ACCESS TO HEALTH CARE AMONG WOMEN SEX WORKERS IN VANCOUVER, CANADA: UNIVERSAL HEALTH COVERAGE IN A CRIMINALIZED SEX WORK ENVIRONMENT

by

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Abstract

Background: Universal access to health care is a critical determinant of health. Despite the numerous health inequities faced by women sex workers, research on access to health services among this population remains limited, particularly on the role of social-structural factors. This thesis sought to investigate sex workers experiences along the continuum of health care access in a setting with universal health coverage.

Methods: Data was dawn from "An Evaluation of Sex Workers' Health Access"(AESHA), an open prospective cohort of women sex workers in Vancouver, Canada. Logistic regression analyses were employed to evaluate correlates of institutional barriers to care (using generalized estimating equations for longitudinal data), and to assess baseline engagement in the HCV continuum of care. Extended cox regression analyses, with a confounder model approach, were used to examine the independent effect of depot medroxyprogesterone on HSV-2 acquisition.

Results: These analyses demonstrated inequities faced by sex workers all along the continuum of health care access, from trying to reach health services (Chapter 2), to utilizing these services (Chapter 3), to the impacts of inadequate and sub-optimal care on their health outcomes (Chapter 4). Among 723 participants, 70.4% reported institutional barriers to health care, only half (52.9%) of 552 HCV-seronegative participants having a recent HCV test, and less than 1% of the 302 women living with HCV receiving treatment. Further, high incidence rates of HSV-2 were documented, with depot medroxyprogesterone use independently associated with approximately 4-times increased risk. Importantly, barriers to care appeared to be exacerbated among most vulnerable women, including sexual/gender minorities, migrants, women of Aboriginal Ancestry, uninsured and those with previous experiences of violence.

Conclusions: Findings from this research revealed systemic and persistent barriers to appropriate and quality care among sex workers, highlighting the crucial role played by structural factors in shaping their health care seeking patterns and outcomes. These results further underscore the need to explore new models of care, as well as broader institutional and legal changes to fulfill women sex workers health and human rights, and fully realize the aims of the Canadian universal health system.

Preface

This statement is to certify that the work presented in this thesis was conceived, conducted, written, and disseminated by María Eugenia Socías (MES). The co-authors of the manuscripts included in this thesis, including Dr. Jean Shoveller (JS), Dr. Kate Shannon (KS), Dr. Julio Montaner (JM), Dr. Paul Nguyen (PN), Dr. Silvia Guillemi (SGu), Dr. Shira Goldenberg (SGo), Dr. Kathleen Deering (KD), Sabina Dobrer (SD), Dr. Putu Duff (PD), and Dr. Gina Ogilvie (GO), made contributions only as is commensurate with committee, collegial, or co-author duties.

Data for the empirical analyses of this thesis was drawn from a US National Institutes of Health (NIH)-funded ongoing prospective cohort of women sex workers in Vancouver, Canada: An Evaluation of Sex Workers' Health Access (AESHA), led by KS. As the principal investigator of this study, KS has access to all of the data and takes full responsibility for the integrity of the results and the accuracy of the analyses. This study has been approved by the University of British Columbia/ Providence Health Care Research Ethics Board (H09-02803).

With substantive input from co-supervisors KS, JS and committee member JM, MES conceived the studies and wrote the research protocols. MES worked in close collaboration with PN and SD to develop a statistical analysis plan for Chapters 2-4, which was carried out by PN and SD. JS, KS, JM, and PN provided scientific input and approved the final version of the manuscript presented in Chapter 2. KS, KD, JM, PN, SGu, SGo, and SD provided scientific input and approved the final version of the manuscript presented in Chapter 3. KS, JS, JM, PD and GO provided scientific input and approved the final version of the manuscript presented in Chapter 4. All manuscripts contained in this thesis were prepared, written and edited by MES. 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.

A version of the analysis presented in Chapter 3 has been accepted for publication. Versions of Chapter 2 and 4 have been submitted for publication, and are currently under review.

<u>Chapter 2:</u> ME Socías, J Shoveller, P Nguyen, J Montaner, C Bean, K Shannon. Universal coverage without universal access: Institutional barriers to health care among women sex workers in Vancouver, Canada. *Under review.*

<u>Chapter 3:</u> ME Socías, K Shannon, J Montaner, S Guillemi, S Dobrer, P Nguyen, S Goldenberg, K Deering. Gaps in the HCV continuum of care among sex workers in Vancouver, Canada: Implications for voluntary HCV testing, treatment, and care. *Can J Gastroenterol Hepatol* 2015, in press.

<u>Chapter 4:</u> ME Socías, P Duff, J Shoveller, J Montaner, P Nguyen, G Ogilvie, K Shannon. Use of Injectable Hormonal Contraception Independently Predicts HSV-2 Acquisition in a Cohort of Street- and Off-Street Sex Workers in Vancouver, Canada. *Under review.*

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Dedication

A mi abuelo
Feli

"Un hombre del pueblo de Neguá, en la costa de Colombia, pudo subir al alto cielo. A la vuelta, contó. Dijo que había contemplado, desde allá arriba, la vida humana. Y dijo que somos un mar de fueguitos.
—*El mundo es eso* —reveló—*Un montón de gente, un mar de fueguitos*.
Cada persona brilla con luz propia entre todas las demás. No hay dos fuegos iguales. Hay fuegos grandes y fuegos chicos y fuegos de todos los colores. Hay gente de fuego sereno, que ni se entera del viento, y gente de fuego loco, que llena el aire de chispas. Algunos fuegos, fuegos bobos, no alumbran ni queman; pero otros arden la vida con tantas ganas que no se puede mirarlos sin parpadear, y quien se acerca, se enciende."

(Eduardo Galeano, El mundo, El libro de los abrazos)

CHAPTER 1: Background, rationale, and research objectives

1.1 Background

1.1.1 Canada's Health System

In Canada, most health services are delivered through a publicly funded health care system. Although the federal government sets the national standards for health care, the delivery of health services is mostly planned and regulated at the provincial or territorial level [1].

The Canada Health Act, which was passed in 1984, sets the requirements that provincial and territorial health insurance programs must meet in order to receive full federal cash annual transfers to support their health financing [2]. These include five criteria (public administration, comprehensiveness, universality, accessibility, and portability), two specific provisions (discouraging users chargers and extra-billing for insured health services), and two conditions (provision of provincial information). The goal of the Canadian Health Act is to ensure that all Canadian residents have reasonable, free and universal access to medically necessary health services.

The "public administration" criterion refers to the administration of provincial and territorial plans by a public authority accountable to the regional government ("single payer"), commonly referred to as "medicare". The "comprehensiveness" criterion stipulates that provincial and territorial plans must insure all medically necessary services. These typically include hospital, diagnostic and physician services. However, since no specification is given with regards to the

type and quantity of services that should be included in this minimum basket of services, the services insured vary among provinces. For instance, although physician-provided mental health care is publicly insured, other mental health services (such as those provided by psychologists or social workers), as well as dental and vision care, and outpatient prescription medication are often not publicly funded. The "universality" and "accessibility" criteria require that all residents in a province/territory should have uniform and reasonable access to publicly funded health services without financial or other barriers. Finally, "portability" refers to the coverage of insured services while a resident is temporally away from their home province/territory [2].

Publicly funded care is entirely financed by general tax revenues of the federal, provincial and territorial governments, which in turn is responsible of approximately 70% of the total health expenditures [3]. In some provinces/territories, including British Columbia, this is supplemented by health premiums charged to their residents. Approximately, two thirds of the Canadian population also holds private health insurance for services not included in medicare, which is mainly obtained through employment-based plans [3].

In terms of provision of services, primary health care services are the usual first point of contact with the health care system. In general, family physicians act as "gatekeepers" providing prevention and treatment of common diseases and basic emergency services, as well as referrals and coordination with more specialized forms of care [1, 3].

1.1.2 Inequalities in access to care within Canada's universal health system

Access to health care is a complex and multilevel concept that has been defined in many different ways. Throughout this thesis, I follow a definition put forward by Levesque et al., who broadly defined *access to health care* as the "opportunity to reach and obtain timely and appropriate health care in situations of perceived need for care" [4]. Under this conceptualization, *access to health care* is seen as process that starts with the identification of a health care need, continues with the seeking and reaching of health services, and culminates with the obtainment of approapriate and adequate for that perceived need.

The Canadian health system mandates free-of-charge, point-of-use access for all residents who require medically necessary services. As a result, health care utilization patterns have been taken up broadly as a proxy for health care needs [5, 6] as well as being used to monitor inequalities in access to health services [5, 7, 8]. However, utilization indicators (i.e., "realized access") may not serve as a sufficiently fulsome proxy for "access", since utilization patterns frequently fail to account for an array of individual, environmental and structural-level factors (including characteristics of the health system) that shape health care seeking behavior patterns [4]. Similarly, global measures of utilization also reveals little about the factors that drive the social patterning of utilization within or across primary care or specialist services in Canada [5, 9-13]. As such, there has been growing interest in conducting more comprehensive assessments of the process of accessing appropriate and quality health services, as well as documenting the extent of inequality in access to and use of these services. A relatively intuitive and

increasingly commonly used indicator of access to care, both in Canada and internationally, is *perceived unmet health care needs*, defined as "the difference between the care felt to be necessary to deal with a particular problem and the services actually received" [14]. Unmet care needs can arise due a variety of reasons, which have been traditionally categorized in three broad categories, including accessibility (e.g., distance/transportation, cost), availability (e.g., wait times, limited number of health care providers, service not available in the area), and acceptability barriers (e.g., language and cultural barriers) [15, 16].

Previous population-based studies indicate that up to one-quarter Canadians face difficulties when trying to access either primary or specialist care [6, 17]. Among individuals reporting difficulties accessing health services, wait times, followed by availability of services have been consistently identified as important drivers of unmet health care needs. A serious concern often linked with postponing or forgoing preventive or curative services is the potential subsequent impacts on individual health and additional burden on the health system [18, 19]. In addition, more than 30 years after the implementation of the Canada Health Act, research shows that access to health care is not uniform across the Canadian population. Consistent with the "Inverse Care Law"[20, 21], marginalized populations, including women, Aboriginal people, recent immigrants, youth, and sexual/gender minorities, are more likely to experience barriers to health services, despite having the greatest health and social needs [6, 22-28]. Identifying and understanding diverse barriers to accessing health care and characterizing the unique needs of these marginalized population subgroups will be critical for the development of effective interventions to address them.

1.1.3 Social-structural determinants of health and health care access among women sex workers

Globally, women sex workers (hereafter, sex workers) face a disproportionate burden of occupational and health risks that are largely shaped by the social, political and legal contexts, as well as gendered and cultural norms prevailing in most societies [29]. Indeed, research consistently shows that in Canada, and in other settings that criminalize sex work, sex workers experience an array of health and social harms, including elevated risks of HIV and other STIs, substance use, and violence [30-33].

Given the high burden of HIV and STIs among sex workers [34], much of the existing research on health risks and health care access among this population have been primarily within the HIV field, and until recently mainly focused on biological and behavioral factors [29, 35]. However, there has been growing awareness of the limitations of purely individual approaches to explain and address the uneven distribution of disease and resulting health inequities among marginalized populations, including sex workers [29, 35-39]. This has resulted in calls to a shift of paradigm to consider a "structural determinants" framework [29, 35, 39, 40]. Structural factors (i.e., factors that reside outside the control of individuals) that have been shown to influence health outcomes among sex workers operate at the macro-structural (e.g., regulatory approaches towards sex work and drug use, systemic barriers to housing and health care access, migration, stigma), community organization (e.g., community empowerment, sex work collectivization), and work environment level (e.g., local policing practices, violence, geographic distribution of health and social services). These factors interact dynamically with each other, and

with interpersonal (e.g., condom use, gender/power dynamics with intimate partners and/or clients) and individual (e.g., substance use, comorbidities) factors to shape risks and opportunities among sex workers [35].

In light of the accumulating evidence pointing to the importance of social-structural factors as key drivers of HIV risks and access to HIV prevention and care services, there has been increasing interest in expanding the "structural determinant" framework to investigate health outcomes more broadly among sex workers [41, 42]. For instance, an emerging body of literature has started to document how structural factors also play a critical role in shaping sexual and reproductive health inequities faced by sex workers, including high prevalence of unwanted pregnancies, low access to female-controlled contraceptives, and low rates of cervical cancer screening [41, 43-46].

However, much less is known about sex workers' experiences on access to more general forms of health services, including for other prevalent health conditions such as hepatitis C (HCV), mental health issues, substance use disorders, and gender-based violence, particularly in settings with universal health coverage [47-49]. The few existing studies suggest that alongside barriers commonly reported by the general population (e.g., wait times, service availability), sex workers also report fear of stigmatization, disrespect by health care providers, as well as policing practices and violence when seeking health care [31-33, 49]. Similarly, there is a dearth of research examining the impact of sub-optimal quality of care on sex workers' health outcomes.

1.2 Rationale

Universal access to appropriate and high quality health care is a basic human right, and has been identified as a critical determinant of sex workers' health and well-being [29, 30, 36]. While there is growing recognition of the importance of multi-level factors to explain and address health inequities among sex workers, the bulk of research has mostly been limited to the HIV field. There has been comparatively less research examining sex workers' access to health services outside the HIV/STI arena. In particular, little is known on how social-structural factors intersect with interpersonal and individual factors to enable or constrain sex workers' access to health services. The current study offers an opportunity to characterize sex workers' health needs and ascertain how social-structural factors affect their access to health services, aside from HIV/STI services in a setting with universal health coverage.

1.3 Objectives

The overarching goal of this thesis is to describe and assess women sex workers' access to health services other than HIV/STI services in Vancouver, Canada. To that end, I decided to focus on a set of relevant health services for this population: general health services, HCV services, and reproductive services. I also examined three key steps in accessing health care (i.e., health care reaching, health care utilization, and health care outcomes). Thus, the specific objectives of this dissertation are:

1. **To investigate the prevalence and correlates of institutional-level barriers to health services among women sex workers in Vancouver, Canada.** Using

multivariable logistic regression with generalized estimating equations, Chapter 2 longitudinally examines the correlates of institutional-level barriers to general health services in a prospective cohort of street- and off-street women sex workers in Vancouver, Canada, over a 44-month follow-up period. It is hypothesized that similar to research on access to HIV services, structural-level factors will also be key barriers to access to broader health services.

2. **To characterize engagement in the HCV continuum of care and identify correlates of recent HCV testing among a cohort of women sex workers in Vancouver, Canada.** Chapter 3 assesses baseline engagement in the HCV continuum of care in a prospective cohort of women sex workers in Vancouver, Canada, including prevalence of HCV, awareness of HCV status, and access to HCV-related care and treatment. In addition, given that HCV testing is the gateway to HCV-related health services, correlates of recent HCV testing are also investigated. Given increasing public health interest to expand HCV treatment to vulnerable populations, this analysis provides important information on key leakage points in the HCV continuum of care among sex workers.

3. **To investigate the effect of depot medroxyprogesterone acetate (DMPA) on HSV-2 acquisition among women sex workers in Vancouver, Canada.** Research presented in Chapter 4 investigates the impacts of DMPA, one of the most widely used long-acting, reversible contraceptives, especially among marginalized women, on HSV-2 acquisition within a longitudinal community cohort of street and off-street sex workers in Vancouver, Canada. Importantly, it has been hypothesized that increased risk of herpes simplex

virus 2 (HSV-2) may be a possible indirect pathway through which DMPA may increase the risk of acquiring and transmitting HIV. Extended Cox regression analyses, with a confounder model approach, are employed to assess the independent effect of DMPA as a predictor of HSV-2 acquisition. This analysis provides insight into potential unintended consequences of inadequate care.

1.4 Study design and population

This research was conducted as part of an ongoing, cohort study of women sex workers' in Vancouver, Canada, "An Evaluation of Sex Workers' Health Access" (AESHA). Analyses presented in this thesis are based on baseline and longitudinal data collected between January 2010 and February 2014.

1.4.1 An Evaluation of Sex Workers' Health Access

An Evaluation of Sex Workers' Health Access (AESHA) is an ongoing open prospective cohort of more than 800 women sex workers in Metro Vancouver, British Columbia, Canada, that initiated recruitment in 2010. This study was developed based on community collaborations with sex work agencies since 2005 [50] and is monitored by a Community Advisory Board encompassing more than fifteen agencies. Eligibility criteria for this cohort include, age ≥14 years, self-identification as women (including male-to-female transgender individuals), and having exchanged money for sex in the previous 30 days. Participants are recruited through a combination of outreach to outdoor/ public (e.g., streets, alleys), indoor (e.g., massage parlours, micro-brothels, in-call locations), and off-street (e.g., online

and newspapers advertisements) sex work venues across Metro Vancouver, using time-location sampling [51, 52].

After providing written informed consent, at baseline and on a bi-annual basis thereafter, participants complete an interviewer–administered questionnaire by trained women interviewers (both experiential and non-experiential). The questionnaire collects socio-demographic information, sex work patterns, sexual health (including contraceptives and condom use) and intimate partners, violence and trauma, drug use patterns, health care services access and utilization, and physical, social and structural characteristics of the working and living environment. In addition, at each visit, a project nurse offers participants HIV and HCV and other sexual transmitted infections (STIs) testing, alongside pre- and post-test counseling. The project nurse also provides basic treatment for STIs onsite, as well as referrals to health services when needed. Participants receive an honorarium of CAD$ 40 at each visit for their time and expertise. The study has received ethical by the Providence Health Care/University of British Columbia Research Ethics Board.

1.5 Overview of thesis

This thesis is divided into 5 chapters. Chapter 1 offers an overview of the Canadian Health System and inequalities in access to care among the general Canadian population. It also presents existing knowledge gaps regarding social-structural factors driving inequalities in health care access among sex workers. Chapters 2, 3 and 4 are empirically driven original analyses. Chapter 2 starts by identifying correlates of institutional barriers to general health services among

women sex workers in Vancouver, Canada. Building on these findings, and given the high prevalence of HCV among sex workers in this setting but a dearth of research examining sex worker's experiences with HCV-related services, Chapter 3 seeks to specifically characterize access and uptake of HCV testing, treatment and care among this population. The analysis presented in Chapter 4 moves farther along in the continuum of access to health care to explore how adequacy of care can impact health outcomes. To this end, Chapter 4 investigates the independent effect of depot medroxyprogesterone acetate, a controversial long-acting reversible contraceptive, usually prescribed to marginalized women, on HSV-2 acquisition. Importantly, in addition to HSV-2 associated morbidity, this STI can also lead to increased risk of HIV and negative pregnancy outcomes. Finally, Chapter 5 provides a summary and discussion of key implications of the empirical analyses undertaken in Chapters 2-4 in terms of future research directions, ongoing theoretical advancement, and policy and practice related to the provision of health care for women sex workers in this Canadian setting.

CHAPTER 2: Universal coverage without universal access: Institutional barriers to health care among women sex workers in Vancouver, Canada

2.1 Introduction

As a basic human right and a critical determinant of individual and population health outcomes [36], Universal Health Coverage (UHC) is the subject of a globally approved United Nations General Assembly resolution (A.67/81) [53], and has emerged as a key component of the 2030 Sustainable Development Goals [54]. In light of the Canada Health Act, which establishes that all Canadian residents should have "reasonable access to health services without financial or other barriers", Canada is frequently described as a leader in the realization of UHC [55]. Unfortunately, in reality, many Canadians, including women, recent immigrants, Aboriginal people, and youth, face multiple institutionally-generated barriers when trying to access good quality and appropriate health services [6, 22-25, 27]. As a result, many postpone or forgo seeking care, with potentially catastrophic impacts on their health [18, 19].

Access to health care can broadly be conceived as "the opportunity to reach and obtain timely and appropriate health care in situations of perceived need for care" [4]. Accumulating evidence suggest that access to health services is a multidimensional and complex concept that results from the interaction between individual factors, social and physical living and working environments, the

characteristics of the health system, and macro-structural-level factors (e.g., laws and policies) [4, 56, 57]. Among these, health system-related factors, including service accessibility (e.g., distance/transportation), availability (e.g., waiting times), and acceptability (e.g., language and cultural barriers) have been acknowledged as particularly important from a health policy perspective as they concomitantly disenfranchise those most in need, while being most amenable to institutional-level interventions (e.g., funding formulae; hospital policies; legal frameworks) [15, 16].

Research shows that in Canada, and in other contexts that criminalize sex work, sex workers bear an array of health and social harms, including violence, exposure to HIV and other STIs, and substance use that require attention within the health care system [30-33]. While access to health care has been identified as a key determinant of sex workers' health [29, 30], research on institutional-level barriers that affect sex workers' access to appropriate and high-quality health care remains limited, particularly in settings with UHC. To address this gap, the current study documents the prevalence and correlates of institutional-level barriers to health services among a prospective cohort of street- and off-street sex workers in Vancouver, Canada.

2.2 Methods

2.2.1 Study design, population and procedures

As described in Chapter One, An Evaluation of Sex Workers' Health Access (AESHA) is an ongoing community-based, prospective cohort of sex workers recruited through time-location sampling [51, 52], and outreach to outdoor/public (e.g., streets, alleys), indoor (e.g., massage parlours, micro-brothels, in-call

locations), and off-street (e.g., online and newspapers advertisements) sex work venues across Metro Vancouver beginning in 2010, that was developed based on community collaborations with sex work agencies since 2005, and that has been described in detail previously [50]. In brief, individuals aged 14 years and older, who self-identify as women (including transgender women), have exchanged sex for money in the previous 30 days at baseline, and provide written informed consent are eligible for inclusion. After providing written informed consent, at baseline, and on a bi-annual basis thereafter, participants complete a main interviewer-administered questionnaire, and a health-specific questionnaire, followed by voluntary HIV/HCV/STI testing. Basic treatment for STIs is also offered onsite, regardless of inclusion in study. Interview, outreach and nursing staff include both experiential (current/former sex works) and non-experiential staff with substantial community rapport. The main questionnaire collects socio-demographic data, sex work and drug use patterns, intimate partners, and physical, social and structural characteristics of the working and living environment. The clinical questionnaire elicits information on overall health and wellness, and health care services access and utilization. Participants receive an honorarium of $40CAD for their time and expertise at each study visit. The study has been approved by the Providence Health Care/University of British Columbia Research Ethics Board, and is monitored by a community advisory board of 15+ women, sex work and policy partner agencies. For the current analysis, participants were eligible if they completed at least one study visit between January 1, 2010 and August 31, 2013.

2.2.2 Study variables

The primary outcome of interest for this analysis was a time-updated variable (using the prior 6 months as a reference point) of having experienced one or more institutional-level barriers to accessing health care. Institutional-level barriers were categorized in two broad ways: (1) Availability of care (operationalized as having experienced no or poor access to care due to any or all of the following: limited hours of operation or limited number of physicians at clinical site(s), and long wait times); and (2) Acceptability of care (operationalized as having experienced poor quality care due to any or all of the following: was not served in preferred language, health care provider of preferred sex/gender was not available, and felt disrespected by health care providers).

Based on prior literature examining access to health care a number of independent variables that have been shown to influence access to health services, with a particular focus on social-structural-level factors, were considered [4, 29, 56]. Time-fixed variables of interest at baseline included: socio-demographic characteristics, such as: age (<25 versus ≥25 years), Aboriginal/Indigenous ancestry (inclusive of First Nations, Metis, Inuit, yes versus no); sexual/gender identity (lesbian, gay, bisexual, transgender* or two-spirit, —LGBT*2S—versus cis-gender and straight); and, international migration status (immigrant/migrant versus Canadian-born). All other variables considered were time-updated variables at each semi-annual follow-up using the last 6 months as a reference point, and were dichotomized (yes versus no) unless otherwise specified. These include: individual medical comorbidities (HIV and HCV sero-status based on biological testing, and self-reported lifetime diagnosis of mental illness, including depression, post-

traumatic stress disorder, anxiety, schizophrenia, and borderline personality, attention deficit and bipolar disorders); individual behaviours, such as non-injection or injection drug use; and interpersonal-level risks, such as physical/sexual violence by partners or clients. The analysis also accounted for other previous experiences of violence and interactions with police, including having been threatened/verbally assaulted by community residents or businesses, self-reported police harassment without arrest (e.g., having been held against will, property confiscated, police raid, verbally harassed), having been arrested by police, and incarceration. Furthermore, the analysis included other structural-level factors, such as unstable housing, financially supporting dependents (e.g., child or partner), having a provincial health insurance card; as well as physical and social features of the environments where sex workers provide primarily services to their clients (formal sex work establishment/in-call venue, such as massage/beauty parlours or micro-brothels; informal indoor/out-call venues, such as sauna, bar/clubs, hotel/hourly rental, or clients' house; or outdoor/public space, such as street, public washroom, or car). Unstable housing was defined as any one night or longer stay in a single room occupancy hotel, shelter, hostel, hotel, treatment/recovery house, couch surfing, staying with friends or family, staying in a vehicle, on the street/alley/park, or squatting.

2.2.3 Statistical analyses

As a first step, baseline individual-, interpersonal- and structural-level factors, stratified by participants' reports of institutional-level barriers to care at some point during the study period were examined. Since analyses of factors

potentially associated with reporting institutional barriers to health care included serial measures for each participant bivariate and multivariable logistic regression using generalized estimating equations (GEE) analyses with a logit link for the dichotomous outcome was then undertaken. The GEE method provides standard errors adjusted for the repeated measurements from the same participant using an exchangeable correlation structure. Variables found to be associated with institutional-level barriers at p <0.10 level in bivariate analyses were considered for inclusion into the multivariable model. As in previous research [46, 58], the multivariable model was built using a backward selection approach. Quasi-likelihood under the independence model criterion (QIC) was used to identify the model with the best overall fit as indicated by the lowest QIC value.[59] All statistical analyses were performed using the SAS software version 9.4 (SAS Institute, Cary, NC, USA).

2.3 Results

In total, 723 sex workers were enrolled between January 1, 2010 and August 31, 2013. At baseline, the median age was 34.5 years (Interquartile range [IQR] 28.0–42.0). As shown in Table 1, over a third were of Aboriginal ancestry (35.8%), and over a quarter were immigrants/migrants to Canada (27.4%). Overall, 11.2% participants were living with HIV and 41.8% with HCV. Recent use of non-injection and injection drugs at the time of enrolment was relatively high, 68.6% and 39.4% respectively. These 723 sex workers contributed to 2506 observations for this analysis. Over the 44-month study period, there were 1097 institutional-level barriers events (43.8%), with 509 participants (70.4%) reporting at least one time

when they could not access care due to institutional-level barriers. As indicated in Figure 1, the most frequently reported institutional-level barriers were those related to service availability including long wait times (54.6%) and limited hours of operation (36.5%). In addition, over one-quarter of study participants reported having been unable to access acceptable health care due to feeling disrespected by health care providers (26.1%).

Table 2 presents results of the bivariate and multivariable GEE logistic regression analyses. In the bivariate analysis, factors positively associated with experiencing institutional barriers over the study period included self-identification as a gender/sexual minority, having ever been diagnosed with a mental illness, recent use of injection drugs, having experienced violence by intimate partners and/or clients, not having a provincial health insurance card, having been threatened by community residents or businesses, and having been harassed or arrested by the police. On the contrary, women living with HIV and immigrant participants had reduced odds of experiencing these barriers.

In the multivariable GEE model, self-identification as a gender/sexual minority (adjusted odds ratio [AOR] = 1.32, 95% Confidence Interval [CI] 1.03–1.69), having ever been diagnosed with a mental illness (AOR=1.66, 95% CI 1.34–2.06), having experienced violence by intimate partners (AOR=1.46, 95% CI 1.10–1.94) or clients (AOR=1.31, 95% CI 1.05–1.63), not having a provincial health insurance card (AOR=3.47, 95% CI 1.59–7.57), and having been threatened by community residents or businesses (AOR=1.41, 95% CI 1.04–1.92 remained independently associated with increased odds of experiencing institutional barriers to care; while women living with HIV remained associated with reduced odds (AOR=0.54, 95% CI 0.39–0.72).

2.4 Discussion

Despite Canada's universal health system, these results show that women sex workers in Vancouver continue to face high prevalence of institutional barriers to health care. Over a 44-month follow-up period, seven of every ten participants reported institutional barriers to health services, approximately three-times higher than estimates of difficulty accessing either primary or specialist care among the general Canadian population [6, 17]. Long wait times were the most frequently experienced institutional-level barrier, affecting more than half of the sex workers evaluated. Moreover, one quarter of study participants reported that feeling disrespected by health care providers interfered with their ability to access care. Alarmingly, those who may have the greatest and most complex health care needs (e.g., immigrants; gender/sexual minorities; those who experience mental health problems, or have experienced violence) were also more likely to experience institutional barriers. In order to fully realize the goals of the Canada Health Act and ensure sex workers' access to safe, non-judgemental, quality health services, interventions within the health system, as well as broader institutional changes across multiple sectors will be needed. Models of care that are sex-worker-led, integrated and low-threshold service delivery hold promise, as does the removal of criminal sanctions against all aspects of sex work.

A key and extremely relevant finding of the current study is that sex workers reporting having experienced violent events, either at the partner-, workplace- (i.e., client violence), or community-level (i.e., threatened by community residents or businesses), were at 30% to 50% increased odds of experiencing institutional barriers to health care. This is in line with previous research demonstrating links between

partner- and workplace-based violence and reduced access to health services [32, 60-62]. These findings reflect the pervasiveness of violence, as well as ongoing stigma and discrimination against sex workers. Indeed, an emerging body of evidence indicates that sex workers suffer a disproportionate burden of violence compared to the general population of women, which is usually enhanced by the cultural taboos against the sell of sex and the criminalized or quasi-criminalized nature of sex work prevailing in many parts of the world [61, 63-65]. Fear of arrest or police harassment forces sex workers to work in more isolated and hidden spaces, limiting their ability to work together, and placing them at increased risk of violence [29]. Further, criminalization contributes to an environment, where violence against sex workers is seen as normal or justified [30]. Gender-based violence, in turn, is a well-known structural determinant of multiple adverse health outcomes, including increased risk for HIV infection and other STIs, unintended pregnancies, mental health problems, and mortality [61, 66]. Collectively, these findings point to the importance of a human rights approach to the provision of health care, as well as other potential health-related benefits of decriminalizing sex work. Sex workers' safety and access to health services and other support resources is a public health imperative [31, 32, 67]. In addition, evidence from other settings suggests that community empowerment and other health-promoting institutional arrangements (e.g., sex work collectives and unions) may also buttress other macro-level reforms (e.g., legal reforms regarding sex work), as well as other efforts to address violence reduction and promote more accessible and acceptable forms of health care provision for sex workers [68-72]. Alongside these efforts to reduce violence, systems should be put in place to rapidly respond when an episode of violence occur, and facilitate access of

victims of violence to non-judgemental health services, counselling and other relevant legal and social support [73].

Unsurprisingly, not having a provincial health insurance card was a strong correlate of reporting institutional-level barriers to health care. Despite Canada's national publicly funded health system, a substantial number of individuals lack health insurance, mainly homeless, migrants with precarious status, as well as landed immigrants in mandatory waiting periods for provincial health insurance, all of whom might face multiple and intersecting health and social disparities [74-77]. Disrespectful treatment by health care providers, distance to available health services or limited knowledge on how to navigate them, as well as fear of being denounced to immigration among migrants with precarious status are obstacles frequently reported by these vulnerable groups [75, 76, 78, 79]. These barriers are often exacerbated among sex workers due to the criminalized and highly stigmatized nature of sex work in Canada [76, 77, 80]. In addition to being excluded from publicly funded coverage, uninsured individuals usually cannot seek private health insurance due to high costs and/or lack of citizenship status [75, 76, 78, 79]. Indeed, previous research in Vancouver shows that recent migrant women sex workers have 3-fold increased odds of unmet health care needs compared to Canadian-born counterparts [81]. While community-based health centres offer no-cost care, their long waiting lists and enrolment requirements (e.g., to live within clinic's catchment area, to have identification documents) often result in postponement or avoidance of care [76]. Collectively, these data underscore the urgent need for structural-level interventions to remove barriers to care, particularly among medically uninsured sex workers. Models from a variety of settings, including the Mobile Access Project (MAP van) in Vancouver, Canada, the St. James

Infirmary in San Francisco, CA, USA, and the Sonagachi Project in India, indicate that peer/ sex worker-driven models are critical to facilitate access to health services for hidden, stigmatized and highly mobile populations such as under housed and migrant sex workers [46, 82-85]. The elimination of waiting periods for provincial health insurance, alongside increases of human and financial resources allocated to community health clinics and relaxation of their enrolment criteria could go a long way to addressing the pressing health care needs of this vulnerable population subgroup [76].

In the current analysis, sexual/gender minority women were more likely to experience institutional-level barriers to health care, reinforcing the urgent need for gender-sensitive and culturally appropriate care that is tailored to the special needs of sexual and gender minorities. Although, the LGBT community is not a homogenous group, they share a long history of pervasive marginalization and systematic exclusion from healthcare, which continues to shape the numerous health inequities that affect this population [86-89]. Sexual and gender minorities face multiple challenges in accessing appropriate primary and secondary care, including refusal of care, harassment, and lack of competent and sensitive providers with adequate knowledge of their unique needs, which may further exacerbate these inequities [26, 86, 87, 90-92]. Again, St. James Infirmary offers a best practices approach to sex worker-led occupational safety and health clinics for sex workers of all genders and sexual orientations [84]. Expanding and emphasizing LGBT-related topics in medical and nursing schools' curricula, as well as recurrent training to health care workers could also contribute to a more knowledgeable and sensitive health care workforce. This, alongside the development of strong anti-discriminatory health policies in health care provision will be critical for the

achievement and sustainability of appropriate, safe and welcoming health service environments for all sex workers [93-95].

Additionally, participants with diagnosed mental disorders had increased odds of reporting institutional barriers to health care. It is well known that untreated mental health needs can have significant negative health and socio-economic consequences, both for the individual and for the health system [96-100]. Thus, the finding that sex workers with mental disorders were not accessing health services, including treatment for their mental health condition, is highly concerning. Past research has documented high prevalence of unmet health care needs among individuals with mental illnesses [96, 101-104]. Uptake of mental health services are known to be affected by several factors, including those at the intra- and inter-personal level (e.g., stigma, distrust about the effectiveness of treatments, low self-perceived need for services), as well as institutional-level barriers (e.g., availability and accessibility of services) [96, 104, 105]. Importantly, institutional barriers seem to be more prevalent among individuals with severe/moderate illnesses [96, 103, 106]. In addition, while services by psychiatrists are covered under the Canada Health Act, other mental health-related services, such as psychotherapy or other psychosocial interventions, as well as outpatient prescription drugs are excluded, which might be contributing to a portion of unmet care needs in this population.[55] Indeed, although to a lesser extent than the United States, financial barriers to mental health services are also reported within Canada's universal health system [101, 102, 104, 107]. Altogether, these findings point to the need to revisit mental health services coverage by Canada's publicly-funded health system, as well as to explore interventions that take into account the specific needs of patients with

moderate/severe mental disorders in order to improve the access to and quality of the mental health services, and ultimately reduce health disparities.

Finally, a somewhat unexpected finding of this analysis was that women living with HIV were less likely to report institutional barriers to health care. Historically, women living with HIV have faced multiple structural barriers to appropriate and quality health care, including HIV related care [108-110]. This is particularly true for key HIV-affected populations, such as women sex workers. Pervasive stigma and discrimination within and outside the health sector, as well as punitive laws targeting sex work, have been identified as important drivers of health care avoidance and sub-optimal HIV treatment outcomes among sex workers [29, 111-113]. However, within the current context in Vancouver, it could be the case that rapid scale up of an intensive government-sponsored HIV prevention and care initiative (launched in 2010 and designed to maximize the individual and public health benefits of antiretroviral therapy) [114], coupled with the roll-out of women-centred care models [115] might have resulted in better access and engagement in HIV care among women sex workers. This, in turn, might have contributed to improved general care among women living with HIV in our cohort. Yet, in a sub-analysis restricted to sex workers living with HIV, we found that marginalized sub-populations, including sexual/gender minorities, immigrants, and women without a provincial health insurance card were at increased odds of reporting institutional barriers to health services (data not shown), highlighting the need for further research to examine access barriers as they specifically pertain to women sex workers living with HIV. In addition, the evidence documenting negative health and social outcomes associated with criminalization of sex work, including violence by clients and police, increased risk of HIV and other STIs, as well as food and

housing insecurity, should not be overlooked [29, 30, 32, 61, 109]. Nor should we overlook the potential for criminalization of sex work and HIV to continue to promote institutional level barriers to accessing health care through stigma, discrimination, and fear of legal reprisals, which creates serious impediments to a range of primary and secondary prevention initiatives, in addition to HIV treatment efforts. As modelling studies indicate, decriminalization of sex work (as a single intervention) could avert approximately 40% of HIV infections among sex workers and their clients in the next decade in Vancouver [29].

A number of limitations should be considered in the interpretation of the current study. First, due to the criminalized and stigmatized nature of sex work in Canada, the study sample was not randomly selected, and therefore these results might not be generalizable to other populations of sex workers. To mitigate this potential selection bias, time-location sampling [51, 52], a well-known strategy for achieving representative samples of hard-to-reach and hidden populations, was employed. Second, this analysis relied on self-reported data that might have been affected by social desirability or underreporting. However, all the interviews were conducted in safe and privacy-enhancing environments by interviewers with extensive experience and strong community rapport (including experiential staff), and there is no reason to believe that there would be differences in the reporting of sensitive data between participants who experienced barriers to health care and those who did not. Third, the primary outcome was based on a self-report measure over a 6-month recall period, which could have resulted in the underestimation of the real prevalence of institutional-level barriers to health care in this sample. Similarly, participants might have experienced other institutional-level barriers (e.g., costs, distance/transportation) that were not included in our questionnaire. Fourth,

although this analysis relied on prospective longitudinal data, given the study design (e.g., 6-month reference point for both the time updated outcome and explanatory variables) does not permit the establishment of temporal and causal pathways.

In summary, this study found that despite Canada's universal health system, women sex workers in Vancouver continue to face alarmingly high prevalence of institutional-level barriers to health services, including long wait times, limited hours of operation, and perceived disrespect by health care providers. Further, consistent with the Inverse Care Law [20], some of the most marginalized women and with greatest health care needs in this sample were at increased risk of experiencing these barriers. First and foremost, these findings supports global calls to the removal of criminal sanctions against all aspects of sex work to fully fulfill women sex workers health and human rights. In turn, results from this study highlight the need for safe and enabling environments that can promote sex workers' access to appropriate health services. Globally, there are experiences of proportionate universalism approaches [116], where sex-worker-led, low-threshold service delivery models have been demonstrated to improve access to health care, and decrease the numerous health and social inequities faced by this population [46, 82-85]. It is time to take similar action within the Canadian context in terms of our efforts to provide universal access within a globally respected UHC system; too much is at stake to accept the status quo.

Table 2.1 Baseline characteristics of sex workers, stratified by self-reported institutional-level barriers to health care at some point during the study period, Vancouver, Canada, 2010-2013

Characteristic	Total, n (%)† (N = 723)	Institutional barriers to health care*, n (%)	
		Yes (n = 509)	No (n = 214)
Individual-level factors			
Age <25 years old	96 (13.3)	63 (12.4)	33 (15.4)
Aboriginal ancestry	259 (35.8)	196 (38.5)	63 (29.4)
Sexual/gender minority	184 (25.5)	146 (28.7)	38 (17.8)
Immigrant to Canada	198 (27.4)	114 (22.4)	84 (39.3)
HIV positive*	81 (11.2)	56 (11.0)	25 (11.7)
HCV positive*	302 (41.8)	232 (45.6)	70 (32.7)
Mental health illness*	347 (48.0)	282 (55.4)	65 (30.4)
Non-injection drug use*	496 (68.6)	376 (73.9)	120 (56.1)
Injection drug use*	285 (39.4)	227 (44.6)	58 (27.1)
Interpersonal-level factors			
Physical/sexual violence by partners*	109 (15.1)	89 (17.5)	20 (9.4)
Physical/sexual violence by clients*	168 (23.2)	131 (25.7)	37 (17.3)
Structural-level factors			
Unstable housing*	590 (81.6)	420 (82.5)	170 (79.4)
Supports others financially*	209 (28.9)	133 (26.1)	76 (35.5)
No provincial health insurance card*	12 (1.67)	7 (1.4)	5 (2.4)
Primary place of servicing clients*			
Formal sex work/in-call establishment	222 (30.7)	127 (25.0)	95 (44·4)
Informal indoor venue	189 (26.1)	141 (27.7)	48 (22.4)
Outdoor/public space	312 (43.2)	241 (47.4)	71 (33.2)
Threatened/ verbally assaulted by community residents or businesses*	103 (14.3)	90 (17.7)	13 (6.1)
Police harassment without arrest*	272 (37.6)	204 (40.1)	68 (31.8)
Police arrest*	49 (6.8)	40 (7.9)	9 (4.2)
Incarceration*	108 (14.9)	82 (16.1)	26 (12.2)

* Time-updated variable using last 6 months as a reference point

† Percentages may not necessarily sum to 100% due to missing observations or rounding error.

Table 2.2 Bivariate and multivariable GEE logistic regression analyses of correlates of self-reporting institutional barriers to health care among a prospective community cohort of sex workers in Vancouver, Canada, 2010-2013

Characteristic	Odds Ratio (95% CI)	
	Unadjusted	**Adjusted‡**
Individual-level factors		
Age <25 years old (yes vs. no) †	1.35 (0.96 – 1.88)	
Aboriginal ancestry (yes vs. no)	0.96 (0.78 – 1.20)	
Sexual/gender minority (yes vs. no) †	1.49 (1.17 – 1.89)	1.32 (1.03 – 1.69)
Immigrant to Canada (yes vs. no) †	0.78 (0.61 – 1.00)	
HIV-positive (yes vs. no) *†	0.57 (0.42 – 0.78)	0.54 (0.39 – 0.72)
HCV-positive (yes vs. no) *	0.86 (0.69 – 1.06)	
Mental health illness (yes vs. no) *†	1.79 (1.45 – 2.20)	1.66 (1.34 – 2.06)
Non-injection drug use (yes vs. no) *	1.07 (0.86 – 1.32)	
Injection drug use (yes vs. no) *†	1.22 (1.01 – 1.48)	
Interpersonal-level factors		
Physical/sexual violence by partners (yes vs. no) *†	1.70 (1.30 – 2.21)	1.46 (1.10 – 1.94)
Physical/sexual violence by clients (yes vs. no) *†	1.53 (1.25 – 1.88)	1.31 (1.05 – 1.63)
Structural-level factors		
Unstable housing (yes vs. no) *	1.15 (0.95 – 1.40)	
Supports other financially (yes vs. no) *	1.13 (0.93 – 1.38)	
No provincial health insurance card (yes vs. no) *†	2.19 (1.02 – 4.72)	3.47 (1.59 – 7.57)
Primary place of servicing clients (ref: formal sex work establishment/ in-call venue) *		
informal indoor venue	1.07 (0.83 – 1.37)	
outdoor/public space	1.20 (0.93 – 1.57)	
Threatened/ verbally assaulted by community residents or businesses (yes vs. no) *†	1.73 (1.30 – 2.30)	1.41 (1.04 – 1.92)
Police harassment without arrest (yes vs. no) *†	1.30 (1.09 – 1.54)	
Police arrest (yes vs. no) *†	1.89 (1.23 – 2.90)	1.52 (0.96 – 2.41)
Incarceration (yes vs. no) *	1.17 (0.91 – 1.49)	

* Time-updated variable using last 6 months as a reference point
† Significant at p < 0.10 in the unadjusted analyses and considered as potential confounders in the multivariable model selection process.
‡ Only the final list of variables included in the multivariable model after variable selection is included in this column.

Figure 2.1 Frequency of institutional-level barriers to health care among sex workers in Vancouver, Canada, 2010-2013
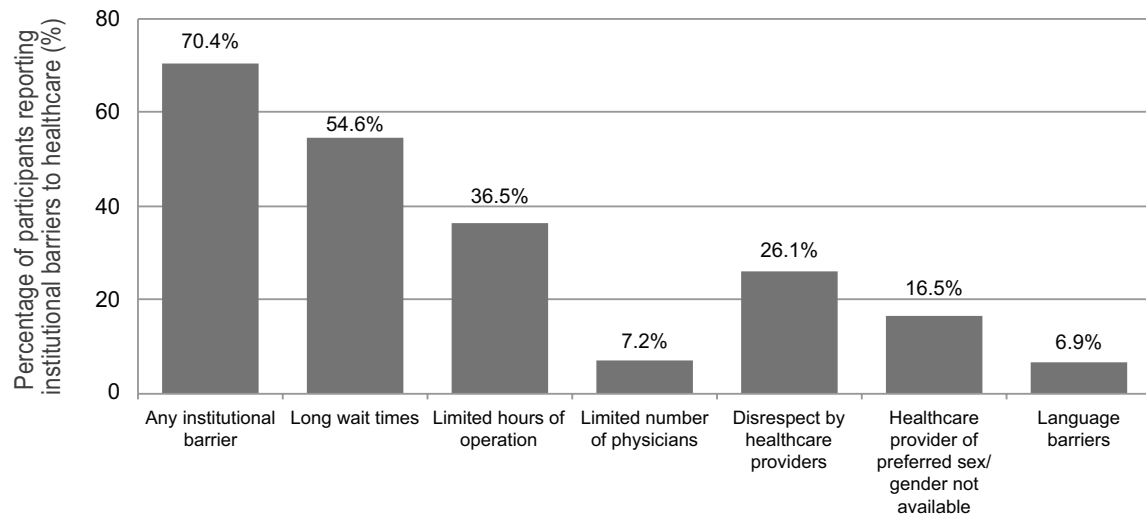
CHAPTER 3: Gaps in the HCV continuum of care among sex workers in Vancouver, Canada: Implications for voluntary HCV testing, treatment, and care

3.1 Introduction

Chronic hepatitis C (HCV) is an emerging global health problem. According to recent estimates, more than 185 million people worldwide are living with chronic HCV infection [117]. Without treatment, between 15% and 30% of people with HCV will progress to cirrhosis, end-stage liver disease, hepatocellular carcinoma and eventually death. Indeed, HCV is thought to be responsible for 350,000 annual deaths globally [117]. HCV infection accounts not only for an important health and social burden [118], but also for a significant economic burden, both for the health system [119-121] and for the affected individual [122]. Importantly, the economic burden of HCV is heavily associated with the treatment of complications associated with end-stage liver disease (e.g., cirrhosis, hepatocellular carcinoma), while viral clearance (i.e., sustained viral response [SVR]) has been associated with lower costs [121, 123, 124].

The burden of chronic HCV infection is also substantial in Canada, with approximately 0.8% of the Canadian population—nearly 250,000 individuals—living with HCV in 2007 [125, 126]. However, this figure is likely to be an underestimate of the real prevalence, which could be up to 2.8% [127, 128]. Chronic

HCV is the leading indication for liver transplantation [129], and modeling studies have projected that, under the current status-quo scenario, the incidence of HCV-related complications will continue to rise until at least 2035 [121, 126]. In fact, a recent study from Ontario, Canada, found HCV to be the infectious disease accounting for the greatest loss of health-adjusted life years in the province [118].

Recent advances in HCV therapeutics have resulted in high success rates for all genotypes (>90-95% in most scenarios). Newer treatments are markedly more effective, safer, shorter and better tolerated [117]. Importantly, HCV eradication is associated with up to 90% reductions in all-cause mortality, risk of developing hepatocellular carcinoma and need for liver transplantation [130]. Additionally, achieving a sustained virological response has a secondary prevention benefit, by eliminating the risk of onward transmission of HCV [131, 132]. Indeed, given increasing availability of highly curative HCV drugs, and building on lessons from the HIV field [133], there have been increasing global calls to consider the implementation of an HCV treatment as prevention strategy [131, 132]. However, this needs to be tempered by the potential for HCV reinfection.

A comprehensive HCV treatment and prevention strategy would need to meet a number of critical steps to achieve optimal individual- and population-level health outcomes [134]. Knowledge of HCV status (i.e., being tested for and diagnosed with HCV) represents a critical first step in the HCV cascade of care. However, a substantial proportion of individuals living with HCV (at least 21% in Canada) remain unaware of their HCV status [126, 135]; and are not connected to care and treatment, and consequently are at risk for poor health outcomes. Collectively, these issues highlight the critical importance of access to and uptake of

HCV treatment, as well as other prevention strategies, particularly among key affected populations, to maximize the impact of HCV efforts.

HCV disproportionally affects groups who are under-represented in health surveillance and who are underserved by the health system. Sex workers, particularly those who are street-involved and use injection drugs, may be particularly vulnerable to HCV[117, 136]. In addition, multiple studies show that sex workers face many unique challenges that can severely reduce their access to and uptake of health services. These include fear of disclosing sex work or drug use due to criminalization and stigmatization, disrespect by health care providers, poor quality of care, and lack of women- and sex worker-tailored services, among others [31, 32]. However, and despite the increased vulnerability to HCV through dual sex/drug use routes and barriers to health services among sex workers, research on access to HCV testing and care among this population remains negligible. Therefore, the aim of the current study was to characterize engagement in the HCV continuum of care and identify correlates of recent HCV testing among a cohort of women sex workers in Vancouver, Canada.

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3.2 Methods

3.2.1 Study design

Data was drawn from An Evaluation of Sex Workers' Health Access (AESHA), an ongoing open prospective cohort of more than 720 women sex workers in Metro Vancouver, British Columbia, Canada, initiated in 2010. This study was developed based on community collaborations with sex work agencies since 2005 [50] and is monitored by a Community Advisory Board encompassing more than

fifteen agencies. Eligibility criteria for this cohort include, age ≥14 years, self-identification as women (including male-to-female transgender individuals), and having exchanged money for sex in the previous 30 days. Participants are recruited through a combination of outreach to outdoor/ public (e.g., streets, alleys), indoor (e.g., massage parlours, micro-brothels, in-call locations), and off-street (e.g., online and newspapers advertisements) sex work venues across Metro Vancouver, using time-location sampling [51, 52]. Sampling and recruitment procedures have been described in detail elsewhere [50].

After providing written informed consent, participants complete an interview–administered questionnaire at baseline and every six months thereafter, and are offered HIV, HCV and other sexual transmitted infections (STIs) testing, alongside pre- and post-test counseling. The questionnaire collects socio-demographic information, sex work patterns, sexual health and intimate partners, violence and trauma, drug use patterns, health care services access and utilization (including HIV and HCV care), and physical, social and structural characteristics of the working and living environment. A trained nurse provides basic treatment for STIs onsite, as well as referrals to health care services when needed. Participants receive an honorarium of $40CAD at each visit for their time and expertise. The study has been approved by the Providence Health Care/University of British Columbia Research Ethics Board.

The current study used cross-sectional baseline data from participants who enrolled between January 2010 and August 2013.

3.2.2 HCV continuum of care

Study population. For the analysis characterizing the HCV continuum of care, only participants with serologically confirmed HCV infection (i.e., HCV antibody [Ab] positive) at baseline were included.

Statistical analysis. Descriptive statistics were used to assess engagement in each step of the HCV continuum of care, including the proportion of: 1) women living with HCV, 2) diagnosed and aware of their infection, 3) access to HCV related-care, 4) offered treatment, and 5) received treatment. Access to HCV care was evaluated through several questions regarding HCV care in the six months prior to the baseline visit, including if women had received regular blood tests for HCV, had seen an HCV specialist, had been offered HCV treatment (including if declined) and had been receiving HCV treatment. The total number of HCV Ab-positive participants at baseline was used as denominator for all of the calculations.

3.2.3 Recent HCV testing

Study population. The analysis of correlates of recent HCV testing was restricted to sex workers who self-reported being HCV-seronegative at enrollment or who acquired HCV less than one year before the date of their baseline visit.

Primary outcome. The primary outcome of interest for this analysis was recent HCV testing, defined as self-reporting having tested for HCV within the 12 months prior to the baseline visit. Participants who had never tested for HCV or those whose last test was >12 months were considered to not have a recent HCV test.

Explanatory variables. Based on previous studies examining correlates of uptake of HCV and HIV testing among sex workers and other vulnerable populations [137-143], a range of individual, contextual and social-structural explanatory variables that were hypothesized to influence utilization of HCV testing in this setting were selected. Individual-level factors examined included socio-demographic characteristics, and substance use behaviors, such as: age (per year older), Aboriginal/Indigenous ancestry (including First Nations, Métis and Inuit peoples, yes versus no), international migration status (immigrant/migrant versus Canadian-born), self-identification as sexual/gender minority (lesbian, gay, bisexual, transgender or two-spirit—LGBT—versus heterosexuals), baseline HIV status (positive versus negative), heavy alcohol drinking (>4 drinks per day, yes versus no), and any non-injection or injection drug use (yes versus no). Contextual factors evaluated included: current place of residence (living in the inner city drug use epicentre [Downtown Eastside, DTES] versus elsewhere in Vancouver versus being homeless), physical and social features of the work environment such as primary place of soliciting clients (street/public place versus others, including off-street independent/self-advertising or off-street indoor venue-based solicitation), servicing a higher number of clients (≥10 versus <10 clients/week), inconsistent condom use with clients (defined as 'usually', 'sometimes', 'occasionally' or 'never' versus 'always'), client perpetrated physical or sexual violence (yes versus no), involvement in peer support (yes versus no), and recent incarceration, defined as having been in detention, prison or jail overnight or longer (yes versus no). Social-structural barriers to health services, including limited availability (defined as limited hours of operation or long wait times) and language barriers (yes versus no)

were also considered. Except for the socio-demographic variables, all other variables refer to the 6-month period prior to the baseline visit.

Statistical analysis. First, individual-, contextual- and social-structural-level factors among participants who self-reported having a recent HCV test to those who did not were compared. In the bivariate analyses, logistic regression was used to analyze the categorical and continuous variables. Then, to examine the independent factors associated with recent HCV testing, a multivariable logistic regression model was fitted, using an a priori defined model-building approach based on the examination of the Akaike Information Criterion (AIC) and p-values. A backward stepwise technique was used in the selection of covariates. This approach has been used successfully in a number of studies [137, 144]. Starting with a full model containing all variables associated with the outcome at *p*<0.10 level in bivariate analyses, the AIC of the model is noted and the variable with the largest p-value is dropped to build a reduced model. This iterative process is continued until no variables are left. The model with the lowest AIC value is selected as the final model. Two-sided p-values, and unadjusted and adjusted odds ratios with 95% confidence intervals are reported. All statistical analyses were performed using the SAS software version 9.4 (SAS Institute, Cary, NC, USA).

3.3 Results

3.3.1 HCV continuum of care

Among 705 sex workers who received HCV testing at baseline, 302 were seropositive for HCV, resulting in a HCV prevalence of 42.8%. Among them, the median age was 36 years (Interquartile Range [IQR]: 29-43), just over half (51.7%)

were of Indigenous/Aboriginal ancestry, and one third identified as a sexual/gender minority (33.1%). Recent use of non-injection or injection drugs was self-reported by 93.1% and 74.5%, respectively. With regards to the work environment, the majority (77.8%) were women who primarily solicited clients in public spaces. Overall, at baseline, 77.5% participants were aware of their HCV infection, 41.7% reported having accessed HCV-related care, 13.9% having been offered treatment, and only 1.0% reported receiving treatment (Figure 1).

3.3.2 Recent HCV testing

This analysis included 552 women sex workers, of whom 420 (76.1%) self-reported being HCV-seronegative at baseline and an additional 132 (23.9%) being newly diagnosed with HCV within one year prior to enrolment. The median age was 34 (IQR: 27-42), 183 (33.2%) were of Indigenous/Aboriginal ancestry, and 46 (8.3%) were also living with HIV. Over one quarter (27.0%) lived in the inner city drug use epicentre, and over half primarily solicited clients in public/outdoor settings (51.6%). Recent use of non-injection or injection drugs was self-reported by 65.6% and 34.4% participants, respectively. In total, 292 (52.9%) reported having a recent HCV test (i.e., within the last year).

As shown in Table 1, factors positively and statistically significantly (i.e., $p<0.05$-level) associated with recent HCV testing in bivariate analyses included being of Aboriginal/Indigenous ancestry, identifying as a sexual/gender minority, living with HIV, use of injection and non-injection drugs, currently living in the inner city drug use epicentre, or being homeless (versus living outside the DTES), primarily soliciting clients in public/outdoor spaces, having been exposed to client-

perpetrated violence, inconsistent condom use with clients, involvement in peer support, and recent incarceration. On the contrary, immigrant women, participants with higher number of clients and those reporting language barriers to health services had reduced odds of having a recent HCV test.

As indicated in Table 2, in multivariable analyses, identifying as a sexual/gender minority (Adjusted Odd Ratio [AOR]=1.89, 95% Confidence Interval [CI] 1.11-3.24), use of injection (AOR=2.00, 95%CI 1.19-3.34) or non-injection drugs (AOR=1.95, 95%CI 1.00-3.78) and living in the inner city drug use epicentre (versus elsewhere in Vancouver) (AOR=3.19, 95%CI 1.78-5.73) remained independently and positively statistically significantly associated with having a recent HCV test, while immigrant participants (AOR=0.24, 95%CI 0.12-0.48) were less likely to have had a recent HCV test.

3.4 Discussion

To my knowledge, this is the first study to characterize access and uptake along the HCV care continuum among sex workers, a population with disproportionate burden of HCV [117, 136]. In this analysis, only half of the women who self-reported being HCV seronegative or previously unaware of their HCV status had been tested for HCV in the last year. Among women living with HCV, approximately one quarter were unaware of their HCV status prior to having an HCV test at their baseline visit. Importantly, and similar to a previous study of recent HIV testing among women sex workers in this setting [137], a number of markers of vulnerability were associated with recent HCV testing, including use of non-injection and injection drugs, self-identification as a gender/sexual minority,

and living in Vancouver's Downtown Eastside neighborhood (Canada's poorest postal code, which also features a well-established illicit drug market). This is not surprising in light of Canada's HCV screening approach, which to date have mostly focused on targeting individuals perceived to be at higher risk of HCV infection, including people who use injection drugs, or with clinical or laboratory evidence of liver disease [125]. In addition, it could also be the case that British Columbia's government-sponsored "HIV Treatment as Prevention" (STOP HIV/AIDS®) initiative, which is scaling-up access to HIV testing and related care, with a particular focus on the inner city Downtown Eastside community, might have also contributed to increase uptake of HCV testing among these vulnerable populations [114, 145]. However, the high prevalence of previously *undiagnosed* HCV infection among sex workers revealed through the current analysis suggests that specific, vulnerable populations at very high risk of acquiring HCV (e.g., people who inject drugs) [146, 147] have yet to enjoy the full benefits promised through more universal screening approaches. Stigma, as well as fear of disclosure of positive results, may continue to pose barriers to HCV testing (only available as nominal testing), particularly in more under-served and criminalized populations, including women sex workers.

Furthermore, the current study found that immigrant women were less likely to report having a recent HCV test. These results are in line with previous research from different settings showing that migrant and new immigrant populations frequently experience enhanced barriers to health services [77, 80, 144, 148]. These barriers include limited knowledge on how to navigate the local health system, stigma, cultural and language barriers, as well as woman's immigration legal status, which could result in exclusion from services, even within a publicly-funded health

insurance scheme, such as the Canadian medicare system. Altogether, these findings highlight the need for tailored interventions to facilitate migrant sex workers' access to voluntary testing and other health services, such as peer/sex worker-led outreach to connect migrant sex workers to culturally appropriate and low-threshold health services. In addition, as lessons from successful global initiatives demonstrate, community empowerment through sex workers collectivization can play a key role in increasing access to health and social services for all sex workers, including migrant women [149-151].

These results also showed that more than 40% of women sex workers in Vancouver had evidence of current/past HCV infection, likely due to dual parenteral and sexual routes [152-155]. Despite this high HCV prevalence, less than half of sex workers living with HCV in the current study reported being connected to HCV care and almost none were receiving treatment. These results are in line with previous studies showing extremely low rates of HCV treatment uptake in British Columbia, Canada, particularly among women [120], and people who use illicit drugs [156].

Although not formally evaluated in the current study, determinants of low treatment uptake among this cohort of sex workers may reflect a combination of structural and individual barriers to health care. Misperceptions of HCV as relatively benign disease, absence of symptoms associated with chronic HCV until advanced stages, fear of side effects and associated treatment costs have been suggested as barriers to HCV treatment uptake [157, 158]. For example, a recent study indicated that individuals with chronic HCV in British Columbia face substantial out-of-pocket expenses on HCV-related health care, even within a publicly funded universal health care system. The burden of these costs mostly falls

on individuals with lower income and no extended health insurance, which could play a key role in patients forgoing or delaying treatment until advances stages of liver diseases [122]. Altogether, these findings suggest an urgent need to explore alternative mechanisms to facilitate and support engagement in care and to ensure equitable access to HCV treatment to vulnerable populations including sex workers [120, 122].

At the structural level, studies have demonstrated that stigma and misconceptions among health care providers regarding eligibility for HCV treatment of people who use drugs, as well as their perception of the clients potential to adhere to the regimen and eventual risk of re-infection represent major barriers to access to HCV treatment in this setting [157, 159, 160]. Additionally, Canada's criminalized sex work and drug use environment poses a further challenge in this regard. Indeed, previous studies have shown that policing practices can play an important role in shaping health care access among marginalized populations such as sex workers, people who use drugs or transwomen [32, 92, 161, 162]. Accordingly, decriminalization of sex work and drug use could offer an important first step towards increasing access to HCV testing and care to these vulnerable populations and a critical step for the success of any HCV "treatment as prevention" strategy [132, 163]. For instance, decriminalization of sex work could facilitate connections to health services of hidden migrant sex workers, who primarily work in indoor settings, do not disclose their involvement in sex work to friends, families and providers, and who are often disengaged from care. In addition, improving access to HCV care will require a combination intervention approach, including mobile and culturally competent services, as well as harm

reduction and addiction management among other social-structural interventions [160].

This study has several limitations. First, due to the cross-sectional nature of this study we were unable to determine temporal and causal relationships between the explanatory variables and outcome. Second, the sample was not randomly selected and therefore the results of this study may not be generalizable to all sex workers in Vancouver or to other settings. However, the use of time-location sampling [51, 52], a strategy known to help achieving representative samples of hard-to-reach populations helped to mitigate such potential bias. Third, since the data was collected through self-reporting it might be subject to recall or social-desirability biases. However, all interviews were conducted in confidential and safe environments by highly experienced interviewers with strong community rapport and involvement, facilitating accurate responses. Fourth, due to the lack of access to HCV RNA, we were not able to evaluate the number of participants with confirmed chronic HCV infection or with sustained virological response (SVR). However, as studies of the natural history of HCV infection show, up to 85% of individuals infected with HCV will progress to chronic infection [164, 165]. In addition, the extremely low HCV treatment uptake within this cohort makes SVR a rare event.

In summary, the results of this study show that almost half of self-reported HCV-seronegative women within a large cohort of women sex workers had not received an HCV test in the prior year, and hardly any women with HCV had accessed treatment. With increasing efficacy and tolerability of HCV drugs, these findings highlight the importance of facilitating and sustaining access to HCV testing, care and early treatment to all the population to improve not only individual and population outcomes, but also to decrease economic costs. In addition, given the

high burden of HCV and large gaps in the HCV continuum of care among sex workers in Vancouver, future studies evaluating barriers and facilitators to HCV testing and care among this population are urgently needed in order to help inform public health efforts against HCV. Removal of criminal sanctions against sex work and drug use, as well as comprehensive interventions targeting these key populations, including mobile and culturally competent services, as well as harm reduction and addiction management will be critical to the success of any HCV treatment as prevention strategy [160, 163].

Table 3.1 Bivariate logistic regression analyses of factors associated with recent HCV testing among self-reported HCV negative female sex workers in Vancouver Canada

Characteristic	Recent HCV test, n (%)		Odds Ratio (95% CI)	p - value
	Yes n = 292	No n = 260		
Age, median (IQR)	32.5 (26 – 41)	35 (29 – 42)	0.98 (0.97 – 1.00)	0.079
Sexual/gender minority				
yes	99 (33.9)	33 (12.7)	3.53 (2.28 – 5.47)	<0.001
no	193 (66.1)	227 (87.3)		
Aboriginal ancestry				
yes	129 (44.2)	54 (20.8)	3.02 (2.07 – 4.41)	<0.001
no	163 (55.8)	206 (79.2)		
Living with HIV*				
yes	34 (11.6)	12 (4.6)	2.67 (1.35 – 5.27)	0.005
no	257 (88.0)	242 (93.1)		
Heavy drinking*				
yes	9 (3.1)	4 (1.5)	2.02 (0.61 – 6.63)	0.248
no	282 (96.6)	253 (97.3)		
Non-injection drug use*				
yes	254 (87.0)	108 (41.5)	9.41 (6.18 – 14.33)	<0.001
no	38 (13.0)	152 (58.5)		
Injection drug use*				
yes	149 (51.0)	41 (15.8)	5.57 (3.71 – 8.34)	<0.001
no	143 (49.0)	219 (84.2)		
Immigrant to Canada				
yes	25 (8.6)	142 (54.6)	0.08 (0.05 – 0.13)	<0.001
no	266 (91.1)	118 (45.4)		
Current place of residence*				
outside Downtown Eastside	134 (45.9)	210 (80.8)	Ref	
Downtown Eastside	125 (42.8)	24 (9.2)	8.16 (5.01 – 13.29)	<0.001
homelessness	29 (9.9)	21 (8.1)	2.16 (1.19 – 3.95)	0.012
Primary place of soliciting clients*				
outdoor/public	199 (68.2)	86 (33.1)	4.33 (3.03 – 6.19)	<0.001
indoor/off-street/independent	93 (31.8)	174 (66.9)		
Higher number of clients*				
yes (≥10/week)	140 (48.0)	148 (56.9)	0.69 (0.49 – 0.97)	0.035
no (<10/week)	146 (50.0)	107 (41.2)		
Inconsistent condom use with clients*				
yes	65 (22.3)	31 (11.9)	2.16 (1.36 – 3.45)	0.001

Characteristic	Recent HCV test, n (%)		Odds Ratio (95% CI)	p - value
	Yes n = 292	No n = 260		
no	219 (75.0)	226 (86.9)		
Involvement in peer support*				
yes	53 (18.2)	22 (8.5)	2.47 (1.46 – 4.20)	0.001
no	231 (79.1)	237 (91.2)		
Physical/sexual violence by client*				
yes	84 (28.8)	46 (17.7)	1.88 (1.25 – 2.82)	0.002
no	208 (71.2)	214 (82.3)		
Recent incarceration*				
yes	57 (19.5)	19 (7.3)	3.11 (1.79 – 5.38)	<0.001
no	229 (78.4)	237 (91.2)		
Language barrier to health services*				
yes	3 (1.0)	29 (11.2)	0.08 (0.03 – 0.28)	<0.001
no	289 (99.0)	231 (88.8)		
Availability barrier to health services*				
yes	112 (38.4)	106 (40.8)	0.90 (0.64 – 1.27)	0.563
no	180 (61.6)	154 (59.2)		

* Refers to the six month period prior the baseline interview
Note: Column percentages may not necessarily sum to 100% due to missing data or rounding error

Table 3.2 Multivariable logistic regression model of factors associated with recent HCV testing among self-reported HCV negative female sex workers in Vancouver Canada

Characteristic	Adjusted Odds Ratio (AOR)	95% Confidence Interval (CI)	*p* - value
Sexual/gender minority			
(yes vs. no)	1.89	(1.11 – 3.24)	0.020
Non-injection drug use*			
(yes vs. no)	1.95	(1.00 – 3.78)	0.049
Injection drug use*			
(yes vs. no)	2.00	(1.19 – 3.34)	0.008
Immigrant to Canada			
(yes vs. no)	0.24	(0.12 – 0.48)	<0.001
Current place of residence* (Ref: outside Downtown Eastside)			
Downtown Eastside	3.19	(1.78 – 5.73)	<0.001
homelessness	1.03	(0.50 – 2.12)	0.928
Higher number of clients*			
(yes vs. no)	0.67	(0.43 – 1.06)	0.088
Recent incarceration*			
(yes vs. no)	1.87	(0.95 – 3.67)	0.069

* Refers to the six month period prior the baseline interview
† Only the final list of variables included in the model with the best overall fit (i.e., lowest AIC value) are shown. Age, Aboriginal ancestry, HIV status, primary place of soliciting clients, client-perpetrated violence, inconsistent condom use by clients, peer support and language barriers to health services were included in the full model, but removed in the backwards selection approach

Figure 3.1 HCV continuum of care for women sex workers living with HCV, Vancouver, Canada
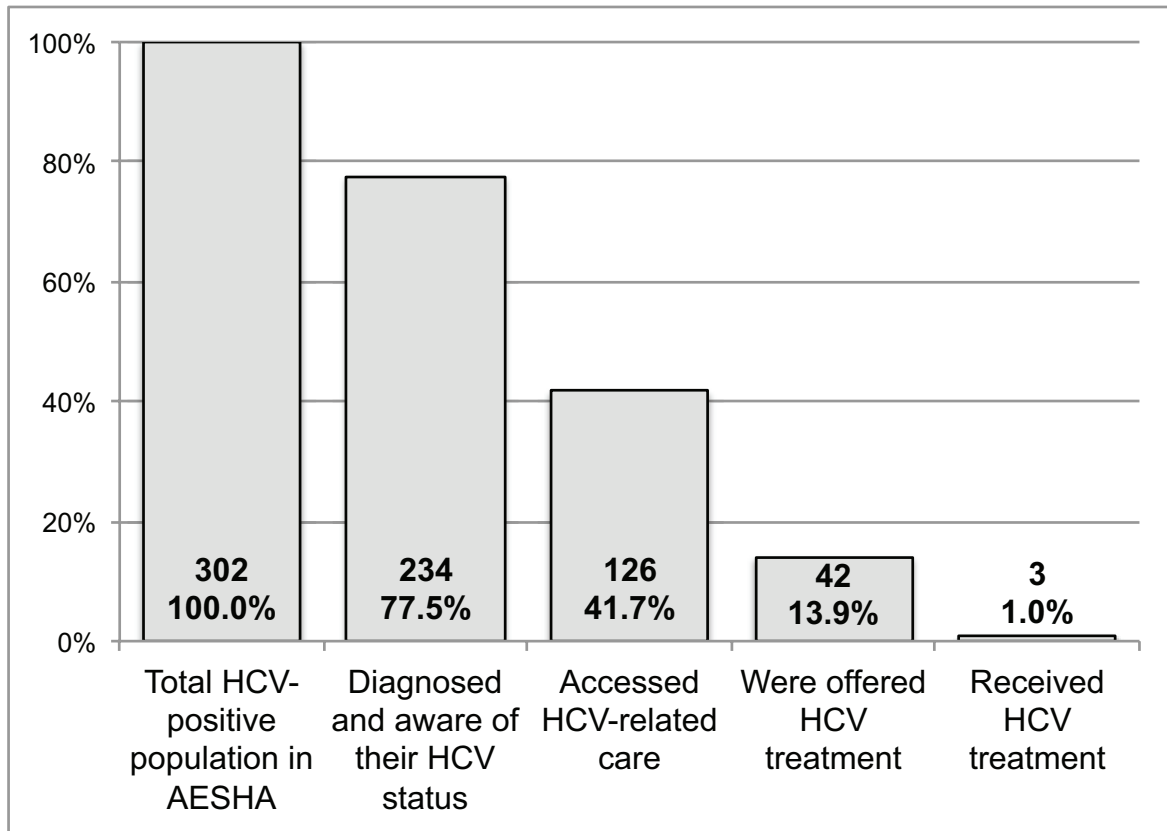
CHAPTER 4: Use of injectable hormonal contraception independently predicts HSV-2 acquisition in a cohort of street- and off-street sex workers in Vancouver, Canada

4.1 Introduction

Unintended pregnancy remains a significant global public health challenge, with worldwide rates of around 41% [166]. Unintended pregnancy, in turn, has negative impacts on women's and newborn's health, as well as imposes a substantial social and economic burden for women and their families, as well as to the larger society [166, 167]. Access to effective, safe and acceptable contraceptives that are tailored to suit individual women's needs is crucial to women's reproductive choice and control. In particular, long-acting, reversible contraceptive (LARC) methods offer a highly effective female-controlled option that does not require daily compliance [167].

A growing body of epidemiological data suggests that depot medroxyprogesterone acetate (DMPA, Depo-Provera®), one of the most widely used hormonal LARC may increase the risk of acquiring and transmitting HIV and other sexual transmitted infections (STIs) among women [166, 168-170]. This is particularly concerning given the widespread prescription of DMPA, especially to women who are concurrently at high risk of exposure to HIV and unintended pregnancy, such as women living in Sub-Saharan Africa and marginalized women in high income settings [166].

The underlying biological mechanisms through which DMPA use may contribute to increased risk of HIV acquisition are not well understood. Proposed mechanisms include thinning or disruption of the cervicovaginal epithelium, interferences with innate and adaptive soluble and cellular local and systemic immune response, and alteration in the vaginal microbiome [171]. DMPA may also indirectly raise the risk of HIV by facilitating herpes simplex virus type 2 (HSV-2) genital infection, a well-known risk factor for HIV acquisition [171, 172].

Despite high rates of unmet reproductive health needs [45] and heightened vulnerability to STIs among women sex workers [29], research on the effects of DMPA on HSV-2 and HIV acquisition among this population is limited [173, 174]. We therefore conducted this study to investigate the effect of DMPA use on HSV-2 acquisition within a longitudinal community cohort of street and off-street sex workers in Vancouver, Canada.

4.2 Methods

The reporting of this study complies with the STROBE guidelines for observational studies [175]. The study has been approved by the Providence Health Care/University of British Columbia Research Ethics Board.

4.2.1 Study design and population

Data for this analysis was drawn from An Evaluation of Sex Workers' Health Access (AESHA), an ongoing open prospective cohort of more than 740 women sex workers in Metro Vancouver that initiated enrolment in 2010. Eligibility criteria include, age ≥14 years, self-identification as women (including transgender women),

and having exchanged money for sex in the previous 30 days. Participants are recruited through a combination of outreach to outdoor/ public (e.g., streets, alleys), indoor sex work venues (e.g., massage parlours, micro-brothels, in-call locations), and off-street self-advertizing spaces (e.g., online and newspapers) across Metro Vancouver, using time-location sampling [52]. Sampling and recruitment procedures have been described in detail elsewhere [50].

The current analysis was restricted to female sex workers who were seronegative for HSV-2 at baseline and who completed at least one follow-up visit between January 1, 2010 and February 28, 2014.

4.2.2 Procedures

After providing written informed consent, at baseline and on a bi-annual basis thereafter, participants complete an interviewer–administered questionnaire by trained women interviewers (both experiential and non-experiential interview and nursing staff). The questionnaire collects socio-demographic information, sex work patterns, sexual health (including contraceptives and condom use) and intimate partners, violence and trauma, drug use patterns, health care services access and utilization, and physical, social and structural characteristics of the working and living environment. In addition, at each visit, a project nurse offers participants HIV and HCV and other sexual transmitted infections (STIs) testing, alongside pre- and post-test counseling. STI testing includes HSV type-specific serology (TSS), nontreponemal (rapid plasma reagin [RPR]) and treponemal tests (Treponema pallidum hemagglutinin assay [TPHA]) for all samples with positive RPR, and NAAT testing for *N. gonorrhoeae* and *C. trachomatis* in urine specimens.

HSV-2 diagnosis is done using a 2-step approach. First, serum samples are screened with a non-specific EIA HSV IgG. If this test is reactive, then the serum is tested for anti-HSV-2 using the TSS Focus HerpeSelect-2 IgG EIA (Focus Diagnostics, Cypress, CA, USA) [176]. The project nurse also provides basic treatment for STIs onsite, as well as referrals to health services when needed. Participants receive an honorarium of CAD$ 40 at each visit for their time and expertise.

4.2.3 Measures

The primary outcome of interest was time to HSV-2 seroconversion, defined as the time interval from study recruitment to the estimated date of HSV-2 acquisition during follow-up. Date of HSV-2 seroconversion was estimated as the midpoint between the last HSV-2 negative test and the first HSV-2 positive test. Participants who remained HSV-2 seronegative throughout the study period were censored at the time of their last HSV-2 serologic assay before February 28, 2014.

The primary explanatory variable of interest was a time-varying measure of DMPA use for pregnancy prevention in the 6-month period preceding the study interview (yes vs. no). Several secondary individual, interpersonal and environmental factors that in previous analyses have been shown to potentially confound the relationship between hormonal contraception and HIV/STIs risk were also considered [169, 173, 177, 178]. Time-fixed variables of interest at baseline included the following socio-demographic characteristics: age (per year older), Aboriginal/Indigenous ancestry (inclusive of First Nations, Metis, Inuit) (yes vs. no), and highest educational attainment (high school or postsecondary education vs. less than high school completion). Time-varying variables included individual-level

factors such as HIV status and incident STIs (syphilis, *N. gonorrhoeae* and *C. trachomatis*) based on biological testing (positive vs. negative); interpersonal-level factors such as average number of clients per week, number of male non-commercial partners, and inconsistent use of condoms by both clients and male non-commercial partners (yes vs. no); and characteristics of the work environment such as primary place of servicing clients (formal sex work establishment/in-call venue [e.g., massage/beauty parlors, health enhancement centres, micro-brothels]; informal indoor/out-call venues [e.g., sauna, bar/clubs, hotel/hourly rental, clients' house]; or outdoor/public space [e.g., street, public washroom, car]). Among participants without a history of syphilis at baseline (i.e., RPR and TPHA negative), incident syphilis was defined as a positive TPHA and RPR titres ≥1:8, while for those with a history of syphilis (i.e., TPHA positive), it was defined as a fourfold increase in RPR titres between visits. All time-varying variables were time-updated at each semi-annual follow-up visit and refer to the 6-month period prior to the interview.

4.2.4 Statistical analysis

Initially, baseline characteristics of the study sample stratified by DMPA exposure at any time during the study period were examined. Categorical variables were analyzed using the Pearson's chi-squared test (or Fisher's exact test in the presence of small cell counts) and continuous variables were analyzed using the Wilcoxon rank sum test.

Next, the person-time and Kaplan Meier methods were employed to estimate incidence density rates and cumulative incidence of HSV-2 infection, overall, and

stratified by DMPA exposure at some point during the study period. Survival curves were compared using the log-rank test.

To assess the independent effect of DMPA use on HSV-2 infection risk, the extended Cox regression analyses was used. First, a bivariable Cox regression model was run to estimate the unadjusted hazard ratios of DMPA exposure and secondary variables on the risk of HSV-2 acquisition. Then, a multivariable confounding model was constructed using a variable selection process described by Maldonado and Greenland [179]. As a first step, a full model that included the primary explanatory variable of interest, and potential confounders that were chosen a priori (i.e., age) or associated in the unadjusted analyses at $p<0.20$ was fitted. The value of the coefficient associated with DMPA exposure in the full model was noted, and then, in a stepwise manner, removed the secondary explanatory variable corresponding to the smallest relative change on the effect of DMPA use on HSV-2 risk. This iterative process was continued until the minimum relative change exceeded 5%. The remaining variables were considered as confounders in the multivariable analysis. All statistical analyses were performed using the SAS software version 9.3 (SAS Institute, Cary, NC, USA).

4.3 Results

Between January 2010 and February 2014, 744 women sex workers were enrolled in AESHA cohort. Of these participants, 143 (19%) met the inclusion criteria for this analysis, contributing to 228 person-years (py) of follow-up. At baseline, the median age was 34 years (interquartile range [IQR]: 27–41), 28% were of Aboriginal ancestry, 5% were living with HIV, and approximately one third primarily serviced

clients in public spaces. Sexual activity was relatively high with a median of 9 clients per week (IQR: 5–15).

Overall, 19 women (13.3%) reported use of DMPA for pregnancy prevention at some point during the study period. As shown in Table 1, there were significant differences in women using DMPA at some point during the study period compared to those who were not. Specifically, at baseline, DMPA users were younger, had lower educational levels, and were more likely to be of Aboriginal ancestry. DMPA users were also more likely to be living with HIV, have a concurrent STI, and report inconsistent use of condoms by clients.

There were 39 HSV-2 seroconversions over the study period (median follow up of 18.6 months [IQR 8.4–29.9]), resulting in an overall incidence rate of 17.1 cases per 100 py (95% confidence interval [CI] 12.4–23.6). Incidence rates were significantly higher among women using DMPA (57.4 cases per 100 py, 95% CI 31.4–105.0) compared to those who were not (13.1 cases per 100 py, 95% CI: 8.9–19.1). As indicated in Figure 1, the cumulative incidence of HSV-2 infection after 24 months of follow-up was 62.0% (95% CI 38.7%–85.2%) among DMPA users compared to 24.4% (95% CI 16.8%–34.7%) among non-users (log-rank $p<0.001$).

In addition to DMPA exposure, secondary variables that were positively associated with HSV-2 acquisition in unadjusted Cox analyses included: Aboriginal ancestry, HIV infection, and primarily servicing clients outdoors or in informal indoor settings (compared to formal sex work establishments) (Table 2).

Table 3 shows the unadjusted and adjusted hazard ratios between DMPA use and HSV-2 infection. In the adjusted Cox analyses, DMPA exposure remained independently associated with approximately 4-times increased risk of HSV-2 acquisition (adjusted hazard ratio [AHR] 4.43, 95% CI 1.90–10.35).

To assess the robustness of the findings, in sub-analyses, we examined the effect of DMPA exposure on HSV-2 acquisition among participants who were HIV negative at baseline. Adjusted Cox analyses among the sample of 136 HIV negative participants, resulted in similar estimates (AHR 3.97, 95% CI 1.64–9.60).

4.4 Discussion

This study found high overall incidence rates of HSV-2 among a cohort of women sex workers in Vancouver. These rates are comparable to estimates among women sex workers in Africa, which in turn are among the highest HSV-2 incidence rates reported [180, 181]. After controlling for key individual, interpersonal and environmental confounders, DMPA exposure remained independently associated with approximately 4-times increased risk of HSV-2 acquisition. Importantly, these findings hold when restricting the analyses to HIV negative participants at baseline.

To my knowledge, only two other studies have previously assessed the potential association between DMPA use and HSV-2. Both were conducted among African women, and showed conflicting results. Chohan et al. found no association between DMPA use and HSV-2 infection among sex workers in Kenya [174]. Conversely, Grabowski et al. found that, among Ugandan women in stable heterosexual partnerships, women using DMPA consistently had double the risk of acquiring HSV-2 [21].

There is a paucity of research examining the underlying mechanisms through which DMPA could increase the susceptibility to HSV-2. It has been suggested that the hypoestrogenic environment created by DMPA exposure may result in thinning of the vaginal epithelium and changes in soluble mucosal defense, which in turn

may facilitate HSV-2 infection [171]. Indeed, studies in mouse models have demonstrated that DMPA increases the risk of HSV-2 infection up to 100-fold and hampers immune responses to HSV-2 [182, 183]. Although these findings provide biological plausibility for a potential link between DMPA use and HSV-2 acquisition, they should be interpreted with caution since, due to inter-species differences in local immune responses and vaginal microbiome (mouse models as compared with humans) [171]. Further prospective studies among women at-risk for HSV-2 infection are needed to ascertain the human health relevance of animal model results.

The findings of this analysis add to the ongoing debate on the potential impact of DMPA on HIV risk [168, 169, 171]. A well-established and growing body of literature supports a negative synergy between HSV-2 and HIV. HSV-2 infection has been associated with approximately three-fold increased risk of HIV acquisition [172], and this risk appears to be higher among individuals with recent HSV-2 infection [173, 184]. In addition, among people living with HIV, increases in plasma and genital HIV viral load have been observed during clinical and subclinical reactivation of herpetic genital lesions [185, 186], suggesting that co-infection with HSV-2 might play an important role in HIV transmission and progression [187, 188]. Thus, if DMPA use is conclusively demonstrated to increase the biological risk of HSV-2 acquisition, this might have important implications for family planning at an individual level (e.g., informed choice regarding contraceptives) as well as for public health interventions (e.g., tailored public health messages about contraceptive options for women at-risk for HIV and for women living with HIV and their sexual partners). The development of sensitive and well-evidenced intervention approaches in this area would benefit greatly from additional research on the social

pathways through which biological risks pertaining to HSV-2 and other outcomes (e.g., HIV) are realized – and potentially exacerbated.

Finally, an additional and extremely relevant finding of this analysis is that, despite early caution raised by researchers and public health scholars in Canada, the UK and Australia [189, 190] regarding the use of DMPA, use of this LARC was disproportionately higher among the most vulnerable women in this sample, including younger women, women of Aboriginal ancestry, those with lower educational levels, and women living with HIV. These women are already at increased risk of poor health outcomes due to socio-economic and political inequities; and the use of DMPA for pregnancy prevention might further expose them to other health risks, including potential risks of STIs and bone mineral density loss [191]. Altogether, these findings raise strong concerns regarding prescribing practices and proper informed consent in marginalized populations.

The current analysis has a number of limitations that should be noted. First, exposure to DMPA was not randomized in this study, and therefore we cannot exclude selection biases and residual confounding. While a randomized controlled trial would account for these potential biases and provide more definitive answers, such a trial might prove challenging, including feasibility issues due to the long duration of follow-up required for results to be available. Second, these findings are based on a cohort of street and off-street women sex workers in Vancouver, Canada; and as such they might not be generalizable to women in the general population or in other geographic areas. Third, this analysis relied on self-reported data, including sexual behaviors and use of DMPA, which might be subject to recall and social desirability bias. However, all interviews were conducted in private and safe environments by experienced interviewers with strong community rapport,

facilitating accurate responses. In addition, as it has been previously suggested [173], behavioral confounding might be less of an issue for sex workers who on the whole may use condoms for prevention of STIs independently of their choices of contraceptives for pregnancy prevention. Further, I am not aware of any reason why there would be systematic differences in reporting sensitive data between sex workers who reported or not use of DMPA. Fourth, there is variable delay between HSV-2 primary infection and seroconversion. As a result, there is chance to have inadvertently included women who despite being seronegative for HSV-2 at baseline were already infected. Similarly, it is possible that at the end of the study period, some women who were still seronegative for HSV-2 had actually recently acquired HSV-2. Finally, the small sample size and small number of incident HSV-2 infections during the follow-up period may have limited the statistical power, as reflected by wide confidence intervals for some of the estimates. That said, even after adjustment for potential confounders, DMPA remained independently and strongly associated with HSV-2 acquisition.

In summary, this study found high incidence rates of HSV-2 in a cohort of street and off-street sex workers in Vancouver, Canada. This study also found a strong association between DMPA exposure and HSV-2 acquisition, as well as disproportionately higher use of DMPA among the most marginalized women in this sample. Taken together, these issues raise concerns about the provision of optimal reproductive and sexual health care to women sex workers in Vancouver. These results point to an urgent need to engage women sex workers in the development of tailored health services that comprehensively address their particular reproductive and sexual health needs, including improving access to a wider range of contraceptive methods. In addition, health care providers should

inform and advise women of the potential risks associated with DMPA use. Finally, given the known links between HSV-2 and HIV, findings of this analysis further underscore the need for future research on the biological and social pathways through which DMPA appears to increase the risk of HSV-2 and other STIs to help inform the development of safer reproductive choices, including LARCs for women worldwide.

Table 4.1 Baseline characteristics, stratified by DMPA use at some point during the study period, of HSV-2 seronegative sex workers in Vancouver, Canada

Characteristic	Total, n (%) (N = 143)	DMPA Use		p - value
		Yes, n (%) (N = 19)	No, n (%) (N = 124)	
Individual				
Age (med, IQR)	34 (27–41)	27 (23–33)	35.5 (28–42)	0.004
Aboriginal ancestry	40 (28.0)	11 (57.9)	29 (23.4)	0.002
High school completion	93 (65.0)	8 (42.1)	85 (68.6)	0.024
HIV seropositive*	7 (4.9)	4 (21.1)	3 (2.4)	0.006
STI*	5 (3.5)	3 (15.8)	2 (1.6)	0.017
Interpersonal				
Average number of clients per week (med, IQR)*	9 (5–15)	9 (5–18)	9 (5–15)	0.852
Inconsistent condom use by clients*	25 (17.5)	8 (42.1)	17 (13.7)	0.006
Number of male intimate/non-commercial partners (med, IQR)*	1 (0–1)	1 (0–1)	1 (0–1)	0.149
Inconsistent condom use by non-commercial partners*	62 (43.4)	10 (52.6)	52 (41.9)	0.214
Environmental				
Primary place of servicing clients*				
Formal sex work/in-call establishment	70 (48.9)	5 (26.3)	65 (52.4)	REF
Informal indoor venue	29 (20.3)	4 (21.1)	25 (20.2)	0.303
Outdoor/public space	44 (30.8)	10 (52.6)	34 (27.4)	0.022

*Time-updated variable using last 6 months as a reference point.
DMPA: depot medroxyprogesterone acetate; IQR: Interquartile range; STI: sexual transmitted infection

Table 4.2 Bivariate Cox analyses of potential confounders associated with HSV-2 acquisition among sex workers in Vancouver, Canada

Characteristic	Unadjusted	
	Hazard Ratio (95% CI)	*p* - value
Age†		
(per year older)	0.99 (0.96 – 1.02)	0.545
Aboriginal ancestry†		
(yes vs. no)	2.10 (1.13 – 3.92)	0.020
High school completion†		
(yes vs. no)	0.65 (0.35 – 1.21)	0.175
HIV seropositive*†		
(yes vs. no)	3.65 (1.06 – 12.56)	0.040
STI*		
(yes vs. no)	2.11 (0.63 – 7.00)	0.224
Average number of clients per week*†		
(per one client increase)	1.03 (1.00 – 1.06)	0.060
Inconsistent condom use by clients*†		
(yes vs. no)	1.99 (0.96 – 4.15)	0.065
Number of male intimate/non-commercial partners		
(per one partner increase)	0.99 (0.97 – 1.01)	0.413
Inconsistent condom use by non-commercial partners*		
(yes vs. no)	0.80 (0.41 – 1.57)	0.516
Primary place of servicing clients (ref: formal sex work establishment)*†		
Informal indoor venue	3.33 (1.27 – 8.75)	0.015
Outdoor/public space	5.41 (2.16 – 13.53)	<0.001

* Time-updated variable using last 6 months as a reference point.
† Considered as potential confounders in the multivariable model selection process.
CI: confidence interval; STI: sexual transmitted infection

Table 4.3 Bivariate and multivariable Cox analyses for the association between DMPA use and HSV-2 acquisition among women sex workers in Vancouver, Canada

	Unadjusted Hazard Ratio (95% CI)	Adjusted Hazard Ratio (95% CI)†
DMPA use*	6.04 (2.79 – 13.06)	4.43 (1.90 – 10.35)

* Participant used DMPA for pregnancy prevention in the last 6 months.
† Adjusted for primary place of servicing clients, time-updated to refer to the past 6 months. Age, Aboriginal ancestry, educational attainment, HIV status, number of clients per week and inconsistent condom use by clients were included in the full model, but removed in the backwards selection approach.
DMPA: depot medroxyprogesterone acetate; CI: confidence interval

Figure 4.1 Cumulative incidence of HSV-2 infection, stratified by DMPA use at some point during the study period, among sex workers in Vancouver, Canada, 2010-2014
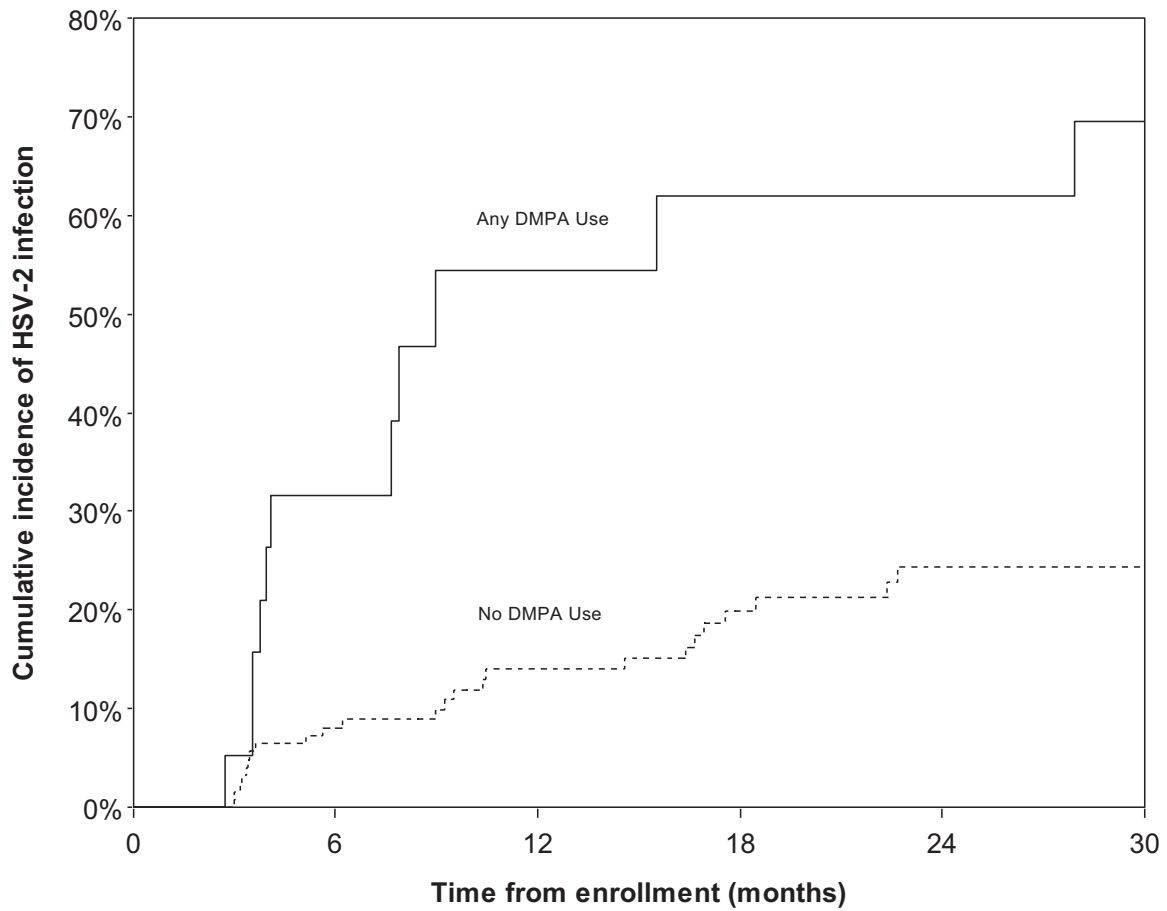
CHAPTER 5: Summary of findings, implications for policy, and future directions

5.1. Summary of findings

This thesis sought to investigate women sex workers' experiences on access to health care, in Vancouver, Canada, a setting with universal health coverage. Data for the three analyses included in this thesis were drawn from AESHA, an open, prospective cohort of street and off-street women sex workers in Vancouver, Canada, with over 800 participants enrolled to date. Guided by the Structural Determinant framework [35], and a conception of *access to health care* as a multi-level process that starts with the identification of a health care need, continues with the process of seeking and reaching health services, and concludes with the opportunity to receive adequate care for one's need [4], this research has identified key structural determinants that interact with each other and with factors at other levels to create barriers to health care at different points in the continuum, and to ultimately shape sex workers' health outcomes. As discussed, in more detail in Sections 5.2 and 5.3, findings from this study add to the growing body of literature pointing to the important role of social-structural factors as drivers of risks and opportunities among sex workers.

5.1.1 Prevalence and correlates of institutional barriers to health care among women sex workers in Vancouver

Among different barriers to health services, those arising at the institutional level are considered particularly important given the potential implications for health programming and planning. Thus, Chapter 2 investigated the prevalence and correlates of institutional-level barriers among sex workers in a setting that purports to provide free, universal, and comprehensive health coverage to all its residents. However, this analysis found that seven of ten sex workers reported experiencing recent institutional barriers to health services, which is three-times higher than the estimate for the general Canadian population. In addition, consistent with studies in the general population, long wait times was the most commonly cited barrier. However, over one quarter participants in this study reported avoiding health care due to disrespectful treatment by health care providers. Results from this analysis also confirm what is has been termed the "Inverse Care Law", as most vulnerable women in this sample were the most likely to experience barriers to health care. Among social-structural factors, of particular concern is that experiences of violence, either at the partner-, workplace- (i.e., client violence), or community-level (i.e., threatened by community residents or businesses) were strongly associated with experiencing institutional-barriers to health care.

5.1.2 Access and uptake of HCV-related services among women sex workers in Vancouver

In British Columbia, HCV disproportionally affects groups that are underserved by the health system. Among these populations, women sex workers are at increased risk for acquiring HCV through dual sex/drug use routes, and at the same time, as indicated by findings in Chapter 2 face many unique challenges when trying to access health services. Hence, Chapter 3 provided a baseline assessment of engagement in the HCV continuum of care among sex workers in Vancouver. With over 40% HCV prevalence in this cohort of sex workers, results from Chapter 3 confirmed the high burden of HCV among this population. In addition, Chapter 3 revealed large gaps in the HCV continuum of care. Particularly concerning were the low access to HCV testing, with one-fifth of women living with HCV being previously unaware of their status, and the exceptionally low prevalence of HCV treatment. While there is immense optimism regarding future HCV treatment efforts, including optimism related to BC PharmaCare coverage of newer, more efficacious and safer HCV drugs [163], these benefits will not be fully realized in an equitable manner if the most affected populations continue to face barriers to accessing HCV-related care.

5.1.3 Impacts of use of depot medroxyprogesterone acetate (DMPA) for pregnancy prevention on HSV-2 acquisition among women sex workers in Vancouver

Moving farther along in the continuum of health care access, Chapter 4 sought to explore the potential impacts of sub-optimal reproductive and sexual health care among women sex workers in Vancouver, represented here as the

prescription of DMPA, a highly controversial long-acting and reversible contraceptive. The analysis documented extremely high incidence rates of HSV-2 in this cohort of sex workers, which are among the highest incidence rates ever reported worldwide. Further, this analysis also revealed a strong association between DMPA exposure and HSV-2 acquisition, as well as disproportionately higher use of DMPA among the most marginalized women in our study.

5.2 Contributions of research

As outlined in Chapter 1, most of the existing research on health care access among sex workers has predominantly been within the HIV field, and largely focused on individual determinants. The work undertaken as part of this thesis seeks to address this gap, by expanding the Structural Determinant framework to investigate health care access and outcomes more broadly among sex workers. Chapter 2 is among the first studies to empirically document the importance of social-structural factors as drivers of health care access among sex workers, aside from HIV and reproductive care. While some research on access to general health services among sex workers has been undertaken, these has been mostly qualitative in nature and conducted outside Canada, where health systems and legal approach towards sex work may differ from that in Canada. Findings from this analysis indicate that stigma and discrimination against sex workers remains deeply entrenched within the health care system, negatively shaping sex workers' health seeking patterns. To my knowledge, the analysis presented in Chapter 3 is the first one to characterize access and uptake along the HCV care continuum among sex workers, a population with, as confirmed by Chapter 3, a disproportionate burden

of HCV. Unsurprisingly, large gaps in every step of the continuum were observed. Finally, results from Chapter 4 add to the ongoing debate of the potential impacts of DMPA on HIV risk, and particularly to a possible mediating pathway through which DMPA could increase susceptibility to HIV infection. Importantly, most marginalized women were more likely to use DMPA for pregnancy prevention, and therefore at increase risk of acquiring HSV-2. These findings raise concern about prescribing practices and proper inform consent to vulnerable populations. These findings also empirically demonstrate the negative impacts of historical and pervasive neglect of sex workers' reproductive and sexual rights.

In summary, findings from the three analyses included in this thesis consistently demonstrate inequities faced by sex workers across the continuum of health care access, from trying to reach health services (Chapter 2), to utilizing these services (Chapter 3), to the impacts of inadequate and sub-optimal care on their health outcomes (Chapter 4). The empirical evidence paints a picture of egregious levels of unmet health care needs: 70% of women sex workers in the AESHA cohort reported experiencing institutional barriers to health care; 50% of women with negative or unknown HCV status not having a recent HCV test; only 1% of women living with HCV receiving treatment; and 13% of HSV-2 seronegative women using DMPA as a contraceptive.

Furthermore, social-structural inequalities not only act to constrain sex workers access to appropriate and quality care as whole, but also recreate these inequalities *within* the sex worker population, confirming that the social gradient in health spans not only across different social groups, but also within these groups [37]. Collectively, these results contribute to the growing field of research that employs a structural determinant framework to help unpack how social-structural,

environmental and individual factors interact dynamically and synergistically with each other to shape health outcomes among sex workers.

5.3 Implications for health policy and programming

There is international consensus that UHC is a basic human right and a critical determinant of individual and population health, though what constitutes a truly 'universal' approach to health care provision remains open to interpretation [192]. Within the Canadian context, UHC is purported "to ensure reasonable access to medically necessary hospital and physician services for all residents without financial or other barriers" [1]. Under this definition, individuals living in Canada but who are undocumented and therefore cannot apply for an insurance health card, including refugees, illegal immigrants, or homeless, are not entitled to health care. Furthermore, Canada's approach to UHC assumes that health is solely a function of medical service provision, ignoring a broader set of social and other determinants of the health [193]. Third, an emphasis on *financial barriers* fails to acknowledge other important barriers to the fulsome provision of UHC, particularly that many individuals are systematically excluded from the health system due to stigma based on their gender, sexual orientation, or ethnicity. Finally, "reasonable access" is not defined, which undermines any attempt to measure equity in access. As discussed throughout this thesis, multiple and intersecting forms of stigma (e.g., gender, ethnicity, occupation), in concert with the legal context of sex work in Canada, put women sex workers at unique risk to experiencing unmet health care needs.

The findings from this thesis suggest that under the current *status quo*, Canada is failing to provide UHC to some of the most vulnerable Canadians, while

concomitantly failing to achieve safer and healthier living and working environments for all sex workers. The current thesis demonstrates that sex workers' had reduced access and uptake of good quality and appropriate health care, including general health services (Chapter 2), HCV-related care (Chapter 3), and sexual and reproductive care (Chapter 4). Further, barriers to health care were exacerbated among the most vulnerable subgroups of women sex workers, including sexual/gender minorities, migrants, women of Aboriginal Ancestry, uninsured and those with previous experiences of violence. Stigma against sex workers and disrespectful behavior by health care providers was documented as a serious concern. As such, based on the findings of the current thesis, the health system must take seriously its unique responsibility to live up to the aims of UHC.

Central for this will be the implementation of women-centred models of care, that is care that takes into account the multiple and diverse needs and values of women with an holistic and culturally-competent approach [194, 195]. The concept of women-centred care is not new, and indeed in the year 2000, the Vancouver/Richmond Health Board (V/RHB) developed a *Framework for Women-Centred Health* to guide the planning and implementation of policies and programmes across the range of services that are more relevant for women's need, such as sexual and reproductive health services, childcare, and gender-based violence [195]. This framework, which considers health within the broader context of social determinants, consists of 12 elements: (1) the need for respect and safety; (2) the importance of empowering women; (3) involvement and participation of women; (4) collaborative and inclusive work environments; (5) women's patterns or preferences in obtaining health care; (6) women's forms of communication and interaction; (7) the need for information; (8) women's decision-making processes; (9)

a gender-inclusive approach to data; (10) gendered research and evaluation; (11) gender-sensitive training; and (12) social justice concerns. Examples of women-centred models of care in British Columbia include the BC Women's Hospital, which includes a range of services for women, and expands the concept of women-centred care to also incorporate women-specific HIV/AIDS services. Importantly, as hypothesized in Chapter 2, the scaling up of other relevant interventions (e.g., the scaling up of HIV treatment and prevention initiatives) warrants additional research in order to better understand the potentially beneficial implications of tailored, women-centred care roll-out efforts.

Furthermore, the findings of the current thesis point to the important potential health gains to be made through successful reforms in sectors other than health. For example, previous research conducted in Vancouver showed that fear of police or violence were strong determinant of health care avoidance among sex workers [32]. Similar findings are presented in Chapter 2, where sex workers with previous violence events, either at the partner-, workplace- or community-level, were at 30% to 50% increased risk of experiencing institutional barriers to health care. Altogether these findings support an urgent need for legal reforms that would facilitate the development of safe and enabling environments for sex workers' access to health care.

As well, other potentially helpful interventions directed more specifically to the health care system would include efforts to enhance safe and non-judgemental services that provide integrated care, are located near the place of work, and have extended hours of operations [31, 33, 196]. While many sex worker services in Vancouver hold promise [46, 82], including Women's Information Safe Haven Drop-In Centre Society (WISH), the Mobile Access Project (MAP) and peer/sex worker-

led outreach efforts by the Sex Workers' Rights Advocacy Network (SWAN) and Sex Workers United Against Violence Society (SWUAV), they remain relatively small in scale, chronically under-resourced, and out of necessity for acute issues, provide basic prevention, social support and referral linkages [46, 82]. Building on these local community successes and low threshold and peer/ sex worker-led models, will be key to expanding and adapting sex-worker led, low-threshold health delivery models to the Canadian setting. The success of any intervention will be dependent on the engagement of a diverse range of constituents within and across sex worker communities to better understand and address their specific needs (e.g., women of Aboriginal ancestry, migrants, street-based sex workers, gender/sexual minorities, youth, under housed).

Drawing lessons from other settings [46, 82-85] also holds great promise. Among sex-work led health delivery models, St. James Infirmary in San Francisco, CA, USA, is considered a WHO/UN best standard practice model of sex work- led occupational safety and health clinic [84]. Grounded on the principles of harm reduction [30], and inclusive of sex worker staff, this program provides comprehensive free medical and social services for sex workers of all genders and sexual orientations. Services offered at this clinic include primary care, reproductive and sexual care, HIV, HCV and STI counselling and testing, mental health services, and needle exchange, as well as an outreach component to reach more hidden and mobile sex workers. Alongside sex worker services, programs to educate health care workers on sex workers needs and rights should be implemented, and reinforced by anti-discriminatory health policies, including for gender expression, sexual orientation, and ethnicity [31, 33]. This might have the additional benefit of building a culturally competent health force in mainstream health facilities, that

could facilitate referrals for services not provided within the sex workers-specific clinics.

A particularly relevant area that should be strengthened and enforced is that of proper informed consent and non-coercive care to vulnerable populations [197]. Importantly, Chapter 4 showed that use of DMPA was disproportionately higher among the most disadvantaged women in this study, suggesting that they might have been not fully informed of the potential risks associated with its use or alternative and safer contraceptives. Further, it has been argued that higher prescription rates of this highly controversial contraceptive to marginalized women (e.g., women of Aboriginal Ancestry, women living with HIV, with lower educational attainment) might be explained by health care providers' paternalistic approach and an underlying assumption that socially disadvantage women are not good mothers [189]. This hidden form of social control is not only unethical, neglecting women's agency and rights to motherhood, but also, as demonstrated in Chapter 4, has other potentially negative unintended health outcomes.

While gender- and culturally-sensitive health services for the diverse population of sex workers are critical for improving sex workers' health outcomes, discrimination in health care settings is likely a reflection of sex work-related stigma within the larger society. Hence, equity in health and health care access for sex workers will not be achieved without moving upstream and tackling the roots of the numerous health inequities faced by this population. Among these upstream factors, the broader context of sex work legal approaches is arguably the strongest one shaping the health of sex workers. There is a large body of evidence that demonstrates that punitive policies targeting sex work displace sex workers to more isolated areas, significantly hindering their access to health and social services, and

rendering them more vulnerable to physical and sexual violence, and HIV acquisition [29, 30, 32, 58, 61, 65, 198-200]. On the contrary, research on experiences from settings where sex work is fully decriminalized, such as New Zealand, demonstrates that decriminalization of sex work has resulted in better working conditions, and increased access to health, social and legal services, significantly improving sex workers' health and safety [201].

We are currently witnessing a time of evolving legal approaches towards sex work in Canada. While sex work itself has been legal for most part of the Canadian history, in December 2013 (Bedford vs. Canada), the Supreme Court of Canada unanimously struck down three of four criminal offences related to prostitution on the basis that they violated sex workers' rights to life, liberty and security, namely the prohibition of operating a "bawdy house" (section 210), living on the avails of prostitution (section 212), and communicating in public for purposes of prostitution (section 213) [202]. The Court's unanimous decision was supported by extensive Canadian and international research consistently documenting the profound negative impacts of criminalization of any aspect of the sex work industry on the health, safety and human rights of sex workers [29, 30, 32, 61, 65, 198-200], as well as multiple organizations including the World Health Organization, Amnesty International, Human Rights Watch, and the Global Commission on HIV and the Law [203, 204]. However, in November 2014, Bill C-36, the *Protection of Communities and Exploited Persons Act*, a new prostitution legislation received Royal Assent [205]. This new legislation only made minor changes to previous provisions deemed unconstitutional by the Supreme Court in *Bedford* (i.e., communicating for the purpose of selling sex, gaining material benefit from sex work), resulting in continued marginalization of sex workers and perpetuation of harms associated

with the laws, including increased risk of violence due to displacement to isolated areas, and rushed negotiation with clients due to fear of encounters with police, reduced access to health and social services, and exclusion of the protections of labour regulations. In addition, Bill C-36 introduced new laws prohibiting the purchase and/or advertisements of sexual services, further undermining sex workers health and security. Evidence from Sweden, Norway and Vancouver [206-208], indicate that the "Nordic model" of criminalizing clients not only does not eliminate sex work, but instead displaces sex workers to isolated and unsafe areas, recreating similar dangerous working conditions to the criminalization of the sell of sex. The ban on advertising makes working in safe indoor setting almost unviable, as well as severely limits sex workers channels of communication to share safety information and promote community involvement.

This thesis adds to the growing body of literature pointing to the negative effects of enforcement-based approaches on the health and safety of women sex workers. Findings from Chapters 2-4 provide substantial evidence of how criminalization of sex work fuels stigma against sex workers within and outside the health care setting, and contributes to an environment where violence against sex workers is seen as normal or justified. Violence and stigma, in turn, were identified as key barriers to accessibility (Chapter 2) and utilization of health services (Chapter 3). Further, the sub-optimal quality of care observed in Chapter 4, likely arises from negative views of sex workers as "immoral or criminal" as opposed to a rights-based approach which points to the obligation and benefits of providing universal access to health services and other support resources [31, 32, 67].

5.4 Strengths and limitations

Data for the analyses included in this thesis were drawn from AESHA, an open prospective community-based cohort of street and off-street sex workers in Vancouver, Canada. Access to this rich longitudinal dataset with more than 800 participants, and more than 4 years of follow-up constitutes a major strength of this research. In addition, the close and long-standing collaborations with sex workers agencies and continued two-way communication with sex workers' groups provided context to this study, helping to inform my research questions, and at the same time ensuring that my research is directly relevant to them and help inform policy and programs directed to improve the health and living conditions of this marginalized population. Another strength of this study is that interviews are conducted by both experiential and non-experiential interviewers with strong community rapport, mitigating common biases of working with vulnerable populations and sensitive data, such as social-desirability bias.

This research has also a number of limitations that should be taken into account when interpreting the findings of this thesis. First, given the hidden nature of sex work and consequent lack of overall available numbers of sex workers in Canada, the study population was non-randomly selected. Despite the use of time-location sampling, a strategy known to help attain representative samples of hard-to-reach population [51, 52], the risk of selection of bias cannot be excluded. Second, empirical findings of this thesis are based on a cohort of sex workers in Vancouver, and thus might not be generalizable to sex workers in other settings. Third, as in most non-random observational studies, there might be residual confounding by factors not captured in the questionnaires. Finally, as noted above, research

involving vulnerable populations and self-reported sensitive data might be subjected to social-desirability and recall biases. However, it has been shown that when interviewed in safe environments, such as the one provided by the AESHA study, sex workers and other vulnerable populations provide reliable and accurate reports of their experiences [209, 210]. Other strengths and limitations specific to each analysis are discussed in each corresponding chapter.

5.5 Future research directions

Guided by a *Structural Determinants* framework [29, 35] and a conceptualization of *access to health care* as process [4], the current study has provided some initial insight on women sex workers' experiences on access to health services other than HIV services in a setting with UHC. Chapter 2 identified major institutional-level barriers to healthcare (e.g., service availability, disrespectful treatment by health care providers), as well as subpopulations of sex workers at increased risk of experiencing these barriers (e.g., victims of gender- and/or occupational stigma-based violence). While identifying these barriers is a critical first step for developing effective interventions to address them, much more work needs to be done to have a comprehensive understanding of women sex workers' access to health care in this setting.

For example, mix-methods research would be helpful in understanding how different structural factors interact with each other and with factors at other levels to facilitate or constrain sex workers' access to health care. For instance, although Chapter 3 presented the first baseline assessment of women sex workers' engagement in the HCV continuum of care, it is currently not known the extent to

which the low uptake of HCV related care might be explained by similar institutional-level barriers and/or factors driving these barriers found in Chapter 2. In BC, there is increased interest of scaling-up HCV treatment and care to control de HCV epidemic. Understanding and addressing the barriers to HCV care, as well as the social determinants underlying the increased risk of HCV (re)infection among sex workers will be essential to increase and sustain access to HCV-related care among sex workers and improve individual and population outcomes. Similarly, these frameworks could be also be used to evaluate the process of *access* for other relevant health services for sex workers, including sexual and reproductive health, mental health, and addiction services both for the overall population of sex workers, as well as for specific subgroups.

In addition, future research should also longitudinally monitor changes in access to different health services among sex workers. In particular, two major areas deserve particular attention. First, the impacts of Bill C-36 should be assessed and documented to continue to inform legal reforms supporting decriminalization of sex work in Canada. Second, there is a critical need to scientifically evaluate women sex workers' access and uptake of current women-centred health delivery models in mainstream facilities and other low-threshold delivery models, as well as their impacts on health outcomes, to identify interventions that work and should thus be further explored and scaled-up.

Other avenue of future research relates to Chapter 4's findings. Specifically, there is need for additional basic, clinic, and epidemiological research to better understand the biological and social pathways through which DMPA appears to increase the risk of HSV-2 and other STIs, including HIV. If the association between DMPA and HSV-2 is proved to be causal, this will have important implications from

a contraceptive policy perspective. Further research is also needed to evaluate if other forms of hormonal contraception have similar unintended consequences to help inform the development and access to safer contraceptives. Chapter 4 also raised some ethical concerns regarding potentially coercive health-related practices that may be neglecting women sex workers' autonomy and decision-making capacities. Qualitative research is urgently needed to better understand and promote sex workers' exercise of their rights within the asymmetrical power dynamics between healthcare providers and clients.

5.6 Conclusions

This study sought to examine women sex worker's access to health services within a setting that purports to provide UHC. Guided by a *Structural Determinants* framework, the three empirical analyses included in this thesis revealed systemic and persistent barriers to appropriate and quality health care. Importantly, findings from this research underscore the crucial role played by structural factors in shaping health care seeking patterns and outcomes among sex workers. Among these, stigma and violence, likely enhanced by the criminalized nature of sex work in Canada, were identified as strong determinants of health care avoidance among sex workers, highlighting the need for safe and enabling environments to promote sex workers' access to health services. Drawing upon previous successful women-centred and sex worker-specific health delivery models, low-threshold, sex-worker led integrated health services should be further explored and adapted to the Canadian context. Ultimately, as unequivocally demonstrated by this study and past

research, women sex workers' health and human rights will not be fully fulfill unless laws that criminalize any aspect of the sex work industry are removed.

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