64), few have sought to disentangle the independent effects and dynamic interplay of various domains of the work environment (i.e., social, policy, physical and economic) on sexual and reproductive health. Furthermore, given clandestine nature of indoor sex work, existing research has focused on street-based settings, while evidence of the role of formal and informal indoor work venues on sexual and reproductive health, particularly in the North American context, remain poorly understood (56).

A number of qualitative and quantitative studies from Vancouver and elsewhere have highlighted how distal macro-level factors such as sex work laws and policies and their enforcement shape sex work venues, and intersect with interpersonal and individual-level factors to affect sex workers' experiences of violence (46,47) and access to services (65). For example, the enforcement of prohibitive sex work laws and policies have been found to displace sex workers

to the margins, reducing their ability to access health services (65). Stratified analyses suggest that intersecting individual-factors, such as Aboriginal ancestry and illicit drug use further hinder health services access (65).

In contrast, emerging qualitative research from unsanctioned indoor venues demonstrate how workplace models that circumvent sex work law enforcement may support sex workers' health and safety. For example, Anderson and colleagues found that sex workers working alongside others in indoor venues reported reduced client- perpetrated violence (46) due to availability of peer-safety mechanisms. Other studies suggest the informal peer-safety mechanisms afforded by sex workers' ability to work cooperatively facilitate violence prevention, condom negotiation and use by clients and also improved relations with police(47). In contrast, qualitative accounts from other indoor settings in Vancouver suggest that enforcement of macro-level laws in these venues constrain sex workers' ability to promote their health and safety. In these interviews, migrant indoor sex workers reveal that the threat of police raids/inspections deter managerial support for condom use by restricting their availability onsite for fear it may be used as evidence of sex work(66). As mentioned previously, the physical absence of condoms onsite, sex workers' immigration status (e.g., fear of arrest or deportation) (67), limited English proficiency, gender norms and violence, and poverty have been found interact to reduce women's ability to negotiate and use condoms in the context of sex work (68).

Additional research into the physical and policy work environment has found that specific management and health-related policies (e.g., condom promotion programmes (69–71) and sexual health policies (72)) may support condom use. Work environments that supply condoms

and access to other health services have been shown to reduce HIV risk (69,73–76). Recent qualitative research also has examined the effect of safety policies and the removal of violent clients on sex workers' sexual risk (47,77,78).

The social features of sex work venues have steadily been gaining attention, particularly due to the high level of client-perpetrated violence and its observed influence on sexual risk (79–82). For example, client-perpetrated violence was associated with elevated levels of coerced unprotected sex (including anal), and non-condom use among sex workers in Baltimore (83). Swain et al.'s study among migrant Indian sex workers is among the few to examine the social features of sex workers' work environments (client physical and sexual violence), on reproductive health outside of HIV risk (84). This study found that experience of violence (by any intimate partner) was associated with higher pregnancies, pregnancy losses, and forced pregnancy termination (ever and multiple), and described how these are shaped by the intersection of violence and migration. Similarly, Decker and colleagues' study shed light on the interplay between social features of the work environment and women's interpersonal relations, and found sex work involvement sometimes was associated with increased experiences of intimate partner violence, including forced sex. Though pervasive (85,86), the role of intimate partner violence (and its effect on reproductive health) among sex workers has generally been overlooked and represents an important area for future research.

A number of qualitative studies have described the role of poverty and economic pressures on sex workers' entry and continuation of sex work (13,14,87,88). This includes work in LMICs demonstrating higher income and income control (89), and lack of economic pressures on

improved condom negotiation and use by clients (90). However, more research is needed to better understand the nuanced nature of the economic features of the workplace, such as fee structure, prices for service, management fees and their intersections with other factors in shaping sex workers' sexual and reproductive health. Together, these studies showcase the important influence of workplace environments on sex workers' HIV risks. However, these studies have generally focused on only one (or two) feature(s) of the work environment at a time, rather than examining the iterative and simultaneous influence of various workplace features on HIV risk or reproductive health.

1.5 Rationale for the current study

Despite a growing body of research on the structural determinants among sex workers, there remain important gaps in the evidence base surrounding sex workers' reproductive rights, including their broader reproductive health access and outcomes. First, while a growing number of researchers are examining reproductive health among sex workers, these have largely been descriptive and in the context of LMICs. This is, in part, driven by political priorities to reduce HIV infection, and consequently funding that is specifically focused on HIV care and prevention. Second, existing research on the reproductive health of sex workers has rarely extended beyond the realm of HIV/STI prevention, severely limiting the development of effective interventions to support sex workers' broader reproductive needs. Third, and perhaps most significantly, the majority of existing empirical research has adopted an individual-level focus, failing to account for the more upstream structural factors that enable or constrain sex workers' reproductive choice and health outcomes. There are a number of reasons for the lack of studies examining structural determinants, including lesser availability of standardized and validated measures for

sex workers, and challenges of measuring and interpreting structural-level determinants and data. The need to understand the multiple, intersecting and dynamic influences of structural factors on sex workers' health outcomes have been highlighted as a research priority (104). A better understanding of these intersections and their implications for sex workers' ability to realize their reproductive rights is urgently needed.

Gaining an understanding of the reproductive needs of marginalized populations to inform structural-level interventions has been recognized as a major research and political priority both internationally, as well as in British Columbia (BC) (37,105,106). Aligned with the United Nations Millennium Development Goal (5B), the first is the need to identify and evaluate interventions to reduce reproductive health inequities (7). In British Columbia, experts have called for interventions research to improve reproductive health services access and to address unmet needs for effective contraceptives, particularly among marginalized populations (107). Additionally, researchers and politicians have increasingly called for an examination and evaluation of the impact of population level interventions that modify the social, economic, physical and structural environments (such as workplace interventions) on female sex workers' health (108). In fact, female sex workers' workplaces are the primary intervention sites for the City of Vancouver's 2011 action plan to facilitate safer working conditions for sex workers (105). These research and political priorities, alongside existing gaps in our understanding of female sex workers' reproductive needs and wants, points to the need for new research that evaluates interventions to support the reproductive needs and rights of this population.

1.6 Study aim and objectives

The overall aim of this study is to examine the impact of sex workers' structural environments (e.g., macro-structural, community organization and various features of sex work venues) on sex workers' reproductive health access and outcomes. The study addressed the following objectives:

1. To better understand the reproductive aspirations and desires of female sex workers in Vancouver (street-based and off-street), Chapter 2 examines the structural correlates of pregnancy intentions. This analysis provides insights into the pregnancy aspirations and desires of female sex workers. The results reflect an important first step in identifying the reproductive health needs and wants of female sex workers, with an eye to informing recommendations for policy and programming to improve reproductive health rights of sex workers.

2. Building on the findings from Chapter 2, Chapter 3 investigates the impacts of various features of sex workers' venues on condom use for pregnancy prevention. This analysis had two objectives: (1) to develop a sex work venue-level index that systematically catalogues the unique and intersecting social, physical, and policy features of indoor workplaces; and (2) this index and established social cohesion scale among sex workers was then used to longitudinally evaluate the impact of a comprehensive set of community organization and workplace features on sex workers' negotiation of barrier contraceptives for the purposes of pregnancy prevention. This analysis is among the first reports in the peer-reviewed literature to use a venue-based index to quantify the impact of sex workers' workplaces on pregnancy prevention. These findings will be used to provide recommendations regarding safer indoor workplace models and community-led

interventions and has informed arguments supporting decriminalization of sex work, as necessary to promote positive sexual and reproductive health among female sex workers.

3. To gain an understanding of female sex workers' access to routine reproductive health services, a combination of geographical information systems (GIS), advanced spatial analysis, and longitudinal methods was used to prospectively evaluate the impact of macro- structural, and work environments both as barriers and facilitators on female sex workers' uptake of cervical cancer screening. In addition to the novel methods used in this chapter, the substantive findings will be used to inform recommendations regarding decisions about the spatial distribution and location of service delivery sites.

1.7 Study design and methods

1.7.1 Study design

These analyses drew on data from an ongoing, prospective cohort of street and off-street sex workers in Vancouver known as AESHA (An Evaluation of Sex Workers Health Access) initiated in January 2010. The current thesis is based on baseline and longitudinal data collected between January 2010 to August 2013. As AESHA is an open-prospective cohort with ongoing recruitment, participants are able to enter the study at any time throughout the study period. As such, the sample size has continued to grow since data collection began in 2010. The samples in all three analyses are restricted to participants who are biologically female. Chapter 2 uses baseline data from the first wave of data collection (n= 542), with a final sample size of 510 after restrictions (to biologically female participants, with valid responses to the outcome). Chapters 3 and 4 draw on longitudinal data, two years after data collection began, with a sample size of 646

participants. Chapter 3 is a subset of this population, restricting to sex workers primarily working in formal and informal indoor settings, and those with a valid answer to the primary outcome (n=588). Chapter 4 uses a sample size of 611, after restricting the initial sample of 646 by biologically female participants with valid responses to the outcome.

AESHA was built on longstanding partnerships with local sex work and community agencies since 2005 (109), and continues to be monitored by a community advisory board of 15+ agencies. Eligibility criteria for the study included being female (inclusive of transgender women) and having exchanged sex for money within the past month. Sex workers were recruited using community mapping and time-location sampling both at outdoor venues (e.g. streets, alleys) and indoor sex work venues (e.g., massage parlours, micro-brothels, and sex workers' homes) through daytime and late night outreach. Online recruitment targeting online solicitation spaces was also used. Time-location sampling is a strategy that recruits hard-to-reach populations by sampling in places and times where they often congregate, and uses physical spaces, rather than persons as the primary sampling unit (110). As described in a previous paper (109), community mapping by the outreach team (including former/current sex workers) was employed to identify sex work venues and outdoor spaces or sex work "strolls". Interviewers, outreach and nursing staff include both experiential (sex work experience) and non-experiential community research team.

Instrument - Following informed consent, participants completed interviewer-administered questionnaires at baseline and semi-annually. The main questionnaire elicited a wide range of individual-level information including: socio-demographics, individual- drug use patterns and

duration in sex work. A range of macro-structural-level variables were obtained, including housing-status, poverty/economic hardship, education level, migration history and experiences of stigma. At the partner/dyad level, data were collected on sex work partnerships (e.g., regular versus one-time clients), types and frequency of these partnership, types of sex acts and condom/contraceptive negotiation with sexual partners. At the community organization level, a number of community-organization data were also collected, including a validated scale on sex worker social cohesion (72) and volunteer/group involvement activities. A wide range of workplace environment data were collected, including policies features (e.g., management policies, safety policies), social features (e.g., client violence, managers/pimps, interactions with police/community including arrests), economic features (e.g., fee structures, payment negotiation), and physical features (e.g., security cameras, call buttons, access to sexual and reproductive health care services, contraceptives, HIV/STI testing).

A wide range of geographic information systems (GIS) data were also collected, including self-report data on where women lived, solicited and serviced clients, where women accessed health care services, and places where they had experienced violence, harassment or arrests from police, community members and clients. All data were entered into ArcGIS to create maps and geographical variables for regression analysis.

In addition, a project nurse administered a brief health-related questionnaire that elicited information on the broader sexual, reproductive and physical health needs of women, including pregnancy history, pregnancy intentions, contraceptive usage and health services access. Following the pre-test counselling, participants were offered voluntary HIV, STI and HCV

testing. Blood was drawn for syphilis, HSV-2 antibody and HCV testing. HIV was screened for using Biolytical INSTI rapid tests (followed by western blots to confirm positive tests). Urine samples were also collected to test for gonorrhoea and Chlamydia. Participants were compensated for their time and expertise with \$40 CAD at baseline and at each follow-up visit for their time and expertise. The study received ethical approval from University of British Columbia's Research Ethics Board (H0902803).

1.8 Overview of the dissertation

This dissertation contains five chapters. The Introduction provides an overview of the current literature pertaining to sex work and reproductive health, summarizes current evidence into the structural determinants of sex workers' reproductive health, and highlights the existing gaps in knowledge. The Introduction also presents a conceptual framework used to inform all aspects of the dissertation. Chapters 2-4 describe the detailed protocols and techniques used to conduct the empirical analyses required to address the objectives described above. Chapter 2 examines the structural drivers of pregnancy intentions among sex workers, setting the stage for the subsequent chapters. Chapter 3 presents the development of a preliminary '*Safer Indoor Work Environment Index*', and prospectively examines the impact of various venue-level features on sex workers' negotiation of male condom use for pregnancy prevention. In Chapter 4, the longitudinal impact of macro-structural and work environment features, including spatial accessibility of reproductive health services (using GIS data), on cervical screening is presented. Finally, Chapter 5 summarizes the findings from Chapters 2-4, describes implications of the current research for policy and programming decisions, and identifies promising areas for further study.

Chapter 2: Pregnancy intentions among sex workers: recognizing the rights and wants of sex workers as mothers

2.1 Introduction

Though risks for HIV and pregnancy are intimately intertwined, research on female sex workers has focused almost exclusively on disease prevention and transmission, while overlooking the reproductive health needs and wants of this population (14). Sex workers have been negatively portrayed in the media, by the public, and often by public health providers as ‘vectors of disease’(14), immoral women and/or criminals, and they are rarely viewed in their role as parents, perhaps because they do not conform to society’s perception of ‘good mothers’ (91). Diverted research and practice attention from the reproductive rights and needs of female sex workers also may contribute to the high level of unmet reproductive needs among this population (92). Understanding the pregnancy intentions of female sex workers is necessary to inform comprehensive public health programmes that can meet their specific reproductive needs and desires.

Despite emerging evidence of high levels of pregnancy and parenting among sex workers (35,93), little is known about the pregnancy intentions of this population, particularly among sex workers in high income settings such as in North America. The few empirical studies that have explored sex workers’ reproductive health and pregnancy patterns were conducted among non-drug using sex workers in low- and middle-income countries, and did not explicitly investigate pregnancy intentions (7,94). Instead, these studies documented levels of abortions as a proxy measure of unintended pregnancy, which probably underestimates the true rate of unintended

pregnancy by not accounting for unintended pregnancies resulting in live births or those that ended in spontaneous abortion. These and most other existing studies assessed pregnancy intention retrospectively (i.e., pregnancy intentions before versus after conception, or using unintended pregnancy as a proxy for pregnancy intention) (95), and did not have the capacity to capture true levels of pregnancy intentions.

While we located no studies examining pregnancy intentions among sex workers, pregnancy intention studies among marginalized populations and women living with HIV may contribute to our understanding of pregnancy intentions among sex workers, given high prevalence of HIV (23% among street-based sex workers) and marginalization among this population (96). A recent study among women living with HIV of reproductive age living in Vancouver, Canada, revealed pregnancy intention levels approaching that of the general population, with age, marital status and ethnicity being significant predictors of wanting to become pregnant (97). In other studies, pregnancy intentions of persons living with HIV/AIDS have been shown to vary according to a variety of other individual and social factors, including parity, social expectations and cultural norms(98), and knowledge of mother-to-child-transmission of HIV (99). Social networks, such as immediate and extended family members and friends also significantly impact women's pregnancy desires and intentions through approval or encouragement of childbearing (100), including the intentions of intimate partners (101).

The enforcement of Canada's sex work laws have also been posited to fuel stigma (including stigma towards parenting sex workers) (57,102,103), and to reduce access to health services (65), which may deter sex workers from wanting to start a family. The government of Canada has

recently proposed a new sex work legislation (Bill C-36) to replace laws previously struck down by the Supreme Court of Canada in December 2013. Bill C-36 would criminalize the purchase of sex, the advertising for sexual services, the material benefit from sexual services and soliciting clients in areas where children may be expected to be (e.g., schools, day-cares). This bill is expected to reproduce the stigma and lack of access to health services seen in the law previously struck down by the Supreme Court of Canada in December 2013.

There is limited literature regarding the pregnancy intentions of marginalized women (104). This literature review located no empirical studies measuring correlates of prospective pregnancy intentions among sex workers. This study therefore sought to examine the correlates of pregnancy intention among a cohort of female sex workers in Vancouver, Canada. Gaining an understanding of the pregnancy intentions of sex workers is an important first step in identifying their reproductive health needs and wants and in developing recommendations for policy and programming that will improve the reproductive health rights, access and outcomes for sex workers in Vancouver and elsewhere (2).

2.2 Methods

2.2.1 Study design

This analyses drew on cross-sectional, baseline data from the AESHA (An Evaluation of Sex Workers' Health Access) project, with data collected between January 2010 and October 2011. (n=542). The An Evaluation of Sex Workers' Health Access (AESHA) project is an ongoing, open prospective cohort of street- and off-street female sex workers (2010-present). This study has a long history of community collaborations, including a research project beginning in 2005

that was established in partnership with sex work and 15+ community agencies, that continues to monitor and advise on the project. Female and transgender sex workers above the age of 14 are sampled using time-location sampling methods and recruited using day- and night-time outreach to sex work venues (e.g., streets, alleys, massage parlours, micro-brothels, and in-call locations) across Metro Vancouver. The AESHA outreach team also actively recruits sex workers through online solicitation spaces. The study holds ethical approval through Providence Health Care/University of British Columbia Research Ethics Board.

Following informed consent, at baseline and semi-annual follow-up visits, sex workers complete an interviewer-administered questionnaire by trained interviewers (with and without sex work experience) and a pre-test counseling questionnaire and voluntary HIV/STI/HCV serology testing by a project nurse. The main interview questionnaire elicits a wide range of information including at the individual level (e.g., socio-demographics, sexual and drug risk patterns, HIV/STI infection); interpersonal level- (e.g., gender-based violence from clients, managers and intimate partners), work-environment level (e.g., working conditions, places of solicitation and servicing clients), community level (e.g., social cohesion) and macro-structural level (e.g., homelessness, migration, interactions with police). The nurse-administered (pre-test counseling) questionnaire elicited a wide range of information on the broader sexual, reproductive and physical health needs of women, including pregnancy history, pregnancy intentions, contraceptive usage and health services access (including Pap testing). Following the pre-test counselling questionnaire, blood was drawn for syphilis, HSV-2 antibody and HCV testing. HIV was screened for using Biolytical INSTI™ rapid tests (followed by western blots to confirm positive tests). Urine samples were also collected to test for gonorrhoea and Chlamydia. In

addition, to better understand the role that geography plays in shaping sex workers' health and safety, detailed geographic data are collected, including information on place of service, place of solicitation, location of violent incidents by clients, interactions with police and places of accessing health care. All participants receive remuneration of \$40CAD at each bi-annual visit. Participants were compensated for their time and expertise with \$40CAD at baseline and at each follow-up visit for their time and expertise.

2.2.2 Dependent variable

The dependent variable, pregnancy intention, was defined as a response of “yes trying to become pregnant now” or “yes in the future” or “yes, currently pregnant” versus “no” to the following survey item: “Are you planning/hoping to have any (more) children in the future?”

2.2.2.1 Independent variables

Independent variables were considered based on *a priori* knowledge from the literature as well as other hypothesized confounders. Guided by a *Structural Determinants Framework*, individual- and biological factors included: age (measured as a continuous variable), Aboriginal ancestry (inclusive of First Nations, Métis, Inuit and non-status First Nations), Caucasian or Asian/visible minority (Chinese, Vietnamese, Thai, Filipinia, India, Pakistani, Bangladeshi, Black, Latina). Individual drug use patterns of interest were: past 6 months use of injection and non-injection drugs (excluding marijuana and alcohol). Since pregnancy history and parity have also been documented as predictors of pregnancy desires/intention (98), we accounted for number of pregnancies, number of children in the mother's custody, ever had a child removed by child welfare services, and any barriers to pregnancy and mothering services (yes versus no) in our

analysis. In light of the pregnancy intentions literature (99), we also accounted for interpersonal factors and such as having had a male intimate partner (non-commercial), condom use by intimate partners within the previous six months. Given the documented association between intimate partner violence and unintended pregnancy (105–107), we used the WHO standardized scale for intimate partner violence (Version 9) that captures any or all of physical, sexual and emotional violence perpetrated by a primary male intimate/sexual partner in the past 6 months (108). At the workplace level, client-perpetrated physical and/or sexual violence within the past 6 months was also included in our analysis. Other workplace level factors hypothesized to influence pregnancy intentions were considered in our analysis, including: inconsistent condom use by clients, and use of hormonal contraceptives (i.e., birth control pills, injectable hormones), place of servicing clients. Primary place of servicing clients was categorized as: street/public space (e.g., alleys, streets, parks); informal indoor spaces (e.g., bars, saunas, hourly rental rooms, in/out-call); and formal sex work establishments (e.g., brothels/quasi brothels, massage parlours, beauty establishments). At the macro-structural level, migrant status (not born in Canada vs. born in Canada) and educational attainment (high school graduate vs. less than high school education) were included.

2.2.3 Statistical analyses

The analytic sample of 542 was restricted to biologically female sex workers who provided a valid response to the pregnancy intentions question, resulting in a final sample size of 510 participants. Initially, we examined bivariate associations between individual, interpersonal, workplace and macro-structural-level factors with pregnancy intentions. For these comparisons, we employed Pearson's chi-squared test for analysis of dichotomous, categorical variables and

Wilcoxon rank sum test for continuous variables. Logistic regression was used to generate odds ratios (ORs) with 95% confidence intervals for all categorical dichotomous variables. When observations were less than or equal to five, Fisher's exact test of probability was used to generate p-values. All variables with p-values <0.10 were included in the multivariable logistic regression model and Akaike Information Criteria (AIC) selection was employed to arrive at the final multivariable model(109).

The final model was tested for multi-collinearity. Two variables (having a male intimate (non-commercial) partner and inconsistent condom use with a non-commercial intimate partner) were removed from the model due to collinearity with (physical, emotional or sexual) intimate partner violence (IPV) in the last six months. Given the significant association between the intimate partner violence variable and both 'having a male intimate partner' and 'inconsistent condom use with an intimate partner', as well as literature suggesting that IPV is high among pregnant and parenting women (105–107), IPV was therefore considered the more important variable to include. The adjusted odds ratios (AORs) and p-values were calculated for variables remaining in the final model after AIC selection (Displayed in Table 2.2). As in previous studies (110), variables that retained significance at $p < 0.05$ level in the multivariable model after adjusting for potential confounders were considered statistically significant. Variables with p values <0.10 in our final multivariable model were considered marginally significant, as in previous studies (111–113).

2.3 Results

Of 510 women, 143 (28.0%) expressed an intention to have (more) children. Sample characteristics are presented in Table 2.1, stratified by pregnancy intention. The median age for women expressing pregnancy intention was 29 [Interquartile range (IQR): 25-35], compared to a median of 38 [IQR: 31-44] among those not desiring children. There were no differences in pregnancy intentions by Aboriginal ancestry or ethnicity, with 49 (34.0%) of women with Aboriginal ancestry, 50 (34.9%) of Caucasian and 44 (30.8%) of Asian women (primarily migrant/new immigrant workers) indicating wanting (more) children. Approximately half (49.8%) of our sample had a high school education, and 32% reported homelessness in the past six months.

Table 2.1 Sample characteristics and unadjusted odds ratios with 95% Confidence Intervals (95% CIs) and two-sided p-values for the association with pregnancy intentions among 510 sex workers living in Metro Vancouver, Canada

Characteristic	Yes n (%)	No n (%)	Odds Ratio (95% CI)	p - value
Individual, behavioural and biological factors				
Age (Median, IQR)	29 (25.0-	38.0 (31.0-	0.89 (0.86– 0.91)	<.001
Number of prior pregnancies (Median, IQR)	2.0 (2.0-4.0)	3.0 (2.0-5.0)	0.92 (0.83-1.02)	0.103
Ever pregnant				
yes	110 (76.9)	289 (78.7)	0.90 (0.57 – 1.43)	0.654
no	30 (23.1)	78 (21.3)	REF	
Aboriginal ancestry	49 (34.3)	147 (40.1)	0.87 (0.55 – 1.37)	0.541
Visible minority (primarily Asian)	44 (30.8)	90 (24.5)	1.27 (0.78 – 20.7)	0.334
Caucasian	50 (35.0)	130 (35.4)	REF	
HIV positive	8 (6.2)	48 (13.1)	0.40 (0.18 – 0.86)	0.016
HIV negative	121 (93.8)	287 (78.2)	REF	
Interpersonal factors				
Have intimate male partner*	83 (58.0)	139 (37.9)	2.27 (1.53 – 3.36)	<0.001

Characteristic	Yes	No	Odds Ratio	<i>p</i> - value
No intimate male partner*	60 (42.0)	228 (62.1)	REF	
Inconsistent condom use by intimate male partner*	73 (51.0)	117 (31.9)		
No inconsistent condom use by	70 (49.0)	250 (68.1)	REF	0.002
Intimate partner violence*	40 (28.0)	61 (16.6)	1.95 (1.23 – 3.08)	0.004
No intimate partner violence*	103 (72.0)	306 (83.4)	REF	
Injection drug use†	48 (33.6)	149 (40.6)	0.74 (0.49 – 1.11)	0.143
No injection drug use†	95 (66.4)	218 (59.4)	REF	
Workplace factors				
<i>Place of servicing clients *</i>				
Formal indoor (e.g., brothel, massage parlour)	28 (19.6)	95 (25.9)	1.95 (1.17 – 3.26)	0.011
Informal indoor (e.g., hotel, client's place)	64 (44.8)	169 (46.1)	0.92 (0.52 – 1.62)	0.759
Outdoor/public space (e.g., car, bathroom, parking lot)	51 (35.7)	101 (27.5)	REF	
Physical or sexual violence by clients*	61 (42.7)	134 (36.5)	1.29 (0.87 – 1.92)	0.200
No physical or sexual violence by clients*	82 (57.3)	236 (63.5)	REF	
Inconsistent condom use by clients*	35 (24.5)	48 (13.1)	2.15 (1.32– 3.51)	0.002
No inconsistent condom use by clients*	108 (75.5)	319 (86.9)	REF	
Macro-structural factors				
Immigrant/new migrant to Canada (Born abroad)	43 (30.1)	81 (37.9)	2.27 (1.53 – 3.36)	<.001
Born in Canada	100 (69.9)	286 (62.1)	REF	
<i>Education</i>				
High-school graduate	71 (51.7)	183 (49.0)	1.11 (0.76 – 1.64)	0.584
Less than high-school	69 (48.3)	187 (51.0)	REF	
Homeless*	50 (35.0)	113 (30.8)	1.21 (0.80 – 1.82)	
Not homeless*	93 (65.0)	257 (69.2)	REF	0.364
* Last 6 months				
† Ever				

Table 2.2 displays bivariate and multivariable associations with pregnancy intentions. In multivariable analysis, inconsistent condom use by clients (AOR=1.95; [95%CI=1.11-3.43; p=0.002]), servicing clients in formal indoor spaces versus public outdoor spaces (AOR=1.95; [95%CI=1.17- 3.26; p=0.011]) were associated with elevated odds of wanting children after controlling for potential confounders. Intimate partner violence in the last 6 months (physical, sexual or emotional) was associated with a 64% increased odds of pregnancy intentions (AOR= 1.64; [95%CI= 0.97-2.78]) although this association was only marginally significant (p=0.065). Younger age, measured as a continuous variable (AOR=0.89; [95%CI=0.87-0.92], p=<0.001) was related to positive pregnancy intentions, after adjusting for potential confounders.

Table 2.2 Bivariate and multivariable associations and 95% Confidence Intervals (95%CI) for the correlates of pregnancy intentions among 510 female sex workers living in Metro Vancouver, Canada

Characteristic	Odds Ratio (OR)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Individual-level factors		
Age	0.89 (0.86-0.91)	0.89 (0.86 – 0.92)
Ethnicity		
Aboriginal vs. Caucasian	0.87 (0.55 – 1.37)	–
Visible minority vs. Caucasian	1.27 (0.78 – 1.76)	–
High-school graduate	1.11 (0.76 – 1.64)	–
Homeless*	1.21 (0.80 – 1.82)	–
HIV positive	0.40 (0.18– 0.86)	–
Ever pregnant	0.90 (0.57 – 1.43)	–
Used injection drugs†	0.74 (0.49 – 1.11)	–
Interpersonal and Structural factors		
Physical/Sexual violence by client*	1.29 (1.32 – 3.51)	–
Inconsistent condom use by clients*	2.15 (1.32– 3.08)	1.95 (1.11 – 3.43)
Have male intimate partner*	2.27 (1.53 – 3.36)	–
Inconsistent condom use by intimate male partner*	2.23 (1.50 – 3.31)	–

Characteristic	Odds Ratio (OR)	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Intimate partner violence*	1.95 (1.23 – 3.08)	1.64 (0.87 – 2.78)
Place of servicing clients *		
Formal indoor (e.g., brothel, massage parlour) versus. Outdoor/public space	1.33 (0.96 – 2.08)	1.95 (1.17 – 3.26)
Informal indoor (e.g., hotel, client's place) versus. Outdoor/public space	0.78 (0.47 – 1.30)	0.91 (0.52 – 1.62)
* Last 6 months		
† Ever		

2.4 Discussion

Approximately one in four (28.0%) of the women in our study expressed an intention to become pregnant, with younger age, inconsistent condom use by clients, intimate partner violence in the past 6 months, and servicing clients in indoor settings being significantly associated with increased pregnancy intentions after adjusting for potential confounders. The pregnancy intention level among our sample appears to be lower than that of the general female Canadian population (of reproductive age) (37.5%)(98), and marginally higher compared to reported rates among HIV positive women in Canada (25%) (114), although more work is needed to fully understand how sex workers' pregnancy intentions compared to women of other occupations.

These findings challenge stereotypes about female sex workers (e.g., being unlikely to want to be mothers) (115) and support qualitative accounts that sex workers do desire pregnancy, just as women in other occupations (98). Qualitative research describes that women place high importance on children and on their role as mothers, and view motherhood as fulfilling their need

to give and receive love(98). Some accounts portray motherhood as giving sex workers' lives meaning and structure, and this may sometimes be the only source of life satisfaction (116).

In light of recent findings that indicate condoms to be female sex workers' primary method of birth control (116), in the absence of access to other forms of birth control it was not unexpected that inconsistent condom use by clients was associated with elevated odds of pregnancy intention in this study. Our results show that women who want children have 95% increased odds of inconsistent condom use with commercial sex clients, suggesting a potential increase HIV/STI risk pathway. While this finding warrants further investigation, there are evidence elsewhere that suggests increased feelings of intimacy, coupled with reduced condom use with more regular clients. These results suggest an urgent need for integrated HIV and reproductive health services that balance the need for HIV prevention with sensitivity to female sex workers' reproductive rights and needs. Such services should be non-judgmental, supporting dual contraceptive usage, including modern contraceptives (e.g., hormonal contraceptives including the birth control pill and intrauterine devices (IUDs)) in combination with barrier contraceptives (e.g., male or female condoms) for women not desiring pregnancy, whilst also providing information and supports for achieving safe pregnancies for sex workers wanting children. They should include improved access to antiretroviral and addictions treatment, STI screening and treatment, perinatal services (including prevention of mother-to-child transmission services), family planning information, and fertility treatment.

Our results show a 64% increased odds of intimate partner violence among sex workers who intend to have (more) children, though this finding was only marginally significant. While there

is a substantial body of work linking domestic violence and pregnancy in the general population, this research has almost exclusively focused on pregnancy and the early postpartum periods (105,117,118). Instead, our results suggest that women experiencing domestic abuse are more likely than those not experiencing abuse or without a stable partner, to report pregnancy intentions. The mechanism linking IPV and positive pregnancy intention is unclear and warrants further investigation. Given that previous literature has shown higher rates of IPV among pregnant and parenting women, our finding may be reflective of a climate of IPV within relationships where women either already have children or are actively discussing having children. Another possible explanation for our finding is that sex workers experiencing IPV may desire the safer, more stable family life that having a child might be presumed to offer. Further qualitative research, and in-depth work on pregnancy and violence experiences, is recommended. Of importance, this finding draws attention to the often overlooked, but prevailing normalization and ‘everyday’ violence experienced by sex workers, both in their private and work lives.

Previous qualitative studies among street-based sex workers have suggested high rates of various forms of violence from clients, pimps and intimate partners (119,120). The culture of violence towards sex workers may, in part, stem from the highly criminalized and stigmatized nature of sex work and poverty, and as such, community-level interventions to reduce poverty and stigma surrounding sex work could be beneficial.

On a programming level, there is a need for harm reduction services for female sex workers, including trauma counselling and respite from abusive relationships. In particular, there is a need

for structural and gender-transformative interventions that target male gender inequity norms among male perpetrators of violence (121).

Of particular interest, female sex workers who serviced clients in formal sex work establishments had almost two-fold increased odds of wanting to have children compared to those that serviced clients in outdoor/ or public spaces or informal indoor spaces. A possible explanation is that given the highly criminalized and stigmatized context of sex work in Canada, sex workers may feel more able to keep their private and personal lives separate while working in indoor sex work establishments. Formal indoor sex work establishments may also provide a safer, more stable environments that may better support women's intentions to have children. This hypothesis is supported by qualitative research that suggests that maintaining privacy around sex workers' work from friends, family and their children is a priority for parenting sex workers (116). In addition to potentially offering a form of privacy, formal indoor work environments may offer greater and/or more stable financial remuneration compared to outdoor sex work or other informal sex work arrangements (122), as well as the potential to access social support networks within the work environment (122), which may affect their pregnancy intentions.

Given the recently tabled sex work legislation in Canada, these findings highlight a need to pursue a framework that promotes sex workers' health and safety, and improves access to formal indoor establishments that may better support their reproductive right to have children. A decriminalized framework may offer these benefits, and has had positive impacts on sex workers' health and safety in New Zealand since its inception in 2003, including reduced violence and improved access to health care and support services (123).

Our finding of greater pregnancy intentions among younger women is consistent with the literature (97), and may be explained by lower parity and unfulfilled pregnancy desires among younger women. Younger female sex workers in our setting have been shown to have increased health risks due to elevated levels of homelessness (97,124,125), and avoidance of health and support services, which may have serious consequences on the reproductive health of female sex workers and their children.

Together, these findings highlight a critical need for accessible and targeted sexual and reproductive health (SRH) services that support sex workers' reproductive choice, from pregnancy prevention (e.g., contraception, abortion services), through to pregnancy and child rearing (e.g., family planning, perinatal care, parental support services). Given the close ties between HIV and pregnancy, innovative service delivery models that integrate HIV and SRH services (e.g., HIV integrated into SRH services or vice versa) may hold promise. Additionally, these findings concur with previous studies that suggest that the geographical location and method of service delivery are paramount to promoting health care access among sex workers (126). In particular, integrated services within close proximity to sex workers' workplaces or homes, or outreach to sex workers' workplaces (127) may provide immense benefit in mitigating existing elevated levels of harms faced by them and help interrupt a pattern of accumulating damage over their life course and that of their children. Examples of accessible, innovative models include the Esselen Street Clinic in Johannesburg, South Africa, that provides (on-site and mobile) integrated RH/HIV services (128), and the Sheway project in Vancouver, that offers

woman-centred, harm-reduction treatment services, and parental and parental support to mothers and their families (129).

This study has a number of limitations. The clandestine nature of sex work makes identifying a sampling frame, and randomly selecting participants that are representative of the population, a challenge. To address this limitation, time-space sampling and social mapping were used that systematically sample women at times and locations where they often congregate (97). Due to the sensitive nature of the topic, social desirability bias cannot be excluded and may have resulted in underreporting of pregnancy intention. Using a dichotomous measure of pregnancy intention (i.e., intending to become pregnant versus not intending to become pregnant) may not capture ambivalence with regards to pregnancy intentions, which has been associated with higher numbers of pregnancies compared to women who definitely did not want children, in lower-middle income countries (i.e., Morocco, Malaysia) (130,131). Finally, given that our study findings are specific to sex workers in an urban North American setting, our study findings may not be generalizable to sex workers in other settings, particularly those with differing policies and outlook on sex work.

2.4.1 Conclusions and future directions

These findings suggest that sex workers may have pregnancy intentions similar to women in other occupations, challenging widely held assumptions. They indicate a need for integrated HIV, reproductive health and harm reduction services that cater to the needs of women experiencing intimate partner violence and inconsistent condom use with clients. Such services should support sex workers' choices (e.g., improved access to contraception, termination, pre-

and post-natal care and child rearing supports), offer (or link to) counselling and respite from abuse relationships, and be delivered at or near sex workers' workplaces. Alternative legal frameworks such as the decriminalization of sex work, might further improve sex workers' reproductive rights to have children by increasing access to formal indoor sex work establishments and encouraging the delivery of targeted, integrated services at or near these locations.

Chapter 3: The impact of social, policy and physical venue features and social cohesion on the negotiation of barrier contraceptives among sex workers: a safer indoor work environment index

3.1 Introduction

There is a growing body of evidence globally of high levels of unmet reproductive and sexual health need among women sex workers (2,128,132). Emerging research from low-and middle-income countries (LMICs) has demonstrated high rates of unintended pregnancies and poor access to contraceptives and other reproductive health services (6–8,93). The data from higher income settings is sparse, however, recent research from Canada found similarly low rates of access to sexual and reproductive health services, including among pregnant and parenting sex workers, high rates of unintended pregnancies alongside poor access to barrier and non-barrier contraceptives for pregnancy prevention (133).

There is increasing global recognition of sexual and reproductive health inequities experienced by sex workers (3,5,132). Barriers to accessing and safely negotiating contraceptive usage reflect an important feature of those inequities and are largely attributed to structural and interpersonal factors, particularly violence and threats of violence, criminalization and stigmatization of sex work (134). Increasingly, socio-ecological and structural determinants frameworks are being used to map how sex workers' ability to negotiate health risks and protections are affected by structure, including: (a) macro-structural factors (e.g., laws, policies); (b) community organization (e.g., sex work organizing, sex worker community empowerment and social cohesion); and (c) work environment features (e.g., physical structures; venue-based policies; managerial practices) (18,22,135). Concomitantly, there has been a shift towards

complementing existing biomedical and behavioural approaches with structural and community-led interventions that account for both proximal and distal structural determinants in shaping sex workers' health outcomes (136,137). Though previous research on structural determinants has focused on venue and community empowerment interventions in the context of HIV prevention and treatment (60,63), this has been almost exclusively drawn from LMIC settings and to our knowledge, only one study has examined the multiple intersecting influences of supportive workplace models and social cohesion on barrier contraceptives usage (138).

In Vancouver, Canada, despite the criminalization of sex work, unsanctioned indoor sex work venues have long existed, both as formal/'in-call' sex work establishments (e.g., licensed massage parlours, beauty parlour, micro-brothels), and informal or 'out-call' indoor venues (e.g., bars, hotels, saunas). Emerging qualitative and ethnographic studies in high-income settings have demonstrated that social, policy and physical features of indoor venues and social capital (e.g., social cohesion and social participation) among sex workers may promote reduced violence and increase control over condom negotiation with clients (46,47,139).

Given the absence of epidemiological data on the impact that workplace models and community empowerment together promote or constrain health outcomes in higher income settings, and the dearth of data related to broader reproductive and sexual health; this study aimed to 1) catalogue social, policy, and physical features of indoor venues to develop a *Safer Indoor Work Environment Index*; 2) to longitudinally evaluate the impact of higher scores on the *Safer Indoor Work Environment Index* and social cohesion on sex workers' negotiation of (male and female) condoms in a prospective cohort of sex workers in Vancouver, Canada.

3.2 Methods

3.2.1 Study design

Data from January 2010 to February 2013 were drawn from the AESHA study. The sampling procedures, eligibility criteria and survey content are described fully in Chapters one and two. The current longitudinal analysis began with the sample size of 646, and was restricted to sex workers who indicated primarily working in formal (e.g., massage parlours, micro-brothels) or informal indoor settings (e.g., hotels, clients' places, own home) in the past six months, resulting in a sample size of 588.

3.2.2 Primary outcome

The primary outcome was a time-updated variable of barrier contraceptives usage for pregnancy prevention within the last month, defined as “yes” to either or both of “male condoms” or “female condoms” at baseline and each semi-annual visit.

3.2.3 Primary exposure variable: index development and internal validity

Early formative and qualitative research with sex workers (46,47), led to the inclusion of a diverse set of 43 questions on the social, policy and physical features of indoor work environments (e.g., in and out-call venues), within the AESHA questionnaire which were then catalogued to develop the *Safer Indoor Work Environment Index* (See Table 3.2 for the list of venue features). To make use of longitudinal data, all factors were considered as time-updated variables at every six-month interview, over the three-year follow-up period. Based on the overwhelming distribution of responses to all 43 questions favouring “always” or “never”, item

responses were dichotomized (i.e., “always”, “usually”, “occasionally” and “sometimes” vs. “never”). Guided by a Structural Determinants framework, the literature from LMICs, consultations with AESHA staff and community partners, each of these questions were grouped based on the outcome they were intended to support: 1) social and policy venue-based features included supportive venue-based policies and managerial practices; 2) physical venue-based features included: physical safety and security measures; access to sexual and reproductive health; and access to drug harm reduction, where relevant).

Index items were assigned scores based on a review of the literature from LMICs, in-depth qualitative research conducted with AESHA participants (46,47), and consultations with the AESHA staff and community partners. Work environment features previously reported to be ‘supportive’ of contraceptive use was given a score of 1 vs. 0. The descriptive statistics for each item, including their distributions were examined. Tetrachoric correlations and Latent Class Analysis (LCA), specifying one class, were used for variable reduction by examining the correlations between all potential items within each subscale. Items yielding low intraclass membership probabilities were excluded until the combination of items with the highest internal consistency (as measured by Cronbach’s alpha and Kuder-Richardson coefficients at a threshold of > 0.5) was achieved. The final index consisted of 27 venue-based items and is composed of four subscales:

Social and Policy Venue-Based Subscale (9 items) – Sex workers were asked if their indoor workplace had in place policies and managerial practices to support sex workers’ safety and control in negotiation transactions with clients, displayed in Table 3.2.

Physical Venue-Based Subscale (18 items) – Physical venue-based subscale reflect three components: a) *Physical Security Features*; b) *Access to Sexual/Reproductive Health Services and Supplies*; and c) *Access to Drug Harm Reduction Services and Supplies*. (See Table 3.2)

Community Organization and Empowerment Subscale (12 items): Lippman, Kerrigan and colleagues' Social Cohesion Scale (140) - was used to score the level of social cohesion among workers (e.g., perceptions of peer supportiveness, trust and mutual aid), based on responses ranging from “strongly agree” to “strongly disagree”. Lippman, Kerrigan and colleagues' social cohesion scale is described in detail elsewhere (140), and has been previously adapted and validated with sex workers in LMIC settings (32).

Longitudinal Regression Analyses: Due to low levels of missingness (<5%) a listwise deletion approach was taken for missing data. Similar to work in LMIC settings (32,140), responses to the presence of each indoor features were summed and standardized for bivariate and multivariable longitudinal analyses. A combined score for all venue sub-scales was created, giving equal weight to each sub-scale. To determine if workplace features and community organization were independently correlated with barrier contraceptive usage among sex workers longitudinally, multivariable analyses using generalized estimating questions (GEE). GEE methods are suited for the time-varying variables included in this analysis, and account for correlations arising from repeated measurements on the same participant over time by and adjusting the estimate and standard error accordingly(141). A working correlation matrix was also used to help account for repeated measures by the same respondent over three years of follow-up.

A series of confounding models were constructed (one for each subscale, and another for the index with all subscale scores combined) using an approach described by Rothman and Greenland (142), for a total of six models. Confounders were chosen based on *a priori* knowledge of associations with barrier contraceptive usage, and a bivariate GEE correlation with our outcome ($p < 0.10$). The conservative p-value cut-off of < 0.10 was chosen to guard against residual confounding (143). In addition, variables were also considered confounders if they altered the association of interest by 10%. All potential confounders were included in a full model. Backwards elimination, beginning with variables with the highest p-values was used to arrive at the final model. The final model fit was checked using (quasi-likelihood information criteria) QIC. SAS statistical software package version 9.3 was used for all data analyses (SAS Institute, Cary, NC, USA).

3.3 Results

Of a total of 646 sex workers enrolled in AESHA between January 2010 to February 2013, this analysis was restricted to 588 (86.1%) sex workers who had worked in indoor venues (e.g., formal/ 'in-call' sex work establishments, e.g., massage parlours, micro-brothels; and informal or 'out-call' venues, e.g., bars, hotels, saunas) over the three-years of follow-up. The median age of the sample was 35.1 (Interquartile range IQR: 28.0-42.0), over one-third (37.9%, $n=223$) of women were of Aboriginal ancestry and 23.6% ($n=139$) were immigrant/new migrant sex workers, primarily from Asia. Overall, 66.0% were visible minorities and 34.0% Caucasian, with approximately half (48.6%) of the participants having completed high school or some form of higher education. While 45.5% of the sample intended on becoming pregnant, over half also

reported barrier contraception usage (63.6%). At baseline, among the 374 women who used condoms, all reported male condom use and 12 (2%) reported using female condoms as well (See *Table 3.1* for details). All participants had complete data on work environment features, and 1.02% (n=6) were missing among the outcome, though this did not vary between exposure and non-exposure groups.

Table 3.2 describes the properties of the subscales of the *Safer Indoor Work Environment Index* which had satisfactory Cronbach and Kuder-Richardson scores. All subscales had Cronbach alphas scores of > 0.85, indicating a high level of internal consistency. There was one exception—the physical security features component of the Physical Venue-Based Subscale had a Cronbach alpha of 0.523.

Work environment scores and condom use for pregnancy prevention: In multivariable GEE analyses, increasing scores for all but one of the work environments were independently correlated with increased odds of barrier contraceptive usage. With an increase of one standard deviation for the combined index, there was a 3% increased odds of barrier contraceptive usage (AOR=1.03; 95% Confidence Interval (CI): 1.01-1.04). As displayed in *Table 3.3*, the adjusted odds ratios aligned with increasing scores for each work environment sub-scale, as follows: Managerial Practices & Venue Safety Policies (AOR=1.07; 95% CI 1.01-1.14); Physical Security Features (AOR=1.11; 95%CI 0.96-1.29); Access to Sexual and Reproductive Health Services and Supplies (AOR=1.07; 95%CI 1.01-1.13); Access to Drug Harm Reduction Services and Supplies (AOR=1.09; 95%CI 1.01-1.18); as well as Lippman, Kerrigan and colleagues' Social Cohesion Scale (AOR=1.05; 95%CI 1.03-1.07).

Table 3.1 Baseline characteristics of 588 female sex workers who worked in indoor settings in Metro Vancouver, Canada, stratified by barrier contraceptive

Baseline Sample Characteristics (n=588)	<i>Use of Barrier Contraceptives, last month</i>		<i>p-value</i>
	<i>Yes</i>	<i>No</i>	
	374 (63.6%)	214 (36.4%)	
<i>Individual Factors</i>			
Age (mean, median (IQR)) (35.1, 34.5 (28.0-42.0))	34.0, 33 (27.5-41.0)	(29.5-44.0)	<0.001
Aboriginal Ancestry	130 (34.8)	93(43.5)	0.642
Injection drug use* <i>Yes</i>	244 (65.2)	121(56.5)	0.403
<i>No</i>	142 (38.0)	99 (46.3)	
Non injection drug use* <i>Yes</i>	232 (62.0)	115 (53.7)	0.144
<i>No</i>	258 (69.0)	167(78.0)	
Intend to become pregnant*	116 (31.0)	47(22.0)	<0.001
No intentions to become pregnant*	170 (45.5)	46 (21.5)	
<i>Interpersonal Factors</i>			
Have intimate partners*- <i>Yes</i>	216 (57.8)	118 (55.1)	0.058
Have intimate partner*- <i>No</i>	158 (42.2)	96 (44.9)	
Inconsistent condom use with clients*	60(16.0)	37 (17.3)	0.462
No Inconsistent condom use with clients*	314 (84.0)	177(82.7)	
<i>Macro-structural Factors</i>			
Education			
High school graduate	193(51.6)	109 (50.9)	0.444
Less than high school graduate	181 (48.4)	105(49.1)	
Migrant	103 (29.6)	36 (16.8)	<0.001
Non-migrant	271 (70.5)	178 (83.2)	
Homelessness* – <i>Yes</i>	104 (27.8)	70 (32.7)	0.526
Homelessness* – <i>No</i>	270 (72.2)	144(67.3)	
Unstable housing*- <i>Yes</i>	309 (82.6)	182 (85.1)	0.774
Unstable housing*- <i>No</i>	65(17.4)	32 (14.9)	
* Last 6 months			

Table 3.2 Safer indoor work environment index: sub-scale properties of social, policy and physical venue-based features and social cohesion among 588 sex workers in the AESHA cohort in Metro Vancouver, Canada (2010- 2013)

Work Environment Domain	Properties		
	Mean, range Median (IQR)	Cronbach Alpha (standardized)	K-R coefficient [‡]
Social and Policy Venue-Based Features +			
<i>Venue Safety Policies & Managerial Practices Component:</i>	1.41,10	0.906	0.856
Women’s only space (e.g., workers)	0 (0-2)		
Women’s only front desk staff and management			
Venue has restrictions on hours of operation;			
Management explicitly discuss sex work;			
Management post bad date (violent perpetrator) sheets;			
Management requires client sign-in;			
Venue has no overnight restrictions;			
Management restricts number of clients to one a at a time;			
Management has explicit safety plan for violent clients			
Physical Venue-Based Features +			
<i>Physical Security Features Component</i>	0.60 (5)	0.572	0.523
Video camera in hallway/ entrance	0 (0,1)		
Security guards onsite			
Buzzer/call button in room			
Phone in room			
Access to Sexual/Reproductive Health Services and Supplies Component			
	1.87 (8.0)	0.874	0.903
Access to male condoms	2 (0-3)		
Access to female condoms			
Access to lube			
Access to emergency contraceptives			
Primary health care/ or street nurse comes to venue			
Voluntary and accessible Pap testing (e.g., comes to venue)			
Voluntary and accessible STI testing (e.g., comes to venue)			
Voluntary and accessible HIV testing (e.g., comes to venue)			
Access to Drug Harm Reduction Services and Supplies Component			
	0.95, 6.0	0.895	0.895
Crack pipes and drug use cleaning supplies	0 (0,1)	(0.89	
Sharps containers		1)	
Syringes			
A&D counselors available/ come to venue			
On site methadone available/ come to venue			
Active referrals made by building			

		Properties	
		Mean, range	
		median (IQR)	Cronbach alpha (standardized)
Community Organization Level			
Lippman, Kerrigan and colleagues' Social Cohesion Scale(140): <i>measures perception of mutual aid, trust, connectedness, support among workers</i>		18.65 (37) 19 (15-23)	0.919 (0.920)
You can count on your colleagues if you need to borrow money			
You can count on your colleagues to accompany you to the doctor or hospital			
You can count on your colleagues if you need to talk about your problems			
In general, your colleagues in the area where you work only worry about themselves			
You can count on your colleagues if you need advice			
You can count on your colleagues if you need somewhere to stay			
You can count on your colleagues to help deal with a violence or difficult client			
You can count on your colleagues to help you find clients			
You can count on your colleagues to support the use of condoms			
The group of women/men with whom you work is an integrated group			
In general, people you work with are always arguing among each other			
In general, the people you work with get along well			
All items summed and standardized (0,1,2,3 points for ascending responses)			
‡ Kuder-Richardson coefficient			
+ All items summed and standardized (1 for yes; 0 for no)			
NB: Cronbach alpha and Kuder-Richardson scores >0.85 were considered to indicate a high level of internal consistency			

Table 3.3 Bivariable and multivariable odds ratios using Generalized Estimating Equations (GEE) for the relationship between social, policy and physical venue-based features, social cohesion and barrier contraceptive usage within the last month among 588 sex workers in the AESHA cohort in Metro Vancouver, Canada, 2010-2013

Characteristic	Barrier contraceptive usage		
	Crude Odds Ratio (95%CI)	Adjusted Odds Ratio (95% CI)	p-value
<i>Total Safer Indoor Work Environment Index*</i>	1.04 (1.02- 1.05)	1.03 (1.01- 1.04) ‡	<.001**
Social and Policy Venue-Based Subscale: Managerial Practices and Venue Safety Policies Component	1.04 (0.98-1.11)	1.07 (1.01-1.14) ‡	0.031**
Physical Venue-Based Subscale: Physical Security Component	1.05 (0.92-1.21)	1.11 (0.96-1.29) ‡	0.163
Physical Venue-Based Subscale : Access to Sexual Reproductive Health Services and Supplies Component	1.07 (1.01-1.12)	1.07 (1.01-1.13) ‡	0.016**
Physical Venue-Based Subscale: Access to Drug Harm Reduction Services and Supplies Component	1.04 (0.97-1.12)	1.09 (1.01-1.18) ‡	0.033**
Community Organization Environment: <i>Lippman, Kerrigan and colleagues' Social Cohesion Scale score</i>	1.06 (1.04-1.07)	1.05 (1.03-1.07) ‡	<0.001**

‡ Based on GEE bivariable results, models adjusted for the following confounders: age, migrant status and pregnancy intention.

* Each venue-based sub-scale and social cohesion scale given equal weight in combined *Safer Indoor Work Environment Index*

3.4 Discussion

This study longitudinally quantifies the impact of intersecting social, policy and physical venue-based features and social cohesion on sex workers' negotiation of barrier contraceptives. The findings point to the key roles of venue and social cohesion in affecting sex workers' sexual and reproductive health. It also makes a methodological contribution by offering a multi-component *Safer Indoor Work Environment Index* that can be used to measure the degree to which venue features and social cohesion create 'supportive' or enabling environments conducive to sex workers' health and safety. Only a handful of studies have examined the more complex and intersecting influences of structural factors on sex workers' condom use negotiation. In particular, studies from the Dominican Republic, Brazil, China and the Philippines have shown how supportive workplace models, including venue-based sexual health policies, managerial practices, and physical layout (e.g., access to condoms; health and social supports) shape negotiation of HIV risk (49,138,140,144). Using the *Safer Indoor Work Environment Index*, our study demonstrates that venue-level safety policies and managerial practices, access to sexual and reproductive health and drug harm reduction services and supplies, combined with higher levels of social cohesion among workers, directly impact sex workers' use of barrier contraceptives.

The implementation of venue-level managerial practices and safety policies (e.g., venue-based policies, supportive managerial practices to prevent violence and promote sex workers' health) were independently correlated with sex workers' increased ability to negotiate condom use. Every standard deviation increase in the social and policy venue-based subscale corresponded with a 7% increased odds of condom use. Results from the current study also confirm findings

from earlier qualitative research in this setting, both in unsanctioned indoor venues within supportive women-only housing (47), and licensed health enhancement and massage parlour venues (46).

Physical access to sexual and reproductive health services and supplies at a venue level was also directly correlated with sex workers' condom use over the three-year period. Other studies also have found evidence linking access to health and safety supplies and services to consistent condom use (71,75,145,146). However, our research demonstrates that it is the synergy of social, policy and physical features at venues that promote sex workers' condom use over time. Physical access to relevant services and supplies also may reflect important features of venue-level social relations whereby sex workers, managers, and peers collectively support and facilitate condom use(49,144). Qualitative studies on sex work policies and management in India, China and brothels in Nevada, USA also have reported that managers may represent important 'nodes' for STI information, and provide protection from violence, contributing to increased condom use (139,147,148).

At the community level, increasing scores for social cohesion among sex workers (140) were directly correlated with increased contraceptive usage. The role of community empowerment, cohesion and sex worker engagement has been well documented globally, including in WHO guidelines, however this data is almost exclusively drawn from LMIC settings, such as Brazil, Dominican Republic and India. These are settings where there has been significant investment in resources to support these features amongst sex worker communities (75,147,149). Such investments have not been nearly as prevalent in higher-income settings (including Canadian

communities) and point to an area where evidence-informed investment in novel actions and supports for sex worker communities could be beneficial from a health and safety perspective. Only a handful of other studies have measured specific and intersecting facets of community empowerment, most notably data from Brazil and Dominican Republic (32,149). Our results build on these by longitudinally demonstrating how a combination of social, policy and physical venue-based features and community organization characteristics can promote sex workers' sexual and reproductive health.

Finally, over all follow-ups, increased access to drug harm reduction services and supplies (in the last 6 months) was also associated with increased odds of condom use in the last month. Previous research has shown that among sex workers who use drugs, increased control over drug preparation reduces sex workers' risk of violence (or threat of violence) at the time of drug use and increases control over negotiation of both sexual and drug risks (150). Alongside previous research that have linked substance use and inconsistent condom use (primarily within street-based contexts) (151,152), our findings help to address an evidence gap regarding the potentially positive effects of drug-harm reduction interventions on sex workers' sexual and reproductive health. Drug-harm reduction interventions and their apparent capacity to offer positive, value-added effects on the sexual and reproductive health outcomes of sex workers is a promising area of research and practice.

3.4.1 Limitations

This analysis has a number of strengths and limitations. First, we did not measure consistency/frequency of condom use, and therefore cannot extrapolate these findings to

hypothesize their impact on pregnancy outcomes or HIV transmission rates. Unfortunately, we were unable to measure the influence of economic venue-based features (e.g., service fees, payment structure, income) on contraceptive usage, and this represents an area for future research. Contraceptives and pregnancy can be a sensitive topic for already stigmatized populations and thus as with all self-reported data, responses may be subject to social desirability bias. However, we have no reason to assume that sex workers in safer (versus less safe) work environments would differentially report contraceptive usage, resulting in little impact on our estimate. Further, as this is a longitudinal study, interviewers have developed good rapport with participants, and include both interviewers with sex work experience along with strong community linkages.

3.4.2 Conclusions

The results provide implications for future sexual and reproductive health policy and programming, including HIV/STI prevention. Specifically, this research highlights the role of venue-based policies and managerial practices, as well as access to health and social supports, on sex workers' sexual and reproductive health. Substantial evidence exists in Canada and globally that criminalization and unsafe work environments reduce sex workers' ability to safely negotiate condom use due to fear of violence and arrest. Safer indoor venues with supportive policies and practices, together with strong policy support for sex workers to work collectively, represent structural avenues through which to promote and protect sex workers' safety and health. Furthermore, these results suggest that even within contexts that feature substantial barriers for sex workers' to access health care (57), supportive sex workplaces may also help by

providing such services themselves or by facilitating better access to appropriate supplies, services and programs, including contraceptives.

The WHO/UN is calling for decriminalization of sex work globally (153). In 2013, the Supreme Court of Canada struck down sex work laws that prohibited (among other provisions) working in indoor settings or the hiring or accessing of managers and others third parties, such as security. This study indicates that safer workplace models that include supportive venue and management practices (e.g., security and access to other health resources and services) are key to sex workers' health and safety. The evidence documented in the current study provides insights to inform and modify a new legal/policy framework. Furthermore, this analysis' findings shed light on how safer workplace models and the ability of sex workers to work together remains a conduit to promoting sex workers' ability to negotiate their sexual and reproductive health. Though the proposed legislation tabled in June 2013 will likely continue to impede women's ability to work safely in indoor settings, there is still opportunity to modify this legislation and its enforcement to mitigate the harms resulting from previous laws.

Chapter 4: Barriers to cervical cancer screening among sex workers in Vancouver: the importance of social and structural factors in shaping access to reproductive health services

4.1 Introduction

Globally, cervical cancer is the third most common cancer affecting women of reproductive age (154). Cervical cancer continues to claim a substantial number of lives in Canada, with recent estimates of 380 cervical cancer-related deaths and 1,450 diagnoses in 2013 alone (155). However, since the introduction of Papanicolaou (Pap) test that allows for detection malignant and pre-cancerous lesions, Canada has observed significant decreases in cervical cancer mortality, largely attributed to this screening method (156,157). Cervical cancer prevention is currently in a dynamic place in British Columbia, with the introduction of the Human papillomavirus vaccine (HPV) into the routine immunization schedule for girls in grades 6 and 9, as well as the increasing acceptability of the HPV DNA testing. While pap testing is currently the primary cervical cancer screening tool, a shift towards HPV testing is expected (158).

Cervical cancer is caused by certain high risk genotypes of the human papilloma virus (HPV)(159). Female sex workers experience elevated levels of HPV risk factors, including a high number sex partners (160), inconsistent condom use by clients and intimate partners (161), early sexual debut (162), recurrent STI infections (including co-infection by multiple HPV types) (21,72), and high HIV burden (163). A growing number of studies, primarily from low-and middle-income settings, reveal sex workers are disproportionately affected by HPV infection; however data on HPV infection and cervical cancer screening among sex workers in these settings, and from higher income settings is largely absent. A recent study from Cambodia

reported 41.1% of women tested positive for HPV, 36% of whom were co-infected by different strains of HPV and 23.3% were infected by high risk strains (21). Similarly, a high prevalence of HPV and high-risk human papillomavirus (HR-HPV), respectively, have been reported among sex workers in: Mexico (48.9% and 24.6%)(164); Peru (66.8% and 46.2%) (165); and Belgium (77.4% and 55.9%) (166). Emerging evidence, primarily from low-and middle- income countries (LMICs) suggests that sex workers are outpacing the general population in the number of new HPV infections. Infection with HPV has been linked to younger age (164,167), inconsistent condom use, number of years in sex work (168), higher number of partners (21,167), HIV(21), non-barrier contraception among this population (167).

Despite high levels of HPV and high-risk HPV types among sex workers worldwide (166), a gap remains in the literature pertaining to the barriers to cervical cancer screening facing sex workers, particularly in the North American setting (167). This information is required to inform policies and programming to reduce cervical cancer morbidity and mortality, particularly among marginalized populations such as sex workers. Descriptive studies from the UK among street- and parlour-based sex workers reported high lifetime rates of cervical screening, with rates higher among parlour-based sex workers (169,170).

While there remains a dearth of studies examining barriers to cervical cancer screening among sex workers, there are data on barriers among the general population (171,172). Among women in the UK, fear of embarrassment, not having time, fear of pain and negative results acted as barriers to cervical cancer screening (173). In Vancouver, women of Aboriginal ancestry were found to be less likely to undergo cervical cancer screening, with structural barriers such as lack

of appropriate providers, lack of recall-based screening programs, socioeconomic inequalities, colonial legacy and generational effects, transportation and geographic barriers preventing women from cervical cancer screening (174). Geographic barriers, including avoidance of health care and harm reduction services due to policing and fear of arrest have been identified as barriers to health service access among street-based sex workers (65), suggesting a need to further explore the role that physical and social geography play in routine reproductive health care access, including Pap testing. The current study examined levels of cervical cancer screening, specifically pap testing, among street- and off-street sex workers in Vancouver. The study also characterized barriers to annual voluntary cervical cancer screening at the individual (e.g., socio-demographic characteristics), interpersonal (e.g., intimate partner violence), workplace (e.g., venue-type) and structural levels (e.g., spatial distribution of service sites, homelessness).

4.2 Methods

4.2.1 Dependent variable

This longitudinal analysis used data from the AESHA project (2010-2013), described in detail in Chapters one and two.

The dependent variable, ‘annual Pap testing’, was a time-updated variable, updated every six months. Our decision to use annual testing as was based on consultations with health professionals working with sex workers and recommended standards of care for annual Pap testing among sex workers(166). This differs slightly from the British Columbia Cancer Agency’s guidelines, which recommends annual testing among sexually active women for the

first three years, continued by biennially screening once three consecutive negative tests have been received(175). At baseline and every follow-up, sex workers provided the month of their most recent Pap test, which was used to estimate the month of their next Pap test appointment. To allow for longitudinal analysis, at every semi-annual follow-up, the dependent variable was time-updated. If a sex worker tested at or within a year of her last Pap test, she was considered to test annually. Conversely, if it had been longer than a year since her last Pap test, she was considered to not test annually.

4.2.2 Explanatory variables

Aboriginal ancestry and immigration status (place of birth) were considered fixed variables, and all other variables were considered time-variant. Guided by a Structural Determinants Framework, individual-level and biological factors included: age (years) as a continuous variable; HIV status; drug use (injection and non-injection); and Aboriginal ancestry. Aboriginal ancestry was based on self-report as First Nations, Inuit or Métis. At the interpersonal level, we included intimate partner violence, and at the workplace-level, sex workers' primary places of servicing clients were considered. Macro-structural variables included: educational attainment (defined as high school graduate versus not); immigration status (place of birth); homelessness in the past 6 months (defined as having ever spent one night or longer sleeping on the street); barriers to health care services in the past 6 months; and accessing outreach services that offer Pap-testing in the past 6 months.

4.2.3 Geographic Information Systems (GIS) explanatory variables

To measure spatial accessibility to Pap testing locations, GIS coordinates for all cervical cancer screening locations accessed (and reported) by sex workers in our sample were collected and mapped. Using information from the British Columbia Translink (Vancouver's public transportation company) and Google Maps, travel times (a combination of walking and public transit) between women's places of: 1) solicitation; 2) service; and 3) living and the nearest cervical cancer screening locations (reported by any participant) were calculated. Given places of solicitation generally had the closest proximity to cervical cancer screening sites, distances from these locations were used to determine spatial accessibility to cervical cancer screening. Catchment areas were created that represented the distances women could travel within 15 minutes of their solicitation space. Similarly, 15-minute travel time catchments were also created around each cervical cancer screening site. If the catchment of the nearest cervical cancer screening site overlapped with the catchment around a sex workers' solicitation space, cervical cancer screening was considered to be 'spatially accessible'. These catchments were used to create our binary explanatory variable 'Spatially accessible Pap-testing site'.

4.2.4 Analytic sample and statistical analyses

Of the total sample of 646 participants, analyses were restricted to biologically female sex workers and therefore would also be eligible for cervical cancer screening, resulting in a sample size of 611 sex workers. Baseline descriptive analysis was conducted to generate frequencies, proportions, medians and interquartile ranges (IQR) for continuous data. Bivariable logistic regression analysis with generalized estimating equations (GEE) using an exchangeable correlation structure and logit link for the binary outcome were used to measure the independent

associations of explanatory variables (including geographical variables) with annual cervical cancer screening over the two year follow-up period. GEE methods are suited for the time-varying variables included in this analysis, and account for correlations arising from repeated measurements on the same participant over time by adjusting the estimate and standard error accordingly(141).

To guard against residual confounding, variables were considered for inclusion in the final multivariable model using a conservative p-value cut-off of $p < 0.10$ (143). As in previous studies (113), a backward stepwise approach was used to construct the final multivariable model, and included a combination of sequential removal of variables starting with the highest p-value (indicating the least statistical significance) and an assessment of the Quasi-likelihood Information Criteria. Quasi-likelihood Information Criteria is the equivalent of the Akaike's information criterion (AIC) for longitudinal data. The model with the lowest Quasi-likelihood Information Criteria (QIC) value was used to assess model fit, with the final model exhibiting the lowest QIC value. Crude Odds Ratios (ORs) and Adjusted ORs (AORs), 95% Confidence Intervals (95% CIs), and two-sided p-values were provided. The factors retained in the final multivariable model, after QIC selection are presented as AORs in Table 4.2. SAS version 9.4 was used for all statistical analyses (SAS Institute Inc., Cary, North Carolina, USA).

4.3 Results

Between January 2010 and August 2013, 611 biologically female street- and off-street sex workers enrolled in AESHA and provided valid responses to the month of their last pap test (from the larger sample of 646 women). As displayed in Table 4.1, the median age of

participants was 34 years old (Interquartile range (IQR): 28-42), with no significant difference in age between those reporting annual Pap testing (median= 33.5; IQR: 27-41) and those who did not (median=34; IQR: 28-42). One-third (34.9%) of the sample identified as having Aboriginal ancestry. Over a quarter (25.9%) were migrant/new immigrants to Canada, with 28.4% (n=44) of migrants moving to Canada 10+ years ago, 29.7% (n=46) 5-9 years ago, and 65 (41.9%) had been in Canada for less than 4 years. Ten percent of the sample was HIV seropositive, with a higher proportion of HIV+ sex workers reporting annual Pap testing compared to HIV- sex workers (52.3% versus 37.0%, p-value= 0.010).

The majority (92.5%) reported ever having a pap test in their lifetime, of whom one-third (38.6%) reported annual Pap testing. Most participants (67.3%) reported having received their Pap test results, with most receiving results in person at the clinic (69.5%), by phone (17.1%), or by outreach (6.1%). About one-fifth (22.9%) reported never having received their Pap test results. Of those, 12 sex workers (7.3%) assumed their tests were negative and 8 (3.3%) were unsure about their Pap test results. Among those who had received their Pap test results, 16 (6.5%) reported abnormal results (See Table 4.3).

In multivariable GEE analysis, HIV sero-positivity (AOR=1.65; 95%CI 1.06-2.58, p-value: 0.026) and having accessed outreach services offering Pap testing (AOR= 1.35; 95%CI 1.09-1.66) both increased sex workers' odds of annual Pap testing over all follow-up periods. Having experienced a barrier to health care services in the past 6 months reduced women's odds of annual Pap testing (AOR=0.81; 95%CI 0.65-1.00, p-value 0.052), though this was only

marginally associated. Bivariable and multivariable associations with annual pap screening are reported in Table 4.2.

Spatial accessibility of Pap test locations was not significantly associated with annual Pap testing in bivariable analysis (OR=0.93; 95%CI 0.56-1.54). As demonstrated in Figure 4.1, 58.8% of sex workers had at least one Pap-testing location within 15 minutes walking time of their place of solicitation. (See Figure 4.1)

Table 4.1 Socio-demographics and other characteristics among 611 street- and off-street female sex workers in Vancouver, stratified by annual cervical cancer screening (at baseline), with p-values

Characteristic	Total (%) (611 = 100%)	Annual cervical cancer screening		p - value
		Yes (%) (236 = 38.6)	No (%) (375 = 61.4)	
Individual and biological factors				
Age (mean, median (IQR))	34.8, 34 (28-42)	34.5, 33.5 (27-41)	35.0, 34 (28-42)	0.560
HIV positive [†]	63 (10.3)	33 (14.0)	30 (8.00)	0.010**
HIV negative [‡]	548 (89.7)	203(86.0)	345 (92.0)	-
Aboriginal ancestry	213 (34.9)	98 (41.5)	115 (30.7)	0.011**
Injection drug use	245 (40.1)	95 (40.3)	150 (40.0)	0.790
No injection drug use	366 (59.9)	141 (59.8)	225 (60.0)	-
Interpersonal factors				
Physical or sexual violence by client [†]	144 (23.6)	56 (23.7)	88 (23.5)	0.198
No physical or sexual violence by client [†]	467 (76.4)	180 (76.3)	287 (76.5)	-
Intimate partner violence [†]	130 (21.3)	52 (22.0)	78 (20.8)	0.404
No intimate partner violence [†]	481 (78.7)	184 (78.0)	297 (79.2)	-
Inconsistent condom use [†]	112 (18.3)	47 (19.9)	65 (17.3)	0.440
Consistent condom use [†]	499 (81.7)	189 (80.1)	310 (82.7)	-
Work environment factors				
<i>Primary place of service[†]</i>				
Street/public places	274 (44.8)	111 (47.0)	163 (43.5)	-
Informal indoor	153 (25.0)	61 (25.9)	92 (24.5)	0.683
Formal indoor	184 (30.1)	64 (27.1)	120 (32.0)	-

Characteristic	Total (%) (611 = 100%)	Annual cervical cancer screening		<i>p</i> -value
		Yes (%) (236 = 38.6)	No (%) (375 = 61.4)	
<i>Macro-structural factors</i>				
High school education	312 (51.5)	112 (47.5)	200 (53.3)	0.050**
Less than high school education	299 (48.9)	124 (52.5)	175 (46.7)	-
Born in Canada	453 (74.5)	185 (74.6)	268 (74.4)	-
Migrated to Canada 10+ years ago	44 (7.2)	29 (11.7)	15 (4.2)	0.488
Migrated to Canada 5-9 years ago	46(7.5)	13 (5.2)	33 (9.2)	0.445
Migrated to Canada recently (0-4 years ago)	65(10.7)	21 (8.4)	44 (12.2)	0.045**
Homeless†	186 (30.4)	72 (30.5)	114 (30.4)	0.391
Not homeless†	425 (69.6)	164 (69.5)	261 (69.6)	-
Experienced barriers to health care services †	386 (63.2)	132 (55.9)	254 (67.7)	0.095*
No barriers to health care services †	225 (36.8)	104 (44.1)	121 (32.3)	-
Accessed services that offer Pap testing †	314 (51.4)	138 (58.5)	176 (46.9)	0.003**
Did not access services offering Pap testing †	297 (48.6)	98 (41.5)	199 (53.1)	-
<i>GIS variables</i>				
Spatially accessible Pap testing site	160 (58.8)	56 (57.7)	104 (59.4)	0.785
Pap testing site not spatially accessible	112 (41.2)	41 (42.3)	71 (40.6)	-
* Marginally statistically significant at $p < 0.10$				
** Statistically significant at $p < 0.05$				
† In the last 6 months				

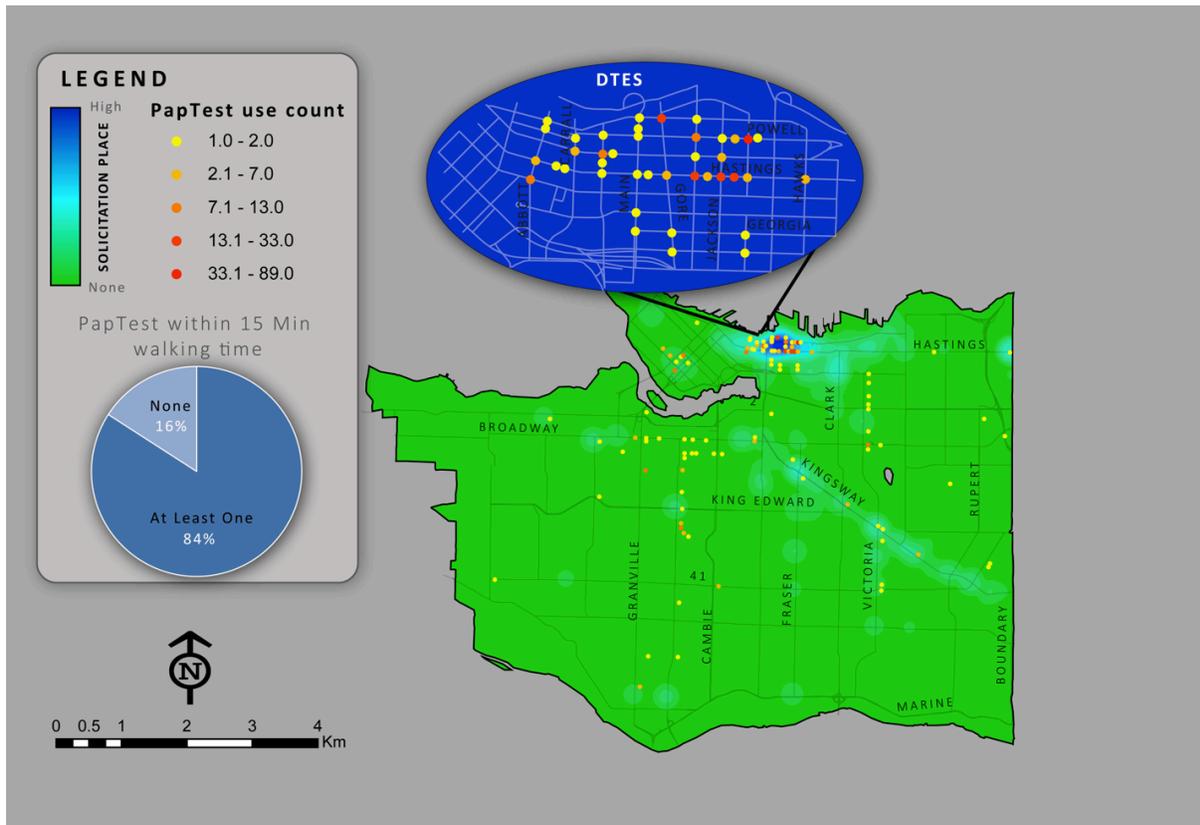
Table 4.2 Bivariable and multivariable odds ratios using Generalized Estimating Equations (GEE) for the correlates of annual cervical cancer screening among 611 street- and off-street female sex workers in Metro Vancouver, Canada

Characteristic	Crude Odds Ratio (95%CI)	p-value	Adjusted Odds Ratio (95% CI)	p-value
Individual and biological factors				
Age	0.99 (0.98-1.01)	0.560	-	-
HIV positive†	1.79 (1.15-2.78)	0.010**	1.65 (1.06-2.58)	0.026**
Aboriginal ancestry	1.44 (1.09-1.91)	0.011**	-	-
Born in Canada	REF		-	-
Injection drug use	1.03 (0.82-1.30)	0.790	-	-
Interpersonal factors				
Physical or sexual violence by client †	0.84 (0.65- 1.09)	0.198	-	-
Physical or sexual violence by intimate partner†	1.12 (0.86-1.46)	0.40	-	-
Inconsistent condom use by any client†	1.13 (0.83-1.52)	0.440	-	-
Work Environment Factors				
<i>Place of service†</i>			-	-
<i>Informal indoor settings</i>	0.95 (0.75-1.21)	0.683	-	-
<i>Formal indoor settings (e.g., brothels/quasi-brothels)</i>	0.84 (0.60-1.17)	0.302	-	-
<i>Outdoor, public spaces</i>	REF		-	-
Macro-Structural Factors				
Born in Canada	REF			
Migrated to Canada 10+ years ago	0.84 (0.52-1.37)	0.488	-	-
Migrated to Canada 5-9 years ago	0.82 (0.48-1.39)	0.445	-	-
Migrated to Canada recently (0-4 years ago)	0.58 (0.34-0.99)	0.045**	-	-
Migrated to Canada 10+ years ago	0.84 (0.52-1.37)	0.488	-	-
Homelessness	0.90 (0.72-1.14)	0.391	-	-
Experienced any barriers to health care†	0.83 (0.67-1.03)	0.095*	0.81 (0.65-1.00)	0.052*
Accessed outreach services offering Pap testing†	1.37 (1.11-1.69)	0.003**	1.35 (1.09-1.66)	0.006**
** Significant at p<0.05				
* Marginally significant at p<0.10				
† Past 6 months				

Table 4.3 Descriptive statistics for frequency of cervical cancer screening and receipt of results among 611 street- and off-street sex workers in Metro Vancouver, Canada

Characteristic	Total
<i>Ever had a Pap test- Yes</i>	565 (92.5%)
<i>Never had a Pap test</i>	46 (7.53%)
Pap test results (last 6 months)	
Received results, Normal	165 (67.3%)
Received results, Abnormal	16 (6.5%)
Didn't receive results	56 (22.9%)
Not sure	8 (3.3%)
Method for receiving Pap test results (among those who received, and specified a method of receipt)	
By Phone	28 (17.1%)
In person	114 (69.5%)
Outreach	10 (6.1%)
Didn't get a call back, assumed negative	12 (7.3%)

Figure 4.1 Map of sex work solicitation spaces in relation to pap testing locations as reported by street- and off-street sex workers across Metro Vancouver



NB: PapTest use count indicates how often a pap test location was frequented by sex workers. Pap tests received via outreach methods are not included in this map. Spatial accessibility, defined as having at least one pap test location within 15 minutes walking distance of place of solicitation is displayed in the legend's pie chart.

4.4 Discussion

While increasing evidence suggests that sex workers are disproportionately impacted by HPV infection, including by HR-HPV genotypes that cause cervical cancer, few have examined the correlates of and barriers to cervical screening (Pap testing) among sex workers in high income settings. As with other jurisdictions, British Columbia is expected to shift from pap testing as its primary cervical screening method, to HPV testing (177). Regardless, issues of access to screening are relevant, and these findings remain important in highlighting barriers and

facilitators to cervical screening among the sex worker population. Despite the availability of universal health care in Canada, only 38.6% of sex workers in the current study reported annual cervical screening. The level of cervical screening among our sample is comparable to that reported among street-based sex workers in the UK (38% of sex workers in that setting reportedly underwent cervical screening) (170). The current study also characterized the barriers to accessing cervical screening and align with results of other research that reveals reduced health services access among sex workers generally (57, 65).

The issue of not having received Pap test results is a notable finding from our study, with over one-fifth (22.9%) of sex workers not receiving their results. This is in contrast with a UK study among street-based sex workers that found that 44/46 women who ever had a Pap test knew their results (170). While the standard protocol adopts a ‘no news is good news’ approach, the low receipt of results among sex workers is potentially problematic. Given that sex workers are at high risk of HR-HPV and less likely to obtain their test results, there is potential for an underestimation the prevalence of abnormal Pap test results among our sample. While the prevalence of abnormal results (6.5%) in our sample is higher than Canadian women of comparable age ranges (177), there may still have been some underreporting in our sample because study participants had not received their results. A failure to provide sex workers with adequate follow-up services (including communication of positive or negative results) has also been documented in the UK (170). An in-depth examination into the preferred models of results communication among sex workers in Vancouver is warranted and may contribute to overall efforts to enhance sexual and reproductive health service provision to sex workers.

Our results indicate that contact with outreach services that provide cervical screening (e.g., street-nurses, mobile outreach) increased the odds of testing by 35%. This corroborates previous studies globally, including in Vancouver, that established links between a peer/ sex worker-led outreach (that included a peer outreach and a drop-in onsite nursing service) and increased HIV treatment access and adherence (127). Another Vancouver study found contact with a mobile outreach program that provided violence and HIV prevention supplies was associated with increased inpatient addictions treatment (179). In Peru, a community-based intervention providing mobile services found increased condom use and reduced STI prevalence, including among sex workers typically not reached by government-operated services (180). Other innovative models include health care services run by and for sex workers, such as in San Francisco's St. James Infirmary (SJI) (181). The SJI model of care has been shown to be highly successful in providing confidential and non-judgmental occupational sexual health services for sex workers, and linked to higher uptake of services (182). Innovative, tailored occupational sexual health models such as sex worker-led strategies remain critical, and would help to reduce issues surround sex work stigma sometimes projected by health care workers. Active engagement of sex workers in outreach services may also help reach marginalized and hidden sex workers operating in more isolated settings.

While the positive correlation between outreach and cervical screening highlights the importance of increasing spatial accessibility to testing, we did not find a significant association between annual testing and having a Pap-testing site within 15 minutes of solicitation catchment areas. Having multiple service spaces available within a reasonable distance may be a necessary, but not sufficient, condition to promote uptake of cervical screening. Our findings suggest that the

social characteristics of service spaces (e.g., service delivery models; attitudes of staff) may play an important role in sex workers' cervical screening access. Previous research has shown that fear of sex work/drug use and HIV disclosure to health care professionals, distrust of authority figures (183), occupational stigma (57), limited hours of operation (102,169,170), and displacement away from health care services due to police enforcement all acted to reduce health care access (65). In the current study, language barriers were among the most common barrier to health care services, with 25.9% of sex workers reporting having been born abroad in settings where English is not the first language (e.g., Asia). This highlights a need for outreach services that employ providers and sex workers who have proficiency in Mandarin/Cantonese and/or access to translators who are trained in culturally-sensitive approaches to sexual and reproductive health service provision.

Sex workers living with HIV had 65% increased odds of having annual cervical screening compared to their HIV-negative counterparts. This may reflect Pap testing guidelines that recommend annual testing among people living with HIV (184). Additionally, Sex workers living with HIV (who are aware of their status) may have increased contact with health care services, increasing access to routine check ups, including Pap testing. While sex workers living with HIV were more likely to have an annual Pap test, almost half (45.6%) reported having missed their scheduled test. This finding points to the need for improved access to integrated HIV and reproductive health services (21), both for sex workers living with and without HIV.

4.4.1 Strengths and limitations

Given that most of our measures relied on self-report data, these responses may be subject to social desirability bias. However, given our staff included community and experiential staff (staff with sex work experience) well known and trusted in the community, it is likely that this would have reduced this bias (185). Our outcome, annual Pap testing, may be subject to recall bias, potentially resulting in inaccurate estimations of our outcome. Given this study is among the first to apply GIS/spatial analysis to health access among sex workers, there are limitations related to our GIS variables: First, the walking distance to health care services that is considered acceptable among female sex worker is unknown, although 15 minute walking buffers were considered reasonable by our interview staff and similar buffers (e.g., 20 minutes) have been used in studies conducted with other populations (186). Additionally, while we acknowledge that not all possible Pap testing sites were included in our analyses, our analysis assumes sex workers reported the majority of sites that sex workers are likely to access. The large number of observations used in this analysis (approximately 1,400) ensures that a large number of Pap testing sites were included.

4.4.2 Conclusions

Even where physical access to cervical screening sites appears to be sufficient, structural barriers continue to impede annual, voluntary cervical screening amongst sex workers. Although British Columbia may be shifting its approach to cervical screening from pap testing to HPV testing(187), the barriers identified within this study regarding engagement in screening remain highly relevant, and provide critical insight into program design and opportunities to increase cervical cancer screening and prevention going forward. Mobile and outreach delivery models,

including community and sex worker-led efforts, that are better tailored to the needs of sex workers may hold potential for increasing cervical screening levels. The same promise may hold for an integrated approach between HIV-related services and sexual/reproductive health services for seropositive sex workers. Clearly, in light of the overall low levels of annual testing in sex workers, there is need to scale up access to innovative and effective HPV prevention and cervical care effort (21), including new approaches that focus on the needs of new immigrants and migrant sex workers, as well as better understanding of why sex workers choose not to access pap testing.

The creation of explicit guidelines for voluntary, annual Pap testing for marginalized and key affected populations may confer important health benefits. To fully realize the potential of various cervical screening methods, there is a need for further research on acceptability and efficacy among this population. Finally, additional research regarding alternative strategies for HPV/cervical cancer screening (e.g., molecular-based screening with HPV DNA) also may contribute to our understanding of how to more effectively intervene in the context of the sex worker populations (188).

Chapter 5: Discussion, implications and conclusions

5.1 Summary of findings

The reproductive rights of sex workers have been largely ignored in previous research, resulting in a substantial gap in the evidence base surrounding the broader reproductive needs and wants of sex workers- and, ultimately, contributing to a failure to address a high level of unmet reproductive need in this population. Chapter Two empirically investigated the prevalence and factors associated with pregnancy intentions among street- and off-street sex workers. These results suggested that while sex workers have pregnancy intentions similar to women in other occupations, they have distinct needs compared to women in the general population, highlighting a need to better understand and attend to the reproductive needs of sex workers. At the work environment level, servicing clients in formal indoor settings (e.g., massage parlours, brothels) was positively associated with pregnancy intentions.

Building on these findings, Chapter Three longitudinally investigated the role that indoor work environments have on sex workers' ability to negotiate condoms for pregnancy prevention. For the purposes of this thesis, a '*Safer Indoor Work Environment Index*' was developed, drawing on existing research and formative qualitative research from this setting that catalogued intersecting features and 'supportiveness' of sex workers' indoor work environments (i.e., physical, social and policy work-environments and community organization environments)(46,189). These findings suggest that the intersection of supportive social, policy, physical features at the venue-level together with strong social cohesion among sex workers support sex workers' ability to negotiate for and use condoms.

Finally, the longitudinal analysis in Chapter Four quantified access to cervical screening (a routine reproductive health service) among street- and off-street sex workers and identified the structural correlates of cervical screening. Geographic information systems (GIS) data and spatial analyses also revealed spatial accessibility from sex workers' workplaces to cervical screening locations. Chapter Four findings revealed low cervical screening levels among both HIV positive and HIV negative sex workers, and suggests that barriers to accessing health care (particularly language barriers) decrease the odds of cervical screening. While physical distance (spatial accessibility) was not significantly associated with cervical screening, access to outreach services models (e.g., mobile services, street-nurses) substantially increased sex workers' odds of testing annually. These findings suggest that even in settings where the physical distance to services is reduced, other forms of structural barriers (e.g., service delivery models, language barriers) continue to impede access to regular, voluntary reproductive health services, such as cervical cancer screening. Chapter Four is among the few studies to examine access to routine reproductive health services (e.g., cervical screening) among sex workers, and reveals low levels of cervical screening, receipt of results, with barriers to health care services reducing odds of cervical screening. This study points to potentially effective structural interventions (i.e., outreach methods of service delivery) to improve access and utilization of this reproductive health service.

Guided by a *Structural Determinants* Framework and *Reproductive Justice* Frameworks, the current dissertation empirically investigated how numerous and overlapping structural factors synergistically shape sex workers' broader reproductive health access and outcomes. This study presented three separate analyses of longitudinal data gathered through the AESHA study, a

prospective cohort of street- and off-street sex workers in Vancouver. This dissertation's findings extend the limited, but growing body of evidence on the unmet reproductive needs of sex workers.

The overall findings demonstrate that structural factors (e.g., venue features; health-service delivery barriers; intimate partner violence) continue to constrain female sex workers' ability to achieve their reproductive health rights, including accessing essential reproductive health services. Numerous structural interventions (e.g., workplace supports, health service delivery models) were also identified that may enable women to exercise their reproductive choice. Taken together, the overall findings of the dissertation demonstrate that structural features of sex workers' working and living environments need to be considered when designing sexual and reproductive health policy and programming.

5.2 Study contributions and recommendations

5.2.1 Theoretical approach and methodological contributions to social epidemiology

The current dissertation advances the field of Social Epidemiology, by employing conceptual framings and methodologies that are relatively novel to the field(190). Social Epidemiology is an emerging field that combines epidemiological methods and social sciences theory to understand how contextual circumstances, such as social, political, cultural and economic factors, influence health. This dissertation is among the few to examine the impact of multiple and intersecting factors at the macro-, community organization, workplace environment, interpersonal and individual levels on sex workers' broader reproductive health access and outcomes. My conceptual framework, drawing on *Structural Determinants* and *Reproductive Justice*

Frameworks builds on critiques of linear, risk-environment frameworks(191,192) commonly used in sex work research, to also examine protective, ‘enabling environments’ that support sex workers’ reproductive rights and contribute to the limited body of knowledge on the topic of sex workers’ broader reproductive health needs and outcomes.

My approach also departs from those taken in previous research by examining individual and behavioural factors while also accounting for the dynamic interplay between individuals, their structural environments(30,31), and communities(193). This approach responds to experts’ calls to examine structural determinants as dynamic, complex adaptive systems(31). Additionally, building on work from Overs, this dissertation examines how macro-structural and community organization factors intersect with behavioural- and risk- factors(193) while also examining various features of the workplace environment and its overlap with community organization factors in shaping sex workers’ negotiation of reproductive health. Notably, this dissertation adopts a gender relations framework which has been largely absent from the Social Epidemiological literature (190,194), and illuminates how gender relations (e.g., male condom negotiation with partners, the role of intimate partner violence) contribute to reproductive health inequities.

As a result of the current dissertation, I developed the *Safer Indoor Work Environment Index*, which represents a first step towards: (1) systematically cataloguing various intersecting features of the indoor work environment; and (2) understanding independent and combined effects of venue-level factors in contributing to sex workers’ ability to exercise their reproductive rights. While key studies from LMICs have documented the impact of social cohesion and various HIV-

focused workplace interventions(40,195,196), this is the first in a high income context. In addition, as far as we are aware, this is the first to develop an index of the social, policy and physical features of indoor work venues and their individual and combined contributions to the negotiation of reproductive health outcomes.

Additionally, while the aim of Social Epidemiology is to understand the role of context in shaping health, the use of GIS and spatial analysis tools in this field remains in its infancy(190), particularly in sex work research. The GIS and spatial analysis methods used in Chapter 4 build on foundational work, including by Nancy Krieger and Patricia O'Campo, who have used GIS to illustrate links between geographic areas and health inequities, including STIs, violence and pregnancy outcomes(197,198). The methods used in Chapter 4 highlight the potential applications of GIS and spatial analyses to evaluate spatial access/proximity as a barrier or facilitator of health and social outcomes in studies going forward. Finally, this dissertation employs longitudinal study design and methods, which are better suited for examining the complex and dynamic influence structural factors over time(22), compared to cross-sectional approaches taken in most previous research.

In sum, the longitudinal nature and innovative methods adopted in Chapters 2 through 4 extend previous sex work and reproductive health research by integrating structural factors and evaluating their independent and combined contributions towards achieving reproductive rights. Importantly, understanding the role of structural factors in shaping sex workers' reproductive health is valuable in informing novel structural interventions to support reproductive health access and outcomes among this population. While there is a need for further advances in theory

and methodologies to account for complexities and interrelatedness of multi-level factors on sex workers' sexual and reproductive health, these analyses contribute to the existing body of knowledge on multi-layered and complex approaches to investigating sexual and reproductive health among sex workers.

5.2.2 Informing interventions

The findings presented in the current dissertation provide critical and timely insights into alternative legal frameworks, policies and enforcement models that may better promote sex workers' health and safety. In light of the recently tabled legislation- the 'Protection of Communities & Exploited Persons Act (Bill C-36)' proposed in June 2014- there is an important opportunity for the current dissertation to inform Parliamentary and Senate debates and amendments, as well as public opinion regarding the potential impacts that the proposed legislation may have on sex workers' health and safety. Findings from Chapters 2-4 suggest that alternative legal frameworks, including municipal licensing and sex work regulation models that improve access to safer indoor workplaces, may better support sex workers' pregnancy intentions, contraceptive negotiation and access to routine reproductive health services. Legal access to safer indoor workspaces and reduced fear of police encounters/arrest also create environments that enable the provision of appropriate reproductive health and harm reduction services (including condoms)(68). Furthermore, such safer work environments also confer protection from client-perpetrated violence and provide sex workers with a level of control and privacy that some sex workers' have described as essential to fulfilling their reproductive rights(116). Furthermore, findings from Chapter 4 suggest that a legal framework that enables

sex workers' ability to work together (e.g., social cohesion among sex workers) fosters an enabling environment for sex workers to negotiate their reproductive health.

The proposed legislation (Bill C-36) in its current form is expected to limit sex workers' ability to work effectively in safer indoor spaces by preventing sex workers from working with others, such as managers. Furthermore, given the criminalization of clients is likely to drive sex workers underground(199), which has been found to perpetuate violence against sex workers, and profoundly limit their ability to negotiate for their health and safety(200,201). The findings of the current dissertation point to the need for a decriminalized model of sex work, as recommended by the WHO in partnership with UNAIDS, UNFPA, UNDP and Network of Sex Work Projects (NSWP)(202). Decriminalization has been implemented in New Zealand since 2003 and found to positively support sex workers' health outcomes, access and safety, including sexual and reproductive health outcomes(123).

Alongside legal reforms, there is a clear need for sex work reforms at the municipal level, removing punitive, criminalized and enforcement-based approaches to sex work. Ideally, such reforms would recognize sex work as a legitimate occupation, and regulate sex work by the same occupational health and safety standards applied to other businesses. Vancouver City's Task Force on Sex Work has begun to take small, but important steps towards mitigating some of the harms incurred by policing, including the recent creation of community liaison officer positions, (officers who have previous or current experience as sex workers) to work closely with community, policy and police.

Criminalization of sex work also perpetuates stigma and infringes on sex workers' ability to organize as a community in order to advocate for conditions that support their health, safety and human rights(203–205). Chapter 3 supports evidence from LMICs that demonstrate the positive impact of social cohesion and community empowerment on sex workers' ability to negotiate their reproductive health(42), and underscores the need for sex worker community empowerment interventions. It is imperative that the voices of sex workers steer the development of HIV/Sexual and Reproductive Health (SRH) programming, with sex workers closely involved in the development and implementation of interventions that affect them. While sex worker/peer-led models have already proven successful in increasing HIV prevention(206,207) in LMICs, there is a paucity of such evaluations in the North American setting. Sexual and reproductive health services developed and led by sex workers, that include sex worker/peer-based mobile and outreach service delivery may hold promise. Furthermore, sex worker community empowerment interventions that promote sex worker engagement and social cohesion have been found to foster sex workers' collective agency to challenge occupational harms(42), advocate for and develop workplace models that more fully support sex workers' right to positive sexual and reproductive health and safety.

This study demonstrates the need to move beyond traditional HIV/ SRH programming that focuses solely on education and behavioural change. Echoing findings elsewhere (47,195,208,209), this study highlights the urgent need for HIV/SRH programming to consider supportive interventions at the workplace-level. In particular, Chapter 3 demonstrates the potential benefit of a combination of social, policy and physical venue-based features/services in supporting positive sexual and reproductive health. This confirms exploratory and qualitative

narratives of sex workers, that beneficial venue-based features may include: increased access to supportive management, safety and security policies and measures(47,77,78), and access to sexual health and drug harm reduction services(71,196,210). There is important evidence and cautionary tales of on-site health services at sex work venues leading to more coercive or mandatory practices or loss of confidentiality(211,212). Instead, models of sex worker-led and sex worker-specific occupational health and safety services offer key opportunities for safe, non-judgmental workplace health and safety for sex workers, outside mainstream clinics. The St. James' Infirmary in San Francisco is considered a WHO/UN best practice(181,212). St. James Infirmary is run by and employs former and current sex workers, emphasizes sex worker engagement. This clinic embraces a harm reduction approach, provides a range of services including: HIV/STI care; transgender health; peer counseling; psychiatric evaluation; needle exchange and massage among others. The program also has an outreach component to street and venue-based sex workers(181).

The need for accessible, sex worker-tailored, non-judgmental and integrated HIV and reproductive health services was a cross-cutting theme across all chapters, aligning with expert recommendations elsewhere (1,128,132). Chapter 2 highlights the need for services that focus on HIV and pregnancy prevention while also supporting sex workers' intentions for pregnancy. Similarly, Chapter 4 suggests the integration of cervical screening into HIV prevention and care programming may increase suboptimal screening levels amongst HIV positive and negative sex workers. The clandestine nature of sex work, particularly sex workers working in hidden indoor venues necessitates innovative service models such as sex work-led/-engaged programming with occupational health programming and outreach at their core (127,180,213–215). This was

demonstrated in Chapters 3 and 4, where access to services via outreach increased regular voluntary pap testing and ability of sex workers to negotiate condom use for pregnancy prevention respectively.

Given the high levels of violence by intimate partners and clients in our setting and abroad (83,85) and its impacts on sexual and reproductive health outcomes(117), services which integrate violence and trauma related programming into HIV/SRH services are critical. This includes trauma counseling and the provision of respite from abusive relationships. Such programming needs to acknowledge gender-power disparities within relationships with clients and intimate partners(216,217), including gendered-power imbalances related to condom-negotiation(218). Additionally, there is a need for intimate partner violence prevention programming that targets the male perpetrator of violence, such as the Stepping Stones programme in South Africa(121).

5.3 Study strengths and limitations

The data for these analyses were drawn from the AESHA study, which was built on long-standing relationships within the community, is comprised of an interview team (some of whom have sex work experience themselves) and overseen by a community advisory board of over 15 groups, including sex work organizations. The AESHA staff has an excellent rapport with sex workers in the area, tempering common biases often associated with sex work research, such as social desirability bias. However, there are accounts in other settings of increased social desirability bias as relationships are formed with interviewers, in the context of HIV prevention studies. AESHA's close ties with sex workers and sex work groups allowed for expert

consultations throughout the study, informing my research questions and providing context for results. Finally, the use of longitudinal analytic methods in Chapters 3 and 4 is a major strength increasing the validity of study results.

This study has a number of limitations, as noted previously. Given the clandestine nature of sex work, achieving a representative sample can be challenging. To mitigate this limitation, time-location sampling in combination with community mapping (mapping of solicitation/service locations in partnership with sex workers) was conducted to sample sex workers at times and locations where they often congregate (219). Given that most of our measures relied on self-report data, these responses may be subject to social desirability bias. However, a number of studies have found sex workers and drug users provide truthful accounts of their sex and drug use activities when questioned in a non-threatening environment(185), and we believe the community-based nature of the AESHA study serves to reduce the likelihood of this form of response bias. Finally, since Vancouver was the only study site for this research, findings may not be generalizable to sex workers in other settings.

5.4 Future research

While recommendations for future research specific to each research objective are outlined in the previous chapters, a few key areas for future research will be noted here. Collectively, these studies point to the need for interventions research to promote positive sexual and reproductive health among sex workers. This would include future qualitative and quantitative research into novel integrated HIV/ SRH service delivery models, including outreach and peer-based models. Additional qualitative and quantitative research is needed to identify innovative sex work

workplace models, including identifying the optimal types and combination of workplace services and supports, and their independent and combined effect on sex workers' SRH and safety over time. There is a critical need to better understand the complex, dynamic and non-linear pathways of structural factors in shaping sexual and reproductive health; this necessitates methodological advances to effectively disentangle these multiple and intersecting factors. Such advances would require improved dialogue between epidemiology and the social sciences, including incorporating and adapting the use of longitudinal and multi-level designs into social epidemiological research. Future research should also examine the impact of the economic environment and physical safety features of work environments on sex workers' reproductive health. Such work is paramount in informing Canada's future sex work policies and regulations, particularly given recent shifts in Canada's sex work legal landscape. Moreover, there is a need for ongoing monitoring of the future changes to Canada's sex work laws the impacts of their enforcement to ensure the health, safety and human rights of sex workers are supported.

Secondly, this study provides insight into understanding the broader reproductive health needs and desires of sex workers. Future research should include a more thorough examination of pregnancy prevention methods, particularly the proper use and adherence to modern contraceptives (alone and combination with barrier contraceptives). Given high levels of pregnancy intentions among sex workers, future research is needed into fertility treatment for sex workers wanting to become pregnant, pregnancy needs and supports for sex workers wanting children, as well as the experiences and services necessary to support successful parenting among sex workers. This literature review revealed only a handful of studies that have examined access to routine reproductive services, including one on pap testing, and another on access to

antenatal services in the context of HIV care. Given the high unmet reproductive need among this population, future research should examine access to essential routine services such as pregnancy testing and counseling, perinatal care, breast cancer screening, and access to the HPV vaccine. Additionally, the relatively high levels of HIV among sex worker populations warrant further exploration into promoting the reproductive needs and wants of HIV seropositive sex workers is needed. In general, there are a paucity of studies examining HIV seropositive women's reproductive needs and rights, highlighting an urgent need for future population health ethics research to better understand the needs, including ethical challenges faced in exercising their reproductive rights.

5.5 Conclusions

Together, this dissertation examines sex workers' ability to exercise their reproductive rights, highlighting the pivotal role that structural factors play in enabling or restricting access to reproductive health services and the negotiation of their sexual and reproductive health. Macro-structural factors such as barriers to health services (e.g., poor treatment by health care staff, language barriers), criminalization of sex work that prevents sex workers from working collectively indoors, and interpersonal factors including intimate partner violence are among the challenges sex workers contend with in negotiating their reproductive health. Despite the high level of reproductive need and wants among sex workers, there remains a considerable gap in HIV/SRH services access, highlighting a need for non-judgmental sex worker-led integrated HIV/SRH services, catered to the needs to sex workers, delivered within close proximity to sex workers' place workplaces (e.g., outreach models and safer work environments). Given that Canada's former sex work laws were struck down by the Supreme Court of Canada in 2013 on

the grounds that they violated sex workers' Charter of Rights and Freedoms, the current study offers critical insight into how a decriminalized legal framework can promote positive sexual and reproductive health by facilitating the implementation of structural interventions (e.g., safer workplace models; sex worker organization and HIV/SRH services). Recognizing the reproductive rights of marginalized women, such as sex workers, and understanding the complex and powerful structural forces that forge the reproductive inequities they bear, is a small, but important step towards ensuring the complete empowerment of all women.

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