THE IMPACT OF STRUCTURAL INEQUITIES AND INTERPERSONAL VIOLENCE
ON FOOD SECURITY AND HIV CARE AMONG WOMEN LIVING WITH AND
AFFECTED BY HIV IN A CANADIAN SETTING

by

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B.Sc., Simon Fraser University, 2014

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

MASTER OF SCIENCE

in

THE FACULTY OF GRADUATE AND POSTDOCTORAL STUDIES

(Population and Public Health)

THE UNIVERSITY OF BRITISH COLUMBIA

(Vancouver)

October 2017

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ABSTRACT

BACKGROUND: Women living with HIV (WLWH) and sex workers (SWs) are priority populations for HIV prevention, diagnosis, treatment, and care. There is limited research into the impacts of structural (e.g., laws) and interpersonal violence (i.e., physical, sexual, verbal) on access to necessities (e.g., food, housing), HIV treatment, or the relationship between violence and HIV stigma. This thesis investigated the role of structural and interpersonal violence in an environment of HIV non-disclosure criminalization, in food insecurity among SWs living with and affected by HIV, and in antiretroviral (ART) adherence.

METHODS: Data were drawn from two community-based prospective cohort studies, An Evaluation of Sex Workers’ Health Access (AESHA) and Sexual Health and HIV/AIDS: Women’s Longitudinal Needs Assessment (SHAWNA). Bivariate and multivariable logistic regression were used to examine the correlates of physical and/or verbal violence due to HIV disclosure without consent among WLWH in the SHAWNA cohort. Bivariate and multivariable logistic regression using generalized estimating equations (GEE) were used to model correlates of food insecurity among SWs in the AESHA cohort. Finally, a multivariable confounder model was created to assess the independent relationship between ART adherence and physical and/or sexual violence for WLWH in the SHAWNA cohort.

RESULTS: Among 255 WLWH enrolled in SHAWNA between 2010-2016, bivariate and multivariable logistic regression showed that WLWH who were “outed” had elevated odds of experiencing physical and/or verbal violence (Objective 1). In AESHA, among 761 SWs living with or affected by HIV between 2010-2014, bivariate and multivariable logistic regression using GEE revealed increased odds of food insecurity for SWs who experienced physical and/or
sexual violence (Objective 2). Among 250 WLWH enrolled in SHAWNA between 2014-2017, bivariate and multivariable logistic regression using GEE found decreased odds of optimal ART adherence among WLWH who experienced physical and/or sexual violence (Objective 3).

**CONCLUSIONS:** Structural and interpersonal violence are important factors in the health needs and outcomes of SWs and WLWH. Universally applied trauma-informed care by primary healthcare providers is crucial. The decriminalization of sex work and HIV non-disclosure must be a priority. Given the high proportion of Indigenous women represented in this thesis, culturally relevant programming must be accessible.
LAY SUMMARY

This thesis aimed to investigate the role of systemic inequities and violence in health needs and outcomes for women living with HIV and sex workers affected by HIV. This analysis brought to light a high proportion of marginalized women living with or affected by HIV who have experienced physical, sexual, and/or verbal violence. These experiences of violence are associated with poor health and human rights outcomes including confidentiality violations, food insecurity, and suboptimal HIV treatment adherence. There is a clear need for evidence-based, women-centered laws, policies, and programming to increase marginalized women’s access to health care, safety, and basic needs in Metro Vancouver.
PREFAEc
This thesis was conducted using data from two ongoing, community-based prospective studies: one of street and off-street sex workers (An Evaluation of Sex Workers’ Health Access or AESHA, 2010-present) and the other with women living with HIV (Sexual Health and HIV/AIDS: Women’s Longitudinal Needs Assessment or SHAWNA, 2010-present). Both studies are housed at the Gender and Sexual Health Initiative. AESHA is funded by the US National Institutes of Health (R01DA028648, PI: Shannon, co-PI: Goldenberg) and MacAIDS. SHAWNA is funded by the Canadian Institutes for Health Research (MOP-133617, PI: Shannon, co-PI: Krusi) and MacAIDS. All data collection, entry, coding and cleaning was conducted by AESHA and SHAWNA staff at the Gender and Sexual Health Initiative. These studies have been approved by Providence Health Care/University of British Columbia Research Ethics Board (AESHA: H09-02803; SHAWNA: H14-01073) and BC Women’s Hospital (BCWH)

With feedback and direction from my supervisory committee (Supervisors: Dr. Kate Shannon and Dr. Jeannie Shoveller, Committee member: Dr. Gina Ogilvie), I devised and conceptualized the research designs (Chapters 2-4). In collaboration with statisticians, I developed my data analysis plans for each chapter, after which they carried out the analyses in SAS based on continued feedback. I created all tables using Microsoft Word.

Chapter 2 has been submitted for publication and is currently under review at a peer-reviewed journal.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>AESHA</td>
<td>An Evaluation of Sex Workers' Health Access</td>
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<td>AOR</td>
<td>Adjusted Odds Ratio</td>
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<tr>
<td>ART</td>
<td>Antiretroviral Therapy</td>
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<tr>
<td>BC</td>
<td>British Columbia</td>
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<tr>
<td>CI</td>
<td>Confidence Interval</td>
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<td>CIHR</td>
<td>Canadian Institutes of Health Research</td>
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<td>GBV</td>
<td>Gender-Based Violence</td>
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<td>GEE</td>
<td>Generalized Estimating Equations</td>
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<td>GSHI</td>
<td>Gender and Sexual Health Initiative</td>
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<td>HCV</td>
<td>Hepatitis C Virus</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<td>HSV-2</td>
<td>Herpes Simplex Virus-2</td>
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<td>IPV</td>
<td>Intimate Partner Violence</td>
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<tr>
<td>IQR</td>
<td>Interquartile Range</td>
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<tr>
<td>LGBTQ2S</td>
<td>Lesbian, Gay, Bisexual, Trans, Queer, 2-Spirit</td>
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<tr>
<td>OR</td>
<td>Odds Ratio</td>
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<tr>
<td>PLWH</td>
<td>People Living With HIV</td>
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<td>SHAWNA</td>
<td>Sexual Health and HIV/AIDS: Women's Longitudinal Needs Assessment</td>
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<tr>
<td>SW</td>
<td>Sex Worker</td>
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<tr>
<td>TasP</td>
<td>Treatment as Prevention</td>
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<td>UK</td>
<td>United Kingdom</td>
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<td>UN</td>
<td>United Nations</td>
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<tr>
<td>UNAIDS</td>
<td>Joint United Nations Programme on HIV/AIDS</td>
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<td>US</td>
<td>United States</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WIHS</td>
<td>Women's Interagency HIV Study</td>
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<td>WISH</td>
<td>WISH Drop-In Centre</td>
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<tr>
<td>WLWH</td>
<td>Women Living With HIV</td>
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GLOSSARY

**AESHA:** An Evaluation of Sex Workers’ Health Access (2010-present). AESHA is a trans inclusive community-based longitudinal cohort study to evaluate the physical, social, and policy factors related to sex workers’ sexual health, HIV transmission vulnerability, and access to health care in Metro Vancouver. AESHA includes ongoing outreach to indoor and outdoor sex work venues by trained nursing staff and experiential and non-experiential research team members.

**Intersectionality:** A term to describe the synergy by which different, combined social positions and systems of oppression interact to indivisibly affect individual experiences of inequity and marginalization (e.g., race, gender, HIV status).

**SHAWNA:** Sexual Health and HIV/ADS: Women’s Longitudinal Needs Assessment (2010-present). SHAWNA is a trans-inclusive community-based longitudinal research study to evaluate the social, policy, legal, gender, and geographical gaps in women’s HIV care in Metro Vancouver. SHAWNA includes ongoing outreach through Peer Research Associates, experiential and non-experiential research team members and trained nursing staff.

**Structural inequities:** negative manifestations of structural factors arising in the setting of discrimination and/or violations of human rights principles experienced by groups and individuals. For example, police harassment, homelessness, racism, sexism, homophobia, transphobia.
**Violence**: The WHO defines violence as “the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation”. This definition includes physical, sexual and verbal violence. **Workplace violence** is a distinction made to refer to any violence in the setting of sex work that threatens sex workers’ health and safety from perpetrators such as clients, police, managers, third parties, or other actors linked to the workplace.
ACKNOWLEDGMENTS

I would like to thank my supervisors, Dr. Kate Shannon and Dr. Jeannie Shoveller, and my supervisory committee member, Dr. Gina Ogilvie, for their guidance, mentorship, encouragement, and expertise over the course of my master’s training.

Funding for this work was generously provided by the Canadian Institutes of Health Research. I would also like to thank GSHI for salary support during my master’s training.

I offer my enduring appreciation to the participants in the AESHA and SHAWNA studies whose wealth of knowledge and faith in the real-world impact of research made this thesis possible. The AESHA and SHAWNA staff were an indispensable help in completing this work through their patient and understanding interviewing, nursing, and outreach. I am grateful for the support of the administrative staff at the GSHI/ BCCfE. Further, I would like to sincerely thank Dr. Putu Duff, Dr. Kathleen Deering, Melissa Braschel, Margaret Erickson, Premala Matthen, Karina Czyzewski, Chrissy Taylor, Julie Sou, Tina Ok and many other individuals at GSHI for their honest encouragement, feedback, and camaraderie over the course of my master’s degree at the GSHI/ BCCfE.

I owe my deepest gratitude to my family and friends for their unwavering support, particularly during the final stages of thesis-writing before my move to Montreal. To my mother for her incredible ability to quickly understand my research and provide critical guidance on structure when I was close to the end and to my father for his fantastic proof-reading, driving me food late at night, and helping me move in the midst of it all. Thank you both for your moral and financial support throughout my education and the sacrifices you have made to allow me the opportunity to thrive.
I am grateful to YouthCO HIV & Hep C Society, to all its past and present staff and volunteers since 2008, for allowing me the space to grow into myself and my research endeavours from a perspective firmly rooted in humanity and social justice. I would like to thank the BLM-V crew for their solidarity and ever-inspiring resistance and Solange Knowles for reaffirming the work I do when I needed a final push. I’d like to thank my new colleagues and friends at JSF for their insightful feedback and encouragement around my defence. Last but absolutely not least I am forever grateful to Roy for his untold support and understanding over the course of this degree, his editing and proof-reading, and insistence that I prioritize my mental and physical health in order to approach this work as well as possible.
To Jeremiah Sigola
Chapter 1: INTRODUCTION

1.1 BACKGROUND

Human rights are fundamental pre-requisites to health (1). Structural inequities in societies often occur in the context of violations of human rights and these breaches have negative effects on individuals and public health strategies for HIV prevention, transmission, and access to care (2). Structural factors are features that operate external to the locus of control of the individual, and these are now recognized as critical factors shaping the HIV and violence epidemics (3, 4). There is a growing body of evidence that demonstrates how macrostructural factors (e.g., laws, policies, racism, stigma) operate dynamically with other more proximal factors at the mesostructural level (e.g., community, workplace) and also at the microstructural levels (e.g., interpersonal interactions that directly affect persons) to shape individual health outcomes in addition to access to care for marginalized populations (5). Several documents including recent WHO and UNAIDS guidelines (1, 6, 7), sexual and reproductive health recommendations among women living with HIV (WLWH) (8), and recommendations for HIV prevention, treatment, and care among sex workers (2, 9) all call for the application of human rights principles and the removal of criminalizing laws targeting HIV and sex work as necessary preconditions for access to HIV prevention, care, and supports (1). Structural inequities are negative manifestations of structural factors arising in the setting of violations of human rights principles. Structural inequities exist in two highly criminalized and stigmatized populations of women sex workers and WLWH. These populations may overlap and concurrently experience the effects of multiple structural inequities. This thesis draws on two community-based research projects in Canada where both sex work and HIV non-disclosure operate within highly
criminalized frameworks. Growing evidence suggests that these laws, which are often framed as a means to “protect women”, are in fact “gender-blind” and place women, including trans women, at increased risk of violence and poor access to basic health services (10-13). To further test this hypothesis, I use social epidemiological analyses to map the potential pathways through which structural inequities (e.g., HIV-related discrimination, police harassment, and homelessness), together with various forms of violence (HIV-related violence; gender-based violence; workplace violence) affect access to basic necessities and human rights (i.e., food security, antiretroviral therapy).

Violence

In 1996, the WHO adopted a broad definition of violence that includes “the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation” (14). This WHO definition encompasses both systemic violence at population and community levels and interpersonal violence at the individual level. Furthermore, violence has since been increasingly recognized as a public health and human rights concern, as opposed to being viewed merely as a social issue (14, 15). Global evidence reveals that women and gender/sexual minority communities (including trans women)

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1 Sex work criminalization in Canada

Canada criminalizes sex work demand by targeting clients and third parties through the Protection of Communities and Exploited Persons Act. While this is technically different from criminalizing sex workers themselves, it reproduces the same outcomes: sex workers are forced to work in more isolated areas to avoid police harassment of their clients, which often results in rushed transactions and an inability to properly screen clients who may be violent. This does little to protect sex workers and only perpetuates lack of access to safety and healthcare.

HIV non-disclosure criminalization in Canada

PLWH in Canada are legally obligated to disclose their HIV status prior to engaging in sexual activity that poses a “realistic risk” of transmission. PLWH must disclose their status before having sex without a condom (even if viral load is “low”) or having sex using a condom if viral load is higher than “low”. There is no duty to disclose if viral load is low and a condom is used, however, this does not match transmission science, which dictates that low viral load or a condom would suffice to prevent a realistic transmission risk. A frequent charge for HIV non-disclosure is aggravated sexual assault. Convictions for this offense can result in life imprisonment and mandatory registration on the Sexual Offender Registry.
disproportionately experience the burden of interpersonal violence throughout their lives (16-18). The WHO estimates global levels of intimate partner physical and sexual violence against women in the general population to be between 30-60% (19). However, marginalized women living with or disproportionately affected by HIV (e.g., street-based sex workers, women who use drugs) are exposed to rates of violence many times higher than the general population as a result of structural inequities (4, 20).

Additionally, there is a well-established link between male-perpetrated intimate partner violence (IPV) and HIV risk among women in the general population, with the majority of evidence emerging from high HIV endemic settings of sub-Saharan Africa and the Global South (21, 22). Among marginalized women who use drugs, intimate partner violence and drug market violence have been linked to elevated HIV risks in some settings (20). Among women, men, and trans sex workers, there is growing evidence to suggest HIV burden is increased by exposure to various forms of workplace violence, which varies widely in and across settings by working conditions, laws and policing, (23, 24). However, far less is known about these and other forms of violence (e.g., intimate partner violence; violence from community members) among sex workers in criminalized settings and how this may shape access to basic health and human rights necessities. Similarly, among women sex workers, while the linkages between HIV risk and exposure to workplace violence have been established (4), we know far less about other forms of violence perpetrated against sex workers in settings that are criminalized and how other structural inequities (e.g., policing, homelessness) also shape women’s access to basic necessities (e.g., food security), as well as HIV services and supports (e.g., access to HIV treatment).
The current thesis aims to:

**Objective 1:** Characterize the links between non-consensual HIV disclosure and its relationship to physical and/or verbal violence experienced by WLWH;

**Objective 2:** Evaluate the impact of various forms of structural inequities (e.g., police harassment, homelessness) in the context of sex work criminalization and interpersonal violence (e.g., workplace violence, gender-based intimate partner violence) on food insecurity among sex workers living with and affected by HIV in a longitudinal study; and

**Objective 3:** Determine whether there is a correlation between gender-based physical and/or sexual violence and adherence to antiretroviral therapy (ART) among WLWH.

### 1.2 THEORETICAL AND CONCEPTUAL FRAMEWORKS

Analysis of the epidemiology of HIV suggests that the dynamics of viral transmission and disease progression cannot be solely explained at the biological level, since certain populations are more profoundly affected compared to others. An important framework that helps to examine the determinants of HIV beyond the biological level includes the consideration of structural factors. This thesis draws upon a framework referred to as the “structural determinants of HIV” (7) which was proposed by Shannon *et. al.* (9) and based on work by Diez Roux (25) and Rhodes (26). The structural determinants of HIV framework recognizes that structural inequities such as racism, sexism, and homophobia are driven by the “powerful social backdrop” within and before which marginalization occurs (27). The structural determinants of HIV framework maps the dynamic and iterative pathways to HIV and health access (9). The framework recognizes factors that operate at the macrostructural, mesostructural, and microstructural levels; each of these
levels is described in the current thesis with a view to understanding the application of this framework to HIV. Furthermore, the concept of intersectionality is used to explore how the presence of two or more structural inequities existing concurrently may affect the health of individuals and communities. The role of human rights violations in contributing to structural inequities is also considered in this thesis.

1.2.1 STRUCTURAL DETERMINANTS OF HIV

For the purposes of this thesis, the structural determinants of HIV framework provides a means to conceptualize the links between (i) macrostructural factors, (ii) mesostructural level factors, and (iii) microstructural factors and how these connections may influence HIV prevention, testing, treatment, and access to care. Macrostructural factors are at the pinnacle of the hierarchy and include institutional policies, sex work laws, criminalization of HIV non-disclosure, social stigma, colonialism, and racism. Mesostructural factors are the filter through which macrostructural factors are interpreted (e.g., cultural norms, social networks, gendered power dynamics and work-environment factors.) Microstructural level factors (e.g., interpersonal violence, stigmatization, food insecurity) directly impact individuals and manifest as a consequence of macrostructural and mesostructural level factors. These structural factors are dynamic, intersect, and have iterative effects at structural and individual levels. Figure 1.1 illustrates the intersecting effects of multiple levels of structural inequity and the effects they contribute to at the individual level related to violence and health and human rights outcomes.

Structural inequities, those that exist beyond the control of the individual (9), are preserved and sometimes introduced though policies or laws that reinforce negative stereotypes and discrimination against marginalized groups. Laws do not operate in a vacuum; they are
created by individuals with power and are therefore subject to the limitations and biases their creators may hold. These laws, whether evidence-based or not, dictate enforcement through policing institutions whose officers mediate direct interactions between individuals and the law.
Figure 1.1 Structural determinants framework—relationships between structural inequities, violence, and HIV
1.2.2 HUMAN RIGHTS AND STRUCTURAL INEQUITIES

Structural inequities arise when basic human rights are violated and vice versa. Fundamental human rights include the rights to i) equality and non-discrimination, ii) privacy and confidentiality, iii) respect for the dignity and autonomy of each person, and iv) access to the basic necessities of life (e.g., food, health care, and housing) (1). The right to equality and non-discrimination is foundational to justice and, in the context of WLWH and sex workers, required to ensure equal access to health care and basic necessities in two populations that face intersecting systemic inequities and barriers to care. Criminalization of sex work and HIV non-disclosure both threaten the right to non-discrimination and have been shown to result in experiences of violence and decreased access to health services (4, 28). The right to privacy and confidentiality requires informed consent about what information is collected by health care and that HIV status is not revealed without consent. In an environment where HIV is stigmatized, this may have dire consequences for PLWH. Similarly, the stigma associated with sex work may result in negative outcomes if confidentiality is breached or may deter sex workers from open communication with healthcare providers (29). Respect for personal dignity and autonomy requires informed consent and counselling to allow WLWH the agency to make decisions about their own healthcare, particularly for members of marginalized populations whose engagement in care requires that these populations feel safe and respected. Coercive or non-voluntary HIV testing may erode trust of health care professionals and may decrease access for marginalized populations. Access to the basic necessities to life is a human right enshrined in international agreements and federal laws however, access remains unequal for populations affected by structural inequity. Unequal access to food, housing, and healthcare affects many marginalized populations (30-32) and presents a barrier to effective HIV testing, treatment, and care.
1.3 STRUCTURAL INEQUITIES AND VIOLENCE AGAINST WOMEN

Structural inequities differentially predispose some women to violence and human rights violations through multiple interwoven forms of systemic oppression. All women, including trans women, are subject to and may experience sexism and gender-based violence across their lifetimes. Sexism is a prejudice based on gender that is supported by structural and institutional power (33). Patriarchal societies place men in positions of power across most institutions and systems, thus, sexism serves to maintain gender inequality that privileges men and masculinity, and is perpetuated by sociocultural attitudes and norms towards women in conventional gender roles (33).

Violence against women is defined by the United Nations Declaration on the Elimination of Violence Against Women as “any act of gender-based violence that results in, or is likely to result in physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivations of liberty, whether occurring in public or in private life” (34). While gender-based violence against men and boys does exist, the structural power dynamics of sexism that make women more susceptible to violence based on gender, paired with the lack of resources and agency that women who experience gender-based violence often have, make women the focus of this thesis.

Globally, 1 in 3 women is estimated to experience physical or sexual violence in her lifetime (35). While IPV is a leading and recognized form of gender-based violence, women can also experience various types of interpersonal violence in their lives including gender-based violence (including IPV, domestic violence, non-partner sexual assault, non-partner physical assault); workplace violence (in the context of sex work); childhood abuse (physical, sexual, and/or verbal
violence in childhood); and HIV-related violence. These experiences of violence can interact and accrue over the lifetime, therefore, literature suggests the importance of accounting for the many different forms of interpersonal violence and trauma (36). A 2016 study by Decker et. al. from the Women’s Interagency HIV Study (WIHS) cohort found that WLWH and women affected by HIV in an urban context faced continuous heightened levels of gender-based violence and that previous experiences of various types of violence posed a greater risk for subsequent physical and sexual violence (37). Similarly, a 2014 Canadian study in Vancouver revealed that recent IPV against sex workers was associated with childhood physical and/or sexual abuse (38). This is consistent with research that women who have survived past violence are at high risk of future experiences of violence (39, 40).

Certain subgroups of women, including Indigenous women, sex workers, and women of gender or sexual minorities, experience additional forms of structural inequities based on these social identities, likely operating through intersectionality. The current thesis will offer one of the first opportunities to characterize the impacts of structural inequities and interpersonal violence, respectively, on access to the necessities of life (e.g., food, safety, HIV treatment and care) for women living with or disproportionately affected by HIV.

1.3.1 VIOLENCE AGAINST WLWH

HIV-related violence is any violence experienced due to HIV status. WLWH face numerous macrostructural inequities that may predispose this population to violence. A significant macrostructural legal factor for WLWH is the institutional discrimination effected through HIV non-disclosure laws that treat the possibility of HIV transmission as a crime (28). Furthermore, these laws are manifest through a mesostructural level culture of fear and stigma
around HIV, as well as gendered power dynamics. Combinations of mesostructural level factors can result in microstructural level experiences that operate interpersonally through stigmatization, discrimination, and various types of violence against WLWH. Living with HIV poses a risk for newly initiated violence (e.g., violence that proximally follows HIV disclosure) or for longstanding violence that worsens after diagnosis. Although few quantitative estimates are available in this realm, one study has estimated the lifetime prevalence of violence against WLWH in high-resource countries at 55% (41). As this estimate is restricted to only IPV, the actual prevalence may be higher when additional sources of violence (beyond intimate partnerships) are considered. It is challenging to assess whether violence is a direct result of living with HIV without considering HIV disclosure as a factor. A qualitative study from 2009 in the United States found that 25% of WLWH had experienced negative consequences because of their HIV disclosure, including physical and verbal assault. Another study suggests that women who already experience violence may be fearful of increased violence if they disclose their HIV status (42, 43). Outside of a participatory qualitative study that reported 89% of WLWH have ever feared or experienced violence before, since, or because of their HIV status (44), there is limited to no epidemiological data around women’s experiences of violence specifically due to HIV status in high-resource settings.

1.3.2 VIOLENCE AGAINST SEX WORKERS

Globally, sex workers are a key population affected by HIV who additionally experience social marginalization and heightened levels of interpersonal violence (4, 38), often as a result of criminalization of sex work (45). Sex work experiences are highly varied since men, women, and trans individuals can all earn a livelihood as sex workers. Evidence indicates that the
criminalization of sex work, a macrostructural factor, has negative health-related and social outcomes (46-50) for all sex workers, particularly for outdoor sex workers who may not have the same protections and social supports as sex workers who work in informal indoor establishments. Research conducted in Metro Vancouver focuses on the experiences of sex workers and highlights these amplified macrostructural factors, including criminalization and social stigma, that impact sex workers’ health and security (38, 51, 52). These factors represent structural inequities that manifest as the high prevalence of violence that some sex workers experience (4, 52) and a high HIV burden of close to 14 times that of the general population in certain marginalized settings (53).

In addition to the gender-based violence women and trans sex workers may face, sex workers may also experience workplace violence—defined as any violence in the setting of sex work that threatens sex workers’ health and safety (4). Violence is a human rights violation and perpetuates social inequities (24). A recent systematic review of violence against sex workers revealed that lifetime experiences of workplace violence ranged from a low of 5% to a high of 75%, and varied significantly based on exposure to structural inequities (e.g. criminalization and policing, stigma) or access to safer labour protections (e.g. safer working spaces, supportive social and policy spaces) (4). In Metro Vancouver, Canada, rates of recent workplace violence or police harassment ranged from 30% among sex workers operating in safer indoor work spaces to as high as 70% among street-based sex workers working in isolated settings (23). A qualitative community-based research study with the street-involved sex workers in Vancouver in 2014 found that while new client-focused policing strategies no longer targeted sex workers the continued policing of sex work reproduced the same harms for sex workers as full criminalization. These harms include rushed negotiations and forgoing screening clients, thereby
duplicating similar fears of police harassment and the risks of workplace violence for sex workers (46). In high-income settings, sex workers’ experiences vary, however outdoor sex workers are more susceptible to violence due to the criminalized nature of sex work in Canada (4). Due to the nature of outdoor sex work, violence is a stark reality for many women. Furthermore, sex workers who experience violence are more likely to be coerced by clients to engage in condomless sex (52), and thus are at risk for HIV transmission. For example, there is a large body of evidence that demonstrates that policies and laws that affect sex workers can create an environment that prevents condom negotiation or vetting potentially dangerous clients at the interpersonal level (9), thus elevating risk of HIV and risk of violence, particularly for those who are racialized, including women who identify as Indigenous (5, 50) or who identify as transgender(50, 54). These intertwined vulnerabilities illustrate the challenging nexus of intersecting forms of structural inequity around HIV for women.

1.3.3 INTERSECTIONALITY

Additionally, this thesis draws on the concept of “intersectionality” (55, 56) in order to highlight and better interpret how multiple forms of discrimination and oppression interact synergistically to affect individuals’ lived experiences (57). This thesis integrates an intersectional lens to offer a more nuanced understanding of structural inequities identified in each chapter and as a tool to craft population-specific policy and program recommendations. Intersectionality is an important element of the structural framework for the determinants of HIV since it allows for the consideration of simultaneous, inextricable social positions that converge upon particular individuals and groups. Different groups of women (e.g., Indigenous women, racialized women, gender/sexual minority women, sex workers) do not necessarily exist in isolation and may
concurrently inhabit more than one social identity. For example, Indigenous women are overrepresented in sex work (58) and thus may simultaneously experience the nexus of racism and occupational stigma. The overall effects of structural inequities on stigma are not merely additive– the whole is greater than the sum of the individual parts (59).

Multiple inequities may intersect and contribute to stigmatization of WLWH and these consequences have been studied qualitatively in Canada by Logie et al. (5). This research reveals the necessity of acknowledging the effects of multiple layers of marginalization and stigma on WLWH in order to inform policy and employ multi-level interventions and supports (5).

The high prevalence of homicide and violence against Indigenous women in Canada (60) has resulted in a long-overdue national Inquiry by the Federal government to account for these women, many of whom were sex workers. The national focus on Missing and Murdered Indigenous Women highlights how women with multiple marginalized identities can be targeted for interpersonal violence and at the same time be unprotected by law enforcement, and subsequently these women are failed by the systems and structures that ostensibly exist for protection and justice. This thesis, the research questions examined within it, and the data obtained must therefore be interpreted with an understanding of the historical and ongoing colonial context of Canada and its particular effect on Indigenous women.

Colonization is a process of invasion and disenfranchisement that depends on the oppression of one group for another’s benefit (61). Canada’s colonial project has had terrible consequences on the health and well-being of Indigenous populations. The intergenerational effects of the violence of colonization, residential schools, child apprehension, and physical/sexual violence against Indigenous people– particularly women– have resulted in a complex challenge to community preservation and to supporting positive health outcomes on a
population level (61-63). Indigenous populations in Canada continue to be marginalized institutionally, systemically, and interpersonally and as such, colonialism has been proposed as a further determinant of health (63). Notwithstanding the incredible resilience and self-driven community support of Indigenous women in the face of systemic inequities including racism, Indigenous peoples are still disproportionately affected by HIV. Data from the Public Health Agency of Canada suggest that while approximately 25% of PLWH in Canada are women, almost 50% of Indigenous PLWH are women. Research conducted among women sex workers and WLWH in Metro Vancouver echoes the heightened representation of Indigenous women in HIV diagnoses (62).

Sexual or gender minority women, i.e., members of the lesbian, gay, bisexual, transgender, queer, two-spirit (LGBTQ2S) community face macrostructural inequities that include homophobia, transphobia, and heterosexism (27). These structural factors privilege cisgender, straight women over other identities and perpetuate marginalization of women in gender/sexual minority groups. Trans women in particular encounter specific challenges and may experience extreme violence around gender identity and gender presentation (64). The intersections of these identities may make navigation through HIV prevention, treatment and care additionally challenging.

1.4 ACCESS TO FUNDAMENTAL HEALTH RIGHTS

The UN Declaration of Human Rights states that every human being, regardless of origin, has the right to “life, liberty, and security of person”(65). For PLWH, certain factors are prerequisites for the right to life to be possible, including access to ART, adequate food security, in addition to privacy and confidentiality with respect to HIV status. Marginalized populations are often most
affected by HIV and face barriers to accessing essential services. Addressing the human rights of marginalized populations is essential to ensuring adequate HIV prevention and care. Violations of the human rights of privacy and confidentiality, equality and non-discrimination, and access to the basic necessities of life (e.g., food, housing, health care and support) are examined in this thesis in the context of structural inequalities faced by marginalized women, WLWH, and sex workers in Metro Vancouver, Canada.

1.4.1 PRIVACY AND CONFIDENTIALITY

PLWH require privacy and confidentiality around HIV status due to the pervasive stigma and discrimination PLWH experience. Explicit expectations of confidentiality are intended to protect individuals against non-voluntary HIV disclosure. The consequences of HIV disclosure can be dire and sometimes violent. For example, a study from the United States found that almost half of women who reported that others knew their HIV status also reported negative consequences of this (66). A similar study from the United States revealed that 29% of WLWH feared disclosure-related violence and 45% of WLWH who had disclosed their status experienced physical, sexual, or emotional abuse at some point after disclosure (67). While there can be positive factors associated with voluntary HIV disclosure (e.g., linkage to care, access to support), non-voluntary HIV disclosure (i.e., disclosure without consent) removes women’s agency to decide whether and how to disclose and leaves women susceptible to violence. HIV disclosure without consent has mostly been researched in low-resource countries. Among WLWH in South Africa, 32% of disclosures occurred without consent (68). In India, 35% of study participants had had their status disclosed without consent (69), in some cases even in front of them. Breaches of confidentiality may lead to further non-voluntary disclosure by others and negative experiences
such as rejection, stigmatization, and financial consequences—particularly for women who rely on financial support from family members (68).

1.4.1.1 CRIMINALIZATION OF HIV NON-DISCLOSURE

HIV non-disclosure laws may originally have intended to reduce HIV transmission. However, in context of fear of HIV, illness, and death, stigma and discrimination were only perpetuated. HIV non-disclosure laws in Canada require all PLWH to disclose their status prior to engaging in a sex act that poses a realistic transmission of HIV and use a condom or have a ‘low’ viral load and use a condom (70, 71). The criminalization of HIV non-disclosure has been internationally criticized for being detrimental to individual and public health (6, 28, 72). This law has not kept pace with scientific advancements in treatment and prevention. Canada is second only to the United States in its absolute number of prosecutions against PLWH for HIV non-disclosure (73). PLWH in Canada can be charged with aggravated sexual assault and conviction can result in life imprisonment and being listed on the National Sex Offender registry. This legal paradox—using sexual assault laws ostensibly designed to protect women as a way to prosecute HIV non-disclosure cases—may put women’s safety in jeopardy and amplify the many forms of structural inequity WLWH already face. Furthermore, this law is unresponsive to the gendered nature of HIV prevention negotiation and HIV status disclosure, which is especially concerning considering that disclosure itself may lead to negative interactions ranging from rejection and abandonment to physical and/or sexual violence (42, 43, 74, 75).

Due to the macrostructural social power dynamics of gender inequity, women are more susceptible to violence and abuse, particularly if they are transgender. WLWH may face intersecting inequities including HIV-related stigma, sex-work related stigma, racism,
homophobia, transphobia and/or gender discrimination (5). While it is clear that WLWH experience heightened levels of violence (44), there is limited research into how criminalization of HIV non-disclosure may impact PLWH and far less is known about the gendered impacts of the laws as they affect WLWH. Some research suggests that the threat of criminal charges alone may be enough to affect health care engagement for WLWH (76).

HIV non-disclosure laws exacerbate an environment of stigma and discrimination, and perpetuate the vilification of PLWH. Stigma and discrimination are magnified by sensationalized media coverage of HIV non-disclosure cases and by public unfamiliarity with the realities of HIV. These media reports over-represent members of marginalized groups (e.g., Black, Indigenous, immigrant) and promote stereotypes about race and HIV (77), which may fuel public perception to such a degree that it may iteratively influence the structural and interpersonal violence and discrimination experienced by marginalized groups (e.g., immigration/travel restrictions; xenophobia).

Non-voluntary HIV disclosure occurs when non-consensual revelation of an individual’s HIV status is divulged by someone else, for example healthcare workers, housing residents, or ex-partners. Non-voluntary HIV disclosure may elicit discriminatory behaviour from others and result in reduced access to treatment and care (43). Despite what has been concluded about the harms of HIV non-disclosure criminalization, there is little available epidemiological evidence among WLWH about non-consensual disclosure experiences and whether a direct relationship to the risk of HIV-driven violence exists. Far less is known from WLWH about whether and how this law may contribute to placing women at increased risk for HIV-related violence as a direct result of stigma towards PLWH.
1.4.2 FOOD INSECURITY

Food is a necessity for survival and therefore a basic human right, yet globally approximately 1 in 4 people is food insecure (78). Food insecurity is defined as the inability to access an adequate quantity and quality of food in socially acceptable ways (79). Food insecurity and HIV have a bidirectional relationship (80) that establishes adequate nutrition as a prerequisite to effective HIV treatment, while financially-related food insecurity can simultaneously heighten HIV risk factors by, for example, engaging in transactional sex or accepting offers of more money for condomless sex. Food security remains a key factor along the cascade of HIV care – seeking access to HIV testing and subsequent care requires an individual’s basic needs to be met while sustained HIV treatment requires sufficient nutrition. A study among PLWH in the United States found 51% to have had insufficient food in the last year and that food insecurity predicted suboptimal ART adherence (81), similar to a Canadian study that found the prevalence of food insecurity among PLWH to be 48% (with women being more food insecure compared to men and Indigenous people more food insecure than non-Indigenous people) (82).

Food is largely bought and sold as a market good and requires economic security, something many marginalized and street-involved women struggle with, even in high-income countries such as Canada. In the context of structural inequity and systemic oppression, there is a clear gendered aspect to financial access that affects food access and heightens women’s global susceptibility to food insecurity (83) (e.g., the wage gap, employment discrimination, single mothers caring for children). Gender is an increasingly recognized theme in food insecurity where marginalized women are at the highest risk of being food insecure (82, 84). There is concern regarding the role of gender-based violence in food insecurity (85) and the current thesis
will seek to examine this question in the Metro Vancouver region.

1.4.2.1 FOOD INSECURITY AMONG SEX WORKERS

Prioritizing physical safety and ensuring money for immediate needs such as food may sometimes take precedence over condom use (thus enhancing HIV risk for sex workers) (86, 87). Furthermore, sex workers may be willing to work in more dangerous areas to ensure financial security and by so doing increase their risk of violence (87). Recent research in Metro Vancouver suggests that financially-driven food insecurity heightens the risk of HIV for young sex workers (88) and there has been limited research on the role of food insecurity for sex workers in a context of structural inequity and violence. A large proportion of the limited research into food security for priority populations of sex workers and WLWH has been conducted in low-resource settings and much of this research has been qualitative in nature. Gaps remain in our longitudinal understanding of the relationships between food security, poverty, violence, and HIV for sex workers in North America.

The structural inequities of sex work criminalization and stigma may undermine access to stable income and create a financial barrier to accessing food. Studies among sex workers and women in Swaziland, Botswana, and Brazil have found inconsistent condom use, a risk factor for HIV transmission, to be associated with food insecurity (89, 90). In Brazil, a cross-sectional study determined that food insecurity among women was associated with reduced condom use (i.e., increased HIV risk) and the likelihood of a sexually transmitted infection, the presence of which also increases HIV risk (90). In Swaziland and Botswana, food insecurity was associated with increased odds of transactional sex and lack of control in sexual relationships (89). There remains limited research into food insecurity among sex workers in high-resource settings where
sex work can also be driven by financial insecurity. This thesis will seek to address factors associated with food insecurity for sex workers in Metro Vancouver.

1.4.2.2 CRIMINALIZATION AND POLICING OF SEX WORK IN THE CONTEXT OF FOOD INSECURITY

Through the introduction of the Protection of Communities and Exploited Persons Act in 2014, Canada has criminalized the demand for sex work by targeting clients and third parties (91), effectively banning the buying of sex work and prohibiting advertising through online channels. This model is similar to Swedish and Norwegian laws, which have also come under scrutiny for destroying the safety measures sex workers could take by advertising online, as well as continuing to conflate trafficking and sex work (92). The criminalization of sex work engenders adversarial relationships with police (i.e., the institution responsible for enforcing laws treats sex work as a criminal activity) and gives officers broad latitude to threaten arrest (e.g., police harassment) or detain individuals perceived to be breaking the law. This tense relationship between law enforcement, sex workers, and clients partly fuels violence where perpetrators may use sex workers’ marginalization and lack of access to justice to enact harm without fear of punishment (93). Evidence shows that targeting clients replicates the same violence and risks for sex workers from clients as well as law enforcement (46). Sex workers living with HIV may also be impacted by a lack of access to HIV treatment due to experiences of violence and criminalization (94). Microstructural level factors interacting with these macrostructural and mesostructural features may manifest, for example, through client condom refusal in an environment of sex work criminalization. Such interactions impede women’s ability to ensure condom use and serve to increase HIV transmission risk. A small but growing body of research
has begun to examine the violence sex workers experience outside of the workplace (e.g., intimate partner violence), revealing a high prevalence in some settings (38). There is limited research into the impacts of broader gender-based violence against sex workers, as non-partner violence is shown to exist in marginalized groups of women at similar levels to partner violence (95, 96).

1.4.3 ANTIRETROVIRAL THERAPY ACCESS

ART has developed considerably in its design and ease of administration since its inception. Optimal ART adherence combined with good nutrition, affordable housing, and other factors to support a healthy lifestyle mean that PLWH can live a life comparable to that of their HIV-negative counterparts. Optimal ART adherence suppresses an individual’s viral load to the point at which it is undetectable and the risk of HIV transmission becomes negligible (97). When an individual’s viral load is not suppressed, the possibility of transmission increases (98). Decreased community viral load (i.e., the average of all reported HIV viral loads in a community) is significantly associated with reductions in HIV incidence (99). The idea of HIV treatment coupled with transmission prevention is called Treatment as Prevention (TasP)(100). For TasP to be effective, a population requires a functional HIV cascade of care (i.e., a system to support continual testing, treatment, and care of individuals in a population). Unfortunately, Canada has neither a national HIV strategy nor a national strategy regarding violence against women; furthermore, epidemiological evidence documents elevated and escalating HIV rates, especially amongst marginalized populations facing multiple structural inequities (101).
ART ACCESS AS A COMPONENT OF HIV CARE

The HIV cascade of care is a continuum that consists of HIV testing and diagnosis, linkage to care and support, retention in care, and ART adherence support (97). ART is considered successful when a patient’s viral load has been reduced to undetectable levels, which makes transmission risk negligible. Adherence support is wide-ranging and includes medical care, mental health and addiction services, affordable housing and prevention counselling to provide patients with a better quality of life and the best opportunity for positive health outcomes. This continuum of HIV care is however susceptible to gaps, barriers, and leaks (97) whether from PLWH being unable to access initial testing services or non-adherence due to inadequate housing or food insecurity (102). These leaks are not only detrimental to individual health outcomes but also affect population risk of HIV transmission. The cascade can be interrupted or have gaps in function at or before any key step. Violence may be one such disruptor. For example, women entering the cascade at the testing stage may be unable to access healthcare for reasons directly due to violence (e.g., abusive partners placing restrictions on their whereabouts) or its related consequences (e.g., mental health conditions such as depression and anxiety, leading women to isolate themselves and not seek support). Each step of the HIV care cascade contains a smaller proportion of PLWH and violence can intercept at any point in the cascade’s continuum, potentially preventing WLWH from accessing optimal HIV care and contributing to ART access disparity between women and men.

ART ADHERENCE AND WOMEN

Women in British Columbia have generally less access to healthcare than men (103). Correspondingly, ART adherence for PLWH has gender gaps, as demonstrated in a review of
multiple studies from high-resource settings showing women’s lower adherence compared to men (104). A longitudinal study in British Columbia among people who use drugs found that WLWH, after adjusting for confounders including drug use, had independently lower odds of optimal ART adherence (105). Given the widespread violence women face in their lives, the barrier it creates to ART access and adherence for WLWH has emerged as a crucial area of research.

1.5 OBJECTIVES

Current understanding of HIV prevention, care, treatment, and support viewed from a critical gendered lens is limited. Based on prior research and the scarcity of investigation into the effects of gender-based violence on the health and human rights of WLWH and women disproportionately affected by HIV, each chapter in this thesis investigates a distinct HIV-related health and human rights issue within the context of structural inequities for marginalized women and WLWH in Metro Vancouver. Figure 1.2 illustrates the two longitudinal studies from which data were drawn. The objectives of this thesis are as follows:

1. **To characterize the links between non-consensual HIV disclosure and its relationship to verbal and/or physical violence experienced by WLWH.** It is hypothesized that non-voluntary HIV disclosure (e.g. by healthcare providers, housing residents, ex-partners) will be associated with HIV-related physical and/or verbal violence in Canada’s climate of aggressive HIV criminalization given the internationally criticized, overly-broad use of criminal law against people living with HIV.

2. **To evaluate, in a longitudinal study, the impact of various forms of structural inequities (e.g., police harassment, homelessness) in the context of sex work criminalization and**
interpersonal violence) on food insecurity among sex workers living with and disproportionately affected by HIV. It is hypothesized that structural inequities (e.g., racism, police harassment) and physical and/or sexual violence (e.g., by clients, police, partners) will be directly correlated with increased odds of food insecurity, an indicator of basic health and human rights.

3. **To determine, in a longitudinal study, whether there is a correlation between gender-based physical and/or sexual violence and adherence to ART among WLWH.** Given emerging evidence to suggest that WLWH experience higher levels of gender-based violence than the general population, this chapter longitudinally models the confounding effect of gender-based physical and/or sexual violence on HIV treatment adherence. It is hypothesized that experiencing interpersonal violence will be independently associated with decreased ART adherence among WLWH.

![SHAWNA and AESHA](image)

<table>
<thead>
<tr>
<th>Population:</th>
<th>Population:</th>
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<tbody>
<tr>
<td>WOMEN LIVING WITH HIV</td>
<td>SEX WORKERS</td>
</tr>
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<td>2010-present</td>
<td>2010-present</td>
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*Figure 1.2: The SHAWNA and AESHA longitudinal community-based cohort studies.*
Chapter 2: HIV DISCLOSURE WITHOUT CONSENT LINKED TO INCREASED RISK OF VIOLENCE AGAINST WOMEN LIVING WITH HIV IN METRO VANCOUVER, CANADA

2.1 INTRODUCTION

Globally, criminalization of HIV non-disclosure and transmission has been condemned by public health, law, and policy experts (6, 72). Canada stands out in its assertive approach to criminalizing HIV non-disclosure, second only to the United States in absolute number of prosecutions (73). Canadian law requires people living with HIV (PLWH) to disclose their HIV status before engaging in sexual acts posing a “realistic possibility” of HIV transmission. PLWH prosecuted under this law can be charged with aggravated sexual assault (106), even when there is no significant risk of transmission. This overly broad use of criminal law has been criticized widely as counterproductive to public health aims and unresponsive to the highly gendered nature of negotiating HIV prevention and disclosure (6, 28, 72, 107, 108). Due to socialized power dynamics, women are often in a more vulnerable position when negotiating sex, condom use, and violence.

While HIV non-disclosure laws have been positioned as a way to protect women (106), there is currently limited epidemiological understanding of how HIV disclosure experiences shape the risk of violence against women living with HIV (WLWH). HIV non-disclosure criminalization has a particularly disproportionate impact on marginalized women. Quantitative evidence has shown that voluntary disclosure of HIV status can vary in cause and consequence (109) with self-disclosure often associated with positive outcomes (e.g., increased access to HIV care, support) (110) as well as lower levels of stigma (111) and the fear of potential harmful outcomes (e.g., violence, rejection) (112, 113). Non-voluntary HIV disclosure (i.e., inadvertent
or deliberate HIV status disclosure without consent by a neighbor, supportive housing staff, intimate partner, healthcare provider etc.) removes WLWH’s choice of when, how, and to whom they disclose their status. In the context of HIV non-disclosure criminalization, it is hypothesized that non-voluntary HIV disclosure may place women at a higher risk of violence.

There is emerging evidence both in Canada and globally of high rates of gender-based violence amongst WLWH, although this has largely been restricted to intimate partner violence and the majority of studies are from the global south. A global participatory survey across 95 countries found that among 485 women, 89% of WLWH had feared or experienced violence before, since, and/or because of their HIV diagnosis (44). Literature suggests that the time period immediately following HIV disclosure can heighten the risk for intimate partner violence (114). However, to date there are few point estimates of violence against WLWH due to HIV status. There is also a paucity of research about non-voluntary HIV disclosure in a criminalized setting and its impacts on risks of violence against WLWH. The current study quantitatively examined the prevalence and correlates of experiences of physical and/or verbal violence due to HIV status amongst WLWH. It also investigated the independent effect of non-voluntary HIV disclosure on risks of violence due to HIV status amongst WLWH.

2.2 METHODS

Community-Based Research Cohort (SHAWNA)

This analysis draws on baseline data from the Sexual Health and HIV/AIDS: Women’s Longitudinal Needs Assessment (SHAWNA), a longitudinal community-based research cohort with WLWH (trans inclusive) aged 14+ who live or access HIV services in Metro Vancouver between May 2010- September 2016. The SHAWNA Project is a partnership with over 20
women’s HIV and community service providers and is guided by two advisory boards: Community Stakeholder Advisory Board that meets semi-annually and a Positive Women’s Advisory Board that meets every 2-3 months with 12-15 WLWH representatives across Metro Vancouver. The SHAWNA Project was initiated based on community-identified needs for more diverse research with WLWH on experiences navigating HIV care. Following over 6 months of community-based consultations with WLWH, HIV care providers and policy experts on research priorities and gaps in services, SHAWNA was launched in early 2015. WLWH are initially invited to enroll in the SHAWNA cohort through outreach by a team of Peer Research Associates (PRAs) of WLWH, self-referrals and referrals from HIV care providers, peer navigators HIV/AIDS organizations and clinical outreach, including close collaboration with the provincial referral centre for WLWH (Oak Tree Clinic, BC Women’s Hospital). Women are referred to one of two community research offices or can identify a safe, confidential space to complete the interview. This study holds ethical approval through both Providence Health Care/University of British Columbia Research Ethics Board and BC Women’s Hospital.

Following informed consent, at baseline and semi-annual follow-up visits, women complete an interviewer administered questionnaire by trained community/ PRA interviewers and a clinically-focused interview questionnaire along with HIV monitoring and STI/ HCV testing with a sexual health research nurse. SHAWNA interviews focus on lifetime and recent (last 6 months) experiences navigating HIV care, community supports, sexual and reproductive health, and treatment outcomes. The main interview questionnaire elicits responses related to socio-demographics (e.g., age, gender/sexual identity, ethnicity, housing history), and social/interpersonal factors (e.g., trauma, violence, peer supports, access to housing, and income assistance). The clinical questionnaire is focused on questions about overall health and wellness,
pregnancy and motherhood, reproductive health access and outcomes, mental health and
supports, and HIV and STI treatment and care experiences including adherence to antiretroviral
therapy. Participants receive an honorarium of $50CAD at baseline and each biannual visit for
their time, expertise and travel.

**Study Variables**

*Outcome: Violence due to HIV status*

Given the documented high levels of violence experienced by WLWH (44), the primary outcome
was based on a “yes” response to the question “have you ever been verbally or physically abused
by someone because they knew or suspected you were HIV positive?”

*Exposure Variables:*

The main explanatory variable of interest was non-voluntary HIV disclosure. This was defined as
ever having one’s HIV status disclosed without consent, based on a “yes” response to the
question “has anyone ever ‘outed’ you for knowing or suspecting you were HIV positive?”

Additional explanatory variables were considered, guided by a structural determinants
framework and *a priori* knowledge based on literature review. Individual variables of interest at
baseline included socio-demographic characteristics such as age, youth (≤29 years versus >29
years), self-identified ethnicity (Indigenous ancestry, inclusive of First Nations/Métis/ Inuit
ancestry), gender identity [trans (inclusive of gender diverse and two-spirit identities) vs.
cisgender women], sexual orientation (lesbian, gay, bisexual, queer, or two-spirit vs. straight),
enagement in sex work (e.g., exchanged sex for money or other goods/services), lifetime use of
non-injection stimulants (inclusive of cocaine/crack/methamphetamines), lifetime use of
injection heroin, and having a mental health issue (self-reported diagnosis of a mental health
condition). Lifetime interpersonal level factors included disclosing HIV status at the time of
diagnosis and intimate partner violence (using the WHO Intimate Partner Violence Scale for severity of physical or sexual IPV). Lifetime socio-structural factors included immigration or migration from another country vs. Canadian born, homelessness or ever living on the street, physical/sexual abuse by police, and incarceration (defined as ever being in jail overnight or longer).

Statistical Analyses

To examine the association of non-voluntary HIV disclosure and other factors to our outcome of physical and/or verbal violence against WLWH due to HIV status, we constructed an explanatory model using bivariate and multivariable logistic regression. Initially descriptive statistics were examined and compared using the Chi-squared test for categorical variables (or Fisher’s exact test for small cell counts) and the Wilcoxon rank-sum test for continuous variables. Variables that were statistically significant at p<0.05 in the bivariate logistic regression analyses were candidates for inclusion in the multivariable model. We then used a manual backward model selection process to identify the best fitting multivariable model, as indicated by the lowest Akaike Information Criterion (AIC). Two-sided p-values and unadjusted and adjusted odds ratios (OR and AOR) with 95% confidence intervals (95% CI) are reported. All statistical analyses were performed using SAS software version 9.4 (SAS Institute, Cary, NC, USA).

2.3 RESULTS

Of 255 WLWH enrolled in SHAWNA, half (49.8%, n=127) had had their HIV status disclosed without consent (including by a neighbor, supportive housing staff, intimate partner, healthcare provider etc.). In addition, 83.1% (n=212) had ever experienced physical and/or verbal violence, with more than one-third (38.0%, n=97) experiencing physical and/or verbal violence due to
their HIV status. The median age at baseline was 44 (IQR: 37-52). Nearly two-thirds of WLWH, (61.2% n=156), self-identified as Indigenous; 7.8% (n=20) as any other minority group; and 30.6% (n=78) as white. There were no differences in reported experiences of violence due to HIV status by ethnicity (p=0.30). As indicated in Table 2.1, in bivariate analyses, homelessness/living on the street (OR: 3.43, 95% CI: [1.52- 7.73]), diagnosis with a mental health condition (OR: 3.06, 95% CI: [1.71- 5.49]), and experiencing HIV disclosure without consent, i.e., “non-voluntary HIV disclosure”, (OR: 5.81, 95% CI: [3.28-10.29]) were associated with physical and/or verbal violence due to HIV status.

In multivariable logistic regression analysis (Table 2.2), non-voluntary disclosure of HIV status retained the strongest independent association with increased odds of physical and/or verbal violence due to HIV status [AOR 4.94 (2.73-8.95)]. Lifetime exposure to homelessness [AOR 2.74 (1.14-6.59)] and being diagnosed with a mental health condition [AOR 2.12 (1.12-4.02)] were also independently associated with increased odds of physical and/or verbal violence due to HIV status.

2.4 DISCUSSION

In this study of WLWH, non-voluntary HIV disclosure was the strongest independent association, linked to 5-fold increased odds of HIV-related physical and/or verbal violence. In the context of global HIV criminalization, these findings highlight an area of significant concern with respect to violence against WLWH. More than three-quarters of WLWH had experienced lifetime physical and/or verbal violence, with one-third reporting this violence specifically due to their HIV status. This is among the first studies to evaluate the effect of non-voluntary HIV disclosure on risk of violence due to HIV status in a climate of HIV criminalization.
Although HIV disclosure as a psychosocial process can be associated with positive health outcomes and increased engagement in HIV care (115), the fear of discrimination or abuse due to stigma can make self-disclosure difficult (44, 112). Non-voluntary HIV disclosure categorically violates women’s rights to privacy and self-determination. Being “outed”—whether intentionally or inadvertently—by a neighbor, supportive housing staff, intimate partner, healthcare provider etc., may increase the risk of HIV-related violence including from partners, peers, and strangers because of the continued pervasive stigmatization of HIV including the criminalization of HIV non-disclosure. WLWH experience elevated rates of gender-based violence related to intersectional structural vulnerabilities (e.g., multiple marginalized identities due to race, gender, sexuality, disability, immigration status, sex work etc.) given their social positions and the interacting social processes (116). However, the current study shows that non-voluntary HIV disclosure, homelessness, and mental health issues remain the primary independent factors driving risk of violence for WLWH.

Violence against WLWH has received some attention, although mostly limited to studies of IPV. For example, in Nigeria, 23.6% of WLWH had experienced IPV since HIV diagnosis with physical and emotional violence being most common (117). In Canada, an Alberta-based study reported IPV among WLWH to be 40.4% and again found physical and emotional abuse to be most prevalent (118). The current study adds critical evidence to demonstrate that in addition to intimate partner violence, WLWH are also at high risk of other forms of violence due to HIV criminalization and its intersection with HIV stigma.

Despite frequently being referenced as protective for women, laws that criminalize non-disclosure of HIV (e.g., as “aggravated sexual assault”) (119), the results of the current study found that WLWH were at 5-fold increased odds of violence within the Canadian legal context
where HIV non-disclosure remains aggressively prosecuted. The social mindset about HIV has not yet caught up to the science of HIV treatment and prevention that can now make transmission risk negligible to zero. Medically, HIV is now conceptualized as a chronic, manageable disease, and when PLWH are on antiretroviral therapy (ART) viral loads can reach undetectable levels, almost eliminating the risk of HIV transmission (28). However, these stringent laws based on poor science persist and unfounded media reporting feeds stereotypes of marginalized people, remains under informed about effective HIV treatment, and contributes to a sense of loathing towards PLWH (77). In this climate, non-consensual HIV disclosure and the resulting physical and/or verbal violence against WLWH is foreseeable and unacceptable.

This study further suggests that intersectional experiences of mental health and homelessness contribute to experiences of HIV-related violence. Literature reveals a complex relationship between homelessness and violence against women, including mental health factors such as depression (120), and that housing status independently predicts HIV risk and health outcomes (121). Homelessness and mental health issues in Vancouver are a persistent concern for marginalized individuals. In 2016, homelessness reached the highest estimate in ten years at almost 2,000 people counted in the city (122). This number is an underestimate as the City of Vancouver records only people available on one day of the year and does not include the neighbouring municipalities that make up Metro Vancouver– the geographical reach of SHAWNA research. Being homeless/having unstable housing and being diagnosed with a mental health condition were both independently associated with physical and/or verbal abuse because of HIV status in this analysis. While living in HIV-specific housing may come with inherent status disclosure, previous research shows that HIV-specific housing contributes to overall stability and connection to care (121). More than three-quarters of WLWH in the present study
had ever been homeless/lived on the street and almost two-thirds had ever been diagnosed with a mental health condition. The link between homelessness, mental illness and poor health outcomes in high-income settings is striking (31, 123) and a 2016 study showed mentally ill homeless PLWH had over 4 times increased odds of food insecurity (31), which is clearly linked to poor HIV-related health outcomes (30, 124). Shelter is a basic human right and accessible, non-discriminatory housing for WLWH is essential to address structural barriers to positive health outcomes. Providing accessible housing to homeless people in Canada shows significantly improved quality of life (125). Housing needs are fluid and essential for medical needs access and retention for PLWH (126). The balance between essential services and privacy needs calls for WLWH to be at the center of HIV care and programming to best address their living requirements.

*Implications for policy and future research*

The present study lends further support to immediately eradicating the overly broad use of criminal law against PLWH and to developing prosecutorial guidelines and rigorous checks in the event that the law does apply to a case of intentional transmission. No other infectious disease is criminalized in this manner; even ones that are chronic, treatable, and passed in the same ways (e.g., Hepatitis B) or ones that are far easier to transmit and difficult to treat (e.g., multi drug resistant tuberculosis). Media literacy around HIV must improve to eliminate bias and alleviate the impacts of irresponsible reporting on the safety of WLWH and public health in general. Canada must tackle gender-based violence in all its forms from the interpersonal level to the structural level in order to make WLWH safer through program support and funding. Given Canada’s colonial context and the high proportion of Indigenous WLWH in Metro Vancouver, there should be a particular focus on culturally appropriate and inclusive HIV care programming.
in collaboration with Indigenous WLWH. Indigenous SHAWNA participants have identified traditions, elders, and ceremonies that uplift and support WLWH (e.g., sharing circles and traditional gatherings) as important factors. Centering WLWH in their own care and program decisions is key to protecting their rights to privacy and self-determination. Further research into the contexts and actors of non-voluntary HIV disclosure may help identify specific areas to increase education and confidentiality guidelines for healthcare providers and other points of contact for WLWH where non-voluntary HIV disclosure may occur. Further research into the contexts and actors of non-voluntary HIV disclosure may help identify specific areas to increase education and confidentiality guidelines for health and social care providers and other points of contact for WLWH where non-voluntary HIV disclosure may occur. Moreover, housing reform to allow accessible, affordable housing to all people living with HIV and/or chronic illnesses will likely significantly improve access to care and health outcomes. Housing should not be seen as a competing need of marginalized groups but a key element to comprehensive healthcare (121). Integrated care from housing to evidence-based, trauma-informed mental health supports would help to reduce the systemic barriers facing WLWH.

**Strengths and limitations**

The present study isolates a relationship between non-voluntary HIV disclosure and WLWH experiencing physical and/or verbal violence due to HIV status (i.e., experiencing abuse directly because of HIV status). This research highlights the importance of confidentiality in the Canadian context by providing quantitative evidence of a link between non-voluntary HIV disclosure and physical and/or verbal violence. This analysis did not capture the source of non-voluntary HIV disclosure however, follow-up questionnaires have been updated to identify where and from whom non-voluntary disclosure occurs (e.g., housing residents, ex-partners,
peers) to provide information for targeted interventions. Qualitative analysis may provide further nuanced explanation. Participants’ responses may have been subject to social desirability bias given the personal nature of questions related to experiencing violence and the stigma that may be attached. However, this bias is expected to be minimal due to the peer-to-peer nature of interviews and the strong community connections of the study staff. While our sample may not be representative of all WLWH in Metro Vancouver, recruitment for SHAWNA is community-based and driven by PRAs, who have strong relationships to the community in Metro Vancouver, allowing us access to a large and diverse sample of WLWH with varying backgrounds in the region.

2.5 CONCLUSION

Violence is a common experience of WLWH. Women whose HIV status was disclosed without consent had almost 5 times increased odds of physical and/or verbal abuse due to their HIV status compared to women who had not experienced HIV disclosure without consent. This research underscores the troubling reality of HIV stigmatization and criminalization and the violent effects it can have on WLWH. Overarching structural factors such as the criminalization of HIV non-disclosure may instigate and reproduce gender-based violence when women experience violent reprisals for living with a treatable health condition. All countries must eradicate the overly broad use of criminal law against PLWH and act to protect WLWH through tackling the various levels of gender-based violence and investing in inclusive, culturally sensitive support and care programs designed in collaboration with WLWH. Governments and organizations must work to eliminate violence against women, reform laws to be evidence-based, and provide accessible housing and trauma-informed health care to marginalized women.
Table 2.1 Descriptive statistics for 255 WLWH in SHAWNA cohort in Metro Vancouver, stratified by physical and/or verbal violence due to HIV status

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (%)</th>
<th>Violence due to HIV status (%)</th>
<th>p-value</th>
<th>Unadjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=255, n (%)</td>
<td>n=97, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (Median, IQR) Youth &lt;30</td>
<td>44 (37-52)</td>
<td>45 (38-53)</td>
<td>0.193</td>
<td>1.02 (0.99-1.05)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>14 (5.5)</td>
<td>2 (2.1)</td>
<td>0.060</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>241 (94.5)</td>
<td>95 (97.9)</td>
<td></td>
</tr>
<tr>
<td>Gender/Sexual minority</td>
<td>84 (32.9)</td>
<td>39 (40.2)</td>
<td>0.053</td>
<td>1.69 (0.99-2.88)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>171 (67.1)</td>
<td>58 (59.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>156 (61.2)</td>
<td>56 (57.7)</td>
<td></td>
</tr>
<tr>
<td>Indigenous ancestry</td>
<td>156 (61.2)</td>
<td>56 (57.7)</td>
<td>0.377</td>
<td>0.79 (0.47-1.33)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>99 (38.8)</td>
<td>41 (42.3)</td>
<td></td>
</tr>
<tr>
<td>Immigrated to Canada from another country</td>
<td>17 (6.7)</td>
<td>5 (5.2)</td>
<td>0.441</td>
<td>0.66 (0.22-1.93)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>237 (92.9)</td>
<td>92 (94.9)</td>
<td></td>
</tr>
<tr>
<td>Ever been homeless/unstable housing</td>
<td>209 (82.0)</td>
<td>89 (91.8)</td>
<td>0.002*</td>
<td>3.43 (1.52-7.73)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>45 (17.7)</td>
<td>8 (8.3)</td>
<td></td>
</tr>
<tr>
<td>Ever exchanged sex for money/goods/services</td>
<td>200 (78.4)</td>
<td>76 (78.4)</td>
<td>0.897</td>
<td>1.04 (0.56-1.94)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>54 (21.2)</td>
<td>20 (20.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>41 (16.1)</td>
<td>19 (19.6)</td>
<td></td>
</tr>
<tr>
<td>Ever physically/sexually abused by police</td>
<td>211 (82.8)</td>
<td>77 (79.4)</td>
<td>0.235</td>
<td>1.50 (0.77-2.95)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>199 (78.0)</td>
<td>80 (82.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>55 (21.6)</td>
<td>17 (17.5)</td>
<td></td>
</tr>
<tr>
<td>Ever in jail overnight or longer</td>
<td>195 (76.5)</td>
<td>82 (84.5)</td>
<td>0.016</td>
<td>2.29 (1.15-4.54)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>54 (21.2)</td>
<td>13 (13.4)</td>
<td></td>
</tr>
<tr>
<td>Any physical and/ or sexual intimate partner violence ever (WHO scale)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Total (%)</td>
<td>Violence due to HIV status</td>
<td>p-value</td>
<td>Unadjusted Odds Ratio (95% CI)</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
<td>-----------------------------</td>
<td>---------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td></td>
<td>n=255, n (%)</td>
<td>n=97, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-injection cocaine/crack/crystal meth use ever</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>236 (92.6)</td>
<td>91 (93.8)</td>
<td>0.660</td>
<td>1.26 (0.46-3.46)</td>
</tr>
<tr>
<td>No</td>
<td>18 (7.1)</td>
<td>6 (6.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injection heroin use ever</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>180 (70.6)</td>
<td>68 (70.1)</td>
<td>0.932</td>
<td>0.98 (0.56-1.71)</td>
</tr>
<tr>
<td>No</td>
<td>73 (28.6)</td>
<td>28 (28.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever diagnosed with any mental health condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>165 (64.7)</td>
<td>77 (79.4)</td>
<td>&lt;0.001*</td>
<td>3.06 (1.71-5.49)</td>
</tr>
<tr>
<td>No</td>
<td>90 (35.3)</td>
<td>20 (20.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disclosed HIV status at time of diagnosis (historical)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>118 (46.3)</td>
<td>46 (47.4)</td>
<td>0.955</td>
<td>1.02 (0.59-1.75)</td>
</tr>
<tr>
<td>No</td>
<td>101 (39.6)</td>
<td>39 (40.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever outed as being HIV+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>127 (49.8)</td>
<td>72 (74.2)</td>
<td>&lt;0.001*</td>
<td>5.81 (3.28-10.29)</td>
</tr>
<tr>
<td>No</td>
<td>125 (49.0)</td>
<td>23 (23.7)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Column percentages may not necessarily sum to 100% due to missing data or rounding error. All descriptive statistics show the frequencies and proportions for categorical variables and medians and interquartile ranges (IQR) for continuous variables. CI = Confidence Interval

*p ≤ 0.05
Table 2.2 Multivariable ORs using logistic regression for the correlates of lifetime physical and/or verbal violence due to HIV status among 255 women living with HIV in the SHAWNA cohort in Metro Vancouver, Canada

<table>
<thead>
<tr>
<th>Variable (lifetime)</th>
<th>Adjusted Odds Ratios (95% Confidence Intervals)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outed for being HIV+</td>
<td>4.94 (2.73-8.95)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Homeless/lived on the street</td>
<td>2.74 (1.14-6.59)</td>
<td>0.025*</td>
</tr>
<tr>
<td>Diagnosed with a mental health condition</td>
<td>2.12 (1.12-4.02)</td>
<td>0.021*</td>
</tr>
<tr>
<td>* p ≤ 0.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 3: THE EFFECT OF VIOLENCE AND INTERSECTING STRUCTURAL INEQUITIES ON HIGH RATES OF FOOD INSECURITY AMONG MARGINALIZED SEX WORKERS IN A CANADIAN SETTING

3.1 INTRODUCTION

Food insecurity is the inability to access an adequate quantity and quality of food in socially acceptable ways (79). While food is a necessity for survival, and therefore a basic human right, approximately 1 in 4 people is food insecure globally (78). In high-income settings, food insecurity and poor nutrition are prevalent concerns among people who use drugs, (127) homeless populations, (128) and people living with or affected by HIV, (90, 129, 130) especially as food insecurity is associated with HIV transmission and decreased access to HIV treatment (84, 131).

There is increasing evidence that gender plays a key role in food security, particularly where women support families and children (83, 85). Studies have shown gendered power dynamics and gender norms (i.e., sexism) function in food insecurity and that women are disempowered due to restricted autonomy over and access to food (89, 132). Three recent epidemiological studies among poor and marginalized women in Brazil (133) and women of the general population in the United States (85, 134) found associations between physical and/or sexual IPV and food insecurity. Gender has emerged as an important theme for marginalized women and women living with HIV (WLWH) who have the highest risk of food insecurity (82, 84) and are affected by other known associated factors (e.g., homelessness/housing instability and substance use) (30, 135).

Despite this growing work on gender dynamics and structural drivers of food insecurity among homeless women and women who use drugs, (136) there remains limited evidence on
rates of food insecurity among women and trans sex workers. Furthermore, to our knowledge there is limited research on the role of broader gender-based violence on food insecurity among women, or how this may differ for women living with HIV compared to HIV-negative counterparts, as non-partner violence is shown to exist in marginalized groups of women at similar levels to partner violence (95, 96). To address this gap, this study prospectively adapts a standardized food insecurity scale used with marginalized women living with and affected by HIV to examine the prevalence of moderate-to-severe food insecurity among street and off-street women and trans sex workers, and factors correlated with increased odds of acute food insecurity.

3.2 METHODS

We drew data from a community-based longitudinal cohort of street and off-street sex workers in Metro Vancouver, An Evaluation of Sex Workers Health Access (AESHA). The current analysis used prospective data between January 2010 and August 2014. AESHA was developed based on long-term community partnerships with sex work agencies since 2005 and an active Community Advisory Board of representatives from over 15 community agencies. Eligibility for the study includes being women (transgender and cisgender inclusive) aged 14 years and older, having exchanged sex for money within the last 30 days at baseline, and providing written informed consent. Experiential (current/former) sex workers are represented across interview, outreach and nursing staff, and all staff members have substantial community sex work experience. Given the challenges of recruiting members of hard-to-reach criminalized and stigmatized populations in isolated/hidden locations, time-location sampling was used, as in previous studies,(137) to recruit youth (defined as <30 years; consistent with global guidelines) and adult women and transgender sex workers through daytime and late night outreach to outdoor/public sex work locations (i.e.
streets, alleys) and indoor sex work venues (i.e. massage parlours, micro-brothels, and in-call locations) across Metro Vancouver. Moreover, online recruitment was used to reach sex workers working through online solicitation spaces. Indoor sex work venues and outdoor solicitation spaces (‘strolls’) were identified through community mapping conducted together with current/former sex workers and continue to be updated by the outreach team. The study holds ethical approval through Providence Health Care/University of British Columbia Research Ethics Board.

At enrolment and on a bi-annual basis, women complete an administered questionnaire from a trained interviewer and HIV/STI/HCV serology testing by a project nurse. The main interview questionnaire elicits responses related to socio-demographics (e.g. age, gender/sexual identity, ethnicity, housing history), sex work patterns (e.g. number of clients, fees/ types of sexual services, client characteristics, condom use), drug use patterns of sex workers and their clients, physical work environment factors (e.g. type of work environment, access to condoms and other prevention resources), social/ interpersonal environment factors (e.g. social cohesion among sex workers, exposure to intimate partner and occupational violence) and structural environment factors (e.g. adverse interactions with police, prostitution arrests). Following a pre-testing counselling questionnaire with the project nurse, Biolytical INSTI rapid tests are used for HIV screening, with reactive tests confirmed by blood draw for western blot. Voluntary self-swabs are collected for gonorrhoea and chlamydia, and blood is drawn for syphilis. Sex workers can visit one of two office locations in Metro Vancouver or complete the interview-administered questionnaire and nursing component at their work or home location. All participants receive an honorarium of $40 CAD at each bi-annual visit for their time, expertise and travel. Treatment is
provided onsite by our project nurse for symptomatic STI infections, and free serology and Papanicolaou testing are also available, regardless of enrolment in the study.

**Time-Updated Outcome**

Moderate-to-severe food insecurity, the primary outcome, was a time-updated variable, defined as responding ‘often true’ or ‘sometimes true’ to at least one item on the Radimer-Cornell food insecurity scale,(138) with the last 6 months as a reference point. We measured household food insecurity using a validated version of the Radimer-Cornell food security scale (see Appendix A), which has been previously adapted, validated, and used in this setting with people who use drugs and people living with HIV.(127, 129, 139) For example, questions included: “I worry about whether my food will run out before I get money to buy more”, “I eat less than I think I should because I don’t have enough money for food”, “the food I bought just didn’t last and I didn’t have money to buy more”. The alpha Chronbach score for the Radimer-Cornell food security scale was 0.87 with the AESHA cohort, indicating good internal consistency of the scale.

**Explanatory variables**

Explanatory variables of interest considered *a priori* based on the literature included: Time-fixed variables using baseline data included: youth (<30 years of age); identifying as a gender/sexual minority (gay, lesbian, bisexual, transgender, transsexual, two-spirit or otherwise gender non-conforming [LGBTQ2S], vs. straight and cisgender); self-identifying as Indigenous (First Nations, Métis, Inuit vs. non-Indigenous). All other variables were time-updated at semi-annual visits using the last six months as a reference point. *Structural variables* included housing (unstable housing defined as ‘yes’ to living in SRO; shelter/hostel; hotel; treatment/recovery house; couch surfing; staying with family; staying with a friend; in a vehicle; on the
street/alley/park; squatting; jail; or other; or having lived at any residence for less than 6 months); financially supporting dependents (defined as responding ‘yes’ to ‘does anyone depend on you for financial support (including money, food, shelter, clothing, necessities)?’); living with a mental health issue (self-reported diagnosis); means of food access (financially self-sufficient, reliant on food services only, both); and place of accessing food (outside the Downtown Eastside (DTES) only, within DTES only, both); place of solicitation and service defined as (outdoor; informal indoor; indoor); and police harassment without arrest (including physical and/or sexual harassment, held against will without arrest, confiscation of condoms or other personal belongings). Individual-level variables included recent stimulant use (cocaine, crack, methamphetamine) by injection and/or non-injection use; and HIV and STI serostatus, based on nurse testing at baseline/semi-annual follow-up. STIs included one or more of acute gonorrhoea, syphilis, or chlamydia. Given food insecurity can exist both within work and private lives, we examined both time-updated (using the last six months as a reference) and 2) lifetime exposure to physical and/or sexual violence, defined as responding ‘yes’ to physical assault, rape or sexual abuse by any perpetrator (e.g. intimate partner, client, police, exploitative manager, stranger, drug market violence).

**Statistical Analyses**

To prospectively examine factors correlated with moderate-to-severe food insecurity, we constructed explanatory models using bivariate and multivariable logistic regression using generalized estimating equations (GEE). First, bivariate comparisons according to the outcome of moderate-to-severe food insecurity were carried out using the chi-squared test for categorical variables (or Fisher’s exact test for small cell counts) and the Wilcoxon rank-sum test for continuous variables. For descriptive purposes we stratified the outcome by HIV status. We
examined the outcome using bivariate and multivariable GEE to account for multiple measures on the same individual, with a logit link for the dichotomous outcome.

Variables that were statistically significant at \( p<0.05 \) in the bivariate GEE analyses, or were \textit{a priori} variables, were candidates for inclusion in the multivariable models. We used a manual backward model selection process to identify the multivariable model with best fit, as indicated by the lowest quasi-likelihood under the independence model criterion value.\(^{(140)}\) All \( p \)-values are two-sided and we performed all analyses using SAS software version 9.4. (SAS Institute, Cary, NC, USA).

3.3 RESULTS

Sample characteristics

This analysis included 761 women and trans sex workers in AESHA contributing to 3141 observations (median visits = 4, IQR = 2-6) between 2010 and 2014. Table 3.1 summarizes the socio-demographic characteristics of the sample, stratified by the outcome of moderate-to-severe food insecurity. The average age was 34.9 years with 31.4% (\( n=239 \)) youth (< 30 years old) at baseline. A total of 11% (\( n=84 \)) of sex workers were living with HIV. Youth were more likely than older women to be food insecure. A quarter of the sex workers in the study, 25.6% (\( n=195 \)), self-identified as a gender/sexual minority and were more likely to be food insecure than heterosexual, cisgender sex workers.

Food insecurity

At baseline, almost two thirds of sex workers, 64.9% (\( n=494 \)) were moderate-to-severely food insecure based on the Radimer-Cornell standardized scale, and this increased over the study period to almost three quarters, 72.4% (\( n=551 \)). Additionally, 96.4% (\( n=81 \)) of the sex workers
living with HIV were food insecure at some point during the study compared to 69.3% (n=455) of sex workers who were not living with HIV. Three quarters of sex workers, 75.6% (n=575), reported either only buying their own food or sometimes buying their own food at baseline. One third, 33.8% (n=257), of sex workers responded “yes” to losing weight over the past year because they didn’t have enough food to eat, 32.2% (n=245) responded “yes” to having hunger pains in the past 6 months but not being able to eat because they could not afford food. Furthermore, 8.8% (n=67) sex workers responded “yes” to exchanging sex (including oral sex) directly for food in the last 6 months.

Bivariate and Multivariable results

In bivariate GEE analyses, exposure to lifetime or recent physical and/or sexual violence (OR 12.11 [95% CI: 8.08, 18.15] and OR 1.99 [95% CI: 1.70, 2.32], respectively), living with a mental health issue (OR 3.16 [95% CI: 2.46, 4.07]), living with HIV (OR 1.62 [95% CI: 1.15, 2.29]), recent homelessness or unstable housing (OR 1.97 [95% CI: 1.65, 2.34]), and recent stimulant (cocaine, crack or crystal methamphetamine) use (OR 3.35 [95% CI: 2.78, 4.03]) were correlated with moderate-to-severe food insecurity.

In multivariable analysis, Indigenous ancestry (AOR= 1.58 [95% CI: 1.18, 2.10]) unstable housing (AOR= 1.27 [95% CI: 1.03, 1.57]), stimulant use (AOR= 1.97 [95% CI: 1.57, 2.45]), heroin use (AOR= 1.72 [95% CI: 1.36, 2.19]), mental health diagnosis (AOR= 2.38 [95% CI: 1.85, 3.05]), recent violence (AOR= 1.54 [95% CI: 1.24, 1.91]), means of food access: reliant on food services only vs. self sufficient (AOR= 1.78 [95% CI: 1.38, 2.29]) and means of food access: both vs. self-sufficient (AOR= 2.29[95% CI: 1.84, 2.86]) were correlated with moderate-to-severe food insecurity (Table 3.2). We also considered a separate multivariable confounder
model with lifetime exposure to physical and sexual violence to assess the long-term impact of exposure to violence, which resulted in an increased AOR of 4.62, 95% CI: (2.99, 7.14).

3.4 DISCUSSION

The present study found that 72.4% of sex workers were chronically and acutely food insecure over the five-year period, with close to a five-fold increased odds among those who experienced lifetime violence and 50% increased odds among those experiencing recent physical and or sexual violence. Violence against sex workers is a human rights and public health concern globally (4) and is elevated and exacerbated in settings where sex work is criminalized and sex workers lack legal rights and protections (3, 141). There is also some evidence to suggest that beyond workplace violence, structural and gendered barriers may place some sex workers at higher risk of intimate partner and other interpersonal violence, including sexual and physical violence perpetrated based on gender, heterosexism, homophobia, and transphobia (10, 27, 142).

While growing research has focused on the scope and drivers of workplace violence against sex workers, including laws, policing, stigma and poor working conditions, and to some extent intimate partner violence, far less is known about the impact of physical and/or sexual violence on access to basic necessities (e.g. food, housing) for sex workers. Ethnographic and qualitative work suggests that in settings where violence is ubiquitous and largely unaddressed, gendered power dynamics may severely limit sex workers’ control over resources. A number of studies in San Francisco and Vancouver among street-involved and drug-using sex workers and among migrant sex workers have shown that sex workers who lack legal protections have less control over their income and may be more likely to have an intimate non-paying partner, regular client, or manager who is exploitative or violent (38, 143-146). The findings herein suggest that both acute physical and/or sexual violence and lifetime/historical exposure to violence,
regardless of perpetrator, have a direct link to higher risk of food insecurity. While the exact mechanism of the relationship between physical and/or sexual violence and food insecurity is still unclear, this research suggests that structural barriers of criminalization and stigma previously shown to create poor working conditions and isolated and exploitative housing for sex workers, may undermine sex workers’ access to a basic human right: adequate and secure access to food.

Studies among other marginalized populations in similar high-resource settings show equally high rates of food insecurity and a relationship to HIV risk. For example, a study from San Francisco revealed that food insecurity could lead to economic coercion and condomless sex (i.e., a risk factor for HIV transmission) because the need for food was a more urgent priority than condom use (147). Another study among people living with HIV in San Francisco and among drug users living with HIV in Vancouver found associations between food insecurity and measures of high-risk sexual behavior, (131, 148) a known correlate of past exposure to violence (39, 40) and a factor for HIV transmission.

Beyond violence, other intersecting structural inequities were independently correlated with increased odds of food insecurity in the multivariate model for recent physical and/or sexual violence including unstable housing, stimulant or heroin use, and ever being diagnosed with a mental health condition, while youth and Indigenous women had among the highest rates of food insecurity. In the multivariable model for recent physical and/or sexual violence, diagnosis with a mental health condition approximately doubled the odds of food insecurity. Physical and mental health conditions are associated with and have been shown to increase vulnerability to food insecurity and vulnerability to food insecurity increases as the number of concurrent health conditions increase (149, 150). Among injection drug users, a 2012 study found that in Ontario,
Canada, 54.5% were food insecure due to a lack of money to buy food (151). Our study found that heroin or stimulant use was associated with almost twice the odds of moderate-to-severe food insecurity. This may be because the immediacy of addictions can override the perceived necessity to buy food or due to stimulant use to suppress the appetite and stay awake (152). It has also been suggested that the competing costs of food and drugs for people with addictions may contribute to food insecurity (153). Unstable housing in the last 6 months was associated with an increased odds of food insecurity. Vancouver’s cost of living can make housing unaffordable for some and present an unjust choice between shelter and food for others. Due to the long-lasting and intergenerational effects of colonialism, discrimination, and racism, Indigenous people in Canada often suffer from negative health outcomes associated with poverty and a lack of access to healthcare (62). Ongoing systemic oppression leaves many Indigenous women and trans women with limited access to resources, employment, and family or community support, which may further impact food security.

In the Downtown Eastside (DTES), similar to other urban inner city centres in North America, access to fresh produce is scarce. Although some not-for-profit food services provide meals, they may not be safe or friendly for women or accessible to sex workers’ available hours. Not surprisingly, our findings suggest that sex workers who are reliant on food services (or who “dumpster-dive” or forced to steal as basic a necessity as food) have almost twice the odds of moderate-to-severe food insecurity compared to sex workers who are financially self-sufficient. One-third of sex workers use not-for-profit food services or other non-paying means in conjunction with buying food for themselves. This may allow sex workers the agency to choose their own food when they are able, while supplementing their diet with not-for-profit services when necessary. Besides some convenience stores, sex workers who bought their own food
within the DTES were most frequently accessing food from the only large fresh produce store in the area, and from a grocery chain with a store bordering the DTES.

**Strengths and limitations**
Food insecurity assessment varies widely in the literature. Previous studies have used a single item from the scale or created a binary yes/no food insecurity measure, (127) while some have combined and reported the full scale measures to assess the broad impact of food insecurity (154). In this study we report the results of the full scale, addressing combined household, women, and children’s food insecurity together rather than as three separate subscales. Our statistical results were almost identical to the full scale for both the women’s and household food insecurity subscales and provided no new information. Additionally, very few women are currently parenting children so there was insufficient statistical power for a separate children’s hunger subscale. This study sample may not be representative of all sex workers in all contexts because identifying a representative sample is challenging when investigating criminalized and stigmatized environments. However, we include highly experienced interview, outreach, and nursing staff, including current/former sex workers, as well as multilingual mobile and sex worker outreach that allows for a large and diverse sample of sex workers. As with all self-report data, responses may be vulnerable to social desirability bias, although, through the peer-to-peer nature of experiential staffing, interviewer rapport with sex workers and explicit confidentiality, there is no reason to believe this would have differentially impacted our results.

**Implications for policy and future research**
Since Canada’s sex work laws force women to work in isolated areas where they are more vulnerable to violence, decriminalizing sex workers’ means of obtaining money for food would
allow women more security in meeting their basic nutritional needs. When women’s ability to earn a living is threatened by criminalization, so too is their food security. Key international health and policy organizations including WHO, UNAIDS, and UNFPA encourage the decriminalization of sex work (7) because evidence shows that criminalization endangers sex workers (11) and limits access to services and support (155, 156). Policy and law changes should reflect this growing body of evidence in support of sex work decriminalization in order to eliminate a key structural barrier to basic food security. Because lifetime exposure to violence is associated with drastically elevated odds of food insecurity, the particular relationship should be further examined through both quantitative and qualitative research. Working towards the elimination of gender-based violence on structural, institutional, and interpersonal levels may improve health outcomes for sex workers, particularly those living with HIV, and result in increased levels of food security when gender-based violence is targeted through long-term, evidence-based education and policy. Trauma-informed clinical interventions by service providers at different levels of the healthcare system should connect women who have experienced violence to appropriate care and support services (157). In Vancouver these services may include Women Against Violence Against Women (WAVAW) and Battered Women’s Support Services (BWSS) in Vancouver. At the same time, governments should initiate food programming and policies for marginalized populations in Vancouver to alleviate the pressure of food insecurity for sex workers in partnership with anti-violence and women-centered healthcare organizations. These programs should incorporate elements of choice and nutritional variety as sex workers who may try to supplement the food services they access are in fact more vulnerable to food insecurity. Programs to support women who experience violence should work to explicitly include and support Indigenous sex workers and women living with HIV. Sex workers
who work in the DTES are buying their own food with their own money but do not have places in their communities to buy it. This is an area rampant with opportunity for supporting current initiatives (e.g., urban farms, reduced-cost grocery stores) and for innovative community-based, government-funded interventions to address this concern (e.g., online grocery shopping and delivery, pop-up/mobile produce stores).

3.5 CONCLUSION

Almost three-quarters of sex workers were food insecure over the study period, a prevalence that is 3 times higher than the global average (78) and approximately 9 times higher than the national average (158). Physical and/or sexual violence is significantly and independently associated with food insecurity among sex workers in Metro Vancouver. This association is alarming given the already marginalized status of sex workers in Canada due to laws that endanger their health and safety. Furthermore, almost all women living with HIV in this study experienced food insecurity. This indicates a major gap in services and may have significant population health implications for HIV treatment. Municipal and provincial governments must support and broaden the reach of programs that alleviate the pressure of food insecurity for marginalized women and are competent in addressing the needs of women who experience gender-based violence. They must work to specifically include Indigenous women and women living with HIV. Service providers should be trained in assessing exposure to violence as well as their clients’ food security status. Simultaneously, policy and law changes should reflect the growing evidence for sex work decriminalization to increase women’s safety. Decriminalizing sex workers’ means of obtaining money for food would allow women much more security in meeting their basic nutritional needs. Qualitative research into the reasons behind food insecurity for women who have experienced
violence may provide more definitive explanations for this concerning association and provide insight into much needed interventions and supports for sex workers. Food security is a fundamental human right intrinsic to survival; gender-based violence impedes women’s right to life, liberty, and security of person. Their demonstrated association in this study is cause for targeted action towards equity and social justice.
Table 3.1 Descriptive statistics and food security status at baseline for 761 women sex workers in the AESHA cohort in Metro Vancouver, Canada

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (%) N=761</th>
<th>Food Insecure (%) N=494 (%)</th>
<th>p-value</th>
<th>Unadjusted OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Median, IQR)</td>
<td>35 (28-42)</td>
<td>33 (27-42)</td>
<td>0.183</td>
<td></td>
</tr>
<tr>
<td>Youth &lt;30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>239 (31.4)</td>
<td>166 (33.6)</td>
<td>0.081</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>521 (68.5)</td>
<td>328 (66.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender/Sexual minority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>195 (25.6)</td>
<td>161 (32.6)</td>
<td>&lt;0.001</td>
<td>2.82 (2.18-3.65)</td>
</tr>
<tr>
<td>No</td>
<td>566 (74.4)</td>
<td>333 (67.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigenous ancestry</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>268 (35.2)</td>
<td>225 (45.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>493 (64.8)</td>
<td>269 (54.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV positive</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>84 (11.0)</td>
<td>74 (15.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>671 (88.2)</td>
<td>416 (84.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STI positive</td>
<td></td>
<td></td>
<td>0.051</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>84 (11.0)</td>
<td>62 (12.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>626 (82.3)</td>
<td>394 (79.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any unstable housing in the last 6 months or housing for less than 6 months</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td>2.00 (1.65-2.34)</td>
</tr>
<tr>
<td>Yes</td>
<td>619 (81.3)</td>
<td>438 (88.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>141 (18.5)</td>
<td>55 (11.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financially supports other dependent/s</td>
<td></td>
<td></td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>228 (30.0)</td>
<td>108 (21.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>533 (70.0)</td>
<td>386 (78.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of financial dependents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>531 (69.8)</td>
<td>384 (50.5)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>166 (21.8)</td>
<td>80 (10.5)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>3+</td>
<td>32 (4.2)</td>
<td>12 (1.6)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Total (%)</td>
<td>Food Insecure (%)</td>
<td>p-value</td>
<td>Unadjusted OR</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>-----------</td>
<td>-------------------</td>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>N=761</td>
<td>N=494 (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any injection or non-injection cocaine, crack or crystal meth use in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>513 (67.4)</td>
<td>434 (87.9)</td>
<td>&lt;0.001</td>
<td>3.35 (2.78-4.03)</td>
</tr>
<tr>
<td>No</td>
<td>248 (32.6)</td>
<td>60 (12.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any injection or non-injection heroin use in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>318 (41.8)</td>
<td>272 (55.1)</td>
<td>&lt;0.001</td>
<td>2.62 (2.16-3.19)</td>
</tr>
<tr>
<td>No</td>
<td>443 (58.2)</td>
<td>222 (44.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary place of servicing clients in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor</td>
<td>319 (41.9)</td>
<td>270 (54.7)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Informal indoor</td>
<td>205 (26.9)</td>
<td>173 (35.0)</td>
<td>0.053</td>
<td></td>
</tr>
<tr>
<td>Indoor</td>
<td>236 (31.0)</td>
<td>50 (10.1)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Isolated spaces for solicitation in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>312 (41.0)</td>
<td>268 (54.3)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>449 (59)</td>
<td>226 (45.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any police harassment, including arrest, while working in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>279 (36.7)</td>
<td>230 (46.6)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>482 (63.3)</td>
<td>264 (53.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rushed negotiation with client due to police presence in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>272 (35.7)</td>
<td>243 (49.2)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>489 (64.3)</td>
<td>251 (50.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Means of food access</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financially Self-sufficient</td>
<td>322 (42.3)</td>
<td>116 (23.5)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Reliant on services only</td>
<td>176 (23.1)</td>
<td>142 (28.7)</td>
<td>&lt;0.001</td>
<td>2.89 (2.33, 3.60)</td>
</tr>
<tr>
<td>Both</td>
<td>253 (33.3)</td>
<td>229 (46.4)</td>
<td>&lt;0.001</td>
<td>3.46 (2.85, 4.20)</td>
</tr>
<tr>
<td>Place of accessing food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside DTES only</td>
<td>419 (55.1)</td>
<td>210 (42.5)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>DTES only</td>
<td>145 (19.1)</td>
<td>118 (23.9)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>189 (24.8)</td>
<td>161 (32.6)</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Total (%)</td>
<td>Food Insecure (%)</td>
<td>p-value</td>
<td>Unadjusted OR</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------</td>
<td>-------------------</td>
<td>---------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>N=761</td>
<td>N=494 (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever diagnosed with any mental health condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>367 (48.2)</td>
<td>306 (61.9)</td>
<td>&lt;0.001</td>
<td>3.16 (2.46-4.07)</td>
</tr>
<tr>
<td>No</td>
<td>386 (50.7)</td>
<td>184 (37.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any recent physical or sexual violence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>284 (37.3)</td>
<td>238 (48.2)</td>
<td>&lt;0.001</td>
<td>1.99 (1.70-2.32)</td>
</tr>
<tr>
<td>No</td>
<td>454 (59.7)</td>
<td>236 (47.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any lifetime physical or sexual violence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>601 (79.0)</td>
<td>470 (95.1)</td>
<td>&lt;0.001</td>
<td>12.11 (8.08-8.15)</td>
</tr>
<tr>
<td>No</td>
<td>155 (20.4)</td>
<td>21 (4.3)</td>
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<td></td>
</tr>
</tbody>
</table>
Table 3.2 Multivariable logistic regression for moderate-to-severe food insecurity among 761 SWs in Metro Vancouver, Canada

<table>
<thead>
<tr>
<th>Variable</th>
<th>Moderate-to-severe food insecurity</th>
<th>95% Confidence Interval (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indigenous ancestry</strong> (yes vs. no)</td>
<td>1.58</td>
<td>(1.18-2.10)</td>
</tr>
<tr>
<td><strong>Any unstable housing†</strong> (yes vs. no)</td>
<td>1.27</td>
<td>(1.03-1.57)</td>
</tr>
<tr>
<td><em><em>Any stimulant</em> use†</em>* (yes vs. no)</td>
<td>1.97</td>
<td>(1.57-2.45)</td>
</tr>
<tr>
<td><strong>Any heroin use†</strong> (yes vs. no)</td>
<td>1.72</td>
<td>(1.36-2.19)</td>
</tr>
<tr>
<td><strong>Ever diagnosed with mental health condition</strong> (yes vs. no)</td>
<td>2.38</td>
<td>(1.85-3.05)</td>
</tr>
<tr>
<td><strong>Physical and/or sexual violence†</strong> (yes vs. no)</td>
<td>1.54</td>
<td>(1.24-1.91)</td>
</tr>
<tr>
<td><strong>Means of food access</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Reliant on food Services only vs. self-sufficient)</td>
<td>1.78</td>
<td>(1.38-2.29)</td>
</tr>
<tr>
<td>(Both vs. self-sufficient)</td>
<td>2.29</td>
<td>(1.84-2.86)</td>
</tr>
</tbody>
</table>

* Crack, cocaine, or methamphetamine
† In the last 6 months
Chapter 4: GENDER-BASED VIOLENCE HAS AN INDEPENDENT EFFECT ON REDUCED ANTIRETROVIRAL THERAPY ADHERENCE AMONG A PROSPECTIVE COHORT OF WOMEN LIVING WITH HIV IN METRO VANCOUVER, CANADA

4.1 INTRODUCTION

Antiretroviral therapy (ART) has been employed globally to treat HIV and, where available, has been successful at drastically reducing AIDS cases and lessening the impact of HIV at individual and population levels. A successful “cascade” of HIV care is predicated on retention in care and adherence to ART in order to achieve viral suppression for improved individual health and for preventing new HIV transmissions (102). However, a gender gap in adherence exists globally (104) and in British Columbia (159), a region with some of the most advanced programming for access to ART. Suboptimal ART adherence results in uncontrolled viral replication, increased morbidity, hospitalizations, and decreased linkages to care or undiagnosed comorbidities (160).

ART adherence for people living with HIV may be challenging for numerous reasons including side effects, social relationships, and stigma (161), and may present particular challenges for WLWH who experience structural and interpersonal violence. Adherence barriers may further include poor access to services, discrimination, poverty, food insecurity, homelessness, and mental health or addictions issues (102). Yet there remains little epidemiological research into understanding the gendered barriers to adherence among women living with HIV (WLWH).

A limited number of studies have found that past trauma and male-perpetrated IPV may be linked to delayed ART initiation (162), and uncontrolled viral replication— a result of poor adherence (118, 163). To date, the majority of studies from North America and the Global South have been cross-sectional in design and have focused on violence perpetrated by male intimate
partners and past trauma. To our knowledge, there is no prospective data on the impact of
gender-based physical and/or sexual violence on adherence outcomes for WLWH, or other steps
in the HIV cascade. The Women’s Interagency HIV Study (WIHS) in the United States found
that while living with HIV did not predict risk for physical or sexual violence, over 60% of
women in the study had experienced at least one type of gender-based violence (37). In South
Africa, IPV was first prospectively associated with HIV acquisition as recently as 2010 with over
50% higher HIV incidence among women who had experienced IPV. Among WLWH, IPV has
been linked to delayed ART initiation (162) and uncontrolled viral replication (118, 163).
However, the link between gender-based violence against WLWH and ART adherence is an
understudied area, particularly in resource-rich settings.

In the first cross-sectional global survey of WLWH, almost 90% of WLWH reported
having experienced or feared any kind of violence in their lifetimes (44), underscoring a critical
need to understand whether and how gender-based violence impacts adherence for this
population. Gender-based violence against WLWH is defined broadly as: “any act, structure, or
process in which power is exerted in such a way as to cause physical, sexual, psychological,
financial or legal harm to women living with HIV” (164). WLWH who experience gender-based
violence may have increased challenges with ART adherence due to the interruptions violence
may inflict on a daily treatment regimen and the immediate health concerns (e.g., mental health,
physical safety) that WLWH may prioritize over the less immediate effects of HIV (160).

Longitudinal research to date has revealed a strong temporal relationship between IPV
against women and incident HIV infection (165, 166), suggesting that the burden of IPV is likely
to remain high after women have seroconverted (118). IPV has emerged as a predictor for poor
HIV-related outcomes for WLWH by affecting retention in care and adherence to ART (160) and
as a strong predictor of poor general health outcomes (167-170). However, research on the
impacts of other forms of violence (i.e., violence perpetrated by strangers or someone other than
an intimate partner) on HIV-related health outcomes remains a relatively under-studied area.
Previous research among WLWH in British Columbia has identified high proportions of
physical, sexual and/or verbal violence perpetrated by strangers (52%) and acquaintances (41%)
(96). A longitudinal study of the impact of various stressful events for both men and women in
the United States showed increased odds of ART non-adherence (171). Thus, gender-based
violence may be an under-recognized barrier to women’s ability to access HIV care and, as with
IPV, there remains a dearth of research into the relationship between gender-based violence and
HIV-specific health outcomes.

There have been no longitudinal prospective studies of which we are aware that examine
the impact of gender-based violence on ART adherence for WLWH. Given the widespread
gender-based violence documented among WLWH, it is hypothesized that WLWH in Metro
Vancouver who experience gender-based violence will report suboptimal ART adherence. The
objective of this study was therefore to longitudinally evaluate the independent effect of gender-
based physical or sexual violence on ART adherence amongst WLWH on ART in a Canadian
setting.

4.2 METHODS

Community-Based Research Cohort (SHAWNA)

This analysis draws on time-updated data between September 2014 and February 2017 from the
ongoing Sexual Health and HIV/AIDS: Women’s Longitudinal Needs Assessment (SHAWNA),
a longitudinal community-based research cohort with WLWH (trans inclusive) aged 14+ who
live or access HIV services in Metro Vancouver. The SHAWNA Project has been described in detail in Chapter 2. As I was interested in examining questions added in 2014, this analysis was restricted to data from September 2014 to February 2017.

**Study Variables**

**ART Adherence Outcome Measure**

The primary dependent variable was optimal ART adherence. Consistent with earlier work (172), this study defines “optimal adherence” as self-reported adherence to ART being ≥95% in the last 3-4 weeks (therefore suboptimal adherence is defined as <95% ART adherence in the last 3-4 weeks). Participants were asked to mark how much of their medication they had taken in the past 3-4 weeks on a visual analog scale (VAS) of adherence (173), an ordinal scale on a solid line marked from 0%-100% in 10% increments, as used in previous ART adherence studies (174, 175). A categorical variable was created from this scale with (1= ≥95% adherence and 0= <95% adherence). Self-report measures of adherence have shown reliable validity with other measures of adherence such as viral load and CD4 count (176-178) and have proven to be accurate (175, 179).

**Main Exposure Variable**

Gender-based violence was measured as a time-updated exposure of experiencing one or both of physical or sexual violence at each study visit, using the last 6 months as a reference point. Gender-based violence included IPV measures using the WHO Intimate Partner Violence Scale (Version 9.9), and physical and/or sexual violence by any perpetrator in the last 6 months. Physical violence included being slapped, pushed or shoved, hit with a fist or something else that could hurt, kicked, dragged, beaten, choked, burnt, threatened to use or actually used a gun,
knife, or other weapon. Sexual violence included rape or being forced to do something sexual that was humiliating or degrading.

Covariates

Based on previous studies, *a priori* time fixed measures based on baseline data considered included age, ethnicity (Indigenous, inclusive of First Nations/Métis/Inuit vs. Other), gender identity (transgender) and sexual orientation (lesbian, bisexual, queer, or two-spirit [LGBQ2S+]), and lifetime exposure to homelessness. Time-updated measures included any injection and non-injection illicit drug use (excluding marijuana), engagement in sex work, recent homelessness (defined as living on the street in the last 6 months), unstable housing (defined as living anywhere other than an apartment or house), incarceration, mental health diagnosis, and recent contact with any HIV-specific outreach.

Statistical Analyses

First, descriptive statistics at baseline were calculated for variables of interest, stratified by self-reported optimal ART adherence. Differences between those who experienced optimal versus suboptimal adherence were assessed using the Wilcoxon test for continuous variables and Pearson’s chi-square test (or Fisher’s exact test for small cell counts) for categorical variables.

Next, correlates of optimal ART adherence were examined using bivariate and multivariable generalized estimating equations (GEE) with a logit link and an exchangeable correlation matrix. GEE accounts for repeated measures on the same participant over time (180). To evaluate whether recent physical and/or sexual violence was independently associated with ≥95% ART adherence, a multivariable confounder model was constructed. Potential confounders were chosen based on bivariate associations with ART adherence (at p <0.05), as well as the
literature and available data collected for the SHAWNA cohort between September 2014 and February 2017.

The multivariable model was constructed based on the selection process described by Maldonado and Greenland (181). A full model included the explanatory variable of interest, optimal ART adherence, and all potential confounders. Potential confounders were then removed in a stepwise manner until the minimum relative change in the coefficient associated with self-reported ≥95% ART adherence exceeded 5%. Two-sided p-values and unadjusted (OR) and adjusted (AOR) odds ratios with 95% confidence intervals (CI) for the association between physical and/or sexual violence and ≥95% ART adherence were generated. All statistical analyses were performed using the SAS software version 9.4 (SAS Institute, Cary, NC, USA).

4.3 RESULTS

Descriptive Statistics

Of 250 WLWH in SHAWNA included in this longitudinal GEE analysis who were on ART between September 2014 and February 2017, at baseline 17.2% (n=43) had experienced physical and/or sexual violence in the last 6 months and over one quarter, 26.8% (n=67) reported suboptimal ART adherence in the last 3-4 weeks. The median age was 45 (IQR: 39-52) and more than half the participants identified as having Indigenous ancestry (57.6%, n=144). Almost all WLWH had ever experienced physical and/or sexual violence in their lifetimes (94.8%, n=237), and more than three quarters, 80.0% (n=200), had ever been homeless or living on the street. Further baseline socio-demographics and structural-environmental characteristics of WLWH in this study are displayed in Table 4.1. Over the study period, 30.0% (n=75) of WLWH
experienced physical and/or sexual violence and 42.0% (n=105) of WLWH reported suboptimal (<95%) adherence to ART.

**Bivariate and Multivariable GEE Analyses**

Table 4.2 displays unadjusted and adjusted odds ratios for the association between recent physical and/or sexual violence and self-reported ≥95% ART adherence. Of note, the ubiquity of lifetime physical and/or sexual violence prevented further analysis of this variable due to zero cell counts, i.e., all WLWH who reported suboptimal ART adherence during the study had experienced physical and/or sexual violence in their lifetimes. In bivariate GEE analysis, decreased odds of optimal ART adherence were significantly associated with physical and/or sexual violence in the last 6 months [OR: 0.47, 95% CI (0.30-0.74)], any injection or non-injection drug use [OR: 0.39, 95% CI (0.24-0.62)], Indigenous ancestry [OR: 0.60, 95% CI (0.38–0.95)], ever being homeless or living on the street [OR: 0.41, 95% CI (0.23-0.75)] and accessing HIV outreach services [OR: 0.64, 95% CI (0.44-0.92)] in the last 6 months.

In the final multivariable GEE confounder model, recent physical and/or sexual violence retained an independent negative effect on optimal ART adherence [AOR: 0.44 95% CI (0.28-0.70)] after adjusting for any injection or non-injection drug use, excluding alcohol and marijuana. The odds of optimal ART adherence were 56% lower for WLWH who had experienced violence in the last 6 months compared to WLWH who had not. For this analysis, self-reported adherence data was then tested against administrative data to derive the outcome through confidential linkage to information available from the BC HIV Drug Treatment Program (DTP), a free province-wide ART dispensation and care program).
violence remained significantly associated with suboptimal adherence using DTP data, supporting the use of self-reported adherence measures.

4.4 DISCUSSION

This is among the first longitudinal studies of gender-based violence and ART adherence for WLWH. In the present GEE study, 30.0% (n=75) experienced recent physical and/or sexual violence over the study period and 42.0% (n=105) reported suboptimal (<95%) adherence to ART. Gender-based violence had an independent negative effect on ART adherence over time. These findings support the logical extension from the known impacts of IPV on ART adherence for WLWH to include all gender-based violence against WLWH. While IPV against WLWH has been identified as a barrier to ART adherence, our results advance previous research and reveal gender-based violence to be an under-recognized factor in suboptimal ART adherence.

Emerging research identifies the prevalence of gender-based violence against WLWH as a concern requiring urgent attention. Orza et al. estimated that 90% of WLWH had experienced violence in their lifetimes (44), which is consistent with 95% of WLWH from the present study. In a population of WLWH in British Columbia, Borwein et al. also found that over 80% of harder-to-reach WLWH had experienced lifetime violence with almost 25% having experienced recent violence (96). Forty-three percent of WLWH from Southern Alberta, Canada reported experiencing some form of abuse (162). These frequencies are similar to the present study in which 30% of WLWH had experienced recent physical and/or sexual violence. While there is extremely limited research into gender-based violence and adherence for WLWH, some comparisons can be drawn to IPV research. Previous literature suggests that IPV is significantly associated with 52% lower odds of ART adherence (self-report) across six cross-sectional studies.
[OR 0.48, 95% CI (0.30-0.75)] (182), which is similar to the present longitudinal study estimating 57% lower ART adherence (self-report). Another cross-sectional study from Canada that included women only did not evaluate adherence directly but showed that WLWH who experienced IPV were 45% less likely to be using ART and twice as likely to have uncontrolled viral replication (118). A longitudinal study using GEE across five states in the Southern United States examined the impact of stressful events (including physical and/or sexual violence, among other factors) on ART adherence for men and women. This study found that for participants who experienced the median number of stressful or traumatic life events, the odds of ART non-adherence more than doubled (171).

Widespread misogyny, and its inherent individual and structural violence, creates an environment in which already-stigmatized WLWH face exacerbated marginalization and correspondent health risks. Suboptimal adherence is associated with poor viral suppression and treatment resistance (183). Suboptimal adherence also may contribute to an increased potential of HIV transmission. The prevalence of gender-based violence against WLWH and its association with poor HIV-related outcomes underpins an urgent call to prioritize support and interventions for this population. As the present research extends beyond IPV there are many structural policy implications to consider including gathering data through a new national survey of violence against women in Canada, a national strategy to combat violence against women, and affordable housing so that women have more agency to leave abusive situations or communities.

More than half of WLWH in the present study self-identify as Indigenous and make up more than two-thirds of WLWH with suboptimal ART adherence. The intersections of racism and sexism may contribute to Indigenous women’s heightened experiences of gender-based violence, therefore programming and interventions must focus on cultural sensitivity and the intentional
inclusion of Indigenous women. The frequency of physical and/or sexual violence against WLWH requires that service providers are sensitive to women’s experiences of trauma and employ best practices of trauma-informed care when interacting with clients. The primary concern of care providers should be centering WLWH in their own care and providing connections to trusted and helpful community resources. Dechief (2003) has previously identified how the healthcare system can be supportive of women experiencing violence and provide meaningful resources by practicing women-centered care, engaging in empowerment and cultural safety training for health care providers and, providing comprehensive care to address all facets of health (184). It is also noted that screening and identification of violence does not necessarily equate to improved health outcomes for women and the context of care must be systemically changed to prioritize community connection and access to support (184).

**Strengths and limitations**

While the literature presents various methods to evaluate adherence and ambiguous results regarding the reliability of self-reported ART adherence in various settings (185, 186), a self-reported measure of ART adherence was chosen in this specific population. However, the association between ART adherence and physical and/or sexual violence was retained when administrative data was used to derive the outcome. Pharmacy pick-up alone may not reflect adherence. Relying on self-reported adherence has proven remarkably accurate (175, 179), especially when recalled within the last month (187). Peer interviewers, with the rapport and skill that they bring to interviews, may serve to reduce social-desirability bias in self-reported ART adherence in this cohort. If adherence was over-reported, then the results of this study may in fact underestimate the negative effect of physical or sexual violence on ART adherence, lending
further weight to the grave impacts demonstrated in this study. Additionally, this study sought to broaden the definition of violence employed in most epidemiological research related to WLWH in order to establish a greater understanding of the scope of violence WLWH experience beyond intimate partnerships e.g., community members, peers, law enforcement.

4.5 CONCLUSION

Over time, self-reported ART adherence was significantly lower among WLWH who had experienced recent physical and/or sexual violence compared to those who had not. This finding has major individual and population health implications given the widespread violence WLWH face. Canada must implement a national strategy to combat violence against women from the individual to systemic levels and structure healthcare and support programming to focus on marginalized WLWH, particularly Indigenous women. Trauma-informed care, women-centred care, and meaningful support and community connections for women experiencing gender-based violence may positively impact ART adherence and health outcomes in the population.
Table 4.1 Socio-demographic and structural-environmental factors of WLWH in the SHAWNA Cohort in Metro Vancouver who reported ≥95% adherence in the last 3-4 weeks compared to those who did not, at baseline (n=250)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (%)</th>
<th>Optimal ART adherence (≥95%)</th>
<th>Suboptimal ART adherence (&lt;95%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Median, IQR)</td>
<td>45 (39-52)</td>
<td>46 (39-53)</td>
<td>44 (38-49)</td>
<td>0.158</td>
</tr>
<tr>
<td>Youth &lt;30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 (4.4)</td>
<td>7 (3.8)</td>
<td>4 (6.0)</td>
<td>0.493</td>
</tr>
<tr>
<td>No</td>
<td>238 (95.2)</td>
<td>175 (95.6)</td>
<td>63 (94.0)</td>
<td></td>
</tr>
<tr>
<td>Gender/Sexual minority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>95 (38.0)</td>
<td>73 (39.9)</td>
<td>22 (32.8)</td>
<td>0.309</td>
</tr>
<tr>
<td>No</td>
<td>155 (62.0)</td>
<td>110 (60.1)</td>
<td>45 (67.2)</td>
<td></td>
</tr>
<tr>
<td>Indigenous ancestry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>144 (57.6)</td>
<td>98 (53.6)</td>
<td>46 (68.7)</td>
<td>0.032*</td>
</tr>
<tr>
<td>No</td>
<td>106 (42.4)</td>
<td>85 (46.4)</td>
<td>21 (31.3)</td>
<td></td>
</tr>
<tr>
<td>Immigrated to Canada from another country</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21 (8.4)</td>
<td>17 (9.3)</td>
<td>4 (6.0)</td>
<td>0.396</td>
</tr>
<tr>
<td>No</td>
<td>228 (91.2)</td>
<td>165 (90.2)</td>
<td>63 (94.0)</td>
<td></td>
</tr>
<tr>
<td>Ever been homeless/living on the street</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>200 (80.0)</td>
<td>139 (76.0)</td>
<td>61 (91.0)</td>
<td>0.010*</td>
</tr>
<tr>
<td>No</td>
<td>49 (19.6)</td>
<td>43 (23.5)</td>
<td>6 (9.0)</td>
<td></td>
</tr>
<tr>
<td>Homeless/ living on the street in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>44 (17.6)</td>
<td>29 (15.9)</td>
<td>15 (22.4)</td>
<td>0.236</td>
</tr>
<tr>
<td>No</td>
<td>205 (82.0)</td>
<td>153 (83.6)</td>
<td>52 (77.6)</td>
<td></td>
</tr>
<tr>
<td>Any unstable housing in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>240 (96.0)</td>
<td>175 (95.6)</td>
<td>65 (97.0)</td>
<td>1.00</td>
</tr>
<tr>
<td>No</td>
<td>10 (4.0)</td>
<td>8 (4.4)</td>
<td>2 (3.0)</td>
<td></td>
</tr>
<tr>
<td>Exchanged sex for money/goods/services in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>84 (33.6)</td>
<td>57 (31.2)</td>
<td>27 (40.3)</td>
<td>0.184</td>
</tr>
<tr>
<td>No</td>
<td>165 (66.0)</td>
<td>125 (68.3)</td>
<td>40 (59.7)</td>
<td></td>
</tr>
<tr>
<td>Any moderate to severe food insecurity in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>178 (71.2)</td>
<td>130 (71.0)</td>
<td>48 (71.6)</td>
<td>0.926</td>
</tr>
<tr>
<td>No</td>
<td>72 (28.8)</td>
<td>53 (29.0)</td>
<td>19 (28.4)</td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Total (%)</td>
<td>Optimal ART adherence (≥95%)</td>
<td>Suboptimal ART adherence (&lt;95%)</td>
<td>p-value</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>----------------</td>
<td>-----------------------------</td>
<td>--------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>n=250, n (%)</td>
<td>n=183</td>
<td>n= 67</td>
<td></td>
</tr>
<tr>
<td>Any physical and/or sexual violence ever</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>237 (94.8)</td>
<td>173 (94.5)</td>
<td>64 (95.5)</td>
<td>1.00</td>
</tr>
<tr>
<td>No</td>
<td>2 (0.8)</td>
<td>2 (1.1)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Any physical and/or sexual violence in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43 (17.2)</td>
<td>30 (16.4)</td>
<td>13 (19.4)</td>
<td>0.612</td>
</tr>
<tr>
<td>No</td>
<td>193 (77.2)</td>
<td>142 (77.6)</td>
<td>51 (76.1)</td>
<td></td>
</tr>
<tr>
<td>Ever in jail overnight or longer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>189 (75.6)</td>
<td>136 (74.3)</td>
<td>53 (79.1)</td>
<td>0.435</td>
</tr>
<tr>
<td>No</td>
<td>61 (24.4)</td>
<td>47 (25.7)</td>
<td>14 (20.9)</td>
<td></td>
</tr>
<tr>
<td>In jail, overnight or longer in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12 (4.8)</td>
<td>6 (3.3)</td>
<td>6 (9.0)</td>
<td>0.093</td>
</tr>
<tr>
<td>No</td>
<td>235 (94.0)</td>
<td>174 (95.1)</td>
<td>91 (91.0)</td>
<td></td>
</tr>
<tr>
<td>Any injection or non-injection drug use(^a) in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>164 (65.6)</td>
<td>110 (60.1)</td>
<td>54 (80.6)</td>
<td>0.002(^*)</td>
</tr>
<tr>
<td>No</td>
<td>84 (33.6)</td>
<td>72 (39.3)</td>
<td>12 (17.9)</td>
<td></td>
</tr>
<tr>
<td>Ever diagnosed with any mental health condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>165 (66.0)</td>
<td>117 (63.9)</td>
<td>48 (71.6)</td>
<td>0.255</td>
</tr>
<tr>
<td>No</td>
<td>85 (34.0)</td>
<td>66 (36.1)</td>
<td>19 (28.4)</td>
<td></td>
</tr>
<tr>
<td>Contacted any HIV-specific outreach in the last 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>96 (38.4)</td>
<td>67 (36.6)</td>
<td>29 (43.3)</td>
<td>0.132</td>
</tr>
<tr>
<td>No</td>
<td>135 (54.0)</td>
<td>106 (57.9)</td>
<td>29 (43.3)</td>
<td></td>
</tr>
</tbody>
</table>

CI = Confidence Interval
Percentages may not sum to 100% due to missing data
\(^a\)excluding alcohol and marijuana
\(^*\) p<0.05
Table 4.2 Longitudinal bivariate and multivariable GEE analyses for the association between ART adherence and physical and/or sexual violence among WLWH in SHAWNA cohort in Metro Vancouver (n=250)

<table>
<thead>
<tr>
<th>Variable</th>
<th>≥95% ART adherence in the last 3-4 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unadjusted Odds Ratio (95% CIs)</td>
</tr>
<tr>
<td>Physical and/or sexual violence in the last 6 months</td>
<td>0.47 (0.30-0.74)**</td>
</tr>
</tbody>
</table>

* Adjusted for any injection or non-injection drug use (excluding alcohol and marijuana). Indigenous ancestry, having ever been homeless/living on the street, and accessing HIV outreach services in the last 6 months were included in the full model but removed in the backwards selection approach.

** p ≤ 0.01
Chapter 5: DISCUSSION

5.1 SUMMARY OF THESIS FINDINGS

Although emerging evidence shows that WLWH experience high levels of violence (44), the relationships between gender-based violence and access to basic needs, including food security and ART, have been understudied, particularly in the Canadian setting. This thesis aimed to investigate these gaps by studying three health and human rights-linked outcomes related to structural inequities for WLWH and marginalized women affected by HIV: (1) HIV-related violence in the setting of criminalization of HIV non-disclosure; (2) food insecurity among marginalized women disproportionately affected by HIV and subject to laws criminalizing sex work; (3) ART adherence among WLWH. All analyses were examined through a structural determinants of health lens, with a human rights perspective, gender focus, and the intersecting dynamic relationships operating through multiple systemic inequities.

5.1.1 CRIMINALIZATION OF HIV NON-DISCLOSURE AND WLWH

To examine the factors that impact HIV-related violence, this study (Chapter 2) employed logistic regression to model associations with HIV-related physical and/or verbal violence among 255 WLWH in the SHAWNA cohort in Metro Vancouver. The multivariable GEE results revealed that being “outed” about one’s HIV status (i.e., experiencing non-voluntary HIV status disclosure) was the strongest independent association with increased risk of HIV-related violence (i.e., physical and/or verbal abuse due to HIV status), with almost 5 times increased odds, followed by homelessness and living with a mental health condition.
These findings reflect how HIV-related violence against WLWH is associated with non-voluntary HIV disclosure in an environment where failure to disclose is criminalized. The association between violence against women (particularly IPV) and HIV acquisition has been well documented (21, 40, 188, 189). This is the first study, to our knowledge, that demonstrates significant HIV-driven violence against WLWH in a Canadian setting where non-disclosure is criminalized. This criminalizing climate likely contributes to the public’s sense of fear of HIV transmission and may contribute to stigmatization and discrimination against PLWH, especially for women who already experience structural inequities. Outside of studies on intimate partner violence and WLWH (118) and a global qualitative participatory study that looked at both fear of and experiences of violence (44) for WLWH, there are no estimates of HIV-related violence against WLWH in Canada.

HIV non-disclosure criminalization does not consider the scientific advancements of HIV transmission and has been highly criticized as being “gender-blind”. It is framed as a means to protect women from sexual assault but in fact may contribute to placing women at increased risk of violence. Barriers to and consequences of HIV disclosure for women include fear of rejection, isolation, and stigma (76). Given that this law puts sexual health responsibility solely on the partner living with HIV, it may place women who disclose their HIV status at higher risk for interpersonal violence because of the stigma associated with HIV operating in tandem with the structural inequities of sexism and misogyny that women often experience. Research suggests that the mere threat of criminal charges and the fear of non-voluntary HIV disclosure may affect women’s disclosure decisions and access to healthcare services (76).

Non-voluntary HIV disclosure (whether by health care providers, community members, housing residents, etc.) is a violation of the right to privacy and confidentiality and impedes
women’s agency to decide for themselves to whom and when they will disclose. WLWH may choose to delay disclosure in some settings to protect themselves from negative consequences such as rejection, abandonment, and violence. Breaches of the human right to privacy and confidentiality in an environment of stigma and criminalization create additional challenges to safety, especially when women are already marginalized and facing systemic inequities. Human rights and public health lenses are desperately needed to replace overly broad criminalization (1, 28, 107), with laws protecting privacy rights and protecting WLWH against discrimination, especially in light of this study and others revealing that these laws likely harm and expose women to violence.

Few studies exist that specifically assess HIV disclosure and subsequent violence against WLWH. A national probability sample study from the United States found that, overall, in a sample of women and men living with HIV, 12.6% of participants experienced physical IPV since HIV disclosure and women experienced double the amount of violence compared to men (113). The current study sheds light on the prevalence of non-voluntary HIV disclosure in Metro Vancouver and contributes further evidence to the experiences of HIV-related violence against WLWH.

In addition to non-voluntary HIV disclosure, HIV-related violence in this study was associated with homelessness and mental health issues. This finding is consistent with previous literature in similar populations highlighting the intersecting challenges of homelessness and mental health issues for marginalized populations affected by HIV (120, 121). These co-existing concerns must be addressed through structural human rights considerations and consider the importance of access to adequate housing and mental health care as fundamental elements of a comprehensive HIV response that aims to eliminate violence and enable people to lead full lives.
5.1.2 THE EFFECT OF VIOLENCE AND STRUCTURAL INEQUITIES ON HIGH RATES OF FOOD INSECURITY FOR SEX WORKERS

Food security is an established international human right, yet many marginalized Canadians struggle to afford food (139, 190). Food security and HIV have a unique reciprocal relationship whereby food security may act as a driving factor for HIV transmission risk (e.g. unprotected or higher-risk sex acts in exchange for food) while PLWH require adequate nutrition for optimum treatment outcomes in turn affecting HIV transmission risk (80). Research efforts have previously focused on the scope and drivers of workplace violence against sex workers, including laws, policing, stigma and poor working conditions (4), as well as IPV (albeit to a lesser extent) (38). Despite these previous research efforts, far less is known about the impact of overall physical and/or sexual violence (inclusive of workplace violence and IPV) on the access to basic necessities for sex workers, including food security. Using GEE, this prospective study (Chapter 3), examined the correlates of food insecurity for 761 sex workers in the AESHA cohort living with and/or disproportionately affected by HIV in Metro Vancouver between 2010 and 2014. Our study showed that women who had experienced physical and/or sexual violence had almost 5 times the odds of reporting food insecurity and almost all sex workers living with HIV were food insecure. This is one of the first studies in a high-resource setting to demonstrate the correlation between violence and food insecurity for sex workers. Previous studies showing similar associations between violence and food insecurity were conducted among a general population of women in the United States and among marginalized women in Brazil (85, 133, 134).
Our study highlights the negative effects of the intersecting risks of physical and/or sexual violence, living with HIV, and experiencing food insecurity. The findings of this study suggest that both recent physical and/or sexual violence and lifetime exposure to physical and/or sexual violence, regardless of perpetrator, have a direct link to higher odds of food insecurity. This correlation may be because women in sex work feel rushed and unable to appropriately screen clients for safety due to sex work criminalization laws in Canada (46). These laws have been repeatedly shown to act as barriers to physical health and safety, while in contrast, decriminalization of sex work has been shown to facilitate access to human rights necessities including healthcare (155, 156). The pressure to earn a livelihood may override concerns about sexual health or HIV if a client either pressures sex workers into sex without a condom or offers more money for sex without a condom (86) (our study did not explore condom negotiation in relation to food insecurity). Notably, almost half (46.6%) of sex workers who were food insecure had experienced recent police harassment. This is alarming due to the already-criminalized nature of sex work which endangers women’s health and safety. Our study noted that police harassment did not hold in multivariable analysis examining factors associated with food insecurity, however other studies in a similar setting have shown police harassment to be a key factor associated with other human rights issues (e.g., violence against sex workers and barriers to health care access) (52).

In our study, Indigenous ancestry, ever being diagnosed with a mental health condition, unstable housing, stimulant use, heroin use, and the means of food access were other factors significantly associated with food insecurity. This is additional evidence that intersecting identities and inequities to contribute to food insecurity (84, 131). Indigenous people in Canada face multiple structural inequities, such as poor housing and healthcare discrimination in the
setting of systemic and institutional racism (191, 192). Therefore, it is not surprising to find that Indigenous women may be at greater risk of experiencing food insecurity, where cultural considerations and traditional food practices have been affected by colonization (193).

Physical and mental health conditions are associated with, and have been shown to increase, vulnerability to food insecurity and this vulnerability increases with the number of concurrent health conditions (149, 150). Our study also showed that affordable, stable housing is crucial to health and well-being and that unstable housing is correlated with food insecurity. This supports previous findings in San Francisco that show high levels of food insecurity among marginally housed individuals living with HIV (194), as well as in Vancouver where accessible housing significantly improved quality of life for marginalized individuals (125). Vancouver’s high cost of living may make it challenging for individuals to afford both housing costs and food, resulting in marginalized communities sometimes having to make a choice between affording shelter and affording food.

Another factor contributing to food insecurity in our study was illicit drug use. The association between food insecurity and drug use – and their competing demands – has previously been observed (151, 153). Illicit drug use may impinge on experiences of food insecurity where individuals have high levels of competing needs, including housing, and so priorities may be rearranged (195). The amount of drug use, rather than the type, has previously been found to be associated with food insecurity (153). Changes in eating habits from decreasing the number of meals eaten (196) to skipping meals (197) are associated with drug addictions. Chapter 3 showed that women who are not financially self-sufficient were also more likely to experience food insecurity. It is clear from the present study and those of others that many overlapping structural inequities contribute to food insecurity.
5.1.3 SUBOPTIMAL ART ADHERENCE AMONG WLWH

Access to healthcare is a basic human right. In the context of HIV, effective treatment and ongoing healthcare are essential components of the public health strategy for HIV. Structural inequities, as a result of human rights violations, have an impact on access to healthcare, in particular ART access and optimal ART adherence. To examine the levels of ART adherence among WLWH in Metro Vancouver, this study (Chapter 4) opted to examine the independent confounding effect of physical and/or sexual violence on ART adherence among 250 WLWH in the SHAWNA cohort between September 2014 and February 2017. Almost one-third of WLWH in the study had experienced recent violence and 42% had suboptimal adherence to ART. Using a confounder model to examine the independent effect of physical and/or sexual violence on ART adherence, this study found that the odds of optimal ART adherence were 57% lower for WLWH who had experienced recent physical and/or sexual violence compared to those who had not.

These results include broader experiences of violence to expand on the fact that IPV has been documented to be significantly associated with lower ART adherence and poor viral suppression across multiple studies, with most conducted in the United States (182). WLWH who experience IPV may suffer from resulting mental health issues (e.g., depression, anxiety etc.), triggering decreased ART adherence (198). Decreased ART adherence is in turn linked to uncontrolled HIV replication and CD4 T-cell decline, well-known markers of poor ART treatment and disease progression (160). Mental health issues may additionally affect retention in care and contribute to delayed ART initiation, resulting in comorbidities that remain unrecognized and untreated, in addition to unrecognized HIV complications. Poor clinical
outcomes associated with these pathways include: hospitalizations, AIDS, comorbidities, amongst other negative outcomes (160).

Women consistently show lower levels of ART adherence (104, 159) as a result of both gender (e.g., social and structural inequities) and sex-based biological differences (e.g., weight and dosage modifications, estrogen levels). Research indicates that men’s and women’s engagement with ART adherence differ for reasons including stigma, depression, stress or anxiety around treatment and its perceived side-effects (104). Women are not inherently worse at adherence; rather, the layered, intersectional experiences of gender, sexual orientation, poverty, homelessness, drug use, and relationship status, in addition to the daily lived experience of sexism may all contribute to adherence challenges. We note, to the best of our knowledge, the lack of community-based data from Canada regarding the forms and levels of violence that WLWH experience over their lifetimes. Our study is the first longitudinal community-based study in Canada to examine the relationship between gender-based violence, regardless of perpetrator, and ART adherence. The findings indicate that violence against WLWH is widespread and furthermore that it poses a significant barrier to treatment adherence. This may be because immediate health and safety concerns take precedence over the long-term perception of the effects of HIV. Women may also be suffering from depression and/or post-traumatic stress and may engage in activities that make it difficult to remember or prioritize taking HIV medication daily (e.g., self-medication through alcohol or drug use). We postulate that structural inequities that contribute to the violation of human rights, and manifest as poverty, may also play a role in requiring WLWH to work demanding hours in low-paying jobs, restricting women’s time to manage the myriad of health-care related necessities required for WLWH (e.g., picking up medication and keeping up with clinic appointments).
Perpetrators of violence are also more likely to be living with HIV (189, 199, 200). Women experience gender-based violence through repeated sexual exposure and thus risk acquisition of HIV and women in this situation likely continue to experience violence post-seroconversion. Women who have previously experienced gender-based violence have a higher risk of further violence (39) and previous sexual violence is associated with sexual risk behaviour (201, 202)—both of these factors pose risks for HIV transmission.

When viewed from a wider public health perspective, suboptimal ART adherence contributes to the evolution of HIV drug resistance, thus generating a complex cycle of violence and HIV transmission. It is clear from the current study that interventions must target violence against WLWH, and support women’s health and human rights. Structural inequities facing women living with HIV affect the dynamics of HIV transmission at the population level as suggested by suboptimal ART adherence demonstrated in the current study. WLWH already face challenging and sometimes life-threatening circumstances and cannot be expected to solely shoulder the responsibility of population health.

5.2 IMPLICATIONS AND RECOMMENDATIONS

5.2.1 IMPLICATIONS AND RECOMMENDED INTERVENTIONS
The Canadian Charter of Rights and freedoms guarantees individuals the right to life, liberty, and security of person (203). Canada has also ratified the 1976 UN Covenant on Economic, Social, and Cultural Rights, which states that the nation must “recognize the right of everyone to an adequate standard of living for [themselves] and [their] family, including adequate food, clothing, and housing and to the continuous improvement of living conditions” (204). Signatories
promise to “take appropriate steps to ensure the realization of this right”. This has not happened in Canada. Food, safety, and health are not commodities, but rather they are required for an adequate standard of living, so steps must be taken towards ensuring that marginalized women, particularly WLWH and sex workers, can realize their guaranteed human rights. Violations of human rights lead to stigma, discrimination, violence, and criminalizing laws that impede access to HIV prevention, treatment and care.

UNAIDS outlines several key human rights programs that are needed in every HIV response: stigma and discrimination reduction programs; HIV-related legal services, monitoring and reforming laws and policies regarding HIV; legal literacy for PLWH; sensitization of lawmakers and police on issues around HIV and human rights; training for healthcare providers on human rights related to HIV; and reducing discrimination against women in the context of HIV (1). Many of these elements are applicable to the outcomes of this thesis as human-rights centred interventions and programs are required to support marginalized women at the macrostructural and mesostructural levels.

5.2.1.1 IMPLICATIONS AND RECOMMENDATIONS FOR RESEARCH AND POLICY AT THE MACROSTRUCTURAL LEVEL

In addition to the specific implications addressed in each thesis chapter, there are broader macrostructural consequences of this research that support changes to create an environment conducive to human rights at the community level. The following recommendations for the macrostructural level have the potential for crosscutting impacts to decrease violence against marginalized women, increase food security, and enhance accessibility to healthcare.
Elimination of broad use of HIV non-disclosure laws

HIV non-disclosure laws have proven ineffectual and detrimental to public health and education. These laws do not match the scientific recommendations to reduce HIV risk and, in fact, amplify the structural vulnerabilities women and trans women face in a patriarchal society, particularly if women inhabit additional marginalized identities (e.g., Black or Indigenous, sex workers, sexual or gender minorities). In this thesis, non-voluntary HIV disclosure was associated with HIV-related physical and/or verbal violence. Further, unstable housing as well as mental health diagnoses were associated with HIV-related physical and/or verbal violence. These research findings underscore the high prevalence of violence against WLWH and its association with non-voluntary HIV disclosure (i.e., HIV disclosure without consent). These findings illustrate clear breaches of women’s rights to confidentiality in a country where HIV non-disclosure laws exist.

There is an urgent need for law reform and prosecutorial guidelines, which will help protect marginalized WLWH from continued or newly-instigated violent situations as well as redistribute responsibility for sexual health to the entire population. This requires collaboration between lawyers, law enforcement, public health practitioners, and WLWH to address privacy and confidentiality concerns and best practices.

Decriminalization of sex work

Repeated international calls to decriminalize sex work and reams of evidence supporting decriminalization have yet to be meaningfully applied in Canada. Evidence has shown that criminalizing any aspect of sex work (e.g., sex workers or clients, where or how sex workers operate) produces the same outcomes—isolation for fear of law enforcement and increased risks to sex workers’ safety (4, 46). Workplace safety should be a right afforded to everyone regardless of whether the work is formal or informal labour, particularly when sex workers have
been and continue to be subject to violence and lack of protection due to their occupation (2). Marginalized women bear the brunt of harmful structural inequities in the context of sex work criminalization, and may face compounded inequities when they inhabit multiple social identities (e.g., Indigenous, trans, sex worker). Research has consistently shown that decriminalization of sex work would increase access to basic health and support services (155, 156, 205) and the findings in the current thesis suggest that removal of criminal laws and adversarial relationships to police remain critical to supporting access to food security, a basic health and human right. It is also relevant to note that decriminalization would make it easier for sex workers to report violence to the police (206), as violence is another significant factor that increases women’s risks of HIV transmission and access to care.

**Gender-based violence policy and programming**

Important changes must be made to build and improve clinical settings so that women feel safe, disclose experiences of violence if they decide it will be helpful, and feel confident that any requests for assistance will lead to trusted, tangible, accessible resources. This requires a fundamental systemic shift in the mechanics and culture of healthcare: incentives and ability for care providers to spend more time with their patients to assess their broader social determinants of health, prioritizing racialized women and trans women to lead in care provision and management (which necessitates support to stream members of marginalized groups into universities, medical school, research, policy-making), as well as the implementation of universal trauma-informed care considerations because such a high proportion of WLWH and sex workers experience violence.
Financial security through universal basic income

Violence is difficult to escape without financial stability. This may be particularly evident in cities like Vancouver with a high cost of living. The results of this thesis suggest that the current welfare system is not providing sufficient assistance to access affordable basic necessities. Universal basic income may reduce inequality, alleviate poverty, and allow people access to basic necessities including food and housing (207). Less poverty would likely mean less strain on health and social services, increased autonomy of individuals, and an increase in the quality of services that are provided. A Canadian study from 2011 found that women who flee IPV overwhelmingly rely on food assistance such as food banks (208), suggesting a strong relationship between experiences of violence and food insecurity. Furthermore, the same study found that even when women have left violence, ongoing support is crucial (208). Policies must support women beyond violence screening and provide longer-term support and access to mental health, housing, and addictions support past exiting violent situations. British Columbia must adapt studies of universal basic income and conduct its own pilot projects to evaluate the potential impact on health outcomes.

5.2.1.2 IMPLICATIONS AND RECOMMENDATIONS FOR RESEARCH AND POLICY AT THE MESOSTRUCTURAL LEVEL

Current macro-level structures are currently failing marginalized women, both women sex workers and WLWH. The negative effect that violence has on access to basic human rights for WLWH and marginalized women suggests there are major flaws in how public health is supported and how healthcare is administered in this environment. Governments and organizations must start to address social inequities at the community level whilst simultaneously
working to dismantle larger structural inequities that impede health outcomes. Harm reduction interventions are not intended to completely redress systemic issues but work to keep people alive and safer while larger structural changes can be made for longer-term public health benefits. For marginalized women, these community-level approaches may include universally-applied trauma-informed care, increasing access to basic needs (such as food security, HIV care), and addressing stigma around HIV.

**Trauma-informed care**

Screening women for gender-based violence may inadvertently contribute to the challenges women face through perpetuating unequal power dynamics, creating the implication that access to healthcare depends on answering truthfully, and fuelling stigma towards certain groups of women. Women may not feel safe disclosing violence or may not perceive their situations to be violent. Ethical concerns arise when facilities and systems are not equipped to respond appropriately when violence is disclosed and cannot actually support women in exiting harmful situations. Dechief (2003) has previously identified how the healthcare system can be supportive of women experiencing violence and provide meaningful resources by practicing women-centered care, engaging in empowerment and cultural safety training for health care providers, and providing comprehensive care to address all facets of health (184). It is also noted that screening and identification of violence does not necessarily equate to improved health outcomes for women and the context of care must be changed to prioritize community connection and meaningful support (184).

Trauma-informed care is the general idea that healthcare must universally understand and consider the far-reaching effects of trauma. There are no strict guidelines regarding the specific components of trauma-informed care; however, advocates have broadly outlined six key
principles: safety; trustworthiness and transparency; peer support; collaboration and mutuality; empowerment, voice and choice; and consideration of cultural, historical and gender issues (209). This thesis reveals the heightened levels of violence that marginalized women face in Metro Vancouver. Healthcare that is sensitive to the commonality of women’s histories and present experiences of violence—equally applied and without stereotyping—will lead to better care overall.

Providing childcare in the same buildings as healthcare facilities may facilitate women’s ability to maintain clinic appointments without additional logistics to organize for their children. Geographical sensitivity to location, transit accessibility, and welcoming and open settings with regards to the built environment may also help women access the healthcare they need. The mental health elements of trauma-informed care must also stay current and support women in addressing historical and recent trauma.

**Food security**

Canada is one of few resource-rich countries that lacks a food policy. As of June 2017, the Canadian federal government has begun conducting online consultations to create a food policy for Canada including increasing access to affordable food (210). The federal government also organized a summit in June 2017 with representatives from a wide variety of organizations and stakeholders, including Indigenous groups and researchers. However, there is little information yet to determine whether food security will be considered a human right and social determinant of health. Food security can also be approached as a harm-reduction measure (211) to alleviate the pressure on sex workers to obtain money for food or other basic necessities. For PLWH, food security and nutritional adequacy are critical components to effective ART. Free, healthy, and
nutritious food provision should be funded at all HIV service organizations to minimize gaps in the HIV treatment cascade and avoid treatment failure.

Food banks are independent organizations often strained for resources and adequately nutritious food. Consequently, food banks may have to limit the food quantities distributed and sometimes require identification and registration for use of the bank. These factors create additional barriers to potential users. The very fact that people have to use food banks is itself an indicator of food insecurity, not an indicator of adequate access. Non-profit organizations in Metro Vancouver that provide food services in addition to their other programming often find themselves strained for resources as well, and sometimes forgo food provision when it is seen as an “extra” service rather than a fundamental necessity.

There are opportunities for intervention-based research based on community-led initiatives that already exist e.g., community gardens urban farms, and reduced cost grocery stores, which may all provide employment for people with low-incomes. There are also opportunities for social innovation and evaluation of web-based grocery stores with delivery options that women could connect with using their smartphones or computers at public libraries. Pop-up or mobile grocery vans, supported by government and/or businesses, could also increase access to food for marginalized populations.

**HIV Care and Confidentiality**

In a climate of HIV criminalization and the high levels of violence against WLWH this thesis reveals in Metro Vancouver, it is crucial that healthcare providers and service providers adhere to strict confidentiality in relation to HIV status. Addressing stigma through continued education in the community may also be key to keeping WLWH safe when people learn to disassociate HIV with inevitable illness and death. However, there may be a risk that community education
comes with unintended negative consequences leading to non-voluntary HIV disclosure. A qualitative study from South Africa recorded that the media played a role in disclosure events. For example, a television program revealed a specific kind of baby formula WLWH received from the hospital to feed their babies (68). Another source for non-voluntary disclosure in this South African study was the breach of confidentiality by people to whom they had first disclosed their HIV status (68). This thesis indicates that non-voluntary disclosure also occurs in different settings in North America due to breaches of confidentiality. While the sources of non-voluntary disclosure were not identified, there are many possible sources of non-voluntary disclosure, including health professionals, family, friends, ex-partners, or community members.

The media plays a significant role in public perceptions of HIV in North American settings, especially as HIV non-disclosure criminalization cases are often sensationalized and this then contributes to the fear and stereotypes held around HIV (77). These stereotypes are often racial in nature and rely on age-old tropes that vilify Black people, immigrants, and Indigenous people as being dangerous, uncivilized, dirty etc. (77) It is clear from the experiences of stigma and violence detailed by women that there is more work to be done around HIV education at all levels of society. Media literacy around HIV may be improved by training and workshops for journalists and editors, as well as the creation and distribution of online resources for this field.

5.3 IMPLICATIONS FOR FUTURE RESEARCH

This thesis addresses the gaps in public health research into the experiences of two marginalized populations—WLWH and sex workers—around key health and human rights issues: HIV-related violence, food insecurity, and ART adherence. This work has however identified several additional gaps, which require further investigation.
There is currently little longitudinal research about the levels and frequency of violence WLWH face. Future research must identify the many sources of violence for WLWH in order to appropriately target interventions, whether within the healthcare system, in the community, intimate partnerships or combinations thereof. Further epidemiological studies must be conducted across Canada and in other regions in order to form a solid global understanding of the violence WLWH face, its prevention, potential interventions and means of support for women experiencing violence.

This thesis has identified that sex workers experience disproportionate levels of food insecurity and that sex workers living with HIV face almost universal food insecurity. This is a population experiencing multiple structural inequities linked to food insecurity that requires significant attention. Current discussions to introduce a Canadian food policy present a unique opportunity and critical necessity to conduct intervention research to examine food security measures before and after a food policy is launched, in addition to evaluation of any evidence-based programs the proposed policy may initiate. Comparative studies of food insecurity between jurisdictions that have decriminalized sex work may be useful to inform policy.

An examination and replication of universal basic income projects, adapted to the context in Vancouver may help to inform alternative or additional policies to the current welfare system. There is limited research into the effects of providing basic income to support positive health outcomes without the removal of existing beneficial programs.

This thesis identifies a high proportion of WLWH who have experienced violence in their lifetimes and suggests that this violence affects ART adherence. Evidence-based trauma-informed care interventions, including access to mental health care, should be implemented and
evaluated in HIV clinics to assess whether ART adherence improves for WLWH. This research may help to better direct healthcare structure and administration.

Finally, WLWH must be meaningfully involved and consulted at all stages of any future research. Given the disproportionate representation of Indigenous women in these studies, Indigenous women must be centered and empowered to speak to what will help eliminate violence against women, and what will support women who have experienced and continue to experience violence.

5.4 STRENGTHS AND LIMITATIONS

Strengths of this thesis include the use of longitudinal data from two large community-based studies. Analysis of data from the SHAWNA and AESHA cohorts allowed for the use of a GEE approach (Chapters 3 and 4) to account for repeated measures on the same individual over time (180). Particularly with respect to data for WLWH, much available epidemiological research into the experiences of violence for WLWH is cross-sectional or qualitative in nature. This thesis contributes novel longitudinal research on the various forms of structural inequities and violence among two populations of marginalized and stigmatized women: women living with HIV and women sex workers (trans inclusive).

This thesis employed a structural determinants of HIV framework (45) and adapted it to health outcomes, which focused on both WLWH and sex workers. This framework, paired with a combination of analytical lenses from empirical and theoretical literature on social inequities and health as well as a human rights lens, allowed for the examination of structural inequities that affect health for marginalized women in Metro Vancouver. This thesis drew on an intersectional feminist perspective to interpret the results and consider the implications of social positionality for marginalized women beyond HIV status to include race, gender, and sexuality in a larger
context of structural oppression, in an effort to provide a more nuanced understanding of the structural inequities highlighted in the analyses. While incorporating the idea of intersectionality into population health research has previously been broached (212) it remains infrequent in epidemiological research. In this research, a sensitivity to multiple inextricable identities and an understanding of the role of relative social and cultural privilege may help better identify inequities, compile evidence specific to the context of particular marginalized groups, and create sharper tools and targeted programs for intervention and policy (212). While this thesis did not conduct an intersectional analysis, the work drew upon the framework and theory of intersectionality to inform policy and recommendations. This thesis also highlights a need for future research, particularly with WLWH and other groups marginalized along multiple axes, to engage with intersectional methods and theory. Approaches to population health research informed by intersectionality are important because additive models are not necessarily designed to capture the complex effects of unique combinations of oppressions. Other methods such as structural equation modelling, moderated mediation models (213), and new methods that have yet to be built may be better positioned to express the synergistic effects of mutually reinforcing oppressions.

The scarcity of engagement with the concept of intersectionality in population health research may be because researchers themselves are not objective impartial agents; they may operate from their own assumptions, positions of power, privilege, and bias, and thus fail to examine the interlocking oppressions of women of colour and oftentimes, due to systems of power that dictate who is able to conduct research, do not have lived experiences that help inform research meaningful to the populations “under observation”. This is why GIPA and MIPA principles the greater and meaningful involvement of HIV-affected populations at all
levels of investigation is crucial to meaningful research (1). To address these key principles, the SHAWNA and AESHA studies have intentionally included WLWH and women with lived experiences of sex work as core staff members (interviewers, research nurses, coordinators).

Furthermore, a clear understanding of how systemic oppression operates is essential to research that attempts to minimize replicating the harms of colonization (e.g., “taking” experiences for career-furthering publication). Critically examining the political implications of universities’ knowledge production, particularly with regards to research among marginalized populations in the context of larger, continued systemic oppression, is key to improving methodology and creating more meaningful impact for affected populations.

**Limitations**

The findings of this thesis should be interpreted with the consideration of several limitations. Sex work remains a stigmatized occupation and its marginalized nature means that random population sampling is a challenge. Data for the AESHA study is obtained through community mapping and time-location sampling strategies by community interviewers, including current/former sex workers and a multilingual team of English, Cantonese, and Mandarin speakers (137). Given that it is not possible to have a sampling frame of all sex workers, sex workers were invited through weekly daytime and late-night outreach to street, indoor, and online spaces. The AESHA project’s strong community and experiential connections ensure a broad representation of street and off-street sex workers across Metro Vancouver. Sex workers (current or former) are represented across all AESHA positions (e.g. outreach workers, interviewers, sexual health research nurses, and coordinators) and have a strong rapport with sex workers. Similarly, SHAWNA recruitment and follow-up is conducted though outreach by a team of Peer Research Associates (PRAs) comprised of WLWH, self-referrals and referrals from
HIV care providers, peer navigators, HIV/AIDS organizations and clinical outreach, including close collaboration with the provincial referral centre for WLWH (Oak Tree Clinic, BC Women’s Hospital).

The data used in this thesis for both AESHA and SHAWNA cohorts is self-reported. There are sensitive questions about violence and trauma from the interviews and participant responses may be subject to social desirability bias. To minimize this effect, there are different locations from which interviews can be conducted and rapport between participants and interviewers is good due to sourcing interviewers with connections to the communities and a culture of positioning the participants as experts of their own experience. However, if the data does reflect fewer experiences of violence because of social desirability bias, the results would be biased towards the null and present an underestimate of the true effect size.

Finally, gender and sexuality are combined into one variable for this thesis as the sample size did not allow enough power to separately consider gender identity alone (e.g. cisgender women vs. transgender women). However, as close to a third of participants in AESHA identify as lesbian, bisexual, queer, or Two-Spirit, GSHI has previously examined the experiences of violence that differ by sexual orientation and by sexual/gender minority status (vs cisgender and straight) (214, 215). Given the smaller proportion of trans sex workers and/or PLWH in Vancouver, the SHAWNA and AESHA teams are exploring the experiences of of trans women and Two-Spirit sex workers and WLWH through qualitative and mixed methods work (216, 217).
5.5 CONCLUSION

This thesis contributes new knowledge to research into the relationships between violence, human rights, and structural inequities faced by marginalized women, specifically WLWH and sex workers in Canada. Chapter 2 highlights the extensive violence WLWH experience as a result of their HIV status, which occurs within a context influenced by the criminalization of non-HIV disclosure. The research in this chapter revealed that non-voluntary HIV disclosure was associated with 5 times the odds of HIV-related physical and/or verbal violence (i.e., HIV disclosure without consent was linked to 5 times the odds of violence due to HIV status). The findings from Chapter 3 revealed that among marginalized women sex workers, physical and/or sexual violence was associated with almost 5 times the odds of food insecurity and, importantly, almost all WLWH were food insecure. Finally, the data from Chapter 4 found an independent relationship between physical and/or sexual violence and suboptimal ART adherence for WLWH. WLWH who had experienced recent violence had 57% lower odds of optimal ART adherence than women who had not.

Together, these findings emphasize the heightened levels of violence that marginalized women in Metro Vancouver face and the associated human rights-related challenges, particularly concerning access to basic necessities (including food security and adequate HIV care), personal autonomy, and freedom from violence. Demonstrably, the rights to life, liberty, and security of person do not equally apply to marginalized people, especially when individuals’ lived experiences lie at the intersection of multiple marginalized identities. This thesis highlights the overrepresentation of Indigenous women who are either sex workers and/or living with HIV—a result of systemic oppression and structural inequities that have marginalized this group of people and excluded many from positions of power. In Canada’s colonial context, and
particularly in its 150\textsuperscript{th} year of Confederation, the country should shift funding into improving Indigenous-led initiatives and increase opportunities and conditions for Indigenous people as leaders who have been implementing self-directed community-based care for thousands of years.

Violence, gender inequity, marginalization, and HIV-related discrimination fuel the HIV epidemic. UNAIDS recommends that national HIV responses must have: stigma and discrimination reduction programs, education to decrease barriers to human rights, legal support and increased access to justice. These factors are critical to successful HIV prevention and treatment programs.

Addressing the structural inequities that establish a climate that enables violations of human rights, promotes marginalization, and affects personal and public health must be effected at macrostructural and mesostructural levels including stigma and violence elimination programs and increased access to justice. Strategies to mitigate violence in all its forms, and at all levels, will require tremendous shifts in societal culture and attitudes towards women, health care provision, and human rights. Many of these changes are slow-moving, however, the long-term benefits of funding and supporting human rights, feminist education, women-centred healthcare, access to nutritious food and accessible housing are predicted to contribute significantly to marginalized women living a much-improved quality of life and this, in turn, will benefit population health on a large scale.
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APPENDICES

Appendix A

Radimer-Cornell Food Insecurity Scale, adapted for use in marginalized populations

<table>
<thead>
<tr>
<th>Radimer/ Cornell Scale</th>
<th>Often true</th>
<th>Sometimes true</th>
<th>Never true</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. I worry about whether my food will run out before I get money to buy more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] N/A (eats meals only at drop-ins)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. I worry about whether the food that I can afford to buy for my household will be</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>enough [ ] N/A (eats meals only at drop-ins)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. The food that I bought just didn’t last, and I didn’t have money to buy more</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] N/A (eats meals only at drop-ins)</td>
<td></td>
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<td>d. I ran out of the foods that I needed to put together for a meal and I didn’t have</td>
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<tr>
<td>money to get more food [ ] N/A (eats meals only at drop-ins)</td>
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<td>e. We eat the same thing for several days in a row because we only have a few different</td>
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<tr>
<td>kinds of food on hand and didn’t have money to buy more</td>
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<tr>
<td>[ ] N/A (eats meals only at drop-ins)</td>
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<tr>
<td>f. I am often hungry, but I don’t eat because I can’t afford enough food</td>
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<td>g. I eat less than I think I should because I don’t have enough money for food</td>
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<td>h. I can’t afford to eat properly</td>
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<tr>
<td>i. My child (children) are not eating enough because I just can’t afford enough food</td>
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<td>[ ] N/A (no dependent children)</td>
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<td>j. I know my child (children) are hungry sometimes, but I just can’t afford more food</td>
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<td>[ ] N/A (no dependent children)</td>
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<td>k. I cannot afford to feed my child (children) a balanced meal because I can’t afford</td>
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<td>that [ ] N/A (no dependent children)</td>
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