ADVERSE CHILDHOOD EXPERIENCES AND
RISK BEHAVIOURS IN
PEOPLE WHO USE INJECTION DRUGS

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ABSTRACT

Adverse childhood experiences— including parental and familial factors such as parental substance abuse, parental mental health problems, parental incarceration, parental unemployment and family violence, and personal factors such as physical, sexual, and emotional abuse— have been shown to strongly affect health risk behaviours in adulthood in the general population and are thus important in the health status of an individual. However, studies of people who use injection drugs have generally focused on disease seroprevalence and risk behaviours without considering their psychosocial histories.

In the 2000 Regina Seroprevalence and Risk Behaviours Study, 255 people who use injection drugs completed a standardized, confidential, and anonymous interview which included questions on adverse childhood experiences and injection-related and sexual risk behaviours. Associations among and between participants' reported adverse childhood experiences and subsequent risk behaviours were tested. Demographic factors were also considered, and general linear models of factors associated with risk behaviours were developed.

The rates of adverse childhood experiences and risk behaviours reported were very high. Several of the adverse childhood experiences studied were related to increased risk behaviours. The factors associated with injection-related risk behaviours were similar to those associated with sexual risk behaviours. The impact of adverse childhood experiences on risk behaviours was found to be cumulative; the more adverse childhood experiences the participants reported, the more risk behaviours they also reported.

This information provides a unique opportunity to address these problems in the treatment and prevention of injection drug use. Supplementary research is needed to further elucidate the factors associated with high-risk behaviours in people who use injection drugs.
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DEDICATION

For Jeremy
&
For Carol

My Favourites.
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DEFINITIONS OF TERMS USED IN THIS THESIS

**CAGE questions:** A set of four questions designed to detect the presence of alcohol dependence(1)

**Minor physical abuse:** Pushing or slapping

**Serious physical abuse:** Punching, kicking, or burning

**Seroprevalence:** Prevalence of blood-borne pathogens

**Socioeconomic status (SES):** “A descriptive term for a person’s position in society.”(2)

ABBREVIATIONS USED IN THIS THESIS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CES-D score</td>
<td>Center for Epidemiological Studies Depression score</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>GLM</td>
<td>General linear model</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>LCDC</td>
<td>Laboratory Centre for Disease Control; now known as the Centre for Infectious Disease Prevention and Control (CIDPC)</td>
</tr>
<tr>
<td>OR</td>
<td>Odds ratio</td>
</tr>
<tr>
<td>RHD</td>
<td>Regina Health District</td>
</tr>
<tr>
<td>SES</td>
<td>Socioeconomic status</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually-transmitted disease</td>
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CHAPTER 1: INTRODUCTION

1.1 RATIONALE AND BACKGROUND

The prevalence of human immunodeficiency virus (HIV), hepatitis C virus, hepatitis B virus, hepatitis A virus, chlamydia, gonorrhea, and syphilis among the population who uses injection drugs in Regina, Saskatchewan had not been studied. Regina Health District (RHD) and Saskatchewan Health, with input from the local harm reduction committee, identified a need to define the extent of these problems, provide a baseline of seroprevalence rates, and allow for continued surveillance. These agencies formally requested the aid of Health Canada in April 1999.(3)

The outcome of this collaboration was the Regina Seroprevalence and Risk Behaviour Study, a cross-sectional study with descriptive and analytic components conducted in Regina from April to November 2000. Partners in the study were RHD, Saskatchewan Health’s Population Health Branch and Provincial Laboratory, and the Laboratory Centre for Disease Control Bureau of HIV/AIDS, STD, and TB at Health Canada (LCDC; now known as the Centre for Infectious Disease Prevention and Control). Participants completed an interview-administered standardized questionnaire with demographic and behavioural components and submitted blood and urine samples that were tested for HIV, hepatitis viruses, chlamydia, gonorrhea, and syphilis.

Injection drug use is well-documented as a high-risk activity for the transmission of blood-borne pathogens due to the sharing of previously used needles and other injection equipment including spoons or cookers, filters, and water.(4-8) People who use injection drugs and who do not
share any of their injection equipment with other users have a theoretically negligible risk of contracting blood-borne pathogens through their injection activities. However, people who use injection drugs often engage in other high-risk behaviours, including unprotected sex with multiple partners, anal sex, and trading sex for money or drugs;\(^{(7, 9-14)}\) the risk associated with some of these activities can be mitigated by practicing "safer sex" techniques.

During my experiences as an interviewer with the Regina study, I began to wonder why certain participants practiced "safer" injection techniques and sexual behaviours than others. Many demographic, psychological, and social factors have been linked to high-risk behaviours among people who use injection drugs.\(^{(4-6, 8, 9, 12, 15-37)}\) However, studies rarely consider the impact of the injection drug-using person's psychosocial history on their current risk behaviours. The research that does address the psychosocial histories of people who use injection drugs focuses almost exclusively on childhood abuse. Little research has considered other adverse childhood experiences (such as parental or familial factors) in relation to high-risk behaviours among people who use injection drugs. Additionally, there is very little Canadian research on the impact of adverse childhood experiences on adult risk behaviours among people who use injection drugs.

Childhood experiences undoubtedly have a strong impact on adult lives. Adverse childhood experiences can be grouped into two categories: personal factors such as childhood emotional, physical, and sexual abuse; and parental or familial factors such as parental mental health, drug, or alcohol problems, parental incarceration, parental unemployment, and witnessing violence between parents. Adverse childhood experiences from both categories have been linked with a wide range of health problems and high-risk behaviours in adolescence and adulthood in clinical and community-based populations.\(^{(11, 23, 33, 34, 38-99)}\) Although there is far less research examining the long-term outcomes of adverse childhood experiences in populations of people who use injection drugs, it
is hypothesized that experiencing deleterious situations in childhood adds to the problems experienced by this already high-risk group.

1.2 STUDY SCOPE AND PURPOSE

The primary objectives of the Regina Seroprevalence and Risk Behaviour Study were:(3)

1. to estimate the seroprevalence of HIV, HCV, HBV, HAV, chlamydia, gonorrhea, and syphilis among people who use injection drugs in Regina;

2. to determine risk factors associated with infection with the above pathogens;

3. to profile injection-related and sexual behaviours among people who use injection drugs in Regina;

4. to determine factors (including social and mental health factors) associated with risky injection-related and sexual behaviours; and

5. to identify service gaps as well as barriers to using services among people who use injection drugs in Regina.

Several secondary objectives of the Regina study were also identified. These were:(3)

1. to make suggestions and recommendations for ongoing surveillance of these diseases among people who use injection drugs in Regina;

2. to make suggestions and recommendations for high-risk injection and sexual behaviours among people who use injection drugs in Regina; and

3. to make suggestions and recommendations for developing more specific and targeted preventative services for people who use injection drugs in Regina.
The purpose of this thesis is to address an aspect of the fourth primary objective of the Regina study: factors associated with risky injection and sexual behaviours.

1.3 RESEARCH OBJECTIVES

The hypothesis that I will be testing is: **Specific adverse childhood experiences are associated with later high-risk injection and sexual behaviours among people who use injection drugs.** My research questions are as follows:

1. What are the individual associations among and between adverse childhood experiences and risk behaviours?

2. Does exposure to different levels of adverse childhood experiences result in different levels of high-risk injection and sexual behaviours in adulthood among people who use injection drugs, i.e., is there a dose-response relationship between adverse childhood experiences and adult risk behaviours in this population?

3. Which individual adverse childhood experiences are associated with higher numbers of high-risk injection and sexual behaviours in adulthood among people who use injection drugs?

4. Which combinations of adverse childhood experiences are associated with higher numbers of high-risk injection and sexual behaviours in adulthood among people who use injection drugs?

Socio-demographic characteristics will be examined within each research question. Refer to Appendices A and E for the specific variables used from the Regina Seroprevalence and Risk Behaviour Study.
1.4 SIGNIFICANCE

It is anticipated that the results of this study will make a small but significant contribution to the understanding of people who use injection drugs. Although injection drug use is in itself a very high-risk activity, there are different levels of risk among people who use injection drugs. Little research has been done on the childhood and family determinants of subsequent high-risk injection practices and sexual practices among people who use injection drugs. A better understanding of these relationships could help to shape strategies aimed at disease-prevention among people who use injection drugs and the prevention of injection drug use altogether.

1.5 ETHICS

Ethical approval for the Regina Seroprevalence and Risk Behaviour Study was obtained from Regina Health District Ethics prior to the implementation of the study. Ethical approval for this thesis project based upon data from the Regina study was obtained from the University of Saskatchewan Advisory Committee on Ethics in Behavioural Science Research in May 2001 (see Appendix B).
CHAPTER 2: LITERATURE REVIEW

This chapter is organised into two main themes: risk behaviours and adverse childhood experiences. Initially I provide an overview of behaviours that present a high risk for the transmission of blood-borne and sexually-transmitted pathogens, specifically injection-related risk behaviours. Then I consider demographic and social characteristics that are associated with high-risk behaviours among people who use injection drugs and the relationships among these factors and risk behaviours. In the next section, I consider the influences of adverse childhood experiences in adulthood; this section is broken into two parts: personal factors (abuse) and parental factors. The chapter concludes with a brief review of the limitations of the literature, conclusions, and directions for future research.

2.1 RISK BEHAVIOURS

The literature on the reliability of self-reported injection drug use suggests that respondents report their risk behaviours and social determinants accurately. In a test-retest of a interviewer-administered self-report questionnaire completed by 196 people who use injection drugs over a 48-hour period in 5 American cities, Needle et al found that the participants consistently reported drug use, injection practices, and sexual behaviours. In another test-retest study of interviewer-administered HIV risk behaviour questionnaires completed by 246 people who use injection drugs in Massachusetts and Rhode Island, USA approximately two weeks apart, De Irala et al found consistently good reliability in self-reports of sexual and drug use behaviours. Kokkevi et al compared the entrance surveys of 78 drug-using Greeks who entered drug treatment facilities at least twice within the same year and found that the reliability of self-reported behavioural and socio-demographic data was very good. Morrison et al found that in-depth, confidential interviews
were important when gathering self-reported data on the frequency of drug and sexual behaviours from people who use injection drugs.\(^{(103)}\)

Behaviours that have been identified as presenting a high risk for the transmission of HIV and other blood-borne and sexually transmitted diseases (STDs) include injection drug use, multiple sex partners, unprotected sex, anal sex, and trading sex for money or drugs.\(^{(4-8, 104)}\) These activities may be inter-related.\(^{(7, 9-14)}\) Calzavara et al showed an association between recreational drug and alcohol use and higher-risk sexual activities in a five-year follow-up study of a cohort of 249 homosexual or bisexual men in Toronto, Ontario.\(^{(7)}\) In a cross-sectional study of 620 homeless youths in Los Angeles, California, USA, Yates et al found that compared to homeless youths who were not involved in prostitution, youths who traded sex for money, drugs, food, clothes, or shelter were more likely to report high-risk behaviours such as sex with multiple partners and substance abuse.\(^{(10)}\) Frischer et al found that injection drug use was directly related to prison experience, sexual activity, sharing of injection equipment, and prostitution in a sample of 503 Scottish injection drug users.\(^{(13)}\) In a sample of 303 people who use injection drugs in North West England, Klee et al found that casual sex was associated with needle sharing.\(^{(12)}\) Martinez et al found that youths who used injection drugs drank alcohol more frequently, reported higher rates of recent non-injection drug use, and were more likely to report a history of survival sex than youths who did not use injection drugs among a sample of 186 homeless youths in three cities in California, USA.\(^{(11)}\) However, in a three-year follow-up of a cohort of 211 heterosexuals who used injection drugs enrolled in drug treatment programs in Los Angeles, California, USA, Stacy et al found no link between drug use and unsafe sex.\(^{(105)}\)

2.1.1 Injection-related risk behaviours

There are many opportunities during the drug preparation and injection processes for the transmission of blood-borne pathogens to occur. The drugs are first mixed and melted in water in a spoon or cooker that is heated from below to dissolve the drug into an injectable liquid. The same
water that is used to rinse used syringes after injection is often used to dissolve the drugs before injection.(106-108) When cooled, the drug solution is filtered as it is drawn into the syringe barrel by placing the tip of the needle in a cotton or filter placed in the cooker to remove larger undissolved particles in the solution.

People who use injection drugs often use a syringe to help to mix the drug into solution and to measure and distribute each person’s share of the drug.(106-109) People who use injection drugs may “frontload” the drug solution—transfer drug from one syringe to another by removing the needle of the receiving syringe and squirting the drug solution from the donor syringe directly into its barrel (this technique is only used when the syringe has a removable needle, which is more common in Europe than in North America (109))—or “backload” the drug solution—transfer the drug from one syringe to another by removing the plunger of the receiving syringe and squirting the drug from the donor syringe directly into its barrel (this technique is employed when using one-piece diabetic syringes, which is more common in North America (109), and is generally considered to be a more difficult maneuver)—as a means of measurement when the drugs are being shared by more than one person.(106-111) These syringe-mediated drug-sharing practices put people who use injection drugs at risk not because potentially-infected syringes are directly shared, but because the syringes are utilized in the process of sharing drugs. Viral transmission can occur if contaminated cookers, water, filters, or mixing syringes are shared by multiple people, even if the individuals use their own sterile syringes for injection;(106-110, 112, 113) the perceived risk of this “indirect sharing” may be obscured because contamination occurs during intermediate steps in the injection process.(112, 113)

The injection process begins with “registering;” the needle is inserted through the skin and the injector pulls back on the plunger of the syringe. If blood rushes into the barrel of the syringe, the injector knows that the tip of the needle is inside of a vein. (106, 109, 114) The blood mixes with the drug solution and small amounts may remain in the needle which may be reused by another person. For people that are “hard to hit” or who have collapsed or scarred veins from repeated injection, registering often requires several attempts resulting in several opportunities for blood to
enter the syringe. Many people who use injection drugs increase the entry of blood into the syringe by practicing a procedure known as “booting” in which only part of the drug solution is injected into the vein at a time and the blood from the vein is repeatedly pulled back into the syringe to mix with the drug solution. (109, 115) While booting is not a necessary step in the injection process like registering, many people who use injection drugs believe that it increases the “rush” of injection. People who use injection drugs may use previously-used needles or syringes to inject for a number of reasons, including lack of access to sterile injection equipment or to show trust with another person.

While injection drug use is in itself a very risky behaviour, different levels of risk can be attributed to different injection practices. Similarly, some sexual practices—such as unprotected sex (sex without a condom or barrier), anal sex, sex with multiple partners, and prostitution (trading sex for money or drugs)—are far riskier than other sexual practices. (7, 23, 116) Direct sharing (borrowing and lending) of previously used needles or syringes with other people who use injection drugs is well established as a very high-risk activity for the transmission of blood-borne infections. (12, 29, 110, 111, 116-118) However, indirect sharing of other injection equipment or gear also poses a high level of risk, and may occur more frequently than direct sharing. (29, 104, 106, 107, 110-113, 116) In an ethnographic study in seven US cities of people who use injection drugs, Needle et al reported that indirect sharing of injection equipment occurred in 94% of the 54 observed injection events. (107) Koester et al found that indirect sharing was twice as prevalent as direct sharing in a sample of 585 people who use injection drugs in Denver, Colorado, USA. (112) People who use injection drugs who do not share needles or other injection equipment at all, directly or indirectly, have a theoretically negligible risk of contracting or transmitting HIV, Hepatitis B and C, and other blood-borne pathogens through their injecting activities.

Proper cleaning of shared needles and other injection equipment has been posited to reduce the risk of HIV transmission in interdisciplinary studies that tested the effectiveness of bleach against HIV-1 in syringes and the efficacy of people who use injection drugs in following prescribed bleaching techniques. (118-124) The recommended cleaning procedure for injection equipment
includes a pre-bleach rinse with water to remove organic material and two rinses with undiluted household bleach (sodium hypochlorite 5.25%) for at least 30 seconds followed by two water rinses. Other disinfectants—such as alcohol, peroxide, and household cleaners—are less effective against HIV than bleach. Unfortunately, little is known about the efficacy of bleach against other blood-borne pathogens such as Hepatitis B and C, although preliminary laboratory evidence suggests that similar bleaching techniques may be effective against at least Hepatitis B virus.

The effectiveness of needle disinfection strategies in the field has been debated. In an observational study of 146 people who use injection drugs, Gleghorn et al found that the majority of their subjects demonstrated inadequate needle cleaning techniques. In a study of cleaning efficacy in Florida, USA, McCoy et al taught 450 people who use injection drugs needle-cleaning techniques and assessed their recall by observing them clean needles 6-12 months later; only 35.8% of the subjects correctly followed the prescribed cleaning techniques. In a nested case-control study comparing 16 HIV-positive people who use injection drugs to 89 HIV-negative controls in New York City, Titus et al found that the reported use of bleach to clean needles was not protective against HIV infection. In another matched case-control analysis nested in a prospective study of 34 HIV-positive and 154 HIV-negative black heterosexuals who use injection drugs in Baltimore, Maryland, USA, Vlahov et al also found that disinfection of shared needles with bleach was not protective against HIV seroconversion. Despite the limited power of these studies, the results suggest that disinfection of injection equipment is not a substitute for the use of new, sterile injection equipment and underline the importance of needle exchange programs, which have been shown to reduce needle-sharing behaviour.

Injecting drugs while incarcerated may pose a special risk as correctional facilities have many characteristics likely to increase the risk of transmission of blood-borne pathogens. High risk groups, especially people who use injection drugs, are over-represented among inmates compared with the outside community. Sharing injection equipment with multiple partners is far
more common inside prisons than in the community; harm-reduction efforts such as needle-exchange programs are generally eschewed by the authorities of correctional facilities (131) which results in a large confined population of people who use injection drugs sharing a very limited amount of worn-out contraband injection equipment.

2.1.2 Factors associated with high-risk behaviours among people who use injection drugs

Demographic characteristics associated with risky injection or sexual behaviours among people who use injection drugs include age, gender, race, marital status, socioeconomic status, and education.(4, 6, 8, 9, 12, 15-28) In a sample of 166 adolescents in New South Wales, Copeland et al found that females who used injection drugs were significantly more likely than males who used injection drugs to share injection equipment, to inject more frequently, and to inject at a younger age.(20) In a sample of 303 people who use injection drugs in North West England, Klee et al found that males were more likely than females to engage in casual sex.(12) Schoenbaum et al found that minority (non-White) race and low socioeconomic status were independently associated with HIV infection in a sample of 452 people who use injection drugs in New York, USA; race was also independently associated with sharing needles with strangers.(24) In a cross-sectional study of 806 young offenders in British Columbia, Rothon et al showed that Aboriginal young offenders were five times more likely to have used injection drugs compared with non-Aboriginal young offenders.(9) In a cross-sectional study of 681 men who have sex with men (MSM) in Vancouver, British Columbia, Heath et al found that Aboriginal MSM have an increased risk of preceding risk factors for HIV infection, including sexual abuse, poverty, poor mental health, and involvement in the sex trade.(19) However, in a cross-sectional study of 226 people who use injection drugs in San Francisco, California, USA, Gibson et al found that White race increased the odds of needle sharing, while Black race was protective against needle sharing.(28) Mandell et al found that needle sharing was more
frequent among those with lower socioeconomic status (which included measures of education, income, employment, homelessness and incarceration history) in a sample of 2524 people who use injection drugs in Baltimore, Maryland, USA.(26)

Mental health problems such as depression, anxiety, low self-esteem, powerlessness, isolation, fatalism, and hostility have also been linked to high-risk behaviours among people who use injection drugs and in the general population.(4, 19, 23, 27, 29-33) Strathdee et al found that depression (in addition to low education, low social support, and sexual abuse) was a determinant of sexual risk-taking in a cohort of 439 HIV-negative gay and bisexual men in Vancouver, British Columbia.(23) In a cross-sectional study of 323 people who use injection drugs recruited from methadone programs in Philadelphia and New Jersey, USA, Metzger et al found that participants who shared needles were more likely than participants who did not report needle sharing to report psychiatric symptoms such as depression, anxiety, hostility, paranoia, and psychotism.(27) Camacho et al found that psychological dysfunction (including measures of depression, anxiety, and hostility) was significantly associated with injection-related risk behaviours (including sharing needles, sharing needles with greater numbers of other people who use injection drugs, and sharing with strangers) and sexual risk behaviours (including greater numbers of partners, unprotected sex with other people who use injection drugs, and prostitution) in a sample of 834 people who use injection drugs in Texas, USA.(32)

Finally, social factors such as poverty, living in a neighborhood with large numbers of people who use injection drugs, inadequate housing and homelessness, and factors associated with the users' social network have been associated with high risk injection and sexual behaviours among people who use injection drugs.(4, 5, 8, 12, 16, 17, 19, 29, 34-37) In a case-control study involving 281 people who use injection drugs in Vancouver, British Columbia, Patrick et al showed that unstable housing was independently associated with HIV seroconversion.(4) In a cross-sectional study of 303 people who use injection drugs in North West England, Klee et al found that homelessness was associated with needle sharing and frequent casual sex.(12) Latkin et al found that among a sample
of 330 people who use injection drugs in Baltimore, Maryland, USA, the users’ social networks were important determinants of needle-sharing behaviour; higher total network density, larger drug network size, and injecting at friend’s residences were positively associated with sharing needles that had been cleaned with bleach, while sharing of needles that had not been cleaned with bleach was associated with reports of injecting in semi-public areas. In a case-control study of 281 people who use injection drugs in Vancouver, Strathdee et al found that social determinants, particularly a history of sexual abuse, were among the most important predictors of using borrowed needles. After controlling for HIV serostatus, factors independently associated with borrowing needles were increased injection frequency, polydrug use, and ever experiencing non-consensual sex. Depression was associated with borrowing, but not independently so. Homosexual activity was independently associated with borrowing among males and living with a sexual partner was an independent predictor for females. Access or barriers to clean needles were not associated with borrowing.

Aral et al describe the complex interplay, or “risk ecology,” among demographic characteristics, social factors, and risk behaviours (see Figure 2.1).

![Diagram](image)

**Figure 2.1: Effect of demographic characteristics on risk behaviours** (adapted from Aral et al.)
“Demographic and societal determinants of behaviour mutually influence each other: demographic characteristics influence the social environments that individuals live in, while societal factors define the social meaning of demographic characteristics.”(16) The demographic characteristics of an individual directly affect their health risk behaviours; for example, age and gender are strong predictors of the number of sexual partners an individual chooses. Risk behaviours also affect demographic characteristics to some extent. For example, drug use may lead to downward social mobility, thereby affecting SES, or sexual behaviours may lead to marriage or divorce. Additionally, demographic characteristics have an indirect impact on risk behaviours through their effect on the individual’s social environment; societal factors provide the context in which risk behaviours are shaped and conducted. For example, women who use injection drugs are more likely than men who use injection drugs to be in a sexual relationship with a partner who also uses injection drugs, which promotes sharing of injection equipment as well as unsafe sexual practices; the dominant male culture among people who use injection drugs also inhibits women’s power to negotiate safer practices.(20) Finally, the relational placement of an individual in society greatly affects their experience of behavioural options.

More education may not necessarily be the key to reducing risk behaviours among people who use injection drugs. In a cross-sectional study of 110 methadone-maintained people who use injection drugs in New York City, USA, Magura et al found that needle-sharing could not be attributed to a lack of knowledge of the dangers inherent in this behaviour nor to ignorance of how to effectively reduce the risks of infection.(29) Attitudes towards needle-sharing were found to be most important in determining this behaviour; the participants were more likely to share if they would rather share equipment than tolerate withdrawal symptoms, if they believed that their friends would be insulted if they refused to share equipment with them, or if they expressed an attitude of fatalism about developing AIDS due to their past risk behaviours. Additionally, a social environment in which friends and sexual partners also use injection drugs increased the likelihood of needle sharing. Finally, economic pressure to share and not owning personal injection equipment were also directly associated with sharing.
2.2 **ADVERSE CHILDHOOD EXPERIENCES**

Adverse childhood experiences can be separated into two categories: personal factors such as childhood emotional, physical, and sexual abuse; and parental or familial factors such as parental mental health, drug, or alcohol problems, parental incarceration, parental unemployment, witnessing violence between parents, and family reliance on welfare. The long-term influences of these two categories of experiences are generally studied separately. However, childhood abuse may be an indicator of more generalized family dysfunction.\(^{(134)}\) Conditions such as drug abuse, spousal violence, and criminal activity in the household often co-occur with child abuse.\(^{(38, 39)}\) Without considering these measures of household dysfunction along with childhood abuse, long-term influence might be erroneously attributed to single types of abuse and the cumulative effects of multiple categories of adverse childhood experiences would be ignored.\(^{(38)}\)

The 1995-1996 Adverse Childhood Experiences (ACE) Study was the first study to attempt to describe the relationship between adult health risk behaviours, health status, and disease states and both childhood abuse and household dysfunction in a large sample from the general population.\(^{(38, 39)}\) A retrospective cohort survey, this study was conducted in San Diego, California, USA among 13194 adults who had completed a standardized medical evaluation at a large health maintenance organization clinic; 8056 of these people adequately completed a standardized mail-in questionnaire about adverse childhood experiences.

Felitti *et al* studied seven categories of adverse childhood experiences: emotional, physical, or sexual abuse; violence against mother; and growing up with a substance abusing, mentally ill, or incarcerated household member.\(^{(38)}\) The number of categories of these adverse childhood experiences was then compared to measures of adult risk behaviour, health status, and disease. Logistic regression was used to adjust for effects of demographic factors on the association between the cumulative number of categories of childhood exposures and the risk factors for the leading causes of death in adult life. The impact of adverse childhood experiences on adult health status was found to be strong and cumulative. There was a strong dose response relationship between the
breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several diseases. Compared to those who had experienced none of the seven categories of adverse childhood experiences, people who reported four or more of the categories had four- to twelve-fold increased health risks for alcoholism, drug abuse, depression, and suicide attempt; a two- to four-fold increase in smoking, poor self-rated health, more than 50 sexual partners, and sexually transmitted disease; and a 1.4 to 1.6-fold increase in physical inactivity and severe obesity. The number of categories showed a graded relationship to the presence of adult diseases including ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease. The seven categories of adverse childhood experiences were strongly interrelated and persons who experienced multiple categories were likely to have multiple health risk factors later in life.

In a separate analysis of the ACE Study data that included parental separation or divorce in addition to the seven original categories of adverse childhood experiences, Anda et al considered the impact of adverse childhood experiences on adolescent and adult smoking habits.(39) They found that all eight categories showed a comparably increased risk for smoking (OR ~2). Compared to those reporting no adverse childhood experiences, persons reporting five or more categories had substantially higher risks of early smoking initiation (OR 5.4), ever smoking (OR 2.1), and heavy smoking (OR 2.8). Each relationship between smoking behaviour and the number of adverse childhood experiences was strong and graded.

Rosow and Lauritzen assessed the long-term effects of several adverse childhood experiences— including sexual or physical assault, bullying, parental alcohol abuse, and parental psychiatric problems— in a cohort of 800 Norwegian drug addicts.(135) They found that self-reported suicidal behaviour and suicidal ideation were more prevalent among addicts who reported various adverse childhood experiences, and that the proportion of those who reported these behaviours increased with greater reported numbers of adverse childhood experiences, suggesting a dose-response relationship. In a sample of 89 patients undergoing intensive mental health treatment, Rose found high levels of several adverse childhood experiences (including parental alcoholism and
childhood physical and sexual abuse) with subsequent negative mental health outcomes in adulthood including frequent hospitalizations, substance abuse, and self-mutilation. (41)

2.2.1 Personal factors—Abuse

Childhood abuse has been found to have a wide-ranging influence on quality of life and health risk behaviours in adulthood. The existing literature supports the hypothesis of a continuum of risk, in which early abuse leads to later abuse and violence, (40, 44) which may increase the prevalence of high-risk behaviours. (40) Exposure to violence or abuse in childhood conveys a greater risk for later experiencing other violence, psychological and physical morbidities, and high-risk behaviours. (23, 40, 42-44)

There are three types of child abuse: sexual, physical, and emotional abuse. Previous research has indicated that these types of maltreatment should be considered separately as the background and social characteristics of abused children and their families tend to vary by type of abuse. (136, 137) However, these types of abuse often co-occur, yet studies of the long-term effects of childhood abuse have usually examined only one type of abuse, particularly sexual abuse, and few have assessed the cumulative impact of more than one type of abuse. (38) While the long-term outcomes of childhood sexual abuse have been studied to the greatest extent, there is evidence that other forms of child maltreatment may have equally deleterious effects, particularly in combination. (62, 138)

2.2.1.1 Medical problems

Childhood sexual abuse has been linked with higher occurrence of a number of medical problems in adulthood. These include ischemic heart disease, cancer, chronic lung disease, skeletal fractures, headaches, obesity, gastrointestinal problems, and liver disease. (38, 45-54) In a matched case-control study of 231 adults in San Diego, California, Felitti found that patients who reported a
history of rape, incest, or molestation had higher rates of chronic depression, morbid obesity, marital instability, high utilization of medical care, and certain psychosomatic symptoms, particularly chronic gastrointestinal distress and recurrent headaches.(48)

In a cross-sectional study of 511 American women from a rural midwestern community, Springs et al found that women who were sexually abused in childhood reported significantly more medical problems, greater levels of somatization, and more health risk behaviours (such as smoking, alcohol use, drug abuse, earlier age at first intercourse, greater number of sexual partners before age 18, and a greater number of total sexual partners) than non-abused women.(46) More severe abuse was associated with more severe medical problems. Extent of social support correlated inversely with the number of gynecologic problems reported in the sexually abused group. In a cross-sectional study of 668 female gynecologic patients in New Jersey, USA, Moeller et al noted that childhood physical, sexual, and emotional abuse had deleterious physical as well as psychological effects in adulthood.(47) Women who reported childhood abuse reported significantly more hospitalizations for illness, greater numbers of physical and psychological problems, and lower ratings of their overall health than women who did not report childhood abuse. They also noted a graded effect of childhood abuse—the more types of maltreatment a woman experienced as a child, the poorer her reported adult health and the more likely she was to have experienced abuse in adulthood.

2.2.1.2 Psychological problems

Childhood abuse has also been shown to be related to a number of psychological problems in childhood through adulthood. These include depression, fear, anxiety, compulsivity, low self-esteem, powerlessness, withdrawal, guilt, hostility, mistrust, self-injury, sexual problems, suicide ideation, and suicide attempts.(38, 42, 45-62) Gould et al found an association between childhood abuse (OR 6.4; 95% CI 2.4 to 17.6) and a history of suicide attempts in a sample of 292 adult family medicine patients in Seattle, Washington, USA; childhood sexual abuse was associated with a higher risk of suicide (OR 4.1; 95% CI 1.7 to 9.9) than emotional abuse (OR 3.7; 95% CI 1.4 to 10.0) or
physical abuse (OR 1.2; 95% CI 0.5 to 3.1). In a cross-sectional study of 195 female clients of an outpatient crisis intervention service in Los Angeles, California, USA, Briere found that women who were sexually abused in childhood reported greater substance addiction and self-destructiveness, and were more likely to be sexually revictimized as adults. In a separate study of 278 female undergraduates, Briere and Runtz found that women who reported a history of childhood sexual abuse reported higher levels of dissociation, somatization, anxiety, and depression than did nonabused women. Marcenko et al found that women who reported childhood physical or sexual abuse were significantly more likely to report symptoms of psychological distress than were women with no reported experiences of childhood abuse in a cross-sectional study of 127 African American mothers. In a cross-sectional study of a non-clinical sample of 1099 American women, Wilsnack et al found that women with a history of childhood sexual abuse were significantly more likely than nonabused women to report problems with alcohol use, psychoactive drug use, depression and anxiety, pain that prevented intercourse, and early age of first sexual intercourse. Duncan et al found that childhood physical assault was associated with lifetime and current episodes of depression, post-traumatic stress, and substance abuse in a national sample of 4008 American women.

Finkelhor presents a four-factor conceptual framework for understanding the long-term psychological effects of childhood sexual abuse: (1) Traumatic sexualization - sexuality becoming associated with frightening or confusing memories that can lead to sexual dysfunction in the adult; (2) Stigmatization - feelings of shame and low self-esteem, which increase the risk of drug and alcohol use; (3) Betrayal - the realization of betrayal, particularly if a family member perpetrates the abuse, leading to mistrust of others or potential revictimization; and (4) Powerlessness - the loss of control over one's body, leading to a need for control as adults, potentially contributing to a number of negative outcomes including substance use. These psychological effects have serious implications for adult behaviours.
2.2.1.3 Health risk behaviours

Adolescents and adults that were abused as children have been shown in numerous clinical and non-clinical samples to be more likely to report health risk behaviours such as smoking, alcoholism, drug abuse, driving while intoxicated, earlier initiation of sexual activity, and having more than 50 sexual partners than their non-abused counterparts. (39, 42, 45-48, 50, 51, 54, 60, 63-69, 71) In a cross-sectional study of 145 young offenders in Florida, USA, Dembo et al found that childhood physical or sexual abuse was positively related to high rates of illicit drug use, but not to the use of tobacco and alcohol. (63) Dunn et al found that childhood abuse was a very common experience among a sample of 100 American veterans seeking treatment for drug and alcohol abuse problems. (68) Triffleman et al found that the total number of lifetime substance dependence disorders was strongly positively associated with total childhood trauma exposure among a sample of 46 male American veterans seeking treatment for drug and alcohol abuse problems. (134) In a cross-sectional study of 600 high school students in Rhode Island, USA, Riggs et al found that adolescents with a history of physical abuse were three times more likely than their nonabused peers to drink alcohol and smoke cigarettes, twice as likely to use illicit drugs, six times more likely to self-induce vomiting, and five times more likely to attempt suicide; adolescents who reported a history of sexual abuse had a three and one half greater chance of being sexually active and were more than three times more likely to attempt suicide than their nonabused peers. (67) In a cross-sectional study of 127 African American mothers,Marcenko et al found that childhood sexual trauma was correlated with severity of adult drug use. (60)

In a cross-sectional analysis of 5290 high school students in Minnesota, USA, Lodico et al found that sexually abused adolescents were more likely to be sexually active (RR 1.5), to initiate sexual activity earlier (RR 2.7), to have impregnated someone or to have been pregnant (RR 5.6, 2.4), and are less likely to report condom use (RR 1.3) than their nonabused peers. (66) Gender-specific comparisons indicated that there was an association between sexual abuse and drinking before sex for males (RR 1.9); sexually abused females were more likely to have sexual onset prior to
age 12 (RR 4.8); sexually abused males were more likely to have impregnated someone (RR 5.6) than sexually abused females were to have been impregnated (RR 2.4). Sexually abuse males, but not females, were more likely to report injection drug use (RR 9.3) and needle-sharing (RR 10.3). In a separate subanalysis of the 2973 males in this sample, Hernandez et al found that childhood sexual abuse was predictive of drinking and having serious drinking problems; sexual and physical abuse decreased the effect of race on illegal substance use, running away, skipping school, suicide attempts, forcing sex, and committing violent acts.(65)

Hibbard et al found that several problem behaviours—including considering (RR 7.0) or attempting suicide (RR 9.2), running away (RR 9.1), and laxative use (RR 3.7) or vomiting (RR 4.9) to lose weight—were strongly associated with a history of childhood physical or sexual abuse in a cross-sectional sample of 3998 students in rural midwestern USA.(54) Higher emotional and behavioural risk scores were observed among abused students. The effects of physical and sexual abuse on risk scores were independent and additive; no interaction was observed. An interaction of gender and sexual abuse on problem behaviour was observed, with problem behaviour being significantly greater among sexually abused boys.

2.2.1.4 HIV risk

A growing body of literature suggests that because childhood abuse may lead to depression, low self esteem, powerlessness, impulsivity, sexual compulsivity, revictimization, substance abuse, a lack of self protection, and prostitution in adulthood (23, 40, 49-51, 70, 72-76)—all of which are risk factors for HIV infection—people who have been abused as children may be at greater risk for infection with HIV or other blood-borne or sexually transmitted diseases in adulthood.(23, 49, 70, 75, 139) In a longitudinal study of 602 American youths over six years, Cunningham et al showed that a history of physical or sexual abuse was related to engaging in a variety of HIV risk behaviours—including lack of condom use, choosing risky partners, multiple partners, and injection drug use—in adolescence and continuing into adulthood.(139) In a cross-sectional survey of 491
female university students in New England, USA, Johnsen and Harlow found that women with a history of sexual abuse reported significantly more negative attitudes about sexuality, less sexual assertiveness about birth control or refusing unwanted sex, less efficacy concerning HIV prevention, more anticipation of a negative response from a partner concerning safe sex, more illicit substance use, and more sexual revictimization in adulthood compared to nonabused women.(76) El-Bassel et al found that childhood physical and sexual abuse were both significantly associated with sexual abuse by commercial partners in adulthood in a sample of 1300 female prostitutes in New York City, USA.(14) In a cross-sectional survey of 100 adolescent psychiatric inpatients in Rhode Island, USA, Brown et al found that sexual abuse was related to negative HIV-related attitudes, knowledge, and behaviours.(73) A history of sexual abuse was associated with impaired sexual decision-making and HIV-prevention skills, even in this already at-risk group.(73)

In a population-based, cross-sectional telephone survey of 3473 adults in Washington State, USA, Bensley et al found an association between both self-reported childhood sexual and physical abuse and adult health risk behaviours; one third to one half of those who reported HIV risk behaviours (such as IV drug use, occurrence of sexually transmitted disease, or unprotected anal sex) or heavy drinking also reported childhood abuse.(72) They also noted a gender-specific influence of childhood sexual and physical abuse. For women, childhood and chronic sexual abuse (occurring without nonsexual physical abuse) was associated with a more than sevenfold increase in HIV risk behaviours (OR 7.4; 95% CI 2.4 to 23.5); sexual abuse combined with physical abuse was associated with a fivefold increase in HIV risk behaviours (OR 5.0; 95% CI 2.2 to 11.5). For women, only combined physical and sexual abuse was associated with heavy drinking (OR 6.2; 95% CI 2.2 to 16.9). Physical abuse alone was not associated with either health risk behaviour for women. For men, any sexual abuse was associated with an eightfold increase in HIV risk behaviours (OR 7.9; 95% CI 1.8 to 35.1); physical abuse alone was associated with a threefold increase in HIV risk behaviours (OR 3.2; 95% CI 1.3 to 7.9) and a similar increase in risk of heavy drinking (OR 3.2; 95% CI 1.8 to 5.5).
In a cross-sectional study of 186 adults in Southeastern New England, USA, Zierler et al found an association between a history of childhood sexual abuse and high risk behaviours and diseases in adulthood. (49) Those who reported childhood sexual abuse were four times more likely to be working as prostitutes (90% CI 2.0 to 8.0). Women who reported a history of childhood sexual abuse were nearly three times more likely than nonabused women to become pregnant before the age of 18 (90% CI 1.6 to 4.1) and two times more likely to report heavy alcohol use. Men with a history of sexual abuse had a twofold increase in prevalence of HIV infection compared to nonabused men (90% CI 1.0 to 3.9).

In a cross-sectional American study of 1288 HIV-infected women and 357 women at risk for HIV, Cohen et al found that 31% of the HIV-positive women and 27% of the HIV-negative women reported childhood sexual abuse. (40) Childhood sexual abuse was strongly associated with a lifetime history of domestic violence and high-risk behaviours, including drug use (OR 4.25), having more than 10 male sexual partners (OR 2.29), having male partners at risk for HIV infection (OR 2.07), and involvement in the sex trade (OR 2.62).

In a cross-sectional study of 1001 adult homosexual and bisexual men in Chicago, Denver, and San Francisco, USA, Bartholow et al reported that childhood sexual abuse was significantly associated with mental health counselling and hospitalization, problematic psychoactive substance use, depression, suicidal thoughts or actions, lack of social support, HIV risk behaviours including unprotected anal intercourse (OR 1.36; 95% CI 1.01 to 1.77), prostitution (OR 2.13; 95% CI 1.60 to 2.85), and injection drug use (OR 2.53; 95% CI 1.84 to 3.49), and HIV seroconversion (OR 1.44; 95% CI 1.09 to 1.90). (50)
2.2.1.5 Parenting: Intergenerational transmission of violence

Intergenerational transmission of risk, i.e., the transmission of risk among members of a family from one generation to the next, has been widely demonstrated in the literature for various types of risky behaviours. Adults who have been victims of childhood abuse often have difficulty with parenting skills and a higher potential for abusing their own children.(43, 44, 59, 140-145) In a cross-sectional study of 206 low-income single mothers of young children in Kentucky, USA, Hall et al found that experiencing physical and sexual abuse in childhood was positively associated with the mothers abusing their own children in adulthood.(140) Sexual abuse had the strongest association. Compared with mothers who were not sexually abused in childhood, those reporting violent sexual abuse as children were almost six times more likely to have a high potential for physically abusing their children.

There is evidence that the intergenerational transmission of abuse is decreased in situations where there is high perceived social support.(44, 142, 146-148) Littry et al investigated the moderating effects of perceived childhood social support on the relationship between childhood physical abuse and the potential for child abuse in adulthood among 369 undergraduates in North Carolina, USA, and found that differences between abused and nonabused individuals were observed only under conditions of low perceived social support; when childhood social support was perceived to be high, abused and nonabused participants did not differ in their potential to abuse.(142) Onyskiw et al studied the relationships between adults’ childhood experiences, their current level of marital support, and quality of parenting interactions in 66 families with new babies in Edmonton, Alberta, and found that there was no relationship between childhood acceptance and parenting quality for mothers; however, fathers who perceived less positive interactions with their parents in childhood had less positive parenting responses, but this relationship was decreased in situations of more optimal marital support.(146) In interviews with seven adolescent mothers who were abused in childhood, Williams et al found that the adolescents viewed becoming a parent as an opportunity to receive support from family members and to build more positive relationships.(147)
2.2.1.6 Severity of abuse

More severe childhood abuse has been found to correlate with more severe adult problems.(45-48, 61) Prostitutes have been shown to have experienced extremely high levels of childhood sexual abuse.(149) Walker et al found that a history of childhood abuse and neglect was associated with perceived poorer overall health, greater levels of physical and emotional functional disability, increased numbers of distressing physical symptoms, and more health risk behaviours in a cohort of 1225 adult women from a large health maintenance organization in Seattle, Washington, USA; women with multiple types of childhood abuse and neglect showed the greatest health problems for both self-reported symptoms and physician-coded diagnoses.(45) Cheasty et al found that the severity of childhood sexual abuse was related to the development of depression in a sample of 237 Irish women.(61) In a sample of 95 HIV seropositive adult men in Philadelphia, Pennsylvania, USA, Holmes found that compared to men without histories of sexual abuse, men with histories of childhood sexual abuse had greater odds of subsequent injection drug use (adjusted OR 2.4; 95% CI 0.55-10.6) and early initiation of injection drug use (adjusted OR 12.2; 95% CI 1.7 to 90.3) and that progressively invasive types of sexual abuse impart progressively greater risk for subsequent injection drug use.(150)

In a cross-sectional study of a population of 181 active drug-using women in San Antonio, Texas, USA, Medrano et al found very few significant associations between childhood trauma and current HIV risk behaviours.(151) However, this may be due to the fact that they considered childhood physical, sexual, and emotional abuse as a single dichotomous variable in their analysis. Therefore, those who experienced mild to severe forms of abuse were clustered together which could have masked significant differences between these groups. This may suggest a range of influence of childhood abuse on adult experiences depending on severity and type of abuse.(151)
2.2.2 Family and parental factors

Family experiences represent a crucial influence in childhood. The family, as the principal source of socialization for children, directly and indirectly influences the development of various attitudes and behaviours in children which they carry with them to adulthood. (152)

It has long been recognized that dysfunctional family backgrounds are common among persons with substance abuse problems. (19, 71, 78, 153) Children from families with a greater degree of conflict may be more likely to subsequently abuse drugs than children from families with less discord. (78, 80, 81, 99) Parental views on drug use have been shown to be important in the initiation of adolescent drug use. (98) Barnes and Windle found that parental support, specific parental guidelines for adolescent behaviours, and parental attitudes towards drinking were significant predictors of alcohol-related problems, illicit drug use, and other deviant behaviour among a random sample of 673 high school students in New York state, USA. (152) Parental attachment and permissiveness are important in determining initiation of substance abuse in adolescents. (154) Other research suggests that violence may be transmitted from one generation to the next—child victims of abuse are more likely to become child abusers or engage in other forms of aggressive behaviour in adulthood. (59, 84, 142, 147, 150, 155)

2.2.2.1 Parental mental health problems

Adults who had parents with mental health problems have been shown to be more likely to abuse drugs and to have mental health and behavioural problems themselves. (33, 71, 77, 78) Familial clustering of psychiatric disorders associated with drug dependence has been demonstrated. (80) Parental psychological problems have been shown to adversely affect parenting skills and to result in negative consequences for children. (82, 156-158) In a cross-sectional study of 73 children of 73 parents who use injection drugs in Baltimore, Maryland, USA, Pilowsky et al. found that parental depression was significantly associated with depressive and anxiety-related symptoms in the children. (77) In a 10-year longitudinal study of 69 African American inner-city mothers in
Chicago, Illinois, USA, Hans et al found that maternal psychopathology, particularly personality disorder, was related to a variety of negative aspects of parenting behaviour even after controlling for maternal substance abuse.(157) In a follow-up study of 78 cocaine-using mothers prenatally and 6 months postnatally in Los Angeles, California, USA, Beckwith et al found that maternal depression and paranoia both pre- and postnatally were associated with less positive parenting skills and more negative child development outcomes.(158)

2.2.2.2 Socioeconomic status

Parental socioeconomic status (SES)—widely used to refer to an individual's position in society and often measured using variables such as education, employment status, occupation, income, and wealth—has many implications in the lives of children.(159, 160) Parenting styles have been shown to be markedly different depending on the parents' level of SES, partly in response to the different circumstances in which they live.(161)

SES is also an important indicator of child abuse and neglect. Unemployment and poverty are among the more significant social factors related to child abuse and neglect. Among families in which the father is unemployed or employed part-time, the risk of abuse is higher than in households where the father is employed full-time.(44, 143-145) A disproportionate number of cases of child abuse come from low income families;(44, 136, 137, 143, 144, 162, 163) however, this may be because lower class families are much more vulnerable to being publicly recorded for abusive behaviour.(143, 144) Nonetheless, the association between poverty and abuse has been documented repeatedly. In a cross-sectional study of 2814 abused American children, Jones et al found that childhood neglect, in comparison with other types of abuse, was most strongly associated with poverty, regardless of race.(136) Cappelleri et al found that family income and ethnicity were risk factors for both sexual and physical abuse in a large national sample of abused children in America. Additionally, gender had a differential effect as a function of income in predicting the risk of sexual versus physical abuse—girls were more likely than boys to be sexually abused than physically abused.
with a greater gender difference in lower income families. (137) In an ecological study of census data in Baltimore, Maryland, Zuravin found that neighborhoods with a higher percentage of families who were poor (defined as income less than 200% of the poverty line) or with higher proportions of vacant housing had higher rates of reported child abuse and neglect. (162) In a cross-sectional study of 3232 American households with children under age 18, Wolfner et al found that the highest rates of abusive violence against children occurred in families with patterns of lower SES (families whose annual income was below the poverty line, families where the father was unemployed, families where the caretakers held blue-collar jobs, and families with four or more children). (163)

Researchers have shown that social stress is an important mediator of child abuse and neglect. (143, 144) The stresses of living in poverty are thought to impede parents’ ability to respond appropriately to the physical and emotional needs of their children. (44, 164) In a cross-sectional study of 6002 American households, Gelles found single parents to be more likely to abuse their children than parents in dual-caretaker households due to economic stress; child abuse was found to be a function of poverty in single-parent homes. (144) Children living in poverty experience greater psychological distress than children of higher SES. (164) In a longitudinal study of 1753 children of 1344 mothers, McLeod and Shanahan found that poverty significantly predicted children’s negative emotional symptoms such as depression and withdrawal as well as negative responses such as disobedience, bullying, and destructiveness. (164)

Drug and alcohol problems often go along with poverty, which may exacerbate the negative effects of socioeconomic stress. (71) In a cross-sectional study of 656 adults in Michigan, USA, Hill et al found that adults with an alcohol-dependent parent and more childhood socioeconomic stress had higher frequencies of psychopathology and lower indices of adult functioning. (165) In a study of more than 700 000 Americans over 11 years, Dee found that the prevalence of alcoholism and binge drinking increased in periods of economic recession, suggesting an influence of economic stress on drinking patterns. (166)

People who experienced abuse in childhood have been shown to have lifelong problems with
education and employment resulting in decreased SES. In a qualitative study of 20 urban low-income women who were recovering cocaine abusers and had experienced childhood abuse, Hall found that the women commonly reported problems in their adult lives in the areas of learning and work, stemming from their childhood abuse.(141) Thus, the intergenerational transmission of abuse may have a socioeconomic component: lower SES in adulthood may be a result of childhood abuse, which in turn increases the risk of abuse for the next generation of children.

2.2.2.3 Parental drug and alcohol problems

Growing up with parents who have drug or alcohol problems confers many risks. Violence is increased in families where members abuse alcohol or drugs.(93) Parental drug and alcohol abuse contributes to severe family dysfunction and elevates the risk of child maltreatment as patterns of physical violence as well as emotional or sexual abuse of family members often go along with alcoholism and drug abuse.(79, 83, 86, 91, 99) There is a significant relationship between parental drug and alcohol abuse and child maltreatment of all types, including physical, sexual, and emotional abuse as well as physical and emotional neglect.(86, 88, 99, 167-172) In a cross-sectional study of 80 pregnant American women, Williams-Petersen et al found that drug-using women had a higher potential for child abuse, particularly when levels of social support were low.(172) In a review of 190 randomly-selected records of child maltreatment, Famularo et al found that parental alcoholism was specifically associated with child physical abuse and parental cocaine abuse was specifically associated with child sexual abuse.(168) Sher et al found that a family history of alcoholism was associated with a number of childhood stressors in a sample of 489 university students in Missouri, USA, including disrupted family rituals, embarrassment, neglect, and abuse; several of these stressors were also found to be related to an alcohol use disorder in the students.(86) Robertson et al noted that in a sample of 93 homeless adolescents in Hollywood, California, USA, one quarter attributed their homelessness to parental alcohol abuse.(96) However, it is difficult to directly relate parental substance abuse to child abuse and neglect, as substance abuse rarely exists as an independent risk factor— it is usually
associated with a number of other characteristics which increase the risk of abuse and neglect, including unemployment, poverty, personality problems, etc. (84)

Children who grow up with drug or alcohol-abusing parents are more likely to abuse substances themselves in adulthood. (33, 34, 71) There are several different theories that attempt to explain the intergenerational transmission of drug and alcohol addiction. Many studies suggest a genetic mechanism in the intergenerational continuity of substance abuse. (34, 78-80, 84, 97) There are also two prominent theories in the literature that posit an environmental mechanism in the generational continuity of substance abuse problems. The first, a social learning approach, regards substance use in teens and young adults as imitative of parental patterns of substance use. (79, 85, 87, 90, 173) Children learn primarily by example and imitation, (174, 175) so it is not surprising that children who grow up with drug-addicted or alcohol-abusing parents often turn to a lifestyle of drug or alcohol abuse themselves. The second theory, derived from a medical model, assumes that youths' substance use is related to emotional pathology which results from adverse family circumstances related to parental substance use. (79, 84, 87, 90, 173) Children raised in homes with substance abusers are more often exposed to adverse experiences so they turn to drugs or alcohol to cope. These theories are not mutually exclusive: a multifactorial model of familial transmission incorporates a developmental perspective in which social learning factors play a more important role in the initiation of substance use and individual emotional problems become more important in later stages of substance abuse. (78-80, 90, 98) However, it is likely that the mechanisms through which the inter-generational transmission of substance use problems occur are of differential importance in different subgroups of the population. (87)

Parental alcoholism has many negative effects on children. Research suggests that parental alcohol problems increase the risk of a wide variety of emotional and behavioural disorders in children, including delinquency, truancy, aggressive behaviour, hyperactivity, and temper tantrums. (79, 87) Children of alcoholics are also generally considered to be at high risk for subsequent alcohol abuse and other drug problems; through biological and social pathways, the
familial transmission of alcoholism is well-documented.(33, 79-96) In a three-year longitudinal case-control study of 454 adolescents, Chassin et al found that parental alcoholism was a powerful risk factor for the development of both alcohol and drug abuse disorders.(89) In a separate analysis of this data, Chassin et al suggested that parental alcoholism influenced adolescent substance use through increased incidence of uncontrollable life events, through decreased parental monitoring, and through increased temperamental emotionality.(176) Stenmark et al found that parental alcohol use positively predicted juvenile substance use among a sample of 268 young offenders in South Carolina, USA.(95) Annis et al found evidence of sex-patterning (i.e., mother-daughter, father-son) in drug use among family members in a sample of 539 adolescent homes.(92)

The vast body of literature on the long-term outcomes for children of alcoholics far outweighs and predates the available literature on children of other substance abusers.(82, 84, 85, 94) Relatively little is known about the children of people who abuse substances other than alcohol,(84, 85, 169) and much of this research focuses on fetal exposure to maternal drug abuse.(169) However, the growing body of evidence indicates that through biological and psychosocial pathways, these children are also at increased risk for later addictions and other problems.(11, 33, 84, 85, 90, 92, 93, 97-99, 155) Martinez et al linked a range of traumatic childhood events—including parental substance use, forced institutionalization, and a history of prostitution—to injection drug use in a sample of 186 homeless youths in California, USA.(11)

Children of parents who abuse drugs may be at very high risk due to a combination of biological vulnerability and care-taking inadequacy. Exposed to drugs in utero through maternal use, they are burdened with a number of biological and developmental disadvantages that researchers are only just coming to understand; growing up with drug-addicted parents, these children may suffer the myriad effects of abuse and neglect.(71, 82, 83, 177) Characteristics of both chemically dependent parents and their children contribute to an increase in the risk of abuse or neglect.(93)

Infants of mothers who abuse drugs may demonstrate several behavioral sequelae as a result of the physical effects of drug exposure in utero that make them more difficult to care for.(84, 167,
177-179) These can include irritability, poor or irregular feeding and sleep patterns, frequent crying, vomiting, and poor consolability. (93, 178-180) As they mature, these children may also demonstrate delays and deficits in motor development, language initiation, IQ scores, and height and weight. (93, 178, 179, 181) As a result, these are children with special needs that place high demands on their caregivers. (71, 167, 177, 182)

Unfortunately, the parents of drug-exposed infants may be ill-equipped to cope with their infants' special needs. (71, 177, 180, 182) A variety of studies have shown that drug-addicted women have problems in interacting with their children when compared with other mothers; (157, 179) however, parenting impairments by a substance-abusing adult may not be solely a result of the substance abuse, but also of preexisting psychological conditions which contribute to the individual's addiction. (179) A large majority of people who abuse drugs have evidence of other mental, emotional, or personality disorders that can further compromise their ability to care for their children. (93, 157) Those who use drugs heavily tend to have poor parenting skills, which can exacerbate the damage done to children by drug exposure in utero. (82, 84, 93, 167, 174, 177, 180-183) Drug addiction interferes with a parent's ability to provide the consistent nurturing and caregiving that are essential in children's biological and psychological development. (93, 167, 170, 174, 177, 180, 183) The amount of time that chemically dependent parents must spend in activities related to getting and using addictive substances clearly interferes with optimal, even marginal, parenting. (93, 167, 170, 177, 183) Child maltreatment is more common among parents with substance abuse problems. (167, 179, 181, 183) Additionally, children of drug users are more likely to witness violence in their homes and to be victims of violence which has serious long-term implications for their development. (175, 179)

In a 10-year longitudinal study of 69 African American inner-city mothers in Chicago, Illinois, USA, Hans et al found that substance-abusing mothers provided their children with less optimal parenting than mothers from similar socioeconomic backgrounds, and that this was mediated by maternal psychopathology. (157) In a cross-sectional study of 127 African American mothers,
Marcenko et al. found that severity of maternal drug addiction was highly correlated with child placement in protective custody. In a case control study comparing 15 drug-addicted mothers in a methadone maintenance program and their 15 preschool children with 15 non-drug-addicted mothers and their 15 children in California, USA, Bauman and Dougherty found that drug-addicted mothers performed less adaptively than non-drug-addicted mothers on measures of personality and parenting behaviour while their children performed more poorly than children of non-drug-addicted mothers on measures of intelligence, development, and socially adaptive behaviour. These results were confirmed by Bauman and Levine in a subsequent study of 70 methadone-maintained drug-addicted mothers and their 70 preschool children and a matched control group of 70 non-drug-addicted mothers and their 70 preschool children. However, in a recent case-control study of the parenting capacities of 69 methadone-controlled drug-addicted mothers and 51 demographically-matched non-addicted mothers, Suchman and Luthar found that only lack of parental involvement was directly related to being an addict, and that socioeconomic status and other demographic characteristics such as marital status and family size significantly moderated the relationship between addiction and parenting.

2.2.2.4 Witnessing violence in the home

Exposure to violence adversely affects children's development in many areas, such as their ability to function in school, their emotional stability, and their orientation toward the future. Children who witness violence may exhibit signs of post-traumatic stress disorder, including diminished ability to concentrate in school, persistent sleep disturbances, flashbacks, disordered attachment, sudden startling, and a fatalistic attitude toward the future. Witnessing violence between parents in the home results in more severe emotional and developmental consequences. Little is known about the long-term effects for children who witness violence, but it is likely that this disordered orientation towards the future results in an increase in risk-taking behaviours.
Children who witness violence are more likely to grow up to become abusive themselves.\(44, 143, 155\). In a sample of 25 adolescent boys who had experienced sexual abuse in southeast England, Skuse et al found that witnessing intrafamilial violence distinguished boys who subsequently sexually abused other children from boys who were solely victims of sexual abuse.\(187\)

2.3 **LINK BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND ADULT RISK BEHAVIOURS**

The link between adverse childhood experiences and adult health risk behaviours may be partly due to coping.\(99, 188\) Coping has been defined as “activities or behaviours used in an attempt to maintain a balance between environmental demands and resources currently available to meet those demands.”\(188\) High levels of exposure to adverse childhood experiences produce anxiety, anger, depression, low self-esteem, lack of self-efficacy, and psychological distress in children with long-lasting effects into adulthood.\(82\) Victims often internalize and blame themselves for their abuse.\(91\) These factors make it more likely that a person will engage in high-risk activities such as injection drug use or risky sex and be less likely to take precautions in these actions. Substance misuse and other health risk behaviours can be seen as maladaptive attempts to deal with life stresses;\(98, 189, 190\) persons are viewed as active agents who try to cope with the stressors and temptations they experience, rather than reacting passively to the biological impulses of addiction. Inadequate coping mechanisms to deal with life stresses have been linked to initiation and maintenance of tobacco and alcohol use in early adolescents \(190\) and to drug and alcohol use as coping mechanisms in adults.\(191\) High risk behaviours demonstrated by individuals who experienced deleterious situations as children can thus be seen as adaptive or coping responses that over time became contextually inappropriate and possibly health-threatening.\(57, 64, 72, 99\) For example, the belief that one is unable to refuse unwanted sexual advances, although true in the context of childhood abuse, may persevere into adulthood, often contributing to HIV risk-behaviours.\(76\)
Certain behaviours that have long-term negative effects on health may also have immediate positive effects of alleviating emotional pain or enhancing pleasure. (188, 190, 191) Health risk behaviours such as substance abuse or risky sexual practices may be consciously or unconsciously used because they have immediate pharmacological or psychological benefits as coping strategies to deal with the negative emotional, neurobiological, and social effects of childhood abuse or household dysfunction. (38, 39, 69, 72, 99, 188, 190, 191) Substance abuse as a coping mechanism accomplishes two functions: it minimizes negative feelings and maximizes positive feelings. (34) People may use drugs in part to self-medicate the intense, painful feelings and even physiological changes that are associated with significant traumatic life events. (82)

Other factors may also help to explain the association between adverse childhood experiences and adult risk behaviours. For example, alienation and low self-esteem resulting from adverse childhood experiences may prompt substance use as a means of social interaction with minimal interpersonal closeness. (69) Abuse or neglect in childhood may prompt the child to leave home early and enter situations that carry a high risk of sexual coercion and substance abuse. (69)

2.4 LIMITATIONS

The power of many of the studies on adult risk behaviours, childhood abuse, and other adverse childhood experiences, particularly in population who use injection drugs, is limited due to relatively small sample sizes. However, the results of the studies support each other, as well as the few studies with larger sample sizes, suggesting a predictable pattern.

Childhood abuse is generally under-reported in adulthood. In a follow-up study of 69 young adults who were formerly incarcerated delinquents interviewed 9 years after they underwent extensive neuropsychiatric evaluations, Femina et al found that 26 gave responses that were discrepant with information on physical abuse gathered when they were adolescents; 69% of these denied or minimized any experiences of abuse. (192) The further in time the participants were removed from the abuse, the less they remembered it. This would lead to an underestimation of the effects of
childhood abuse.

There are several other methodological problems in many of the studies surveyed above. The use of the family history method by many of the studies, in which information about problems among family members is obtained from only one member of the family, has been shown to underestimate the frequency of problems in the family, which would also lead to an underestimation of effect. Most studies in the literature cannot establish temporality between the reported adverse childhood experiences and risk behaviours. Causality between adverse childhood experiences and adult risk behaviours is difficult to infer from current literature as there is a significant time lapse between adverse childhood experiences and the reporting of them in adulthood in most studies, during which many other intervening factors may influence behaviour.

2.5 CONCLUSIONS

People who use injection drugs have been shown to engage in many behaviours that put them at increased risk for the transmission of HIV, Hepatitis C, and other blood-borne pathogens and sexually transmitted diseases. Factors associated with high risk behaviours among people who use injection drugs include demographic characteristics (such as age, sex, race, socioeconomic status, marital status, and education), mental health problems (such as depression, anxiety, low self-esteem, powerlessness, isolation, fatalism, and hostility), and social factors (such as poverty, neighborhood characteristics, and social networks). It is important to note that these factors are often inter-related.

Adverse childhood experiences, which include personal factors (experiencing childhood abuse) as well as parental factors (such as parental mental health, drug, or alcohol problems, parental unemployment, and witnessing violence between parents), have a strong impact on adult lives. Research in the general population on the long-term outcomes of adverse childhood experiences indicates that children who experienced significant detrimental events while growing up subsequently have greater levels of negative health and behavioural outcomes in adulthood. It is hypothesized that these negative outcomes may come about as a result of attempts to cope with adverse childhood
experiences.

The majority of the research on people who use injection drugs has assessed their risk behaviours and disease seroprevalence without considering the influence of their childhood experiences and psychosocial histories. There is a growing body of evidence that is attempting to address these issues; adding to it will help to shape both strategies aimed at disease prevention among people who use injection drugs and strategies aimed at the prevention of injection drug use altogether.
CHAPTER 3: METHODOLOGY

3.1 STUDY DESIGN

This thesis draws upon data from the 2000 Regina Seroprevalence and Risk Behaviour Study. This study considered infectious disease seroprevalence, demographics, and risk behaviours in a sample of 255 people who use injection drugs. It was a cross-sectional study that collected data through in-depth, in-person interviews using a standardized, structured questionnaire administered by a trained interviewer in addition to blood and urine sample collection and testing. The sociodemographic and behavioural variables from the Regina study that are considered in this thesis are summarized in Appendix A.

3.2 SAMPLE SIZE

The sample size of the Regina Seroprevalence and Risk Behaviour study was calculated using Statcalc from Epi Info (version 6.04b, 1994; Center for Disease Control, Atlanta, GA). This calculation assumed an injection drug-using population of 1000 to 2000 persons in the RHD service area (0.5%-1.0% of the total population) and HIV seroprevalence of 2% to 5% among people who use injection drugs. It yielded a range of 158-255 when a 95% confidence interval was assumed. This range of sample sizes is consistent with previous Canadian surveys of people in Cape Breton and Prince Albert who use injection drugs. A sample size of 255 was selected as yielding an acceptable degree of precision and cost.
3.3 Study Participants

Social stigma and legal implications contribute to the highly covert nature of injection drug use. Therefore, it is necessary to rely on nonrandom convenience sampling in studies of people who use injection drugs. A sample of 255 people who use injection drugs took part in the Regina study at one of two locations (the STD clinic in the Public Health offices, and Four Directions Community Health Centre which services an Aboriginal population, both located in or near low-income neighborhoods) between June and September 2000. Participants were anonymous volunteers recruited initially through local harm reduction services and advertising, followed primarily by word of mouth. As participants were generally required to be able to make and keep an appointment to take part in the study, it is possible that the sample represents a more “functional” level of drug user. Every effort was made to accommodate drop-in participants to avoid this.

People were considered to be eligible to participate in the study if they reported injecting drugs at least once in the 12 months prior to the interview, if they were 14 years or older at the time of the interview, and if they were willing to participate in an in-person interview and undergo blood and urine testing.(3) People were excluded from the study if they only identified as a diabetic who had never borrowed needles, if they were deemed by the interviewer to be incapable of providing informed consent, or if they were unable to speak English.(3)

3.4 Consent

Informed consent was obtained from each participant prior to the interview. Before commencing the interview, the interviewer informed the participants of the aims and objectives of the study and explained the study protocol. The participants also received a written explanation of the study procedures, including detailed information on data collection, blood and urine collection,
blood storage, and data storage. All participants were informed of the procedures in place to preserve their anonymity. All participants were informed of their right to withdraw from the investigation at any time and that withdrawal from the study would not affect their current or future health care in Regina. All participants were informed of their right to refuse to answer any questions with which they were uncomfortable.

In order to ensure their anonymity, the participants did not sign a consent form; instead, after reviewing a detailed consent form with the participants, verbal consent was obtained by the interviewer who then signed the form (see Appendix C). Understanding the purpose of the study (i.e., the objectives), the potential risks involved (i.e., potential discomfort during venipuncture), and willingness to complete the questionnaire and to provide a blood sample constituted voluntary and informed consent.

3.5 Data Collection

In the Regina study, a trained interviewer administered a detailed questionnaire (designed by the LCDC with input from RHD, Saskatchewan Health, and the Regina Harm Reduction Task Force) with quantitative and qualitative components in an anonymous in-person interview that lasted approximately 45-60 minutes. Topics addressed by the questionnaire component of the study were: demographics of the participants; injection and sexual behaviours in the last six months; social, mental health, and addictions histories of the participants; use of methadone and needle exchange services; injection behaviour when incarcerated; and service needs of people who use injection drugs and barriers to service use (see Appendix D).(3) Parental factors were proxy-reported by the participants. In order to limit recall bias, questions about specific injection and sexual behaviours were limited to the six months prior to the interview.
After the interview, the interviewer provided health education and referrals to appropriate community agencies as required and conducted pre-test counseling as per current public health guidelines. Participants then submitted approximately 10 ml of blood for testing for HIV, hepatitis viruses, and syphilis serology, and a urine specimen for chlamydia and gonorrhea testing. All specimens were tested at the Saskatchewan Provincial Laboratory in Regina. Participants returned two weeks after their initial appointment to receive their test results and post-test counselling. In order to defray transportation expenses and related personal costs, participants were paid $20 upon completion of the questionnaire and blood and urine collection. To encourage them to return for their test results, participants were paid $10 at their return visit.

3.6 Confidentiality

Extensive measures were taken to ensure and maintain confidentiality in the Regina Seroprevalence and Risk Behaviour Study. Participants provided verbal consent instead of signing a consent form (see Appendix C). No real names were used or required for any part of the investigation except when contact-tracing was initiated at the request of participants who tested positive for any of the infections tested for; in this instance, no written consent was sought. Questionnaires did not contain any personal identifiers, and instead had a unique three-digit investigation code to distinguish study participants. Blood and urine test results were linked to the questionnaire only by the three-digit code. Individuals were asked to provide a set of initials, a date of birth, and a nickname at the time of blood collection. However, this was to facilitate laboratory data entry (non-nominal coding) and to ensure that the participants received their own test results without having to divulge their names to the study interviewers.
3.7 Data Analysis

The questionnaire and lab result data were entered into Epi Info, version 6.04. The questionnaires and lab results were distinguished by a unique investigation code; no personal identifying information accompanied any of the data. The data were cleaned and converted to SPSS format by Health Canada. The data for this thesis were analysed using SPSS version 10.05.

3.7.1 Data recoding

Most of the variables were drawn directly from questions asked in the Regina study questionnaire (see Appendix E). However, some of the data were recoded to arrive at the variables used in this thesis’ analyses. Several variables were determined by pooling data from numerous related questions. Anal sex in the past six months was determined by considering the responses to all of the anal sex questions asked about regular, casual, and client partners. Previous diagnosis of STD was calculated by considering the responses to the questions that asked about a list of specific STDs. Witnessing parental violence was determined by combining the responses to the questions on violence between parents, violence between parents and siblings, and violence between parents and their friends. Two of the behavioural variables (Less than 100% cleaning of borrowed needles/gear in the last six months; Less than 100% condom use with non-regular partners in the past six months) were converted from ordinal responses (Always/Usually/Sometimes/Occasionally/ Never) into dichotomous responses (Yes/No). Education was dichotomized from a large list of options: participants who had completed grade 12 and those who had not.

Alcohol dependence was determined using the four CAGE questions (Have you ever felt that you should Cut down on your drinking? Have people Annoyed you by criticizing your drinking? Have you ever felt bad or Guilty about your drinking? Have you ever had a drink first thing in the
morning (Eye-opener) to steady your nerves or get rid of a hangover?). Affirmative responses to two or more of these questions indicates a strong likelihood of alcohol dependence,(1) so participants who gave positive responses to two or more of these questions were considered to be alcohol dependent.

An abbreviated seven-item version of the Centre for Epidemiological Studies Depression (CES-D) scale was used which asked participants to rate the extent to which they experienced feelings consistent with clinical depression.(133, 194) Responses were scaled from one to five and summed; totals above the 75th percentile (i.e., above 23) were considered to represent an elevated depression score in subsequent analyses.

The total number of adverse childhood experiences and total number of risk behaviours were summed for the dose-response and model-building phases of the analyses. Risk behaviours were considered all together, and grouped into injection-related and sexual categories.

3.7.2 Analysis

Descriptive analyses were initially undertaken for all of the variables. For categorical data, frequencies and percentages were assessed; for continuous data, means and ranges were determined. These values were calculated for sociodemographic variables, adverse childhood experiences, and risk behaviours.

Bivariate analyses were used to determine the significance of the associations between adverse childhood experiences and risk behaviours, among adverse childhood experiences, among risk behaviours, and between sociodemographic factors and adverse childhood experiences and risk behaviours. Logistic regression is the most commonly used model in epidemiology,(195) and is used to model the relationship between an exposure and a dichotomous outcome variable after
adjusting for a number of potential confounders. Binary logistic regression analysis was used to examine the bivariate associations among the data. The inter-relatedness of adverse childhood experiences and risk behaviours was also assessed.

The denominators of two of the risk behaviour variables considered in these analyses were slightly different than the other variables (which applied to all of the participants). The variable that considered participants' injection activities while incarcerated applies only to participants who had been incarcerated in the past (89.4%). Similarly, the variable that addressed participants' cleaning of borrowed needles or gear in the six months prior to the interview applies only to participants who reported borrowing needles or gear in the six months prior to the interview (39.2%). However, as both of these behaviours have been well-documented as conferring a large degree of risk for the transmission of blood-borne pathogens, they were considered in the risk behaviours summary variables along with the five other risk behaviours.

Risk behaviour variables were summed to produce three continuous variables: total number of risk behaviours, total number of injection-related risk behaviours, and total number of sexual risk behaviours. All risk behaviour variables (borrowing needles/gear in the past six months, borrowing needles while incarcerated, insufficient cleaning of borrowed needles/gear in the past six months, more than 50 sex partners in lifetime, insufficient condom use with non-regular partners in the past six months, prostitution in the past six months, and anal sex in the past six months) were summed for the total number of risk behaviours summary variable. The first three variables (borrowing needles/gear in the past six months, borrowing needles while incarcerated, and insufficient cleaning of borrowed needles/gear in the past six months) were summed for the total number of injection-related risk behaviours summary variable, and the final four variables (more than 50 sex partners in lifetime, insufficient condom use with non-regular partners in the past six months, prostitution in the past six months, and anal sex in the past six months) were summed for the total number of sexual risk
behaviours summary variable. The adverse childhood experiences were also summed for subsequent analyses.

The term dose-response relationship describes “the relationship of observed outcomes (responses) in a population to varying levels (doses) of a protective or harmful agent such as a form of medication or an environmental contaminant.”(2) In the context of this study, the dose is the number of adverse childhood experiences reported by the participants and the response is the number of risk behaviours reported. This situation is different from the context in which the concept of dose-response is traditionally used in that the dose is typically a chemical agent and the outcome is usually a biological or physiological measure. However, the concept of dose-response has been used by other researchers in situations similar to this study involving sociological predictors and outcomes.(38, 39) A dose-response relationship between adverse childhood experiences and risk behaviours was assessed by simple linear regression analyses, using the risk behaviour summary variables as dependent variables and the adverse childhood experiences summary variable as the independent variable.

The risk behaviour summary variables were next studied in the model-building phase of analysis using univariate general linear modeling (GLM). General linear modeling provides a common approach for diverse statistical methods such as ANOVA, ANACOVA, and multiple linear regression. It is an extension of the traditional linear model, and is therefore applicable to a wider range of data analysis problems.(198) Univariate GLM is used to model the relationship between one dependent variable and one or more factors by providing regression analysis and analysis of variance.(199) The factor variables divide the population into groups. There are two statistical assumptions in this model: normality and homoscedasticity (homogeneity of variance).(198) Three separate general linear models were developed to predict the number of risk behaviours reported by the participants.
The following procedure was used to create each of the three models predicting the number of risk behaviours reported by the participants. For the model-building phase of analysis, variables with \( p < 0.1 \) were considered to be statistically significant. Sociodemographic variables and adverse childhood experiences that were significantly associated with the outcome variables in bivariate analyses were entered into the specific quantified risk behaviours models. All significant independent variables were initially entered into a univariate general linear model. Continuous independent variables were entered as covariates, categorical independent variables were entered as fixed factors, and the risk behaviour summary variable was entered as the dependent variable. Variables that were statistically significant in this model as well as variables that were deemed to be clinically significant based on the literature were chosen for the next step of model building and entered into a new general linear model. The resulting model was the main effects model.

Next, confounding and interaction of variables that were statistically significant in bivariate analyses but were not in the main effects model were assessed. Confounding occurs when meaningfully different interpretations of the relationship of interest result when the confounder is excluded or included in the model.\(^2\, 195, 200\) Interaction, or effect modification, occurs when the relationship of interest is different at different levels of the interacting factor.\(^2\, 195, 200\) Potential confounders were selected from the variables that were significant in bivariate analyses and were included in the main effects model one at a time; if the differences between the \( \beta \) coefficients of the variables in the main effects models with and without the potential confounder were greater than 20\%, the variable was considered to be a confounder and added to the final model. Interaction was assessed by adding interaction terms into the main effects model. Partial F tests were used to determine if including each interaction term in the model was better than excluding it; statistically significant interaction terms were considered to be significant effect modifiers and were included in the final model. Interactions were graphed to illustrate their effect.
3.7.3 Power Estimates

Power is the probability that if there is a difference between two populations (exposed and unexposed) then samples from these will show a significant difference. Calculations based on the prevalence of adverse childhood experiences in this population of people who use injection drugs produced a range of power estimates from 80.5%-100%. Calculations based on the prevalence of risk behaviours produced a range of power estimates from 68.1%-100% (see Appendix F).
CHAPTER 4: RESULTS

This chapter is organised into five sections. The first section provides the distribution of the variables used in subsequent analyses: sociodemographic characteristics, adverse childhood experiences, and risk behaviours. The bivariate associations among adverse childhood experiences and among risk behaviours as well as between adverse childhood experiences, risk behaviours, and sociodemographic factors are presented in the second section. The third section presents evidence for a dose-response relationship between adverse childhood experience and risk behaviour summary variables. Section four presents the bivariate linear associations between sociodemographic factors, adverse childhood experiences, and risk behaviour summary variables. Results from the general linear models which describe sociodemographic variables and adverse childhood experiences associated with risk behaviour summary variables are presented in the final section.

4.1 DISTRIBUTION OF THE VARIABLES

4.1.1 Frequencies of sociodemographic characteristics

Selected sociodemographic characteristics measured for the participants are reported in Table 4.1. Slightly more of the participants were male (52.9%) than female (47.1%). The large majority (90.6%) of the participants were Aboriginal; less than 10% reported being white. Most of the participants (71.4%) reported that they had not completed Grade 12. The mean age of the participants was 32.5 years, with a range from 14 years to 67 years. The mean CES-D revised depression score of the participants was 20.2 points with a range from 8 points to 35 points;
participants in the top 25th percentile (i.e., with depression scores greater than 23) were considered to have an elevated depression score in subsequent analyses. The majority (80.0%) of the participants answered affirmatively to two or more of the CAGE questions indicating a likelihood of alcohol dependence.

Table 4.1: Distribution of sociodemographic variables

<table>
<thead>
<tr>
<th>Sociodemographic factors</th>
<th>n (% of 255)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>135 (52.9)</td>
</tr>
<tr>
<td>Female</td>
<td>120 (47.1)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Aboriginal</td>
<td>231 (90.6)</td>
</tr>
<tr>
<td>White</td>
<td>24 (9.4)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Less than Grade 12</td>
<td>182 (71.4)</td>
</tr>
<tr>
<td>Grade 12 or higher</td>
<td>73 (28.6)</td>
</tr>
<tr>
<td>Mean age (range)</td>
<td>32.5 years (14-67)</td>
</tr>
<tr>
<td>Mean CES-D revised depression score (range)</td>
<td>20.2 (8-35)</td>
</tr>
<tr>
<td>Alcohol dependence*</td>
<td>204 (80.0)</td>
</tr>
</tbody>
</table>

*defined as two or more affirmative responses to the four CAGE questions

4.1.2 Frequencies of adverse childhood experiences

The frequencies of adverse childhood experiences are reported in Table 4.2. Levels of childhood abuse were very high among the participants; 68.6% reported some type of abuse before age 16. More than half (54.5%) of the participants reported minor physical abuse—defined as pushing or slapping—before the age of 16. 43.9% reported serious physical abuse—defined as kicking, punching, or burning—before age 16. 44.3% of the participants reported that they had been sexually abused before age 16. 55.7% had experienced emotional abuse before age 16. The participants also experienced a substantial degree of family-related adverse childhood experiences. Most (81.6%) of the participants reported that one or both of their parents had an alcohol problem.
when they were growing up. 21.6% reported parental drug problems. 30.6% of the participants reported that one or both of their parents had a mental health problem. 45.1% of the participants had a parent with a police or court record. More than half (58.8%) of the participants reported that one or both of their parents were unemployed and seeking employment for more than one year while they were growing up. The majority (84.3%) of the participants reported witnessing parental violence when they were growing up.

Table 4.2: Distribution of adverse childhood experiences

<table>
<thead>
<tr>
<th>Adverse childhood experiences</th>
<th>n (% of 255)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor physical abuse before age 16</td>
<td>139 (54.5)</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>112 (43.9)</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>113 (44.3)</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>142 (55.7)</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>208 (81.6)</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>55 (21.6)</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>78 (30.6)</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>115 (45.1)</td>
</tr>
<tr>
<td>Parental unemployment for more than 1 year</td>
<td>150 (58.8)</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>215 (84.3)</td>
</tr>
</tbody>
</table>

4.1.3 Frequencies of risk behaviours

The frequencies of injection-related and sexual risk behaviours reported by the participants are presented in Table 4.3. 39.2% of the participants reported borrowing needles or gear in the six months prior to the interview. 12.5% reported ever borrowing needles while incarcerated. 6.3% of the participants reported that they cleaned borrowed needles or gear less than 100% of the time when sharing needles or gear in the six months prior to the interview. 28.6% of the participants reported having more than 50 sex partners in their lifetime. 29.4% reported that they used condoms less than
100% of the time with non-regular sex partners in the six months prior to the interview. 23.9% of the participants reported prostitution—defined as exchanging sex for money, gifts, drugs, or shelter—in the six months prior to the interview. 13.3% reported practicing anal sex in the six months prior to the interview.

Table 4.3: Distribution of risk behaviours

<table>
<thead>
<tr>
<th>Risk behaviours</th>
<th>n (% of 255)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used someone else's needles or gear in the past 6 months</td>
<td>100 (39.2)</td>
</tr>
<tr>
<td>Ever used someone else's needle while incarcerated</td>
<td>32 (12.5)</td>
</tr>
<tr>
<td>Less than 100% cleaning of borrowed needles or gear in the past 6 months</td>
<td>16 (6.3)</td>
</tr>
<tr>
<td>More than 50 sex partners in lifetime</td>
<td>73 (28.6)</td>
</tr>
<tr>
<td>Less than 100% condom use with non-regular partners in the past 6 months</td>
<td>75 (29.4)</td>
</tr>
<tr>
<td>Involvement in prostitution in the past 6 months</td>
<td>61 (23.9)</td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>34 (13.3)</td>
</tr>
</tbody>
</table>

4.2 BIVARIATE ASSOCIATIONS

The bivariate associations among adverse childhood experiences and among risk behaviours, as well as between adverse childhood experiences and risk behaviours, were assessed using logistic regression analyses. These associations were adjusted for sex and age. Both crude and adjusted odds ratios (OR), 95% confidence intervals (CI), and p-values for each adverse childhood experience and risk behaviour are reported in Appendix G (Tables G1-G26). Summaries of the crude associations among adverse childhood experiences, among risk behaviours, and between adverse childhood experiences and risk behaviours are reported in Tables 4.4, 4.7, and 4.10 respectively.
The bivariate associations between sociodemographic factors and adverse childhood experiences and risk behaviours were also assessed using logistic regression analyses. Only crude associations were tested. The associations for each sociodemographic factor are reported in Appendix G (Tables G27-G36). Summaries of the crude associations between sociodemographic factors and adverse childhood experiences and risk behaviours are reported in Tables 4.11 and 4.12 respectively.

4.2.1 Associations among adverse childhood experiences

4.2.1.1 Parental alcohol problem

Growing up with a parent with an alcohol problem was significantly associated with several other adverse childhood experiences (Table 4.4; Appendix G, Table G1). Participants who reported a parental alcohol problem were significantly more likely to also report other parental problems such as a parental drug problem, parental police or court record, parental unemployment, and witnessing parental violence. Parental alcohol problems were also independently associated with childhood abuse; participants who reported parental alcohol problems were significantly more likely to also report minor physical abuse before age 16, sexual abuse before age 16, and emotional abuse before age 16.
Table 4.4: Summary of crude bivariate associations (p-values) among adverse childhood experiences

<table>
<thead>
<tr>
<th>Adverse childhood experiences</th>
<th>Parental alcohol problem</th>
<th>Parental drug problem</th>
<th>Parental mental health problem</th>
<th>Parental police or court record</th>
<th>Parental unemployment</th>
<th>Witnessed parental violence</th>
<th>Minor physical abuse before age 16</th>
<th>Serious physical abuse before age 16</th>
<th>Sexual abuse before age 16</th>
<th>Emotional abuse before age 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental alcohol problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>0.06</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>&lt;0.001</td>
<td>0.91</td>
<td>0.09</td>
<td>&lt;0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>&lt;0.001</td>
<td>0.28</td>
<td>0.06</td>
<td>&lt;0.001</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>0.006</td>
<td>1.00</td>
<td>0.01</td>
<td>0.11</td>
<td>0.07</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>0.07</td>
<td>0.51</td>
<td>0.001</td>
<td>0.71</td>
<td>0.98</td>
<td>0.001</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>0.03</td>
<td>0.91</td>
<td>0.02</td>
<td>0.13</td>
<td>0.10</td>
<td>0.88</td>
<td></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>&lt;0.001</td>
<td>0.42</td>
<td>0.002</td>
<td>0.32</td>
<td>0.71</td>
<td>0.002</td>
<td></td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
4.2.1.2 Parental drug problem

Parental drug problems were associated with fewer other adverse childhood experiences than parental alcohol problems (Table 4.4; Appendix G, Table G2). Parental drug problems were significantly associated with parental alcohol problems, parental mental health problems, and a parental police or court record. Parental drug problems were not significantly associated with childhood abuse.

4.2.1.3 Parental mental health problem

Parental mental health problems were significantly associated with several other adverse childhood experiences (Table 4.4; Appendix G, Table G3). Growing up with a parent who had a mental health problem was significantly associated with parental drug problems and a parental police or court record. Parental mental health problems were independently associated with all types of reported childhood abuse.

4.2.1.4 Parental police or court record

Parental police or court record was significantly associated with several other adverse childhood experiences (Table 4.4; Appendix G, Table G4). Participants who reported growing up with a parent who had a police or court record were significantly more likely to also report all other reported parental factors, including parental alcohol problems, parental drug problems, parental mental health problems, parental unemployment, and witnessing parental violence. Childhood abuse was not significantly associated with having a parent with a police or court record.
4.2.1.5 Parental unemployment

Parental unemployment for more than one year was significantly associated with many other adverse childhood experiences (Table 4.4; Appendix G, Table G5). Parental factors related to parental unemployment were parental alcohol problems, parental police or court record, and witnessing parental violence. Parental unemployment was not significantly associated with childhood abuse.

4.2.1.6 Witnessing parental violence

Witnessing parental violence (defined as violence between parents, between parents and siblings, or between parents and their friends) was significantly related to many other adverse childhood experiences (Table 4.4; Appendix G, Table G6). Parental factors that were significantly associated with witnessing parental violence were parental alcohol problems, parental police or court record, and parental unemployment. Childhood abuse before age 16 was also significantly associated with witnessing parental violence: minor and serious physical abuse as well as emotional abuse before age 16 were all related to witnessing parental violence.

4.2.1.7 Minor physical abuse before age 16

Minor physical abuse (defined as pushing or slapping) before the age of 16 was significantly associated with several other adverse childhood experiences (Table 4.4; Appendix G, Table G7). Participants who reported minor physical abuse were significantly more likely to also report adverse parental factors such as parental alcohol problems, parental mental health problems, and witnessing parental violence. All other types of reported childhood abuse were strongly associated with minor physical abuse before age 16.
4.2.1.8 Serious physical abuse before age 16

Serious physical abuse (defined as kicking, punching, or burning) before the age of 16 was also significantly associated with several adverse childhood experiences (Table 4.4; Appendix G, Table G8). Parental factors associated with serious physical abuse were parental mental health problems and witnessing parental violence. All other types of reported childhood abuse were strongly associated with serious physical abuse before age 16.

4.2.1.9 Sexual abuse before age 16

Sexual abuse before the age of 16 was significantly associated with several adverse childhood experiences (Table 4.4; Appendix G, Table G9). Parental factors that were significantly associated with sexual abuse were parental alcohol problems and parental mental health problems. Sexual abuse before age 16 was strongly associated with all other types of childhood abuse reported.

4.2.1.10 Emotional abuse before age 16

Emotional abuse before the age of 16 was also significantly associated with many adverse childhood experiences (Table 4.4; Appendix G, Tables G1-G9). Participants who reported emotional abuse were significantly more likely to also report parental alcohol problems, parental mental health problems, and witnessing parental violence. All other types of childhood abuse reported were strongly associated with emotional abuse before age 16.
### Table 4.5: Inter-relatedness of adverse childhood experiences—prevalence of reporting additional specific adverse childhood experiences among participants who reported exposure to adverse childhood experiences

<table>
<thead>
<tr>
<th>Adverse childhood experiences</th>
<th>Severe physical abuse</th>
<th>Minor physical abuse</th>
<th>Sexual abuse</th>
<th>Emotional abuse</th>
<th>Parental alcohol problem</th>
<th>Parental drug problem</th>
<th>Parental mental health problem</th>
<th>Parental poverty or parental unemployment</th>
<th>Witnessed parental violence</th>
<th>Parental arrest or parental court record</th>
</tr>
</thead>
<tbody>
<tr>
<td>% reporting additional adverse childhood experiences</td>
<td>(41.3)</td>
<td>(64.5)</td>
<td>(58.7)</td>
<td>(81.6)</td>
<td>(64.5)</td>
<td>(30.6)</td>
<td>(81.5)</td>
<td>(19.4)</td>
<td>(90.1)</td>
<td>(64.0)</td>
</tr>
<tr>
<td>Median (range)</td>
<td>90.8</td>
<td>94.8</td>
<td>99.8</td>
<td>84.1</td>
<td>99.8</td>
<td>90.8</td>
<td>99.8</td>
<td>90.8</td>
<td>99.8</td>
<td>90.8</td>
</tr>
</tbody>
</table>
Table 4.6: Inter-relatedness of adverse childhood experiences—prevalence of reporting additional adverse childhood experiences among participants who reported exposure to adverse childhood experiences *

<table>
<thead>
<tr>
<th>Adverse childhood experiences *</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual abuse</td>
<td>98.2</td>
<td>98.2</td>
<td>95.6</td>
<td>88.5</td>
<td>79.6</td>
<td>58.4</td>
<td>35.4</td>
<td>15.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Minor physical abuse</td>
<td>100</td>
<td>99.3</td>
<td>97.8</td>
<td>92.1</td>
<td>78.4</td>
<td>55.4</td>
<td>32.4</td>
<td>13.7</td>
<td>5.8</td>
</tr>
<tr>
<td>Severe physical abuse</td>
<td>100</td>
<td>100</td>
<td>99.0</td>
<td>93.6</td>
<td>81.1</td>
<td>60.6</td>
<td>37.4</td>
<td>16.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>100</td>
<td>98.6</td>
<td>95.7</td>
<td>90.8</td>
<td>78.1</td>
<td>55.6</td>
<td>30.9</td>
<td>13.3</td>
<td>5.6</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>98.6</td>
<td>93.8</td>
<td>83.2</td>
<td>72.6</td>
<td>58.2</td>
<td>394</td>
<td>22.1</td>
<td>9.0</td>
<td>3.8</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>100</td>
<td>98.2</td>
<td>94.6</td>
<td>81.9</td>
<td>61.9</td>
<td>43.7</td>
<td>38.2</td>
<td>21.8</td>
<td>14.5</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>97.4</td>
<td>93.6</td>
<td>84.6</td>
<td>75.6</td>
<td>58.9</td>
<td>42.3</td>
<td>23.1</td>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>100</td>
<td>99.1</td>
<td>91.3</td>
<td>82.6</td>
<td>69.6</td>
<td>52.2</td>
<td>33.1</td>
<td>16.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>96.7</td>
<td>93.3</td>
<td>84.6</td>
<td>75.9</td>
<td>62.6</td>
<td>42.6</td>
<td>26.6</td>
<td>11.3</td>
<td>5.3</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>98.6</td>
<td>92.6</td>
<td>82.4</td>
<td>71.2</td>
<td>56.8</td>
<td>37.7</td>
<td>21.4</td>
<td>8.8</td>
<td>3.7</td>
</tr>
<tr>
<td>Median (range)</td>
<td>99.4</td>
<td>98.2</td>
<td>94.1</td>
<td>83.6</td>
<td>72.6</td>
<td>53.8</td>
<td>32.8</td>
<td>14.8</td>
<td>6.4</td>
</tr>
</tbody>
</table>

*Percentages based on those exposed to first adverse childhood experience.
4.2.1.11 Inter-relatedness of adverse childhood experiences

If a participant was exposed to one of the adverse childhood experiences, the probability of exposure to any other adverse childhood experience was increased substantially (Table 4.5, Table 4.6). When participants were exposed to a first adverse childhood experience, the median probability of exposure to any additional adverse childhood experience was 99.4%; for any two additional adverse childhood experiences, the median probability was 98.2%, and so on (Table 4.6).

Witnessing parental violence was reported with other adverse childhood experiences most often; the median probability of exposure to any additional adverse childhood experience of participants who reported witnessing parental violence was 91.0%. Parental drug problem was reported with other adverse childhood experiences least often; the median probability of exposure to any additional adverse childhood experience of participants who reported a parental drug problem was 21.6%.

4.2.2 Associations among risk behaviours

4.2.2.1 Borrowing needles or gear in the past six months

Borrowing needles or other injection equipment (gear) in the six months prior to the interview was independently associated with only one other risk behaviour—prostitution in the past six months (Table 4.7; Appendix G, Table G10). The association between borrowing needles or gear in the past six months and less than 100% cleaning of borrowed needles or gear in the past six months was not assessed as the latter variable does not apply to participants who did not report borrowing needles or gear in the past six months.
<table>
<thead>
<tr>
<th>Risk behaviours</th>
<th>Borrowed needles or gear in past 6 months</th>
<th>Ever borrowed needles while incarcerated</th>
<th>&lt;100% cleaning of borrowed needles/gear in past 6 months</th>
<th>&gt;50 sex partners in lifetime</th>
<th>&lt;100% condom use with non-regular partners in past 6 months</th>
<th>Prostitution in past 6 months</th>
<th>Anal sex in past 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrowed needles or gear in past 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.2.2.2 Borrowing needles while incarcerated

Borrowing needles while incarcerated was not independently associated with any of the other risk behaviours (Table 4.7; Appendix G, Table G11).

4.2.2.3 Less than 100% cleaning of borrowed needles or gear in the past six months

Less than 100% cleaning of borrowed needles or gear in the six months prior to the interview was not significantly associated with other injection-related risk behaviours, but it was related to sex-related risk behaviours (Table 4.7; Appendix G, Table G12). Participants who did not report cleaning borrowed needles or gear every time they injected were more likely to also report less than 100% condom use with non-regular partners in the past six months and anal sex in the past six months.

4.2.2.4 More than 50 sex partners in lifetime

Having more than 50 lifetime sex partners was not significantly associated with injection-related risk behaviours, but it was associated with other sex-related risk behaviours (Table 4.7; Appendix G, Table G13). Participants who reported having more than 50 sex partners in their lifetime were significantly more likely to also report prostitution in the past six months and anal sex in the past six months.

4.2.2.5 Less than 100% condom use with non-regular partners in the past six months

Less than 100% condom use with non-regular partners in the six months prior to the interview was significantly associated with other risk behaviours (Table 4.7; Appendix G, Table
Participants who did not report using a condom with all their non-regular partners for every act of intercourse in the six months prior to the interview were also more likely to report less than 100% cleaning of borrowed needles or gear in the past six months, prostitution in the past 6 months, and anal sex in the past 6 months.

4.2.2.6 Prostitution in the past six months

Involvement in prostitution (defined as trading sex for money, drugs, or shelter) in the six months prior to the interview was significantly associated with several other risk behaviours (Table 4.7; Appendix G, Table G15). Participants who reported prostitution in the past six months were more likely to also report borrowing needles or gear in the past six months, having more than 50 sex partners in their lifetime, less than 100% condom use with non-regular partners in the past six months, and anal sex in the past six months.

4.2.2.7 Anal sex in the past six months

Engaging in anal sex in the six months prior to the interview was also significantly associated with several other risk behaviours (Table 4.7; Appendix G, Tables G10-G15). Participants who reported anal sex in the six months prior to the interview were significantly more likely to also report less than 100% cleaning of borrowed needles or gear in the past six months, more than 50 sex partners in their lifetime, less than 100% condom use with non-regular partners in the past six months, and prostitution in the past six months.
### Table 4.8: Inter-relatedness of risk behaviours—prevalence of reporting additional specific risk behaviours among participants who reported exposure to risk behaviours

<table>
<thead>
<tr>
<th>Risk behaviours</th>
<th>n (% of total)</th>
<th>Borrowed needles/gear in past 6 months</th>
<th>Ever borrowed needles while incarcerated</th>
<th>&lt;100% cleaning of borrowed needles/gear in past 6 months</th>
<th>&gt;50 sex partners in lifetime</th>
<th>&lt;100% condom use with non-regular partners in past 6 months</th>
<th>Prostitution in past 6 months</th>
<th>Anal sex in past 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection-related</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borrowed needles/gear in past 6 months</td>
<td>100 (39.2)</td>
<td>15</td>
<td>15</td>
<td>32</td>
<td>35</td>
<td>34</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>32 (12.5)</td>
<td>46.9</td>
<td>9.4</td>
<td>31.3</td>
<td>31.3</td>
<td>15.6</td>
<td>12.5</td>
<td></td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>16 (6.3)</td>
<td>93.8</td>
<td>18.8</td>
<td>37.5</td>
<td>62.5</td>
<td>37.5</td>
<td>31.3</td>
<td></td>
</tr>
<tr>
<td>Sexual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>73 (28.6)</td>
<td>43.8</td>
<td>13.7</td>
<td>8.2</td>
<td>30.1</td>
<td>43.8</td>
<td>23.3</td>
<td></td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>75 (29.4)</td>
<td>46.7</td>
<td>13.3</td>
<td>13.3</td>
<td>29.3</td>
<td>40.0</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>61 (23.9)</td>
<td>55.7</td>
<td>8.2</td>
<td>9.8</td>
<td>52.5</td>
<td>49.2</td>
<td>26.2</td>
<td></td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>34 (13.3)</td>
<td>55.9</td>
<td>11.8</td>
<td>14.7</td>
<td>50.0</td>
<td>44.1</td>
<td>47.1</td>
<td></td>
</tr>
<tr>
<td>Median (range)</td>
<td></td>
<td>51.3</td>
<td>13.5</td>
<td>11.6</td>
<td>34.8</td>
<td>39.6</td>
<td>38.8</td>
<td>21.7</td>
</tr>
</tbody>
</table>

(43.8-93.8) (8.2-18.8) (8.2-15.0) (29.3-52.5) (30.1-62.5) (15.6-47.1) (12.5-31.3)
Table 4.9: Inter-relatedness of risk behaviours—prevalence of reporting additional risk behaviours among participants who reported risk behaviours

<table>
<thead>
<tr>
<th>Risk behaviours</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Injection-related</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borrowed needles/gear in past 6 months</td>
<td>77.0</td>
<td>43.0</td>
<td>20.0</td>
<td>7.0</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>71.9</td>
<td>37.5</td>
<td>21.9</td>
<td>9.4</td>
<td>3.1</td>
<td>3.1</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>93.8</td>
<td>87.5</td>
<td>56.3</td>
<td>25.0</td>
<td>12.5</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Sexual</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>80.8</td>
<td>46.6</td>
<td>21.9</td>
<td>9.6</td>
<td>2.7</td>
<td>1.4</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>73.3</td>
<td>48.0</td>
<td>26.7</td>
<td>10.7</td>
<td>2.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>93.4</td>
<td>60.7</td>
<td>29.5</td>
<td>13.1</td>
<td>3.3</td>
<td>1.6</td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>91.2</td>
<td>67.6</td>
<td>38.2</td>
<td>17.6</td>
<td>5.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Median (range)</td>
<td>80.8</td>
<td>48.0</td>
<td>26.7</td>
<td>10.7</td>
<td>3.1</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>(71.9-93.8)</td>
<td>(37.5-87.5)</td>
<td>(20.0-56.3)</td>
<td>(7.0-25.0)</td>
<td>(2.0-12.5)</td>
<td>(1.0-6.3)</td>
</tr>
</tbody>
</table>
4.2.2.8 Inter-relatedness of risk behaviours

If a participant reported one of the risk behaviours, the probability of reporting any other risk behaviours was increased (Table 4.8, Table 4.9). When participants reported one risk behaviour, the median probability of them reporting an additional risk behaviour was 80.8%; the median probability of reporting any two additional risk behaviours was 48.0%, and so on (Table 4.9).

Borrowing needles or gear in the six months prior to the interview was the risk behaviour reported with other risk behaviours most often; the median probability of reporting any additional risk behaviours for participants who reported borrowing needles or gear in the past six months was 51.3% (Table 4.8). Incomplete cleaning of borrowed needles or gear in the six months prior to the interview was the risk behaviour reported with other risk behaviour least often; the median probability of reporting any additional risk behaviours for participants who reported cleaning their borrowed needles or gear less than 100% of the time in the past six months was 11.6%.

4.2.3 Associations between adverse childhood experiences and risk behaviours

4.2.3.1 Parental alcohol problem

Growing up with a parent who had an alcohol problem was significantly associated with few of the reported risk behaviours (Table 4.10; Appendix G, Table G16). Parental alcohol problem was independently associated with only less than 100% condom use with non-regular partners in the six months prior to the interview.
4.2.3.2 Parental drug problem

Parental drug problem was also independently associated with few of the reported risk behaviours (Table 4.10; Appendix G, Table G17). Participants who reported a parental drug problem were significantly more likely to also report less than 100% condom use with non-regular partners in the six months prior to the interview and prostitution in the six months prior to the interview. However, both of these relationships were non-significant after adjusting for age and sex.

4.2.3.3 Parental mental health problem

Participants who reported growing up with a parent who had a mental health problem were not significantly more likely to report any of the risk behaviours (Table 4.10; Appendix G, Table G18). The relationships between parental mental health and the reported risk behaviours remained non-significant after accounting for the age and sex of the participants.

4.2.3.4 Parental police or court record

Growing up with a parent who had a police or court record was significantly associated with few of the risk behaviours (Table 4.10; Appendix G, Table G19). Parental police or court record was significantly related to borrowing needles or gear in the six months prior to the interview and less than 100% condom use with non-regular partners in the six months prior to the interview, even after adjusting for age and sex.
Table 4.10: Summary of crude bivariate associations (p-values) between adverse childhood experiences and risk behaviours

<table>
<thead>
<tr>
<th>Adverse childhood experiences</th>
<th>Risk behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Borrowed needles or gear in past 6 months</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>0.34</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>0.32</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>0.90</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>0.17</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>0.04</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>0.001</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>0.04</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>0.01</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>0.12</td>
</tr>
</tbody>
</table>
4.2.3.5 Parental unemployment

Parental unemployment was significantly related to very few of the risk behaviours (Table 4.10; Appendix G, Table G20). Participants who reported that their parent(s) were unemployed and seeking employment for more than one year while they were growing up were significantly less likely to also report anal sex in the six months prior to the interview. This relationship remained significant even after accounting for the age and sex of the participants.

4.2.3.6 Witnessing parental violence

Participants who reported that they witnessed parental violence when they were growing up were significantly more likely to also report a few of the risk behaviours (Table 4.10; Appendix G, Table G21). Witnessing parental violence was independently associated with borrowing needles or gear in the six months prior to the interview and less than 100% condom use with non-regular partners in the six months prior to the interview. However, the relationship between witnessing parental violence and borrowing needles or gear in the past six months became non-significant after adjusting for the age and sex of the participants, while the relationship between witnessing parental violence and borrowing needles while incarcerated became significant after adjusting for age and sex.

4.2.3.7 Minor physical abuse before age 16

Minor physical abuse before the age of 16 was also significantly associated with few of the reported risk behaviours (Table 4.10; Appendix G, Table G22). Participants who reported minor physical abuse before age 16 were significantly more likely to also report borrowing needles or gear in the six months prior to the interview and less than 100% cleaning of borrowed needles or gear in
the six months prior to the interview. These relationships remained significant after accounting for the age and sex of the participants.

4.2.3.8 Serious physical abuse before age 16

Serious physical abuse before the age of 16 was significantly associated with few of the reported risk behaviours (Table 4.10; Appendix G, Table G23). Serious physical abuse before age 16 was independently related to borrowing needles or gear in the six months prior to the interview and borrowing needles while incarcerated. However, the relationship between serious physical abuse and borrowing needles while incarcerated became non-significant after accounting for the age and sex of the participants, while the relationship between serious physical abuse and less than 100% condom use with non-regular partners in the six months prior to the interview was significant after adjusting for age and sex.

4.2.3.9 Sexual abuse before age 16

Sexual abuse before the age of 16 was significantly related to several of the reported risk behaviours (Table 4.10; Appendix G, Table G24). Participants who reported that they had experienced sexual abuse before age 16 were significantly more likely to also report borrowing needles or gear in the six months prior to the interview, borrowing needles while incarcerated, having more than 50 sex partners in their lifetime, and prostitution in the six months prior to the interview. However, the relationship between sexual abuse and prostitution in the six months prior to the interview was non-significant after adjusting for the age and sex of the participants.
4.2.3.10 Emotional abuse before age 16

Finally, emotional abuse before the age of 16 was not significantly associated with any of the reported risk behaviours (Table 4.10; Appendix G, Table G25). The relationships between emotional abuse before age 16 and the reported risk behaviours remained non-significant even after adjusting for the age and sex of the participants.

4.2.4 Associations between sociodemographic factors and adverse childhood experiences

4.2.4.1 Sex

The sex of the participants was significantly associated with the adverse childhood experiences they reported (Table 4.11; Appendix G, Table G26). Females were significantly more likely than males to report a parental alcohol problem, a parental drug problem, a parental police or court record, and witnessing parental violence. Experiences of childhood abuse were also related to sex; female participants were more likely than their male counterparts to report sexual abuse before the age of 16.

4.2.4.2 Race

Race was also significantly related to several adverse childhood experiences (Tables 4.11; Appendix G, Table G27). Aboriginal participants were significantly more likely than white participants to report a parental police or court record, parental unemployment, and witnessing parental violence. Childhood abuse was also related to race. Aboriginal participants were significantly more likely than white participants to report minor physical abuse before age 16 and sexual abuse before age 16.
Table 4.11: Summary of crude bivariate associations (p-values) between sociodemographic factors and adverse childhood experiences

<table>
<thead>
<tr>
<th>Adverse childhood experiences</th>
<th>Sex</th>
<th>Race</th>
<th>Elevated depression score</th>
<th>Alcohol dependence</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental alcohol problem</td>
<td>0.02</td>
<td>0.05</td>
<td>0.047</td>
<td>0.70</td>
<td>0.22</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>0.01</td>
<td>0.35</td>
<td>0.56</td>
<td>0.11</td>
<td>0.36</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>0.09</td>
<td>0.44</td>
<td>&lt;0.001</td>
<td>0.14</td>
<td>0.62</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>0.047</td>
<td>0.04</td>
<td>0.76</td>
<td>0.91</td>
<td>0.76</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>0.10</td>
<td>&lt;0.001</td>
<td>0.89</td>
<td>0.67</td>
<td>0.77</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>0.047</td>
<td>0.02</td>
<td>0.07</td>
<td>0.08</td>
<td>0.56</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>0.92</td>
<td>0.03</td>
<td>0.07</td>
<td>0.01</td>
<td>0.44</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>0.24</td>
<td>0.13</td>
<td>0.01</td>
<td>0.002</td>
<td>0.79</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>&lt;0.001</td>
<td>0.003</td>
<td>0.01</td>
<td>0.33</td>
<td>0.65</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>0.58</td>
<td>0.15</td>
<td>0.003</td>
<td>0.002</td>
<td>0.57</td>
</tr>
</tbody>
</table>

4.2.4.3 Elevated depression score

An elevated depression score was significantly associated to experiences of adverse childhood events (Table 4.11; Appendix G, Table G28). Participants with a CES-D depression score above the 75th percentile were more likely to report a parental alcohol problem and a parental mental health problem. Additionally, experiences of childhood abuse associated with an elevated depression score.
were serious physical abuse before age 16, sexual abuse before age 16, and emotional abuse before age 16.

4.2.4.4 Alcohol dependence

Alcohol dependence, as determined by the four CAGE questions, was significantly associated with several adverse childhood experiences (Table 4.11; Appendix G, Table G29). Alcohol dependence was not associated with any of the parental factors reported. However, childhood abuse was significantly related to alcohol dependence; participants who were alcohol dependent were more likely to report minor physical abuse before age 16, serious physical abuse before age 16, and emotional abuse before age 16.

4.2.4.5 Education

Education was not significantly associated with any of the reported adverse childhood experiences (Table 4.11; Appendix G, Table G30). Participants with less than a Grade 12 education reported similar rates of parental factors and childhood abuse as participants who had completed Grade 12 or higher.

4.2.5 Associations between sociodemographic factors and risk behaviours

4.2.5.1 Sex

The sex of the participants was significantly associated with few of the reported risk behaviours (Table 4.12; Appendix G, Table G31). Females were significantly less likely than males to report borrowing needles while incarcerated. Females were significantly more likely than males to report prostitution in the six months prior to the interview.
4.2.5.2 Race

Race was not significantly related to any of the reported risk behaviours (Table 4.12; Appendix G, Table G32). Aboriginal and white participants reported similar rates of injection and sexual risk behaviours.

4.2.5.3 Elevated depression score

An elevated depression score was significantly related to few risk behaviours (Table 4.12; Appendix G, Table G33). Participants who had depression scores above the 75th percentile were significantly more likely to report only more than 50 sex partners in their lifetime.

4.2.5.4 Alcohol dependence

Alcohol dependence was not significantly associated with any of the reported risk behaviours (Table 4.12; Appendix G, Table G34). Participants who were alcohol dependent according to the CAGE questions reported similar rates of risk behaviours as those who were not alcohol dependent.

4.2.5.5 Education

Finally, education was found to be significantly associated with a few risk behaviours (Table 4.12; Appendix G, Table G35). Participants who had less than a Grade 12 education were significantly less likely than participants who had completed Grade 12 or higher to report borrowing needles while incarcerated. Participants who had less than a Grade 12 education were significantly more likely than participants who had completed Grade 12 or higher to report prostitution in the six months prior to the interview.
Table 4.12: Summary of crude bivariate associations (p-values) between sociodemographic factors and risk behaviours

<table>
<thead>
<tr>
<th>Risk behaviour</th>
<th>Sociodemographic factors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
</tr>
<tr>
<td>Borrowed needles or gear in the past 6 months</td>
<td>0.11</td>
</tr>
<tr>
<td>Ever borrowed needles or gear while incarcerated</td>
<td>0.001</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles or gear in past 6 months</td>
<td>0.45</td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>0.20</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>0.31</td>
</tr>
<tr>
<td>Prostitution in the past 6 months</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>0.71</td>
</tr>
</tbody>
</table>

4.3 CUMULATIVE ASSOCIATION BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND RISK BEHAVIOURS

Simple linear regression was used to examine a dose-response relationship between adverse childhood experiences and risk behaviours. Three separate regression models were calculated using the three risk behaviour summary variables (total number of risk behaviours, total number injection-related risk behaviours, and total number of sexual risk behaviours) as dependent variables (Table 4.13). All three models were statistically significant with positive β coefficients, indicating that there is a positive dose-response relationship between the number of adverse childhood experiences reported and the number of risk behaviours reported, i.e., the number of risk behaviours reported...
increased with increasing numbers of adverse childhood experiences reported. There was a 0.147 increase in total number of risk behaviours reported for each additional adverse childhood experience reported. There was a 0.076 increase in number of injection-related risk behaviours reported for each additional adverse childhood experience reported. Finally, there was a 0.071 increase in number of sexual risk behaviours reported for each additional adverse childhood experience reported.

Table 4.13: Dose response relationship between adverse childhood experiences and risk behaviours*

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of risk behaviours</td>
<td>0.069</td>
<td>0.147 (0.080-0.214)</td>
<td>18.79</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Number of injection-related risk behaviours</td>
<td>0.068</td>
<td>0.076 (0.041-0.111)</td>
<td>18.51</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Number of sexual risk behaviours</td>
<td>0.028</td>
<td>0.071 (0.019-0.123)</td>
<td>7.23</td>
<td>0.008</td>
</tr>
</tbody>
</table>

*Independent variable = Number of adverse childhood experiences

Unfortunately, the amount of variance in the number of risk behaviours reported accounted for by the number of adverse childhood experiences reported is small. The number of adverse childhood experiences reported by the participants accounts for 6.9% of the variance in the total number of risk behaviours reported ($R^2=0.069$). The number of adverse childhood experiences reported by the participants accounts for 6.8% of the variance in the total number of injection-related risk behaviours reported ($R^2=0.068$). Finally, the number of adverse childhood experiences reported by the participants accounts for 2.8% of the variance in the total number of sexual risk behaviours reported ($R^2=0.028$). This indicates that when considering the total number of risk behaviours reported by the participants, the number of adverse childhood experiences reported accounts for injection-related risk behaviours more than sexual risk behaviours.
4.4. Associations between sociodemographic characteristics, adverse childhood experiences, and risk behaviour summary variables

Linear regression analysis was used to examine the relationship between sociodemographic factors, adverse childhood experiences, and risk behaviour summary variables. Age at first time of injection was considered as a covariable for the injection-related risk behaviours model and previous diagnosis of STD was considered as a covariable for the sexual risk behaviours model.

4.4.1 Associations between sociodemographic factors and adverse childhood experiences and total number of risk behaviours

Linear regression analysis was used to test the associations between sociodemographic factors, adverse childhood experiences, and total number of risk behaviours.

4.4.1.1 Variables associated with total number of risk behaviours

Only two sociodemographic factors were significantly associated with the total number of risk behaviours reported by the participants (Table 4.14). Age was negatively associated with total number of risk behaviours; the total number of risk behaviours reported by the participants decrease with increasing age. Age accounted for 2.4% of the variance in total number of risk behaviours reported. Sex was also significantly related to total number of risk behaviours as female participants reported higher total numbers of risk behaviours than male participants. 2.6% of the variance in total number of risk behaviors reported is explained by sex.

Several adverse childhood experiences were significantly related to the total number of risk behaviours reported (Table 4.14). Parental factors independently associated with total number of risk behaviours were parental drug problem, parental police or court record, parental mental health
problem, and witnessing parental violence. These parental factors accounted for 1.5%, 4.0%, 1.2%, and 2.3% of the variance in total number of risk behaviours respectively. All forms of childhood abuse were also significantly associated with total number of risk behaviours; participants who reported minor or serious physical abuse, sexual abuse, or emotional abuse before the age of 16 reported higher total numbers of risk behaviours. These abuse factors accounted for 2.2%, 2.0%, 7.3%, and 1.2% of the variance in total number of risk behaviours respectively.

Table 4.14: Variables significantly associated with total number of risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.024</td>
<td>-0.02 (-0.04 to -0.005)</td>
<td>6.30</td>
<td>0.01</td>
</tr>
<tr>
<td>Sex (female)</td>
<td>0.026</td>
<td>0.44 (0.11 to 0.77)</td>
<td>6.77</td>
<td>0.01</td>
</tr>
<tr>
<td>Socio-demographic factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>0.015</td>
<td>0.41 (0.002 to 0.82)</td>
<td>3.93</td>
<td>0.049</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>0.040</td>
<td>0.55 (0.21 to 0.88)</td>
<td>10.60</td>
<td>0.001</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>0.012</td>
<td>0.32 (-0.04 to 0.69)</td>
<td>3.02</td>
<td>0.08</td>
</tr>
<tr>
<td>Adverse childhood experiences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>0.023</td>
<td>0.57 (0.12 to 1.03)</td>
<td>6.06</td>
<td>0.01</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>0.022</td>
<td>0.41 (0.07 to 0.74)</td>
<td>5.78</td>
<td>0.02</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>0.020</td>
<td>0.39 (0.05 to 0.72)</td>
<td>5.11</td>
<td>0.03</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>0.073</td>
<td>0.74 (0.42 to 1.07)</td>
<td>20.01</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>0.012</td>
<td>0.31 (-0.03 to 0.64)</td>
<td>3.19</td>
<td>0.08</td>
</tr>
</tbody>
</table>
4.4.1.2 Variables not associated with total number of risk behaviours

Several sociodemographic factors were found to be not significantly associated with the total number of risk behaviours reported by the participants (Table 4.15). Race, level of education attained, elevated depression score, and alcohol dependence were all not significantly related to the total number of risk behaviours reported.

Two of the adverse childhood experiences measured were also not significantly related to the total number of risk behaviours reported (Table 4.15). Parental alcohol problem and parental unemployment were found to be not significantly associated with total number of risk behaviours.

Table 4.15: Variables not significantly associated with total number of risk behaviours

<table>
<thead>
<tr>
<th>Socio-demographic factors</th>
<th>Independent variables</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race (Aboriginal)</td>
<td></td>
<td>0.002</td>
<td>0.22 (-0.36 to 0.80)</td>
<td>0.57</td>
<td>0.45</td>
</tr>
<tr>
<td>Education (&lt;Grade 12)</td>
<td></td>
<td>0.004</td>
<td>0.19 (-0.18 to 0.56)</td>
<td>1.02</td>
<td>0.31</td>
</tr>
<tr>
<td>Elevated depression score</td>
<td></td>
<td>0.008</td>
<td>0.28 (-0.12 to 0.67)</td>
<td>1.92</td>
<td>0.17</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td></td>
<td>0.001</td>
<td>0.12 (-0.30 to 0.54)</td>
<td>0.34</td>
<td>0.56</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td></td>
<td>0.005</td>
<td>0.24 (-0.20 to 0.67)</td>
<td>1.15</td>
<td>0.28</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td></td>
<td>0.002</td>
<td>0.13 (-0.21 to 0.47)</td>
<td>0.56</td>
<td>0.46</td>
</tr>
</tbody>
</table>
4.4.2 Associations between sociodemographic factors and adverse childhood experiences and total number of injection-related risk behaviours

Linear regression analysis was used to test the associations between sociodemographic factors, adverse childhood experiences, and total number of injection-related risk behaviours.

4.4.2.1 Variables associated with total number of injection-related risk behaviours

Of the sociodemographic factors tested, only age at first injection was significantly related to the total number of injection-related risk behaviours reported by the participants. This variable accounts for 1.3% of the variance in total number of injection-related risk behaviours reported. However, many of the adverse childhood experiences tested were associated with the total number of injection-related risk behaviours (Table 4.16). Parental factors that were significantly associated with the total number of injection-related risk behaviours reported were parental police or court record and witnessing parental violence. These variables accounted for 4.1% and 3.5% of the variance in the number of injection-related risk behaviours respectively. All forms of childhood abuse were also positively associated with injection-related risk behaviours; participants who reported minor or serious physical abuse, sexual abuse, or emotional abuse before age 16 reported higher numbers of injection-related risk behaviours. These factors accounted for 4.6%, 3.2%, 4.7%, and 2.0% of the variance in number of injection-related risk behaviours respectively.
Table 4.16: Variables significantly associated with total number of injection-related risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-demographic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at first injection</td>
<td>0.013</td>
<td>-0.01 (-0.02 to 0.001)</td>
<td>3.42</td>
<td>0.07</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>0.041</td>
<td>0.29 (0.12 to 0.46)</td>
<td>10.87</td>
<td>0.001</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>0.035</td>
<td>0.36 (0.13 to 0.60)</td>
<td>9.05</td>
<td>0.003</td>
</tr>
<tr>
<td><strong>Adverse childhood experiences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>0.046</td>
<td>0.31 (0.13 to 0.48)</td>
<td>12.23</td>
<td>0.001</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>0.032</td>
<td>0.26 (0.08 to 0.43)</td>
<td>8.31</td>
<td>0.004</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>0.047</td>
<td>0.31 (0.14 to 0.48)</td>
<td>12.41</td>
<td>0.001</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>0.020</td>
<td>0.20 (0.03 to 0.38)</td>
<td>5.07</td>
<td>0.03</td>
</tr>
</tbody>
</table>

4.4.2.2 Variables not associated with total number of injection-related risk behaviours

All but one of the sociodemographic factors tested were not significantly associated with the number of injection-related risk behaviours reported by the participants (Table 4.17). Age, sex, race, level of education, elevated depression score, and alcohol dependence were all not significantly related to the number of injection-related risk behaviours reported.

Several adverse childhood experiences were also not significantly associated with the number of injection-related risk behaviours reported (Table 4.17). Parental alcohol problem, parental drug problem, parental mental health problem, and parental unemployment were all not significantly related to the number of injection-related risk behaviours reported by the participants.
Table 4.17: Variables not significantly associated with total number of injection-related risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.002</td>
<td>-0.003 (-0.01 to 0.006)</td>
<td>0.46</td>
<td>0.50</td>
</tr>
<tr>
<td>Sex (female)</td>
<td>&lt;0.001</td>
<td>-0.03 (-0.15 to 0.20)</td>
<td>0.08</td>
<td>0.77</td>
</tr>
<tr>
<td>Race (Aboriginal)</td>
<td>0.001</td>
<td>0.09 (-0.21 to 0.39)</td>
<td>0.34</td>
<td>0.56</td>
</tr>
<tr>
<td>Education (&lt;Grade 12)</td>
<td>0.001</td>
<td>-0.05 (-0.25 to 0.14)</td>
<td>0.26</td>
<td>0.61</td>
</tr>
<tr>
<td>Elevated depression score</td>
<td>&lt;0.001</td>
<td>0.0003 (-0.20 to 0.21)</td>
<td>&lt;0.001</td>
<td>1.00</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>0.007</td>
<td>0.15 (-0.07 to 0.37)</td>
<td>1.74</td>
<td>0.19</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>0.006</td>
<td>0.14 (-0.88 to 0.36)</td>
<td>1.44</td>
<td>0.23</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>&lt;0.001</td>
<td>0.03 (-0.18 to 0.24)</td>
<td>0.05</td>
<td>0.82</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>0.003</td>
<td>0.09 (-0.10 to 0.28)</td>
<td>0.82</td>
<td>0.37</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>0.004</td>
<td>0.10 (-0.08 to 0.27)</td>
<td>1.13</td>
<td>0.29</td>
</tr>
</tbody>
</table>

4.4.3 Associations between sociodemographic factors and adverse childhood experiences and total number of sexual risk behaviours

Linear regression analysis was used to test the associations between sociodemographic factors, adverse childhood experiences, and total number of sexual risk behaviours.
4.4.3.1 Variables associated with total number of sexual risk behaviours

Four of the sociodemographic variables tested were found to be significantly associated with the number of sexual risk behaviours reported by the participants (Table 4.18). Age was negatively associated with total number of sexual risk behaviours; the number of sexual risk behaviours reported by the participants decreased with age. Sex was also associated with number of sexual risk behaviours; females reported more sexual risk behaviours than males. Education and elevated depression score were also associated with the number of sexual risk behaviours reported. Age accounts for 3.1% of the variance in number of sexual risk behaviours reported, sex accounts for 5.0%, education accounts for 1.1%, and elevated depression score accounts for 1.3% of the variance in the number of sexual risk behaviours reported.

A few of the adverse childhood experiences tested were also significantly related to number of sexual risk behaviours (Table 4.18). Participants who reported a parental drug problem, a parental mental health problem, a parental police or court record, or sexual abuse before the age of 16 reported more sexual risk behaviours. The amount of variance in number of sexual risk behaviours reported accounted for by these variables is 2.3%, 1.1%, 1.5%, and 4.3% respectively.
Table 4.18: Variables significantly associated with total number of sexual risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig-</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-demographic factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.031</td>
<td>-0.02 (-0.03 to -0.006)</td>
<td>8.00</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sex (Female)</td>
<td>0.050</td>
<td>0.47 (0.22 to 0.72)</td>
<td>13.38</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Education (&lt;Grade 12)</td>
<td>0.011</td>
<td>0.24 (-0.04 to 0.52)</td>
<td>2.81</td>
<td>0.095</td>
</tr>
<tr>
<td>Elevated depression score</td>
<td>0.013</td>
<td>0.28 (-0.02 to 0.57)</td>
<td>3.31</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Adverse childhood experiences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>0.023</td>
<td>0.39 (0.08 to 0.69)</td>
<td>6.00</td>
<td>0.02</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>0.011</td>
<td>0.23 (-0.04 to 0.51)</td>
<td>2.75</td>
<td>0.098</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>0.015</td>
<td>0.26 (0.003 to 0.52)</td>
<td>3.98</td>
<td>0.047</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>0.043</td>
<td>0.43 (0.18 to 0.69)</td>
<td>11.38</td>
<td>0.001</td>
</tr>
</tbody>
</table>

4.4.3.2 Variables not significantly associated with total number of sexual risk behaviours

Many of the sociodemographic factors tested were not significantly associated with the number of sexual risk behaviours reported by the participants (Table 4.19). Race, alcohol dependence, and previous diagnosis of STD were all not significantly related to total number of sexual risk behaviours.

Several of the adverse childhood experiences tested were also not significantly related to total number of sexual risk behaviours (Table 4.19). Parental factors such as parental alcohol problem, parental unemployment, and witnessing parental violence as well as abuse factors such as minor or
serious physical abuse and emotional abuse before the age of 16 were not significantly associated
with the number of sexual risk behaviours reported by the participants.

Table 4.19: Variables not significantly associated with total number of sexual risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>R Square</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race (Aboriginal)</td>
<td>0.001</td>
<td>0.13 (-0.31 to 0.57)</td>
<td>0.35</td>
<td>0.56</td>
</tr>
<tr>
<td>Alcohol dependence</td>
<td>&lt;0.001</td>
<td>0.03 (-0.34 to 0.30)</td>
<td>0.02</td>
<td>0.88</td>
</tr>
<tr>
<td>Previous diagnosis of STD</td>
<td>0.003</td>
<td>0.12 (-0.14 to 0.37)</td>
<td>0.77</td>
<td>0.38</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>0.001</td>
<td>0.10 (-0.23 to 0.43)</td>
<td>0.34</td>
<td>0.56</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>&lt;0.001</td>
<td>0.03 (-0.23 to 0.30)</td>
<td>0.06</td>
<td>0.80</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>0.005</td>
<td>0.21 (-0.14 to 0.56)</td>
<td>1.39</td>
<td>0.24</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>0.002</td>
<td>0.10 (-0.16 to 0.36)</td>
<td>0.62</td>
<td>0.43</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>0.004</td>
<td>0.13 (-0.13 to 0.39)</td>
<td>1.00</td>
<td>0.32</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>0.003</td>
<td>0.11 (-0.15 to 0.37)</td>
<td>0.65</td>
<td>0.42</td>
</tr>
</tbody>
</table>
4.5 Risk behaviour models

Univariate general linear modeling (GLM) was undertaken to construct models of variables associated with total number of all risk behaviours, total number of injection-related risk behaviours, and total number of sexual risk behaviours. Variables that were statistically significant from the bivariate analyses performed in section 4.4 were initially entered into the specific quantified risk behaviour models. Only the main effects and final models are presented in this section.

4.5.1 Model of total number of risk behaviours

Ten of the sociodemographic and adverse childhood experience variables were significantly related to total number of risk behaviours in bivariate analyses (Table 4.14). These were age, sex, parental drug problem, parental mental health problem, parental police or court record, witnessing parental violence, minor physical abuse before age 16, serious physical abuse before age 16, sexual abuse before age 16, and emotional abuse before age 16. All ten variables were entered simultaneously into a univariate GLM model. Two of these variables (parental police or court record and sexual abuse before age 16) were significant (p<0.1). These two statistically significant variables, along with age and sex, which were judged to be clinically significant, were entered into a main effects model (Table 4.20). The main effects model accounts for 10.2% of the variance in total number of risk behaviours.
Table 4.20: Main effects model for total number of risk behaviours

<table>
<thead>
<tr>
<th>Variable</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
<th>Unique Variance Explained (Eta²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.015 (-0.034 to 0.004)</td>
<td>2.354</td>
<td>0.126</td>
<td>0.009</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>-0.093 (-0.451 to 0.265)</td>
<td>0.262</td>
<td>0.609</td>
<td>0.001</td>
</tr>
<tr>
<td>Parental police or court record (no)</td>
<td>-0.405 (-0.737 to -0.072)</td>
<td>5.731</td>
<td>0.017</td>
<td>0.022</td>
</tr>
<tr>
<td>Sexual abuse before age 16 (no)</td>
<td>-0.666 (-1.007 to -0.326)</td>
<td>14.849</td>
<td>&lt;0.001</td>
<td>0.056</td>
</tr>
<tr>
<td>Intercept</td>
<td>2.660 (2.042 to 3.279)</td>
<td>41.203</td>
<td>&lt;0.001</td>
<td>0.223</td>
</tr>
</tbody>
</table>

Model adjusted R²=0.102

Table 4.21 presents the final model for total number of risk behaviours. Interaction and confounding were next assessed in the main effects model. Minor physical abuse before age 16 and serious physical abuse before age 16 were determined to be significant confounders as inclusion of these variables appreciably changed the coefficients of at least one other variable in the model, so they were included in the final model of total number of risk behaviours. Sex was found to be a significant effect modifier in the relationships between parental police or court record and total number of risk behaviours, sexual abuse before age 16 and total number of risk behaviours, and serious physical abuse before age 16 and total number of risk behaviours, so these interaction terms were included in the final model.
Table 4.21: Final model for total number of risk behaviours

<table>
<thead>
<tr>
<th>Variable</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
<th>Unique Variance Explained (Eta²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.018 (-0.037 to 0.0008)</td>
<td>3.542</td>
<td>0.061</td>
<td>0.014</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>-1.170 (-1.809 to -0.532)</td>
<td>1.372</td>
<td>0.243</td>
<td>0.006</td>
</tr>
<tr>
<td>Parental police or court record (no)</td>
<td>-0.809 (-1.275 to -0.344)</td>
<td>5.737</td>
<td>0.017</td>
<td>0.023</td>
</tr>
<tr>
<td>Sexual abuse before age 16 (no)</td>
<td>-0.922 (-1.459 to -0.385)</td>
<td>9.290</td>
<td>0.003</td>
<td>0.037</td>
</tr>
<tr>
<td>Minor physical abuse before age 16 (no)</td>
<td>0.074 (-0.377 to 0.525)</td>
<td>0.105</td>
<td>0.746</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Serious physical abuse before age 16 (no)</td>
<td>-0.453 (-1.020 to 0.114)</td>
<td>1.193</td>
<td>0.276</td>
<td>0.005</td>
</tr>
<tr>
<td>Sex X Parental police or court record (male, no)</td>
<td>0.823 (0.183 to 1.462)</td>
<td>6.424</td>
<td>0.012</td>
<td>0.026</td>
</tr>
<tr>
<td>Sex X Sexual abuse before age 16 (male, no)</td>
<td>0.679 (-0.063 to 1.420)</td>
<td>3.245</td>
<td>0.073</td>
<td>0.013</td>
</tr>
<tr>
<td>Sex X Serious physical abuse before age 16 (male, no)</td>
<td>0.411 (-0.300 to 1.121)</td>
<td>1.295</td>
<td>0.256</td>
<td>0.005</td>
</tr>
<tr>
<td>Intercept</td>
<td>3.286 (2.593 to 3.980)</td>
<td>43.157</td>
<td>&lt;0.001</td>
<td>0.150</td>
</tr>
</tbody>
</table>

Model adjusted $R^2=0.141$

Levene's test of equality of error variances: $F=1.298; p=0.156$

Lack of fit: $F=1.357; p=0.102$

The final model accounts for 14.1% of the variance in total number of risk behaviours (adjusted $R^2=0.141$). The assumption of homoscedasticity for the model was met; Levene's test for homogeneity of variance indicates that the error variance of the total number of risk behaviours is
equal across the groups. The lack of fit test indicates that this model adequately accounts for the relationship between total number of risk behaviours and the predictor variables.

The model intercept $\hat{\beta}$ coefficient, 3.286, is the predicted value of the total number of risk behaviours when all of the predictor variables are zero. Age is inversely related to the number of risk behaviours; for every one year increase in age there is a corresponding decrease of 0.018 in total number of risk behaviours. Age accounts for 1.4% of the total variability in total number of risk behaviours ($\eta^2=0.014$).

The interaction between sex and parental police or court record remained significant in the final model. This interaction accounts for 2.6% of the total variability in total number of risk behaviours ($\eta^2=0.026$). This interaction is graphed in Figure 4.1. Female participants who reported that they grew up with a parent who had a police or court record reported almost two times as many risk behaviours as female participants who did not report a parental police or court record; the same did not hold for males.

The interaction between sex and sexual abuse before age 16 also remained significant in the final model. This interaction accounts for 1.3% of the total variability in total number of risk behaviours ($\eta^2=0.013$). This interaction is graphed in Figure 4.2. Female participants who were sexually abused before the age of 16 reported almost two times as many risk behaviours as female participants who did not report childhood sexual abuse; this relationship was less pronounced in male participants.

Several variables were non-significant ($p>0.1$) in the final model but contributed to the validity of the model. These included minor physical abuse before age 16, serious physical abuse before age 16, and an interaction between sex and serious physical abuse before age 16.
Figure 4.1: Interaction between sex and parental police or court record—estimated marginal means of total number of risk behaviours.

Figure 4.2: Interaction between sex and sexual abuse before age 16—estimated marginal means of total number of risk behaviours.
4.5.2 Model of total number of injection-related risk behaviours

Seven of the sociodemographic and adverse childhood experience variables were significantly related to total number of injection-related risk behaviours in bivariate analyses (Table 4.16). These were age at first injection, parental police or court record, witnessing parental violence, minor physical abuse before age 16, serious physical abuse before age 16, sexual abuse before age 16, and emotional abuse before age 16. All seven variables were entered simultaneously into a univariate GLM model. Three of these variables (parental police or court record, witnessing parental violence, and sexual abuse before age 16) were significant (p<0.1). These three statistically significant variables, along with age and sex, which were judged to be clinically significant, were entered into a main effects model (Table 4.22). The main effects model accounts for 9.2% of the variance in total number of injection-related risk behaviours.

Table 4.22: Main effects model for total number of injection-related risk behaviours

<table>
<thead>
<tr>
<th>Variable</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
<th>Unique Variance Explained (Eta²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.002 (-0.01 to 0.008)</td>
<td>0.20</td>
<td>0.66</td>
<td>0.001</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>0.193 (0.005 to 0.381)</td>
<td>4.12</td>
<td>0.04</td>
<td>0.016</td>
</tr>
<tr>
<td>Parental police or court record (no)</td>
<td>-0.221 (-0.400 to -0.04)</td>
<td>5.88</td>
<td>0.02</td>
<td>0.023</td>
</tr>
<tr>
<td>Witnessed parental violence (no)</td>
<td>-0.266 (-0.505 to -0.03)</td>
<td>4.79</td>
<td>0.03</td>
<td>0.019</td>
</tr>
<tr>
<td>Sexual abuse before age 16 (no)</td>
<td>-0.327 (-0.505 to -0.149)</td>
<td>13.04</td>
<td>&lt;0.001</td>
<td>0.050</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.896 (0.573 to 1.220)</td>
<td>11.24</td>
<td>&lt;0.001</td>
<td>0.107</td>
</tr>
</tbody>
</table>

Model adjusted R²=0.092

90
Table 4.23 presents the final model for total number of injection-related risk behaviours.

Interaction and confounding were next assessed in the main effects model. Age of initiation into injection drug use was determined to be a significant confounder as its inclusion appreciably changed the coefficients of at least one other variable in the model, so it was included in the final model of total number of injection-related risk behaviours. None of the interactions tested were significant.

Table 4.23: Final model for total number of injection-related risk behaviours

<table>
<thead>
<tr>
<th>Variable</th>
<th>B Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
<th>Unique Variance Explained (Eta²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.002 (-0.01 to 0.01)</td>
<td>0.08</td>
<td>0.77</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>0.176 (-0.02 to 0.367)</td>
<td>3.26</td>
<td>0.07</td>
<td>0.013</td>
</tr>
<tr>
<td>Parental police or court record (no)</td>
<td>-0.216 (-0.397 to -0.04)</td>
<td>5.53</td>
<td>0.02</td>
<td>0.022</td>
</tr>
<tr>
<td>Witnessed parental violence (no)</td>
<td>-0.286 (-0.529 to -0.04)</td>
<td>5.32</td>
<td>0.02</td>
<td>0.021</td>
</tr>
<tr>
<td>Sexual abuse before age 16 (no)</td>
<td>-0.299 (-0.482 to -0.116)</td>
<td>10.39</td>
<td>0.001</td>
<td>0.041</td>
</tr>
<tr>
<td>Age at first injection</td>
<td>-0.007 (-0.02 to 0.005)</td>
<td>1.39</td>
<td>0.24</td>
<td>0.006</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.916 (0.582 to 1.251)</td>
<td>11.24</td>
<td>0.001</td>
<td>0.044</td>
</tr>
</tbody>
</table>

Model adjusted $R^2=0.093$

Levene's test of equality of error variances: $F=2.24; p=0.007$

Lack of fit: $F=0.916; p=0.632$
The final model accounts for 9.3% of the variance in total number of injection-related risk behaviours (adjusted \( R^2 = 0.093 \)). The assumption of homoscedasticity for the model was not met; Levene’s test for homogeneity of variance indicates that the error variance of the total number of injection-related risk behaviours is not equal across the groups. This is probably due to the relatively small size of the sample. The lack of fit test indicates that this model adequately accounts for the relationship between total number of injection-related risk behaviours and the predictor variables.

The model intercept \( \beta \) coefficient, 0.916, is the predicted value of the total number of injection-related risk behaviours when all of the predictor variables are zero. Gender was significantly associated with the total number of injection-related risk behaviours; females reported 0.176 fewer injection-related risk behaviours than males, which accounts for 1.3% of the total variability in total number of injection-related risk behaviours (\( \text{Eta}^2 = 0.013 \)). Participants who did not report growing up with a parent with a police or court record reported 0.216 fewer injection-related risk behaviours than those participants who reported this experience, which accounts for 2.2% of the total variability in total number of injection-related risk behaviours (\( \text{Eta}^2 = 0.022 \)). Participants who reported that they had not witnessed parental violence when they were growing up reported 0.286 fewer injection-related risk behaviours than participants who had witnessed parental violence, which accounts for 2.1% of the total variability in total number of injection-related risk behaviours (\( \text{Eta}^2 = 0.021 \)). Participants who did not report childhood sexual abuse reported 0.299 fewer injection-related risk behaviours than participants who were sexually abused before the age of 16, which accounts for 4.1% of the total variability in total number of risk behaviours (\( \text{Eta}^2 = 0.041 \)).

Two of the variables were non-significant (\( p > 0.1 \)) in the final model but contributed to the validity of the model. These were age and age at first injection.
4.5.3 Model of total number of sexual risk behaviours

Eight of the sociodemographic and adverse childhood experience variables were significantly related to total number of sexual risk behaviours in bivariate analyses (Table 4.18). These were age, sex, level of education, elevated depression score, parental drug problem, parental mental health problem, parental police or court record, and sexual abuse before age 16. All eight variables were entered simultaneously into a univariate GLM model. Only one of these variables, sexual abuse before age 16, was found to be statistically significant (p<0.1). This statistically significant variable, along with age and sex, which were judged to be clinically significant, was entered into a main effects model (Table 4.24). The main effects model accounts for 7.4% of the variance in total number of sexual risk behaviours.

Table 4.24: Main effects model for total number of sexual risk behaviours

<table>
<thead>
<tr>
<th>Variable</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
<th>Unique Variance Explained (Eta²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.0145 (-0.029 to -0.00005)</td>
<td>3.90</td>
<td>0.049</td>
<td>0.015</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>-0.274 (-0.551 to 0.003)</td>
<td>3.79</td>
<td>0.053</td>
<td>0.015</td>
</tr>
<tr>
<td>Sexual abuse before age 16 (no)</td>
<td>-0.340 (-0.603 to -0.077)</td>
<td>6.48</td>
<td>0.011</td>
<td>0.025</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.757 (1.279 to 2.236)</td>
<td>34.91</td>
<td>&lt;0.001</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Model adjusted R²=0.074

Table 4.25 presents the final model for total number of sexual risk behaviours. Interaction and confounding were next assessed in the main effects model. Parental drug problem was determined to be a significant confounder as its inclusion appreciably changed the coefficients of at
least one other variable in the model, so it was included in the final model of total number of sexual risk behaviours. The interaction between sex and sexual abuse was found to be statistically significant, so was also included in the final model.

Table 4.25: Final model for total number of sexual risk behaviours

<table>
<thead>
<tr>
<th>Variable</th>
<th>β Coefficient (95% CI)</th>
<th>F</th>
<th>Sig.</th>
<th>Unique Variance Explained (Eta²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.0109 (-0.026 to 0.004)</td>
<td>2.02</td>
<td>0.16</td>
<td>0.008</td>
</tr>
<tr>
<td>Sex (male)</td>
<td>-0.619 (-1.012 to -0.225)</td>
<td>4.45</td>
<td>0.036</td>
<td>0.018</td>
</tr>
<tr>
<td>Sexual abuse before age 16 (no)</td>
<td>-0.668 (-1.034 to -0.303)</td>
<td>6.81</td>
<td>0.010</td>
<td>0.027</td>
</tr>
<tr>
<td>Parental drug problem (no)</td>
<td>-0.236 (-0.557 to 0.0840)</td>
<td>2.11</td>
<td>0.15</td>
<td>0.008</td>
</tr>
<tr>
<td>Sex x Sexual abuse before age 16 (male, no)</td>
<td>0.649 (0.131 to 1.166)</td>
<td>6.09</td>
<td>0.014</td>
<td>0.024</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.951 (1.461 to 2.442)</td>
<td>30.20</td>
<td>&lt;0.001</td>
<td>0.108</td>
</tr>
</tbody>
</table>

Model adjusted $R^2=0.098$

Levene’s test of equality of error variances: $F=1.79; p=0.089$

Lack of fit: $F=1.02; p=0.46$

The final model accounts for 9.8% of the variance in total number of sexual risk behaviours (adjusted $R^2=0.098$). The assumption of homoscedasticity for the model was met; Levene’s test for homogeneity of variance indicates that the error variance of the total number of sexual risk behaviours is equal across the groups. The lack of fit test indicates that this model adequately accounts for the relationship between total number of sexual risk behaviours and the predictor variables.
The model intercept $\beta$ coefficient, 1.951, is the predicted value of the total number of sexual risk behaviours when all of the predictor variables are zero. The interaction between sex and sexual abuse before age 16 remained significant in the final model. This interaction accounts for 2.4% of the total variability in total number of sexual risk behaviours ($\eta^2=0.024$). This interaction is visible in Figure 4.3. Female participants who reported that they were sexually abused before the age of 16 reported almost two times as many sexual risk behaviours as female participants who did not report sexual abuse before age 16; the same did not hold for males.

Two of the variables were non-significant ($p>0.1$) in the final model but contributed to the validity of the model. These were age and parental drug problem.

![Figure 4.3: Interaction between sex and sexual abuse before age 16—estimated marginal means of total number of sexual risk behaviours](image)
CHAPTER 5: DISCUSSION

5.1 SUMMARY

High levels of both adverse childhood experiences and risk behaviours in adulthood were noted among the participants of the Regina Seroprevalence and Risk Behaviour Study. The relationships among and between these categories of variables were assessed in bivariate analyses. There was a high degree of inter-relatedness among the adverse childhood experiences measured; most of the adverse childhood experiences were independently associated with several other adverse childhood experiences. The amount of inter-relatedness was somewhat less among risk behaviours, although all but one of the risk behaviours studied (sharing needles while incarcerated) were independently associated with at least one other risk behaviour. Sharing needles or gear in the six months prior to the interview and incomplete condom use with non-regular partners in the six months prior to the interview were independently associated with the most individual risk behaviours (five and six respectively). Most of the adverse childhood experiences studied were found to be related to the individual risk behaviours; only two factors (parental mental health problem and emotional abuse before age 16) were not independently associated with at least one of the risk behaviours studied.

The relationships between sociodemographic factors and adverse childhood experiences and risk behaviours were also assessed in bivariate analyses. Almost all of the sociodemographic factors studied were associated with several of the adverse childhood experiences measured; only level of education attained was not related to any of the adverse childhood experiences. Sociodemographic
factors were associated with fewer of the risk behaviours, although all of the sociodemographic factors were associated with at least one of the risk behaviours studied.

Dose-response relationships between adverse childhood experiences and three risk behaviour summary variables (total number of all risk behaviours, total number of injection-related risk behaviours, and total number of sexual risk behaviours) were assessed by simple linear regression analyses. All three tests showed a statistically significant positive association, indicating that the number of risk behaviours reported by the participants increased with increasing numbers of adverse childhood experiences reported. The relationship between the number of adverse childhood experiences reported and the number of injection-related risk behaviours reported appears to be stronger than the relationship between the number of adverse childhood experiences reported and the number of sexual risk behaviours reported.

Bivariate linear regression analyses were used to determine which sociodemographic variables and adverse childhood experiences were significantly associated with the risk behaviour summary variables. Age and sex were associated with both total number of risk behaviours and total number of sexual risk behaviours. Education and depression score were also associated with total number of sexual risk behaviours. Age at first injection was the only sociodemographic factor associated with total number of injection-related risk behaviours. Parental drug problem and parental mental health problem were associated with both total number of risk behaviours and total number of sexual risk behaviours. Witnessing parental violence, minor physical abuse before age 16, serious physical abuse before age 16, and emotional abuse before age 16 were all associated with both total number of risk behaviours and total number of injection-related risk behaviours. Parental police or court record and sexual abuse before age 16 were associated with all three risk behaviour summary variables.
A few of the variables studied were not significantly associated with any of the risk behaviour summary variables. The sociodemographic factors that were not associated with the risk behaviour summary variables were race and alcohol dependence. The adverse childhood experiences that were not associated with the risk behaviour summary variables were parental alcohol problem and parental unemployment.

Univariate general linear modeling showed similarities in the factors associated with the three risk behaviour summary variables. Parental police or court record was related to increased numbers of both total number of risk behaviours and total number of injection-related risk behaviours. However, this relationship was sex-specific in the total number of risk behaviours model. Female participants who had grown up with parents who had a police or court record reported higher numbers of total risk behaviours than female participants who did not report this experience; the same did not hold for male participants. Sexual abuse before age 16 was related to increased numbers of risk behaviours in all three models. However, this relationship was sex-specific in the total number of risk behaviours and sexual risk behaviours models. Female participants who were sexually abused before age 16 reported more total risk behaviours and more sexual risk behaviours than female participants who were not sexually abused in childhood; the same did not hold for males.

5.2 Links to the Literature

5.2.1 Risk behaviours and adverse childhood experiences

Many behaviours that present a high risk for the transmission of HIV and other blood-borne and sexually transmitted pathogens– including sharing needles or other injection equipment, insufficient cleaning of shared needles or injection equipment, multiple sex partners, unprotected sex,
anal sex, and prostitution (4-8, 104)—were identified among the participants of the Regina Seroprevalence and Risk Behaviour Study. Many of these behaviours were inter-related in the participants, confirming the literature on this point.(7, 9-14)

Adverse childhood experiences that have been shown to be linked to high-risk behaviours in adulthood— including parental and familial factors and childhood abuse (11, 33, 34, 39, 42, 45-48, 50, 51, 54, 60, 63-69, 71, 77-99, 155, 165, 173, 185)—were also prevalent among the participants. Participants reported very high levels (21.6%-84.3%) of all of the adverse childhood experiences studied. While unnerving, these findings are to be anticipated when one considers the literature on the long-term outcomes of adverse childhood experiences and the high-risk nature of the lifestyle associated with injection drug use. The adverse childhood experiences studied were also inter-related, further supporting other researchers' findings that adverse childhood experiences often co-occur.(38, 39)

As discussed by Felitti et al, adverse experiences in childhood may have a significant effect throughout the lifespan of an individual (see Figure 5.1).(38) Adverse childhood experiences may lead to social, emotional, and cognitive impairment in childhood, which may subsequently lead to the adoption of high-risk behaviours in adolescence. This in turn may lead to disease, disability, and social problems in adulthood, potentially culminating in an early death.

This scenario aptly describes the lives of many of the participants in the Regina Seroprevalence and Risk Behaviour Study. The high levels of adverse childhood experiences found are not surprising due to the high-risk nature of the study sample. However, some of the adverse childhood experiences studied, notably parental police or court record and sexual abuse before age 16, were associated with a higher-risk situation, even in this already at-risk population. As in the literature,(38, 39, 135) the impact of adverse childhood experiences on injection-related and sexual
risk behaviours was found to be cumulative; the more adverse childhood experiences the participants reported, the more risk behaviours they also reported.

![Diagram of adverse childhood experiences throughout the lifespan]

Figure 5.1: Potential influences of adverse childhood experiences throughout the lifespan (adapted from Felitti et al.)

The large majority of the participants in the Regina Seroprevalence and Risk Behaviour Study were Aboriginal, a finding which concurs with the results of a similar study of people who use injection drugs that was conducted in Prince Albert, Saskatchewan in 1998.(201) Aboriginal people have been identified as a Canadian population at particular risk for the use of injection drugs.(202) Aboriginal people have an increased risk of substance misuse and injection drug use as they often experience many socioeconomic disadvantages associated with drug misuse such as poverty, low levels of education, unstable family structure, physical abuse, and poor social support networks.(202) "These social disadvantages have been precipitated and exacerbated by discrimination, the after-effects of residential schools, and barriers to health care such as language barriers and the lack of culturally sensitive or appropriate services."(202)
5.2.2 Unexpected findings

Some of the variables associated with high-risk behaviours were of only borderline significance and could likely reach statistical significance with an increased sample size. In contrast with previous research, (4, 6, 8, 9, 12, 15-28) in this study a few of the variables (race, alcohol dependence, parental alcohol problems, and parental unemployment) were not found to be significant in any of the risk behaviours models studied. However, it is important to remember that all of the participants in this study were by definition “at risk” because of the risky nature of the lifestyle associated with injection drug use. It is possible that these factors contributed to the participants’ increased level of risk compared to the general population, even if they did not increase the level of specific risk behaviours within the sample.

5.3 LIMITATIONS

5.3.1 Data issues

Several issues with data collection an analysis may have biased the results of this study. Most of these issues would likely lead to an underestimation of the effect of adverse childhood experiences on adulthood risk behaviours.

Adverse childhood experiences, particularly childhood abuse, are generally under-reported in adulthood. (192) The data on adverse childhood experiences collected from the participants was particularly subject to recall bias as these events generally occurred some time before the interview took place. Information on risk behaviours was limited to the six months prior to the interview whenever possible to minimize the effect of recall bias.
All parental data was proxy-reported by the participants, and thus parental substance abuse, mental health, unemployment, etc were not directly assessed. It is likely that bias is present as the frequencies of family problems are generally underestimated. (80)

Many of the questions asked in the questionnaire were of a highly sensitive nature. Questions on sensitive topics are subject to increased response errors; respondents are likely to distort their answers to avoid embarrassment or to respond in a socially desirable manner. (2, 196)

Because of the cross-sectional nature of this study, causality cannot be firmly established for any of the associations found. However, because data on risk behaviours in this analysis were limited to events that took place in the six months prior to the interview whenever possible, childhood experiences were generally defined as occurring before age 16, and almost all (99.2%) of the participants were 16 or older, temporality can be tentatively established, i.e., it is likely that the adverse childhood experiences preceded the risk behaviours.

In summing the risk behaviour variables and adverse childhood experience variables for subsequent analyses it was assumed that the individual risk behaviours and adverse childhood experiences were quantitatively equivalent, when in fact they are qualitatively quite different. Each of the risk behaviours presents a different degree of risk—i.e., some behaviours are riskier than others—and each of the adverse childhood experiences represents a very different experience. As it would be very difficult to assess the magnitude of risk associated with each behaviour and adverse childhood experience, it is common practice to consider such behavioural and experiential measures in a simple quantitative way. However, one must bear in mind that the behaviours and experiences are indeed quite different and therefore any conclusions based upon quantitative analysis of them will be somewhat limited; for example, it would be impossible to firmly establish causality between the adverse childhood experiences and the adulthood risk behaviours.
5.3.2 Power

The sample size of 255 for the Regina Seroprevalence and Risk Behaviour Study was calculated in order to detect the prevalence of HIV, which was presumed to be the least prevalent pathogen tested. Thus the power of the study to detect the associations between adverse childhood experiences and risk behaviours was limited by the sample size.

5.3.3 Recruitment

Due to the social stigma and legal implications associated with injection drug use, it was necessary to rely on nonrandom convenience sampling in the Regina Seroprevalence and Risk Behaviour study. The monetary incentive to participate made it likely that this sample had low SES; individuals who had a higher SES and used injection drugs would have more to lose and less to gain by self-identifying as a person who uses injection drugs, and would thus be much less likely to participate. The unstable lifestyle associated with injection drug use might preclude involvement with this study; as participants were generally required to be able to keep an appointment up to four days in advance in order to participate in the study, it is possible that the sample represents a more “functional” population of people who use injection drugs. Therefore this sample cannot be said to be representative of all people who use injection drugs in the Regina Health District, and the results of this study are not generalisable. Nonetheless, this study provides 255 important reasons to address the issues raised.
5.4 Implications

The results of this study have a number of important implications. Disease prevention and drug treatment programs that target people who use injection drugs are not likely to be successful unless they address the often troubled psychosocial histories of people in this population. The results of this study clearly emphasize the importance of focusing on childhood in policies and programs aimed at both harm reduction in people who use injection drugs and the prevention of injection drug use altogether, as experiences during this time period have an undoubtedly strong effect throughout the lifetime of an individual. The over-representation of Aboriginal people in this sample suggests that programs aimed at addressing the issues raised by this study must be culturally sensitive.

The amount of variability in risk behaviours accounted for by the final models was relatively low. This means that while the adverse childhood experiences considered in this study are important in determining risk behaviours in people who use injection drugs, there are factors that are missing. More research is needed to further elucidate the factors associated with high-risk behaviours in people who use injection drugs.

5.5 Conclusions

Current understanding of people who use injection drugs often includes the assumption that this population engages in very high-risk behaviours. The results of this study have shown that while many people who use injection drugs do practice high-risk behaviours, some do not. The discrepancy in the prevalence of risk behaviours among the participants of the Regina Seroprevalence and Risk Behaviour Study was partly accounted for by their psychosocial histories, including adverse childhood experiences.
In developing models to determine the factors associated with high-risk behaviours, the importance of a number of variables considering adverse childhood experiences and sociodemographic factors was assessed. The factors related to injection-related and sexual risk behaviours were similar in many aspects. Childhood sexual abuse stood out as especially important among the participants in determining both types of high-risk behaviours in adulthood, particularly for women.

These findings underscore the importance of being sensitive to the psychosocial histories, particularly the childhood experiences, of people who use injection drugs when developing policies and programs aimed at disease prevention in people who use injection drugs, and the treatment and prevention of injection drug use. Supplementary research is needed to further expand the current knowledge of factors associated with high-risk behaviours in people who use injection drugs.
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138. Cotter PA. Sexual abuse is not the only childhood adversity that may lead to depression. British Medical Journal 1998;316:1244.


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Arnold RP, Cook DAG. Medical problems of adults who were sexually abused in childhood. *British Medical Journal* 1990; 300: 705-708.


Cotter PA. Sexual abuse is not the only childhood adversity that may lead to depression. *British Medical Journal* 1998; 316: 1244.


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APPENDIX A:

VARIABLES USED IN ANALYSIS
Table A1: Socio-demographic variables considered in analysis

<table>
<thead>
<tr>
<th>Socio-demographic variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Ethnicity</td>
</tr>
<tr>
<td>Education</td>
</tr>
<tr>
<td>Depression Score</td>
</tr>
<tr>
<td>Alcohol Dependence</td>
</tr>
</tbody>
</table>

Table A2: Adverse childhood experiences considered in analysis

<table>
<thead>
<tr>
<th>Adverse childhood experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal factors</td>
</tr>
<tr>
<td>Minor physical abuse before age 16 (pushing, slapping)</td>
</tr>
<tr>
<td>Serious physical abuse before age 16 (punching, kicking, burning)</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
</tr>
<tr>
<td>Parental factors</td>
</tr>
<tr>
<td>Parental alcohol problem</td>
</tr>
<tr>
<td>Parental drug problem</td>
</tr>
<tr>
<td>Parental mental health problem</td>
</tr>
<tr>
<td>Parental police or court record</td>
</tr>
<tr>
<td>Parental unemployment for more than 1 year</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
</tr>
</tbody>
</table>
Table A3: Risk behaviours considered in analysis

<table>
<thead>
<tr>
<th>Risk behaviours</th>
<th>Injection-related</th>
<th>Sexual</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Used someone else’s needle or other injection equipment (gear) in past 6 months</td>
<td>More than 50 sex partners in lifetime</td>
</tr>
<tr>
<td></td>
<td>Ever used someone else’s needle while incarcerated</td>
<td>Less than 100% condom use with non-regular partner(s) in the past 6 months</td>
</tr>
<tr>
<td></td>
<td>Less than 100% cleaning of borrowed needles/gear in the past 6 months*</td>
<td>Involvement in prostitution in the past 6 months</td>
</tr>
<tr>
<td></td>
<td>Age at first use of injection drugs**</td>
<td>Anal sex in the past 6 months</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previous diagnosis of sexually transmitted disease**</td>
</tr>
</tbody>
</table>

* Participants reported whether or not they had cleaned borrowed needles or gear. The appropriateness of the methods they used to clean they needles or gear was not assessed in this analysis.

** Considered as a covariable in specific risk behaviour model only
APPENDIX B:
ETHICAL APPROVAL
UNIVERSITY ADVISORY COMMITTEE
ON ETHICS IN BEHAVIOURAL SCIENCE RESEARCH

NAME: N. Muhajarine (K. Hay)  BSC#: 2001-89
Community Health and Epidemiology

DATE: May 25, 2001

The University Advisory Committee on Ethics in Behavioural Science Research has reviewed
the Application for Ethics Approval for your study "Outcomes of Adverse Childhood
Experiences in Injection Drug Users: Risk Behaviours & Disease Outcomes" (01-89).

1. Your study has been APPROVED.

2. Any significant changes to your proposed study should be reported to the Chair for
   Committee consideration in advance of its implementation.

3. The term of this approval is for 5 years.

I wish you a successful and informative study.

Valerie Thompson, Chair
University Advisory Committee
on Ethics in Behavioural Science Research

VT/bk

Office of Research Services, Ethics Committees, University of Saskatchewan
APPENDIX C:
STUDY CONSENT FORM
INFORMATION FORM FOR STUDY PARTICIPANTS

SEROPREVALENCE AND RISK BEHAVIOUR STUDY AMONG INJECTION DRUG USERS IN REGINA

Regina Public Health, together with Health Canada and Saskatchewan Health, is conducting a survey to better understand how people who inject drugs become infected with viruses, such as HIV, hepatitis B, and hepatitis C. We also want to find out how we can improve the health and well-being of injection drug users in Regina.

Overview of Study:
If you consent to participate in the study, you will be asked to take part in an interview with a study nurse that takes approximately 45 minutes to one hour to complete. In this interview, you will be asked about your needle sharing and sexual behaviours because we want to better understand how drug injectors become infected with certain viruses. You will also be asked questions about your background and your family and about different types of services that are needed in the community because we want to better understand how we can help injection drug users. After the interview, you will be asked to submit a blood sample so that we can test your blood for HIV, hepatitis A, B, and C, and syphilis. You will also be asked to provide a urine sample so that you can be tested for chlamydia and gonorrhea.

May I Expect Any Risks or Problems by Participating in This Study?
There are no risks. You may experience slight discomfort when your blood sample is taken, but the study nurses are highly skilled and any discomfort should be minimal.

Is There Any Advantage to Taking Part in This Study?
There is no advantage. However, you will have a say in recommending the types of services and programs (e.g., improved housing, health care, treatment) that are needed in Regina. You will also find out if you are infected with any of the viruses we are testing for, and we can refer you to any health care or treatment services that you need.

Voluntary Nature of Participation:
Participation in this research study is voluntary. If you choose to participate, you are free to withdraw from the study at any time. It will not affect your access to current services offered by Regina Public Health or other agencies in Regina, nor will it affect your present or future health care. You are encouraged to ask questions regarding the study at any time prior or during the process.
Confidentiality:
No identifying information will be used or revealed in this study. All information, including blood and urine test results, will be coded by number and will not be identifiable by name. No names will be used on any reports or publications.

Additional Information About the Study Can Be Obtained by Contacting:

Sandra Rendall, PHN
Study Co-Ordinator
(306) 766-7612

or

Dr. Ross Findlater
Co-Principal Investigator
(306) 766-7771

Your Rights as a Subject in this Study:
If you have any questions about your rights as a subject participating in this study, you may contact Dr. Gordon Asmundson, Chair, Regina Health District Ethics Committee, at (306) 766-5384.
**Consent Form**

**SEROPREVALENCE AND RISK BEHAVIOUR STUDY**
Regina Health District

<table>
<thead>
<tr>
<th>Date of interview</th>
<th>Interviewer's ID code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Site of interview</td>
<td></td>
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</tbody>
</table>

Tell the participant that he/she may get coffee or tea. You may begin with something like this:

This survey is part of a study that we, at Regina Public Health, are working together to complete with Health Canada and Saskatchewan Health.

The purpose of this survey is to try to better understand how many people who inject drugs become infected with certain viruses. We also want to better understand the factors that make someone begin injection drug use. In addition, we want to find out how we can improve the health and well-being of injection drug users in Regina.

To answer these questions, we are asking you to complete a questionnaire, submit a blood sample so that we can test your blood for different viruses and provide a urine sample to be tested for other infections.

Because we want to better understand how we can help injection drug users, we are asking people to answer a number of questions about certain behaviours - such as needle sharing and sexual practices. In order to help develop appropriate services, we will also be asking questions about your background (such as your living circumstances) and family. We will also ask questions about the different types of services needed in our community (health care services, addiction services, housing, and others) - so that we can make recommendations to government policy makers.

The information we will talk about is strictly confidential. All findings from this study will be included in a scientific report - however NO PARTICIPANT WILL BE NAMED OR IDENTIFIED IN ANY WAY IN THE SCIENTIFIC REPORT.

If you have ANY questions, please ask me now. You may also ask questions at any time during the interview, or afterwards, if you call the study hotline.

Tell the person it will take about ## minutes to conduct the interview and collect the blood and urine sample.

We will begin the survey with a number of questions to make sure you fit the criterion for the study, and to make sure you understand what the purpose and limitations of this study are.
ELIGIBILITY CRITERIA

1. Have you used a needle to inject yourself with drugs in the last 12 months? (If only insulin or other therapeutic injections, with no needle sharing, then NO)
   ○ Yes ➔ Skip to two
   ○ No ➔ End interview, thank participant for his/her interest in the study, and explain that he/she does not meet the study criteria.

2. What is your date of birth? ➔ Confirm age as of today’s date
   ○ Age 14 years or older ➔ Go to Instruction box below
   ○ Less than 14 years of age ➔ End interview; thank participant for his/her interest in the study, and explain that he/she does not meet the study criteria

Investigation code

AFFIX THE INVESTIGATION CODE OVER
THIS SPACE NOW.

CONSENT CHECKLIST

Participation in the investigation is completely VOLUNTARY. You can drop out at ANY time during the interview or blood collection, without affecting the type of service or care you receive from Regina Health District or other health care providers in the city.

If you wish to access other services (such as drug treatment, mental health, or services, such as vaccination for hepatitis B), resources and referrals can be provided today and/or when you return for your blood and urine test results.

The questionnaire and lab tests are COMPLETELY CONFIDENTIAL. WE DO NOT want to know your name. However, we will be asking you for your initials (first 2 letters of the first and last name), and your date of birth so that you can identify yourself to us to obtain your blood/urine results when you return. If you want the results of your blood/urine tests, you must come back to receive them. We will not give you your results over the telephone.

If you provide a blood sample, your blood will be tested for HIV (the virus that causes AIDS), Hepatitis A, Hepatitis B, Hepatitis C, and syphilis. If you provide a urine sample, your urine will be tested for chlamydia and gonorrhea. We will NOT be looking for any drug markers or drug levels.

DO YOUR UNDERSTAND THIS?  ○ Yes  ○ No (DISCUSS/CLARIFY)
If you wish to obtain the results of your tests, you MUST COME BACK to see me or another study nurse in about 3 weeks time. A return visit will be booked during today's visit. You will need your code to obtain your results. When you return, we will offer you a variety of public health services, which may include:

- Offering and providing treatment for any infections;
- Referral to community-based services;
- Referral to other health care providers;
- Offering and providing vaccination for Hepatitis B
- Assisting in the notification of your partners.

We will not be releasing your name to anyone. If you test positive for any of these infections, you may need treatment that is not provided by the study nurse or public health nurse, including referral to other health care professionals. Should you wish to seek other treatments, you may be required to identify yourself by name. If you choose, we can assist you with this when the time comes. If you want me to forward your results to another health care professional (i.e. Doctor), you will be asked to sign a consent form before I do this.

DO YOU UNDERSTAND THIS?  O Yes   O No
You are not being asked to sign anything because this is a confidential process and if you
sign, your signature will identify you. Therefore, by saying to me that you agree to
participate in this study, you are agreeing to complete the study questionnaire, permit a
SINGLE blood sample to be drawn to test for HIV, Hepatitis C, Hepatitis B, Hepatitis A,
and syphilis and provide a urine sample to test for chlamydia and gonorrhea.

DO I HAVE YOUR CONSENT FOR THIS?

☐ Yes  ☐ No

We may want to use your blood in the future for other laboratory tests (for example: new
types of hepatitis). For this, we will remove the coding from your sample and since your
code will not be attached to the sample, we will be UNABLE to inform you of the results of
any other laboratory tests done in the future.
May we store your leftover blood for this purpose?

☐ YES  ☐ NO  "DESTROY AFTER TESTING" STICKER ON BLOOD TUBE
        NOW

During the interview, should you disclose any life-threatening information (suicidal or
bomideal feelings), I am obliged to disclose this information to the appropriate medical
health officer for his/her assessment and resolution.

I, ____________________________, have completed the consent checklist with this
participant. He/she has indicated an understanding of all the points in the checklist and is
willing to continue with the protocol.

Interviewer’s signature ____________________________ Date __________

At this point, if person DOES NOT want to continue, please note his/her
approximate age (do not ask), gender, and site of interview.

approximate age ______ gender ______ site ______

Investigation code ____________________________ AFFIX THE INVESTIGATION CODE OVER
        THIS SPACE NOW.
APPENDIX D:
STUDY QUESTIONNAIRE
HIV, HBV, and HCV among IDUs in Regina: A Seroprevalence and Risk Behaviour Study
HC-003-165-9943

Participant Questionnaire

Date of interview: ________________________________
Time to complete interview: ________________________________
Interviewer: ________________________________
In this interview, I will be asking you questions about yourself and your lifestyle. Anything you tell me during this interview will be kept totally confidential. I do not need to know your name, or the name of anyone we may speak about. This first part of the interview is about your background, where you live, and about some of your medical history.

D1. What year were you born? [year]
D2. What sex are you?
   ○ Female  ○ Male
D3. Were you born outside of Canada?
   ○ No
   ○ Yes List Country:

D4. Have you ever lived outside of Canada?
   ○ No
   ○ Yes Country: Year(s)

D5. What ethnic/racial group do you belong to? Do not read, but can prompt:
   ○ White
   ○ Black
   ○ Asian
   ○ East Indian
   ○ Aboriginal (indicate sub-group)
     ○ Metis
     ○ Inuit
   ○ First Nation, specify:
     ○ Status  ○ Non-status
   ○ Other

D6. Are you currently attending school?
   ○ Yes → Specify grade or level, then go to D8
   ○ No → Go to D7

D7. What is the highest level of education you completed? → Do not read; choose only one:
   ○ Some elementary school
   ○ Completed elementary school
   ○ Some high school
   ○ Completed high school
   ○ Some college/trade school
   ○ Completed college/trade school
   ○ Some university
   ○ Completed university
   ○ Other (specify:)

D8. Right now, where do you live?
   ○ Regina → Skip to Q D10a)
   ○ Another Saskatchewan City → Name city
   ○ Non-urban setting - town/village/farm
   ○ First Nations' community
   ○ Other

D9. If you don't live in Regina, how often do you visit?

   [ ] times a month or
   [ ] times a year
   ○ Other

D10a). How long have you lived in insert their city/community?

   [ ] years or
   [ ] months or
   [ ] weeks

If they have lived in this city/community for less than 2 years, ask D10b). If they have lived there for more than 2 years, go to D11.

D10b). Where did you live immediately before you lived in insert their city/community?

D11. Have you ever lived outside of the province in the past 5 years? (Prompt specifically Vancouver, Toronto, Montreal, Calgary, Winnipeg, or Edmonton)

   ○ No
   ○ Yes → Where?
   (List cities)

D12. What area/neighborhood in Regina do you spend most of your time in?

   Specify neighborhood/intersection:
D13. What kind of housing do you live in now? → Do not read; May need to prompt.
   - Apartment or house
   - Parent's house
   - Other relative's house
     (specify):____________
   - Friend's place
   - Boarding house
   - Hotel/motel room
   - Shelter
   - Transition house/halfway house
   - Recovery House
   - Detox
   - Street/no fixed address
   - Other: _____________________________

D14. What kind of relationship are you in right now? → Choose one only
   - Married
   - Common law
   - Divorced
   - Separated
   - Widowed
   - Not seeing anyone
   - Steady boyfriend/girlfriend
   - Dating more than one person
   - Same sex couple
   - Other
     (Specify):_______________________

D15. Are you currently supporting any children?
   - No
   - Yes → How many? ________

D16. During the last six months, what was your main source of income? → Don't read but can prompt. Can fill in more than one answer
   - Job or business, full time
   - Job or business, part time
   - Gov't or disability benefits
   - Welfare
   - Spouse's/partner's/relative's income
   - EI (Employment insurance)
   - Mother's allowance
   - Sex trade
   - Dealing drugs
   - Break-ins/theft
   - Not applicable (e.g. student, incarcerated)
   - Other (specify):

D17. Has your current source of income changed in the last year?
   - No
   - Yes → How?

→ What caused this change?
Now I would like to ask you some questions about your medical and related history. Remember that all the answers you give are kept totally confidential.

M1. Have you ever received blood or blood products?
   ○ No (prompt for Hx of accident)
   ○ Unsure/don’t know
   ○ Yes → What kind and when? (year)
   1. 
   2. 
   3. 
   4. 

M2. Have you ever donated blood?
   ○ No (prompt for memory)
   ○ Unsure/don’t know
   ○ Yes → Most recent year

Now I am going to ask some questions about tattoos.

M3. Do you have any tattoos:
   ○ No → Go to M7
   ○ Yes → How many?
     ○ 1 - 3
     ○ 4 - 9
     ○ 10 or more

M4a. How old were you when you had your first tattoo? _______ years old

M4b. How old were you when you had your last tattoo? _______ years old

M5. Where did you go to have your tattoo(s) done? → Check all that apply
   ○ At a tattoo parlour/shop
   ○ In prison (myself or another inmate)
   ○ At home by myself, (not in jail)
   ○ Friend
   ○ Unsure/don’t remember
   ○ Other (specify):

M6. In your opinion, how often was the tattoo equipment sterile/clean?
   ○ Always
   ○ Usually
   ○ Sometimes
   ○ Occasionally
   ○ Never
   ○ Don’t know/can’t remember

Next, I am going to ask some questions about piercing.

M7a. Is any part of your body pierced?/Do you have anything pierced (i.e. ear, nose or body piercing)?
   ○ No → Go to Drug Section
   ○ Yes

M7b. How old were you when you had your first piercing? _______ years old

M7c. How old were you when you had your last piercing? _______ years old

M8. Where did you go to have the piercing done? → More than I answer allowed
   ○ At hairdresser/shop (including jewelry shop)
   ○ In prison
   ○ At home by myself, (not in jail)
   ○ Friend
   ○ Unsure/don’t remember
   ○ Other (Specify:)

3

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Q9. In your opinion, how often was the piercing equipment sterile/clean?
   ○ Always
   ○ Usually
   ○ Sometimes
   ○ Occasionally
   ○ Never
   ○ Don't know/can't remember

This is the end of the general section. I would now like to move on to some questions on drug use.
Injection Drug Use

Now I am going to ask you some questions about your general drug and needle use. Remember that all the answers you give are kept totally confidential.

I. How old were you when you first began using street drugs (such as marijuana, hashish, cocaine, crack, heroin, morphine, dilaudid, glue, sniff, gas, hairspray, or other drugs as Ritalin or Talwin)?
   ______ years old

II. Had you been drinking the FIRST time you ever used any street drugs?
   ○ Yes
   ○ No

The next question is about drugs that you have ever used for recreation but not by injecting.

III. Which of the following drugs have you ever used more than 3 times NOT BY INJECTING? → READ OUT LIST & choose all that apply
   ○ Alcohol
   ○ Mushrooms
   ○ Pot, weed, hash
   ○ Cocaine
   ○ Acid
   ○ Speed
   ○ Heroin
   ○ Methadone
   ○ Glue (sniff)
   ○ Solvents (Lyso, Pam, Aqua Velva)
   ○ Gasoline
   ○ Valium, ativan, Librium, halcyon, Lectopam, serax
   ○ Codeine
   ○ Tylenol with codeine (T3s, T4s,...)

   Remember- not by injecting!
   ○ Demerol
   ○ Dilaudid
   ○ Percodan
   ○ MS/contin
   ○ Fiorinal
   ○ Talwin
   ○ Ritalin
   ○ Crack
   ○ Other ______

IV. How old were you when you first used needles to inject drugs?
   [ ] years old

V. What would you say is the ONE main reason you started using injection drugs?
   → Do not read. Choose only ONE
   ○ Others/friends introduced me to it
   ○ Liked getting high/partying
   ○ To forget or escape my problems
   ○ Wanted a better way to do drugs
   ○ Curious/interested in effect
   ○ Had money to do it
   ○ Help withdraw from other drugs
   ○ Don't know/forget
   ○ Other (specify):

VI. Have you ever used a needle/gear that someone else had already used?
   ○ No Ψ skip to II
   ○ Yes Ψ What part(s)?
     ○ Needle
     ○ Cotton/Filter
     ○ Water
     ○ Spoon (cooker)
     ○ Syringe

VII. In your lifetime, whose needles/gear did you ever use?
     ○ sex partner
     ○ friend
     ○ dealer
     ○ inmate
     ○ stranger
     ○ other (specify:)

VIII. When was the last time you injected/shot up?
     ○ Today
     ○ 1-3 days ago
     ○ 4-6 days ago
     ○ 1-2 weeks ago
     ○ More than 2 weeks but less than 6 months ago
     ○ Between 6 months and a year ago

IF ANSWERED BETWEEN 6 MONTHS AND A YEAR AGO, ASK: Have you stopped using? All other responses, go to I9
   ○ No → Go to I9
   ○ Yes → Go to I9, then skip to I35
I9a. How long have you/had you been using?

- [ ] years or [ ] months
- O used one time only
  - O used a total of less than 1 month

I9b. What is the longest period of time that you have quit for? ________________

Why? ________________

***IF SUBJECT HAS NOT USED IN PAST 6 MONTHS, GO TO I13***

Now I'd like to talk to you about your current drug use—that is, what has been happening in the past six months.

I10. In the past 6 months, what drugs have you injected?

- May choose more than one answer.
  - O T&R
  - O Dilaudid
  - O Demerol
  - O Cocaine
  - O Heroin
  - O Ritalin
  - O Morphine
  - O Talwin
  - O Others: ________________

I11. In the past 6 months, which ONE drug did you inject most often?

- Choose one only.
  - O T&R
  - O Dilaudid
  - O Demerol
  - O Cocaine
  - O Heroin
  - O Ritalin
  - O Morphine
  - O Talwin
  - O Others: ________________

I12. On average (during the last 6 months):

- How many days per week did you inject? _______
- How many times a day did you inject? _______
- How many days per month did you inject (during the last 6 months)? _______

OR:

- Injected less than once a month O
- Injected one time only O

I13. Where were you usually when you injected/shot up (during the last 6 months)?

- O Own home
  - O Friend's place
  - O In a park
  - O In a bar/restaurant
  - O In a public washroom
  - O In the street (alley, doorway, etc.)
  - O Car/vehicle
  - O Shooting gallery
  - O Prison/jail
  - O Other: ________________
  - O Don't remember

I14. When you injected (during the last 6 months), were you usually:

- O Alone
  - O With your sex partner
  - O With other users
    - How many other users did you usually shoot up with? ___
    - Specify number: ______

I15. In the past 6 months, did you use needles and gear that someone else had already used?

- Be sure to prompt that this includes sex partners/friends
  - O No (prompt: How can you be sure?) Skip to I20
  - O Unsure/don't know
  - O Yes ➔ What part?
    - O Needle
    - O Cotton/filter
    - O Spoon
    - O Water
    - O Syringe

I16. What is the approximate % of injections in the past 6 months where you borrowed/rented needles/gear:

- Show prompt card
  - O Always
  - O Usually
  - O Sometimes
  - O Occasionally
I17. How frequently were you intoxicated (drunk) when you borrowed or used someone else's needle (in the past 6 months)?
  O Always
  O Usually
  O Sometimes
  O Occasionally
  O Never

I18. In the past 6 months, who's needles/gear did you EVER use? ->May identify more than one
  O Sex partner
  O Friend
  O Dealer
  O Inmate
  O Stranger
  O Other -> Specify:

I19. When you used a needle/gear that someone else had already used in the past 6 months, what are some of the reasons why:
  O Did not have one "on me"
  O Didn't know where to get new ones
  O Couldn't get new ones (pharmacy, street project, Carmichael, AIDS Regina, etc. closed)
  O I sold all my needles/gear
  O My needle was too dull or plugged
  O I was with my sex partner
  O I wanted to show trust/bonding
  O My stuff got mixed up with someone else's
  O Too high to care at the time
  O Didn't care/"why not?"
  O I won't get HIV or other diseases
  O Other -> Specify:

I20. Did other people use a needle or other gear that you had already used in the past 6 months?
  O No (prompt: How can you be sure?) -> Skip to I22
  O Unsure/don't know -> Skip to I22
  O Yes -> What parts?
    O Needle
    O Cotton/filter
    O Spoon
    O Water
    O Syringe

I21. In the past 6 months, whom did you lend your needles/gear to? -> Can name more than one
  O Sex partner
  O Friend
  O Inmate
  O Stranger
  O Other -> Specify:

I22. How many new (unused) needles have you acquired in the last month?

I23. Are you able to get the number of new (unused) needles you would like to have?
  O No -> What is the ideal number:
  O Yes
I24. In the past 6 months, did you have any problems trying to obtain a NEW, UNUSED needle?
   O No
   O Yes \textarrow{Why?}
     O Pharmacy closed
     O Needle Exchange closed/unavailable
     O STD clinic needle exchange closed/unavailable
     O Hassled at pharmacy
     O Too far to go (to pharmacy/NEP)
     O Spontaneous use - not prepared
     O Too high to care
     O Limited distribution (at NEP)
     O Legal implications (getting caught by police)
     O Other: 

I25. In the past 6 months, where did you usually get your new (unused) needles from? \textarrow{Do not read; only check off one.}
   O Pharmacy
   O RHD needle exchange-fixed site (STD clinic)
   O RHD needle exchange-van
   O AIDS Regina
   O All Nations Hope
   O Carmichael
   O Nurse/Doctor/Hospital
   O Dealer
   O Friends
   O Someone with a stockpile of new needles
   O Diabetic I know
   O Off the street
   O Other \textarrow{Specify:} 
   O Not applicable; never used new (unused) needles in past six months

\hline

These next questions focus on needle care and disposal.

I26. In the past 6 months, where did you occasionally get your new (unused) needles from? \textarrow{Do not read; may choose more than one.}
   O Pharmacy
   O RHD needle exchange-fixed site (STD clinic)
   O RHD needle exchange-van
   O AIDS Regina
   O All Nations Hope
   O Carmichael
   O Nurse/Doctor/Hospital
   O Dealer
   O Friends
   O Someone with a stockpile of new needles
   O Diabetic I know
   O Off the street
   O Other \textarrow{Specify:} 
   O Not applicable; never used new (unused) needles in past six months

I27. On average, how many times do you use your own needle before you dispose of it?
   \textarrow{Enter #}

I28. How do you dispose of it?
   O Put in puncture proof container in the garbage
   O Throw it in the garbage
   O Throw it away (on the street, in a park, in an alley)
   O Take it to the RHD needle exchange
   O Take it to Carmichael
   O Take it to AIDS Regina
   O Other \textarrow{Specify:} 

**If USES OWN NEEDLE ONCE ONLY, GO TO QI30**
I29. In the past 6 months, when you re-used your own needle, how often did you clean the needle before you used it? → Show prompt card
   ○ Always
   ○ Usually
   ○ Sometimes
   ○ Occasionally
   ○ Never

**IF NEVER SHARED NEEDLES OR GEAR IN THE PAST 6 MONTHS, SKIP TO Q133

I30. In the past 6 months, when you used a needle that someone else had already used, how often did you clean the needle before you used it? → Show prompt card
   ○ Always
   ○ Usually
   ○ Sometimes
   ○ Occasionally
   ○ Never
   ○ Not applicable—never borrows

I31. If you didn’t always clean the needle, why not (in the past 6 months)? Do not read
   ○ Didn’t have the stuff to clean it with
   ○ Wanted a fix bad—couldn’t wait
   ○ Was too high
   ○ Trusted the person and their needle
   ○ Other: ________________

I32. The last time you used someone else’s needle or gear, how did you clean it?
   ○ Bleach alone
   ○ Bleach mix (unsure how much)
   ○ Half bleach/half water
   ○ Rubbing alcohol (non-liquor)
   ○ Cold water
   ○ Hot water
   ○ Boiling needle/syringe
   ○ Don’t know/can’t remember
   ○ Other: ________________

I33. When you clean a needle, how long do you usually leave the cleaning solution in the needle for?
   ○ Just draw up and push solution out
   ○ A few seconds
   ○ 10-15 seconds
   ○ 15-30 seconds
   ○ More than 30 seconds

I34. How many times do you flush the needle?
   ○ Once
   ○ Twice
   ○ Three times
   ○ More than 3 times
   ○ Not applicable

The next questions focus on your LIFETIME use of injection drugs.

I35. Did you EVER use a needle or other gear from someone who YOU KNEW or highly suspected was HIV positive or who had AIDS AT THAT TIME (at the time you shared)?
   ○ No
   ○ Yes → Did you clean the needle/gear?
      ○ No
      ○ Yes

I36. Did you EVER use a needle/gear from someone who YOU KNEW had Hepatitis AT THAT TIME (at the time you shared)?
   ○ No
   ○ Yes → Specify:
      ○ HAV
      ○ HBV
      ○ HCV
      ○ Other → Specify: ________________
      ○ Not sure

If yes, did you clean the needle/gear?
   ○ No
   ○ Yes
Needle Exchange Questions

The next few questions are about your use of needle exchange services in Regina.

N1a). In the last 12 months, have you used any of the needle exchange sites in Regina?
  - No → Go to N3
  - Yes

N1b). Which sites did you use? → May choose more than one
  - RHD needle exchange-fixed site (STD clinic)
  - RHD needle exchange-van
  - Carmichael
  - AIDS Regina
  - Other → Specify:

N1c). How often did you visit the exchange(s)?
  - Every day
  - Every couple of days
  - Once a week
  - Every couple of weeks
  - Once a month
  - Less than once a month
  - Not sure/don’t know

N2. Why did you use needle exchange services in Regina?
  - Convenience (condoms, gear etc.)
  - Free needles
  - Concerned about health
  - Don’t want to get HIV/AIDS
  - Don’t want to get HBV
  - Don’t want to get HCV
  - Other (Specify):

N3. If you didn’t use needle exchange services at all in the last 12 months or you used the services less often than you needed clean needles, why was this?
  - Location of sites
  - I’m not right there when I need it
  - Not open/available when I need it
  - People I know will see me
  - Don’t want to get caught (ie. cops)
  - Out of my way/hassle to get there
  - No longer using
  - Didn’t know about them
  - Get hassled carrying (used) needles
  - Other
  (Specify):

N4. Do you use or have you used any other needle exchanges elsewhere in the province?
  - No
  - Yes →

Where?
Prison Questions

These next questions focus on if you've ever used injection drugs while in jail. Please remember that everything you tell me is strictly confidential.

P1. Have you ever been in jail?
   ○ No → Skip to sex section
   ○ Yes

P2. While you were inside, did you ever use a needle or other implement to inject yourself?
   ○ No → Skip to sex section
   ○ Unsure/don't remember → Skip to sex section
   ○ Yes

P3. Did you use, borrow or rent someone else's needles or gear while you were inside? ○ No → Skip to sex section
   ○ Yes → In which type of facility?
   (fill in table)

<table>
<thead>
<tr>
<th>Facility</th>
<th>needle/gear borrowing/renting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detention centre</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td>local lockup</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td>Provincial</td>
<td>○ Yes ○ No</td>
</tr>
<tr>
<td>Federal</td>
<td>○ Yes ○ No</td>
</tr>
</tbody>
</table>

P4. While in jail, how often did you borrow/rent needles?
   (Show prompt cards)
   ○ Always
   ○ Usually
   ○ Sometimes
   ○ Occasionally

P5. How often did you clean the needles first?
   ○ Always
   ○ Usually
   ○ Sometimes
   ○ Occasionally
   ○ Never → Skip to sex section

P6. What did you clean them with?
   ○ Bleach alone
   ○ Bleach mix (not sure how much bleach)
   ○ Half bleach/half water
   ○ Cold water
   ○ Hot water
   ○ Boiling
   ○ Rubbing alcohol (non-liquor)
   ○ Booze
   ○ Don't know
   ○ Someone else cleaned them
   ○ Other: ___________________________

P7. How long did you usually leave the cleaning solution in the rig for?
   ○ Just draw up and push solution
   ○ A few seconds
   ○ 10-15 seconds
   ○ 15-30 seconds
   ○ More than 30 seconds
   ○ Unsure/can't remember

P8. How many times did you flush it?
   ○ Once
   ○ Twice
   ○ Three times
   ○ More than 3 times
   ○ Not applicable
   ○ Unsure/can't remember

   GO TO SEXUAL HISTORY SECTION.
SEXUAL RISK BEHAVIOUR

Please feel free to ask you some questions about your sexual relationships and your sexual activities. These questions are very important. Please remember that anything you tell me will be kept strictly confidential.

S1. Have you EVER had sexual intercourse (vaginal or anal)?
   ○ No → skip to social determinants section
   ○ Yes

S2. At what age did you first have sexual intercourse (vaginal or anal)?
   _______ years old

S3. How many sexual partners have you had in your lifetime?

<table>
<thead>
<tr>
<th>Regular partner(s)</th>
<th>Casual partner(s)</th>
<th>Client(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>#</td>
<td>#</td>
</tr>
</tbody>
</table>

S4. Have you ever had any of the following sexually transmitted diseases (STDs)? [Can describe what they had]
   ○ Gonorrhoea
   ○ Chlamydia
   ○ Herpes
   ○ Genital Warts
   ○ Syphilis
   ○ PID (Females only)
   ○ Unknown STD
   ○ Don't know
   ○ Other:________

S5. In the last 6 months, did you have any sexual contact (vaginal, anal, oral) with someone of the opposite sex?
   ○ Yes
   ○ No
   If no, and MALE, go to S33; Read boxed preface. If no, and FEMALE, go to S61; Read boxed preface.

These next questions are about regular sex partners of the opposite sex.

A regular sex partner is someone you have had a sexual relationship with for more than three months. This does not include clients/tricks.

S6. In the last 6 months, did you have a regular sex partner of the opposite sex?
   ○ Yes - How many?
   #
   ○ No - Go to S15; Read boxed preface

S7. In the last 6 months, did you have oral sex with your regular partner(s) of the opposite sex?
   ○ Yes
   ○ No - Go to S9

S8. In the last 6 months, how often did you use a condom when you had oral sex with your regular partner(s) of the opposite sex?

   ○ Always [100% of the time]
   ○ Usually [75-99%]
   ○ Sometimes [26-74%]
   ○ Occasionally [1-25%]
   ○ Never [0% of the time]

S9. In the last 6 months, did you have anal sex with your regular partner(s) of the opposite sex?
   ○ Yes
   ○ No - Go to S11

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S10. In the last 6 months, how often did you use a condom when you had anal sex with your regular partner(s) of the opposite sex?

Show prompt card to interviewee.
- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

S11. In the last 6 months, did you have vaginal sex with your regular partner(s) of the opposite sex?
- Yes
- No → If didn’t “ALWAYS” use a condom for oral and/or anal sex, go to S13; If “ALWAYS” used a condom for oral and/or anal sex, go to S14.

S12. In the last 6 months, how often did you use a condom when you had vaginal sex with your regular partner(s)

Show prompt card to interviewee.
- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

ASK S13 ONLY IF DIDN’T ALWAYS USE A CONDOM FOR ORAL, ANAL, AND/OR VAGINAL SEX.

S13. If you didn’t ALWAYS wear/use a condom with your regular sex partner(s) for any type of sexual intercourse (oral, anal, or vaginal) of the opposite sex, what are some of the reasons why?

Check all that apply:
- I trust them/myself they’re safe
- Why should I?
- Didn’t have one
- Wanted to express trust with partner
- Too awkward or afraid to ask
- Partner refused/pressured me
- Too high at the time to care
- I feel I won’t get HIV/AIDS/STDs
- It broke
- Did not care
- Other [Specify]:

S14. Were any of your regular partner(s) of the opposite sex that you had in the last 6 months HIV positive?
- Yes - How many? ______
- No
- Unsure/Don’t know
The following questions apply to casual sex partners of the opposite sex.

A casual sex partner is defined as someone you have had a sexual relationship with for less than three months. This includes one night stands. It does not include tricks/clients.

S15. In the last 6 months, did you have any casual sex partners of the opposite sex?
   ○ Yes → How many? ______
   ○ No → Go to S24; Read boxed preface
   ○ Unsure → Probe for recall:
     If still unsure, go to S24; Read boxed preface.

S16. In the last 6 months, did you have oral sex with your casual partner(s) of the opposite sex?
   ○ Yes
   ○ No → Go to S18

S17. In the last 6 months, how often did you use a condom when you had oral sex with your casual partner(s) of the opposite sex?
   ○ Always [100% of the time]
   ○ Usually [75-99%]
   ○ Sometimes [26-74%]
   ○ Occasionally [1-25%]
   ○ Never [0% of the time]

S18. In the last 6 months, did you have anal sex with your casual partner(s) of the opposite sex?
   ○ Yes
   ○ No → Go to S20

S19. In the last 6 months, how often did you use a condom when you had anal sex with your casual partner(s) of the opposite sex?
   ○ Always [100% of the time]
   ○ Usually [75-99%]
   ○ Sometimes [26-74%]
   ○ Occasionally [1-25%]
   ○ Never [0% of the time]

S20. In the last 6 months, did you have vaginal sex with your casual partner(s) of the opposite sex?
   ○ Yes
   ○ No - If didn’t “ALWAYS” use a condom for oral and/or anal sex, go to S22; If “ALWAYS” used a condom for oral and/or anal sex, go to S23

S21. In the last 6 months, how often did you use a condom when you had vaginal sex with your casual partner(s)
   ○ Always [100% of the time]
   ○ Usually [75-99%]
   ○ Sometimes [26-74%]
   ○ Occasionally [1-25%]
   ○ Never [0% of the time]
ASK 322 ONLY IF DIDN'T ALWAYS
USE A CONDOM FOR ORAL, ANAL,
AND/OR VAGINAL SEX.

S22. If you didn't ALWAYS
wear/use a condom with your casual
sex partner(s) of the opposite sex
for any kind of intercourse (oral,
anal, vaginal) what are some of the
reasons why?

Check all that apply:

DO NOT READ TO INTERVIEWEE.

- I trust them/they're safe
- Why should I?
- Didn't have one
- Wanted to express trust
  with partner
- Too awkward or afraid to
  ask
- Partner refused/pressured me
- Too high at the time to care
- I feel I won't get
  HIV/AIDS/STDs
- It broke
- Did not care
- Other → Specify:

The following questions apply to
client partners of the opposite sex.
A client sex partner is defined as
someone you may or may not know
whom you have sex with for money,
drugs, belongings, or shelter.

S24a). In the last 6 months did
you have sex to get money, gifts,
drugs or a place to sleep?

- No → probe for recall; if
  no and MALE, go to S33; Read
  boxed preface; if no and
  FEMALE, go to S61; Read
  boxed preface.
- Yes → go to S24b
- Unsure / don't remember →
  probe for recall; reassure
  confidentiality; if still unsure,
  to go S33 if MALE; Read
  boxed preface; Go to S61 if
  FEMALE; Read boxed preface

S24b). In the last 6 months, what
were some of the items you
received after having sex?
(check all that apply)

- Money
- Gifts
- Drugs and / or alcohol
- Shelter
- Food
- Other (specify:)

S24c). What item did you receive
most often?

(please enter number from S24b)

S25. In the last 6 months, did you
have oral sex with your
clients/tricks of the opposite sex?

- Yes
- No → Go to S27
526. In the last 6 months, how often did you use a barrier method (condom or dam) when you had oral sex with your client sex partner of the opposite sex?

Show prompt card to interviewee.
- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

527. In the last 6 months, did you have anal sex with your clients/tricks of the opposite sex?
- Yes
- No - Go to S29

528. In the last 6 months, how often did you or your client use a condom when you had anal sex with your clients/ tricks of the opposite sex?

Show prompt card to interviewee.
- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

529. In the last 6 months, did you have vaginal sex with your clients/tricks of the opposite sex?
- Yes
- No - If didn't "ALWAYS" use a condom for oral and/or anal sex, go to S31; If "ALWAYS" used a condom for oral and/or anal sex, go to S32

530. In the last 6 months, how often did you or your client use a condom when you had vaginal sex with your clients/tricks of the opposite sex?

Show prompt card to interviewee.
- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

531. If you didn't ALWAYS wear/use a condom with your clients/tricks of the opposite sex for any type of intercourse (oral, anal, vaginal), what are some of the reasons why?

Check all that apply:
- Do NOT READ TO INTERVIEWEE.
  - Clients pay more money if I don't use condoms
  - Why should I?
  - Didn't have one
  - My pimp won't let me
  - Too awkward or afraid to ask
  - Trick refused/pressured me
  - Too high at the time to care
  - I feel I won't get HIV/AIDS/STDs
  - It broke
  - Did not care
  - Other [Specify]:

---

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S32. In the last 6 months, were any of your clients/tricks of the opposite sex HIV positive?
   - Yes → How many? _______
   - No
   - Unsure/don’t know
   If interviewer is female, go to S61; if interviewer is male, go to S33.

The next questions are for male interviewees only.

Now I’m going to ask you about any male sex partners you may have had during this time frame. Please remember that anything you say is totally confidential.

S33. In the last 6 months, did you have any kind of sex (anal or oral) with a male?
   - Yes
   - No → Go to questions about sex during incarceration (S71)
   - Unsure → Probe for recall; reassure confidentiality; if still unsure, go to questions about sex during incarceration (S71)

A regular sex partner is defined as someone you have had a sexual relationship with for more than three months. This does not include clients/tricks.

S34. In the last 6 months, did you have any regular male sex partners?
   - Yes → How many? _______
   - No → Go to S43

S35. In the last 6 months, did you have oral sex (receptive or insertive) with your regular male sex partner(s)? Define terminology
   - Yes
   - No → Go to S37

S36. In the last 6 months, how often did you use a condom when you had oral sex with your regular male sex partner(s)?

Show prompt card to interviewee.
   - Always [100% of the time]
   - Usually [75-99%]
   - Sometimes [26-74%]
   - Occasionally [1-25%]
   - Never [0% of the time]

S37. In the last 6 months, did you have receptive anal sex with your regular male sex partner(s)? [Define receptive for subject]
   - Yes
   - No → Go to S39

S38. In the last 6 months, how often did you use a condom when you had receptive anal sex with your regular male sex partner(s)?

Show prompt card to interviewee.
   - Always [100% of the time]
   - Usually [75-99%]
   - Sometimes [26-74%]
   - Occasionally [1-25%]
   - Never [0% of the time]

S39. In the last 6 months, did you have insertive anal sex with your regular male sex partner(s)? [Define insertive for subject]
   - Yes
   - No → If didn’t "ALWAYS" use a condom for oral and/or receptive anal intercourse, go to S41; If "ALWAYS" used a condom for oral and/or receptive anal intercourse, go to S42
S40. In the last 6 months, how often did you use a condom when you had insertive anal sex with your regular male sex partner(s)?

Show prompt card to interviewee.

- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [<1-25%]
- Never [0% of the time]

ASK ONLY IF DIDN'T ALWAYS USE A CONDOM FOR ORAL, RECEPTIVE ANAL, OR INSERTIVE ANAL SEX.

S41. If you didn't ALWAYS wear/use a condom with your regular male sex partner(s) for any type of intercourse, what are some of the reasons why?

Check all that apply:

DO NOT READ TO INTERVIEWEE.

- I trust them / they're safe
- Why should I?
- Didn't have one
- Wanted to express trust with partner
- Too awkward or afraid to ask
- Partner refused / pressured me
- Too high at the time to care
- I feel I won't get HIV/AIDS/STDs
- It broke
- Did not care
- Other -> Specify:

S42. In the last 6 months were any of your regular male sex partner(s) HIV positive?

- Yes -> How many? ________
- No
- Unsure / don't know

The following questions apply to your casual male sex partners.

A casual sex partner is defined as someone you have had a sexual relationship with for less than three months. This includes one-night stands, but does not include clients / tricks.

S43. In the last 6 months, did you have any male casual sex partners?

- Yes -> How many? ________
- No -> Go to S52

S44. In the last 6 months, did you have oral sex with your casual male sex partner(s)?

- Yes
- No -> Go to S46

S45. In the last 6 months, how often did you use a condom when you had oral sex with your casual male sex partner(s)?

Show prompt card to interviewee.

- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [<1-25%]
- Never [0% of the time]

S46. In the last 6 months, did you have receptive anal sex with your casual male sex partner(s)? [Define receptive for interviewee]

- Yes
- No -> Go to S48
S47. In the last 6 months, how often did you use a condom when you had receptive anal sex with your casual male sex partner(s)?

Show prompt card to interviewee.
- [ ] Always [100% of the time]
- [ ] Usually [75-99%]
- [ ] Sometimes [26-74%]
- [ ] Occasionally [1-25%]
- [ ] Never [0% of the time]

ASK S50 ONLY IF DIDN'T ALWAYS USE A CONDOM FOR ORAL, RECEPTIVE ANAL, OR INSERTIVE ANAL SEX.

S50. If you didn’t ALWAYS wear/use a condom with your casual male sex partner(s) for any type of sexual intercourse, what are some of the reasons why?

Check all that apply:
- [ ] I trust them/they’re safe
- [ ] Why should I?
- [ ] I didn’t have one
- [ ] Wanted to express trust with partner
- [ ] Too awkward or afraid to ask
- [ ] Partner refused/pressured me
- [ ] Too high at the time to care
- [ ] I feel I won’t get HIV/AIDS/STDs
- [ ] It broke
- [ ] Did not care
- [ ] Other -> Specify:

S51. In the last 6 months, were any of your casual male sex partners HIV positive?
- [ ] Yes -> How many?
- [ ] No
- [ ] Unsure/don’t know
The following apply to male client sex partners.
A client sex partner is defined as a person you may or may not know whom you have sex with for money, drugs, belongings, or shelter.

S52a). In the last 6 months did you have sex with another male to get money, gifts, drugs, or a place to sleep?
   ○ No → probe for recall; if no, go to S71;
   ○ Yes → go to S52b
   ○ Unsure / don’t remember → probe for recall; reassure confidentiality; if still unsure, go to S71.

S52b). In the last 6 months, what were some of the items you received after having sex?
   (check all that apply)
   ○ Money
   ○ Gifts
   ○ Drugs and / or alcohol
   ○ Shelter
   ○ Food
   ○ Other → Specify: __________________________

S52c). What item did you receive most often?
   (please enter number from S52b) __________

S53. In the last 6 months, did you have oral sex with your male clients/tricks?
   ○ Yes
   ○ No → Go to S55

S54. In the last 6 months, how often did you use a condom when you had oral sex with your male clients/tricks?
   Show prompt card to interviewee.
   ○ Always [100% of the time]
   ○ Usually [75-99%]
   ○ Sometimes [26-74%]
   ○ Occasionally [1-25%]
   ○ Never [0% of the time]

S55. In the last 6 months, did you have receptive anal sex with your male clients/tricks? [Define receptive]
   ○ Yes
   ○ No → Go to S57

S56. In the last 6 months, how often did you use a condom when you had receptive anal sex with your male clients/tricks?
   Show prompt card to interviewee.
   ○ Always [100% of the time]
   ○ Usually [75-99%]
   ○ Sometimes [26-74%]
   ○ Occasionally [1-25%]
   ○ Never [0% of the time]

S57. In the last 6 months, did you have insertive anal sex with your male clients/tricks? [Define insertive]
   ○ Yes
   ○ No → If didn’t “ALWAYS” use a condom for oral and/or receptive anal intercourse, go to S59; If “ALWAYS” used a condom, go to S60.
58. In the last 6 months, how often did you use a condom when you had insertive anal sex with your male clients/tricks?

Show prompt card to interviewee.
- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

59. If you didn’t ALWAYS use a condom for oral, receptive anal, or insertive anal sex.

ASK 59 ONLY IF DIDN’T ALWAYS USE A CONDOM FOR ORAL, RECEPIEVE ANAL, OR INSERTIVE ANAL SEX.

58. In the last 6 months, how often did you use a condom when you had insertive anal sex with your male clients/tricks?

Male interviewees, go to questions on sex during incarceration (S68).

The next section is for female interviewees only.

Now I’m going to ask you about any female sex partners you may have had. Remember that everything you say is totally confidential.

61. In the last 6 months, have you had any female sex partners?

- Yes
- No -> Go to questions on sex during incarceration, Q571
- Unsure/don’t know -> probe for recall; if still unsure, go to questions on sex during incarceration, Q571

A regular sex partner is defined as someone you have had a sexual relationship with for more than three months. This does not include clients/tricks.

62. In the last 6 months, did you have any regular female sex partners?

- Yes -> how many? __________
- No -> Go to S65
- Unsure/don’t know -> probe for recall; if no, go to S65

63. In the last 6 months, did you have oral sex with your regular female sex partner(s)?

- Yes
- No -> probe for recall and confirm answer to S62; go to S65
- Unsure/don’t know
S64. In the last 6 months, how often did you use a barrier (a dental dam, Saran Wrap, etc.) when you had oral sex with your regular female sex partner(s)?

- Show prompt card to interviewee.
  - Always [100% of the time]
  - Usually [75-99%]
  - Sometimes [26-74%]
  - Occasionally [1-25%]
  - Never [0% of the time]

A client sex partner is defined as someone you may or may not know whom you have sex with for money, drugs, belongings, or shelter.

S68. In the last 6 months, did you have any female client sex partners?

- Yes → How many? _____ #
- No → If had unprotected oral sex with regular and/or casual female partner, go to S70b)
- Unsure → Probe for recall; if still unsure and had unprotected oral sex with regular and/or casual female partner, go to S70b)

S69. In the last 6 months, did you have oral sex with your female client sex partner(s)?

- Yes
- No → probe for recall; if had unprotected sex with regular or casual female partner, go to S70b)

S65. In the last 6 months, did you have any female casual sex partners?

- Yes → How many? _____ #
- No → Go to S68
- Unsure → Probe for recall; if still unsure, go to S68

S66. In the last 6 months, did you have oral sex with your casual female sex partner(s)?

- Yes
- No → probe for recall; go to S68

S67. In the last 6 months, how often did you use a barrier (a dental dam, Saran Wrap, etc.) when you had oral sex with your casual female sex partner(s)?

- Show prompt card to interviewee.
  - Always [100% of the time]
  - Usually [75-99%]
  - Sometimes [26-74%]
  - Occasionally [1-25%]
  - Never [0% of the time]

S70a). In the last 6 months, how often did you use a barrier (a dental dam, Saran Wrap, etc.) when you had oral sex with your female client sex partner(s)?

- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]
570b. If you didn’t ALWAYS wear/use a barrier with your female partners, what are some of the reasons why?
Check all that apply:

DO NOT READ TO INTERVIEWEE.

- Clients pay more money if I don’t use condoms
- Why should I?
- Didn’t have one
- My pimp won’t let me
- Too awkward or afraid to ask
- Trick refused/pressured me
- Too high at the time to care
- I feel I won’t get HIV/AIDS/STDs
- It broke
- Did not care
- I trust them; they’re safe
- Wanted to express trust with partner
- Other → Specify:

572. If you did have sex while in jail or prison, how often did you use a condom? [Show response card]

- Always [100% of the time]
- Usually [75-99%]
- Sometimes [26-74%]
- Occasionally [1-25%]
- Never [0% of the time]

ASK THE FOLLOWING QUESTION ONLY IF SUBJECT DIDN’T ALWAYS USE A CONDOM

573. If you didn’t always wear a condom, why not?
Check all that apply:

DO NOT READ TO INTERVIEWEE.

- I trust them; they’re safe
- Why should I?
- Didn’t have one
- Too awkward or afraid to ask
- Too high at the time to care
- I feel I won’t get HIV/AIDS/STDs
- It broke
- Did not care
- Other → Specify:

All Male and Female Respondents

571. Have you ever had sex with anyone (excluding conjugal visits) while in jail or prison?

- Yes
- No → Go to Social Determinants Section
- Not applicable; never been to jail → Go to Social Determinants Section

If yes, Was this person [Check all that apply]:

- Male
- Female
- Transgender (explain if necessary)
- Refused

Go to Social Determinants Section.
1. When you were growing up, who did you live with most of the time (choose one only)?
   - Mother
   - Father
   - Both parents
   - Stepmother
   - Stepfather
   - Foster parents
   - Other relatives
   - Friends of the family
   - Other (Specify):

2. Did you have a close, loving and confiding relationship with the adult(s) who raised you?
   - Yes
   - No

3. Before you turned 16, did you ever live away from home for more than a year?
   - No
   - Yes
   If yes, with whom did you live (check all that apply):
     - With relatives
     - In a foster home
     - In an adoptive home
     - In a group home
     - In a residential school
     - In an institution → Type: (i.e. youth detention centre)
     - On the street
     - In a hostel
     - With friends
     - Other

4. How old were you when you left home for good (permanently)?
   _______ years

5. Do you have religious or spiritual beliefs?
   - No
   - Yes
   If yes, how important are these beliefs to you?
     - Very important
     - Somewhat important
     - Somewhat unimportant
     - Not important

6a). Did your parent(s), or the adult(s) who raised you, ever have a drinking problem?
   - Yes
   - No → Go to Q6b
   - Don't know → Go to Q6b
   If yes, was this?:
     - Your father
     - Your mother
     - Both parents
     - Adults who raised you

6b). Did your parent(s), or the adults who raised you have a drug problem?
   - Yes
   - No → Go to Q7
   - Don't know → Go to Q7
   If yes, was this?:
     - Your father
     - Your mother
     - Both parents
     - Adults who raised you

GO TO Q6c ON NEXT PAGE
6a. Which of the following drugs did (he/she/they) use? (Check all that apply)

- Pot/Hash
  - Yes
  - No
  - DK
- Cocaine
  - Yes
  - No
  - DK
- Crack
  - Yes
  - No
  - DK
- Heroin
  - Yes
  - No
  - DK
- Morphine
  - Yes
  - No
  - DK
- Talwin/Ritalin
  - Yes
  - No
  - DK
- Tranquilizers
  - Yes
  - No
  - DK
- Other drugs
  - Yes
  - No
  - DK

(describe)

8. While you were in grades 1-8 in school, did you ever:

a) Frequently receive failing grades?
  - Yes
  - No
  - Don’t know/not sure

b) Frequently get disciplined?
  - Yes
  - No
  - Don’t know/not sure

c) Ever get expelled?
  - Yes
  - No
  - Don’t know/not sure

9. Were you ever told that you had a learning disability?
  - Yes
  - No

10a. Have you ever had a drink of alcohol?
  - Yes
  - No → Go to Q16

10b) Have you ever had 5 or more drinks of alcohol on one occasion?
  - No → Go to Q11
  - Yes → If yes, how old were you when you first had 5 or more drinks on one occasion?
    - Years old

11. Have you been drinking any alcohol in the last 6 months?
  - Yes
  - No
  - If YES, how much do you drink on an average day?
12. Have you ever felt that you should cut down on your drinking?
   ○ Yes  ○ No

13. Have people annoyed you by criticizing your drinking?
   ○ Yes  ○ No

14. Have you ever felt bad or guilty about your drinking?
   ○ Yes  ○ No

15. Have you ever had a drink first thing in the morning (eye-opener) to steady your nerves or get rid of a hangover?
   ○ Yes  ○ No

16. How many of your close friends get drunk more than once a month (this would include close friends who are family members)?
   ○ Most or all of them
   ○ About half of them
   ○ A few of them
   ○ None of them
   ○ Don’t know

17. In the last 12 months, how many of your close friends have used street drugs (this would include close friends who are family members)?
   ○ Most or all of them
   ○ About half of them
   ○ A few of them
   ○ None of them
   ○ Don’t know

In this next section, I would like to ask you some questions about any experiences you or your family may have had with the criminal law and its enforcement. I want to remind you that everything you tell me is strictly private and confidential. Your answers will not be made available to the police or other criminal justice people. Nothing that you say will be used to discriminate you at some later date.

18. Did your parent(s), or the adult(s) who raised you, have a police or court record?
   ○ Yes
   ○ No → Go to Q19
   ○ Don’t know → Go to Q19

   If Yes, was it your?
   Mother  ○ Yes  ○ No
   Father  ○ Yes  ○ No
   Adults who raised you  ○ Yes  ○ No

   → Indicate type of crime for each (Do not read → just use this table as a checklist. May Prompt)

<table>
<thead>
<tr>
<th>Crime</th>
<th>Mom</th>
<th>Dad</th>
<th>Guardian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug or alcohol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>offenses</td>
<td>○ Yes</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td>Theft or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>possession</td>
<td>○ Yes</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td>of stolen goods</td>
<td>○ No</td>
<td>○ No</td>
<td>○ No</td>
</tr>
<tr>
<td>Property crimes</td>
<td>○ Yes</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td>○ No</td>
<td>○ No</td>
</tr>
<tr>
<td>Assault</td>
<td>○ Yes</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td>○ No</td>
<td>○ No</td>
</tr>
<tr>
<td>Sex trade crimes</td>
<td>○ Yes</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td>○ No</td>
<td>○ No</td>
</tr>
<tr>
<td>Other crimes</td>
<td>○ Yes</td>
<td>○ Yes</td>
<td>○ Yes</td>
</tr>
<tr>
<td></td>
<td>○ No</td>
<td>○ No</td>
<td>○ No</td>
</tr>
</tbody>
</table>

3

183
19. Before you turned 16, were you ever in court for anything you had done?
   O Yes
   O No

20a). Have you ever been in jail or a detention centre overnight or longer?
   O Yes
   O No → Go to Q21

20b). If yes, how many times were you ever in any of the following facilities?

<table>
<thead>
<tr>
<th>Facility</th>
<th># of times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detention centre</td>
<td></td>
</tr>
<tr>
<td>Local lockup</td>
<td></td>
</tr>
<tr>
<td>Provincial</td>
<td></td>
</tr>
<tr>
<td>Federal</td>
<td></td>
</tr>
</tbody>
</table>

21. Have you ever engaged in, been arrested for, or charged with any of the following activities?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug or alcohol offenses</td>
<td>O Yes</td>
</tr>
<tr>
<td>O No</td>
<td></td>
</tr>
<tr>
<td>Theft of property or stolen goods</td>
<td>O Yes</td>
</tr>
<tr>
<td>O No</td>
<td></td>
</tr>
<tr>
<td>Property crimes</td>
<td>O Yes</td>
</tr>
<tr>
<td>O No</td>
<td></td>
</tr>
<tr>
<td>Assault</td>
<td>O Yes</td>
</tr>
<tr>
<td>O No</td>
<td></td>
</tr>
<tr>
<td>Sex trade crimes</td>
<td>O Yes</td>
</tr>
<tr>
<td>O No</td>
<td></td>
</tr>
<tr>
<td>Other crimes</td>
<td>O Yes</td>
</tr>
<tr>
<td>O No</td>
<td></td>
</tr>
<tr>
<td>If yes, specify:</td>
<td></td>
</tr>
</tbody>
</table>

22. Were your parent(s), or the adult(s) who raised you, ever unemployed for a period greater than a year and seeking employment?
   Father O No O Yes
   Mother O No O Yes
   Adults who raised you O No O Yes

23. When you were growing up, did your family ever rely on welfare support for more than a year?
   O No
   O Yes

24. As an adult, have you ever had to rely on welfare support for more than a year?
   O No
   O Yes

25. What were all the different ways you got money in the last year?

<table>
<thead>
<tr>
<th>Source</th>
<th>Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job/ Employment</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Pension/OAS/GIS</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Employment Insurance</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>WCB</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Welfare</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Charity (feedback etc.)</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Loan/gift from mate</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Loan/gift from family or relatives</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Loan/gift from friend</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Illegal activities</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>pimping/sex trade?</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
<td></td>
</tr>
</tbody>
</table>
26. When you were growing up, did you ever see violence in your home between:
-> your parents/ or the adults who raised you:
  O Yes  O No
-> your parents and your brothers/sisters:
  O Yes  O No
-> your parents and their friends:
  O Yes  O No

27a). Have you ever been abused physically, emotionally or sexually after you turned 16?
  O No  -> skip to Q28
  O Yes, What type of abuse? (indicate all that apply)

<table>
<thead>
<tr>
<th>Abuse</th>
<th>Occurred when 16 years of age or older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual Abuse</td>
<td>O No</td>
</tr>
<tr>
<td>Minor physical abuse (Pushed, slapped)</td>
<td>O No</td>
</tr>
<tr>
<td></td>
<td>O Yes</td>
</tr>
<tr>
<td>More serious physical abuse (Kicked, punched, burned)</td>
<td>O No</td>
</tr>
<tr>
<td></td>
<td>O Yes</td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>O No</td>
</tr>
<tr>
<td></td>
<td>O Yes</td>
</tr>
</tbody>
</table>

27b). How often did this occur?
(check for all types indicated above):

<table>
<thead>
<tr>
<th>Sexual</th>
<th>Minor Physical</th>
<th>Severe Physical</th>
<th>Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often</td>
<td>Often</td>
<td>Often</td>
<td>Often</td>
</tr>
<tr>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Rarely</td>
<td>Rarely</td>
<td>Rarely</td>
<td>Rarely</td>
</tr>
</tbody>
</table>
28a). Were you ever abused physically, emotionally or sexually when you were younger than 16?
   ○ No → skip to Q29 if answered "Yes" to 27a; otherwise, go to Q30
   ○ Yes → What type of abuse? (indicate all that apply)

<table>
<thead>
<tr>
<th>Abuse occurred when younger than 16 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual Abuse</td>
</tr>
<tr>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
</tr>
<tr>
<td>Minor physical abuse (Pushed, slapped)</td>
</tr>
<tr>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
</tr>
<tr>
<td>More serious physical abuse (kicked/punched/burned)</td>
</tr>
<tr>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
</tr>
<tr>
<td>Emotional abuse</td>
</tr>
<tr>
<td>O No</td>
</tr>
<tr>
<td>O Yes</td>
</tr>
</tbody>
</table>

28b). How often did this occur?
(check for all types indicated above):

<table>
<thead>
<tr>
<th>Sexual</th>
<th>Minor Physical</th>
<th>Severe Physical</th>
<th>Emotional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often</td>
<td>Often</td>
<td>Often</td>
<td>Often</td>
</tr>
<tr>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Sometimes</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Rarely</td>
<td>Rarely</td>
<td>Rarely</td>
<td>Rarely</td>
</tr>
</tbody>
</table>

28c). Who were you abused by?
(Do not read; check all that apply):
   ○ Partner (boyfriend or girlfriend)
   ○ Spouse (including common-law)
   ○ Your biological parents
   ○ Your step/adoptive parents
   ○ Your brother/sister
   ○ Foster parent
   ○ Other relative
   ○ Friend
   ○ Date
   ○ Someone you didn't know
   ○ A John/trick
   ○ Staff at boarding/residential school
   ○ Other (Specify):

29. Did you ever see a counsellor, therapist, doctor, mental health worker, elder or traditional healer to help you deal with your feelings about any of this?
   ○ Yes
   ○ No
   → If no, why not?

***Be sure to discuss the issue of referral to a counsellor with those who were abused and make an offer of support at the end of the interview.***

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30. How often have you ever experienced any of the following?
Read each:
  ° Couldn't get out of a rut
  ° Had trouble keeping your mind on what you're doing
  ° Felt that everything was an effort
  ° Your sleep was restless
  ° You felt lonely
  ° You felt sad
  ° You felt you just couldn't get going

Score on # 30 _______________________

31. Have you ever been told by a doctor (diagnosed) that you have a mental health problem?
  ° No
  ° Yes—Please describe:
    ° Don't know

32. Were you ever hospitalized for a mental health problem?
  ° No
  ° Yes
  ° Don't know

33. Have you ever seriously thought about committing suicide?
  ° No
  ° Yes

34a. Have you ever attempted suicide?
  ° No
  ° Yes

**IF NO, GO TO NEEDS SECTION

34 b) If yes, how?
  ° Deliberate overdose
  ° Slashing / cutting yourself
  ° Hanging yourself
  ° Shooting yourself
  ° Other—specify:

35a. How old were you the first time you attempted suicide?
  (Age)________

35b. How old were you the last time you attempted suicide?
  (Age)________

If you feel that the client is at risk for self-harm or suicide, notify the MHO.

Go to needs n.
This is the final section of the questionnaire. I will be discussing addiction treatment services, prevention programs for HIV, hepatitis, and sexually transmitted diseases, and health care services. I am interested in your views about existing services in Regina. I am also interested in your opinions about this survey. You may provide some of your feedback privately, and I will provide you with paper and an envelope to do so if you choose.

PS1. Have you ever received treatment for ADDICTIONS?
   - O No → Go to Question PS5
   - O Yes → What kind of addiction?
     a/ Alcohol O Yes O No
     b/ Drugs O Yes O No

If yes, what type(s) of treatment have you received?

<table>
<thead>
<tr>
<th>Facility</th>
<th>Yes</th>
<th>No</th>
<th>Where/When (year)</th>
<th>If not Regina, Why?</th>
<th>How useful was it?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient in hospital (hospital detox)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Inpatient residential Rehabilitation facility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Non-medical detox</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>An outpatient drug or Alcohol rehabilitation Centre (not including a methadone program)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Emergency room</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Private doctor’s office</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Prison or jail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Self help group (AA/NA)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Aboriginal treatment/ Healing program/centre</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Saw a private counsellor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Methadone Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
<tr>
<td>Other? Specify:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V S N</td>
</tr>
</tbody>
</table>
PS2. THE NEXT TWO QUESTIONS ARE FOR THOSE WHO USE/USED A METHADONE PROGRAM IN REGINA ONLY; ALL OTHERS GO TO PS3
Which methadone program did/do you use?
- RHD methadone program
- A family physician-run program (including Parliament Place)
- Other → Specify:

Go to PS3

PS2a. If you are not currently using a methadone program, why did you stop?

Go to PS3

PS3. FOR ALL SUBJECTS WHO INDICATED THAT THEY HAD RECEIVED TREATMENT:
The last time you received treatment, why did you go for treatment? [Read]
- Partner/friend/family wanted me to go
- Court-ordered
- Social services made me
- It was my own choice to get help
- Other:

PS4. What do you feel could be done better at the treatment facility/program(s) you attended?

Go to PS7

FOR THOSE WHO ANSWERED "NO" TO PS1 ONLY
PS5. Would you like to receive addictions treatment?
- Yes
- No → Go to PS7

2
PS6. If yes, what is preventing you from getting/seeking treatment?
[Can identify more than one]
○ The kind of program I need is not available
○ I don’t know where to go to get help
○ I’m afraid to have Social Services involved with me and my kids
○ I couldn’t leave my kids to go to a program
○ I don’t have support by family and friends to make this change
○ There is a waiting list
○ Programs don’t tolerate relapse
○ I don’t know if I can change
○ Other → Specify: __________________________

PS7a). Have you ever had hepatitis?
○ Yes
○ No

PS7b). Have you ever been tested for:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th># of tests</th>
<th>Results of test(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HBV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HAV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PS7c). IF TESTED POSITIVE FOR HEPATITIS C, ASK:
Have you ever received anti-viral treatment for Hepatitis C (for example, interferon)?
○ Yes
○ No

If answered “yes” to any of PS7b or “don’t know” for all, go to PS9

PS8. If you haven’t been tested until this survey, why not?
○ Didn’t want anyone to know
○ Afraid of finding out results
○ Afraid of stigma
○ Afraid of violence against me
○ Haven’t felt I’m at risk
○ Other → Specify: __________________________

PS9. Which, if any, of the following services do you use now? [Read]
○ RHD STD clinic
○ Anonymous HIV testing
○ Street Project van
○ Carmichael
○ AIDS Regina
○ All Nations Hope
○ SWAP (Street Workers Advocacy Program)
○ Other → Specify: __________________________

3
PS10. What could be done to improve existing services in Regina?


PS11. What services do you think should be available in Regina that are not available now?


PS12. How did you hear about this project?
   ○ Posters
   ○ Friends/partner told me about it
   ○ Public Health office (ie. nurses told me about it)
   ○ Doctor told me about it
   ○ Other: __________________________

PS13. Why are you participating in this study?


PS14. Were there any questions that upset or frustrated you?


PS15. Do you have any general comments you'd like to make?
[Allow participant opportunity to comment]
** (Comments can also be left in the suggestion box provided)
**This is the end of the interview**

1. Thank the participant for their time and their participation
2. Describe what the next steps will be - i.e.
   - blood/urine sample;
   - giving them follow up cards, etc.
APPENDIX E:

QUESTIONS USED FROM STUDY QUESTIONNAIRE
Sociodemographic factors:

- Age (D1)
- Sex (D2)
- Ethnicity (D5)
- Education (D7)
- Depression score (30)
- Alcohol dependence (CAGE questions, 12-15)

Adverse childhood experiences:

- Minor physical abuse before age 16 (28a)
- Serious physical abuse before age 16 (28a)
- Sexual abuse before age 16 (28a)
- Emotional abuse before age 16 (28a)
- Parental alcohol problem (6a)
- Parental drug problem (6b)
- Parental mental health problem (7)
- Parental police or court record (18)
- Parental unemployment (22)
- Witnessed parental violence (26)

Risk behaviours:

- Used someone else's needle or other injection equipment (gear) in past 6 months (115)
- Ever used someone else's needle while incarcerated (P3)
- Less than 100% cleaning of borrowed needles/gear in the past 6 months (130)
- Age at first use of injection drugs (14)
- More than 50 sex partners in lifetime (S3)
- Less than 100% condom use with non-regular partner(s) in the past 6 months (S17, S19, S21, S26, S28, S30, S45, S47, S49, S54, S56, S58, S67, S70a)
- Involvement in prostitution in the past 6 months (S24a, S52a, S68)
- Anal sex in the past 6 months (S9, S18, S27, S37, S39, S46, S48, S55, S57)
- Previous diagnosis of sexually transmitted disease (S4)
APPENDIX F: POWER ESTIMATES
Table F1: Power estimates

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<tr>
<th>Variable</th>
<th>a</th>
<th>P₀</th>
<th>P₁</th>
<th>n</th>
<th>M</th>
<th>Power</th>
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<td>0.05</td>
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<td>Involvement in prostitution in past 6 months</td>
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<td>0.0239</td>
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<td>More than 50 sex partners in lifetime</td>
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<td>Parent(s) had an alcohol problem</td>
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<td>Parent(s) had a drug problem</td>
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<td>Parent(s) had a police or court record</td>
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<td>Family relied on welfare for &gt; 1 year</td>
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APPENDIX G:
DETAILED ASSOCIATIONS
Table G1: Associations between parental alcohol problem and all other adverse childhood experiences

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<th>Parental alcohol problem</th>
<th>Crude</th>
<th>Adjusted*</th>
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<td></td>
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<td></td>
<td>No</td>
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<td>Parental police or court record</td>
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<td>109</td>
<td>6</td>
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<tr>
<td></td>
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<td>99</td>
<td>41</td>
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<td>Parental unemployment</td>
<td>Yes</td>
<td>134</td>
<td>16</td>
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<td>Witnessed parental violence</td>
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*adjusted for age and sex
Table G2: Associations between parental drug problem and other adverse childhood experiences

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*adjusted for age and sex
Table G4: Associations between parental police or court record and other adverse childhood experiences

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*adjusted for age and sex
Table G5: Associations between parental unemployment and other adverse childhood experiences

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*adjusted for age and sex
Table G6: Associations between witnessing parental violence and other adverse childhood experiences

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*adjusted for age and sex

Table G7: Associations between minor physical abuse before age 16 and other adverse childhood experiences

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*adjusted for age and sex
Table G8: Associations between serious physical abuse before age 16 and other adverse childhood experiences

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<td>5.19 (3.04-8.89)</td>
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*adjusted for age and sex

Table G9: Associations between sexual abuse before age 16 and other adverse childhood experiences

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<td>Emotional abuse before age 16</td>
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*adjusted for age and sex
Table G10: Associations between borrowing needles/gear in the past 6 months and all other risk behaviours

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<th>Crude</th>
<th>Adjusted*</th>
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<td>No</td>
<td>OR (95% CI)</td>
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<td>Ever borrowed needles while incarcerated</td>
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<td>14</td>
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<td>No</td>
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<td>125</td>
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<td>0</td>
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<td></td>
<td>No</td>
<td>85</td>
<td>139</td>
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<td>More than 50 sex partners in lifetime</td>
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<td>32</td>
<td>37</td>
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<td></td>
<td>No</td>
<td>68</td>
<td>102</td>
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<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
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<td>Prostitution in the past 6 months</td>
<td>Yes</td>
<td>34</td>
<td>26</td>
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<td>No</td>
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*adjusted for age and sex
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<th>Adjusted*</th>
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<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
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<td></td>
<td>No</td>
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<tr>
<td>More than 50 sex partners in lifetime</td>
<td>Yes</td>
<td>10</td>
<td>63</td>
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<tr>
<td></td>
<td>No</td>
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<td>160</td>
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<tr>
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<td>65</td>
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*adjusted for age and sex
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<th>Crude</th>
<th>Adjusted*</th>
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</thead>
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<td>No</td>
<td>OR (95% CI)</td>
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<td>10</td>
<td>172</td>
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<td>65</td>
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<td>174</td>
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*adjusted for age and sex
### Table G13: Associations between more than 50 sex partners in lifetime and other risk behaviours

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<th>Adjusted*</th>
</tr>
</thead>
<tbody>
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<td>No</td>
<td>OR (95% CI)</td>
</tr>
<tr>
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*adjusted for age and sex

### Table G14: Associations between less than 100% condom use with non-regular partners in the past 6 months and other risk behaviours

<table>
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<th>&lt;100% condom use with non-regular partners in past 6 months</th>
<th>Crude</th>
<th>Adjusted*</th>
</tr>
</thead>
<tbody>
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<td>Yes</td>
<td>No</td>
<td>OR (95% CI)</td>
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<td>Prostitution in the past 6 months</td>
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<td>31</td>
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<td>No</td>
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<td>149</td>
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<td>15</td>
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*adjusted for age and sex
Table G15: Associations between prostitution in the past 6 months and other risk behaviours

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<th>Adjusted*</th>
</tr>
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<td>Yes</td>
<td>No</td>
<td>OR (95% CI)</td>
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<td>3.48 (1.64-7.65)</td>
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<td>No 45 176</td>
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</tr>
</tbody>
</table>

*adjusted for age and sex
Table G16: Associations between parental alcohol problem and all risk behaviours

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<th>Crude OR (95% CI)</th>
<th>Significance</th>
<th>Adjusted OR (95% CI)</th>
<th>Significance</th>
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<td></td>
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<td>No</td>
<td></td>
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<tr>
<td>Borrowed needles/gear in the past 6 months</td>
<td>Yes</td>
<td>84</td>
<td>16</td>
<td>1.38 (0.71-2.71)</td>
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<td></td>
<td>No</td>
<td>110</td>
<td>29</td>
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<td></td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
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<td>1.67 (0.56-5.01)</td>
<td>0.36</td>
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<td>43</td>
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<td></td>
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<td>Yes</td>
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<td>No</td>
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<td>More than 50 sex partners in lifetime</td>
<td>Yes</td>
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<td>13</td>
<td>1.06 (0.52-2.15)</td>
<td>0.87</td>
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<td>No</td>
<td>148</td>
<td>34</td>
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<td>Yes</td>
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<td>2.32 (1.03-5.23)</td>
<td>0.04</td>
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<td>0.93</td>
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<td>Yes</td>
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<td>0.58 (0.25-1.33)</td>
<td>0.20</td>
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<td>No</td>
<td>183</td>
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*adjusted for age and sex
Table G17: Associations between parental drug problem and all risk behaviours

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<td>26</td>
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<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>6</td>
<td>26</td>
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<td>Yes</td>
<td>3</td>
<td>13</td>
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<td>Yes</td>
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<td>145</td>
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<td>Yes</td>
<td>22</td>
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*adjusted for age and sex
Table G18: Associations between parental mental health problem and all risk behaviours

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<td>Yes</td>
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<td>19</td>
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<td>65</td>
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<td>Yes</td>
<td>6</td>
<td>10</td>
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<td>132</td>
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*adjusted for age and sex
Table G19: Associations between parental police or court record and all risk behaviours

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*adjusted for age and sex
Table G20: Associations between parental unemployment and all risk behaviours

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<td>OR (95% CI)</td>
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<td>0.99 (0.57-1.74)</td>
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<td>50</td>
<td>25</td>
<td>1.60 (0.91-2.81)</td>
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<td>1.52 (0.86-2.69)</td>
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<td>23</td>
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<td>0.90 (0.46-1.74)</td>
<td>0.74</td>
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<td>Yes</td>
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*adjusted for age and sex
Table G21: Associations between witnessing parental violence and all risk behaviours

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<th>Witnessed parental violence</th>
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<th>Adjusted*</th>
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<td>Yes</td>
<td>No</td>
<td>OR (95% CI)</td>
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<td>91</td>
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<tr>
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<td>No</td>
<td>113</td>
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<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>31</td>
<td>1</td>
</tr>
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<td></td>
<td>No</td>
<td>184</td>
<td>39</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>15</td>
<td>1</td>
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<tr>
<td></td>
<td>No</td>
<td>200</td>
<td>39</td>
</tr>
<tr>
<td>More than 50 sex partners in lifetime</td>
<td>Yes</td>
<td>62</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>153</td>
<td>29</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>69</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>146</td>
<td>34</td>
</tr>
<tr>
<td>Prostitution in the past 6 months</td>
<td>Yes</td>
<td>53</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>162</td>
<td>32</td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>Yes</td>
<td>28</td>
<td>6</td>
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<tr>
<td></td>
<td>No</td>
<td>187</td>
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</table>

*adjusted for age and sex
Table G22: Associations between minor physical abuse before age 16 and all risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Minor physical abuse before age 16</th>
<th>Crude</th>
<th>Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Borrowed needles/gear in the past 6 months</td>
<td>Yes</td>
<td>68</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>65</td>
<td>74</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>19</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>120</td>
<td>103</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>126</td>
<td>113</td>
</tr>
<tr>
<td>More than 50 sex partners in lifetime</td>
<td>Yes</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>99</td>
<td>83</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>48</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>91</td>
<td>89</td>
</tr>
<tr>
<td>Prostitution in the past 6 months</td>
<td>Yes</td>
<td>30</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>109</td>
<td>85</td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>Yes</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>118</td>
<td>103</td>
</tr>
</tbody>
</table>

*adjusted for age and sex
Table G23: Associations between serious physical abuse before age 16 and all risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Serious physical abuse before age 16</th>
<th>Crude OR (95% CI)</th>
<th>Significance</th>
<th>Adjusted OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrowed needles/gear in the past 6 months</td>
<td>Yes 52 No 48</td>
<td>1.71 (1.01-2.87)</td>
<td>0.04</td>
<td>1.92 (1.12-3.29)</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>No 54 85</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes 20 No 12</td>
<td>2.37 (1.11-5.09)</td>
<td>0.03</td>
<td>2.18 (1.00-4.79)</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>No 92 131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes 9 No 7</td>
<td>1.70 (0.61-4.71)</td>
<td>0.31</td>
<td>1.69 (0.60-4.71)</td>
<td>0.32</td>
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<tr>
<td></td>
<td>No 103 136</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 50 sex partners in lifetime</td>
<td>Yes 34 No 39</td>
<td>1.16 (0.67-2.01)</td>
<td>0.59</td>
<td>1.17 (0.67-2.03)</td>
<td>0.58</td>
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<tr>
<td></td>
<td>No 78 104</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes 40 No 35</td>
<td>1.71 (1.00-2.95)</td>
<td>0.05</td>
<td>1.84 (1.06-3.20)</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>No 72 108</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prostitution in the past 6 months</td>
<td>Yes 26 No 35</td>
<td>0.93 (0.52-1.67)</td>
<td>0.82</td>
<td>1.26 (0.65-2.46)</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>No 86 108</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>Yes 15 No 19</td>
<td>1.01 (0.49-2.09)</td>
<td>0.98</td>
<td>1.06 (0.51-2.22)</td>
<td>0.88</td>
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<tr>
<td></td>
<td>No 97 124</td>
<td></td>
<td></td>
<td></td>
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*adjusted for age and sex
<table>
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<tr>
<th>Independent variables</th>
<th>Sexual abuse before age 16</th>
<th>Crude</th>
<th>Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borrowed needles/gear in the past 6 months</td>
<td>Yes</td>
<td>55 (54)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>45 (85)</td>
<td>Significance</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>20 (12)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>93 (130)</td>
<td>Significance</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>10 (6)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>103 (136)</td>
<td>Significance</td>
</tr>
<tr>
<td>More than 50 sex partners in lifetime</td>
<td>Yes</td>
<td>41 (32)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>72 (110)</td>
<td>Significance</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>38 (37)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>75 (105)</td>
<td>Significance</td>
</tr>
<tr>
<td>Prostitution in the past 6 months</td>
<td>Yes</td>
<td>37 (24)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>76 (118)</td>
<td>Significance</td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>Yes</td>
<td>19 (15)</td>
<td>OR (95%) CI</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>94 (127)</td>
<td>Significance</td>
</tr>
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</table>

*adjusted for age and sex
Table G25: Associations between emotional abuse before age 16 and all risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Emotional abuse before age 16</th>
<th>Crude</th>
<th>Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>Borrowed needles/gear in the past 6 months</td>
<td>Yes</td>
<td>62</td>
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<tr>
<td></td>
<td>No</td>
<td>72</td>
<td>67</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>21</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>121</td>
<td>102</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>130</td>
<td>109</td>
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<tr>
<td>More than 50 sex partners in lifetime</td>
<td>Yes</td>
<td>44</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>98</td>
<td>84</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>46</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>96</td>
<td>84</td>
</tr>
<tr>
<td>Prostitution in the past 6 months</td>
<td>Yes</td>
<td>34</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>108</td>
<td>86</td>
</tr>
<tr>
<td>Anal sex in the past 6 months</td>
<td>Yes</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>124</td>
<td>97</td>
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*adjusted for age and sex
Table G26: Bivariate associations between sex and adverse childhood experiences

<table>
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<tr>
<th>Independent variables</th>
<th>Sex</th>
<th>OR (95% CI)</th>
<th>Significance</th>
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<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>Yes 103</td>
<td>105</td>
<td>2.18 (1.11-4.25)</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>No 32</td>
<td>15</td>
<td>2.15 (1.16-3.96)</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>Yes 35</td>
<td>43</td>
<td>1.60 (0.93-2.73)</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>No 100</td>
<td>77</td>
<td>1.65 (1.01-2.72)</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>Yes 53</td>
<td>62</td>
<td>1.52 (0.92-2.52)</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>No 82</td>
<td>58</td>
<td>2.06 (1.01-4.20)</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>Yes 74</td>
<td>65</td>
<td>0.97 (0.60-1.60)</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>No 61</td>
<td>55</td>
<td>0.74 (0.45-1.22)</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>Yes 40</td>
<td>73</td>
<td>3.69 (2.19-6.21)</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>No 95</td>
<td>47</td>
<td>1.15 (0.70-1.89)</td>
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Table G27: Bivariate associations between race and adverse childhood experiences

<table>
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<tr>
<th>Independent variables</th>
<th>Race</th>
<th>OR (95% CI)</th>
<th>Significance</th>
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<tbody>
<tr>
<td></td>
<td>White</td>
<td>Aboriginal</td>
<td></td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>Yes 16</td>
<td>192</td>
<td>2.46 (0.99-6.15)</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>No 8</td>
<td>39</td>
<td>0.64 (0.25-1.62)</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>Yes 9</td>
<td>69</td>
<td>0.71 (0.30-1.70)</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>No 15</td>
<td>162</td>
<td>2.68 (1.03-7.00)</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>Yes 5</td>
<td>145</td>
<td>6.41 (2.31-17.78)</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>No 8</td>
<td>32</td>
<td>3.11 (1.23-7.86)</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>Yes 8</td>
<td>131</td>
<td>2.62 (1.08-6.37)</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>No 16</td>
<td>100</td>
<td>2.02 (0.81-5.06)</td>
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<tr>
<td>Sexual abuse before age 16</td>
<td>Yes 7</td>
<td>105</td>
<td>6.36 (1.85-21.88)</td>
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<tr>
<td>Emotional abuse before age 16</td>
<td>No 14</td>
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221
Table G28: Bivariate associations between elevated depression score (above 75th percentile) and adverse childhood experiences

<table>
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<th>Independent variables</th>
<th>Elevated depression score</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>56</td>
<td>152</td>
<td>2.52 (1.01-6.25)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>41</td>
<td>1.22 (0.62-2.40)</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>15</td>
<td>40</td>
<td>3.11 (1.71-5.64)</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>31</td>
<td>47</td>
<td>1.09 (0.62-1.94)</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>29</td>
<td>86</td>
<td>1.05 (0.59-1.88)</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>37</td>
<td>113</td>
<td>2.53 (0.94-6.76)</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>80</td>
<td>1.73 (0.96-3.12)</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>57</td>
<td>158</td>
<td>2.13 (1.19-3.81)</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>40</td>
<td>99</td>
<td>2.09 (1.17-3.73)</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>36</td>
<td>77</td>
<td>2.62 (1.40-4.90)</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>45</td>
<td>97</td>
<td>1.17 (0.53-2.55)</td>
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Table G29: Bivariate associations between alcohol dependence and adverse childhood experiences

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Alcohol dependent</th>
<th>OR (95% CI)</th>
<th>Significance</th>
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</thead>
<tbody>
<tr>
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<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Parental alcohol problem</td>
<td>168</td>
<td>40</td>
<td>1.17 (0.53-2.55)</td>
</tr>
<tr>
<td>Parental drug problem</td>
<td>40</td>
<td>15</td>
<td>0.57 (0.28-1.14)</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>164</td>
<td>35</td>
<td>1.73 (0.84-3.60)</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>67</td>
<td>11</td>
<td>0.96 (0.52-1.79)</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>92</td>
<td>23</td>
<td>1.15 (0.61-2.14)</td>
</tr>
<tr>
<td>Witnessed parental violence</td>
<td>83</td>
<td>22</td>
<td>1.99 (0.93-4.25)</td>
</tr>
<tr>
<td>Minor physical abuse before age 16</td>
<td>119</td>
<td>19</td>
<td>2.28 (1.21-4.31)</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>99</td>
<td>12</td>
<td>2.99 (1.48-6.04)</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>93</td>
<td>19</td>
<td>1.37 (0.73-2.58)</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>123</td>
<td>18</td>
<td>2.70 (1.42-5.13)</td>
</tr>
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</table>

(totals do not equal 255 due to missing data)
Table G30: Bivariate associations between education and adverse childhood experiences

<table>
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<th>Education</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
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<td>&lt;Gr12</td>
<td>&gt; = Gr12</td>
<td>&lt;Gr12 education</td>
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<td>Parental drug problem</td>
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<td>13</td>
</tr>
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<td></td>
<td>No</td>
<td>140</td>
<td>60</td>
</tr>
<tr>
<td>Parental mental health problem</td>
<td>Yes</td>
<td>54</td>
<td>24</td>
</tr>
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<td></td>
<td>No</td>
<td>128</td>
<td>49</td>
</tr>
<tr>
<td>Parental police or court record</td>
<td>Yes</td>
<td>81</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>101</td>
<td>39</td>
</tr>
<tr>
<td>Parental unemployment</td>
<td>Yes</td>
<td>106</td>
<td>44</td>
</tr>
<tr>
<td></td>
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<tr>
<td>Witnessed parental violence</td>
<td>Yes</td>
<td>155</td>
<td>60</td>
</tr>
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<td></td>
<td>No</td>
<td>27</td>
<td>13</td>
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<tr>
<td>Minor physical abuse before age 16</td>
<td>Yes</td>
<td>102</td>
<td>37</td>
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<tr>
<td></td>
<td>No</td>
<td>80</td>
<td>36</td>
</tr>
<tr>
<td>Serious physical abuse before age 16</td>
<td>Yes</td>
<td>79</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>103</td>
<td>40</td>
</tr>
<tr>
<td>Sexual abuse before age 16</td>
<td>Yes</td>
<td>79</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>103</td>
<td>39</td>
</tr>
<tr>
<td>Emotional abuse before age 16</td>
<td>Yes</td>
<td>99</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>83</td>
<td>30</td>
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</tbody>
</table>

Table G31: Bivariate associations between sex and risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Sex</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Sex=female</td>
</tr>
<tr>
<td>Borrowed needles or gear in past 6 months</td>
<td>Yes</td>
<td>47</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>80</td>
<td>59</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>26</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>109</td>
<td>114</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>128</td>
<td>111</td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>Yes</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>101</td>
<td>81</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>99</td>
<td>81</td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>Yes</td>
<td>10</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>125</td>
<td>69</td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>Yes</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>116</td>
<td>105</td>
</tr>
</tbody>
</table>
### Table G32: Bivariate associations between race and risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Race</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>White</td>
<td>Aboriginal</td>
<td>Race=Aboriginal</td>
</tr>
<tr>
<td>Borrowed needles or gear in past 6 months</td>
<td>Yes</td>
<td>5</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>14</td>
<td>125</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18</td>
<td>205</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>23</td>
<td>216</td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>Yes</td>
<td>6</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18</td>
<td>164</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>6</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18</td>
<td>162</td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>Yes</td>
<td>2</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>22</td>
<td>172</td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>Yes</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>18</td>
<td>203</td>
</tr>
</tbody>
</table>

### Table G33: Bivariate associations between elevated depression score (above 75th percentile) and risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Elevated depression score</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Borrowed needles or gear in past 6 months</td>
<td>Yes</td>
<td>24</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>32</td>
<td>107</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>Yes</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>53</td>
<td>170</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>Yes</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>59</td>
<td>180</td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>Yes</td>
<td>26</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>36</td>
<td>146</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>Yes</td>
<td>17</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>45</td>
<td>135</td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>Yes</td>
<td>18</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>44</td>
<td>150</td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>Yes</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>51</td>
<td>170</td>
</tr>
</tbody>
</table>
Table G34: Bivariate associations between alcohol dependence and risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Alcohol dependent</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Borrowed needles or gear in past 6 months</td>
<td>81</td>
<td>19</td>
<td>1.13 (0.59-2.16)</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>28</td>
<td>3</td>
<td>2.49 (0.73-8.56)</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>15</td>
<td>1</td>
<td>3.89 (0.50-30.14)</td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>59</td>
<td>13</td>
<td>1.16 (0.58-2.33)</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>65</td>
<td>9</td>
<td>2.13 (0.98-4.64)</td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>43</td>
<td>17</td>
<td>0.52 (0.26-1.02)</td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>24</td>
<td>9</td>
<td>0.61 (0.26-1.40)</td>
</tr>
</tbody>
</table>

(totals do not equal 255 due to missing data)

Table G35: Bivariate associations between education and risk behaviours

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Education</th>
<th>OR (95% CI)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;Gr12</td>
<td>&gt;=Gr12</td>
<td></td>
</tr>
<tr>
<td>Borrowed needles or gear in past 6 months</td>
<td>74</td>
<td>26</td>
<td>1.11 (0.62-1.98)</td>
</tr>
<tr>
<td>Ever borrowed needles while incarcerated</td>
<td>18</td>
<td>14</td>
<td>0.46 (0.22-0.99)</td>
</tr>
<tr>
<td>&lt;100% cleaning of borrowed needles/gear in past 6 months</td>
<td>11</td>
<td>5</td>
<td>0.89 (0.29-2.61)</td>
</tr>
<tr>
<td>&gt;50 sex partners in lifetime</td>
<td>55</td>
<td>18</td>
<td>1.32 (0.71-2.46)</td>
</tr>
<tr>
<td>&lt;100% condom use with non-regular partners in past 6 months</td>
<td>53</td>
<td>22</td>
<td>0.95 (0.53-1.72)</td>
</tr>
<tr>
<td>Prostitution in past 6 months</td>
<td>50</td>
<td>11</td>
<td>2.14 (1.04-4.38)</td>
</tr>
<tr>
<td>Anal sex in past 6 months</td>
<td>28</td>
<td>6</td>
<td>2.03 (0.80-5.13)</td>
</tr>
</tbody>
</table>

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