The association between self-reported depressive symptoms and risky sexual interactions in an injection drug using population in Winnipeg, Canada

Karyn Gabler

A thesis submitted to the

Faculty of Graduate and Postdoctoral Studies

in partial fulfillment of the requirements for the

MSc degree in Epidemiology

School of Epidemiology, Public Health & Preventive Medicine

Faculty of Medicine

University of Ottawa

ACKNOWLEDGEMENTS

My sincere gratitude is owed to Dr. Ann Jolly. Her support, encouragement, and enthusiasm made this project possible. It was her vibrancy and energy that always reminded me what a true love of research can accomplish. My thanks also go to my advisory committee member, Dr. Ian Colman for his valued feedback, and support throughout this process. This project would not have been possible without such a collaboration of great minds.

I also give thanks to my family, and my friends. Without their ever-present support and words of encouragement, I would not have come so far. It is the positivism and drive that I see in those around me, that models success.

ABSTRACT

Background: Vulnerable populations in Canada shoulder a disproportionately high burden of disease. Transmission of sexually transmitted infections is behaviourally mediated. Previous research indicates an association between depression and sexual risk-taking. Evidence also suggests that social support is an effect modifier.

Methods: Data were collected from a population of injection drug users, between 2003 and 2004 in Winnipeg, using respondent driven sampling. Demographic and social behaviors were analyzed to characterize the population, as well as social networks and ego networks. Logistic regression was used to examine the association between depressive symptoms and sexual risk interactions. Social support was examined as an effect modifier.

Results: The majority of the study participants and network members were aged between 35 and 44, and a high percentage identified as Native Canadians. The highest percentage of people reported welfare as their primary source of income, and injecting stimulants, as their most frequently injected drug. Logistic regression models indicated an increase in the odds of individuals engaging in high-risk sexual interactions, if they had also self-reported elevated depressive symptoms. It was not possible to conclude that social support was an effect modifier.

Conclusion: This research supports a positive association between elevated depressive symptoms, and higher levels of sexual risk interactions. Further research is needed to understand the role of social support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BIC	Bayesian Information Criteria
CES-D	Center for Epidemiologic Studies Depression Scale
DSM-V	Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition
GHQ	General Health Questionnaire
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HRBS	HIV Risk Taking Behavior Scale
IDU	Injection Drug User
MESH	Medical Subject Heading
MSM	Men who have sex with men
RBA	Risk Behavior Assessment Scale
SDS	Severity of Dependence Scale
STI	Sexually Transmitted Infection

1. INTRODUCTION

Vulnerable sub-populations such as injection drug users are disproportionally burdened by sexually transmitted infections. [1,2,3,5] Previous research has indicated that injection drug users form interconnected social-niches that allow for the behaviourally mediated transmission of STIs and blood borne infections. [34,26] An association between mental health and lifetime prevalence of sexually transmitted diseases has been reported. [26] It is possible that an association between depression and increased sexual risk interactions contributes to the increased behaviourally mediated transmission of sexually transmitted diseases in IDU populations - discussed in section 1.4.2. It is also possible that the association between increased sexual risk interactions and depressive symptoms could be mediated by social support - discussed in section 1.5.

1.1 SEXUALLY TRANSMITTED INFECTIONS IN CANADA: THE BURDEN

In Canada, sexually transmitted infections have been on the rise since the 1990's. In 2008, 70% of reported notifiable diseases were sexually transmitted infections (113,115 cases). Chlamydia was the most commonly reported sexually transmitted infection, accounting for 51% of all notifiable diseases reported. In 2010, the reported chlamydia infection rate was 277.6 per 100,000. [1]

Infection associated morbidity has a negative impact on the entire population, but it is vulnerable sub-populations, such as injection drug users, street-involved individuals and sex workers that shoulder a disproportionately high burden of disease. Vulnerable populations are at an elevated risk of acquiring a sexually transmitted infection compared to the general Canadian population. [1,2] Estimates from 2001 suggest that prevalence of HIV is 17 to 68 times higher among injection drug users compared with the general U.S. population.

[3,5] Rates of chlamydia infections are seven times higher among First Nations adults as compared to the general population. [1]

Members of these sub-populations are interlinked, forming social networks. Social networks are natural social units that comprise components (groups of individuals who are connected directly or indirectly by at least one tie). A sexual network can be a subset of a social network. Components in a social network are formed by the direct or indirect sexual interactions between individuals. [3,5] In vulnerable sub-populations, where disease prevalence is high and where risk behaviours (e.g. unprotected sexual intercourse) are present, a viable niche for the transmission of sexually transmitted diseases, including HIV, can develop. [3,5,34] Previous analysis of the injection drug using population used for this research (Section 2.2) found that increased HIV and HCV transmission were significantly associated with risky sexual interactions. The odds of an HIV infection were 2.4 times higher for individuals with opposite-sex client partners, and 8.6 times more likely for individuals with same-sex client partners. [3] Behavioural instability as well as close proximity to a reservoir of infectious disease should make sub-populations such as injection drug users a priority target for public health interventions. [26]

To reduce the incidence rate of sexually transmitted infections in vulnerable sub-populations, targeted prevention and control strategies should be developed and implemented. [1] Developing effective interventions begins with understanding the correlates, environment and social milieu of risk-taking. [13] One possible correlate of sexual risk-taking is mental health. Previous research indicates that mental health is statistically associated with higher lifetime prevalence of sexually transmitted infections and blood borne infections. [26] Interventions should be multidisciplinary, addressing underlying behavioural modifiers such as mental health and social support (possible correlates of risk-taking). [2] Behavioural modifiers must be addressed because previous research indicates that circumstance alone cannot explain or predict sexual risk interactions. [8]

Data addressing the interrelatedness and sexual risk interactions of vulnerable populations is limited, and the data available underreports health issues. [1,3,27] The aim of the present study is to fill existing knowledge gaps and thereby increase the understanding of correlates (depression) and moderators (social support) of sexual risk interactions in a vulnerable Canadian population, specifically, injection drug users. [14]

1.2 INJECTION DRUG USERS

Injection drug users (IDU) constitute a sub-population with a disproportionately high prevalence of sexually transmitted infections, even though they represent a small proportion of the population. In 2012, there were an estimated 100,000 IDU in Canada, yet annually, they account for 21% to 24% of newly diagnosed HIV cases. [2,31-32] Although injection equipment sharing is higher in the hierarchy of HIV transmission risk, the role of sexual transmission cannot be ignored. [12] Risky sexual interactions also put injection drug users at risk of contracting other sexually transmitted blood borne pathogens and bacterial infections. The behavioural risk of acquiring a sexually transmitted disease is higher for injection drug users than users of less stigmatized substances. [2]

The interplay between sexual behaviours and drug use must be considered. Individuals, especially women, may engage in sex in exchange for drugs. [16] Injection drug users may have non-injecting partners. These non-drug using partners are at a higher risk of infection because their partners engage in syringe sharing practices within their social networks. [36] The injection drug using population could be viewed as a “core” group in the transmission of sexually transmitted infections. Targeting interventions to this group could result in a significant decrease in infection rates given that the IDUs’ infection frequency is disproportionately high relative to the group’s small number. [34]

1.3 SEXUAL RISK INTERACTIONS

The spread of sexually transmitted infections depends on the risk behaviors of individuals as well as their interactions with others because transmission is behaviorally mediated. [3,5] An individual's risk is also dependent on the structure of his social network, and requires that an infectious agent be present in his component. [3] The most common risk factors for acquiring chlamydia, gonorrhea or infectious syphilis include inconsistent condom use, having multiple sex partners and having a new partner in the last two months. [6] Other sexual risk interactions include using sex as a means of income or survival, engaging in sexual activity under the influence of alcohol or drugs, experiencing involuntary sexual encounters, or having high-risk partners (e.g. injection drug users). [1,2,6] Understanding why individuals engage in these interactions and how to encourage safer sexual interactions will help to limit the incidence of sexually transmitted infections.

1.4 DEPRESSION

One possible correlate of risky sexual interactions in injection drug users is depression. Mental disorders are prevalent among the homeless population, which includes many injection drug users. Precise prevalence estimates are hard to obtain. In western countries, between 40% and 95% of homeless people may be affected by mental disorders, the most prevalent being depression. [37,38] National statistics report that one in seven adults will experience a mood disorder in his or her lifetime, with 12.2% lifetime prevalence for depression. Lifetime prevalence of depression is three to four times higher for those in the lowest income bracket and is higher among drug users. [7,12] The estimation for depression prevalence among IDU ranges from 25% to 81%. A meta-analysis identified that 55% of IDU report depressive symptoms that are higher average. [9]

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, provides clinical diagnostic criteria for major depressive disorder and depressive episodes. It includes a list

of depressive symptoms: depressed mood or irritability, decreased interest or pleasure, significant weight change or change in appetite, change in sleep, change in activity, fatigue or loss of energy, feelings of guilt or worthlessness, change in concentration and thoughts of suicide. [15] Although clinical diagnosis is important, previous research indicates that self-perceived mental-health status is also a useful tool because individuals have an astute sense of their own mind. [7] This is important as data is limited for vulnerable populations and may be self-reported.

1.4.1 LITERATURE SEARCH STRATEGY AND RESULTS

In conjunction with a librarian at the University of Ottawa Health Science library, a search strategy was developed to answer the search question: "Is there a correlation between depressive symptoms and risky sexual behaviours in injection drug users"? The three major concepts included in the literature search were depressive symptoms, risky sexual behaviours, and injection drug use. The three major concepts were then expanded into possible MESH (medical subject heading) terms.

The concept of depressive symptoms was expanded to include depression, melancholia, depressive disorder, and dysthymic disorder. The concept of risky sexual behaviours was expanded to include MESH terms, sexual behavior, sexual partners, risk-taking, safe sex, unsafe sex, and sex workers. The concept of injection drug user was expanded to include MESH terms, substance abuse, intravenous, administration intravenous, drug addiction, drug abusers, and drug users.

The search terms, as well as the search question above, were used to retrieve literature from the Medline, Embase, and PsychINFO databases. This search strategy returned 31 articles from the Medline database, 186 articles from the Embase database, and 21 articles from the PsychINFO database.

The abstracts for each of the 238 articles retrieved were reviewed to determine if they were applicable to this research project. Upon review, it was determined that 22 search results were duplicates. An additional 154 results were not relevant. Examples of studies deemed irrelevant include those that focused on other mental disorders (i.e., anxiety, PTSD, or schizophrenia), childhood sexual abuse, HIV treatment interventions, affects of cognitive behavioral therapy, etc.

After removing duplicate and irrelevant search results, 62 full articles were viewed for potential inclusion in the literature review section. Eighteen articles were included in the literature review, seven articles were duplicate results, and 37 articles were deemed irrelevant. Examples of articles that were excluded from the literature review include those that did not look at the association between depressive symptoms and risky sexual behaviours, and those that included only depressive symptoms or only sexual risk interactions.

1.4.2 DEPRESSION AND SEXUAL RISK INTERACTIONS

Studies have found a correlation between depression and higher lifetime prevalence of sexually transmitted infections. This relationship may be mediated by an increase in sexually risky interactions among those who are depressed. [26] There are multiple theories to explain the association between sexual risk interactions and depression or depressive symptoms. Depressive symptoms of hopelessness and helplessness may diminish an individual's drive to engage in protective behaviors, such as practicing safer sex. [8,21,28] Another possibility is that depression may interrupt self-regulating processes, leading to increased risk-taking. [11,21,28] Sexual interactions may also be used as a diversion or relief from a negative mental state. [21]

Globally, there is evidence to support an association between depressive symptoms and sexual risk-taking. [8,10,14] Prospective cohort data from South Africa indicated that depressive

symptoms at baseline predict sexual risk-taking one year later. [8] Data collected upon enrollment into a behavioural intervention study at an STI clinic in St. Petersburg, Russia, revealed an association between depressive symptoms and not using a condom at last sex, as well as, never using a condom in the past three months. [11] Puerto Rican women with severe mental illness, including major depressive disorder, were more likely to have multiple sexual partners, high-risk partners, and trade sex for drugs. [16] A cross-sectional study in China revealed an association between unprotected casual sex and depression, in addition to an increase in risky sexual interactions among drug users compared with non-users. [113] Analysis of a sample of IDU sex-workers in China, recruited through respondent driven sampling, found an association between depression and inconsistent condom use in the past six months. [19]

In North America, the association between depressive symptoms and sexual risk interactions has also been observed. A longitudinal study of inner-city drug users reported a possible causal relationship between high depressive symptoms and having sex with multiple partners, and high-risk partners. [12] A cross-sectional study of Seattle based MSM IDU reported that increased depressive symptoms was associated with having 3 or more sex partners in the past 6 months. [13] Texas based IDU exhibited higher sexual risk-taking (more sexual partners, unprotected sex, high-risk partners, and sex trading) when they also reported higher levels of psychological dysfunction (a composite measure of depression, anxiety, and hostility). Further analysis showed that correlation between each risk measure and the individual measures of psychological dysfunction (i.e. depression alone) were significant. [18] An analysis of IDU in multiple US cities found that depression was associated with unprotected vaginal/anal sex with HIV negative or unknown status partners, as well as negative perceptions of condom use among HIV+ women. [20] A study of New York IDU with a history of opioid dependence, recruited after being discharged from a treatment program, reported an association between depression and a Risk Assessment Battery sex risk sub-scale that included items such as number of sexual partners, condom use, and number of times sex was exchanged for drugs. [28] Analysis of data from substance

dependent individuals in Jackson, Mississippi associated major depressive disorder with greater numbers of commercial sex partners over the past year, as well as greater numbers of casual sex partners. [29]

Despite the amount of evidence supporting the association between depressive symptoms and risky sexual interactions there are also studies that reported contradictory evidence. Analysis of data from a multi-sight US study of opioid-dependent treatment-seeking adults, who required medical treatment for opioid withdrawal, did not find a significant association between depression and sexual risk. [14] Additionally, analysis of IDU recruited from drug treatment centers in the UK found a minimal decrease in the likelihood of engaging in sexual risks with regular and casual partners for those who were depressed as treatment continued. [22] Among HIV positive women, recruited from a drug treatment center at a hospital in New York, depression was associated with fewer occasions of unprotected sex. However, the authors note that the women who were more depressed were more likely to have been abstinent at the beginning of the study and that 83% of them reported unprotected sex at some point during the study period. [23] Analysis of female IDU recruited from methadone clinics in New York found that depression was associated with changes in their sexual behaviour over the previous six months and reduced their chances of getting AIDS. Changes included maintaining a regular partner, getting to know his or her partners before having sex, and using a condom more frequently. This study does not quantify the women's overall level of sexual risk after changes were made. [25] A study of gay and bisexual men recruited from a drug abuse treatment center in Los Angeles reported that they did not find a significant association between depressive diagnoses and higher rates of high-risk sexual behaviours. [26]

Treatment-seeking individuals differ from those who are recruited from community based settings or those who are not treatment seeking. All of the studies that reported contradictory evidence involved populations that were treatment seeking. Shoptaw, et al.

explicitly recommended that their results might only be comparable to other similar treatment-seeking populations. [26]

Treatment seeking individuals, or clinically sampled individuals, may have a higher prevalence of comorbid psychiatric disorders than would ordinarily be found in a probability sampled population. [14,26] Treatment seeking individuals might be less impulsive than non-treatment seeking IDU, thus engaging in less impulsive sexual interactions. [14]

It is also possible that the treatment seeking populations are more homogenous than the community populations, making it more difficult to tease out individual effects, especially when sample size is small. Schiling, et al., suggest that their reported odds ratios may have been affected by the number of subjects analyzed in relation to number of variables. [25]

A possible explanation of the contradictory results reported by some studies is that persons studied in the treatment-seeking settings have more severe depression than the participants in the community setting. Research suggests that there may be a 'U-shaped' relationship between depression and sexual risk. If depression is too severe it can interrupt sexual functioning as well as interest in sex, which leads to less risk interactions. [11,14] Women with higher depression scores were found to engage in less sexual activity in general, not just less risky sexual interactions. [23] Another theory is that depressive mood could be associated with sexual partner loss, decreasing the opportunity to engage in risk taking behaviors. [23]

1.5 SOCIAL SUPPORT AND SEXUAL RISK INTERACTIONS

To fully understand the relationship between depression and sexual risk interactions, possible moderators must be explored. One such moderating factor is social support. The effect of social support on the relationship between depression and sexual risk may go beyond the simple presence or absence of social support. The type of social support (if the

support is positive or negative) likely plays a roll. [17,24] However, data on this subject are limited, and previous research has typically addressed the relationship between social support and risk behaviours or depression but rarely both.

The members within a social network tend to be highly similar. Drug users typically have many other drug users in their networks. [27] Depressed, drug-using women have been shown to be more likely to have depressed partners. [24] Women who report sexually risky behaviours typically have friends who report the same behaviours. [24] These network similarities may be important because peers force conformity to social norms, model risky behaviours, or change risk perception. [13,17,27] Past research indicates that women attribute their own substance abuse and the substance abuse of their partners to the influence of their peers. [16] Having more friends who inject drugs or being in a partnership where both parties are IDU has been shown to increase risk-taking behaviours. [17] Another study found that negative peer norms about condom use were strongly associated with less consistent condom use. Negative peer norms about condom use were strongly associated with injection drug use. [30]

There is some evidence that supports the association between social support and sexual risk interactions. Previous research found that members of a drug-using network who were depressed were more likely engage in sexually risky behaviours**.** **[13]** Conversely, in a Chinese study, optimism and positive social support were associated with higher rates of condom use during sex work. **[19]** The introduction of a stable sexual partner acts as positive support to reduce risk-taking behaviours. **[12,24]**

Having very similar network members may imply that those network members cannot provide necessary social support. If women and their partners are both depressed, the women are unlikely to receive psychological support or assistance with risk reduction. **[24]** However, introducing couple-based or social network intervention strategies may be effective. Previous research in Kazakhstan and the United States has shown that couple-

based interventions effectively reduced sexual risk-taking behaviours within the partnership. [17]

The supposition that can be made from these studies is that there could be a moderating effect of social support on the relationship between depression and sexual risk interactions. The presence of positive social support could lessen the association between depression and sexual risk interactions. Better understanding of the moderating effect of social support could aid in the development of targeted interventions.

1.6 SOCIAL NETWORK ANALYSIS

Social network analysis aims to understand who is linked with whom and how are they connected. [40] Social networks form naturally and can encompass a variety of interdependencies. Social networks are a way of thinking about social systems, focusing on the actors (or nodes) of the system and the relationships between actors within the system as well as the attributes of each node. [41] When analyzing social network data, relational data and attribute data are combined. Relational data reveals the ties and connections between actors. Relational data cannot be reduced to the properties of individual agents themselves. Attribute data (the actor's opinions, qualities, or behaviours) is related to the actor directly. Information about the income, education, and ethnicity of two people are examples of attribute data, whereas knowing that those two people are sex partners, friends, or family are examples of relational data. [42]

A network is the connected web of nodes and the ties that interlink them. For example, node A knows node B, node B knows node C; nodes A and C share a common link. [41] Within a network there are components that are subgroups of the network. There is a path from each node to each other node within a given component, and there are no isolated nodes. [40] Social network analysis applies mathematical techniques to network data to describe

attributes about the network. Results can be used for applied (acted upon directly) or basic (used to inform academia, or to understand the dependent variable) purposes. [41]

Instead of analyzing the larger social network as a whole, one can focus on the network of a focal person instead. This is known as an ego network. Every actor in a network can be an ego and his or her ego network can be studied. An ego network includes the ego (focal person) and his or her alters (known contacts), as well as the ties between the ego's alters. [40,41]

1.7 POTENTIAL UNIQUE SCIENTIFIC CONTRIBUTION AND SCOPE

There is limited information available on high-risk sexual behavior within vulnerable and hard to reach populations. The present analysis adds additional information to the literature, specifically related to Canadian populations – a research area that has been understudied. The present analysis also benefits from the use of respondent driven sampling, reaching marginalized peoples who may not have been reached using traditional sampling methods. These populations have the highest rates of sexually transmitted diseases and the highest burden of disease. This research aims to improve the understanding of high-risk sexual partnerships and their contexts, with the ultimate goal being to build targeted public health policies and interventions.

1.8 OBJECTIVES

1. Describe and analyze the association between self-reported depressive symptoms and risky sexual interactions.

2. Describe and analyze social network characteristics to determine if social support moderates the association between self-reported depressive symptoms and risky sexual interactions.

1.9 HYPOTHESIS

It is hypothesized that the higher the number of depressive symptoms that an individual reports, the greater the likelihood that he or she engages in sexually risky behaviors.

It is hypothesized that the presence of social support in an individual's egocentric social network will diminish the association between self-reported depressive symptoms and risky sexual interactions.

2. METHODS

2.1 OVERVIEW

This thesis was a secondary data analysis of a cross-sectional survey of IDU that was conducted in Winnipeg, Manitoba, Canada. The first objective of this analysis was to assess the association between self-reported depressive symptoms and sexual risk interactions using logistic regression. The second objective of this analysis was to assess the role of social support as an effect modifier for the association between self-reported depressive symptoms and sexual-risk interactions. The measure of social support was derived from egocentric social network information.

The Ottawa Health Science Network Research Ethics Board approved the use of this data on December 02 2014 (Appendix 8.1). Furthermore, the Tri-council policy statement on Ethical Conduct for Research Involving humans (2014) states that: "REB review is not required for research that relies exclusively on secondary use of anonymous information, or anonymous

human biological material, so long as the process of data linkage or recording or dissemination of results does not generate identifiable information." [116]

2.2 STUDY RECRUITMENT

Data were previously collected between December 2003 and September 2004. Initial recruitment was conducted through advertisements placed at local community health centers, and meeting places (e.g. Laundromats). Recruitment strategies differed in the latter part of the study.

In the latter part of the study, two enrollment systems were used to recruit participants into the study. Participants recruited from the community were alternatively assigned to the card system or the personal enrollment system. Participants enrolled to the study through either method were asked to recruit future participants using the same enrollment system. The card system, the personal enrollment system and the observational system were used to gather information about the interconnectedness of the population studied to form a sociometric network of IDUs.

2.2.1 THE CARD SYSTEM

After completing the survey, the participant was given a card containing the study nurse's contact information and the participant's unique study code. The participant was asked to give his card to an IDU who he knew well and who was not already a study participant. The new recruit could choose to participate in the study by contacting the study nurse and retaining the original participant's card. The new recruit and the original participant were linked via the participant's unique identification number on the card.

2.2.2 THE PERSONAL ENROLLMENT SYSTEM

After completing the survey, the participant could bring another IDU that he knew well to the study nurse for possible enrollment. The first participant was asked to remember his unique study identifier, and the nurse also tried to remember the individual's identifier from the original interview. The new participant was linked to the primary participant via their study ID.

2.2.3 THE OBSERVATIONAL METHOD

The observational method relied on the study nurse identifying interactions between IDUs based on her recollection of observed relationships or notes from the study. This was not a recruitment method but it was used to increase the completeness of the sociometric network by identifying links within the population that may have otherwise been unrecorded.

2.3 STUDY OVERVIEW

Study participation was anonymous, with the participants known only by an alias and study-specific identification number. The questionnaire was divided into three sections. In section 1, participants provided information about their own demographic and behavioral characteristics. In section 2, participants shared information about their egocentric network. Participants were prompted to provide information about a maximum of 20 people, using initials or acronyms as identifiers, with whom they had had more than casual contact within the past 30 days. Prompts included friends, relatives, or other individuals to whom they felt close, or with whom they had used drugs, had sex, resided, or hung out with. Section 3 asked detailed questions about the first five (maximum) IDU listed in the participant's egocentric network. Questions (e.g. have you ever used a syringe after [person] used it first?) were asked about each IDU identified. Different answers could be

provided for each IDU. The information elicited was used to describe the participant's IDU risk network.

In section 2 and 3, ego network data was collected using a personal-network research design. The first step of personal-network compilation was to ask the participants to generate a list of names of people they knew. The second step was to ask the participant to 'interpret' each name. [41] During the interpretation phase, respondents provided information about their network members, such as the members' demographic information and relation to the ego. The personal-network design was used to gather attribute and relational data about the participant (the ego or the node), and his or her network members (the alters). Ego network analysis was used to construct measures describing the actor's ego network with new actor-level variables. [41]

People were eligible to participate in the study if they self-reported injection drug use in the six months prior to the interview and if they were aged 15 or older. Potential participants made telephone contact with an experienced study nurse who administered the survey. The study nurse also collected blood specimens (used to test for the presences of HIV and HCV). Interviews were conducted in person, at a location chosen by the participant (e.g., his or her residence). All participants who provided written or oral consent received an honorarium of CND $40, regardless of whether or not they completed all parts of the study. The Health Research Ethics Board of the University of Manitoba and the Winnipeg Regional Health Authority Research Review Committee approved the study design. [43,44,45]

2.4 PRIMARY OUTCOME: SEXUAL RISK INTERACTIONS

To quantify and define sexual risk interactions, novel approaches were tested as there is no agreed upon 'gold standard' for measuring this outcome. [59] Previous research has defined the primary sexual risk factors: number of sexual partners, types of partnerships, and condom use. These factors have been identified as predictors of negative health outcomes,

such as acquiring STIs. [60] Three different ways of quantifying sexual risk interactions were used for this analysis: separated risk matrices by partnership (regular partners, casual partners, or client partners), singular sexual risk indicators (number of partners, engagement in exchange sex) and a modified version of the HIV Risk Taking Behavior Scale (HRBS).

2.4.1 HEAPING

Heaping is a data reporting error that can cause bias. Heaping occurs when participants are asked to provide an answer to an open-ended, autobiographical question. [61] Heaping in discrete data occurs when participants prefer to report their responses in sets, usually multiples of 5, 10, or 20, instead of exact numbers. [62] Heaping is known to occur for questions such as age, weight, elapsed time and number of sexual partners. [63,64]

In the case of this study, visual inspection of the data revealed that heaping likely occurred for answers provided for the number of sexual partners. Participants preferred to give answers that ended in 0's and 5's. Methods of correcting for heaping are categorization and smoothing. Smoothing is based on the idea that heaped responses can be 'spread out' to grouped responses. [61,65] To correct for heaping in this study, categorization was used.

2.4.2 SEXUAL RISK INTERACTIONS MATRICES

Three risk matrices were used to create three separate outcome measures that represented sexual risk interactions by partnership type. A separate matrix was created for risk taken with regular partners, casual partners and client partners (Figure 1). A regular partner was defined as someone with whom the participant has a relationship and with whom they are emotionally involved. A casual partner was defined as someone the participant has had sex with once or a few times, but with whom they have no emotional involvement. A client partner was defined as someone who the participant had sex with

and from whom the participant received money, drugs, or anything else in exchange for sex. There was not a distinction made between same-sex and opposite-sex partnerships. The risk matrix was developed by cross tabulating the number of sexual partners of each type that the participant reported in the past six months, against the consistency of condom use they reported for that type of partnership. The number of partners was categorized as 0, 1, 2-5, 6-19 and above 20. Condom use was categorized as never, rarely, sometimes, usually, or always. Sexual risk scores could range from 0 to 1. Responses were dichotomized into 'lower risk' and 'higher risk' groups to create a binary outcome suitable for logistic regression. Lower risk individuals were considered to have a risk matrix score of 0.375 or lower (figure 1).

		Frequency of condom use				
		ALWAYS	USUALLY	SOMETIMES	OCCASIONALLY	NEVER
Number of Partners	0	0	0	0	0	0
	1	0.125	0.250	0.375	0.500	0.625
	2-5	0.250	0.375	0.500	0.625	0.750
	6-19	0.375	0.500	0.625	0.750	0.875
	20 +	0.500	0.625	0.750	0.875	1

Figure 1. Example of sexual risk interactions risk matrices for a specific partnership type.

2.4.3 SINGULAR MEASURES OF SEXUAL RISK INTERACTIONS

Sexual risk interactions were demarcated into two elements: overall number of partners, and engagement in exchange sex. The number of sexual partners that a person reports has previously been shown to be a good indicator of sexual risk, as well was having been a predictor of negative health outcomes. [66,67] Engagement in exchange sex is another factor that is known to contribute to increased risk of STI acquisition. [68]

Two dichotomous variables were created. The number of regular, casual, and client partners were summed into one measure of number of partners. Individuals with more

than two sexual partners in the past six months were considered to be high risk. Individuals who reported selling sex as their main source of income or their secondary source of income, as well as individuals who reported having sex with at least one client partner were included as having engaged in exchange sex.

Although condom use is also associated with sexual risk and STI acquisition, a single condom use variable was not included, because it is possible that the risk associated with inconsistent condom use in one situation compared with another is very different. For example, if both partners were in a monogamous, long-term relationship, the risk of inconsistent condom use is lower compared to the risk associated with inconsistent condom use with client partners.

2.4.4 MODIFIED HIV RISK-TAKING BEHAVIOUR SCALE

The HIV risk-taking behavior scale (HRBS) is a brief 11-item questionnaire that contains two subsections. One section measures needle sharing behaviour, and the other measures sexual behaviour. [69] Previous validation of the HRBS shows that two distinct factors are contained within the one scale, and that they can be separated into two subscales that measure distinctly different things. [14,70] The HRBS asks questions about sexual risk interactions in the past month: how many people, including clients, has the participant had sex with; how often did he or she use condoms with regular, causal, client partners respectively, and how many times has he or she engaged in anal sex. Responses for each question are scored 0 to 5. Number of sexual partners is divided into six categories: ‘none’, ‘one person’, ‘two people’, ‘3-5 people’, ‘6-10 people’, and ‘more than 10 people’. Condom use is divided into six categories: ‘no partner / no penetrative sex’, ‘every time’, ‘often’, ‘sometimes’, ‘rarely’, and ‘never’. A participant’s score on the scale was calculated by summing across scale items. Higher scores indicate higher sexual risk taking.

The foundation of the HRBS was applied to the information available from this survey to create a modified HRBS scale. Participants were asked about their interactions over the past six months. Previous research has validated the HRBS for a lifetime period of recall as well as a weekly, or a monthly period of recall. As the HRBS has been validated for lifetime recall, the modification of a 6-month time frame should not have affected the measure. [116] No information on oral or anal sexual activity was available. Following the same categorization as the HRBS, a summative measure of sexual risk was created.

The modified HRBS scores were dichotomized to allow for analysis using logistic regression. Creating a binary outcome suitable for logistic regression was chosen despite the fact that there was no previously defined dichotomization score that has been validated for case identification using this scale. In spite of this methodological drawback, logistic regression is less limited by assumptions than multiple linear regression.

2.5 PRIMARY EXPOSURE: SELF-REPORTED DEPRESSIVE SYMPTOMS

Depression was measured using an eight-item scale. The depressive symptoms individuals were asked about included: if they had been feeling sad or depressed, thinking of themselves as worthless, felt life was hopeless, unable to concentrate, able to enjoy day-to-day activities, uninterested in ordinary activities, full of energy, or if they felt life was worth living. Each question had four response options: ‘not at all’, ‘no more than usual’, ‘more than usual’ and ‘much more than usual’.

The items included in the eight-item scale were similar to the items included in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) criteria for major depressive episodes. The DSM-5 criteria for a major depressive episode include the presence of five or more of the following symptoms in a specific time frame: depressed mood, diminished interest in pleasure, weight loss or weight gain, insomnia or hypersomnia, feelings of worthlessness or guilt, diminished ability to think or concentrate, indecisiveness, recurrent thoughts of death or suicidal ideation. Depressed mood or loss of

interest in pleasure must be present. [106] A clinician directed interview is the gold standard for diagnosing major depression. [97]

The items on the depression scale included in this survey were taken from a 140-item general health questionnaire that was developed as a tool for community surveys to identify potential cases of mental illness. The survey makes the assumption that within a given population there are a proportion of individuals who would be clinically identified as having a psychiatric disturbance. The items were designed to measure change in disturbances, identifying severity of cases instead of lifelong possession of traits. Respondents were asked to compare the extent to which they experience each item in the present compared with the extent to which they usually experience it. Items were chosen that were thought to discriminate well between respondents who are potential cases versus those who were not potential cases, as well as to discriminate between those with different degrees of severity of illness.

Each item on the depression scale had an even number of response categories to avoid errors of 'central tendency' (respondents who consistently choose the middle response option when one is available). When respondents consistently choose the 'central' response they provide less information than if they had choose an outside response. To avoid errors of 'central tendency', the questionnaire was constructed to provide four response options for each question.

For the General Health Questionnaire, developers suggested that items should be scored as 0, 0, 1, 1 (the GHQ score) instead of 1, 2, 3, 4 (Likert score). The GHQ scoring method was suggested as beneficial by eliminating effects from users who had middle versus end response tendencies. This method was also suggested to identify pathological deviations from the normal signal possession. Developers did note that there is a potential loss of information associated with this scoring method. When comparing the GHQ scoring method versus the Likert method, developers found that there was less than a one percent

increase in misclassification between 'normals' and 'ills' when using the GHQ scoring method compared with the Likert method. The GHQ method is appropriate for case identification whereas the Likert method is better suited for assessment of severity of illness. After further review, the developers concluded that Likert scoring was inferior for case identification. [57] GHQ scoring was used for the analysis of self-reported depression symptoms in this population.

2.5.1 VARIABLE CREATION

A factor analysis was completed to assess the validity of this depression scale. An unrotated principle component factor analysis found one factor that accounted for 56.6% of the total variance. The factor loadings ranged from 0.61 to 0.83. The scale had a Cronbach's alpha of 0.81. These results were similar to the results previously published by Mandell et al (1999). They reported that there was a single factor solution accounting for 44% of total variance, with factor loadings from 0.62 to 0.73, and a Cronbach's alpha of 0.82. [58] Results from both analyses suggest that this depression scale is reasonably reliable.

In the study conducted by Mandell et al., a depression score was computed by summing each of the positive responses across the eight items on the scale. The scores computed from the depression scale were then dichotomized on the 50^{th} percentile to establish categories of higher and lower depressive symptoms. [58] In this study, the same method was used. A depressive symptoms score was computed by summing each of the positive responses across the either items on the scale. The depression variable was included as a continuous variable to minimize information loss from dichotomization.

Person-mean imputation was used to replace missing values for depression scale items. Before person-mean imputation was used, it was assessed that less than 5% of data was missing for each item of this depression scale. Person-mean imputation replaced missing values for a single scale item by estimating the likelihood of an individual providing a positive response for any item on that scale. For example, if an individual had a missing

value for one or more of the depression questions, the missing value was imputed by taking the number of positive responses he or she provided, divided by the number of questions he or she answered (e.g. three positive answers, out of seven questions answered, then the missing value becomes 0.43).

The person-mean method of imputing values for missing data, as described above, is a very common method. The method has some drawbacks. It can introduce bias into the data, by reducing variability. A reduction in variability can occur even when the missing values are missing completely at random. Bias associated with this form of imputation increases as the percentage of missing data increases. [50,51] Despite potential issues with person-mean imputation, it is computationally simple and continues to be use in academic research. [52]

2.6 EFFECT MODIFIER: SOCIAL SUPPORT

Study data for a specific, pre-defined measure of social support were not collected. Two measures of social support were used for this analysis: a three-item scale and an expanded five-item scale.

The measure of social support was derived by creating an actor level variable from the participant's ego network information. Social network data was used to measure social support because it was thought to represent and validate the social support available to the participant at that time. Participants were asked to think of the people closest to them. They were then asked questions about these people, who may represent a part of their social support network.

Using the personal-network research design allowed for the collection of information needed to describe the context of social support available to each participant. Ego network data provided a direct measure of social support that could be validated.

2.6.1 THREE-ITEM SOCIAL SUPPORT SCALE

The three-item social support scale has alternatively been called a closeness scale, and it has previously been used for research with similar populations. [74] This closeness scale is a modification of the Arizona Social Support Interview Schedule. [75]

The three scale items used were: 'would you talk to [person] about things that are very personal and private', 'if you needed to borrow $25, would [person] lend or give it to you if they had the money', and 'would you ask [person] for advice or help about health problems like infections, AIDS, or hepatitis C'. The first question is a measure of emotional support. The second question is a measure of material support, and the third is a measure of informational support.

The three scale items selected show good inter-item reliability (Cronbach's alpha 0.81). The closeness scale was included as a continuous variable, as it has been previously used in research. [74] Uneven ego network size was factored into the scoring of the closeness scale.

2.6.2 FIVE-ITEM SOCIAL SUPPORT SCALE

The five-item scale included additional variables that were believed to be measures of social support. The additional scale items were frequency of contact between egos and alters, and closeness of ego with alters. These were combined with the three questions included in the three-item closeness scale: ability for ego to talk with alters about personal and private matters, willingness to borrow $25, and ability to speak about health problems.

To facilitate scale creation, contact frequency and closeness were recoded from categorical variables to dichotomous variables. The variables were dichotomized because the three items from the closeness scale are dichotomous. When all variables in the scale have the same outcomes, scoring the scale becomes easier.

Lower contact frequency was considered to be less than once per week; higher contact frequency was considered to be once per week or more. Participants who said they were 'somewhat close' or 'very close' were considered to be close with an alter, and participants who reported being 'distant' or 'very distant' were not considered to be close.

Social support, measured by the five-item scale, was calculated as a percentage. This method was used because participants had unequal network sizes. Each participant could have a maximum of five ego network members, but not all participants listed five members. A summative scale could not be included, because the maximum of 25 points (five positive scale responses, across five network members) would not apply to each participant.

Summing the number of positive scale responses and dividing by the number of possible positive responses for their network calculated the percent of social support. For example, a participant who listed three alters could have a possible 15 points (5 positive responses on social support scale items, from each of the three ego network members). If they had 6 positive responses across their members, they obtained a social support score of 0.4%.

The five-item social support scale had a Cronbach's alpha of 0.72. The social support variable derived from the five-item scale was inspected for distribution and skew. The distribution of answers approximated a normal distribution. For analysis, the percentage of social support was dichotomized on the 50^{th} percentile to create a binary variable.

2.7 ANALYSIS COVARIATES

2.7.1 INDIVIDUAL LEVEL VARIABLES

Individual level measures were taken from the first section of the survey administered to participants in this survey. The individual level measures are meant to characterize demographic and behavioral characteristics of study participants. Individual level measures

used for this analysis include age, sex, education, ethnicity, income source, housing stability, drug injected, injection frequency, and level of dependency.

Previous research has indicated that sex, age, ethnicity, and level of education may be associated with higher levels of sexual risk taking in vulnerable populations. [101] Research also indicates that family stability, and use of illicit drugs may be associated with inconsistent barrier use, and increased number of sexual partners. [111]

Age was included as a categorical variable, divided into four categories: '15-24', '25-34', '35-44' and '45+' years of age. There is not a previously defined set of age categories that should be used in research; however, ten-year age ranges and mid-decade cut-points are typically used in peer-reviewed literature.

Sex was included as a three-level variable (male, female, and transgendered male to female). Relatively few participants identified themselves as male to female transgendered persons (n=6). After initial investigation, it was decided that these respondents could not be incorporated into either the female or the male sex category as the transgendered respondents had a unique response pattern. Due to the small sample size, transgendered persons were removed from the analysis. [53]

Education was categorized as 'less than grade 12', 'high school graduate', and 'post-secondary education or trade school'. Participants who indicated that they were currently in grade school were included with those who reported having less than grade 12 education.

Ethnicity was categorized as 'Caucasian', 'Metis', 'First Nations', and 'other'. The 'other' category included participants who self-identified as Latin American, Middle Eastern, Black-Caribbean, or Black-other, as well as three individuals who were unsure and three

individuals who refused to answer the question. Due to the small sample size (n=11), participants who were part of the 'other' category were removed from the analysis. [53]

A participant's main source of income was divided into four categories: regular work, welfare, donations, and illegal activities (such as dealing drugs).

A variable for type of residence was created to represent housing stability. The variable was generated from the question: "What type of residence do you currently live in?" Housing stability was broken down into 'own residence', 'family or friend's house', 'rooming house / recovery center', 'hostel or hotel', and 'no shelter'. Categories were considered to be in descending order of stability, i.e. 'own residence' being the most stable category.

The drug that they reported injecting most frequently represented the injection drug used by each individual. Missing responses for participants who did not answer this question (n=2) were substituted with the drug most commonly selected by the overall study population for the most frequently injected drug. Injection drug used was a three-level variable: stimulants, opioids and combinations. Categorization was based on the National Institute of Drug Abuse classification system. [54] Stimulants included cocaine, amphetamines, and methamphetamines. Opioids included heroin, methadone and prescription pain medications that are opioid derivatives. Combinations included drug pairings that are usually considered 'speedballs', such as Talwin and Ritalin, as well as heroin and cocaine.

The most frequently injected drug was used to represent injection drug use. To account for the fact that some participants might inject more than one drug, a poly drug use variable was created. The poly drug use variable summed all of the drugs that participants identified using in the past six months.

Frequency of injection drug use was categorized as 'less than once per month to not every week', 'once or twice a week to greater than three times per week but not daily', and 'everyday'.

A dichotomous variable for binging in the past six months was included. A binge was defined in the study questionnaire as a "period of time when [the participant] fixed more often than [his] usual drug use for a short period of time and then [he] went cold or back to usual use".

Five questions were included in the survey to measure drug dependency. Together they form the Severity of Dependence Scale (SDS). [55] This measure was developed as an easily administered scale that quantifies the psychological component of dependence experienced by users of different types of drugs. The scale asks questions about impaired control over drug taking, preoccupation with drug taking, and anxieties about drug use. [56] The scale has been tested in different countries, with different types of drug users. Previous analysis shows that the scale has good test, and re-test reliability. [55] The scale creates a single cumulative score that ranges from 0 to 15.

2.7.2 SOCIAL NETWORK MEASURES

Attribute data are data that have qualitative characteristics (e.g. a person's age). In this study, attribute data are used to identify demographic and behavioral characteristics of ego network members. Attribute data used for this analysis included: age, sex, ethnicity, income source, and drug most frequently injected. The same strategies for categorization that were used in objective one (refer to section 3.1.1) were used in objective two.

Age was divided into four categories: '15-24', '25-34', '35-44' and '45+' years of age. Sex was included as a three-level variable (male, female, and transgendered). Ethnicity was categorized as 'Caucasian', 'Metis', 'First Nations', and 'other'. Main source of income was

divided into four categories: ‘regular work’, ‘welfare’, ‘donations’, and ‘illegal activities’. Injection drug used was a three-level variable: ‘stimulants’, ‘opioids’ and ‘combinations’.

Transgendered persons and persons of ‘other’ ethnicities were not removed from the ego network data for analysis, as these variables were used only for descriptive purposes, negating the effect of small sample size on statistical calculations.

Relational data was used to characterize the relationships between egos and alters.
The relational data used in this analysis included the capacity in which the participant knew each network member, and whether or not each network member was a sexual partner.

Relational capacities included ‘friends’, ‘family members’, ‘significant others’ (past or present), and ‘acquaintances’, such as drug dealers. Study participants indicated whether any ego network members were sexual partners.

2.8 DATA CLEANING

Survey data and social network data were imported into STATA 13, and data cleaning was completed. [46] Data cleaning involved the examination of variable distributions, univariate descriptive statistics, missing data, data entry errors, and outliers. Also, data heterogeneity, homogeneity and skew were evaluated. Data transformations were assessed and used to address skewed distributions where appropriate.

If a categorical variable included ‘other’ as a response option, the ‘other’ text responses were examined to determine if they could be included in one of the predefined categorical responses available for that variable. This process was completed for highest level of education completed, primary source of income, secondary sources of income, ethnicity, current residence, and most frequently injected drug.

Variables that were included in the analysis had a high level of completeness; none had greater than 10% missing data. There was no cut-off for minimum amount of a missing data that warranted further investigation, but it was felt that less than 10% did not merit an examination of the pattern of missing values. [47] Missing values were handled using case-wise deletion, and imputation. Missing values, except depression scale items (addressed separately), were replaced using mean/mode substitutions to eliminate missing observations.

The mean/mode substitution method was chosen because mean substitutions are considered to be a conservative way to handle data and they do not affect the overall distribution for a selected variable. Mean substitution can reduce variability and this reduction in variance can lead to reduced correlation with other variables. [48] For the purpose of this analysis, the amount of missing data was limited enough that any effect on correlation was unlikely to affect the likelihood of a type II error. It is recognized that using these methods might have statistical implications such as diminished statistical power, creation of a biased sample, or a biased analysis. [49]

The survey data for three participants was removed from the dataset (unique ID 144, 147 & 351). In these three cases, greater than 90% of their demographic and behavioral (section 1) questionnaire responses were missing. It was decided to remove this data from the analysis because replacing such a large percentage of missing information with mean/mode substitutions would be unlikely to reflect a meaningful contribution to the analysis.

3. STATISTICAL ANALYSIS

3.1 OBJECTIVE ONE

Descriptive statistics were used to describe the baseline distributions of demographic, and drug use characteristics as well as the distribution of depression and sexual risk interactions in the sample. To further understand the distribution of data, contingency tables were constructed for the explanatory variables stratified by the outcome variable.

The impact of sampling methodology was considered before the statistical analysis began. Inherent to respondent driven sampling is the interconnectedness of observations. To account for clustering in the data, general estimating equation (GEE) models may be used. However, previous research indicates that there is not a significant difference in regression model estimates versus GEE model estimates. [4] Given the previous findings, GEE was not used.

Before beginning logistic regression model building, independent variables were assessed for evidence of multicollinearity, and the presence of outliers.

Logistic regression models were fit to examine the relationship between self-reported depressive symptoms and different measures of sexual-risk interactions.

A saturated model was fit to allow for the identification of influential cases. This was accomplished by plotting the residuals against the predicted probabilities. A Hosmer-Lemeshow goodness of fit statistic was also calculated to assess the overall model. A Lowes graph was produced to assess whether the log odds of the outcome were linearly associated with the covariates. Log likelihood-ratio tests were also used to select covariates for model inclusion. Restricted and unrestricted models were compared. Stepwise model selection was not used because of previously identified statistical issues associated with logistic regression. [71-73] Bayes Information Criterion (BIC) was also used to assess the goodness of the model fit.

3.2 OBJECTIVE TWO

Data was uploaded to UCINET 6 to create the social network and define the components. [76] UCINET is a social network analysis program designed to calculate basic network measures for small networks. Component information was extracted from UCINET and merged with study data from objective one in STATA 13.

Frequency distributions were used to describe characteristics of the study sample within the context of the egocentric network. T-tests were used to assess the significance of differences between the level of sexual risk interactions and the network characteristics.

Effect modification was assessed to conclude if a third variable (social support) affected the association between self-reported depressive symptoms and sexual risk interactions. An interaction term of depression and social support was included in the model. Stratum specific estimates of the association between self-reported depressive symptoms and sexual risk interactions were also calculated.

Given that the social support measure has not been previously validated, a sensitivity analysis was conducted to determine if using different thresholds for dichotomization would affect this variable's role as a potential effect modifier. Predetermined alternative thresholds included dichotomizing on the 30^{th}, 40^{th}, 60^{th}, and 70^{th} percentiles. This was undertaken to help quantify the uncertainty in the measure.

4. RESULTS: OBJECTIVE ONE

4.1 CHARACTERISTICS OF THE STUDY POPULATION

There were 382 study individuals included in the analysis. Summary distributions of demographic variables are found in Table 1.

The mean depressive symptoms score was 3.22, the standard deviation was 2.48 and the 95% confidence intervals were 2.97 – 3.47. Uncleaned depressive symptoms data can be found in Appendix 8.2. This data was included to provide information about the distribution of depressive symptoms in the study population, the data includes individuals who were excluded from the final analysis and person-mean imputation has not been completed.

The distribution of males and females were similar in the study population, with a slightly higher percentage of males (54.5%).

The average participant age was 34.3 years. Approximately one-fifth (22.5%) of the study population was between the age of 15 and 24 years. One-quarter (25.1%) were 25 – 34 years of age, 40.1% were 35 – 44 years of age, and 12.0% were aged 45 and older. Within the study population, 33.3% of participants were Caucasian; 17.8% identified as Metis, and 48.9% identified as treaty or non-treaty First Nations.

The majority of the population (72.0%) had an education level less than grade 12 (at the time of the study). Almost half (47.1%) of the study population reported living in their own residence. Other types of shelter included a family or friend's house (23.8%), a rooming house or recovery center (9.4%), a hostel or a hotel (12.3%), or no shelter, e.g. such as an automobile (7.3%). Income sources reported by the study population included regular work (21.9%), welfare (60.2%), donations (9.9%), or illegal activity such as engaging in exchange sex (7.9%).

Table 1 Distribution of demographic factors within the overall study population, as well as among those with more self-reported depressive symptoms and those with more self-reported depressive symptoms and those with higher reported sexual risk interactions (n=382).

Variable	Category	Overall			Higher Sexual Risk Interactions			Depressive Symptoms	
		Count (n)	Proportion (%)	95% CI	Count (n)	Proportion (%)	95% CI	Mean	95% CI
Age	15 – 24	86	22.5	(18.5, 26.9)	57	19.5	(15.4, 24.5)	3.14	(2.61, 3.66)
	25 – 34	96	25.1	(21.0, 29.7)	77	26.4	(21.7, 31.9)	3.39	(2.89, 3.88)
	35 – 44	154	40.3	(35.4, 45.3)	119	40.9	(35.4, 46.7)	3.25	(2.80, 3.68)
	44 +	46	12.0	(9.1, 15.7)	38	13.1	(9.6, 17.4)	3.05	(2.36, 3.74)

Sex	Male	208	54.5	(49.4, 59.4)	147	50.5	(44.8, 56.3)	2.93	(2.06, 3.27)
	Female	174	45.5	(40.5, 50.5)	144	49.4	(43.7, 55.2)	3.56	(3.19, 3.93)
Ethnicity	Caucasian	127	33.2	(28.7, 38.1)	97	33.3	(28.1, 38.9)	3.39	(2.92, 3.85)
	Metis	68	17.8	(14.2, 21.9)	45	15.5	(11.7, 20.1)	3.46	(2.85, 4.06)
	Native Canadian	187	48.9	(43.9, 53.9)	149	51.2	(45.4, 56.9)	3.01	(2.67, 3.35)
Education	Less than Gr. 12	286	74.8	(70.3, 78.9)	220	75.6	(70.3, 80.2)	3.23	(2.95, 3.52)
	Gr. 12 Graduate	41	10.7	(7.9, 14.2)	30	10.3	(7.2, 14.3)	2.89	(2.08, 3.70)
	Post Grad. Or Trade School	55	14.4	(11.2, 18.3)	41	14.1	(10.5, 18.6)	3.36	(2.66, 4.07)
Housing	Own Residence	180	47.1	(42.1, 52.2)	149	51.2	(45.4, 56.9)	3.50	(3.12, 3.88)
	Family or Friend's House	91	23.8	(19.7, 28.3)	60	20.6	(16.3, 25.6)	3.02	(2.55, 3.47)
	Rooming / Recovery House	36	9.4	(6.8, 12.8)	26	8.9	(6.1, 12.8)	3.26	(2.44, 4.09)
	Hostel of Hotel	47	12.3	(9.4, 16.0)	35	12.0	(8.7, 16.3)	2.98	(2.24, 3.73)
	No Shelter	28	7.3	5.1, 10.4)		7.2	(4.7, 10.8)	2.42	(1.46, 3.38)
Income	Regular Work	84	21.9	(18.1, 26.4)	54	18.5	(14.4, 23.4)	2.46	(1.96, 3.02)
	Welfare	230	60.2	(5.5, 6.5)	177	60.8	(55.1, 66.3)	3.61	(3.29, 3.92)
	Donations	38	9.9	(7.3, 13.3)	32	10.9	(7.8, 15.1)	2.74	(1.87, 3.60)
	Illegal Activity	30	7.9	(5.5, 11.0)	28	9.6	(6.7, 13.6)	2.89	(2.10, 3.68)

Summary distributions of drug use variables are found in Table 2. Most frequently, participants reported injecting stimulants (49.5%). A quarter of participants (27.5%) used opioid derivatives and a quarter (23.0%) used combinations of drugs.

Most study participants reported injecting drugs between less than once per month to less than once per week (54.7%). Approximately 30 percent (29.3%) reported injecting between more than once per week to more than three times per week, but not daily, and 15.9% reported injecting drugs daily.

More than half (59.7%) of participants reported going on a binge in the past six months. Less than half (43.9%) of the study population reported using only one injection drug. Nearly a fifth (36.9%) reported using two to three drugs; 11.5% reported using four to five drugs, and 7.6% reported using more than six injection drugs. The average score for the drug dependency scale was 5.42.

Table 2 Distribution of injection drug use within the overall study population, as well as among those with more self-reported depressive symptoms and those with higher reported sexual risk interactions (n=382).

Variable	Category	Overall			Higher Sexual Risk Interactions			Depressive Symptoms	
		Count (n)	Proportion (%)	95% CI	Count (n)	Proportion (%)	95% CI	Mean	95% CI
Injection Drug Used	Stimulants	188	49.4	(44.4, 54.5)	150	51.5	(45.8, 57.3)	3.41	(3.05, 3.76)
	Heroin & Opioids	105	27.5	(23.2, 32.2)	79	27.2	(22.3, 32.5)	2.90	(2.45, 3.36)
	Combinations	88	23.0	(19.0, 27.5)	62	21.3	(16.9, 26.4)	3.19	(2.63, 3.74)
Frequency Of Injection Drug Use	>1 per month-Not Weekly	209	54.7	(49.6, 59.6)	156	53.6	(47.8, 59.3)	3.16	(2.82, 3.50)
	>1 per week-Not Daily	112	29.3	(24.9, 34.1)	92	31.6	(26.5, 37.2)	3.39	(2.96, 3.85)
	Every day	61	15.9	(12.6, 20.0)	43	14.8	(11.1, 19.4)	3.09	(2.40, 3.79)
Binges	Yes	154	40.3	(35.5, 45.3)	120	41.2	(35.7, 47.0)	3.00	(2.62, 3.93)
	No	228	59.7	(54.6, 64.5)	171	58.8	(52.9, 64.3)	3.36	(3.03, 3.69)
Poly Drug (#) Use	1	168	43.9	(39.1, 49.0)	123	42.3	(36.7, 48.1)	3.16	(2.79, 3.53)
	2-3	141	36.9	(32.2, 41.8)	109	37.5	(32.0, 43.2)	3.15	(2.73, 3.56)
	4-5	44	11.5	(8.6, 15.1)	38	13.1	(9.6, 17.4)	3.58	(2.81, 4.36)
	6 +	29	7.6	(5.3, 10.7)	21	7.2	(4.7, 10.8)	3.33	(2.27, 4.38)
Variable	**Range**	**Mean**		**95% CI**	**Mean**		**95% CI**		
Drug Dependency Scale	0 – 15		**5.42**	**(5.07, 5.77)**		5.57	(5.16, 5.97)		

The characteristics of the population sampled in 2003-2004 were similar to the characteristics of subsequently studied injection drug using population in Winnipeg, Canada. The population sampled in 2009 reported similar distributions of demographic variables and drug use variables. For example, the study reported an approximately equal gender ratio (52.2% male), a majority of First Canadians participants (77.0%), a higher percentage of persons on welfare (67.3%), most participants not having graduated grade 12 (73.5%) and many of participants in their own residence (38.1%). Drug use variables also had similar distributions, however, variable creation and categorization differed between the studies. The similar characteristics of the populations suggest that the 2003-2004 data continues to provide an appropriate representation of an injection drug using population in Winnipeg, Canada. [115]

4.2 ASSOCIATION BETWEEN DEPRESSIVE SYMPTOMS AND SEXUAL RISK INTERACTIONS

Univariate analyses did not show a significant association between regular, casual or client sexual risk interactions, as defined by the risk matrices, and self-reported depressive symptoms (Table 3).

Table 3 The odds ratios and 95% confidence intervals from an unadjusted logistic regression model of the association between sexual risk interactions with regular partners, casual partners, or client partners and self-reported depressive symptoms (n=382).

Variable	Regular Partners		Casual Partners		Client Partners	
	OR	95% CI	OR	95% CI	OR	95% CI
Depressive Symptoms	1.01	(0.91, 1.10)	0.91	(0.80, 1.0)	1.03	(0.84, 1.2)

Univariate analyses did not show a significant association between singular measures of risky sexual interactions (i.e., number of sexual partners and engaging in exchange sex) and self-reported depressive symptoms (Table 4).

Table 4 The odds ratios and 95% confidence intervals from an unadjusted logistic regression model of the association between sexual risk interactions represented by single behaviors (number of partners, or engaging in exchange sex) and self-reported depressive symptoms (n=382).

	Number of Partners		Exchange Sex	
	OR	95% CI	OR	95% CI
Depressive Symptoms	0.95	(0.88, 1.04)	1.05	(0.96, 1.1)

Univariate analyses showed a significant relationship between sexual risk interactions, as defined by the modified HRBS scale, and self-reported depressive symptoms, suggesting that further analysis should be conducted.

An unadjusted logistic regression model resulted in a significant relationship between the modified HRBS score and self-reported depressive symptoms. The unadjusted model suggested an increase in the odds (OR 1.15) of individuals engaging in high-risk sexual interactions if they have higher self-reported depressive symptoms (table 5).

The adjusted (saturated) model suggested an increase in the odds (OR 1.13) of individuals engaging in high-risk sexual interactions if they have higher self-reported depressive symptoms (table 5).

Using the Log Likelihood method for model selection as well as the BIC method, age, sex and income were included as significant covariates in the model. The results of the adjusted model were highly similar to the unadjusted model. The adjusted model suggests an increase in the odds (OR 1.14) of individuals engaging in high-risk sexual interactions if they have higher self-reported depressive symptoms (table 5).

Table 5 The odds ratios and 95% confidence intervals from an unadjusted and adjusted logistic regression model of the association between sexual risk interactions represented by HRBS score and depressive symptoms (n=382).

	HRBS Score (unadjusted)		HRBS Score (adjusted) *		HRBS Score (adjusted) **	
	OR	**95% CI**	**OR**	**95% CI**	**OR**	**95% CI**
Depressive Symptoms	1.15	(1.04, 1.27)	1.13	(1.01, 1.26)	1.14	(1.02, 1.27)

* Model controlled for age, sex, and income, ethnicity, housing, and injection drug used
** Model controlled for age, sex, and income

5. RESULT: OBJECTIVE TWO

5.1 POPULATION CHARACTERISTICS

There were 1558 egos and alters analyzed. The average age was 33.6 years across the egocentric networks. The average difference in age within each ego network (the age of oldest network member minus the age of the youngest network members) was 9.5 years.

There was an approximately equal sex distribution: 56.7% of network members were male; 43.1% of members were female, and less than 1% of members were transgendered.

Network members were most likely to be First Nations (48.3%), or Caucasian (36.3%); fewer members were Metis (11.9%), and 3.5% were of an 'other' ethnicity.

The most frequently reported main source of income was welfare (53%). Other sources of income included regular work (19.4%), donations (6.6%) and illegal activities (20.6%).

Nearly half of the network members reported using stimulants most frequently when they are injecting dugs (41.8%). The remainder reported injecting opioids (23.7%), or combinations of injection drugs (28.3%).

Egos were most likely to report their friends as contacts (61.7%). Network members were also reported to be family (14.1%), significant others, past or present (15.5%), or acquaintances (8.6%). Nearly one-fifth (18.2%) of the alters in the network were sex partners of the ego (Table 6).

Table 6 Distribution of demographic factors within the social network (n=1558).

		Overall		Lower Sexual Risk Interactions		Higher Sexual Risk Interactions	
		Mean	**95% CI**	**Mean**	**95% CI**	**Mean**	**95% CI**
Age	Average	33.6	(32.8, 34.5)	32.3	(30.2, 34.4)	33.6	(32.6, 34.5)
	Range within network	9.5	(8.60, 10.41)	8.11	(6.36, 8.92)	10.06	(8.92, 11.2)
		(%)	**95% CI**	**%**	**95% CI**	**(%)**	**95% CI**
Sex	Male *	56.7	(53.3, 60.0)	36.5	(29.9, 43.0)	45.5	(41.5, 49.5)
	Female *	43.1	(39.7, 46.4)	63.2	(56.6, 69.8)	54.2	(50.2, 58.2)
Sex Partner		18.2	(15.5, 20.7)	14.7	(9.5, 19.8)	20.8	(17.7, 24.1)
Ethnicity	Caucasian *	36.3	(32.0, 40.6)	44.5	(34.7, 54.4)	33.4	(28.4, 38.4)
	Metis	11.9	(9.4, 14.4)	11.3	(6.3, 16.4)	10.8	(7.9, 13.7)
	Native Canadian *	48.3	(43.8, 52.7)	38.9	(28.9, 48.9)	52.5	(47.1, 57.7)
Income	Regular Work *	19.4	(16.2, 22.5)	27.4	(18.9, 35.7)	15.6	(12.3, 18.9)
	Welfare	53.3	(49.0, 57.6)	50.8	(40.8, 60.8)	54.8	(49.6, 59.9)
	Donations	6.6	(4.5, 8.8)	6.7	(2.0, 11.3)	7.1	(4.5, 9.7)
	Illegal Activity	20.6	(17.1, 24.2)	15.1	(7.3, 23.1)	22.4	(18.2, 26.6)
Injection Drug Used	Stimulants	41.8	(37.1, 46.4)	43.7	(32.2, 55.2)	42.4	(36.9, 47.7)
	Opioid Derivatives	23.7	(19.7, 27.7)	22.4	(12.9, 32.0)	21.2	(16.8, 25.7)
	Combination	28.3	(23.6, 32.9)	29.2	(17.9, 40.5)	30.4	(24.8, 35.9)
Relationship	Family	14.1	(11.5, 16.8)	11.6	(6.1, 17.2)	14.9	(11.8, 18.1)

Significant other	15.5	(12.9, 18.1)	11.7	(6.7, 16.8)	17.2	(14.1, 20.2)
Friend *	61.7	(0.58, 0.65)	70.0	(62.1, 77.9)	59.6	(55.1, 63.9)
Other	8.6	(6.4, 10.8)	6.6	(1.9, 11.2)	8.2	(5.7, 10.7)

* Denotes that there was a significance difference at the $p < 0.05$ level.

5.2 UNIVARIATE ANALYSIS OF THE EGOCENTRIC NETWORKS

Sex ratios of ego networks differed for those who took more sexual risk compared to those who took less. The participants who took more sexual risk tended to have a higher percentage of females in their network ($t(304) = 2.11$, $p< 0.05$).

Egos who reported higher sexual risk interactions had a smaller proportion of Caucasian network members ($t(304) = 2.01$, $p< 0.05$), and a higher proportion of First Nations members ($t(304) = 2.33$, $p< 0.05$).

Egos who reported higher sexual risk interactions had a smaller proportion of network members who used regular work as their main source of income ($t(304) = 3.00$, $p< 0.01$).

In addition, those who took higher risks had a lower percentage of friends in their network ($t(304) = 2.19$, $p< 0.05$). There was not a difference in the proportion of sex partners for those who reported higher sexual risk interactions compared with those who reported lower sexual risk interactions.

5.3 SOCIAL NETWORK CHARACTERISTICS

The overall social network sample is included for reference only. There were 186 components in the social network. Each component had a minimum of two nodes; the largest component was composed of 52 nodes. There were 76 participants who did not provide any ego network information and did not recruit anyone else to the study (Table 7). Including egos and alters of the components, and network members who did not recruit

additional study participants, there were 1634 individuals included in this study. Further social network metrics were not included for this analysis.

Nearly one-third (29.1%) of the components had only one member. One-fifth (18.7%) of the components were composed of ten or more individuals. Of components composed of two or more individuals, components with two individuals (dyads) had the highest percentage of individuals engaged in more sexual risk interactions (30.8%).

Table 7 Summary of the number and size of components within the social network and the distribution of high sexual risk interactions within the components (n=1634).

Number of Individuals	Number of components	% of total components	Number at risk	% at risk
1	76	29.0	46	60.5
2	13	5.0	8	30.8
3	26	9.9	20	25.6
4	19	7.3	14	18.4
5	26	9.9	26	20.0
6	36	13.7	26	12.0
7	5	1.9	8	22.9
8	7	2.7	9	16.1
9	5	1.9	5	11.1
10	2	0.8	4	20.0
11	7	2.7	11	14.3
12	8	3.1	15	15.6
13	3	1.1	2	5.1
14	4	1.5	12	21.4
15	1	0.4	1	6.7
16	4	1.5	4	6.3
17	5	1.9	11	12.9
18	1	0.4	1	5.6
20	1	0.4	4	20.0
21	1	0.4	0	0.0
24	1	0.4	4	16.7
26	1	0.4	3	11.5
27	2	0.8	8	14.8
28	1	0.4	5	17.9
31	2	0.8	9	14.5
32	1	0.4	5	15.6
33	1	0.4	7	21.2

36	1	0.4	4	11.1
38	1	0.4	5	13.2
52	1	0.4	4	7.7
TOTAL	262	100	235	--

5.4 SOCIAL SUPPORT AS AN EFFECT MODIFIER

When the interaction term between social support and self-reported depressive symptoms was added to the adjusted logistic regression model, specified in section 4.2, it did not add statistically to the model. There was no indication of effect modification when social support was included as the 5-item scale or when social support was included as the 3-item closeness measure.

The sensitivity analysis also did not indicate that it was the choice to dichotomize on the 50^{th} percentile that caused the insignificant results. To further ensure that social support did not act as an effect modifier, stratified odds ratios were calculated and compared with the overall odds ratio. The results of the test of homogeneity indicated that social support was not an effect modifier.

6. ANALYSIS, CONCLUSION AND DISCUSSION

6.1 SUMMARY

The first objective of this thesis is to assess the association between sexual risk interactions and self-reported depression symptoms in a Canadian injection drug using population.

The second objective of this thesis is to assess whether or not social support was an effect modifier in the association between sexual risk interactions and self-reported depression symptoms in a Canadian injection drug using population.

6.2 DISCUSSION: PRINCIPAL FINDINGS

The results of the analysis for objective one indicated that there is an association between sexual risk interactions and self-reported depressive symptoms. The association is statistically significant only when sexual risk interactions are defined using a modified HRBS scale. The results indicated that sexual risk taking is more likely to occur in persons who showed more self-reported depressive symptoms.

The association seen in this analysis should be interpreted with caution. The association is not present when sexual risk is defined using risk matrices separated by partnership type (regular partners, casual partners, client partners), or when sexual risk interactions are defined by singular risk measures (number of partners, engagement in exchange sex). Previous literature supports sexual risk being defined by the HRBS as well as singular measure, such as number of partners.

There is not a clear explanation why the association with self-reported depressive symptoms is not present using measures other than the modified HRBS. It is possible that singular measures of sexual risk did not produce a significant association because a more global definition of sexual risk interactions, which accounted for condom use and

participation in exchange sex, was required to fully understand the different types of risk an individual could take. The more complete measure of sexual risk may have provided more information and been more meaningful than the singular measures.

There could have been lack of variation in the sexual risk activity in this population. All participants may have had higher engagement in sexual risk behaviours, making it difficult to separate higher from lower risk takers and to then further analyze behaviour patterns stratified by self-reported depressive symptoms. Perceived risk taking may also influence dyadic interactions within the ego network. The ego and his or her network partners may act based on perceived sexual risk norms.

The risk matrices were an intuitive and logical method for defining sexual risk but they have not been used or validated in the scientific literature previously. It is possible that the association was not seen between this measure of sexual risk interactions and self-reported depressive symptoms because risk matrices, as defined in this analysis, are not a valid method of measurement.

The results of the analysis for objective two did not support the a priori hypothesis that social support would act as an effect modifier for the association between sexual risk interactions and self-reported depressive symptoms. There were no indications that social support was an effect modifier. The results did not change when social support was

measured using a three-item scale compared to social support being measured using an expanded five-item scale.

In this study, network data directly measured social support, to provide an important context for support. Previous research indicates that social support may be an important mediator. The homogenous nature of the study population, as well as the network members, may have decreased the ability to detect variance due to social support in this population. Another possible reason for the null result of objective two is that the effect of social support was too small to detect in a high-risk injection drug using population. Social support may also affect this association in a different manner than expected; as the causal pathway between self-reported depressive symptoms and sexual risk interactions is not known, it was only speculation that social support would act as an effect modifier. The role of social support may be more complex, it could precede depression or sexual risk interactions in the causal pathway; social support may act a confounding factor.

Despite the directness of our measure and the previously seen importance of social support, it may not have been an effect modifier in this analysis because of study limitations in the measurement of social support. Further explanation of the limitations of social support is addressed in section 6.5 below.

6.3 DISCUSSION: RESEARCH CONTEXT

The context of this analysis highlights why this type of research is important. The rates of STIs continue to increase in Canada, and the prevalence of depression in vulnerable populations is high. If there is an association between these two factors, it should be investigated further. The associations found in this analysis reflect previous data assessing this association in similar populations.

Since the late 1990s, rates of reported cases of chlamydia, gonorrhea, and infectious syphilis have been on the rise. The increasing rates of these diseases continue to be a public health burden in Canada. [77] In 2012 there were 103,716 identified cases of chlamydia, 12,561 identified cases of gonorrhea, and 2,003 identified cases of infectious syphilis. Since 2003, there has been a 57.6% increase in the rates of chlamydia, a 38.9% increase in the rates of gonorrhea, and a 101.0% increase in the rates of infectious syphilis. [77]

The overall increases in rates suggest that more sensitive laboratory tests, and more complete contact tracing, have increased the number of identified cases. The overall increases in rates also reflect that public health interventions to prevent infection may not be successful, and that changing sexual practices may be placing more individuals at risk of contracting an STI. The rise of STIs in the general population also indicates that research on vulnerable populations should be continued as they traditionally have a higher disease burden than the general population. [1,2]

There is limited research looking at the prevalence of depression in injection drug using populations. Prevalence estimates range from 25% to 80%. A study of young injection drug users in the United States reported that 25% of men and 31% of women met the criteria for major depression using a PRISM instrument (a semi-structured clinical interview that provides diagnoses based on DSM-IV criteria). [78] In a study of 528 users at a needle exchange program in the USA, 54% of persons were identified to meet the criteria for major depression using a structured clinical interview for diagnoses. [79] A Canadian study reported an 81.4% prevalence of depressive symptomatology and a 57.7% prevalence of severe depressive symptomatology in the IDU population studied, using the Center for Epidemiologic Studies Depression Scale (CES-D). [80] A meta-analysis that reviewed 55 studies reported that 55% of participants had above average levels of depressive symptoms. [9] It is clear that depression is a common psychiatric burden for injection drug users. Further research should be undertaken to better understand if depression is associated with risk taking.

There is evidence that the increased lifetime prevalence of STIs, among those who report higher levels of depressive symptoms, may be attributed to an increased engagement in sexual risk behaviors such as multiple sexual partners, inconsistent condom use and selling sex. [26]

The association between increased sexual risk interactions, for those who show increased depressive symptoms, has been seen both globally (in the USA, Puerto Rico, South Africa, Russia, and China), and locally within Canada. [8,10,11-19] For the studied IDU population in Saskatoon, depressive symptoms were associated with a nearly two-fold likelihood of providing sex for drugs, or money. [9] The results of this analysis support that depression is a correlate of sexual risk taking, and that further research should be undertaken to better understand how these two factors are associated.

6.4 IMPLICATIONS

The findings of this analysis are an important contribution to our understanding of the association between sexual risk interactions and self-reported depressive symptoms. There is limited (or no available) data for vulnerable populations in Canada. Furthermore, the utilization of respondent driven sampling provides reassurance that a representative sample was collected; reaching individuals who may not have been included using traditional probability based sampling methodologies. Canadian data is important because the differences in the Canadian health care system, government assistance programs, and distribution of ethnic backgrounds may make it more difficult, or inappropriate, to apply findings from American populations to inform Canadian policy decisions.

The results of the analysis of data collected in 2003-2004 are still relevant in 2016. Further research suggested that the population characteristics of IDU in Winnipeg remained similar

over a five-year period. This may suggest that population characteristics are relatively stable within this population and that previously collected data is applicable. It is clear that the problem of sexually transmitted diseases is still important. The rates of STIs, especially STIs behaviourally spread within marginalized populations, have not decreased in recent years, highlighting the need for new and innovative intervention strategies such as up-steam mental health interventions.

Raising awareness about the association between sexual risk interactions and depressive symptoms are important for public health because it could support the development of upstream interventions.

The impact of depression treatment on sexual risk taking has not been studied. Untreated depression has been associated with HIV treatment non-adherence and faster clinical progression of HIV for injection drug users. [81-83] A meta-analysis of 95 studies found the same association between depression and reduced treatment adherence, and the study population was not restricted to injection drug users. [84-86]

Depression can cause feelings of helplessness and hopelessness, lead to a diminished drive to engage in protective behaviours, and interrupt self-regulating processes. [8,11,21,28] Effective treatment of depression should help to restore a person's feelings of self worth, increase protective behaviours, and reduce the effects on self-regulation. In doing so, an

individual might be more willing to engage in safer sexual practices and be more aware of the risks that he is taking.

Further research is needed to determine the effects of treatment for depression in an injection drug using populations, to assess the impact on sexual risk taking interactions.

Though previous research has suggested that there could be causal association between depressive symptoms and sexual risk interactions, this was a cross-sectional study and causation cannot be determined. [8] Other educational of behavioural interventions aimed at reducing sexual risk interactions among injection drug users may be effective at reducing depressive symptoms in this community. The impact of these interventions on reducing sexual risk interactions, and the association with depressive symptoms could also be studied. If sexual risk interactions precede depressive symptoms than upstream intervention with antidepressants may not be effective for reducing sexual risk interactions, it may be perpetuate the problem by reducing the negative mental state the was previously associated with undertaking higher sexual risk interactions, thus allowing for more risk taking.

6.5 LIMITATIONS

6.5.1 STUDY DESIGN

This study was limited by several factors: study design, biases, and the measurement tools included in the survey instrument. Accounting for these limitations in future studies could help to improve subsequent research.

The data analyzed was taken from a cross-sectional study. The study design does not allow for any conclusions on causality. An association between sexual risk interactions and self-reported depressive symptoms was observed, but there was no indication of the direction of the relationship between these two factors. This limitation occurred because cross-sectional study designs do not provide information about the sequence of events. [88]

Understanding the direction of the relationship between self-reported depressive symptoms and sexual risk interactions is important because we are postulating that depression precedes and influences sexual risk taking. This association is being studied to support the implementation of possible upstream mental health interventions that could positively affect sexual risk taking interactions. However, upstream mental health interventions would not be as effective if the causal nature of the relationship is the opposite of what we expect it is.

The study instrument used relied heavily on self-report, and many of the topic questions could be considered personal, or sensitive. These study design factors may have lead to a social desirability bias. For example, asking participants about their involvement with illegal activities, such as selling sex, may have lead to underreporting of this activity, in spite of

anonymity. Respondents might have biased towards answers aligned to their perception of socially desirable responses, rather than providing more accurate answers. This may have led to under reporting of key variables, such as sexual risk interactions. However, previous research supports that reliability of drug users to accurately report sensitive information, such as drug use or sexual activity. [107,108]

Social desirability bias is thought to be an underlying personality trait that leads to participants selecting desirable answers over those that reflect their true feelings or actions. [89] Participants might also exhibit motivational bias, to avoid feelings of shame or embarrassment, rather than provide accurate answers. Motivational bias could also occur more often in women because of preexisting social norms surrounding sexual behaviours. [90]

Data gathered was retrospective. Recall bias may have been an issue in this study. For example, participants were asked to recall the number of sexual partners that they had in the past six months. Previous research has shown that recall of sexual partners is fallible, and that higher numbers of sexual partners are associated with higher rates of recall error. [91,92] This may have an effect on the association between self-reported depressive symptoms and sexual risk interactions by biasing the relationship towards the null. Participants in the study may actually be undertaking greater sexual risks than they are reporting.

Data was collected in 2003, over ten years prior to this analysis. It is possible that health behaviours in this population have changed since the data was collected. The disproportionate burden of sexually transmitted diseases persists in this population, but more up-to-date data is required to affirm the present association between sexual risk interactions and depressive symptoms.

Data was collected from a homogenous injection drug using population in Winnipeg, Canada. It is possible that results from this analysis are not generalizable to other vulnerable populations.

6.5.2 SEXUAL RISK INTERACTION MEASURES

Sexual risk interactions are difficult to quantify, and yet they are central to the understanding of the transmission dynamics of sexually transmitted infections. [93] There is no 'gold standard' measure available to identify sexual risk. [59]

In this study, the sexual risk behaviour questions asked respondents to recall events over a prolonged period of six months. The questionnaire duration may have increased measurement error, due to recall bias and memory fallacy. The questions asked allowed for continuous answers. Previous research has suggested that choices among categorical answers could increase accuracy, in spite of an associated potential loss of information. [90]

Furthermore, a meta-analysis of condom use measures suggests that information should be gathered on partner-type, as well as specific sexual act (vaginal, anal, or oral sex). Information of this type was not gathered in this study. More detailed condom use information may have improved the overall understanding of the sexual risk interactions participants were engaged in. Using a weighting system to account for the frequency of each type of sexual interaction could also be beneficial. [59]

Pre-validated sexual risk questionnaires should have been included in this study. A modified version of the HRBS was employed and it did produce significant results. However, the interpretation of these results was limited because the questions for this study employed a longer recall time frame than the time frame validated in the original HRBS. This study did not collect any information on engagement in anal sexual activity, which is also included in the original HRBS. Aside from the HRBS, other measures of sexual risk have been used and validated in research such as the Risk Behaviour Assessment Scale (RBA). [94]

The measurement tool chosen to quantify sexual risk should be appropriate for the purpose of the assessment. Scales should be designed to account for several factors: assess risk engagement over a period of time; describe the level of risk, and to detail the event-level risk information. [95,96]

Studies that employ a diary method - asking participants to document the behaviours of interest for a set period of time - may improve accuracy for measuring self-reported sexual

behaviours. [90] Research suggests that shorter recall periods (three months or less); computer-assisted questionnaire administration; integrated behavioral surveillance systems, and biological measures - would all be factors to reduce measurement error.

Within a vulnerable population, it may be important to address the context of sexual risk interactions. For example, individuals may be forced into taking sexual risks by a third-party, such as pimp, or a significant other. Information pertaining to intimate partner violence may also be important. A study of female sex workers found that woman who experienced violent threats from their pimps, their partners or their clients, were more likely to contract an STI than those who were not threatened. [112]

6.5.3 DEPRESSION INDICATORS

The depression scale used in this study was a subset of eight items taken from a 167-item General Health Questionnaire (GHQ). The eight items have shown good inter-item reliability, based on the Cronbach's alpha and a factor analysis. However, the eight-item scale has not been externally validated, and test re-test reliability has not been assessed.

Other modified versions of the GHQ, specifically the GHQ-12, have been tested against a Composite International Diagnostic Interview (CIDI), and they have proven to be a useful measure for detecting depression in the general population. The GHQ-12 and the 8-item

depression scale used in this study, share some common items, but these items are not completely overlapping. [97]

The CES-D and the Beck Depression Inventory have been tested in injection drug using populations. Results have indicated that these two scales measure depression differently. The Beck Depression Inventory has a distinct somatic factor, but the CES-D does not share this characteristic. Both scales were effective for identifying cases of depression in the population. There are also predefined cut-off scores that have been established for these scales, and this methodology is an accepted convention for defining severity of depression. [98,99]

6.5.4 MEASURES OF SOCIAL SUPPORT

Previous research has suggested that social support related network instruments should be used to measure support, because support is a network factor. Social support is multidimensional, and the development of proper network tools will allow for the systematic, causal, study of this construct. [42]

In this study, deriving a social support measure was limited by the design of the ego network information gathering method, and by the survey design. The participants were asked to list up to 20 people that they knew. The participants were then asked additional questions, including questions related to social support - only the first five members of their ego network who were also injection drug users. This study design had limitations, because information about the participants' social support was not included. The participants might have been be receiving important support from members of their ego network (who are not injection drug users), and this important information was not collected.

Some of the questions asked about social support were derived from the Arizona Social Support Interview Schedule. However, these questions formed a closeness scale, and may not have been a good measure of overall social support. There was no pre-validation for the use of these questions in an injection drug using population, and there was no predefined cut-off for dichotomizing what constituted social support. Also, the closeness scale had been included as a continuous predictor previously, but interpreting the interaction of a dichotomous variable, and a continuous variable can be less intuitive.

Previous research suggests that it is important to measure perceived social support. Social support has been identified as a correlate of depression, and it is associated with positive health increases in injection drug users. [100] Research tends to focus on received support, instead of investigating reciprocal support, or provided support. [101] Future research should include an established measure of social support, and it should also include an operational definition of social support, and the desired outcome of assessing it.

6.6 FUTURE DIRECTIONS

This study looked at the association between sexual risk interactions and self-reported depressive symptoms, as well as a possible effect modifier (social support). Future studies may benefit from better measurement tools, expanded social network information, an

expanded population, and inclusion of other important demographic and behavior measures.

Future studies could benefit from better measurement tools used to identify depression. Structured or semi-structured clinical interviews, or pre-validated depression scales - with established cut-offs for case identification - might provide support for the linkage between higher levels of depression, and increased sexual risk-taking.

Outcome measures that assess the association between specific sub-sets of depressive symptoms, such as vegetative symptoms, and sexual risk interactions could be included. If there is a causal relationship, where depressive symptoms promote sexual risk interactions, then different interventions could be developed depending on the types of depressive symptoms that are associated with sexual risk interactions. For example, symptoms of helplessness or hopelessness may benefit from housing-first interventions instead of upstream use of antidepressants.

To better assess social support, pre-validated measures could be included in the survey instrument. Social network information gathered would also benefit from fewer restrictions. By restricting ego network information to only IDUs in this study, information about social support might have been lost. The participants of this study might have had social support networks that were not reflected in the study, because their social support system did not consist of IDUs. Specific social support network instruments should be

included. Future research could also assess other facets of social support (i.e., social isolation or the social-milieu within the sexual dyad) depression, and sexually risky interactions. Future studies could further assess the effectiveness of social support that is being provided, and attempt to measure the capacity of the individuals providing support. Analysis of the level of homogeneity between the actor and the alters providing support should be considered.

To allow for wider application of findings from this type of research, the association of depression and sexual risk interactions should be assessed in other vulnerable populations. The increase in sexual risk interactions could also be applicable to other persons, such as those who are homeless or those who are involved with exchange sex, but who do not inject drugs.

Comorbid mental disorders should be assessed to have a more complete understanding of what factors are affecting this population, and how best to treat them. Vulnerable populations might have higher rates of other psychiatric illnesses, such as anxiety, antisocial personality disorder (ASPD), and post-traumatic stress disorder (PTSD). [102-104] Treatment of ASPD has been related significantly to a reduction in sexual risk taking behaviours. [103] Traumatic brain injuries (TBI) might also be a contributing factor. Rates of TBI are higher among vulnerable populations, such as those who are homeless. [105] Traumatic brain injuries are associated with increased rates of depression. [109]

Future research could also assess whether personality traits, such as introversion and extroversion contribute to the association between depressive symptoms and sexual risk interactions.

6.7 CONCLUSIONS

In conclusion, the results of this analysis indicate that depression status was associated with sexual risk interactions, in an injection drug using population, when sexual risk was measured using a modified HRBS scale. The results did not indicate that social support was an effect modifier of this relationship. However, study limitations might have contributed to this null result.

Notwithstanding the above limitations, this study had numerous strengths. Sexual risk interactions were measured using a standardized instrument that has been previously validated for this population. An understanding of who is providing social support, and a context for social support were described. Further research should be undertaken to better understand the impact of depression on increased sexual risk taking behaviors.

7. REFERENCES

1. Public Health Agency of Canada. (2013). *The chief public health Officer's report on the state of public health in Canada, 2013: infectious Disease—The never-ending threat*. Canada: Public Health Agency of Canada.

2. Tom Wong. (2008 (updated 2010)). *Canadian guidelines on sexually transmitted infections.*

3. Wylie, J. L., Shah, L., & Jolly, A. M. (2006). Demographic, risk behaviour and personal network variables associated with prevalent hepatitis C, hepatitis B, and HIV infection in injection drug users in Winnipeg, Canada. *BMC Public Health, 6*, 229.

4. Aglipay, M., Jolly, A., & Ramsay, T. (2013). Positive and negative support roles in the social networks of vulnerable people. (Master's Dissertation). Retrieved from uO Research.

5. Wylie, J. L., Cabral, T., & Jolly, A. M. (2005). Identification of networks of sexually transmitted infection: A molecular, geographic, and social network analysis. *The Journal of Infectious Diseases, 191*(6), 899-906.

6. Ministry of Health and Long-Term Care, Public Health Division. (2011). *Ontario annual infectious disease epidemiology report, 2009*. Toronto: Queen's Printer for Ontario.

7. Minister of Public Works and Government Services Canada. (2006). *The human face of mental health and mental illness in Canada (*No. HP5-19/2006E). Ottawa Ontario: Government of Canada.

8. Nduna, M., Jewkes, R. K., Dunkle, K. L., Shai, N. P., & Colman, I. (2010). Associations between depressive symptoms, sexual behaviour and relationship characteristics: A prospective cohort study of young women and men in the eastern cape, South Africa. *Journal of the International AIDS Society, 13*, 44-2652-13-44.

9. Pabayo, R., Alcantara, C., Kawachi, I., Wood, E., & Kerr, T. (2013). The role of depression and social support in non-fatal drug overdose among a cohort of injection drug users in a Canadian setting. *Drug and Alcohol Dependence, 132*(3), 603-609.

10. German, D., & Latkin, C. A. (2012). Boredom, depressive symptoms, and HIV risk behaviours among urban injection drug users. *AIDS and Behaviour, 16*(8), 2244-2250.

11. Zhan, W., Shaboltas, A. V., Skochilov, R. V., Kozlov, A. P., Krasnoselskikh, T. V., & Abdala, N. (2012). Depressive symptoms and unprotected sex in St. Petersburg, Russia. *Journal of Psychosomatic Research, 72*(5), 371-375.

12. Williams, C. T., & Latkin, C. A. (2005). The role of depressive symptoms in predicting sex with multiple and high-risk partners. *Journal of Acquired Immune Deficiency Syndromes (1999), 38*(1), 69-73.

13. Perdue, T., Hagan, H., Thiede, H., & Valleroy, L. (2003). Depression and HIV risk behaviour among Seattle-area injection drug users and young men who have sex with men. *AIDS Education and Prevention: Official Publication of the International Society for AIDS Education, 15*(1), 81-92.

14. Pilowsky, D. J., Wu, L. T., Burchett, B., Blazer, D. G., & Ling, W. (2011). Depressive symptoms, substance use, and HIV-related high-risk behaviors among opioid-dependent individuals: Results from the clinical trials network. *Substance use & Misuse, 46*(14), 1716-1725.

15. American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, D.C: American Psychiatric Association.

16. Loue, S., Sajatovic, M., & Mendez, N. (2011). Substance use and HIV risk in a sample of severely mentally ill Puerto Rican women. *Journal of Immigrant and Minority Health / Center for Minority Public Health, 13*(4), 681-689.

17. El-Bassel, N., Wechsberg, W. M., & Shaw, S. A. (2012). Dual HIV risk and vulnerabilities among women who use or inject drugs: No single prevention strategy is the answer. *Current Opinion in HIV and AIDS, 7*(4), 326-331.

18. Camacho, L. M., Brown, B. S., & Simpson, D. D. (1996). Psychological dysfunction and HIV/AIDS risk behavior. *JAIDS Journal of Acquired Immune Deficiency Syndromes, 11*(2).

19. Gu, J., Lau, J. T., Chen, H., Chen, X., Liu, C., & Liu, J. (2010). Mental health and interpersonal factors associated with HIV-related risk behaviors among non-institutionalized female injection drug users who are also sex workers in china. *Women & Health, 50*(1), 20-36.

20. Valverde, E. E., Purcell, D. W., Waldrop-Valverde, D., Malow, R., Knowlton, A. R., Gomez, C. A., et al. (2007). Correlates of depression among HIV-positive women and men who inject drugs. *Journal of Acquired Immune Deficiency Syndromes (1999), 46 Suppl 2*, S96-100.

21. O'Leary, A., Broadwell, S. D., Yao, P., & Hasin, D. (2006). Major depression, alcohol and drug use disorders do not appear to account for the sexually transmitted disease and HIV epidemics in the Southern United States. *Sexually Transmitted Diseases, 33*(7 Suppl), S70-7.

22. Gossop, M., Marsden, J., Stewart, D., & Treacy, S. (2002). Reduced injection risk and sexual risk behaviours after drug misuse treatment: Results from the national treatment outcome research study. *AIDS Care, 14*(1), 77-93.

23. Dolezal, C., Ehrhardt, A. A., Meyer-Bahlburg, H. F., Liu, X., Exner, T. M., Rabkin, J. G., et al. (1998). Sexual risk behavior changes among HIV+ and HIV-female injecting drug users over 4 years. *Women & Health, 27*(4), 1-17.

24. Nyamathi, A., Flaskerud, J., & Leake, B. (1997). HIV-risk behaviors and mental health characteristics among homeless or drug-recovering women and their closest sources of social support. *Nursing Research, 46*(3), 133-137.

25. Schilling, R. F., el-Bassel, N., & Gilbert, L. (1993). Predictors of changes in sexual behavior among women on methadone. *The American Journal of Drug and Alcohol Abuse, 19*(4), 409-422.

26. Shoptaw, S., Peck, J., Reback, C. J., & Rotheram-Fuller, E. (2003). Psychiatric and substance dependence comorbidities, sexually transmitted diseases, and risk behaviors among methamphetamine-dependent gay and bisexual men seeking outpatient drug abuse treatment. *Journal of Psychoactive Drugs, 35 Suppl 1*, 161-168.

27. O'Leary, A. (2001). Substance use and HIV disentagling the nexus of risk. introduction. *Journal of Substance Abuse, 13*(1-2), 1-3.

28. Crooks, D., Tsui, J., Anderson, B., Dossabhoy, S., Herman, D., Liebschutz, J. M., et al. (2014). Differential risk factors for HIV drug and sex risk-taking among non-treatment-seeking hospitalized injection drug users. *AIDS and Behavior.*

29. Tull, M. T., & Gratz, K. L. (2013). Major depression and risky sexual behavior among substance dependent patients: The moderating roles of distress tolerance and gender. *Cognitive Therapy and Research, 37*(3), 483-497.

30. Latkin, C. A., Forman, V., Knowlton, A., & Sherman, S. (2003). Norms, social networks, and HIV-related risk behaviors among urban disadvantaged drug users. *Social Science & Medicine (1982), 56*(3), 465-476.

31. Public Health Agency of Canada. *HIV and AIDS in Canada. Surveillance Report to December 31, 2009*. Surveillance and Risk Assessment Division, Centre for Communicable Diseases and Infection Control, Public Health Agency of Canada, 2010.

32. The Winnipeg Site Network Team. (2011). *CCENDU Winnipeg 2009/2010 report*. Manitoba: Canadian Community Epidemiology Network on Drug Use.

33. Laupland, K. B., & Embil, J. M. (2012). Reducing the adverse impact of injection drug use in Canada. *The Canadian Journal of Infectious Diseases & Medical Microbiology*, *23*(3), 106.

34. Jolly, A. M., Moffatt, M. E., Fast, M. V., & Brunham, R. C. (2005). Sexually transmitted disease thresholds in Manitoba, Canada. *Annals of epidemiology*, *15*(10), 781-788.

35. U.S. Food and Drug Administration. Evaluation of Donor Suitability Consultation [Power Point Slides document]. Retrieved from: http://www.fda.gov/ohrms/dockets/ac/01/briefing/3817b2_02_vallerory/index.htm.

36. De, P., Cox, J., Boivin, J. F., Platt, R. W., & Jolly, A. M. (2007). The importance of social networks in their association to drug equipment sharing among injection drug

users: A review. *Addiction (Abingdon, England), 102*(11), 1730-1739.

37. Martens, W. H. (2001). A review of physical and mental health in homeless persons. *Public Health Reviews, 29*(1), 13-33.

38. Hwang, S. W. (2001). Homelessness and health *Canadian Medical Association Journal, 164*(2), 229-233.

39. Gaetz, Stephen; Donaldson, Jesse; Richter, Tim; & Gulliver, Tanya (2013): The State of Homelessness in Canada 2013. Toronto: Canadian Homelessness Research Network Press.

40. Bruggeman, J. (2008). *Social networks: An introduction*. London: Routledge.

41. Borgatti, S., & Everett, M. (2013). *Analyzing social networks*. Los Angeles: SAGE Publications.

42. Scott, J. (2013). *Social network analysis: A handbook* (3rd ed.). London: SAGE Publications.

43. Wylie J. L., Shah L., Jolly A. M. Demographic, risk behaviour and personal network variables associated with prevalent hepatitis C, hepatitis B, and HIV infection in injection drug users in Winnipeg, Canada. *BMC Public Health* 2006; 6: 229.

44. Wylie J. L., Shah L., Jolly A. M. Incorporating geographic settings into a social network analysis of injection drug use and bloodborne pathogen prevalence. *Health Place* 2007; 13: 617–28.

45. Shaw, S. Y., Shah, L., Jolly, A. M., & Wylie, J. L. (2007). Determinants of injection drug user (IDU) syringe sharing: the relationship between availability of syringes and risk network member characteristics in Winnipeg, Canada. *Addiction*, *102*(10), 1626-1635.

46. StataCorp. 2013. *Stata Statistical Software: Release 13*. College Station, TX: StataCorp LP.

47. Roth, P. L. (1994). Missing data: A conceptual review for applied psychologists. *Personnel psychology*, *47*(3), 537-560.

48. Tabachnick, B., & Fidell, L. (2007). *Using multivariate statistics* (5th ed.). Boston: Pearson/Allyn & Bacon.

49. O Rourke, T. W. (2003). Methodological techniques for dealing with missing data. *American Journal of Health Studies*, *18*(2/3), 165-168.

50. Enders, C. (2010). *Applied missing data analysis*. New York: Guilford Press.
51. Downey, R. G., & King, C. V. (1998). Missing data in Likert ratings: A comparison of replacement methods. *The Journal of general psychology*, *125*(2), 175-191.

52. Hawthorne, G., Hawthorne, G., & Elliott, P. (2005). Imputing cross-sectional missing data: comparison of common techniques. *Australian and New Zealand Journal of Psychiatry*, *39*(7), 583-590.

53. Wylie, J., Shah, L., & Jolly, A. (2006). Demographic, risk behaviour and personal network variables associated with prevalent hepatitis C, hepatitis B, and HIV infection in injection drug users in Winnipeg, Canada. *BMC Public Health*, *6*(1), 229.

54. Commonly Abused Drugs. (2012, April 1). Retrieved June 8, 2015, from http://myusf.usfca.edu/system/files/cad_chart_2014.pdf

55. Gossop M, Darke S, Griffiths P, Hando J., Powis B., Hall W, Strang J (1995). The Severity of Dependence Scale (SDS): psychometric properties of the SDS in English and Australian samples of heroin, cocaine and amphetamine users. Addiction, 90(5):607-14.

56. Gossop M, Best D, Marsden J, Strang J (1997). Test-retest reliability of the Severity of Dependence Scale. Addiction, 92(3):353.

57. Goldberg, D. (1972). *The detection of psychiatric illness by questionnaire; a technique for the identification and assessment of non-psychotic psychiatric illness,*. London: Oxford University Press.

58. Mandell, W., Kim, J., Latkin, C., & Suh, T. (1999). Depressive symptoms, drug network, and their synergistic effect on needle-sharing behavior among street injection drug users. *The American journal of drug and alcohol abuse*, *25*(1), 117-127.

59. Noar, S. M., Cole, C., & Carlyle, K. (2006). Condom use measurement in 56 studies of sexual risk behavior: review and recommendations. *Archives of sexual behavior*, *35*(3), 327-345.

60. Fenton, K. A., Mercer, C. H., Johnson, A. M., Byron, C. L., McManus, S., Erens, B., ... & Wellings, K. (2005). Reported sexually transmitted disease clinic attendance and sexually transmitted infections in Britain: prevalence, risk factors, and proportionate population burden. *Journal of Infectious Diseases*, *191*(Supplement 1), S127-S138.

61. Roberts, J. M., & Brewer, D. D. (2001). Measures and tests of heaping in discrete quantitative distributions. *Journal of Applied Statistics*, *28*(7), 887-896.

62. Wang, H., & Heitjan, D. F. (2008). Modeling heaping in self-reported cigarette counts. *Statistics in medicine*, *27*(19), 3789.

63. Stockwell, E. G., & Wicks, J. W. (1974). Age heaping in recent national censuses. *Social Biology*, *21*(2), 163-167.

64. Crawford, F. W., Weiss, R. E., & Suchard, M. A. (2015). Sex, lies and self-reported counts: Bayesian mixture models for heaping in longitudinal count data via birth–death processes. *The Annals of Applied Statistics*, *9*(2), 572-596.

65. Adrade, C. (2002). Categorizing continuous variables. *Canadian journal of psychiatry*, *47*, 886.

66. Aral, S.O. and Holmes, K.K. (2006) 'The epidemiology of STIs and their social and behavioral determinants: industrialized and developing countries' in Holmes, K.K., Sparling, F., Stamm, W., Piot, P., Wasserheit, J., Corey, L. and Cohen, M. (eds.) (2006) Sexually transmitted diseases, 4th Edition. (New York: McGraw Hill).

67. Fenton, K.A., Mercer, C.H., Byron, C., McManus, S., Erens, B., Copas, A.J., Nanchahal, K., Macdowall, W., Wellings, K. and Johnson, A.M. (2005) 'Reported sexually transmitted disease clinic attendance and sexually transmitted infections in Britain: prevalence, risk factors, and proportionate population burden', Journal of Infectious Diseases 191: Suppl 1, S127-S38.

68. Canadian Guidelines on Sexually Transmitted Infections: 2. Knowing about STI Risk

Factors and Epidemiology. (2013, February 1). Retrieved September 23, 2015.

69. Ward, J., Darke, S., & Hall, W. (1990). *The HIV risk-taking behaviour scale (HRBS) manual*. Sydney: National Drug and Alcohol Research Centre, University of New South Wales.

70. Petry, N. M. (2001). RELIABILITY OF DRUG USERS' SELF-REPORTED HIV RISK BEHAVIORS USING A BRIEF, 11-ITEM SCALE. *Substance use & misuse*, *36*(12), 1731-1747.

71. Shtatland, E. S., Cain, E., & Barton, M. B. (2001, April). The perils of stepwise logistic regression and how to escape them using information criteria and the output delivery system. In *26th Annual SAS Users Group International Conference, Long Beach, California*.

72. Kwemou, M., Taupin, M. L., & Tocquet, A. S. (2015). Model selection in logistic regression. *arXiv preprint arXiv:1508.07537*.

73. Wang, D., Zhang, W., & Bakhai, A. (2004). Comparison of Bayesian model averaging and stepwise methods for model selection in logistic regression. *Statistics in medicine*, *23*(22), 3451-3467.

74. SOCIAL FACTORS RELATED TO SYRINGE SHARING AMONG INJECTING PARTNERS: A FOCUS ON GENDER Sherman, Susan G., Latkin, Carl A., Gielen, Andrea C. 20018300 defect for UNSW Substance Use & Misuse, 2001, Vol.36(14), p.2113-2136

75. Barrera, M. A Method for Assessing Social Support Networks in Community Service Research. Connections 1980,3, 8–13.and Barrera, M. Social Support in the Adjustment of Pregnant Adolescents: Assessment Issues. In Social Networks and Social Support; Gottlieb, B., Ed.; Sage: Beverly Hills, CA, 1981

76. Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

77. Public Health Agency of Canada. *Report on Sexually Transmitted Infections in Canada: 2012*. Centre for Communicable Diseases and Infection Control, Infectious Disease Prevention and Control Branch, Public Health Agency of Canada; 2015.

78. Mackesy-Amiti, M. E., Donenberg, G. R., & Ouellet, L. J. (2012). Prevalence of

psychiatric disorders among young injection drug users. *Drug and alcohol dependence*, *124*(1), 70-78.

79. Brienza, R. S., Stein, M. D., Chen, M. H., Gogineni, A., Sobota, M., Maksad, J., & Clarke, J. (2000). Depression among needle exchange program and methadone maintenance clients. *Journal of Substance Abuse Treatment*, *18*(4), 331-337.

80. Springer, S. A. (2012). High rates of depressive symptomatology among injecting drug users in Saskatoon, Canada. *Evidence Based Mental Health*, *15*(1), 9-9.

81. Turner, B. J., Laine, C., Cosler, L., & Hauck, W. W. (2003). Relationship of Gender, Depression, and Health Care Delivery With Antiretroviral Adherence in HIV-infected Drug Users. *Journal of General Internal Medicine*, *18*(4), 248-257.

82. Yun, L. W., Maravi, M., Kobayashi, J. S., Barton, P. L., & Davidson, A. J. (2005). Antidepressant treatment improves adherence to antiretroviral therapy among depressed HIV-infected patients. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *38*(4), 432-438.

83. Sambamoorthi, U., Walkup, J., Olfson, M., & Crystal, S. (2000). Antidepressant Treatment and Health Services Utilization Among HIV-Infected Medicaid Patients Diagnosed with Depression. *Journal of General Internal Medicine*, *15*(5), 311-320.

84. Bouhnik, A. D., Préau, M., Vincent, E., Carrieri, M. P., Gallais, H., Lepeu, G., ... & Spire, B. (2005). Depression and clinical progression in HIV-infected drug users treated with highly active antiretroviral therapy. *Antivir ther*, *10*(1), 53-61.

85. Ammassari, A., Antinori, A., Aloisi, M. S., Trotta, M. P., Murri, R., Bartoli, L., ... & Starace, F. (2004). Depressive symptoms, neurocognitive impairment, and adherence to highly active antiretroviral therapy among HIV-infected persons. *Psychosomatics*, *45*(5), 394-402.

86. Gonzalez, J. S., Batchelder, A. W., Psaros, C., & Safren, S. A. (2011). Depression and HIV/AIDS treatment nonadherence: a review and meta-analysis. *Journal of acquired immune deficiency syndromes (1999)*, *58*(2).

87. Colman, I., Zeng, Y., Ataullahjan, A., Senthilselvan, A., & Patten, S. B. (2011). The association between antidepressant use and depression eight years later: a national

cohort study. *Journal of psychiatric research*, *45*(8), 1012-1018.

88. Levin, K. A. (2006). Study design III: Cross-sectional studies. *Evidence-based dentistry*, *7*(1), 24-25.

89. Grimm, P. (2010). Social desirability bias. *Wiley International Encyclopedia of Marketing*.

90. Schroder, K. E., Carey, M. P., & Vanable, P. A. (2003). Methodological challenges in research on sexual risk behavior: II. Accuracy of self-reports. *Annals of behavioral medicine*, *26*(2), 104-123.

91. Graham, C. A., Catania, J. A., Brand, R., Duong, T., & Canchola, J. A. (2003). Recalling sexual behavior: A methodological analysis of memory recall bias via interview using the diary as the gold standard. *Journal of sex research*, *40*(4), 325-332.

92. Sackket, D. I. (1979). Bias in analytical research. *J Chronic Dis*, *32*, 51-63.

93. Fenton, K. A., Johnson, A. M., McManus, S., & Erens, B. (2001). Measuring sexual behaviour: methodological challenges in survey research. *Sexually transmitted infections*, *77*(2), 84-92.

94. Needle, R., Fisher, D. G., Weatherby, N., Chitwood, D., Brown, B., Cesari, H., ... & Braunstein, M. (1995). Reliability of self-reported HIV risk behaviors of drug users. *Psychology of addictive behaviors*, *9*(4), 242.

95. Weinhardt, L. S., Forsyth, A. D., Carey, M. P., Jaworski, B. C., & Durant, L. E. (1998). Reliability and validity of self-report measures of HIV-related sexual behavior: progress since 1990 and recommendations for research and practice. *Archives of sexual behavior*, *27*(2), 155-180.

96. Schroder, K. E., Carey, M. P., & Vanable, P. A. (2003). Methodological challenges in research on sexual risk behavior: I. Item content, scaling, and data analytical options. *Annals of Behavioral Medicine*, *26*(2), 76-103.

97. Aalto, A. M., Elovainio, M., Kivimäki, M., Uutela, A., & Pirkola, S. (2012). The Beck Depression Inventory and General Health Questionnaire as measures of depression in the general population: a validation study using the Composite International

Diagnostic Interview as the gold standard. *Psychiatry research*, *197*(1), 163-171.

98. Golub, E. T., Latka, M., Hagan, H., Havens, J. R., Hudson, S. M., Kapadia, F., ... & Strathdee, S. A. (2004). Screening for depressive symptoms among HCV-infected injection drug users: examination of the utility of the CES-D and the Beck Depression Inventory. *Journal of Urban Health*, *81*(2), 278-290.

99. Johnson, M. E., Neal, D. B., Brems, C., & Fisher, D. G. (2006). Depression as measured by the Beck Depression Inventory-II among injecting drug users. *Assessment*, *13*(2), 168-177.

100. Mizuno, Y., Purcell, D. W., Dawson-Rose, C., Parsons, J. T., & The SUDIS team. (2003). Correlates of depressive symptoms among HIV-positive injection drug users: the role of social support. *AIDS care*, *15*(5), 689-698.

101. Winemiller, D. R., Mitchell, M. E., Sutliff, J., & Cline, D. I. (1993). Measurement strategies in social support: A descriptive review of the literature. *Journal of Clinical Psychology*, *49*(5), 638-648.

102. Golden, J., O'Dwyer, A. M., & Conroy, R. M. (2005). Depression and anxiety in patients with hepatitis C: prevalence, detection rates and risk factors. *General hospital psychiatry*, *27*(6), 431-438.

103. Compton, W. M., Cottler, L. B., Ben-Abdallah, A., Cunningham-Williams, R., & Spitznagel, E. L. (2000). The effects of psychiatric comorbidity on response to an HIV prevention intervention. *Drug and Alcohol Dependence*, *58*(3), 247-257.

104. Boarts, J. M., Sledjeski, E. M., Bogart, L. M., & Delahanty, D. L. (2006). The differential impact of PTSD and depression on HIV disease markers and adherence to HAART in people living with HIV. *AIDS and Behavior*, *10*(3), 253-261.

105. Topolovec-Vranic, J., Ennis, N., Colantonio, A., Cusimano, M. D., Hwang, S. W., Kontos, P., ... & Stergiopoulos, V. (2012). Traumatic brain injury among people who are homeless: a systematic review. *BMC public health*, *12*(1), 1059.

106. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). Washington, DC.

107. Needle, R., Fisher, D. G., Weatherby, N., Chitwood, D., Brown, B., Cesari, H. & Braunstein, M. (1995). Reliability of self-reported HIV risk behaviors of drug users. *Psychology of addictive behaviors*, *9*(4), 242.

108. Dowling-Guyer, S., Johnson, M. E., Fisher, D. G., Needle, R., Watters, J., Andersen, M.,& Tortu, S. (1994). Reliability of drug users' self-reported HIV risk behaviors and validity of self-reported recent drug use. *Assessment*, *1*(4), 383-392.

109. Bryant, R. A., O'donnell, M. L., Creamer, M., McFarlane, A. C., Clark, C. R., & Silove, D. (2014). The psychiatric sequelae of traumatic injury. *The American Journal of Psychiatry*.

110. Zhang, X. D., Temmerman, M., Li, Y., Luo, W., & Luchters, S. (2012). Vulnerabilities, health needs and predictors of high-risk sexual behaviour among female adolescent sex workers in Kunming, China. *Sexually transmitted infections*, sextrans-2012.

111. Solorio, M. R., Rosenthal, D., Milburn, N. G., Weiss, R. E., Batterham, P. J., Gandara, M., & Rotheram-Borus, M. J. (2008). Predictors of sexual risk behaviors among newly homeless youth: a longitudinal study. *Journal of Adolescent Health*, *42*(4), 401-409.

112. Decker, M. R., Wirtz, A. L., Baral, S. D., Peryshkina, A., Mogilnyi, V., Weber, R. A., & Beyrer, C. (2012). Injection drug use, sexual risk, violence and STI/HIV among Moscow female sex workers. *Sexually transmitted infections*, *88*(4), 278-283.

113. Yang, X., Latkin, C., Celentano, D., & Luo, H. (2006). Prevalence and correlates of HIV risk behaviors among drug users in China. *AIDS and Behavior*, *10*(1), 71-81.

114. Nemoto, T., Foster, K., & Brown, L. S. (1991). Effect of psychological factors on risk behavior of human immunodeficiency virus (HIV) infection among intravenous drug users (IVDUs). *International journal of the addictions*, *26*(4), 441-456.

115. Shane, A. (2013). Defining intervention location form social network data of people who inject drugs in Winnipeg, Canada. (Master's Dissertation). Retrieved from uO Research.

116. Petry, N. M. (2001). RELIABILITY OF DRUG USERS'SELF-REPORTED HIV RISK BEHAVIORS USING A BRIEF, 11-ITEM SCALE. *Substance use & misuse*, *36*(12), 1731-1747.

8. APPENDIX

8.1 LETTER OF ETHICS APPROVAL

***Ottawa Health Science Network Research Ethics Board/* Réseau des sciences de la santé d'Ottawa Conseil d'éthique de la recherche**

Civic Box 411 725 Parkdale Avenue, Ottawa, Ontario K1Y 4E9 613-798-5555 ext. 14902 Fax : 613-761-4311
http://www.ohri.ca/ohsn-reb

December 02, 2014

Dr. Ann Jolly
Epidemiology and Community Medicine
University of Ottawa
Rm 3230D Roger Guidon Hall
451 Smyth Road
Ottawa ON K1H 8M5

Dear Dr. Jolly:

Re: Protocol #	**20140716-01H**	**The Association Between Self-Reported Depressive Symptoms and Risky Sexual Interactions in an Injection Drug Using Population in Winnipeg, Canada**
Protocol approval valid until -		**December 01, 2015**

I am pleased to inform you that this protocol underwent delegated review by the Ottawa Health Science Network Research Ethics Board (OHSN-REB) and is approved. No changes, amendments or addenda may be made to the protocol without the OHSN-REB's review and approval.

Approval includes the following:
- Thesis Proposal, version 1, dated October 23, 2014
- Data Fields, uploaded October 06, 2014

If the study is to continue beyond the expiry date noted above, a Renewal Form should be submitted to the REB approximately six weeks prior to the current expiry date. If the study has been completed by this date, a Termination Report should be submitted.

The Ottawa Health Science Network Research Ethics Board (OHSN-REB) was created by the merger of both the Ottawa Hospital Research Ethics Board (OHREB) and the Human Research Ethics Board (HREB) for meetings held at the University of Ottawa Heart Institute.

OHSN-REB complies with the membership requirements and operates in compliance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans; the International Conference on Harmonization - Good Clinical Practice: Consolidated Guideline and the provisions of the Personal Health Information Protection Act 2004.

Yours sincerely,

[redacted]

Raphael Saginur, M.D.
Chairperson
Ottawa Health Science Network Research Ethics Board

/hm

8.2 DEPRESSIVE SYMPTOMS DATA

Uncleaned depressive symptoms data. Data includes all participants, before person-mean imputation.

Subject code	DEP1	DEP2	DEP3	DEP4	DEP5	DEP6	DEP7	DEP8
1	1	0	0	2	1	0	1	0
2	1	0	0	0	1	0	0	0
3	3	1	55	55	1	55	3	2
4	3	1	1	1	1	2	1	2
5	0	1	1	0	0	0	0	0
6	2	2	2	1	2	1	1	1
7	1	0	0	0	1	0	0	0
8	1	0	0	0	0	1	1	0
9	2	1	1	1	2	2	2	0
10	1	1	1	0	1	1	1	0
11	2	2	0	2	2	2	55	0
12	0	0	0	0	1	1	3	0
13	2	0	0	1	1	2	2	1
14	2	0	0	1	1	2	2	0
15	2	2	1	1	3	1	1	1
16	2	1	1	1	1	1	0	0
17	0	0	0	0	1	0	1	0
18	1	1	2	2	1	2	1	1
19	1	2	2	2	2	2	1	1
20	3	0	3	1	2	2	3	55
21	2	2	2	3	3	2	2	1
22	1	0	0	2	1	2	2	1
23	1	1	0	2	1	2	2	0
24	2	1	2	1	1	55	2	55
25	0	0	0	1	1	0	3	0
26	1	1	1	2	1	1	1	1
27	0	0	0	1	1	2	2	0
28	0	0	0	1	1	0	2	0
29	3	2	1	1	2	2	1	1
30	2	3	2	2	1	2	0	1
31	0	0	0	0	1	0	1	0
32	2	2	3	2	2	1	3	1
33	1	2	2	2	1	0	1	1
34	2	2	1	2	55	2	3	1
35	1	0	0	1	1	0	1	0

36	1	0	0	0	1	0	2	0
37	0	1	1	0	1	1	0	0
38	0	0	0	0	1	0	1	0
39	3	2	1	2	2	3	2	0
40	2	1	0	0	1	2	2	0
41	2	0	0	1	2	2	2	0
42	3	55	1	2	1	1	1	1
43	2	0	1	2	1	1	2	0
44	3	55	55	1	0	0	55	0
45	1	0	1	1	1	1	2	0
46	2	0	0	1	1	2	3	0
47	1	0	0	0	1	1	2	0
48	1	2	0	2	2	1	2	0
49	0	0	0	1	1	1	2	0
50	3	0	0	0	0	0	1	0
51	2	2	0	2	1	0	0	0
52	0	2	1	2	0	0	2	3
53	3	1	0	2	2	3	3	1
54	0	1	3	2	2	2	3	2
55	2	0	0	0	1	2	1	2
56	1	1	0	0	1	0	2	0
57	2	1	2	0	2	2	0	0
58	1	1	3	0	1	2	2	1
59	1	0	0	1	1	2	1	0
60	1	0	1	0	1	1	1	1
61	3	2	2	2	3	3	3	2
62	2	0	1	0	1	1	1	0
63	1	0	0	3	2	0	3	0
64	0	0	1	0	1	0	1	0
65	1	0	1	0	1	2	1	0
66	2	1	0	0	1	0	1	0
67	2	0	0	3	1	2	1	0
68	3	2	2	2	2	2	2	2
69	0	0	0	0	1	0	2	0
70	0	1	0	2	1	1	1	0
71	1	2	2	0	1	0	1	0
72	0	0	0	0	0	0	0	0
73	0	0	2	0	1	1	1	0
74	2	2	2	0	1	2	0	0
75	1	0	0	0	1	0	1	0
76	1	1	0	0	1	0	1	0

77	1	1	0	0	2	2	2	2
78	2	0	0	0	2	0	2	0
79	3	2	2	0	1	0	2	2
80	2	2	2	1	2	2	1	1
81	1	0	1	0	1	1	1	0
82	1	2	0	2	1	2	2	0
83	2	0	1	2	1	2	1	0
84	0	0	0	0	1	1	1	0
85	2	55	2	3	2	2	2	2
86	3	3	2	2	1	1	1	2
87	1	0	0	1	1	0	1	2
88	1	1	0	2	3	3	3	55
89	2	0	0	1	1	0	1	0
90	2	0	2	2	1	3	3	2
91	2	1	0	2	2	3	3	3
92	0	0	0	2	1	2	2	0
93	1	0	1	2	2	3	2	1
94	2	55	2	2	2	2	3	2
95	2	3	3	2	1	1	1	0
96	1	1	1	0	2	2	1	2
97	2	2	2	2	1	1	2	0
98	0	0	0	0	0	0	1	0
99	2	0	0	0	1	0	0	0
100	3	3	3	3	2	2	3	0
101	2	3	0	1	0	1	2	2
102	3	2	2	3	3	3	3	3
103	1	2	1	2	1	2	2	1
104	0	0	0	0	1	0	1	0
105	0	0	0	1	1	2	1	0
106	0	0	0	0	2	0	2	0
107	1	1	2	3	0	1	0	3
108	1	1	1	1	2	1	1	0
109	3	2	1	0	55	2	1	1
110	0	0	0	1	1	0	2	0
111	0	0	0	0	1	0	1	0
112	0	0	0	0	1	0	1	0
113	2	0	0	0	2	0	3	0
114	0	0	1	1	1	1	3	0
115	1	0	0	2	0	2	1	0
116	0	0	0	1	1	0	0	0
117	3	2	2	2	3	3	3	0

118	2	0	0	0	0	0	2	0
119	2	1	0	1	1	0	2	0
120	3	3	3	1	2	3	3	0
121	3	0	2	3	1	2	3	0
122	2	55	1	1	1	0	2	2
123	2	1	1	1	0	55	0	0
124	2	2	2	3	0	0	3	1
125	1	1	1	1	0	1	0	55
126	1	1	0	2	0	3	3	0
127	2	2	2	0	3	3	3	2
128	1	1	55	1	55	2	3	0
129	2	2	2	0	2	2	2	0
130	1	0	0	0	1	0	1	0
131	2	0	0	0	0	0	0	0
132	0	0	0	0	1	0	1	0
133	0	1	0	1	0	0	1	0
134	3	0	0	2	2	3	2	0
135	2	0	0	1	1	2	3	0
136	3	0	0	2	2	2	2	0
137	1	0	0	2	2	2	2	0
138	3	3	1	0	3			1
139	1	0	1	1	1	0	1	0
140	2	0	0	2	2	0	3	0
141	0	0	0	0	1	0	1	0
142	1	1	0	2	1	2	2	0
143	2	2	2	2	2	2	1	3
145	0	0	0	2	2	1	2	1
146	1	0	0	0	1	1	1	0
148	0	0	0	2	1	1	1	0
149	1	1	1	2	1	1	1	0
150	0	0	0	0	0	0	2	0
151	2	2	2	2	2	2	3	2
152	2	0	0	1	0	1	0	1
153	2	0	0	0	2	1	1	0
154	0	0	0	1	1	0	1	0
155	0	0	0	0	0	0	0	0
156	2	2	2	2	2	2	2	0
157	2	0	0	3	2	3	3	2
158	1	1	1	0	1	0	1	0
159	0	0	0	1	0	0	1	0
160	2	2	2	2	2	2	2	2

161	2	2	2	3	2	3	3	2
162	1	0	0	2	1	0	2	0
163	3	0	0	0	1	2	1	0
164	0	0	0	1	1	2	1	0
165	1	1	0	2	1	1	2	0
166	0	1	1	2	1	2	3	0
167	1	1	0	0	1	1	2	2
168	1	0	0	2	2	2	3	0
169	2	2	0	2	2	2	1	0
170	3	2	0	0	1	1	1	0
171	1	1	1	3	3	3	3	1
172	2	2	2	0	2	2	3	2
173	2	2	2	2	0	1	2	1
174	1	0	0	0	1	0	1	0
175	1	0	0	1	1	2	1	0
176	0	0	0	1	0	0	0	0
177	1	1	1	0	2	2	1	55
178	0	0	0	0	0	0	2	0
179	1	2	1	1	2	2	2	1
180	0	0	0	0	1	0	1	0
181	0	0	0	0	1	0	1	0
182	0	0	0	1	1	2	1	0
183	0	0	0	0	1	1	1	0
184	3	2	1	2	2	0	3	3
185	0	1	0	1	1	0	1	0
186	2	0	0	2	2	2	2	0
187	1	2	2	0	1	2	1	2
188	2	2	0	1	2	2	3	0
189	2	2	2	3	2	3	3	1
190	1	1	1	2	1	2	2	1
191	3	0	2	1	2	2	3	0
192	1	2	0	0	1	0	1	0
193	0	1	0	0	1	2	1	0
194	1	0	2	0	1	0	2	0
195	2	1	0	3	1	3	3	0
196	2	2	2	3	3	1	1	0
197	1	0	0	0	1	2	1	0
198	1	3	2	0	0	0	0	0
199	3	2	2	2	2	3	3	1
200	55	0	0	1	2	2	2	0
201	2	2	1	2	0	2	2	2

202	2	3	1	0	2	3	1	2
203	2	0	2	0	1	0	1	0
204	2	1	0	2	2	2	2	0
205	1	0	0	2	3	3	1	0
206	1	1	1	2	1	2	0	1
207	3	3	3	2	3	3	55	2
208	2	2	2	2	1	2	2	1
209	1	0	0	2	2	2	0	1
210	2	2	2			2	0	2
211	1	0	3	2	1	0	2	1
212	1	1	2	1	2	2	2	1
213	2	3	3	3	2	3	1	1
214	2	2	2	0	2	0	2	2
215	3	3	3	3	3	3	3	3
216	0	0	2	1	2	0	1	0
217	1	0	0	1	1	1	1	0
218	2	1	1	0	1	0	1	2
219	0	1	0	0	1	1	1	0
220	2	1	0	2	1	2	1	1
221	3	2	2	2	3	3	3	3
222	55	1	0	0	2	0	2	0
223	2	0	1	3	3	3	3	0
224	2	2	2	0	3	2	3	2
225	1	0	0	3	0	2	1	0
226	1	1	1	3	1	3	1	0
227	0	0	0	1	1	0	0	0
228	0	0	0	2	0	0	3	0
229	1	55	1	1	3	1	1	0
230	0	0	1	0	1	2	1	0
231	2	0	0	3	2	3	3	2
232	1	0	0	0	0	0	2	0
233	0	0	0	0	1	0	1	0
234	3	0	0	1	2	3	1	0
235	1	0	0	0	1	0	1	0
236	0	0	0	0	0	0	1	0
237	0	0	1	0	1	1	1	0
238	3	3	3	3	2	2	3	3
239	2	0	2	3	2	3	2	2
240	3	55	1	55	2	2	2	0
241	1	0	3	0	2	3	3	0
242	2	2	2	1	1	2	3	2

243	2	2	2	0	1	2	2	2
244	1	0	0	2	1	0	1	0
245	2	2	2	2	2	2	3	2
246	2	2	1	0	2	2	2	2
247	3	3	3	1	2	2	1	2
248	2	0	2	3	2	3	3	2
249	3	0	0	0	2	0	0	0
250	3	3	2	0	1	3	1	2
251	2	2	2	0	1	2	1	2
252	3	3	1	3	3	1	3	2
253	2	0	2	1	1	3	1	3
254	2	0	0	2	1	3	2	0
255	0	1	0	3	55	0	2	0
256	1	0	0	2	55	0	2	0
257	2	2	2	0	2	2	2	2
258	1	0	0	0	1	0	1	0
259	1	2	0	0	1	2	3	1
260	0	0	0	0	0	0	0	0
261	2	0	0	1	0	0	2	0
262	2	2	2	2	0	2	1	0
263	2	2	2	1	2	0	2	0
264	2	1	0	2	2	2	2	0
265	0	0	0	0	1	0	1	0
266	3	3	2	2	3	3	3	3
267	1	0	0	0	2	2	2	0
268	2	2	2	2	2	2	3	3
269	2	1	3	0	2	2	0	1
270	1	0	0	0	1	0	3	0
271	2	2	2		1	2	1	2
272	2	1	2	2	2	2	2	2
273	2	0	0	0	1	0	1	0
274	0	0	0	0	1	0	1	0
275	0	0	0	1	1	2	0	0
276	0	0	0	55	2	0	1	0
277	2	2	1	2	3	3	2	2
278	3	2	1	2	3	3	2	2
279	0	0	0	0	0	0	1	0
280	2	3	3	3	3	3	3	3
281	2	0	0	2	3	3	1	2
282	1	0	0	0	0	1	2	0
283	1	2	0	3	1	1	1	0

284	55	1	1	0	1	1	1	0
285	1	55	1	1	3	3	2	2
286	1	1	0	2	1	2	3	2
287	1	2	0	0	1	0	3	0
288	1	0	0	0	2	2	0	0
289	1	1	1	0	0	0	1	1
290	1	0	1	1	3	3	1	0
291	1	0	1	0	2	2	3	3
292	1	0	0	0	1	0	0	0
293	2	2	2	0	2	1	2	2
294	0	0	0	1	1	0	55	0
295	0	1	0	1	1	0	1	0
296	2	0	0	0	0	2	1	1
297	1	1	0	1	1	0	2	0
298	1	1	0	0	1	0	1	0
299	0	0	0	0	1	0	0	0
300	1	0	0	1	0	0	1	0
301	1	1	1	1	1	2	3	55
302	1	0	0	1	1	2	1	0
303	3	0	0	2	3	3	3	0
304	2	2	2	2	2	2	2	2
305	1	1	2	1	1	2	2	1
306	2	0	0	0	1	0	2	0
307	1	0	0	0	1	2	1	0
308	0	0	0	1	1	0	1	1
309	0	0	0	1	1	1	0	0
310	1	3	0	3	1	0	1	2
311	2	55	55	3	3	2	3	2
312	3	3	3	3	3	3	3	3
313	3	0	0	3	2	2	2	0
314	1	0	0	2	1	1	1	0
315	0	0	0	0	1	0	1	0
316	2	2	3	3	3	3	3	2
317	1	2	3	0	0	2	1	0
318	2	2	3	3	1	2	3	3
319	55	2	55	3	1	2	3	2
320	1	55	1	2	0	2	3	0
321	0	1	0	0	2	2	2	0
322	3	2	2	2	2	3	1	3
323	1	0	0	0	1	0	2	0
324	1	0	1	2	2	2	3	2

325	55	1	1	1	2	2	2	1
326	0	0	0	0	1	0	1	0
327	0	0	0	2	1	1	1	0
328	1	1	1	1	1	0	1	1
329	2	2	3	1	2	2	2	0
330	2	2	1	0	1	0	1	2
331	1	3	2	3	2	3	1	0
332	0	0	0	0	2	2	1	0
333	1	2	2	1	1	2	3	2
334	2	0	0	0	2	1	1	0
335	1	0	1	2	1	0	3	0
336	0	1	0	1	2	0	3	0
337	3	1	0	1	2	3	2	3
338	3	3	2	3	0	2	2	2
339	2	0	0	2	2	1	0	0
340	1	1	0	1	2	2	2	0
341	1	1	0	1	1	1	1	0
342	0	0	0	0	1	0	55	0
343	3	2	2	2	2	0	2	2
344	1	0	0	2	2	0	2	0
345	55	0	0	2	2	2	3	2
346	1	3	2	2	2	2	3	2
347	2	2	2	2	2	3	2	3
348	1	2	2	0	55	3	0	3
349	1	3	3	3	2	1	0	1
350	2	0	0	2	3	2	2	0
352	0	55	2	1	2	1	1	0
353	1	3	2	3	2	2	3	3
354	1	0	0	2	1	0	1	0
355	3	2	2	3	1	1	3	0
356	1	0	0	2	1	1	2	0
357	1	2	2	1	1	2	1	2
358	3	0	0	3	2	3	1	0
359	3	3	3	2	3		3	3
360	55	2	1	0	55	2	2	0
361	0	0	0	0	1	0	1	0
362	55	2	0	2	2	3	1	0
363	0	0	0	0	1	0	2	0
364	1	0	0	0	2	0	2	0
365	2	0	0	0	1	0	1	0
366	1	0	0	1	1	0	2	0

367	2	2	1	3	2	2	3	3
368	0	0	0	2	1	2	2	0
369	2	0	0	2	0	3	3	0
370	2	2	3	2	1	2	2	2
371	2	2	2	55	2	3	55	1
372	0	0	0	0	1	0	2	0
373	3	2	2	2	3	3	1	1
374	2	0	0	0	1	1	1	0
375	0	0	0	1	2	3	2	0
376	1	0	0	1	1	2	3	0
377	1	1	0	2	1	0	1	0
378	2	0	0	2	1	2	1	0
379	1	0	0	0	0	0	1	0
380	1	0	0	0	0	0	55	0
381	55	55	0	0	0	0	2	0
382	2	0	0	2	55	1	1	0
383	2	0	3	0	1	2	2	3
384	1	1	1	2	2	2	1	2
385	3	3	3	2	3	3	2	3
386	99	1	2	2	1	1	1	0
387	2	3	2	3	1	2	2	2
388	1	0	1	3	3	1	3	0
389	1	0	0	2	1	1	1	0
390	3	3	2	2	2	3	3	2
391	2	3	0	3	3	3	2	1
392	2	2	2	3	3	3	3	2
393	3	2	2	2	3	2	3	3
394	2	2	2	0	1	0	1	0
395	55	55	0	0	1	0	1	55
396	0	1	1	2	2	3	2	0
397	55	0	55	2	1	2	2	55
398	3	1	1	2	3	2	1	2
399	0	0	0	0	1	0	0	0
400	0	0	0	2	1	0	1	0
401	2	0	0	2	1	0	2	0
402	0	0	0	1	1	0	1	0
403	1	1	1	2	2	1	1	1
404	3	2	1	1	2	0	1	3
405	3	3	3	3	3	3	3	3
406	2	2	2	2	2	55	1	2
407	0	0	0	0	1	0	1	0

408	2	0	0	0	1	1	2	0
409	2	1	0	0	1	1	1	0
410	1	2	3	1	1	2	1	1
411	3	1	2	2	2	2	3	3
412	3	2	55	1	2	2	1	0
413	55	0	0	2	2	0	2	0
414	2	2	2	3	2	2	2	0
415	2	0	1	3	2	3	2	0
416	3	2	0	3	2	3	3	0
417	3	2	2	2	55	2	3	2
418	55	0	0	1	2	2	2	1
419	2	55	3	3	2	2	2	2
420	2	0	0	2	2	3	2	0
421	1	0	0	2	1	1	1	0
422	2	2	2	2	1	2	1	0
423	2	1	2	2	2	2	1	1
424	3	2	2	2	2	3	2	99
425	0	0	0	3	1	3	3	0
426	0	0	1	3	2	2	1	0
427	2	0	1	2	1	2	1	0
428	3	2	2	2	0	2	2	2
429	0	0	0	0	1	2	1	0
430	2	55	2	1	2	2	3	2
431	1	1	3	0	1	0	1	2
432	1	0	0	0	2	0	2	0
433	2	2	2	1	1	2	1	2
434	2	0	2	1	1	0	1	0
435	0	0	0	0	1	0	1	0

8.3 STUDY INSTRUMENT

Please note, the author of this thesis was not involved with the creation of this study instrument, nor the collection of data analyzed herein.

DEMOGRAPHICS:
Read: "The first set of questions is general questions about yourself".

DEM1. What is your date of birth?
(yyyy/mm/dd)

__ __ __ __ / __ __ / __ __

DEM2. What gender do you identify yourself as?
(Interviewer: Only ask about gender if necessary to clarify):

0 Male
1 Female
2 Transgender female
3 Transgender male
55 Unsure
66 Not applicable
99 Refused to answer

DEM3. Were you born in Canada?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

DEM4. If yes for DEM3, what was your place of birth (city town or reserve and province)

City, town or reserve:

_____

Province:

_____

55 Unsure
66 Not applicable
99 Refused to answer

DEM5. If No for DEM3, what country were you born in?

_____

55 Unsure
66 Not applicable
99 Refused to answer

DEM6. What is the highest level of education you have completed?

0 Graduated grade 12
1 In grade school now (grade _____)
2 Dropped out before grade 12 (grade_____)
3 Trade school
4 University
5 College
6 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

DEM7. Over the last year what was the main way you got money to live on? *(circle only one)*

0 Regular work (full, part time or contract)
1 Welfare, EI, pension or other government support
2 Money from family/friends
3 Sex trade/prostitution
4 Dealing or doing drug runs
5 Panhandling
6 Stealing
7 Boosting
8 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

DEM8. Over the last year what other ways did you get money to live on *(circle all sources)*.?

0 Regular work (full, part time or contract)
1 Welfare, EI, pension or other government support
2 Money from family/friends
3 Sex trade/prostitution
4 Dealing or doing drug runs
5 Panhandling
6 Stealing
7 Boosting
8 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

DEM9. What ethnic group or family background do you most identify yourself with:

Do not read choices

0 Caucasian/White
1 Chinese
2 Filipino
3 South-Asian (e.g. Indian, Pakistani)
4 other Asian (e.g. Vietnamese, Japanese)
5 Latin American
6 Middle Eastern
7 Black-African
8 Black-Caribbean
9 Other black
10 First Nations (treaty)
11 First Nations (non-treaty)
12 Metis
13 Inuit
14 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

(Ctrl)

DEM10. What type of residence do you currently live in?

0 At your own house or apartment
1 At family member's house or apartment
2 At a friend's house or apartment
3 Empty House
4 Hostel/Shelter
5 Hotel
6 Shooting gallery
7 Rooming/ boarding house
8 Recovery house/treatment centre
9 On the street
10 Vehicle (trailer, van, car)
11 Detention centre/ Youth camp
12 Jail or prison
13 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

DEM11. Including your current residence, how many different places have you lived in the past year?

_____

DEM12. Using the first 3 digits of your postal code, what part of the city do you live in?
(Interviewer: If participant is concerned about confidentiality, indicate that approximately 15,000-20,000 other people will have this same postal code information)

Option 1 *(preferred)*
Postal code (first 3 digits)

_____

Option 2
Neighbourhood

_____

55 Unsure
66 Not applicable
99 Refused to answer

DEM13. In what part of the city do you usually hang out?

Option 1 *(preferred)*
Postal code (first 3 digits)

_____

Option 2
Neighbourhood

_____

55 Unsure
66 Not applicable
99 Refused to answer

DEM14. Have you moved to Winnipeg within the past 12 months?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

If yes, go to DEM15 otherwise go to ED1.

DEM15 Where were you living before you came to Winnipeg

City, town or reserve:

_____

Province:

_____

Country:

_____

55 Unsure
66 Not applicable
99 Refused to answer

INDIVIDUAL DRUG BEHAVIOURS

Read: "**Now I would like to ask you about your drug use. All of the answers that you give me are confidential**".

ED1. The first time you fixed (injected/shot up), how old were you?

_____

ED2. In the past 6 months, which of the following drugs have you used without injecting? ***(circle all that apply)***

0 Alcohol
1 Acid
2 Painkillers (e.g. dilaudid)
3 Amphetamines
4 Barbiturates
5 Cocaine
6 Crack
7 Demerol/morphine/opium
8 Downers/tranquilizers
9 Ecstasy
10 Gasoline/solvents
11 Marijuana
12 PCP/Angel dust
13 Tylenol 3
14 Heroin
15 Mushrooms
16 Ruffies (Rohypnol)
17 GHB (gamma-hydroxybutyrate)
18 Methadone prescribed
19 Methadone unprescribed
20 None
21 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

ED3. What is your preferred injection drug? (***drug of choice, circle only one)***

0 Cocaine (uptown)
1 Talwin and Ritalin (speedball)
2 Morphine
3 Heroin (horse, junk, smack, downtown)
4 Heroin and cocaine (speedball)
5 Heroin mixed with another drug
6 Amphetamines (speed, uppers)
7 Methadone
8 Crack/rock cocaine
9 Methamphetamine (crystal meth)
10 PCP (angel dust)
11 Dilaudid
12 Barbiturates (downers)
13 Ritalin alone
14 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

ED4. What drug do you most frequently inject? ***(circle only one)***

0 Cocaine (uptown)
1 Talwin and ritalin (speedball)
2 Morphine
3 Heroin (horse, junk, smack, downtown)
4 Heroin and cocaine (speedball)
5 Heroin mixed with another drug
6 Amphetamines (speed, uppers)
7 Methadone
8 Crack/rock cocaine
9 Methamphetamine (crystal meth)
10 PCP (angel dust)
11 Dilaudid
12 Barbiturates (downers)
13 Ritalin alone
14 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

ED5.Which drugs have you injected in the last 6 months? ***(circle all that apply)***

0 Cocaine (uptown)
1 Talwin and Ritalin (speedball)
2 Morphine
3 Heroin (horse, junk, smack, downtown)
4 Heroin and cocaine (speedball)
5 Heroin mixed with another drug
6 Amphetamines (speed, uppers)
7 Methadone
8 Crack/rock cocaine
9 Methamphetamine (crystal meth)
10 CP (angel dust)
11 Dilaudid
12 Barbiturates (downers)
13 Ritalin alone
14 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

ED6. In the past month, how often did you inject (shoot up)?

0 Not at all
1 Once in a while, not every week
2 Regularly, once or twice a week
3 Regularly, three or more times a week
4 Every day
55 Unsure
66 Not applicable
99 Refused to answer

ED7. Over the past 6 months, what types of places have you injected drugs? ***(circle all that apply)***

0 At your own house or apartment
1 At family member's house or apartment
2 At a friend's house or apartment
3 Empty House
4 Hostel/Shelter
5 Hotel
6 Shooting gallery
7 Rooming/ boarding house
8 Recovery house/treatment centre
9 On the street
10 Vehicle (trailer, van, car)
11 Detention centre/ Youth camp
12 Jail or prison
13 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

Individual Drug Behaviours (Continued)

(If hotel was indicated in ED7, ask the following questions (ED8 and ED9), otherwise go to ED10)

ED8. How many different hotels have you injected at in the past 6 months?

_____

ED9. Over the past 6 months, on how many different days did you inject at each of these hotels **(to a maximum of 6 hotels - if more than 6 ask the person to think about the hotels at which they most frequently inject**)

	# of days	**Name of hotel (if person is willing to provide hotel name**
Hotel A		
Hotel B		
Hotel C		
Hotel D		
Hotel E		
Hotel F		

ED10. Over the past 6 months, what type of place did you inject at most frequently?***(circle only one)***

0 At your own house or apartment
1 At family member's house or apartment
2 At a friend's house or apartment
3 Empty House
4 Hostel/Shelter
5 Hotel
6 Shooting gallery
7 Rooming/ boarding house
8 Recovery house/treatment centre
9 On the street
10 Vehicle (trailer, van, car)
11 Detention centre/ Youth camp
12 Jail or prison
13 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

ED11. This is a "what if" question: If you wanted to always use a clean needle, how certain are you that you could do it ?

0 Extremely sure I could not
1 Quite sure I could not
2 Slightly sure I could not
3 Slightly sure I could
4 Quite sure I could
5 Extremely sure I could
55 Unsure

ED12. In the past 6 months, how often have you given away one of your used needles to someone who needed it to inject drugs?

0 Never
1 Occasionally
2 Sometimes
3 Usually
4 Always
55 Unsure
66 Not applicable
99 Refused to answer

ED13. In the past 6 months, how often have you used someone else's cooker, rinse water, or cotton that someone else has already used, or may have already used?

0 Never
1 Occasionally
2 Sometimes
3 Usually
4 Always
55 Unsure
66 Not applicable
99 Refused to answer

ED14. In the past 6 months, how often did you inject drugs after someone transferred (frontloading, backloading, or piggybacking) drugs into your syringe from their syringe?

0 Never
1 Occasionally
2 Sometimes
3 Usually
4 Always
55 Unsure
66 Not applicable
99 Refused to answer

ED15. In the past 6 months, how often have you used a needle that someone else has already used or may have already used?

0 Never
1 Occasionally
2 Sometimes
3 Usually
4 Always
55 Unsure
66 Not applicable
99 Refused to answer

If "never", go to ED19

ED16. In the last **6 MONTHS**, have you used a needle that had been previously used by someone you suspected or knew was HIV (AIDS virus) and/or HCV (hepatitis C) positive?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

ED17 In the last **6 MONTHS** when you used needles or syringes previously used by someone else, how often did you clean them first?

0 Never
1 Hardly ever
2 Sometimes
3 Frequently
4 Always
55 Unsure
66 Not applicable
99 Refused to answer

If "never", go to ED19.

ED18. How did you usually clean the needles and syringes that someone else had used?

0 Cold water
1 Hot water
2 Boiling water
3 Bleach
4 Alcohol
5 Other,
(specify _____)
55 Unsure
66 Not applicable
99 Refused to answer

ED19. Do you think that you can be infected with <u>hepatitis C</u> by injecting drugs after someone has squirted drugs into your syringe from a syringe that they already injected with?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

ED20. Do you think that you can be infected with <u>HIV</u> by injecting drugs after someone has squirted drugs into your syringe from a syringe that they had already injected with?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

ED21. Do you think that you can be infected with hepatitis C by using someone else's cooker, rinse water, or cotton?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

ED22. Do you think that you can be infected with HIV by using someone else's cooker, rinse water, or cotton?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

ED23. In the past 6 months, how many times have you bought drugs for someone else?

0 0 times
1 1 time
2 2-4 times
3 5-9 times
4 10-24 times
5 25-49 times
6 50-99 times
7 100 times or more
55 Unsure
66 Not applicable
99 Refused to answer

ED24. In the past 6 months, how many times have you sold drugs?

0 0 times
1 1 time
2 2-4 times
3 5-9 times
4 10-24 times
5 25-49 times
6 50-99 times
7 100 times or more
55 Unsure
66 Not applicable
99 Refused to answer

ED25. In the past 6 months, how many times have you bought needles for someone else?

0 0 times
1 1 time
2 2-4 times
3 5-9 times
4 10-24 times
5 25-49 times
6 50-99 times
7 100 times or more
55 Unsure
66 Not applicable
99 Refused to answer

ED26. In the past 6 months, how many times have you given away needles?

0 0 time
1 1 time
2 2-4 times
3 5-9 times
4 10-24 times
5 25-49 times
6 50-99 times
7 100 times or more
55 Unsure
66 Not applicable
99 Refused to answer

ED27. In the past 6 months, how many times have you injected someone else with drugs as a service in return for drugs, money or other goods?

0 0 time
1 1 time
2 2-4 times
3 5-9 times
4 10-24 times
5 25-49 times
6 50-99 times
7 100 times or more
55 Unsure
66 Not applicable
99 Refused to answer

ED28. In the past 6 months, how many time have you injected someone else with drugs as a favour to help them out (i.e. you weren't expecting anything in return)?

0 0 time
1 1 time
2 2-4 times
3 5-9 times
4 10-24 times
5 25-49 times
6 50-99 times
7 100 times or more
55 Unsure
66 Not applicable
99 Refused to answer

NEEDLE SOURCES

NS1. In the last 6 months, have you exchanged needles or gotten new needles at a needle exchange?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

NS2. In the last 6 months, how many of your needles did you usually get at a needle exchange?

0 All
1 Most, but not all
2 About half
3 Less than half
4 None
55 Unsure
66 Not applicable
99 Refused to answer

NS3. In the last 6 months, have you usually exchanged your own needles, or does someone else do it for you?

0 Usually do it myself
1 Usually done for me by someone else
55 Unsure
66 Not applicable
99 Refused to answer

NS4. In the last 6 months, where did you get your new needles from.? (***Circle all that apply)***

0 Nurse/doctor/hospital
1 Pharmacy/drugstore
2 Street Connections
3 Other needle exchanges, (specify_____)
4 Someone on the street
5 Dealer
6 Shooting Gallery Owner
7 Friends/partners/family
8 Found on the street
55 Unsure
66 Not Applicable (don't ever use new syringes)
99 Refused to answer

NS5. Of all the places you obtained new needles from in the last 6 months, from where did you get most of your needles? ***(Circle only one)***

0 Nurse/doctor/hospital
1 Pharmacy/drugstore
2 Street Connections
3 Other needle exchanges, (specify_____)
4 Someone on the street
5 Dealer
6 Shooting Gallery Owner
7 Friends/partners/family
8 Found on the street
55 Unsure
66 Not Applicable (don't ever use new syringes
99 Refused to answer

NS6. In the last 6 months how easy was it for you to obtain a brand new needle/syringe when you needed one?

0 Very easy
1 Somewhat easy
2 Somewhat difficult
3 Very difficult
55 Unsure
66 Not applicable
99 Refused to answer

BINGES

Read: Binges are "when you fixed more often than your usual drug use for a short period of time and then you went cold or back to usual use"

BN1 Over the last **6 months**, did you go on runs or binges of injection drugs?
If No go to SIS1, otherwise BN2

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

BN2 How often did you binge over the last **6 months**?

0 At least once a week
1 Every couple of weeks
2 About once a month (about 6 times)
3 Once every 2-3 months (about 2-3 times)
4 Once every 3-6 months (about 1-2 times)
5 Less than once every 6 months
6 Never
55 Unsure
66 Not applicable
99 Refused to answer

BN3 In the last **6 months**, on average, how long were your binges/drug runs (of injection drugs)?

# of days: _____

# of injections per day:

_____

Total/binge (#days x # injections per day):

_____

What injection drug(s) do you normally binge on? ***(list in order of most frequent)***

1_____

_____

2_____

_____

3_____

_____

SMOKING, INHALING OR SNORTING DRUGS

SIS1. Have you smoked, inhaled or snorted any drugs in the last 6 months?
If No, go to SEB1 (page 10), otherwise SIS2

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SIS2. What drugs have you smoked/inhaled/snorted? ***(circle all that apply)***

0 Acid
1 Barbiturates
2 Cocaine (uptown)
3 Crack/rock cocaine
4 Demerol/morphine/opium
5 Downers/tranquilizers
6 Ecstasy
7 Gasoline/solvents
8 Marijuana
9 PCP/Angel dust
10 Tylenol 3
11 Ruffies (Rohypnol)
12 GHB (gamma-hydroxybutyrate)
13 Methadone prescribed
14 Methadone unprescribed
15 Talwin and Ritalin (speedball)
16 Morphine
17 Heroin (horse, junk, smack, downtown)
18 Heroin and cocaine (speedball)
19 Heroin mixed with another drug
20 Amphetamines (speed, uppers)
21 Methamphetamine (crystal meth)
22 Dilaudid
23 Ritalin alone
24 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

If only marijuana was indicated in SIS2, go to SEB1 (page 10).

SIS3. Not including marijuana, what drug do you most frequently smoke/inhale/snort? ***(Circle only one)***

0 Acid
1 Painkillers (e.g. dilaudid)
2 Barbiturates
3 Cocaine (uptown)
4 Crack/rock cocaine
5 Demerol/morphine/opium
6 Downers/tranquilizers
7 Ecstasy
8 Gasoline/solvents
9 Marijuana
10 PCP/Angel dust
11 Tylenol 3
12 Ruffies (Rohypnol)
13 GHB (gamma-hydroxybutyrate)
14 Methadone prescribed
15 Methadone unprescribed
16 Talwin and Ritalin (speedball)
17 Morphine
18 Heroin (horse, junk, smack, downtown)
19 Heroin and cocaine (speedball)
20 Heroin mixed with another drug
21 Amphetamines (speed, uppers)
22 Methamphetamine (crystal meth)
23 Dilaudid
24 Ritalin alone
25 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

SIS4 Excluding marijuana use, in the past month, how often did you smoke/inhale/snort drugs?

0 Not at all
1 Once in a while, not every week
2 Regularly, once or twice a week
3 Regularly, three or more times a week
4 Every day
55 Unsure
66 Not applicable
99 Refused to answer

SIS5. Excluding marijuana, over the past 6 months at what types of places have you smoked/inhaled/snorted drugs?
(circle all that apply)

0 At your own house or apartment
1 At family member's house or apartment
2 At a friend's house or apartment
3 Empty House
4 Hostel/Shelter
5 Hotel
6 Shooting gallery
7 Rooming/ boarding house
8 Recovery house/treatment centre
9 On the street
10 Vehicle (trailer, van, car)
11 Detention centre/ Youth camp
12 Jail or prison
13 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

SIS6. Excluding marijuana use, over the past 6 months, at what types of places did you most frequently smoke/snort/inhale drugs? **(Circle one only)**

0 At your own house or apartment
1 At family member's house or apartment
2 At a friend's house or apartment
3 Empty House
4 Hostel/Shelter
5 Hotel
6 Shooting gallery
7 Rooming/ boarding house
8 Recovery house/treatment centre
9 On the street
10 Vehicle (trailer, van, car)
11 Detention centre/ Youth camp
12 Jail or prison
13 Other, (specify_____)
55 Unsure
66 Not applicable
99 Refused to answer

SIS7. Not including marijuana use, in the last 6 months, have you used a straw, pipe or can that someone else had already used to smoke, snort or inhale drugs?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

If yes, go to SIS8, otherwise SIS9.

SIS8. Excluding marijuana use, how often, in the last 6 months, did you use a straw, pipe or can that someone else had already used to smoke, snort or inhale drugs?

0 Hardly ever
1 Sometimes
2 Frequently
3 Always
55 Unsure
99 Refused to answer

SIS9. In the last 6 months, have you ever had cuts or burns on your lips or inside your mouth due to crack smoking?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SEXUAL BEHAVIOURS

SEB1. Over the last 6 months, how many sexual partners of the opposite sex have you had (includes vaginal, anal and/or oral sex with regular, casual, and client/"date"/trick partners)?
If 0, then go to SEB4, otherwise SEB2

0 0
1 1-5
2 6-19
3 20-99
4 100-499
5 500-999
6 1000 or more
55 Unsure
66 Not applicable
99 Refused to answer

SEB2. Were any of these opposite sex partners

a) Regular partners (someone with whom you have a relationship and with whom you are emotionally involved)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

b) Casual sex partners (someone you have had sex with once or a few times, but with whom you have no emotional involvement)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

c) Client sex partners (a client is someone who has given you money, drugs, goods or anything else in exchange for sex)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SEB3. In the past 6 months how often did you use a condom or barrier with opposite sex partners? ***(check appropriate box)***

	Partner		
	Regular	**Casual**	**Client**
0 Never			
1 Occasionally			
2 Sometimes			
3 Usually			
4 Always			
55 Unsure			
66 Not Applicable			
Refused to answer			

SEB4. Over the last 6 months, how many sexual partners of the same sex have you had (includes vaginal, anal and/or oral sex with regular, casual, and client/"date"/trick partners)?
If 0, then go to SS1, otherwise SEB5

0 0
1 1-5
2 6-19
3 20-99
4 100-499
5 500-999
6 1000 or more
56 Unsure
66 Not applicable
99 Refused to answer

SEB5. Were any of these same sex partners?

a) Regular partners (someone with whom you have a relationship and with whom you are emotionally involved)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

b.) Casual sex partners (someone you have had sex with once or a few times, but with whom you have no emotional involvement)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

c.) Client sex partners (a client is someone who has given you money, drugs, goods or anything else in exchange for sex)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SEB6. In the past 6 months how often did you use a condom or barrier with same sex partners? ***(Check appropriate box)***

	Partner		
	Regular	**Casual**	**Client**
0 Never			
1 Occasionally			
2 Sometimes			
3 Usually			
4 Always			
55 Unsure			
66 Not Applicable			
Refused to answer			

HEALTH AND SUPPORT
Social support

SS1. Are there people who would loan you $50 if you needed it?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS2. Are there people who you could talk to, to get information about infections like HCV (hepatitis C) and HIV (AIDS virus)?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS3. Are there people you can depend on in an emergency, even if they had to go out of their way?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS4. Are there people you could talk to about things that have been troubling you, or people you could confide in?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS5. Are there people who really understand you, who understand your feelings and what your life is like?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS6. If you were feeling down on yourself, or felt that you couldn't do anything right, are there people who would have faith in you?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS7. Are there people who accept you as you are, both your good and bad points?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SS8. Are there people who let you know they respect who you are, and how you think and act?

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

HEALTH AND SUPPORT
Social diversity

Read: In the past two weeks have you spoken in person or on the phone with:

SD1. A spouse (girl/boyfriend)

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD2. Your parents

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD3. Parents-in-law

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD4. Your children

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD5. Close family members

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD6. Neighbours that you feel you know quite well

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD7. Friends

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD8. People that you work with

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD9. Schoolmates

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD10. Members of a social or recreational group that you belong to (e.g. a sports team)

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

SD11. Members of a group with a religious affiliation

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

HEALTH AND SUPPORT
Drug dependency

DD1. Do you think your use of injection drugs is out of control?

0 Never/almost never
1 Sometimes
2 Often
3 Always/nearly always
55 Unsure
66 Not applicable
99 Refused to answer

DD2. Does the prospect of missing a fix make you anxious or worried?

0 Never/almost never
1 Sometimes
2 Often
3 Always/nearly always
55 Unsure
66 Not applicable
99 Refused to answer

DD3. Do you worry about your use of injection drugs?

0 Never/almost never
1 Sometimes
2 Often
3 Always/nearly always
55 Unsure
66 Not applicable
99 Refused to answer

DD4. Do you wish you could stop?

0 Never/almost never
1 Sometimes
2 Often
3 Always/nearly always
55 Unsure
66 Not applicable
99 Refused to answer

DD5. How difficult do you find it to go without using injection drugs?

0 Not difficult
1 Quite difficult
2 Very difficult
3 Impossible
55 Unsure
66 Not applicable
99 Refused to answer

HEALTH AND SUPPORT

Depression

DEP1. Have you recently been feeling unhappy and depressed?

0 Not at all;
1 No more than usual
2 More than usual
3 Much more than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP2. Have you recently been thinking of yourself as a worthless person?

0 Not at all;
1 No more than usual
2 More than usual
3 Much more than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP3. Have you recently felt that life is entirely hopeless?

0 Not at all;
1 No more than usual
2 More than usual
3 Much more than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP4. Have you recently been unable to concentrate on whatever you're doing?

0 Not at all;
1 No more than usual
2 More than usual
3 Much more than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP5. Have you recently been able to enjoy your day-to-day activities?

0 More so than usual
1 Same as usual
2 Less than usual
3 Much less than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP6. Have you recently tended to lose interest in your ordinary activities?

0 Not at all;
1 No more than usual
2 More than usual
3 Much more than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP7. Have you been feeling full of energy?

0 More so than usual
1 Same as usual
2 Less than usual
3 Much less than usual
55 Unsure
66 Not applicable
99 Refused to answer

DEP8. Have you recently felt that life isn't worth living?

0 Not at all;
1 No more than usual
2 More than usual
3 Much more than usual
55 Unsure
66 Not applicable
99 Refused to answer

HEALTH AND SUPPORT

Extraversion

Read: How would you describe yourself for the following list of common human characteristics. Using the first trait (adventurous) as an example, you can choose numbers from 1-9 with 1 being very unadventurous, 3 is moderately unadventurous, 7 is moderately adventurous, and 9 is very adventurous.

EV1. Unadventurous	1	2	3	4	5	6	7	8	9	Adventurous
EV2. Unassertive	1	2	3	4	5	6	7	8	9	Assertive **(willing to strongly state your opinion; confident and sure of yourself)**
EV3. Inactive	1	2	3	4	5	6	7	8	9	Active
EV4. Timid	1	2	3	4	5	6	7	8	9	Bold
EV5. Silent	1	2	3	4	5	6	7	8	9	Talkative
EV6. Unenergetic	1	2	3	4	5	6	7	8	9	Energetic
EV7. Introverted **(shy, withdrawn)**	1	2	3	4	5	6	7	8	9	Extraverted **(outgoing, sociable)**

HEALTH AND SUPPORT
Infection information for study participant

INF1. Have you ever been tested for hepatitis C? **If No, go to INF2, otherwise INF3.**

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

INF2. Can you tell me some of the reasons why you have not been tested for hepatitis C?

(please respond on separate answer sheet)

INF3. Have you ever been told that you are positive for hepatitis C? **If No, go to INF5, otherwise INF4.**

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

INF4. Who told you that you were positive for hepatitis C?

0 A nurse or doctor
1 A friend
2 Family member
3 Spouse/lover
4 Acquaintance/stranger
55 Unsure
66 Not applicable
99 Refused to answer.

INF5. Have you ever been tested for HIV (AIDS virus)? **If No, go to INF 6, otherwise INF7.**

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

INF6. Can you tell me some of the reasons why you have never been tested for HIV?

(Please respond on separate answer sheet)

INF7. Have you ever been told that you are positive for HIV? **If No, go to INF9, otherwise INF8.**

0 No
1 Yes
55 Unsure
66 Not applicable
99 Refused to answer

INF8. Who told you that you were positive for HIV (AIDS virus)?

0 A nurse or doctor
1 A friend
2 Family member
3 Spouse/lover
4 Acquaintance/stranger
55 Unsure
66 Not applicable
99 Refused to answer.

Read: Would you strongly agree, agree, disagree or strongly disagree with the following statements?

If INF3 was NO,
INF9. Becoming infected with hepatitis C is not one of my main concerns or worries.

0 Strongly agree (e.g. I know I won't ever be infected)
1 Agree (e.g. It's unlikely I will become infected)
2 Disagree (e.g. It's likely I will become infected)
3 Strongly disagree (e.g. I know I will someday be infected)

If INF7 is NO,
INF10. Becoming infected with HIV is not one of my main concerns or worries.

0 Strongly agree (e.g. I know I won't ever be infected)
1 Agree (e.g. It's unlikely I will become infected)
2 Disagree (e.g. It's likely I will become infected)
3 Strongly disagree (e.g. I know I will someday be infected)

HEALTH AND SUPPORT
Overall group norms

GN1.How many of your close friends talk about harm reduction and safe injection?

0 None
1 Very little/few
2 Less than half
3 About half
4 More than half
5 Almost all
6 All
55 Unsure
66 Not applicable
99 Refused to answer.

GN2. How many of your close friends or associates encourage you to inject drugs? **(verbal encouragement)**

0 None
1 Very little/few
2 Less than half
3 About half
4 More than half
5 Almost all
6 All
55 Unsure
66 Not applicable
99 Refused to answer.

GN3. How many of your close friends or associates would encourage you to always use clean needles? **(verbal encouragement)**

0 None
1 Very little/few
2 Less than half
3 About half
4 More than half
5 Almost all
6 All
55 Unsure
66 Not applicable
99 Refused to answer.

GN4. How many of your close friends would encourage you to always use your own equipment like cotton, rinse water, or cookers?

0 None
1 Very little/few
2 Less than half
3 About half
4 More than half
5 Almost all
6 All
55 Unsure
66 Not applicable
99 Refused to answer

GN5. How many of the IDU you know, try to always use clean needles for injecting drugs?

0 None
1 Very little/few
2 Less than half
3 About half
4 More than half
5 Almost all
6 All
55 Unsure
66 Not applicable
99 Refused to answer

SOCIAL NETWORKS

1.) Network members:

Read: We are interested in the relationship between close personal contact and infectious diseases that are transmissible through used syringes, like hepatitis. We would like to ask you some questions about the people you normally associate with. We will not ask you for any information that could be used to identify those individuals and any information you provide to us will be confidential.

First, please think back over the last 30 days about the people with whom you have had more than casual contact. These would be people that you have seen or have spoken to on a regular basis. Most of these close contacts would be people such as friends, family, sex partners, people you inject drugs with, or people you live with.

Let's make a list of these people *(Interviewer - the maximum allowed on the list is 20 people. If the individual reaches 20 people ask them how many additional people they would be able to nominate and note their response on the answer sheet).* **Please use only initials, or some other identifier that will make sense to you such as a made up name. Please do not use their last names. We will use this list to make sure we know which individuals we are talking about. Remember that we are interested in people that you've had contact with in the last 30 days.**

Interviewer: use the following prompts as needed, to help clients recall their associates.

People that you used drugs with in the last 30 days.
People who you had sex with during the last 30 days.
For subjects who are sex workers: list a maximum of 10 sex partners. If the name of a client is not known they can be listed as unknown1, unknown2, etc. If they have a regular sex partner(s) try to ensure that they are included on the list)
Friends, relatives or other individuals that you feel close to?
People you live with.
People you hang out with.

2.) Type of contact: *Interviewer: Once names are listed, please ask the participant the questions listed below and circle the appropriate letter by each name on the following page.*

Questions to ask regarding each of the network members listed on the following page:

1. **Which of these people has injected drugs in the last 6 months:** Enter **Y** (Yes) or **N** (No) or **U** (Unsure)

2. **Not including marijuana use, which of these people has smoked/snorted/inhaled drugs in the last 6 months**: Enter **Y** (Yes) or **N** (No) or **U** (Unsure)

3. **Which of these people has been a sex partner of yours in the last 6 months**: Enter **Y** (Yes) or **N** (No)

4. **What is the gender of each of these people?** Enter **M** Male, **F** female, **TM** transgender male, **TF** transgender female.

5. **What is the age of each of these people?**

6. **What is this person's relationship to you:** Enter **F** (family member), **L** (lover, spouse, girl/boyfriend), **R** (Friend), **C** (Acquaintance/Stranger).

7. **What is this person's ethnic group**: Enter the appropriate letter response

A. Caucasian/White;	**I.** Black-Caribbean
B. Chinese;	**J.** Other black
C. Filipino;	**K.** First Nations (treaty)
D. South-Asian	**L.** First Nations (non-treaty)
E. Other Asian	**M.** Metis
F. Latin American	**N.** Inuit
G. Middle Eastern	**O.** Other
H. Black-African	**P.** Unsure
	Q. Refused to answer

List of network members

Network member #	Network member Identifier	IV drug use	Smoke/Snort/ Inhale	Sex partner	Gender	Age	Relationship *(Co-workers, dealers, tricks, etc should be categorized as acquaintances unless person considers them a friend)*	Ethnic group
1		Y N U	Y N U	Y N	M F TM TF		F L R C	
2		Y N U	Y N U	Y N	M F TM TF		F L R C	
3		Y N U	Y N U	Y N	M F TM TF		F L R C	
4		Y N U	Y N U	Y N	M F TM TF		F L R C	
5		Y N U	Y N U	Y N	M F TM TF		F L R C	
6		Y N U	Y N U	Y N	M F TM TF		F L R C	
7		Y N U	Y N U	Y N	M F TM TF		F L R C	
8		Y N U	Y N U	Y N	M F TM TF		F L R C	
9		Y N U	Y N U	Y N	M F TM TF		F L R C	
10		Y N U	Y N U	Y N	M F TM TF		F L R C	
11		Y N U	Y N U	Y N	M F TM TF		F L R C	
12		Y N U	Y N U	Y N	M F TM TF		F L R C	
13		Y N U	Y N U	Y N	M F TM TF		F L R C	
14		Y N U	Y N U	Y N	M F TM TF		F L R C	
15		Y N U	Y N U	Y N	M F TM TF		F L R C	
16		Y N U	Y N U	Y N	M F TM TF		F L R C	
17		Y N U	Y N U	Y N	M F TM TF		F L R C	
18		Y N U	Y N U	Y N	M F TM TF		F L R C	
19		Y N U	Y N U	Y N	M F TM TF		F L R C	
20		Y N U	Y N U	Y N	M F TM TF		F L R C	

If the study participant nominates 20 network members, ask them how many additional people they could nominate and enter the number here:

Number of additional network members: _____

3.) **<u>Interaction of network members</u>:** *Interviewer: Following step 2), transfer the names of all of the network members to the interaction grid. For each person listed ask the subject to indicate which of the other individuals on the list that particular person knows.*

4.) <u>Choose members</u>: *Interviewer: Now transfer the names of all injection drug users onto the next part of the questionnaire shown below. If there are more than 5 IDU on the list place them, to a maximum of 5, on the questionnaire in the order the study participant placed them on the network member list.*

<u>Network questions re each contact</u>:
Interviewer: List the 5 network members chosen as per the above instructions and assign a code to each contact as follows (this information will be used by data entry to identify each contact of a given study participant.
a) List the first names or initials of the contacts chosen from the list under "initials/first name"
b) Enter the subject code from page 1 of the questionnaire on each of the "subject code" lines.
c) Assign a contact code (1 through 5) after the dash

Transfer the "initial/identifier" to a separate sheet of paper so you and the study participant can refer to it.

Initial/identifier	Subject code		Contact code (1-5)
		—	
		—	
		—	
		—	
		—	

<u>Example shown below:</u>

Initial/identifier	Subject code		Contact code (1-5)
John	121	—	1
AJ	121	—	2
		—	
		—	
		—	

For the following sections, check the appropriate boxes unless full answer is requested

CONTACT DEMOGRAPHICS

CD1. What is [person]'s relationship to you?
This is partially a repeat from the initial network member list, but more detailed types of relationships are listed here, so the participant must be asked the question again for the 5 chosen network members.

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Friend					
1 2 Spouse					
2 Girl/Boyfriend, lover					
3 Ex-lover					
4 Ex-spouse					
5 Mother					
6Father					
7 Brother					
8 Sister					
9 Son					
10 Daughter					
11 Cousin					
12 In-laws					
13 Niece					
14 Nephew					
15 Uncle					
16 Aunt					
17 Other relative					
18 Acquaintance					
19 Stranger					
20 Dealer					
21 Trick					
22 Other, specify below					
55 Unsure					
99 Refused to answer					

If "other" is selected above, specify what "other" means in the box below.

Network Member #	Other, specify
1	
2	
3	
4	
5	

CD2. How long have you known [person]?

Network Member #	
1	
2	
3	
4	
5	

CD3. Where was [person] born?

Network Member #	
1	
2	
3	
4	
5	

CD4. How frequently would you say you have contact with [person]?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Daily					
1. 2-4 times per week					
2. Once a week					
3. 1-3 times per month					
4. Less than once per month					
55 Unsure					
66 Not applicable					
99 Refused to answer					

CD5. How did you meet [person]?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Work together					
1 School					
2 Member of same gang					
3 On the street					
4 Neighbours					
5 Through mutual friends					
6 Through a family member					
7 Injected together					
8 Person is a family member					
9 Bar/Hotel					
10 Other, specify below					
55 Unsure					
66 Not applicable					
99 Refused to answer					

If "other" is selected above, specify what "other" means in the box below.

Network Member #	Other, specify
1	
2	
3	
4	
5	

CD6. What is the highest level of education [person] has completed?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Graduated grade 12					
1 In grade school now (Grade _____)					
2 Dropped out before grade 12 (grade_____)					
3 Trade school					
4 University					
5 College					
6 Other, specify below					
55 Unsure					
66 Not applicable					
99 Refused to answer					

If "other" is selected above, specify what "other" means in the box below.

Network Member #	Other, specify
1	
2	
3	
4	
5	

CD7. Over the last year what was [person's] main source of income?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Regular work (full, part time or contract)					
1 Welfare, EI, pension or other government support					
2 Money from family/friends					
3 Sex trade/prostitution					
4 Dealing or doing drug runs					
5 Panhandling					
6 Stealing					
7 Boosting					
8 Other, specify below					
55 Unsure					
66 Not applicable					
99 Refused to answer					

If "other" is selected above, specify what "other" means in the box below.

Network Member #	Other, specify
1	
2	
3	
4	
5	

CD8. What part of the city do they live in? Use the first 3 digits of their postal code (preferred) or neighbourhood name, if you know it. (**If they live outside of city, ask for name of town or reserve**).

Network Member #	**Postal Code (1st three digits only) or Neighbourhood name**	**Unsure**	**Not app.**	**Refused to answer**
1				
2				
3				
4				
5				

CONTACT INJECTION DRUG RISK

CDR1. To the best of your knowledge, in the past month, how often did [person] shoot up?

	Network Member #				
	1	2	3	4	5
0 Not at all					
1 Once in a while, not every week					
2 Regularly, once or twice a week					
3 Regularly, three or more times per week					
4 Every day					
55 Unsure					
66 Not Applicable					
99 Refused to answer					

CDR2. To the best of your knowledge, what drug does [person] most frequently inject? ***(Check only one)***

	Network Mmber #				
	1	2	3	4	5
0 Cocaine (uptown)					
1 Talwin and ritalin (speedball)					
2 Morphine					
3 Heroin (horse, junk, smack, downtown)					
4 Heroin and cocaine (speedball)					
5 Heroin mixed with another drug					
6 Amphetamines (speed, uppers)					
7 Methadone					
8 Crack/rock cocaine					
9 Methamphetamine (crystal meth)					
10 PCP (angel dust)					
11 Dilaudid					
12 Barbiturates (downers)					
13 Ritalin alone					
14 Other, specify below					
55 Unsure					
66 Not applicable					
99 Refused to answer					

If "other" is selected above, specify what "other" means in the box below.

Network Member #	Other, specify
1	
2	
3	
4	
5	

CDR3. To the best of your knowledge, what is [person's] preferred injection drug?

	Network Member #				
	1	2	3	4	5
0 Cocaine (uptown)					
1 Talwin and Ritalin (speedball)					
2 Morphine					
3 Heroin (horse, junk, smack, downtown)					
4 Heroin and cocaine (speedball)					
5 Heroin mixed with another drug					
6 Amphetamines (speed, uppers)					
7 Methadone					
8 Crack/rock cocaine					
9 Methamphetamine (crystal meth)					
10 PCP (angel dust)					
11 Dilaudid					
12 Barbiturates (downers)					
13 Ritalin alone					
14 Other, specify below					
55 Unsure					
66 Not applicable					
99 Refused to answer					

If "other" is selected above, specify what "other" means in the box below.

Network Member #	Other, specify
1	
2	
3	
4	
5	

CDR4. Approximately, how long have they been injecting drugs? (Record as day, month or year and specify which {d, m or y})

1	
2	
3	
4	
5	

CDR5. To the best of your knowledge, in the past 6 months, has [person] injected: ***(check all that apply)***

	Network Member #				
	1	2	3	4	5
0 In a private residence (such as your own, their own or a friend's house or apartment)					
1 At a hotel					
2 At a shooting gallery					
3 At another public place such as on the street, a public washroom, empty house, or hostel					
55 Unsure					
66 Not applicable					
99 Refused to answer					

CDR6. In the past 6 months, how many times have you and [person] combined or pooled money so that you had enough money to buy drugs or injecting equipment?

	Network Member #				
	1	2	3	4	5
0 0 times, never					
1. 1 time					
2. 2-4 times					
3. 5-9 times					
4. 10-24 times					
5. 25-49 times					
6. 50-99 times					
7. 100 times or more					
55 Unsure					
66 Not applicable					
99 Refused to answer					

CDR7. In the past 6 months, how often did you inject with [person]?

	Network Member #				
	1	2	3	4	5
0 Not at all					
1 Once in a while, not every week					
2 Regularly, Once or twice a week					
3 Regularly, Three or more times per week					
4 Every day					
55 Unsure					
66 Not Applicable					
99 Refused to answer					

CDR8. Have you ever injected with a needle after [person] used it first?

	Network Member #				
	1	2	3	4	5
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
99 Refused to answer					

If "No", go to CDR11.

CDR9. In the past 6 months, how often have you injected with a needle after [person] used it first?

	Network Member #				
	1	2	3	4	5
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
99 Refused to answer					

If CDR9 is other than never, go to CDR10, otherwise go to CDR11.

CDR10. The last time this happened, can you describe in your own words why you ended up using their used needle? Why did they use it first?

(Please respond on separate answer sheet)

CDR11. In the past 6 months, how often has [person] injected with a needle after you used it first?

	Network Member #				
	1	2	3	4	5
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
99 Refused to answer					

If CDR11 is other than never, go to CDR12, otherwise go to CDR13.

CDR12. The last time this happened, can you describe in your own words why they ended up using your used needle? Why did you use it first?

(Please respond on separate answer sheet)

CDR13. In the past 6 months, how often have you used [person's]cooker, rinse water, or cotton after they had already used them?

	Network Member #				
	1	2	3	4	5
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

CDR14. In the past 6 months, how often did you inject drugs after [person] mixed your drugs in a syringe that they had already injected with?

	Network Member #				
	1	2	3	4	5
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

CDR15. How long have you been injecting drugs with [person]? (Record as day, month or year and specify which {d, m or y})

Network Member #	
1	
2	
3	
4	
5	

CDR16. Where do you and [person] inject together? ***(Check all that apply)***

	Network Mmber #				
	1	2	3	4	5
0 In a private residence (such as your own, their own or a friend's house or apartment)					
2 At a hotel					
3 At a shooting gallery					
4 At another public place such as on the street, a public washroom, empty house, or hostel					
55 Unsure					
66 Not applicable					
Refused to answer					

CONTACT DRUG SMOKING

CDSS1. Not including marijuana use, in the past month, how often did [person] smoke, snort or inhale drugs?

	Network Member #				
	1	2	3	4	5
0 Not at all					
1 Once in a while, not every week					
2 Regularly, once or twice a week					
3 Regularly, Three or more times per week					
4 Every day					
55 Unsure					
66 Not Applicable					
99 Refused to answer					

If "Not at all", go to INT1

CDSS2. Not including marijuana, what drug does [person] most frequently smoke, snort or inhale?

	Network Member #				
	1	2	3	4	5
0 Acid					
1 Painkillers (e.g.dilaudid)					
2 Demerol/morphine/opium					
3 Downers/tranquilizers					
4 Ecstasy					
5 Gasoline/solvents					
6 Tylenol 3					
7 Ruffies (Rohypnol)					
8 GHB (gamma-hydroxybutyrate					
9 Methadone (prescribed)					
10 Methadone (unprescribed)					
11 Cocaine (uptown)					
12 Talwin and ritalin (speedball)					
13 Morphine					
14 Heroin (horse, junk, smack, downtown)					
15 Heroin and cocaine (speedball)					
16 Heroin mixed with another drug					
17 Amphetamines (speed, uppers)					
18 Methadone					
19 Crack/rock cocaine					
20 Methamphetamine (crystal meth)					
21 PCP (angel dust)					
22 Dilaudid					
23 Barbiturates (downers)					
24 Ritalin alone					
25 No other drug					
26 Other, specify below					
55 Unsure					
66 Not applicable					
99 Refused to answer					

CDSS3. Not including marijuana use, how long has [person] been smoking, snorting or inhaling drugs? (Record as days, months or years and specify with d, m, or y)

Network Member #	Day, month or year
1	
2	
3	
4	
5	

INTIMACY

INT1. How close are you to [person]?

	Network Member #				
	1	2	3	4	5
0 Very distant					
1 Distant					
2 Somewhat close					
3 Close					
4 Very close					
55 Unsure					
66 Not applicable					
Refused toanswer					

INT2. Would you talk to [person] about things that are very personal and private?

	Network Member #				
	1	2	3	4	5
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
Refused to answer					

INT3. If you needed to borrow $25, would [person] lend or give it to you if they had the money?

	Network Member #				
	1	2	3	4	5
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
Refused to answer					

INT4. Would you ask [person] for advice or help about health problems like infections, AIDS, or hepatitis C?

	Network Member #				
	1	2	3	4	5
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
Refused to answer					

RELATIONSHIP CHARACTERISTICS AND BELIEFS

Read: Can you tell me whether you strongly agree, agree, disagree, or strongly disagree with the following statements (yes/no are used for some statements)?

RE1. Sharing needles is an important part of the relationship that I have with [person].

Network Member #

	1	2	3	4	5
Strongly agree					
Agree					
Disagree					
Strongly disagree					

RE2. If [person] stopped injecting drugs, I would probably also stop.

Network Member #

	1	2	3	4	5
Strongly agree					
Agree					
Disagree					
Strongly disagree					

RE3. If [person] stopped injecting drugs, it would be more difficult to maintain a relationship with them.

Network Member #

	1	2	3	4	5
Strongly agree					
Agree					
Disagree					
Strongly disagree					

RE4. Injecting drugs is an important part of the relationship I have with [person].

Network Member #

	1	2	3	4	5
Strongly agree					
Agree					
Disagree					
Strongly disagree					

RE5. [Person] would object if I wanted to stop injecting drugs.

Network Member #

	1	2	3	4	5
Strongly agree					
Agree					
Disagree					
Strongly disagree					

RE6. [Person] obtains drugs for me.

Network Member #

	1	2	3	4	5
No					
Yes					
Unsure					
Refused to answer					

RE7. I obtain drugs for [person].

Network Member #

	1	2	3	4	5
No					
Yes					
Unsure					
Refused to answer					

RE8. [Person] obtains needles or other equipment for.

Network Member #

	1	2	3	4	5
No					
Yes					
Unsure					
Refused to answer					

RE9. I obtain needles or other equipment for [person].

Network Member #

	1	2	3	4	5
No					
Yes					
Unsure					
Refused to answer					

RE10. I believe that [Person] is infected with HIV (AIDS virus).

Network Member #

	1	2	3	4	5
No					
Yes					
Unsure					
Refused to answer					

RE11. I believe that [Person] is infected with hepatitis C.

Network Member #

	1	2	3	4	5
No					
Yes					
Unsure					
Refused to answer					

NORMS AND EXPECTATIONS OF CONTACTS FOR NEEDLE USE.

Read: Do you strongly agree, agree, disagree or strongly disagree with the following statements.

NE1. [Person] talks about harm reduction and safe injection.

	Network member #				
	1	**2**	**3**	**4**	**5**
0 Strongly agree					
1 Agree					
2 Disagree					
3 Strongly disagree					

NE2. [Person] encourages me to always use clean needles.

	Network member #				
	1	**2**	**3**	**4**	**5**
0 Strongly agree					
1 Agree					
2 Disagree					
3 Strongly disagree					

NE3. [Person] would encourage me to always use my own equipment like cotton, rinse water or cookers?

	Network member #				
	1	**2**	**3**	**4**	**5**
0 Strongly agree					
1 Agree					
2 Disagree					
3 Strongly disagree					

NE4. In the past 6 months, how many times would you estimate [Person] has used someone else's needle?

	Network Member #				
	1	**2**	**3**	**4**	**5**
1 Never					
2 Occasionally					
3 Sometimes					
4 Usually					
5 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

NE5. [Person] would never use a used needle that they found on the street or in a shooting gallery or in some other public place?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Strongly agree					
1 Agree					
2 Disagree					
3 Strongly disagree					

NE6. [Person] would not give a used needle to another IDU?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Strongly agree					
1 Agree					
2 Disagree					
3 Strongly disagree					

INITIATION AND DEMONSTRATION OF INJECTION

ID1. [Person] introduced me or initiated me into injection drug use.

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
Refused to answer					

ID2. [Person] has shown me how to inject drugs.

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
Refused to answer					

ID3. [Person] has injected me with drugs.

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 No					
1 Yes					
55 Unsure					
66 Not applicable					
Refused to answer					

If No, stop administering the questionnaire, otherwise go to ID4.

END OF QUESTIONNAIRE
Thank you.

Interviewer: Ask participant if they have any questions. Provide any informational pamphlets, information about local agencies, and referrals as appropriate

ID4. In the past 6 months, how many times has [person] injected you with drugs?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

If "never", stop administering the questionnaire, otherwise go to ID5

END OF QUESTIONNAIRE
Thank you.

Interviewer: Ask participant if they have any questions. Provide any informational pamphlets, information about local agencies, and referrals as appropriate.

ID5. In the past 6 months, when [person] injected you with drugs, how many times was it done as a favour to help you out (i.e. they weren't expecting anything in return)?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

ID6. In the past 6 months, how many times has [person] injected you with drugs in exchange for money, drugs, or other goods?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

ID7. Is there anything else you would like to add regarding the reasons why you have [person] inject you with drugs?

(Please respond on separate answer sheet)

ID8. In the past 6 months when they injected you with drugs, on how many of those occasions had they used the needles to inject themselves first?

	Network Member #				
	1	**2**	**3**	**4**	**5**
0 Never					
1 Occasionally					
2 Sometimes					
3 Usually					
4 Always					
55 Unsure					
66 Not Applicable					
Refused to answer					

If ID8 is other than "never", go to ID9, otherwise stop administering the questionnaire.

END OF QUESTIONNAIRE
Thank you.

Interviewer: Ask participant if they have any questions. Provide any informational pamphlets, names of local agencies, and referrals as appropriate.

ID9. The last time this happened, can you describe for me why [person] used the needle first?

(Please respond on separate answer sheet)

END OF QUESTIONNAIRE
Thank you.

Interviewer: Ask participant if they have any questions. Provide any informational pamphlets, names of local agencies, and referrals as appropriate.