METHADONE DOSING IN VANCOUVER, BRITISH COLUMBIA: THE
DISTRIBUTION OF PRESCRIBED DOSES, PREDICTORS OF DOSE AND
DOSE-ASSOCIATED BEHAVIOURS

by

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Department of Health Care and Epidemiology

We accept this thesis as conforming to the required standard

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April 2003

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ABSTRACT

Objectives: The primary objectives of this study are to describe the methadone doses that are being prescribed in a large population of injection drug users in Vancouver, British Columbia, to determine whether methadone dose adequacy, along with other factors, are associated with prescribing certain methadone doses and to determine whether patient perception of dose adequacy is associated with the presence of HIV-risk behaviours over time. This thesis also aims to provide a deeper understanding of methadone treatment programs in British Columbia and suggest ways in which methadone maintenance treatment programs can be improved.

Methods: The Vancouver Injection Drug Users Study follows injection drug users in British Columbia’s Lower Mainland through semi-annual interviewer-administered questionnaires. Interviewers gather detailed information, including data regarding participants’ age, gender, HIV status, injection and drug-using behaviour, treatment program utilization. Linear, logistic and generalized estimating equation analyses were performed to address the objectives above.

Results: The median methadone dose was approximately 100 mg per day. Patient perspective of dose adequacy was significantly associated with the dose that patients were prescribed, with persons who reported too low a dose receiving the highest doses and those who reported that their dose was high received the lowest methadone doses. Subsequent analyses demonstrated that patients’ perspectives of dose adequacy were associated with prevalence of specific HIV risk behaviours such as condom use heroin injection.
Conclusion: Methadone doses in the Lower Mainland are high compared to the majority of reports in the literature around the world. Patient satisfaction with dose is highly associated with prescribed methadone dose, which in turn strongly associated with HIV-risk behaviours over time. Methadone providers need to work with patients to ensure patient satisfaction with methadone treatment to positively influence methadone treatment outcomes.
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CHAPTER 1

INTRODUCTION

1.1 METHADONE MAINTENANCE TREATMENT IN BRITISH COLUMBIA

British Columbia's (BC's) Lower Mainland has an estimated 12,000 injection drug users (IDUs) (1, 2). Approximately 4,700 of the most marginal of these users reside in Vancouver's Downtown Eastside (DTES) (3). The DTES community consists of approximately 20 square blocks and is known for its open drug scene and bustling sex trade industry. Heroin use is only one among many of the health problems that reside here. Others include poverty, unemployment, sexually transmitted diseases and widespread drug use. For example, cocaine use has been a major focus of attention in the DTES, as frequent cocaine bingeing is a major risk factor for HIV and hepatitis C infections. Frequent cocaine use has also been associated with a higher number of visits to the Emergency Department at St. Paul's Hospital by DTES residents (4). Using the emergency room as a primary source of health care is financially inefficient, hence, problems that arise as a result of drug use have both public health care implications, and financial consequences for the province.

The city of Vancouver government has recently proposed and implemented a 4-pillar approach to addiction treatment. This approach consists of increased prevention, policing, harm reduction and treatment. The main harm reduction strategy that has been implemented in the city is needle exchange programs. Two other harm reduction strategies that are currently being reviewed are safe injection sites and heroin prescription programs. Although needle exchange programs are now prevalent in the city, they were
not readily accepted when first proposed. A very similar debate now surrounds safe injection sites. Although some see this strategy as potentially reducing drug-related harm, others believe it will only increase the problems surrounding injection drug use. It is unlikely that people on either side of this argument will ever agree, but what they must recognize is that each harm reduction strategy is a part of a much larger picture of reducing harm and increasing treatment and prevention of injection drug use. It is with this important point in mind that I now turn to addiction treatment.

Addiction treatment consists of numerous strategies, which may or may not include the use of pharmacologic agents, but most often incorporates more than one of these strategies at one time. For example, methadone treatment may also include concurrent counseling sessions. Nevertheless, in population-based studies, methadone treatment seems to be the most effective strategy in treating opiate addiction (5).

Methadone maintenance treatment for opiate addiction was first introduced in 1965 by Dole and Nyswander in New York (6). From that time up until 1972, all British Columbia physicians were permitted to prescribe methadone at their own discretion. In 1972, restrictions were implemented, making it mandatory for physicians to be granted permission from the Federal Government to prescribe the drug (7). Attendance at the "Methadone 101 Workshop" has been mandatory for authorization to prescribe methadone in BC (8). The "Methadone 201 Workshop" is a second educational opportunity for methadone prescribers that is not mandatory, although it provides further training and insight into more advanced topics such as methadone and pregnancy, management of hepatitis C and HIV co-infected patients on methadone, as well as many other aspects of methadone maintenance treatment (8).
Since its emergence in addiction treatment in British Columbia, various aspects of injection drug use including methadone treatment have been examined through a variety of studies conducted among Vancouver's IDU community. All of these studies have helped increase the breadth and depth of understanding of issues related to injection drug use and addiction. Dr. Strathdee conducted several studies in this area from 1997 to 1999. For example, in 1997 Strathdee et al (9) conducted a study to identify social and environmental factors related to borrowing used needles, which is an independent predictor of HIV seroconversion (10-15). The results supported previous studies, which found that multi-drug users (16-20) and users who inject more frequently (17, 20-22) were more likely to borrow used needles (9). In addition, the authors found that social determinants, particularly a history of sexual abuse, were highly associated with needle-sharing behaviour among injection drug users in Vancouver. This was the first time such findings were reported and they increased the depth of understanding of this drug-using population. Another study from 1997 by Strathdee et al (3) explained that needle exchange in and of itself is not enough to stop the HIV epidemic in Vancouver. Needle exchange should be considered "one component of a comprehensive program including counselling, support and education" for a harm reduction strategy (3).

Palepu et al (4) studied a different issue associated with injection drug use. Their research focussed on hospital utilization by a cohort of IDUs in British Columbia. The authors found that residents of the DTES often frequented the emergency department of a local hospital and that cocaine users were even more likely to make frequent visits to the emergency. The most common reasons for arriving at the emergency department were due to factors that were both directly and indirectly associated with complications of
injection drug use, such as pneumonia, cellulitis and skin abscesses (4). This study highlighted the importance of integrating harm reduction programs into health care strategies specifically for injection drug users (4).

In work that focussed on mortality in a cohort of injection drug users, Tyndall et al (23) showed that most deaths occurred from preventable causes such as drug use behaviours, despite the high prevalence of HIV in this cohort. Furthermore, injection drug users on methadone treatment were half as likely to die compared to IDUs not enrolled in methadone treatment in this study population (23). This study delved further into the lives of injection drug users and showed the large impact that methadone can have in this population.

The majority of published studies on injection drug use in British Columbia have focussed on factors associated with drug use and the ramifications of the intravenous drug-using epidemic. Lacking, however, are studies that assess the methadone maintenance treatment programs in British Columbia and its role among BC’s IDUs. As of 2002, there were a reported 8,273 active patients in methadone treatment programs in British Columbia (24). The large number of patients currently accessing methadone treatment stresses the importance of assessing these programs. There is an enormous potential for impact on this community if methadone treatment services were found to be lacking full capabilities or in need of improvements.

1.2 PRESCRIBED METHADONE DOSES IN BRITISH COLUMBIA

The range of prescribed methadone doses throughout various methadone clinics around the world is extremely large, and includes doses as low as 50 mg daily to over 500
mg daily (8, 25-40). Due mainly to individual differences in methadone metabolism rates and to variations in methadone prescribing practices, there are no concrete recommendations as to which specific doses optimally reduce opiate use and increase the stability of the addicted individuals involved. Specifically in British Columbia, there are no studies that have assessed the methadone doses that are being prescribed throughout the large population of patients enrolled in methadone treatment nor the effects these doses have on changing HIV-risk behaviours.

1.3 RESEARCH NEEDS AND STUDY JUSTIFICATION

There is ample evidence pointing towards limited access to antiretroviral treatment for IDUs, as well as other medical disadvantages associated with being an injection drug user. These areas, although only reported on in several studies in BC, have helped identify areas that need improvement to promote the health care of IDUs (2-4, 9, 41, 42). Over the past three decades, methadone has been a leading topic in the area of addiction research (25, 26, 32, 37, 43-55). Although it has been studied quite extensively throughout the United States, Europe and Australia, no studies have reviewed methadone programs and the doses being prescribed in a large geographic area. Since underlying policies may explain some of the differences in methadone treatment throughout the world, studying one geographical area controls this variation and allows determination of how prescribed doses affect the outcomes of treatment. Further, although studies have shown that certain risk behaviours tend to decrease after methadone treatment enrolment, these studies have analyzed neither the effects of prescribed methadone dose nor the effects of patient perspective of dose adequacy on these HIV risk behaviours.
Over the course of all the years of methadone prescription in British Columbia, maintenance treatment programs have not been assessed in a comprehensive manner. This thesis probes into the area of methadone dosage in an attempt to better understand and assess the treatment programs, and subsequently specify changes that could improve the health care of opiate-addicted individuals.

1.4 STUDY OBJECTIVES AND THESIS ORGANISATION

There are several objectives that are addressed throughout this thesis, each of which relates back to the main objective of obtaining a better understanding of methadone maintenance dosing and a better understanding of the treatment programs in Vancouver, with an ultimate goal of treatment improvement.

The first objective of this research is to determine the range of the methadone doses that are being prescribed to injection drug users in Vancouver who are enrolled in methadone maintenance treatment.

The second objective of this research is to identify factors that are associated with the prescription of certain methadone doses in methadone treatment programs in Vancouver.

The third objective of this thesis is to determine the relationship between methadone dose and patient reports of dose adequacy on HIV risk behaviours in a population of incident methadone treatment program enrollees.

My thesis consists of 6 chapters. The first chapter briefly outlined the focus of my thesis, along with the stated objectives. Chapter 2 examines the relevant literature and summarizes what is already known about the benefits of methadone, and the clinical, physiological and policy considerations that arise in determining dose. The chapter also
provides a description of the methadone doses that are seen in the literature and a discussion of issues arising from this review. Chapter 3 provides a detailed description of the study setting, methodological considerations and limitations of my studies. Chapters 4 and 5 address the objectives listed above, while Chapter 6 provides a general discussion and summary of the findings presented in this thesis.

1.5 SUMMARY

At the time when this research project was initiated, harm reduction and addiction treatments were and still are important topics and of both public and political interest in Vancouver. Over the course of writing of this thesis, the harm reduction focus has turned to safe injection sites. The drug addiction problem is complex and requires complex solutions and while safe injection facilities are an important step in reducing drug-related harm, methadone maintenance is a treatment option available to opiate-addicted individuals. And while harm reduction strategies are important in populations with large degrees of drug-related harm, it is just as important to have treatment options available to this same population. From qualitative interviews with injection drug users in Denver, Colorado, Koester et al (56) suggest that some users reshape methadone treatment into "self-prescribed harm reduction strategies", while continuing to use street drugs. The study stresses the importance of incorporating both treatment and harm reduction in comprehensive plans to treat opiate addiction. In Vancouver, both of these strategies are a part of the implemented four-pillar approach.

This research was undertaken in an effort to gain a better understanding of methadone maintenance treatment programs, such that this tool can be better used by
health care providers who administer addiction treatment. Understanding the various ways in which drug-addiction can be tackled is an enormous step towards improving the lives of opiate-addicted individuals. Overall, the studies that comprise this thesis contribute to the knowledge on methadone maintenance treatment and may lead to improvements in the care of opiate-addicted individuals on methadone treatment.
1.6 REFERENCES


2.1 INTRODUCTION

Substance abuse and drug dependence results in significant morbidity, mortality, and financial and social costs. For example, in 1993 in the United States, approximately $2.3 billion in Federal government expenditures was spent on treatment programs for cocaine, heroin and marijuana (1). This cost rose to $2.8 billion in 1996 (2). In Canada, the financial costs of substance abuse and injection drug use have been estimated at $18.45 billion and $1.37 billion respectively (3, 4). In particular, the problems associated with injection drug use, including injected heroin, have received special attention because of alarming rates of human immunodeficiency virus (HIV) and hepatitis C (HCV) seroconversion, drug overdose deaths, hospital utilization, and the tremendous costs to individuals, families, and society (5).

Treatment of opioid addiction can be broadly categorized into detoxification and relapse prevention, using pharmacologic or non-pharmacologic methods. Methadone, a synthetic opioid, is the most extensively used and studied pharmacologic treatment for opioid addiction. It can be used in both detoxification and relapse prevention treatment strategies. Although four reviews on methadone have been previously published (6-9), none of these reviews focussed on the patterns of methadone dosing. The purpose of this chapter is to provide a comprehensive review of methadone dosing issues. First, I provide a summary of the benefits attributed to methadone, as well as the clinical and physiologic factors that should be considered when determining appropriate methadone dosage. I then
review the literature on methadone dosing, with particular attention to studies that compare the effects of varying methadone doses. Finally, I identify methadone dosing issues that require further research and assessment.

2.2 Benefits of Methadone

The benefits of methadone maintenance treatment (MMT) have been studied extensively since methadone was first introduced for maintenance treatment of opioid addiction in the 1960s (10, 11). In an observational study of 17,500 heroin addicts enrolled in methadone maintenance treatment in New York City from 1964 to 1971, Gearing et al found that 75% of those who were unemployed at the start of methadone treatment were "socially productive" (employed, homemaker, or in school) while on treatment (12). In the same study, arrest rates sharply dropped to 1.24 per 100 person years compared to pre-treatment rates of 20.1 per 100 person years. Overall mortality rates declined to 7.6 per 1,000 population in those who remained on methadone treatment, which is similar to the mortality rate of 5.6 per 1,000 population in the general population (12). Randomized controlled trials of MMT have shown benefit in terms of improved retention in addiction treatment, increased employment, reduction in illicit narcotic use, reduced criminal activity and incarceration, and lower mortality rates (13-16). Several studies have also shown that methadone maintenance reduces the risk of HIV and HCV infection, as well as risk behaviours associated with HIV seroconversion (17-19). Grella et al's (20) study on sexual behaviour in 158 women showed significant decreases in prostitution, mean number of sexual partners and mean number of sex work contacts after approximately 15 months of follow-up on methadone treatment (20).
et al (21) conducted a study of male methadone patients in six clinics in New York, Philadelphia and Baltimore. They found methadone maintenance treatment to be very effective in reducing injection drug use from 100% of the population to less than 29%. Other benefits reported in a study by Fisher et al (22) included an increase in the number of persons living in permanent housing, an increase in the number of persons engaged in paid work and a significant reduction in the proportion of subjects obtaining income from illegal sources.

In a randomized clinical trial, Sees et al (23) found that methadone maintenance therapy resulted in greater treatment retention and lower heroin use rates than a detoxification program. Yancovitz et al (16) reported a significant reduction in heroin use in an earlier study from 63% to 29% in those immediately enrolled in an interim methadone maintenance clinic compared to those randomized to wait for availability in a clinic prior to treatment entry.

There are of course studies that do not reflect the beneficial effects of methadone treatment (24-27). However, these studies are outnumbered by the plethora of literature that supports the use of methadone as a treatment for opiate addiction. Table 2.2.1 below provides a summary of selected studies that have documented positive changes as a result of methadone treatment.
<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Studies which find a positive association with behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in permanent housing with a higher dose</td>
<td>Fischer et al 1999 (22)</td>
</tr>
<tr>
<td>Increase in employment with a higher dose</td>
<td>Judson et al 1980 (28)</td>
</tr>
<tr>
<td>Decline in obtaining income from illegal activities with a higher dose</td>
<td>Grella et al 1996 (20) Fischer et al 1999 (22)</td>
</tr>
<tr>
<td>Decline in the mean number of sexual partners with a higher dose</td>
<td>Grella et al 1999 (37)</td>
</tr>
<tr>
<td>Greater retention in treatment programs with a higher dose</td>
<td>Caplehorn et al 1991 (38) Sees et al 2000 (23)</td>
</tr>
</tbody>
</table>
2.3  CLINICAL AND PHYSIOLOGICAL CONSIDERATIONS

Methadone acts as an opiate replacement in maintenance treatment because of its similar effect on \( \mu \) opiate receptors to those produced by heroin and morphine. This opioid agonistic activity enables methadone to eliminate the signs and symptoms of opiate withdrawal. Methadone has several properties that make it a preferable substitute to heroin. It has a much longer plasma half-life than heroin (15-40 hours on average), which allows for single daily dosing in most patients, in contrast to the multiple daily doses required for shorter acting opiates. Its oral route of administration eliminates the potential for medical complications associated with inhalation and injection (e.g. soft tissue infections, endocarditis, HIV, and hepatitis C). Also, oral ingestion of methadone does not produce the same euphoria or "high" as heroin.

Levo-alpha-acetylmethadol (LAAM) is another opioid agonist that can be used in substitution therapy. The plasma half-life of LAAM is even longer than methadone, which permits dosing once every 2 days. Buprenorphine is also used in opiate replacement therapy in some countries, but merits special consideration because of its partial opioid agonist activity.

The main route of methadone metabolism is through hepatic biotransformation. There is a great amount of variability in liver metabolism between individuals, hence the same dose of methadone may result in very different blood levels and varying clinical effects. Methadone metabolism is also affected by interaction with many medications. Methadone levels may be decreased by some anticonvulsants (phenytoin, carbamazepine, phenobarbital), several antiretrovirals (amprenavir, efavirenz, lopinavir, nelfinavir,
nevirapine, ritonavir), rifampin, risperidone, and by chronic alcohol use. Methadone levels can be increased by some psychiatric medications (fluvoxamine, diazepam, fluoxetine, sertraline, desipramine), a few antimicrobials (erythromycin, fluconazole, ketoconazole) as well as nifedipine, cimetidine, and acute alcohol ingestion (39-52). In addition, methadone requirements usually increase during the third trimester of pregnancy due to increased hepatic metabolism and metabolism may decrease in patients with severe liver disease.

The therapeutic effects of methadone include the reduction or elimination of opiate withdrawal symptoms, cravings for opiates, and illicit opiate use. The main difficulty with methadone dose prescription is that the dose at which these goals are achieved differ between individuals. A "blocking dose" of methadone may also be reached, at which additional illicit opiate use does not produce euphoric effects. Methadone induction doses start at 20-40 mg daily in most cases. Due to its long half-life, it usually takes 5-7 days to reach steady state for a particular dose and therefore dose increments are usually made no more frequently than every 5-7 days. Subsequently, it may take weeks or months to reach an "optimal" dose. Over this time period, methadone dose is adjusted according to individual clinical response in order to achieve therapeutic goals while avoiding oversedation.

Several studies have examined the role of serum methadone levels (SMLs) in determining adequate methadone dose. A peak SML is taken 3-4 hours post-ingestion, and trough SML is taken just prior to the next dose. Although the SML in an individual patient increases with higher methadone doses, there is poor correlation between absolute dose and SML when comparisons are made between individuals who are given the same
methadone dose. For example, Bell et al (53) reported mean methadone doses of 70 mg, 68 mg and 62 mg in three different study groups. Although these mean methadone doses did not differ significantly, the serum methadone levels in these groups were 372, 246 and 341 ng/ml, respectively (53). Although research indicates that trough SMLs of 150-600 ng/ml effectively suppress drug craving (54-56) and levels of 400 ng/ml or greater block the euphoric effects of injected heroin in most individuals, there have been case reports of patients who required trough SMLs of 800-1200 ng/ml before their withdrawal symptoms were eliminated. Due to these complexities, SMLs are not routinely used in determining optimum methadone doses. However, SMLs are sometimes helpful in confirming inadequate dose in clinical situations where patients report withdrawal symptoms despite receiving "high" doses of methadone. In addition, a "peak-to-trough" SML ratio > 2 suggests that the patient may be a "rapid methadone metabolizer" and consideration should be given to splitting the daily dose into a twice-a-day regimen or using an alternate opioid substitute.

2.4 METHADONE PRESCRIBING POLICIES

Despite the physiologic and metabolic considerations that must be taken into account when prescribing methadone, dosing decisions may ultimately be guided by local, state, provincial or federal policies. In the United States, until mid-2002, federal regulations required that prescribing physicians receive approval from the Food and Drug Administration (FDA) if more than one take-home dose (when ingestion is not supervised) per week was desired in cases where the daily dose was greater than 100 mg. In Canada, management of methadone programs shifted from the federal to the provincial
level in the mid-1990s. Prior to this change, Health and Welfare Canada stipulated that carry privileges (excluding weekends) were not to be granted to patients receiving more than 100 mg per day, and that carry privileges were limited to a maximum of four days or a total dose of 400 mg of methadone. Currently, dosing policies in Canada vary from province to province. In British Columbia, the prescribing physician must receive approval from the College of Physicians if carry privileges are desired beyond four days or above 400 mg, while Ontario does not enforce any dosing restrictions.

Methadone prescribing policies may also vary between methadone clinics, and from physician to physician. In the past, if a patient continued to use illicit opiates while in treatment it was common practice to reduce the daily methadone dose or expel the patient from the maintenance program. Over time, a growing number of methadone programs, such as the Programme Institutionnel de Methadone (PRIM) in Geneva, Switzerland, now promote increasing the methadone dose when continued heroin use is apparent (57).

2.5 Prescribed Methadone Doses

A summary of selected studies that examine prescribed methadone dose are summarized in Table 2.5.1 (see below), and are categorized into observational studies, and intervention studies where methadone dose was experimentally manipulated. The earliest observational study was Dole and Nyswander's (11) 1965 report on methadone treatment of heroin addiction, in which doses ranged from 10 to 150 mg daily, and 16 of 22 patients received daily doses equal to or greater than 100 mg. More recently, Havassy and Tschann reported significantly different mean methadone doses of 70 mg and 52 mg per day in a comparison of two clinics in San Francisco (58). In 1991, Caplehorn and Bell
(38) reported on 238 subjects enrolled in two methadone clinics in Sydney, Australia. The average maximum dose in these two clinics was 60 mg (range: 20-110 mg), and only 41 (17%) of these patients received a maximum dose of 80 mg or higher. (59). Hartel et al (60) conducted a study in which the mean methadone dose of the sample involved was 64 mg. This sample was drawn from a larger clinical population whose mean prescribed methadone dose was slightly lower at 60 mg per day. In 1997, Del Rio examined 111 subjects in Switzerland, whose average methadone daily dose was 54 mg (61), which was the same as the daily dose in a Scottish cohort (62). Magura et al reviewed 1026 individuals who had been admitted to 15 public methadone clinics in New York City from 1989-1990 (63). The average methadone doses for these individuals was 47.5 mg. Approximately 42% of patients were prescribed low doses (mean of 34 mg per day), 39% of patients were prescribed a high mean dose of 58 mg and 18% of patients were prescribed a mean dose of 84 mg per day. In this study, only 3% of the study population averaged 90 mg or more of methadone per day (63).
Table 2.5.1: Summary of the methadone doses from selected observational and experimental studies.

<table>
<thead>
<tr>
<th>Authors</th>
<th>Date</th>
<th>N</th>
<th>Distribution of Methadone Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observational Studies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dole et al (11)</td>
<td>1965</td>
<td>22</td>
<td>Stabilized at 50-150 mg</td>
</tr>
<tr>
<td>Havassy et al (58)</td>
<td>1984</td>
<td>54</td>
<td>52 mg or 70 mg</td>
</tr>
<tr>
<td>Bell et al (53)</td>
<td>1990</td>
<td>32</td>
<td>Observed groups: 62 mg, 68 mg, 70 mg</td>
</tr>
<tr>
<td>Caplehorn et al (38)</td>
<td>1991</td>
<td>238</td>
<td>Grouped in: &lt; 60 mg, 60-79 mg, ≥ 80 mg</td>
</tr>
<tr>
<td>Caplehorn et al (30)</td>
<td>1993</td>
<td>62</td>
<td>Median: 55 mg</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range: 5-110 mg</td>
</tr>
<tr>
<td>Hartel et al (60)</td>
<td>1995</td>
<td>652</td>
<td>Range: 20 mg-100 mg</td>
</tr>
<tr>
<td>Magura et al (64)</td>
<td>1998</td>
<td>1026</td>
<td>1-20 mg (5.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>21-40 mg (26.4%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>41-60 mg (37.1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>61-80 mg (22.3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;80 mg (9.0%)</td>
</tr>
<tr>
<td>van Ameijden et al (65)</td>
<td>1999</td>
<td>498</td>
<td>Ranges: 5-50 mg, 55-70 mg, &gt;70 mg</td>
</tr>
<tr>
<td>Blaney et al (66)</td>
<td>1999</td>
<td>385</td>
<td>Ranges: 1-35 mg, 36-55 mg, 56-90 mg</td>
</tr>
<tr>
<td><strong>Experimental Studies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strain et al (67)</td>
<td>1993</td>
<td>95</td>
<td>Groups: 0 mg, 20 mg or 50 mg</td>
</tr>
<tr>
<td>Rhoades et al (35)</td>
<td>1998</td>
<td>123</td>
<td>Groups: 50 mg or 80 mg</td>
</tr>
<tr>
<td>Strain et al (32)</td>
<td>1999</td>
<td>192</td>
<td>Groups: 40-50 mg or 80-100 mg</td>
</tr>
<tr>
<td>Maxwell et al (33)</td>
<td>1999</td>
<td>164</td>
<td>Mean: 65 mg vs. 211 mg</td>
</tr>
<tr>
<td>Sees et al (23)</td>
<td>2000</td>
<td>179</td>
<td>Dose increased to 80 mg, or a maximum of 100 mg</td>
</tr>
</tbody>
</table>

Subsequent studies have analyzed the effects of methadone dose on various risk behaviours for HIV, on the frequency of illicit drug use and on retention in treatment programs. Some of these studies and their findings are listed in Table 2.2.1. As with previous publications, the majority of these studies reported the use of daily methadone doses below 100 mg, with considerable variation in dosing across studies and treatment.
programs. In 1992, a University of Michigan study found that nearly 70% of surveyed methadone clinics prescribed doses which averaged around 50 mg or less per day.

Havassy and Tschann (58) found a dose-response relationship between methadone dose and treatment retention. Compared to patients who received a maximum dose of less than 60 mg, patients who received 60-79 mg had a relative risk of leaving treatment of 0.47, while the relative risk of leaving was 0.21 in patients who received 80 mg or more. Compared to patients who received high-dose methadone (65-110 mg), drop-out from treatment was lower in the low-dose group (15-40 mg) but higher in the mid-dose group (45-60 mg) (61). Mino et al's (57) study on addiction treatment failure and methadone dose in Geneva, Switzerland showed that upon study entry, approximately 67% of both men and women were prescribed methadone doses equal to or below 60 mg.

Blaney et al's (66) study in 1999 reported that the average stable methadone dose in 265 patients enrolled in a United States Department of Veterans Affairs Methadone Maintenance Treatment Program was 51 mg per day. They did not find significant differences in any outcome variables based on methadone dose. Langendam et al (68) evaluated 827 IDUs over a total of 4961 person-years from the Amsterdam Cohort Study. For 13% of all person-years, no methadone was received. Although natural-cause and overdose mortality rates were significantly lower among drug-users who attended methadone programs than those who did not, there was no significant relationship between mortality and methadone dosage.

In terms of experimental studies, there has also been no uniformity in the doses or range of doses used to analyze the effects of methadone, in addition to no uniformity in definitions of high and low methadone doses. Strain et al (31) published a randomized,
double-blind placebo-controlled trial in 1993 comparing three levels of dosing (0, 20 or 50 mg per day) over 20 weeks. The authors concluded that higher methadone doses were associated with significantly fewer positive urine tests for opioids and cocaine, and increased treatment retention. In a sub-group analysis of the 95 subjects who had remained in treatment the entire 20-week period, the authors found significantly fewer opioid-positive urine tests and lower rates of criminal activity among the highest methadone dose level group (67). In 1998, Rhoades et al (35) conducted a randomized trial with 123 subjects that used methadone doses of either 50 or 80 mg per day. Patients who received 80 mg per day had significantly higher rates of treatment retention and fewer opiate-positive urine results, but more cocaine-positive urine tests, than the group who received 50 mg. More recently, Strain et al (32) conducted a randomized, double-blind clinical trial with 192 subjects comparing methadone doses of 40-50 mg to doses of 80-100 mg. Subjects receiving higher methadone doses had significantly fewer opioid-positive urine tests but they did not find a difference in retention rates. Although some studies have shown benefits associated with higher methadone doses, this is not always the case. Rates of opiate-positive urine tests, as well as retention rates, vary across both observational and experimental studies. It is this observation that suggests that factors other than methadone dose are important in patient outcome in methadone treatment. In 1999, Maxwell reported that the average daily dose of 1100 patients enrolled in a methadone maintenance treatment program in Chicago, Illinois was 78 mg, with doses ranging from 120-780 mg. The authors compared 164 patients who received daily methadone doses greater than 100 mg to 101 randomly selected control patients who
received doses less than 100 mg, and concluded that higher doses were associated with
greater treatment retention and fewer opiate-positive urine tests (33).

2.6 Discussion

There are several trends that are evident from this review of methadone dosing. First,
there are large variations between clinics, cities and countries in the dosing of methadone.
These differences are present in both observational and experimental studies. Secondly,
there are few reports in the literature of mean daily doses greater than 100 mg. Third,
there are no standard definitions of what constitutes high versus low doses. Fourth, there
are few studies that examine the determinants of methadone dosing practices and whether
current doses are adequate to meet patients' needs.

The use of lower doses may be due to a number of factors. Although the majority of
subjects described by Dole and Nyswander in 1965 received methadone doses above 100
mg per day, throughout the 1970s and 1980s, daily methadone doses usually did not
exceed 60-80 mg. Factors that may have influenced the use of lower doses include
concern about overdose, hopes of easing the transition off of methadone, the
implementation of methadone prescription regulations, and the lack of studies using
doses greater than 100 mg per day. To the best of my knowledge, patient satisfaction with
methadone dose has not been comprehensively studied.

As a result, little is known about the effects of prescribing higher methadone dose and
the effect of patient satisfaction or dissatisfaction with their dose on treatment outcome.
In all of the studies that have been published, none have asked methadone patients how
they feel about the adequacy of their methadone doses. Perhaps even more importantly in
terms of the goals of methadone treatment, no studies have addressed the issue of whether patient input and satisfaction with dose is correlated with outcomes of methadone treatment. This thesis describes several investigations to better understand the effects of high methadone doses, patient satisfaction with dose and the consequences of dose satisfaction on treatment outcomes.
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CHAPTER 3
STUDY SETTING AND OVERVIEW OF METHODS AND LIMITATIONS

3.1 STUDY SETTING: THE BRITISH COLUMBIA CENTRE FOR EXCELLENCE IN HIV/AIDS

The British Columbia Centre for Excellence in HIV/AIDS (the Centre) is a research centre located at St. Paul's Hospital in Vancouver, Canada that focuses on HIV/AIDS research and prevention efforts. It is composed of many senior researchers, statisticians, staff and students that work collaboratively in studying aspects of the HIV epidemic. There are several research units within the Centre. The HIV Drug Treatment Program provides HIV-positive persons in BC with antiretroviral therapy and follows these people over time to track their treatment and outcomes. The Vanguard Project follows a cohort of gay and bisexual men in Vancouver, while the Vancouver Injection Drug Users Study studies a cohort of injection drug users in Vancouver.

The Vancouver Injection Drug Users Study (VIDUS) is an ongoing prospective cohort study that has enrolled approximately 1500 injection drug-using residents of the Lower Mainland since 1996. To be eligible for entry into VIDUS, subjects must have injected drugs within the 6 months prior to enrollment, be at least 14 years old and provide written consent. The majority of individuals enrolled in the cohort reside in the marginal conditions of the Downtown Eastside of Vancouver. Subjects in this study are followed every 6 months, at which time they receive HIV testing and are administered a semi-structured questionnaire through a trained interviewer. The questionnaire gathers information regarding many aspects of their lives including demographic data, drug use,
enrollment in treatment programs such as methadone maintenance, housing status, income, sexual and other HIV risk behaviours. At the time of enrollment in VIDUS, approximately 259 VIDUS subjects were being prescribed methadone, while an additional 373 patients initiated methadone over the course of their participation in VIDUS.

The first VIDUS questionnaire, administered in 1996, was based on a pilot study called the "Point Project: A Study of Risk Factors for HIV Infection among Vancouver's Injection Drug Using Community". From the qualitative and quantitative components of this study, risk factors for HIV seroconversion were identified and both the questions and findings from were used to develop the VIDUS questionnaire. Since that time, questions have been changed, added or deleted based on semi-annual client and interviewer feedback. In addition, questions that address current injection drug use issues may be added at the request of VIDUS researchers. Revisions can be made based on subsequent interviewer and client feedback on the new questions.

Data for this thesis were obtained from the VIDUS cohort. Through the use of these data, it was possible to obtain detailed information regarding past and present injection drug-using experience from individuals who are concurrently enrolled in methadone maintenance treatment.

3.2 DATA REQUIREMENTS AND METHODOLOGIC APPROACHES

Although VIDUS was not initiated to directly study issues relating to methadone use, it is a rich source of data on a large number of persons eligible for methadone treatment due to their opiate addiction. For each study described in this thesis, individuals were
chosen from the VIDUS cohort such that the a priori objectives of the individual studies could best be met.

The undertaken analyses required the use of three main statistical methods. Linear regression was used to determine associations between various sociodemographic factors and methadone dose. As with any linear regression, certain assumptions were made for the model to be valid. These assumptions included normally distributed and independent residuals, no variations of explanatory variables except as explicitly stated by the model, constant variance from observation to observation and measurement of explanatory variables without error. This last assumption is important to point out since methadone users were identified through self-report in the VIDUS questionnaire.

Logistic regression was performed to identify factors associated with reporting inadequacies in methadone dose. The assumptions associated with logistic regression models include independence of observations, inclusion of all higher order terms, prediction of variance by the structural model and measurement of both outcome and explanatory variables without error (1).

One of the major methodological considerations in both of these regression methods was determining which VIDUS questionnaires to use when extracting the desired variables. The vast majority of questions in the questionnaires refer to behaviours that occurred "in the last 6 months" prior to the follow-up visit. Questions regarding methadone dose and dose satisfaction however, refer to participants' current dose, no matter what their dose was over the 6 months prior to their visit. An assumption was made that the reported dose did not change drastically in the 6 months between questionnaires. For this reason, both behavioural and demographic data were obtained
from the same questionnaire as methadone dose for the regression models. Had
behavioural and demographic data been obtained from the previous questionnaire, the
recorded behaviours would have referred to ones that occurred 6 to 12 months prior to the
reported methadone dose, making it difficult to interpret noted relationships between
behaviours and methadone dose.

The final statistical method employed was generalized estimating equations (GEE)
analysis, which was used to describe the relationship between methadone dose and
reports of dose adequacy with specified HIV risk behaviours in Chapter 5. Longitudinal
data are extremely effective in studying variables over time, hence these data were
especially important in the analysis in Chapter 5, which focuses on the association
between methadone and HIV-risk behaviours over time in incident methadone treatment
enrollees. The GEE method is most appropriate when analyzing longitudinal data that
consist of repeated measures from the same individuals. GEE method takes into account
the association between repeat observations on a single subject. If the dependence
between repeated measures was ignored, the estimated variance of the calculated
regression coefficients would be incorrect. For factors that are fixed over time, such as
gender and ethnicity, the variance would be under-estimated and for effects that vary over
time, such as current heroin use, the variance would be over-estimated. GEE methods
account for this correlation and provide a corrected estimate of each variable's variance.
In using GEEs, a certain correlation structure must be determined in order to conduct the
analyses. In this thesis, an autoregressive correlation structure was used, which assumes
that observations are only related to their own past values through first or higher order
autoregressive process (2-5). Other correlation structures include independent, exchangeable and unstructured (2).

3.3 **DATA SOURCES**

Individual characteristics were obtained from the interviewer-administered questionnaires while HIV status was obtained from HIV tests performed at each VIDUS visit. At each study visit, data were gathered by experienced interviewers, entered and stored in an Oracle database. At the present time there are 12 follow-up questionnaires that have been administered over the more than six years that the cohort has been followed. Due to the time lag from interview to data entry, data from up to questionnaire 10 were used for the analyses in both Chapter 4 and Chapter 5. More specifically, the cross-sectional analysis in Chapter 4 utilized data from questionnaires 9 and 10. These were the most recently collected data that were completely entered into the VIDUS database. Data for the longitudinal analyses in Chapter 5 were obtained from the baseline questionnaire through questionnaire 10, from eligible participants.

3.4 **OVERVIEW OF SAMPLE SELECTION**

Each of the two individual studies in this thesis utilized a different sub-population of the VIDUS cohort. The analysis in Chapter 4, which describes the prescribed methadone doses and the sociodemographic predictors of dose, used data from individuals who were enrolled in methadone treatment for a minimum of 6 months when they completed questionnaire 10. This requirement minimized the chance of studying subjects who had
not yet reached a stable methadone dose, as methadone doses are most often stabilized within the first several weeks or months of treatment.

The analysis in Chapter 5 examines HIV risk behaviours in persons who started methadone treatment over the course of being enrolled in VIDUS. Data for these analyses were gathered from all VIDUS questionnaires completed by these incident methadone enrollees and entered into the time-dependent GEE model.

3.5 **STUDY LIMITATIONS**

As with all observational studies, although an effort was made to minimize the limitations of the two studies in this thesis, limitations arose and are listed and discussed below.

3.5.1 **Self-reported data and information bias**

All data in the Vancouver Injection Drug Users Study are self-reported. At each follow-up study visit, participants are interviewed by one of seven experienced interviewers. With self-reported data, it is possible that participants are not providing truthful answers regarding their methadone dose and the variety of behaviours that are asked about. With much of the data that are collected through the VIDUS questionnaire, it is not possible to verify the accuracy of the reports.

Also inherent in self-reported data are recall or reporting biases, which may result in either differential or nondifferential misclassification of data. However, there exists a strong relationship of trust between VIDUS participants and the interviewers that is exemplified by high retention rates and by the willingness of participants to answer questions of a very sensitive and intimate nature. Furthermore, Palepu et al (6), examined
the validity of self-reported hospital utilization data from the VIDUS cohort and found high agreement with data from the Ministry of Health. The authors found an overall 75% agreement between self-reports and the administrative data. Therefore, data collected through VIDUS interviews are considered to be highly accurate.

3.5.ii Selection bias

VIDUS participants return for follow-up visits every six months, at which time they complete an interview-administered questionnaire. Inclusion in the analyses in this thesis required that participants had been enrolled in a methadone treatment program for a minimum of six months. This created a potential for selection bias in two areas. First, persons who remain in the VIDUS cohort may differ from those who choose to withdraw. These differential drop-outs can affect the study's internal validity, resulting in incorrect estimates of risk. However, retention rates in VIDUS are quite high; at the time that the latest questionnaire used in this thesis was being administered, 80% of participants returned for a follow-up visit. Since few people leave the study, it is likely that the study population still represents the spectrum of variables present in the target population. Secondly, VIDUS participants who remained on methadone treatment may differ from those who left methadone within 6 months of initiating treatment. This selection bias can again affect the study's internal validity. If possible, it is important to identify the difference in participants who choose to stay and in those who choose to leave a study or treatment such that the estimates of risk are not biased by the exclusion (or inclusion) of a certain variable or group of variables.
3.5.iii External validity

The VIDUS cohort is a sample of the drug-using population in Vancouver and it is from this population that methadone enrollees were obtained. It is possible that VIDUS participants on methadone treatment differ from the overall population of intravenous drug users and methadone maintenance users in Vancouver and elsewhere. For this reason, studies that utilize VIDUS data may not be applicable to other populations of intravenous drug users. However, it is worth noting that VIDUS includes more than 20% of the estimated 5000 intravenous drug users in the Downtown Eastside. This is a large proportion of the population, therefore it increases the likelihood that the results are applicable to the larger population of drug users in Vancouver.

3.6 SUMMARY

The VIDUS cohort is an excellent source from which to gather data for the studies in this thesis. No other source provides as rich a history of a large population of injection drug users in BC. Despite the above limitations, the results from the studies in the succeeding chapters provide strong, novel and intriguing results.
3.7 REFERENCES


CHAPTER 4

PREDICTORS OF PRESCRIBED METHADONE DOSE IN A POPULATION OF INJECTION DRUG USERS

4.1 INTRODUCTION

Over the course of four decades during which methadone has been prescribed as a treatment for heroin addiction, there has been no consensus on the appropriate methadone dose for adequate retention in addiction treatment programs and reduction of illicit drug use. Many studies agree that daily doses between 40 and 120 mg are sufficient to achieve these benefits in many individuals (1-9). However, some researchers recommend the use of much higher doses of methadone (in some cases greater than 700 mg) (10-12). In several studies, higher doses have been found to be more effective than lower doses, although there has often been a limit set on the maximum allowable methadone dose (usually between 50 and 110 mg) (1, 4, 6-8, 13-17).

Methadone dose is considered to be adequate when therapeutic goals such as elimination of opiate withdrawal symptoms, reduction or elimination of narcotic craving and blocking of euphoria from other opiates have been achieved, without causing oversedation (18, 19). Some researchers suggest that not only should doses be increased such that there are no objective or subjective symptoms of withdrawal, but that the idea of a "glass ceiling" or arbitrarily selected upper limit of dose should be eliminated (10, 12).

Based on the current literature, we would not expect demographic characteristics to be determinants of changes in methadone dose. Factors such as gender, age, cultural background and economic status of the patient should not influence physicians' decisions
regarding individuals' methadone doses. Rather, individual withdrawal symptoms, feelings of over-sedation and narcotic craving should influence this decision. Other factors that may influence dose are those that alter hepatic metabolism of methadone such as liver disease, pregnancy and certain medications (including some antiretrovirals and anticonvulsants) (20-26).

The present study quantitatively explores the relationship between methadone dose and individual demographic and behavioural characteristics. The objectives of this study are to determine the average methadone dose in a large prospective cohort of injection drug users, to identify predictors of methadone dose and establish whether patients' perspectives of dose adequacy are correlated with prescribed methadone dose.

### 4.2 Methods

#### 4.2.1 Vancouver Intravenous Drug Users Study (VIDUS)

The Vancouver Injection Drug Users Study (VIDUS) is an ongoing prospective cohort study that has enrolled over 1,500 injection drug users (IDUs) since May of 1996. Recruitment is conducted through posters and advertisements in the community, referrals from community organizations, and word-of-mouth from other participants. For VIDUS entry, individuals must have injected drugs within the past month and be at least 14 years old. All study subjects provide written informed consent.

Participants complete a semi-structured questionnaire through a trained interviewer at enrollment and semiannually thereafter. The questionnaire collects data regarding demographic characteristics, patterns of injecting and non-injecting drug use, use of needle exchange programs, sharing of syringes, health care access, sexual behavior, and
participation in drug and addiction treatment programs. Pretest and posttest HIV
counseling is provided and blood is drawn for HIV and hepatitis C testing at enrollment
and repeated at each visit for individuals whose test results are negative. Participants are
reimbursed CDN $20 for each study visit and those requesting medical or social support
services are referred to the appropriate clinic or agency.

To be eligible for this analysis, study subjects must have reported being enrolled in a
methadone treatment program in two successive VIDUS questionnaires (i.e. in
methadone for a minimum of 6 months) in order to increase the likelihood that subjects
had reached a stable methadone dose.

4.2.i  Outcome measure and explanatory variables

The outcome variable of interest for this analysis was daily methadone dose, reported
in milligrams (mg) by individual VIDUS participants. Fixed explanatory variables such
as date of birth, gender and ethnicity were obtained from the questionnaire at VIDUS
study entry. Information on education level, HIV status, housing status, source of income,
amount of monthly income, incarceration and relationship status were extracted from the
second of the two successive questionnaires used as data sources for this study. Possible
confounding variables that were controlled for in the analyses included continued use of
injected and non-injected heroin, injected cocaine use, alcohol and sleeping pill use, use
of antiretrovirals that affect methadone metabolism (21, 22, 27-29), and length of time on
methadone treatment. Finally, data regarding individuals' perception of dose adequacy
was examined to determine whether patients' perspectives were associated with
prescribed doses. Unlike other variables, which refer to behaviours in the past 6 months,
the adequacy of dose question referred to present dose satisfaction at the time of the second survey. The outcome variable (dose) was also taken from the second survey.

4.2.iii Statistical analyses

Descriptive techniques were used to provide an overview of methadone prescription and client profile. Bivariate tests were performed to identify differences between average methadone dose in stratified groups of interest. Linear regression was used to assess possible predictors of methadone dose. A logistic regression analysis was performed to determine which factors were associated with patients' reports of dose adequacy.

The Kruskal-Wallis test was used to analyse differences between groups. All reported p-values are two-sided.

4.3 RESULTS

A total of 119 women, 145 men and 5 transgender persons met study eligibility criteria. The mean age of this population was 41 years (std dev 8.3). The mean methadone dose for the entire study group was 95.6 mg per day (std dev 41.9), with daily methadone doses as low as 4 mg and as high as 235 mg. The mean methadone dose for women was 100 mg (std dev 43.0), while the mean dose for men was 92.3 mg per day (std dev 40.5). Persons had been on methadone maintenance treatment for a median of 140.7 weeks (Interquartile range (IQR) 58-294 wks) at the time of the questionnaire from which data were extracted.

The remaining analyses were based on data from the 119 females and 145 males in the cohort and are summarized in Table 4.3.1. Of the population studied, approximately 20% reported being of Canadian Aboriginal decent and one third (29.7%) considered
themselves to be in a long-term relationship. Approximately one third (29.2%) of the study population reported non-legal means of income over the past six months. The median income for the study population was $896 (IQR 735-1450) per month. The large majority (88.3%) of study subjects had not been incarcerated in the past 6 months. Finally, 59.8% of participants reported living in permanent housing such as an apartment or a house, while 40.2% were living in non-permanent housing such as jail, a recovery house, a room in a hotel, a shelter or the street at the time of the questionnaire.

Approximately three-quarters of the study subjects reported injecting cocaine and/or heroin in the six months prior to completing the questionnaire, while on methadone. Slightly fewer reported injecting heroin (44.3%) than cocaine (47.7%). In addition, half of the study subjects reported using alcohol in the last six months (50.8%).

In bivariate analyses, higher methadone dose was associated with greater length of time on methadone (p=0.02), being HIV-positive (106.4 vs. 90.8 mg; p=0.003), injecting cocaine in the last 6 months (101.3 vs. 91.0 mg; p=0.039), having been paid for sex in the last 6 months (106.9 vs. 89.4 mg; p<0.001), older age (p<0.001) and reporting that methadone dose was too low (p<0.001). The above results are summarized in Table 4.3.1 below.
### Table 4.3.1 Overview of cohort and bivariate comparisons. (N=264)~\(^\wedge\)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N (%)</th>
<th>Average Dose of Methadone (mg)</th>
<th>p-value</th>
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<td>Gender</td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>145 (54.9)</td>
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<td>0.153</td>
</tr>
<tr>
<td>Female</td>
<td>119 (45.1)</td>
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<tr>
<td>Amount of Monthly Income</td>
<td>254 (96.2)</td>
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<td>0.135</td>
</tr>
<tr>
<td>Length of Time of Methadone</td>
<td>262 (99.2)</td>
<td></td>
<td>0.020</td>
</tr>
<tr>
<td>Age</td>
<td>264 (100)</td>
<td></td>
<td>&lt;0.001</td>
</tr>
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<td>Ethnicity</td>
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<td></td>
</tr>
<tr>
<td>First Nations</td>
<td>52 (19.7)</td>
<td>102.2</td>
<td>0.255</td>
</tr>
<tr>
<td>Other</td>
<td>212 (80.3)</td>
<td>94.3</td>
<td></td>
</tr>
<tr>
<td>Main Source of Income</td>
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</tr>
<tr>
<td>Legal</td>
<td>186 (70.5)</td>
<td>93.4</td>
<td>0.060</td>
</tr>
<tr>
<td>Non legal</td>
<td>77 (29.2)</td>
<td>102.1</td>
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<td>Non-permanent</td>
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<tr>
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<td>30 (11.4)</td>
<td>89.9</td>
<td>0.573</td>
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<td>No</td>
<td>233 (88.3)</td>
<td>96.5</td>
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<td>106.4</td>
<td>0.003</td>
</tr>
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<td>Negative</td>
<td>178 (67.4)</td>
<td>90.8</td>
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<tr>
<td>Any heroin use*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>126 (47.7)</td>
<td>94.1</td>
<td>0.576</td>
</tr>
<tr>
<td>No</td>
<td>138 (52.3)</td>
<td>97.5</td>
<td></td>
</tr>
<tr>
<td>Injected heroin use*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>117 (44.3)</td>
<td>93.6</td>
<td>0.441</td>
</tr>
<tr>
<td>No</td>
<td>147 (55.7)</td>
<td>97.7</td>
<td></td>
</tr>
<tr>
<td>Alcohol Use*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>134 (50.8)</td>
<td>97.1</td>
<td>0.497</td>
</tr>
<tr>
<td>No</td>
<td>130 (49.2)</td>
<td>94.6</td>
<td></td>
</tr>
<tr>
<td>Benzodiazepine use*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>35 (13.3)</td>
<td>108.3</td>
<td>0.191</td>
</tr>
<tr>
<td>No</td>
<td>193 (73.1)</td>
<td>98.8</td>
<td></td>
</tr>
<tr>
<td>Injected cocaine use*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>126 (47.7)</td>
<td>101.3</td>
<td>0.039</td>
</tr>
<tr>
<td>No</td>
<td>138 (52.3)</td>
<td>91.0</td>
<td></td>
</tr>
<tr>
<td>Sleeping pill use*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>70 (26.5)</td>
<td>98.1</td>
<td>0.689</td>
</tr>
<tr>
<td>No</td>
<td>194 (73.5)</td>
<td>95.1</td>
<td></td>
</tr>
<tr>
<td>Being paid for sex*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>101 (38.3)</td>
<td>118.2</td>
<td>0.001</td>
</tr>
</tbody>
</table>
In multivariate analysis, the adequacy of methadone dose, as reported by individual participants, was found to be highly associated with dose (p<0.001). Those who reported that their methadone dose was too low averaged a daily dose 21.9 mg higher than those who reported their dose as being just right. Older age was found to be predictive of higher methadone dose (p=0.005). On average, for each year increase in age, methadone dose increased by 1.02 mg. These results are summarized below in Table 4.3.2.

<table>
<thead>
<tr>
<th>Adequacy of Dose</th>
<th>151 (57.2)</th>
<th>89.4</th>
<th>&lt;0.001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Too low</td>
<td>66 (25.0)</td>
<td>118.2</td>
<td></td>
</tr>
<tr>
<td>Just right</td>
<td>183 (69.3)</td>
<td>89.5</td>
<td></td>
</tr>
<tr>
<td>Too high</td>
<td>14 (5.3)</td>
<td>72.4</td>
<td></td>
</tr>
<tr>
<td>On antiretrovirals that effect methadone metabolism*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease methadone levels</td>
<td>1 (0.4)</td>
<td>130.0</td>
<td>0.264</td>
</tr>
<tr>
<td>Do not effect levels</td>
<td>263 (99.6)</td>
<td>95.8</td>
<td></td>
</tr>
</tbody>
</table>

~ All analyses exclude the 4 transgendered individuals in the cohort.
^ Some variables may not add up to 100% due to missing values
*In the last 6 months.
Table 4.3.2: Multivariate linear regression results for characteristics associated with methadone dose \((R^2=0.240)\).

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Beta Coefficient</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>39.03</td>
<td>36.02</td>
<td>0.280</td>
</tr>
<tr>
<td>Adequacy of Dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too low</td>
<td>42.2</td>
<td>12.62</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Just right</td>
<td>20.3</td>
<td>11.72</td>
<td>0.085</td>
</tr>
<tr>
<td>Too high</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income level (log)</td>
<td>0.61</td>
<td>7.28</td>
<td>0.933</td>
</tr>
<tr>
<td>Length of time on treatment (log)</td>
<td>2.15</td>
<td>6.32</td>
<td>0.734</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-2.49</td>
<td>6.56</td>
<td>0.704</td>
</tr>
<tr>
<td>Male</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aboriginal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-7.46</td>
<td>6.98</td>
<td>0.287</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonpermanent</td>
<td>2.90</td>
<td>5.35</td>
<td>0.600</td>
</tr>
<tr>
<td>Permanent</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>-5.50</td>
<td>6.34</td>
<td>0.387</td>
</tr>
<tr>
<td>Non legal</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin injection in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5.42</td>
<td>5.45</td>
<td>0.321</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin use (not injection)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-2.78</td>
<td>11.23</td>
<td>0.805</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine injection in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-3.71</td>
<td>5.58</td>
<td>0.507</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping pill use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3.11</td>
<td>5.99</td>
<td>0.604</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-7.59</td>
<td>5.28</td>
<td>0.152</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incarceration in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5.14</td>
<td>8.15</td>
<td>0.529</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paid for sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-11.65</td>
<td>6.36</td>
<td>0.068</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A second linear model was performed, which excluded adequacy of dose in order to determine whether this strong association was masking other variables that may predict dose and were significant in bivariate analysis. The results are summarized below in Table 4.3.3. Results from this analysis coincided with the previous model and showed that on average, for each year increase in age, methadone dose increased by 1.33 mg. In addition, two other variables were found to predict methadone dose. Persons who had been paid for sex in the last six months had methadone doses 15.0 mg higher than those who had not been paid for sex (p=0.022) and HIV-positive persons averaged a methadone dose 13.8 mg higher than those who were HIV-negative (p=0.023). To test whether a particular gender was driving the association between sex trade involvement and methadone dose, I included an interaction term between these two variables, but found no significant results. These results are summarized below in Table 4.3.3. Finally, since there was a decrease in the $R^2$, this suggests that although excluding the adequacy of dose variable highlights the importance of involvement in the sex trade and HIV serostatus, the model better explains the variability of the results when patient perception of dose adequacy is included in the model.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Beta Coefficient</th>
<th>Standard Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>51.37</td>
<td>35.34</td>
<td>0.148</td>
</tr>
<tr>
<td>Age</td>
<td>1.33</td>
<td>0.36</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Income level (log)</td>
<td>0.93</td>
<td>7.50</td>
<td>0.902</td>
</tr>
<tr>
<td>Length of time on methadone (log)</td>
<td>4.25</td>
<td>6.44</td>
<td>0.510</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-3.11</td>
<td>6.75</td>
<td>0.646</td>
</tr>
<tr>
<td>Male</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aboriginal Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-8.55</td>
<td>7.18</td>
<td>0.235</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent housing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.11</td>
<td>5.66</td>
<td>0.845</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>-6.52</td>
<td>6.50</td>
<td>0.317</td>
</tr>
<tr>
<td>Non legal</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin injection in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>4.24</td>
<td>5.59</td>
<td>0.449</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-injected heroin in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-0.49</td>
<td>11.14</td>
<td>0.965</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine injection in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-4.53</td>
<td>5.69</td>
<td>0.426</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping pill use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.43</td>
<td>6.14</td>
<td>0.815</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol use in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>-7.22</td>
<td>5.43</td>
<td>0.185</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incarceration in past 6 mths</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>4.36</td>
<td>8.37</td>
<td>0.603</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being paid for sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>4.48</td>
<td>0.022</td>
</tr>
<tr>
<td>No</td>
<td>-15.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>0</td>
<td>6.02</td>
<td>0.023</td>
</tr>
<tr>
<td>Negative</td>
<td>-13.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Finally, a logistic regression model was constructed to determine whether any factors were associated with patient perceived dose adequacy. Due to the small number of individuals who reported that their dose was too high (N=14), these individuals were excluded from the analysis. For each 6-month increase in duration of time in methadone treatment, the odds that patients were satisfied with dose decreased. In addition, for each 1 mg increase in methadone dose, participants had decreased odds of reporting that their dose was just right.

Table 4.3.4: Multivariate results for characteristics associated with satisfaction with dose.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Odds ratio</th>
<th>95% Confidence Interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of time on methadone</td>
<td>0.28</td>
<td>0.13 - 0.56</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Methadone dose</td>
<td>0.96</td>
<td>0.98 - 0.99</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Heroin use*</td>
<td>0.98</td>
<td>0.45 - 2.12</td>
<td>0.955</td>
</tr>
<tr>
<td>Cocaine use*</td>
<td>1.35</td>
<td>0.62 - 2.95</td>
<td>0.453</td>
</tr>
<tr>
<td>Alcohol use*</td>
<td>1.36</td>
<td>0.71 - 2.60</td>
<td>0.354</td>
</tr>
<tr>
<td>Any IDU*</td>
<td>0.38</td>
<td>0.13 - 1.12</td>
<td>0.076</td>
</tr>
</tbody>
</table>

* in the last 6 months

4.4 DISCUSSION

Methadone dosing issues have been examined through both observational studies in clinical settings (1, 10, 13, 16, 19, 30-38) and experimental studies where methadone doses were manipulated (4, 8, 14). This study, however, is novel in several ways. It is the first of its kind to report on a large prospective Canadian cohort. Secondly, no other
studies have examined the association between demographic variables and prescribed methadone doses. Thirdly, this study incorporates patients' perspectives of dose adequacy to determine the relationship this variable and prescribed methadone dose.

This Chapter identified several significant findings. First, the mean daily methadone dose in this cohort (96 mg) was higher than the mean doses reported in other studies (47.5-86.3 mg) (6, 14, 16) and approaches the mean dose reported by Dole and Nyswander in 1965 (18). Several factors may have contributed to this finding. Vancouver is located on Canada's west coast and is a major gateway for illicit drugs from Asia. As a result, the purity of heroin in Vancouver is known to be higher than most cities with similar drug problems, with a street level purity between 60-90%, compared to approximately 15% purity in European cities (39). Subsequently, it is possible that heroin users in Vancouver have a much higher tolerance to opiates and require higher methadone doses than addicts in other heroin-addicted populations. In addition, lower average methadone doses reported in earlier studies may reflect somewhat dated attitudes towards methadone dose limits. Studies over the last decade showing better clinical outcomes with higher methadone doses may have contributed to shifts in attitudes regarding methadone dose limits. Furthermore, differences in methadone doses could potentially be explained by differences in methadone prescribing policies across different countries. In the United States, out-patient methadone can only be prescribed in clinics approved by Federal, State and local authorities while in Canada, out-patient methadone is prescribed in both public and private practice settings. In the US, federal approval was required until 2002 for more than one take-home dose per week for doses above 100 mg. In BC, approval from the College of Physicians is required if take-home doses exceed
four days or 400 mg. Thus, American regulations may have resulted in greater barriers to prescribing higher methadone doses than Canadian regulations.

Patients' perspectives of dose adequacy, older age, having been paid for sex in the last 6 months and being HIV-positive were highly associated with methadone dose. Despite controlling for length of time in methadone treatment, we found age to be predictive of methadone dose. It is possible that older persons in our cohort have developed a higher tolerance for opiates as a result of longer drug use experience, or higher levels of hepatic or renal dysfunction. Secondly, HIV-positive status was predictive of higher methadone doses despite controlling for antiretroviral therapy. It is possible however that we did not have enough participants who were on HIV therapies that effect methadone levels to control for this effect. Other possible explanations include under-reporting of antiretrovirals known to affect methadone metabolism or use of other drugs known to affect methadone metabolism. Overall, older, HIV-positive persons and persons who had been paid for sex were independently predictive of higher methadone dose. It is reassuring that some of the highest-risk individuals in our population (with respect to transmission of communicable diseases such as HIV and hepatitis C) received the highest methadone doses, as these individuals may most benefit from the valuable effects of methadone treatment (40-48). It is also reassuring that demographic features such as gender, income, ethnicity and recent incarceration did not appear to influence the methadone doses that were prescribed.

Finally, we found that participants who reported that their doses were too low had the highest average doses in our cohort. Although patients who felt that their methadone doses were too low tended to receive higher doses, it is possible that their actual
methadone requirements were even higher than what they were being prescribed. Although participants in our study received higher methadone doses compared to other populations described in the literature, physicians who prescribed methadone to our cohort may still have an upper dose limit that they are willing to prescribe. This might indicate that although the upper limit of methadone dose is higher than most, a "glass ceiling" effect still exists in this population.

Alternatively, it is possible that patients reported inadequate methadone doses for inappropriate reasons such as the desire to become sedated from the methadone, to try to alleviate cocaine cravings or to obtain methadone for trafficking. Regardless of the underlying explanation, a significant proportion of patients on methadone reported dissatisfaction with their current methadone dose.

Results from the final logistic regression analysis show that higher methadone and longer duration on treatment are associated with decreased satisfaction with methadone dose. These results are consistent with the relationship between methadone dose and perception of dose adequacy reported in Table 4.3.2. In terms of length of treatment, it is possible that patients who have been on methadone for a longer period of time are more likely to report that dose is too low because of their continued injection drug use. Methadone prescribers may be reluctant to increase methadone dose in patients who have been on treatment for the longest period of time. This hypothesis requires more investigation.

As with many observational studies, there are limitations to this analysis. First, our analysis assumes that participants remained in treatment for the entire duration between questionnaires. If subjects did have breaks in treatment, our estimates of dose would be
conservative, as patients are prescribed lower doses at treatment re-initiation and must be gradually titrated over time. We attempted to account for this through our inclusion criteria. The fact that the median length of treatment was 140.7 weeks (IQR 58-294 weeks) suggests that this was not a major limitation. Secondly, the methadone doses as well as all other data included in our analysis are based on self-report. Participants could be reporting the incorrect methadone doses or other misinformation. However, there exists a strong relationship of trust between the participants and the interviewers that is exemplified by high retention rates (approximately 80%) and by the willingness of participants to answer questions of a very sensitive and intimate nature. Furthermore, Palepu et al (49), examined the validity of self-reported hospital utilization data from the VIDUS cohort and found high agreement with data from the Ministry of Health. Thirdly, we were not able to control for the number of times that the participants enrolled in and dropped out of methadone treatment over the course of their addiction history. Physicians may have less confidence in patients who have repeatedly dropped out of methadone treatment and this may have an effect on the doses that are prescribed.

Despite these limitations, this is a novel study that stresses the importance of research in the area of methadone dosing to identify discrepancies between what the literature supports and what is actually occurring in communities. However, since large differences in methadone metabolism can occur between individuals, it is extremely important to include patients' perspectives on dose adequacy in selecting dosing levels. In addition, it is critical to assess methadone treatment programs to determine if methadone doses are being assigned and adjusted for appropriate reasons. For instance, contrary to the therapeutic goals of methadone maintenance, testimonials from several in-depth
interviews in the VIDUS cohort suggest that some subjects believe that their methadone
doses are being decreased for punitive reasons. They report that their input is not always
an important factor when physicians make dosing decisions (50).

The present study provides a clear indication that a group of high-risk individuals
(with respect to HIV transmission) are receiving the highest methadone doses in our
cohort, and that demographic characteristics such as gender, ethnicity and income are not
associated with methadone dose in multivariate analysis. These results are reassuring.
However, the data also reflect the large number of patients who are dissatisfied with their
doses. Further studies are needed to help describe the role of patient satisfaction in
methadone treatment outcome and the importance of incorporating patient satisfaction
with dose into practice.
4.5 REFERENCES


CHAPTER 5

HIV RISK BEHAVIOURS AMONG INCIDENT METHADONE MAINTENANCE TREATMENT PATIENTS: DOES DOSE AFFECT CHANGE IN BEHAVIOUR?

5.1 INTRODUCTION

Although the benefits of methadone maintenance treatment, including reductions in HIV risk behaviours, are well documented (1-22), much less is known about the effects of methadone dosing on HIV risk behaviours. A recent report by Langendam et al (23) explored the relationship between various HIV risk behaviours and methadone doses within a cohort of HIV-negative drug users in Amsterdam. Overall, this study found that high methadone doses were associated with a lower frequency of both borrowing needles and inconsistent condom use. However, the study population consisted only of HIV-negative persons and did not assess the role of individual perception of dose adequacy (23). In Vancouver, as in many other cities, a large proportion of methadone recipients are HIV and/or Hepatitis C infected. Risk behaviours in this group are of particular relevance due to the likelihood of transmission of these diseases through unsafe sexual and injection practices with uninfected partners.

The aim of this study is to describe the effect of methadone dose as well as individual perception of dose adequacy on sexual and injection risk behaviours in HIV-positive and HIV-negative opiate-addicted injection drug users enrolled in methadone treatment programs.
5.2 METHODS

5.2.i Vancouver Intravenous Drug Users Study (VIDUS)

The Vancouver Injection Drug Users Study (VIDUS) is an open cohort that has enrolled over 1,500 intravenous drug users (IDUs) since May 1996. Recruitment is conducted through posters in the community, referrals from community organizations, and word-of-mouth from other participants. To be eligible for study entry, individuals must have injected drugs within the past month and be at least 14 years old. All study subjects provide written informed consent at study entry.

Participants complete a semi-structured questionnaire through a trained interviewer at enrollment and semiannually thereafter. The questionnaire gathers information regarding demographic data, patterns of injection and non-injection drug use, use of needle exchange programs, sharing of syringes, health care access, sexual and other behaviors, and enrollment in drug and/or addiction treatment programs. Pretest and posttest HIV counseling is conducted and blood is drawn for HIV and hepatitis C testing at enrollment and repeated at each visit for individuals whose tested results are negative. Participants are reimbursed CDN $20 for each study visit and those requesting medical or social support services are referred to the appropriate clinic or agency.

To be eligible for this analysis, participants had to have reported enrolling in a methadone maintenance treatment program over the course of their participation in VIDUS.

5.2.ii Outcome measure and explanatory variables

Self-reported behaviours were extracted from all VIDUS questionnaires completed by incident methadone enrollees. The outcome HIV risk behaviours included any injection
heroin use, any injection cocaine use, frequency of heroin and cocaine injection, needle-sharing, needle-borrowing and frequency of condom use with regular, casual and sex trade partners. Frequency of both heroin and cocaine injection was dichotomized into either frequent injection (once or more times per day) vs. less frequent injection (less than one time per day). Needle-sharing was defined as lending someone a needle that had already been used by the respondent and needle-borrowing was defined as using a needle that had already been used by someone else. Frequency of condom use was categorized into either always or usually vs. never, occasionally or sometimes using condoms. These categories were based on the distribution of the responses regarding condom use.

Explanatory variables included methadone dose (in mg), age, gender, ethnicity, relationship status, education level (completed elementary, high school or higher degree), length of time on methadone treatment, main source of income, HIV status and personal report of dose adequacy (low, adequate, high). Possible confounding variables in the models included behaviours prior to methadone treatment entry, age at first drug injection experience and incarceration in the past 6 months. Length of time on methadone treatment was assessed as an ordinal responses. Length of time on methadone was captured in the following categories: less that 1 month, 1 to <3 months, 3 to <6 months, 6 months to <1 year, 1 to <2 years, 2 to <5 years and 5 or more years.

5.2.iii Statistical analyses

Descriptive techniques were used to provide an overview of the VIDUS participants who met the study criteria. Descriptions included summaries of sociodemographic characteristics such as age, gender and ethnicity, housing status, drug use, and HIV status.
Generalized estimating equations (GEE) were used to determine the relationship between methadone dose and sexual and injection risk behaviours for HIV. After incident methadone enrollees were identified, data on the variables listed above were extracted from all the VIDUS questionnaires completed by these individuals over the course of their enrollment in VIDUS. An autoregression correlation structure was used in the GEE models, i.e. individual responses recorded within a shorter period of time were correlated to a greater degree than responses at more distant period in time. Although this correlation structure was determined prior to starting the analyses, to ensure that results would not have varied greatly if a different correlation structure had been used, the analyses were also run using exchangeable and 3-dependent correlation structures. Results from these analyses were not significantly different from those that used the autoregression correlation structure. All response variables whose structure was ordinal at data collection were dichotomized as described in section 5.2.ii. Initially, ordinal outcomes were modeled assuming a Poisson distribution. However, validation plots for the Poisson analyses did not support this method. Therefore, these outcome variables (specifically frequency of condom use and frequency of heroin and cocaine injection) were dichotomized and modeled assuming a binary distribution, as were the remaining outcome variables of interest. The estimated odds ratio for methadone dose was defined as the effect of a change of 1 mg in the maintenance dose on the odds of a specified outcome variable.

All of the GEE models described below excluded transgendered individuals due to the small number that were eligible for this analysis.
5.3 RESULTS

A total of 172 women, 197 men and 4 transgendered individuals began methadone treatment over the course of their participation in VIDUS. Of the population studied, 85 (22.8%) reported being of Canadian Aboriginal ethnicity and 257 (68.9%) reported Caucasian ethnicity. The median age of women at methadone treatment initiation was 33.3 yrs (IQR 26.4-38.2), while the median age of the men was 37.8 yrs (IQR 29.6-44.1). The median methadone dose for both men and women after a median of 6 months on treatment was 70.0 mg (IQR 50.0-90.0). At the end of follow-up, 20 (5.5%) reported being on methadone for more than 5 years, 101 (27.9%) reported being on methadone for 2 to 5 years, 68 (18.8%) reported being on methadone between 1 and 2 years, and 65 (18.0%) reported being on methadone between 6 and 12 months.

At methadone treatment entry, 208 (55.8%) participants reported having completed high school, while 61 (16.4%) reported a lower level of education. Approximately 160 persons (42.9%) reported a non-legal main source of income in the previous six months. About a third of study subjects (31.4%) had been incarcerated in the 6 months prior to methadone treatment initiation. Finally, 179 (48.0%) participants reported living in permanent housing such as an apartment or a house, while 194 (52.0%) were living in non-permanent housing such as jail, a recovery house, a room in a hotel, a shelter or the street in the 6 months prior to methadone initiation.

The average age at which this cohort of IDUs first injected drugs was 19.3 yrs (std. dev. 6.3). In the first questionnaire after methadone initiation, a large majority of study subjects (83.4%) reported injecting heroin while slightly fewer (62.7%) reported cocaine injection in the 6 months prior to methadone treatment entry. The remainder of the
subjects reported other opiate dependencies or using heroin in a form other than injection.

The above data are summarize below in Table 5.3.1.

Table 5.3.1: Overview of cohort and univariate comparisons at start of methadone treatment (N=369)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>197</td>
<td>46.6%</td>
</tr>
<tr>
<td>Female</td>
<td>172</td>
<td>53.4%</td>
</tr>
<tr>
<td>Age (median)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>37.8 yrs (IQR 26.4-38.2)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>33.3 yrs (IQR 29.6-44.1)</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>257</td>
<td>68.9%</td>
</tr>
<tr>
<td>Aboriginal</td>
<td>85</td>
<td>22.8%</td>
</tr>
<tr>
<td>Other</td>
<td>31</td>
<td>8.3%</td>
</tr>
<tr>
<td>Main Source of Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>210</td>
<td>56.3%</td>
</tr>
<tr>
<td>Non legal</td>
<td>160</td>
<td>42.9%</td>
</tr>
<tr>
<td>Housing status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>179</td>
<td>48.0%</td>
</tr>
<tr>
<td>Non-permanent</td>
<td>194</td>
<td>52.0%</td>
</tr>
<tr>
<td>Incarceration in past 6 mths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>116</td>
<td>31.4%</td>
</tr>
<tr>
<td>No</td>
<td>254</td>
<td>68.6%</td>
</tr>
<tr>
<td>HIV Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>119</td>
<td>31.9%</td>
</tr>
<tr>
<td>Negative</td>
<td>254</td>
<td>68.1%</td>
</tr>
<tr>
<td>Any heroin use*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>311</td>
<td>83.4%</td>
</tr>
<tr>
<td>No</td>
<td>61</td>
<td>16.6%</td>
</tr>
<tr>
<td>Any cocaine use*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>235</td>
<td>63.0%</td>
</tr>
<tr>
<td>No</td>
<td>137</td>
<td>36.7%</td>
</tr>
<tr>
<td>Adequacy of Dose^</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Too low</td>
<td>110</td>
<td>29.5%</td>
</tr>
<tr>
<td>Just right</td>
<td>233</td>
<td>62.5%</td>
</tr>
<tr>
<td>Too high</td>
<td>15</td>
<td>4.0%</td>
</tr>
</tbody>
</table>

~ All analyses exclude the 4 transgendered individuals in the cohort.
^ At the end of follow-up.
*Some variables may not add up to 100% due to missing values.
5.3.1 Heroin use

Male gender (OR=1.96, 95% CI 1.25-3.07, p=0.003), obtaining money from an illegal source in the past 6 months (OR=1.61, 95% CI 1.11-2.33, p=0.013) and being on methadone for a shorter period of time were associated with increased odds of injection heroin. In comparison to subjects who had been on methadone for 5 or more years, individuals who had been on treatment for <1 month, 1-3 months or 3-6 months were significantly more likely to report heroin injection, OR=2.82 (95% CI 1.09-7.31, p=0.033), OR=5.56 (95% CI 2.41-12.82, p<0.0001), OR=2.74 (95% CI 1.28-5.87, p=0.001), respectively. However, subjects with greater exposure ranging between 6 months to 5 years did not differ significantly from those on treatment for more than 5 years (all p-values >0.05). Older age (per year of age) (OR=0.97, 95% CI 0.95-0.99, p=0.044) was associated with decreased odds of injecting heroin.

Injecting heroin frequently (once or more times per day) was associated with reporting that methadone dose was too low (OR=1.77, 95% CI 1.07-2.94, p=0.027), being of Aboriginal decent (OR=2.30, 95% CI 1.32-4.00, p=0.003) and being on methadone treatment for a shorter period of time. Persons on methadone treatment for less than 1 month (OR=11.06, 95% CI 3.27-37.53, p<0.001), on methadone for 1-3 months (OR=11.26, 95% CI 3.68-34.41, p<0.001) and on methadone for 3-6 months (OR=3.81, 95% CI 1.22-11.87, p=0.021), injected heroin more frequently compared to those on methadone treatment for 5 or more years. Older persons (OR=0.97, 95% CI 0.95-0.99, p=0.024), persons only an elementary school education (OR=0.44, 95% CI
persons who first injected at an older age (OR=0.96, 95% CI 0.93-0.99, p=0.034) were less likely to inject heroin frequently.

Table 5.4.1 on page 81 summarizes the association between both methadone dose and patient perception of dose adequacy with heroin use.

5.3.ii Cocaine use

Injecting any cocaine over time was associated with male gender (OR=1.58, 95% CI 1.01-2.47, p=0.044), having an illegal main source of income (OR=1.63, 95% CI 1.18-2.26, p=0.003) and being on methadone treatment for less than 1 month compared to those on methadone for 5 or more years (OR=2.68 95% CI 1.06-6.78, p=0.038). HIV-negative individuals (OR=0.45, 95% CI 0.29-0.70, p<0.001), individuals who had not been in jail in the past 6 months (OR=0.56, 95% CI 0.39-0.81, p=0.002) and persons in a married or common-law relationship (OR=0.67, 95% CI 0.45-0.97, p=0.042) had decreased odds of injecting any cocaine over time.

Methadone was not associated with the frequency of cocaine use over time. However, persons whose main source of income was illegal had injected cocaine significantly more frequently (OR=2.21, 95% CI 1.43-3.41, p<0.001). And lower frequency of cocaine injection was associated with not having been in jail in the 6 months prior to interview (OR=0.58, 95% CI 0.38-0.90, p=0.015).

Table 5.4.1 on page 81 summarizes the association between both methadone dose and patient perception of dose adequacy with cocaine use.

5.3.iii Needle borrowing and loaning

Borrowing used needles was significantly associated with being married or involved in a common-law relationship (OR=1.57, 95% CI 1.10-2.23, p=0.012) and occasionally
needing help injecting (OR=1.73, 95% CI 1.06-2.80, p=0.027). Persons who reported that their methadone dose was too low (OR=0.64 95% CI 0.46-0.91, p=0.011) and persons who first injected drugs at an older age (OR=0.97 95% CI 0.95-0.99, p=0.045) had decreased odds of borrowing used needles. Gender, age, methadone dose, race, HIV serostatus, having been in jail in the past 6 months, obtaining money largely from an illegal source, education level, using any amount of heroin or cocaine and length of time on methadone treatment were not associated with increased or decreased odds of borrowing used needles.

Loaning used needles was associated with being HIV-negative (OR=1.49 95% CI 1.00-2.23, p=0.049), having an illegal main source of income (OR=1.65, 95% CI 1.13-2.39, p=0.009) and occasionally requiring help injecting (OR=1.84, 95% CI 1.06-3.19, p=0.031). Aboriginal status (OR=0.62 95% CI 0.40-0.95, p=0.028) and first injecting drugs at an older age (OR=0.97, 95% CI 0.94-0.99, p=0.026) were associated with decreased odds of loaning used needles.

Table 5.4.1 on page 81 summarizes the association between both methadone dose and patient perception of dose adequacy with borrowing and loaning used needles.

5.3.iv Condom use

Regular partners

Always or usually using condoms with regular partners was associated with a higher methadone dose (OR=1.02, 95% CI 1.01-1.03, p=0.002), having only an elementary school education (OR=4.41, 95% CI 1.32-15.39, p=0.016), first injecting at an older age (OR=1.09, 95% CI 1.01-1.17, p=0.017), being on methadone for less than 1 month (OR=5.63, 95% CI 1.97-16.00, p=0.001), and being on methadone for 2-5 years.
(OR=2.63, 95% CI 1.10-6.27, p=0.023) compared to 5 or more years. Reporting that methadone dose was too low (OR=0.36, 95% CI 0.18-0.72, p=0.004), being HIV-negative (OR=0.15, 95% CI 0.06-0.38, p<0.001), and being married or in a common-law relationship (OR=0.24, 95% CI 0.14-0.41, p<0.001) were associated with decreased odds of always or usually using condoms with regular partners.

**Casual partners**

Always or usually using condoms with casual partners was associated with being of Aboriginal ethnicity (OR=7.04, 95% CI 1.25-39.57, p=0.027) and reporting that methadone dose was too high (OR=2.09, 95% CI 1.43-5.32, p<0.001). HIV-negative serostatus (OR=0.11, 95% CI 0.02-0.49, p=0.004) was associated with decreased odds of always or usually using condoms.

**Sex trade partners**

Finally, male gender (OR=0.003, 95% CI 0.001-0.03, p<0.001) and being prescribed higher methadone doses (OR=0.94, 95% CI 0.91-0.97, p<0.001) were associated with decreased odds of always or usually using condoms with sex trade partners. Reporting that methadone dose was too high (OR=1.07, 95% CI 1.02-1.13, p=0.011) was associated with increased odds of always or usually using condoms with sex trade partners.

Table 5.4.1 on page 81 summarizes the association between both methadone dose and patient perception of dose adequacy with condom use.

### 5.4 DISCUSSION

Despite the interest in methadone treatment over the past several decades, this study provides new insight into the effects of methadone dose and patient satisfaction with dose
on changes in both injection and sexual risk behaviours. Many studies have demonstrated the beneficial effects of methadone on changing sexual (13, 16, 24-26) and injection risk behaviours (2, 13, 25, 27-32). This study however, takes advantage of data from an established cohort of injection drug users to describe the effect of methadone dose and patient perception of dose adequacy on changes in behaviours over time in persons who initiate methadone treatment.

The analyses in this manuscript provide a plethora of information on factors that are associated with changes in sexual and injection risk behaviour. This discussion however, focuses on the relationship between methadone dose and dose satisfaction with changes in behaviours of interest. In summary, higher methadone dose was associated with lower frequency of heroin use, increased rates of condom use with regular partners and decreased rates of condom use with casual and sex trade partners. Reports that methadone dose was too low were associated with decreased odds of borrowing needles and higher rates of frequent heroin injection, decreased rates of condom use with regular partners, while reports that dose was too high were associated with higher rates of condom use with casual and sex trade partners.
Table 5.4.1: Summary of outcome behaviours associated with methadone dose and adequacy of methadone dose.

<table>
<thead>
<tr>
<th>Outcome Behaviour</th>
<th>Methadone Dose</th>
<th>Dose Adequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>p-value</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any IV heroin use</td>
<td>0.99</td>
<td>NS</td>
</tr>
<tr>
<td>Increased heroin frequency</td>
<td>0.99</td>
<td>NS</td>
</tr>
<tr>
<td>Any IV cocaine use</td>
<td>0.99</td>
<td>NS</td>
</tr>
<tr>
<td>Increased cocaine frequency</td>
<td>1.00</td>
<td>NS</td>
</tr>
<tr>
<td>Borrowing needles</td>
<td>1.00</td>
<td>NS</td>
</tr>
<tr>
<td>Loaning needles</td>
<td>1.00</td>
<td>NS</td>
</tr>
<tr>
<td>Condom use with regular partners</td>
<td>1.02</td>
<td>0.002</td>
</tr>
<tr>
<td>Condom use with casual partners</td>
<td>0.99</td>
<td>NS</td>
</tr>
<tr>
<td>Condom use with sex trade partners</td>
<td>0.94</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

OR= odds ratio
NS = not significant

The effect of methadone dose on the frequency of condom use varied with the type of sexual partner (regular, casual or sex trade). Higher methadone dose was strongly associated with increased condom use with regular partners, and unexpectedly, decreased rates of condom use with casual and sex trade partners (although not significantly so for casual partners). A possible hypothesis to explain these results is that although higher methadone doses are usually associated with positive outcomes, this effect may no longer be as important in patients who are on relatively high methadone doses. The analysis in Chapter 4 reported that the average methadone dose in a population of injection drug users from VIDUS was approximately 100 mg per day. Once doses reach this higher
range, it is possible that a ceiling effect occurs and that crude methadone dose may not have as influential an effect on behavioural changes.

In support of this hypothesis, the effect of dose adequacy also varied with the type of sexual partner involved. Reporting that methadone dose was too low was associated with decreased rates of condom use with regular partners, and reports that dose was too high were associated with increased rates of condom use with sex trade partners. Patients who report that their methadone dose is too low may use condoms less often with regular partners because their methadone treatment and addiction has not yet stabilized, as is suggested by their increase odds of using injection heroin. Hypotheses discussed in Chapter 4 suggested that methadone patients who were prescribed the lowest methadone doses in VIDUS reported that their doses were too high because they were stable users trying to reduce or even stop their methadone treatment. In this study, subjects who feel that their methadone doses are too high may be more stable and may even be trying to reduce or stop methadone use. This stability then manifests itself in greater condom use. These relationships speak to the importance of maintaining patient satisfaction with dose, especially since those who reported that their dose was too low maintained the highest risk behaviours, reporting the lowest rates of condom use.

Higher methadone dose was associated with decreased odds of frequently injecting heroin (although not significantly so), while patients that reported that their methadone doses were too low had increased odds of frequently injecting heroin. Although much of the focus in methadone studies has been on methadone dose, this study suggests that patient views on dose adequacy should also be strongly considered in determining dose.
By improving patient satisfaction with methadone dose, may lead to a reduction in HIV risk behaviours.

Many previous studies have shown the benefit of retaining patients in methadone treatment (2, 16, 30, 33-41). The results from this study support these data and show decreased odds of injecting any heroin and reduced rates of frequent heroin injection with longer duration in treatment.

As with many observational studies, there are limitations to this analysis. First, there are individuals in our database for whom data were not available at every questionnaire. However, this limitation has minimal effects since all questionnaire data were evaluated based on a certain amount of time before or after initiating methadone treatment. Secondly, the methadone doses as well as all other data included our analysis are based on self-report. Due to a variety of factors, participants could be reporting the incorrect methadone doses or other misinformation. However, there exists a strong relationship of trust between the participants and the interviewers that is exemplified by high retention rates and by the willingness of participants to answer questions of a very sensitive and intimate nature. Furthermore, Palepu et al (42), examined the validity of self-reported hospital utilization data from the VIDUS cohort and found high agreement with data from the Ministry of Health. Finally, because of the way in which these data were analyzed, temporality could not be established to determine whether methadone dose influenced changes in HIV-risk behaviours or whether the behaviours were present prior to the prescription of certain methadone doses. To determine temporality, these data could be analyzed in a different way such that the risk behaviours being analyzed occur after the prescription of certain methadone doses.
Despite these limitations, this is a novel study with important implications. Methadone clinics across the United States, Canada, Australia and Europe vary greatly in the methadone doses that are prescribed (43-54). Although the benefits of methadone treatment have been described in these studies, it is evident from the presented results that satisfaction with methadone dose is associated with reduced odds of certain HIV-risk behaviours (23, 46, 49, 51-57). Koester et al (58) conducted a qualitative study that addressed the issue of patient perceptions of methadone treatment and the effect on outcome. They concluded that patient perceptions should be recognized and integrated into the methadone treatment plan (58). The analyses in this Chapter provide quantitative data in support of this conclusion, in addition to highlighting the importance of retaining patients in methadone treatment. Through methadone retention and maintenance of patient satisfaction with treatment, it may be possible to further decrease behaviours associated with HIV seroconversion.
5.5 REFERENCES


CHAPTER 6
GENERAL DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY OF STUDY FINDINGS

The Vancouver Injection Drug Users Study has provided detailed data and insight into many aspects of the injection drug-using population in Vancouver. Results from VIDUS studies have helped provided information that can be used to improve the lives of persons in this population (1-10). Hopefully, through the VIDUS data, this thesis has broadened the understanding of methadone dosing and will lead to improved management of persons with opioid addiction.

The findings described in Chapter 4 provided a cross-sectional view of methadone doses that were prescribed to a group of methadone maintenance treatment patients. The median dose in this population was approximately 100 mg per day (IQR 75-130 mg), which is a higher average dose than the majority of doses found in the literature and studies described in Chapter 2 (11-16). Despite this high average dose, 80 of the men and women in this analysis (30%) reported dissatisfaction with their methadone dose.

Analyses in Chapter 5 followed these findings with an attempt to determine whether dose dissatisfaction was associated with treatment outcome. Results from these analyses demonstrated that patients' reports of dose adequacy, in addition to the methadone doses that were prescribed, were related to positive changes in certain HIV risk behaviours.

Aside from the description of the methadone doses in Vancouver, Chapter 4 searched for quantitative evidence that sociodemographic factors were associated with determining methadone dose. The results showed that unlike results from qualitative interviews,
sociodemographic characteristics were not associated with patterns of dose prescription. It was encouraging to find that demographic factors that should not influence decisions regarding methadone dose were not associated with the doses prescribed in this cohort.

The most interesting and novel finding from Chapter 4 was the noted association between patients' reports of dose adequacy and methadone dose. These results highlighted the importance of determining what factors influence methadone dosing practices and what factors are driving the association between reporting that dose was too low and receiving the highest doses in the studied population. Additional data are currently being gathered to gain a greater understanding for the reasons behind this association. However, assuming that reports of insufficient methadone dose were a result of patients experiencing heroin withdrawal, the results from this thesis suggest that methadone treatment programs should be monitored more closely to ensure that methadone doses are being prescribed according to patient needs.

The fact that patients who were on methadone treatment longer were more likely to be satisfied with their methadone dose coincides with results from Chapter 5, which show reductions in certain HIV-risk behaviours with longer time on treatment. The combined results from these two studies describe a picture in which patients' perceptions of dose are highly associated not only with duration on treatment and their prescribed methadone dose, but more importantly, with reducing certain HIV risk behaviours.

6.2 Unique Contributions, Impact and Implications

This thesis has provided several unique contributions in the area of methadone maintenance treatment and has raised interesting questions. Throughout studies in the
area of methadone maintenance treatment, there has been no effort made to study how methadone doses are determined (although methadone prescribers are provided with guidelines to support them in their decisions). The first analysis of this thesis opened up the door to research on this missing link in the literature and described the methadone doses that are being prescribed in a large population of persons on methadone. It also provided unique data regarding behaviours and sociodemographic characteristics that were related with subsequently prescribed methadone doses.

Another unique contribution of this thesis was the reporting of an association between patients' reports of dose adequacy and the subsequently prescribed methadone dose. The results showed that, unexpectedly, those who reported that their dose was too low actually had, on average, a dose much higher than those who were satisfied with their dose. The hypothesized explanation for this finding is that these patients required even higher doses than the ones they received. It is important to delve deeper into this area to determine the reasons for this association.

As a logical next step from the results in Chapter 4, the analyses in Chapter 5 analyzed whether patients' perceptions of dose adequacy affected sexual and injection behaviours that are associated with HIV seroconversion. The novel contributions from these analyses illuminated the importance of maintaining patient satisfaction with their methadone treatment in order to decrease the frequency of certain HIV risk behaviours, especially in terms of reducing heroin injection and increasing the frequency of condom use.

The combined results from these two major studies have implications for the treatment of opiate-addicted individuals. Although the methadone doses that are
prescribed are very important in maintaining retention and reducing certain behaviours, once methadone dose reaches a certain threshold, the importance of satisfaction with dose appears to be a stronger indicator of how well methadone patients fair on their treatment. For this reason, it is important that methadone prescribers take these findings into consideration when treating their patients.

6.3 **RECOMMENDATIONS**

6.3.i **Surveillance and assessment**

This thesis provides novel information regarding methadone dosing in Vancouver. Although methadone maintenance has been in place in British Columbia for many years, there have been no steps taken to assess the program over time, study the methadone doses being prescribed and determine whether it is achieving its goals. This thesis has been the initial step in describing prescribed methadone doses in Vancouver. However, the implementation of an assessment program that regularly explores current issues that arise in methadone treatment is a potential next step with the aim of monitoring programs and ensuring that patient satisfaction is maintained over the course treatment.

6.3.ii **Further research**

There has been much work done in the area of methadone treatment, and the two studies presented in this thesis add greatly to the knowledge of patient perception of dose adequacy. However, this thesis is the first step in research in the area of dose adequacy.

A very important follow-up study to the research presented in this thesis would explore the role of physicians in the methadone doses that are prescribed and the process that physicians go through to determine these doses. The fact that clinics within the same
city (17) have been shown to prescribe significantly different methadone doses is an important clue that physicians may be playing a major role in the doses that are prescribed and perhaps subsequently, in the reported dissatisfaction with methadone treatment. Assessing this issue may be difficult, but would aid in examining the relationship between methadone policies and actual practice in methadone clinics.

A second important follow-up study pertains to the issue of reported dissatisfaction with methadone dose. Although the analysis in Chapter 4 attempted to control for variables that could be driving reports of dose inadequacy, not all pertinent variables were available from the VIDUS database. A more detailed multivariate logistic regression analysis which includes variables such as reporting inadequacies because of the desire to get high, would provide greater understanding as to why methadone patients are reporting dissatisfaction with their doses.

Once this relationship is better clarified, another important follow-up study could focus on the effect of methadone dose and satisfaction with dose on adherence to antiretroviral therapy in HIV-positive persons. Results from the aforementioned studies would provide a more detailed understanding of the role of methadone dose in treatment of opiate-addicted individuals. If maintaining patient satisfaction with methadone treatment increases antiretroviral compliance in HIV-positive subjects, this could increase physician motivation to ensure patient satisfaction with methadone dose.

6.4 CONCLUSIONS

The area of methadone maintenance treatment has been highly studied since its emergence as a treatment for opiate addiction. During this time, various methadone doses
have been described throughout numerous methadone treatment clinics. The two novel studies that comprise this thesis provide a deeper understanding of the issues surrounding methadone dosing and patients’ reports of dose adequacies or inadequacies.

This thesis describes the high average methadone doses being prescribed to methadone maintenance patients in Vancouver, as well as factors associated with these doses, then takes steps to determine whether satisfaction with methadone dose is associated with patient outcomes in treatment. These results stress the importance of ensuring patient satisfaction with their methadone treatment, especially when patients report that their dose is too low. These findings have implications for the way that health care providers administer methadone treatment and stress the importance of maintaining patient satisfaction in treatment, in order to increase the positive outcomes associated with methadone maintenance treatment.
6.5 REFERENCES


Appendix 1
Vancouver Injection Drug Users Questionnaire #10
A1. What is your date of birth?

(yyyy/mm/dd)

A2. Are you living in Vancouver (Lower Mainland) now?

☐ Yes
☐ No

If no, where are you living?

A3. What type of place are you living in now?

☐ Apartment
☐ Room in hotel
☐ House
☐ Shelter/Hostel
☐ NFA/Street
☐ Treatment/Recovery House
☐ Jail
☐ Other (specify: __________________)

A4. What type of places have you stayed in during the past 6 months? (A, R, H, S, N, T, J, O)

2 mon. ago
3 mon. ago
4 mon. ago
5 mon. ago
6 mon. ago

Note: If R, record which ones.

A5. What local neighbourhoods or other cities have you lived in during the past 6 months?

2 mon. ago
3 mon. ago
4 mon. ago
5 mon. ago
6 mon. ago
A5a). If you lived in the DTES in the past 6 months, what things keep you here?

If did not live in DTES, go to A5b

Check all that apply:
- Availability of drugs/alcohol
- Low-income housing
- SRO
- NE
- Family
- Partner
- Released from jail in DTES
- Cheaper drugs/better
- Shelters
- Friends
- My doctor/clinic
- Feel a part of the community
- Services
- Welfare
- Other (specify: )
- Other (specify: )
- Don't know
- Refused
- No fixed address

Why do you come to the DTES?

Check all that apply:
- Availability of drugs/alcohol
- Low-income housing
- SRO
- NE
- Family
- Partner
- Released from jail in DTES
- Cheaper drugs/better
- Shelters
- Friends
- My doctor/clinic
- Feel a part of the community
- Services
- Welfare
- Other (specify: )
- Other (specify: )
- Don't know
- Refused
- No fixed address

A5b). If you don't live in the DTES, how often do you come here?

- Never
- Daily
- 2-3 times a week
- Weekly
- 2-3 times a month
- Monthly
- Less than once a month

A6. What kind of relationship are you in right now?
- Legally married/common law
- Single (widowed, separated, divorced)

A7. Right now, how many people live in the same place with you?

# of people (on average):
- Just me

If not just me who are they?

Check all that apply:
- Acquaintances/Strangers
- Family
- Friends
- Partner
- Roommates
- Other (specify: )
A7a). What is the highest level of education that you have received?
- None
- Elementary (up to Grade 6)
- Grades 7,8,9
- Grades 10,11
- High school certificate (completed Grade 12)
- Technical school
- College/University
- Other (specify: ____________)

B13. Have you or any member of your family ever attended a residential school? (ask ancestry)
- Yes
- No
- Unsure/Don’t know
- Refused
- N/A (No Aboriginal Ancestry)

A8. In the past 6 months, what have been your sources of income?
- Regular job
  Monthly income: $ ____________
  What do you do? ____________
- Government (Welfare) - includes DB II, Schedule ‘C’.
  Monthly Income: $ ____________
- Non-legal — Sex trade
  Monthly Income: $ ____________
- Non-legal — Drugs (dealing or steering)
  Monthly Income: $ ____________
- Non-legal — Other (fraud, boosting, theft, etc.)
  Monthly Income: $ ____________
- Other person’s income
  Monthly Income: $ ____________
- Earned income in jail, prison, detention
  Monthly Income: $ ____________
- Other person’s income
  Monthly Income: $ ____________
- Earned income in jail, prison, detention
  Monthly Income: $ ____________
- N/A (in hospital, etc.)

A9. What is your current monthly income?
$ ____________

A10. How much do you think you have spent on drugs in the past month?
$ ____________

A11. Would you say you spend:
- None or N/A
- Some
- Half of it
- Most of it
- All of it
ALL RESPONDENTS
B: Drug Use History

B11. How old were you when you first used any Alcohol? ____________________________

How old were you when you first used any drugs? ____________________________

What was the first drug you ever used?
______________________________

B12. The first time you used drugs or alcohol, how did you get it?

☐ Given to me
☐ Stole
☐ Bought

If bought, where did the money come from?

☐ Exchanged something for them
☐ Exchanged sex for them
☐ Bootleg/Adult bought
☐ Other (specify): ____________________________

☐ Unsure/Can’t remember
☐ Refused

B14. What substances did you use prior to injecting drugs? (list all)

☐ None
☐ Unsure
☐ Refused
☐ Alcohol
☐ Acid (LSD, sid)
☐ Cocaine
☐ Crack
☐ Sleeping Pills
☐ Ecstasy (E, X)
☐ Gasoline
☐ Glue
☐ Heroin
☐ Methadone (from street)
☐ Mushrooms
☐ MDA
☐ Marijuana
☐ Anti-depressants
☐ Solvents (Lysol, Pam, etc.)
☐ Speed
☐ Talwin and Ritalin
☐ T3’s
☐ Valium
☐ Other Prescription Drugs specify: ____________________________

☐ Other: ____________________________

☐ Other: ____________________________
C1. In the past 6 months, have you used a needle to chip, fix or muscle even once?
- Yes
- No

*If have not fixed, go to E1*

C2. In the past 6 months, have you injected more, about the same, less or quit?
- Injected more
- Injected about the same
- Injected less
- Quit

C3. When did you last fix?
- Today
- Yesterday
- 2-6 days ago
- 1 week ago
- 2 weeks ago
- 3-4 weeks ago
- 1-3 months ago
- 4-6 months ago

C4. What has been your pattern of fixing?

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Past month</th>
<th>2 months ago</th>
<th>3 months ago</th>
<th>4 months ago</th>
<th>5 months ago</th>
<th>6 months ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quit &gt;=1 mon</td>
<td>Light &lt;1/dy</td>
<td>Mod 1-3/dy</td>
<td>Heavy 3-5/dy</td>
<td>VH &gt;5/dy</td>
<td>VVH &gt;=10/dy</td>
<td></td>
</tr>
</tbody>
</table>

If quit, why?

C5. In the past 6 months, in what neighbourhood(s) did you buy drugs?

<table>
<thead>
<tr>
<th>Ever READ OUT LIST Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTES</td>
</tr>
</tbody>
</table>

C5a). In the past 6 months, in what neighbourhood(s) did you use drugs?

<table>
<thead>
<tr>
<th>Ever READ OUT LIST Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTES</td>
</tr>
</tbody>
</table>

C6. In the past 6 months, have you injected in any of the following places?

<table>
<thead>
<tr>
<th>Ever READ OUT LIST Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>Own place (eg. room/apartment)</td>
</tr>
</tbody>
</table>
C7. In the last 6 months, how often have you fixed with others?

<table>
<thead>
<tr>
<th>Always</th>
<th>[over 100%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually</td>
<td>[over 75%]</td>
</tr>
<tr>
<td>Sometimes</td>
<td>[26-74%]</td>
</tr>
<tr>
<td>Occasionally</td>
<td>[under 25%]</td>
</tr>
<tr>
<td>Never</td>
<td>[0%]</td>
</tr>
</tbody>
</table>

[C9a] If never, go to C9

C8. Who have you fixed with in the past 6 months?

<table>
<thead>
<tr>
<th>Ever READ OUT LIST</th>
<th># of people</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your regular sex partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A casual sex partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Close friend</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casual friend/acquaintance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family member</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Someone you didn’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inmate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify:___)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C9. In the past 6 months, when you were using, which of the following drugs did you regularly inject and how often?

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>How often:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Heroin alone</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>b) Cocaine alone</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>c) Heroin and Cocaine (“speedballs”)</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>d) Methadone</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>e) Morphine</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>f) Amphetamines (speed, uppers)</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>g) Talwin &amp; Ritalin (Ts &amp; Rs)</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>h) Other (specify:___)</td>
<td></td>
</tr>
<tr>
<td>h) Other (specify:___)</td>
<td></td>
</tr>
</tbody>
</table>

C9a. In the past 6 months, has police presence affected:

Where you use drugs?
- [ ] Yes
- [ ] No
- [ ] Unsure/Can’t remember
  - [ ] If yes, how?

Where you buy drugs?
- [ ] Yes
- [ ] No
- [ ] Unsure/Can’t remember
  - [ ] If yes, how?

What drugs you use?
- [ ] Yes
- [ ] No
- [ ] Unsure/Can’t remember
  - [ ] If yes, how?
ALL RESPONDENTS
C: Injection Drug Use (continued)

C9b). In the past 6 months, have you been jacked up by the police?

☐ Yes
☐ No [If no, go to C9c]
☐ Unsure/Can’t remember
☐ Refused

If yes, how many times? ________________

☐ Too many to recall

Where were you the last time you were jacked up? (What neighbourhood?) ________________

Did they take anything?

☐ Yes
☐ No
☐ Unsure/Can’t remember

If yes, what:

☐ Drugs
☐ Rig
☐ Pipes
☐ Money
☐ Other

Did they harm you?

☐ Yes
☐ No
☐ Unsure/Can’t remember

If yes, what did they do?

☐ Roughed up
☐ Physically assaulted (specify): ________________
☐ Pepper sprayed
☐ Other (specify): ________________

C9c). Do you have any area restrictions ("red zones") currently?

☐ Yes
☐ No
☐ Unsure/Can’t remember
☐ Refused

If yes, has this influenced where you use or buy drugs?

☐ Yes
☐ No
☐ Unsure/Can’t remember
☐ Refused

If yes, has this affected your access to Needle Exchange?

☐ Yes
☐ No
☐ Unsure/Can’t remember
☐ Refused

C9d). Do you have any outstanding warrants?

☐ Yes
☐ No
☐ Unsure/Can’t remember
☐ Refused

If yes, has this influenced where you use or buy drugs?

☐ Yes
☐ No
☐ Unsure/Can’t remember
☐ Refused

If yes, has this affected your access to Needle Exchange?

☐ Yes
☐ No
☐ Unsure/Can’t remember
☐ Refused
ALL RESPONDENTS
C: Injection Drug Use (continued)

C11. What are the current prices of drugs?

<table>
<thead>
<tr>
<th>Drug</th>
<th>Street Price</th>
<th>Last time you bought</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heroin (a pt)</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Cocaine (a pt)</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Rock (a rock)</td>
<td>$</td>
<td>$</td>
</tr>
</tbody>
</table>

C12. In the past 6 months, did you go on runs or binges when you injected drugs more than usual?

- Yes
- No *If no, go to C16*

If yes:
How many times did you binge?

______/month or ______/6 month

On average, how long do they last?

- <1 day
- 1-2 days
- 3-5 days
- 5+ days

What injection drugs did you use on your last binge?

<table>
<thead>
<tr>
<th></th>
<th>Y/N</th>
<th>Days of use</th>
<th>Number per day (best guess ie. 20+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heroin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speedballs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

What non-injection drugs did you use on your last binge?

<table>
<thead>
<tr>
<th></th>
<th>Y/N</th>
<th>Days of use</th>
<th>Number per day (best guess ie. 20+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crack</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzos</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pot</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C13. Were other people with you during injecting binges?

- Yes
- No
- Unsure/Can’t remember

If yes, who were they?

<table>
<thead>
<tr>
<th>Ever READ OUT LIST</th>
<th># of people</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your regular sex partner</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>A casual sex partner</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>Close friend</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>Casual friend/acquaintance</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>Family member</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>Someone you didn’t know</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>Inmate</td>
<td>________</td>
<td></td>
</tr>
<tr>
<td>Other (specify: )</td>
<td>________</td>
<td></td>
</tr>
</tbody>
</table>

C14. Are you able to keep track of your own rig(s) during the binges?

- Yes
- Sometimes
- No

If yes, how?

- Alone
- Keep it in a safe place
- Mark it
- Use only once
- Break point
- Put in sharps container
- Keep on self
- Other (specify): __________
- Don’t know

C15. Why do you think you went on your last binge?

- Had money
- Other (specify): __________

C16. Have you overdosed in the past 6 months?

- Yes
- No *If no, go to C17*

If yes, when was the last time you overdosed? ______/yyyy

What neighbourhood? __________

What type of place? __________

Specific place? __________
C16a). The last time you overdosed, what was the main drug:
- Heroin
- Cocaine
- Speedballs
- Other (specify):
- Unsure/Can’t remember

C16b). Were you aware of what drug it was?
- Yes
- No
- Unsure/Can’t remember

C16c). Were you aware of how potent it was?
- Yes
- No
- Unsure/Can’t remember

C16d). Were you taking any other drugs?
- Yes
- No
- Unsure/Can’t remember

If yes, what other drugs were you taking?
- Heroin
- Cocaine
- Speedballs
- Speed
- Crack
- Benzos
- Alcohol
- Other (specify):
- Other (specify):

C16e). Were other people with you?
- Yes
- No
- Unsure/Can’t remember

If yes, who were they?

C16f). Were you assisted by other people?
- Yes
- No
- Unsure/Can’t remember

If yes, who?

C16g). Were you seen by an ambulance?
- Yes
- No
- Unsure/Can’t remember

C16h). Were you taken to an ER/Hospital?
- Yes
- No
- Unsure/Can’t remember

C16i). Did you stay in the ER/Hospital until you were released?
- Yes
- No
- Unsure/Can’t remember

C16j). Were you given Narcan?
- Yes
- No
- Unsure/Can’t remember

C17. How often do you get your drugs from the same source (dealer)?
- Always [100% of the time]
- Usually [over 75% of the time]
- Sometimes [26-74% of the time]
- Occasionally [25% or less of the time]
- Never
- Refused

C18. In the past 6 months, how do you hook up with your source?

Every READ OUT LIST Most
- Bus
- SkyTrain
- Delivery (phone)
- Hotel (your own)
- Hotel (not your own)
- Walk/street/outdoors
- Other (specify: )
C20. In the past 6 months, where did you get your rigs from?
Check all that apply:
Ever READ OUT LIST Most
- Pharmacy
- DEYAS fixed site
- DEYAS vans
- DEYAS walking needles
- Other needle exchange(s)
  (specify: ___________)
- Someone on the street
- Hotel exchange (specify: )
- Dealer
- Friends/partner
- Street nurse
- Clinic
- Health Van
- VANDU walkers
- VANDU - Carnegie table
- Other (specify: ___________)
- Other (specify: ___________)

C22. In the past 6 months, what percentage of your new rigs came from any needle exchange?
- All [100%]
- Most [over 75%]
- Some [26-74%]
- Few [under 25%]
- None [0%] If no NE, go to C27b

C23. When you are using, how often do you visit needle exchanges?
- N/A (don’t go myself) if N/A, go to C25
  times per day
  or times per week
  or times per month
  or times per 6 months

C23a). On average, how many rigs do you exchange each visit?
- 1
- 2-5
- 6-9
- 10-19
- 20-29
- 30-49
- 50-99
- 100+

C24. Are you able to exchange as many rigs as you want?
- Yes
- No

If no, why not?

C24a). In the past 6 months, have you received any ‘loaners’ (new syringes you received when you had none to return) from DEYAS?
- Yes
- No If no, go to C25.
- Unsure/Can’t remember

If yes, where did you get them?
- DEYAS fixed site maximum # received
- DEYAS exchange van maximum # received
- DEYAS Foot patrol maximum # received
C24b). If you received loaners, why did you have no used syringes to return?

<table>
<thead>
<tr>
<th>Ever READ OUT LIST Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Left them at home</td>
</tr>
<tr>
<td>□ Lost them</td>
</tr>
<tr>
<td>□ Put them in outdoor receptacle</td>
</tr>
<tr>
<td>□ Court</td>
</tr>
<tr>
<td>□ Threw them away</td>
</tr>
<tr>
<td>□ Gave to friend to exchange</td>
</tr>
<tr>
<td>□ Police took them</td>
</tr>
<tr>
<td>□ I came from outside community</td>
</tr>
<tr>
<td>□ Getting them for someone else</td>
</tr>
<tr>
<td>□ Other (specify: _________)</td>
</tr>
<tr>
<td>□ I don’t know</td>
</tr>
<tr>
<td>□ Hadn’t planned to use</td>
</tr>
</tbody>
</table>

C24c). Have you ever been refused loaners?

- □ Yes
- □ No

If yes, why?

If yes, when?

C25. How often does someone else go to the NE to exchange rigs for you?

- □ Always [100% of the time]
- □ Usually [over 75% of the time]
- □ Sometimes [26-74% of the time]
- □ Occasionally [under 25% of the time]
- □ Never

C26. How often do you go to the NE to exchange rigs for others?

- □ Always [100% of the time]
- □ Usually [over 75% of the time]
- □ Sometimes [26-74% of the time]
- □ Occasionally [under 25% of the time]
- □ Never

C27. In the past 6 months, have you ever sold the rigs you get from the NE?

- □ Yes
- □ No
- □ Refused

C27a). In the past 6 months, have you ever given away new rigs from the NE?

- □ Yes
- □ No
- □ Refused

C27b). In the past 6 months, has anyone given you a new rig from the NE?

- □ Yes
- □ No
- □ Refused

C29. In the past 6 months, how often did you buy rigs from a pharmacy?

- □ Always [100% of the time]
- □ Usually [over 75% of the time]
- □ Sometimes [26-74% of the time]
- □ Occasionally [under 25% of the time]
- □ Never

C29a). In the past 6 months, how often did you buy rigs on the street?

- □ Always [100% of the time]
- □ Usually [over 75% of the time]
- □ Sometimes [26-74% of the time]
- □ Occasionally [under 25% of the time]
- □ Never

C29b). In the past 6 months, how often did you buy rigs from a corner store?

- □ Always [100% of the time]
- □ Usually [over 75% of the time]
- □ Sometimes [26-74% of the time]
- □ Occasionally [under 25% of the time]
- □ Never

If Never to C29a) and C29b) go to C31
C30b). What times have you purchased new rigs (on the street or at a store)?

<table>
<thead>
<tr>
<th>Ever</th>
<th>Read Out List</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 8 am - 5 pm</td>
<td>☐</td>
<td></td>
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<tr>
<td>☐ 5 pm - 12 midnight</td>
<td>☐</td>
<td></td>
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<tr>
<td>☐ 12 am - 8 am</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>☐ Unsure/Can't remember</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C31. Do you find it hard to get new rigs when you need them?

☐ Yes
☐ No
☐ Sometimes

If yes or sometimes, why do you find it hard to get new (unused) rigs?

**DO NOT READ**

Check all that apply:

☐ Was out of area (no NE around)
☐ No rigs to exchange
☐ 1 for 1 limit - can't get enough at one time
☐ Hard to find new needles at night
☐ Missed the NE van / van route
☐ Too high / Drug sick
☐ Refused by drug stores or pharmacy
☐ NE staff
☐ Incarcerated
☐ Other (specify: ________)

C32. In the past 6 months, if you wanted to fix and you didn’t have a new rig, what did you do?

**DO NOT READ**

Check all that apply:

☐ Reuse the one I have
☐ Use a rig that is not my own
☐ Clean it
☐ Don’t clean it
☐ Go to a needle exchange to get new rig
☐ Use drugs another way (ie. smoke)
☐ Borrow rig from someone I know
☐ Steal one
☐ Buy one (where? ________)
☐ Other (specify: ________)
☐ N/A never happened OR I don’t fix if I don’t have a new rig

C33. In the past 6 months, have you fixed with a rig that had already been used by someone else?

☐ Yes
☐ No
☐ Unsure

If yes, how often?

☐ Never
☐ Once
☐ 2-5 times
☐ 6-10 times
☐ 11-100 times
☐ over 100 times

Who have you shared a rig with?

Check all that apply:

<table>
<thead>
<tr>
<th>Ever</th>
<th>Read Out List</th>
<th># of people</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Your regular sex partner</td>
<td>________</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>☐ A casual sex partner</td>
<td>________</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>☐ Close friend</td>
<td>________</td>
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<td>☐</td>
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<tr>
<td>☐ Casual friend/acquaintance</td>
<td>________</td>
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<tr>
<td>☐ Family member</td>
<td>________</td>
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<tr>
<td>☐ Someone you didn't know</td>
<td>________</td>
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<td>☐</td>
</tr>
<tr>
<td>☐ Inmate</td>
<td>________</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>☐ Other (specify: ________)</td>
<td>________</td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>
C34. In the past 6 months, have you used equipment/works that had already been used by someone else?
   - Yes
   - No
   - Unsure/Can't remember

If yes, how often?
   - Never
   - Once
   - 2-5 times
   - 6-10 times
   - 11-100 times
   - over 100 times

Whose equipment/works was it?
   Check all that apply:
   - Your regular sex partner
   - A casual sex partner
   - Close friend
   - Casual friend/acquaintance
   - Family member
   - Someone you didn't know
   - Inmate
   - Other (specify:)

C35. In the past 6 months, have you lent your used rig to someone else?
   - Yes
   - No
   - Unsure

If yes, how often?
   - Never
   - Once
   - 2-5 times
   - 6-10 times
   - 11-100 times
   - over 100 times

Who did you lend your used rigs to?
   Check all that apply:
   - Your regular sex partner
   - A casual sex partner
   - Close friend
   - Casual friend/acquaintance
   - Family member
   - Someone you didn't know
   - Inmate
   - Other (specify:)

C36. On average, how many times do you use your rig?
   # of times: __________________________

C38. In the past 6 months, where have you disposed of your used rigs?
   Check all that apply:
   - Returned it to the needle exchange
   - Put it in my own sharps container
   - Threw it in the garbage
   - Dropped it on the ground
   - Gave it to another user
   - Flushed it down the toilet
   - Put it in a safe place
   - Put it in outdoor sharps container
   - Other (specify:)

C38a). Do you ever break the points off your syringes?
   - Yes
   - No
   - Sometimes

If yes, where do you leave them? ____________
C39. How often do you need someone to help you inject?
- Always [100% of the time]
- Usually [over 75% of the time]
- Sometimes [26-74% of the time]
- Occasionally [under 25% of the time]
- Never

Why have you needed help injecting?
*Check all that apply:*
- New user
- Don’t know how
- Bad veins / no veins
- Hate needles / afraid
- Too high / drugsick
- Shaky hands
- Jugging (Jugular injection)
- Other (specify: ______________________)

C40. In the past 6 months, how many times have you gone to a place where you fixed with a group of people you didn’t know (including alleys)?
- Never
- Once
- 2-5 times
- 6-10 times
- 11-100 times
- Over 100 times
**D1.** These are some detailed questions about your drug use over the past 7 days.

- N/A - no drug use in the past 7 days
- H=heroin, C=cocaine, SB=speedball, R=rock, A=alcohol
- Unsure/Can’t remember

**NOTE:** use checkboxes for substances - fill in # of injections, rocks or drinks as appropriate.

<table>
<thead>
<tr>
<th>Days of week</th>
<th>Today</th>
<th>2 days ago</th>
<th>3 days ago</th>
<th>4 days ago</th>
<th>5 days ago</th>
<th>6 days ago</th>
<th>7 days ago</th>
</tr>
</thead>
<tbody>
<tr>
<td>What drugs were used and the # of injections</td>
<td>H #</td>
<td>H #</td>
<td>H #</td>
<td>H #</td>
<td>H #</td>
<td>H #</td>
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<td># of injections</td>
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</table>

**D2.** We want to get a detailed description of your activities around the last cheque day (even if you do not get a cheque):

- Unsure/Can’t remember
- N/A - no drug use

<table>
<thead>
<tr>
<th>Pre-cheque day (M/T)</th>
<th>Post-cheque day (W/T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 days before</td>
<td>2 days after</td>
</tr>
<tr>
<td>What drugs did you use?</td>
<td>H #</td>
</tr>
<tr>
<td></td>
<td>C #</td>
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<td></td>
<td>SB #</td>
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<td>R #</td>
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<td></td>
<td>A #</td>
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<td></td>
<td>Other</td>
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<tr>
<td># of people with you who were injecting</td>
<td>#</td>
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<tr>
<td># of times you borrowed/shared/lent needles/equipment</td>
<td>#</td>
</tr>
<tr>
<td># of visits to NE</td>
<td>#</td>
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<tr>
<td># of rigs exchanged</td>
<td>#</td>
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</tbody>
</table>
E1. In the past 6 months, did you use any of the following non-injection drugs? (Not prescribed)

**READ OUT LIST**
Show Prompt Card "A"

<table>
<thead>
<tr>
<th>a) Marijuana</th>
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<tbody>
<tr>
<td>Y</td>
<td>How often:</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
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<tr>
<th>b) Cocaine (non-injected) - powder, snorted, etc.</th>
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<thead>
<tr>
<th>c) Crack/Rock</th>
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<td>Y</td>
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<th>d) Sleeping Pills</th>
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<td>How often:</td>
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<tr>
<th>e) Other Opiates (excluding methadone)</th>
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<td>Y</td>
<td>How often:</td>
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<th>f) Heroin (non-injected)</th>
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<td>Y</td>
<td>How often:</td>
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<thead>
<tr>
<th>g) Other Drugs (specify:)</th>
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<tr>
<td>Y</td>
<td>How often:</td>
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</table>

E1a. What prescription drugs did you take in the last 6 months? (must have been prescribed to you)
- None
- Benzo's
- T3's
- Antidepressants
- Methadone
- Other

E1b. In the past 6 months, did you have any alcohol?
- a) Beer/Cider/Coolers
- b) Liquor
- c) Rice Wine/Ginseng
- g) Solvents
- h) Rubbing Alcohol
- i) Wine, Sherry
- j) Other Alcohol (specify:)
E2. Have you been on any alcohol binges in the past 6 months?
- Yes
- No

If no, go to E4

If yes, # of binges: /mth or /6mnths

- # of days per binge:
  - <1 day
  - 1-2 days
  - 3-5 days
  - 5+ days

- # of drinks per day per binge:
  
E4. Have you ever shared a Rock/Crack pipe?
- Yes
- No
- Unsure
- N/A (don't use Rock)

If no or N/A, go to E4a)

If yes, how often in the past 6 months?
- Never
- Once
- 2-5 times
- 6-10 times
- 11-100 times
- Over 100 times

Who have you shared a pipe with?

Check all that apply:

- Your regular sex partner
- A casual sex partner
- Close friend
- Casual friend/acquaintance
- Family member
- Someone you didn’t know
- Inmate
- Other (specify: _______)

E4a. Have you been on any Rock/Crack binges in the past 6 months?
- Yes
- No

If no or N/A, go to E1

If yes, # of binges: __ month or __ 6 months

- # of days per binge:
  - <1 day
  - 1-2 days
  - 3-5 days
  - 5+ days

- # of rocks per day per binge: _______
F1. Have you ever been in detention, prison or jail?
- Yes
- No
- Refused

If yes, have you been in detention, prison or jail in the last 6 months?
- Yes
- No
- Refused

If yes, what were the charges?

If yes, when and where were you in jail?
- YDC
- Local
- Provincial
- Federal

+ (# of days incarcerated)

- Past month
- 2 months ago
- 3 months ago
- 4 months ago
- 5 months ago
- 6 months ago

F3. Did you ever fix in detention?
- Yes
- No
- Refused

F4. How many times did you fix while in detention?
- Once
- 2-5 times
- 6-10 times
- 11-100 times
- Over 100 times

F5. Did you use a new rig every time?
- Yes
- No
- Unsure/Can’t remember
- Refused

F5a. Where did you get the rig from?
- Other inmate
- Homemade
- Nurse
- Health clinic
- Given
- Stolen
- Brought it in myself
- Other (specify: ____________________)
- Refused

F5b. Did you have to pay for it?
- Yes
- No
- Unsure/Can’t remember
- Refused

If yes, how did you compensate its owner?
- Tobacco
- Money Transfer
- Canteen
- Cash money
- Brought it in myself
- Favor/Service what? (specify: ____________________)
- Other (specify: ____________________)
- Other (specify: ____________________)

Where did you fix?
- Own cell
- Other cell
- Yard
- Gym
- Library
- Other area (specify: ____________________)

If other area/cell, did you have to pay?
- Yes
- No
- Unsure/Can’t remember
- Refused
If yes, how?
- Tobacco
- Money Transfer
- Canteen
- Favor/Service
  - what? (specify: ____________)
  Other (specify: ____________)
  Other (specify: ____________)

F6. Did you clean the rig?
- Yes
- No
- N/A (always use new rig or only use own rig)

If yes, what did you clean it with?
*Check all that apply:*
- Bleach .............................................
- Half bleach/Half water...........................
- Water................................................
- Rubbing Alcohol..................................
- Don't know.......................................      
- Other: _________________________________

F7. What injection drugs did you use in jail?
*Check all that apply:*
- Heroin ........................................... 
- Cocaine.......................................... 
- Speedballs...................................... 
- Speed............................................ 
- Other (specify: ____________).............. 
- Other (specify: ____________).............. 
- Refused

F7a. What non-injection drugs did you use in jail?
*Check all that apply:*
- Heroin (non-injected)......................... 
- Cocaine/Crack.................................. 
- Marijuana...................................... 
- LSD............................................... 
- Sleeping Pills.................................. 
- Other Opiates.................................
- Alcohol........................................ 
- Solvents........................................ 
- Methadone.....................................
- Other (specify: ____________)..............
- Other (specify: ____________).............. 

F7b. How did you pay for the drugs?
*Check all that apply:*
- Tobacco
- Money Transfer
- Canteen
- Brought it in myself
- Favor/Service
  - what? (specify: ____________)
  Other (specify: ____________)
  Didn't Pay (specify: ____________)
  Refused

F8. Did you take methadone while in jail?
- Yes, continued my methadone
- Yes, started in detention
- N/A (don't use opiates)
- Took it illicitly
- No - released before I received methadone
- No
F9. While in jail or prison, did you have any tattooing or body piercing done?
   - Yes
   - No
   - Unsure/Can't remember

   If yes, was the equipment sterile/cleaned?
   - Yes
   - No
   - Sometimes
   - Unsure/Can't remember

F10. How often have you ever had sex in detention, prison or jail (consensual or non-consensual)?
   - Never
   - Once
   - 2-5 times
   - 6-10 times
   - 11-20 times
   - 21-50 times
   - 51-100 times
   - Over 100 times
   - Refused

   Was it ...?

   READ OUT LIST

   Check all that apply:
   - Consentual sex with another inmate
   - Conjugal visit
   - Sexual assault/rape
   - Sex in trade for drugs, favours, etc.
   - Other (specify: _________________________)
   - Refused

F11. Did you use condoms/barriers?
   - Yes
   - No
   - Unsure/Can't remember
   - Refused

   If yes, how/where did you get the condoms/barriers? _________________________
DEFINITION:
"Sex" is any type of sexual intercourse - including anal, vaginal and oral sex for which you gave consent.

J1. In the past 6 months, have you had any sex?  
☐ Yes  
☐ No  
If no, go to J13a)

J2. Have you had a regular sex partner?  
☐ Yes  
☐ No  
If no, go to J7

J3. What sex was this regular partner?  
☐ Opposite sex  
☐ Same sex

J4. What kind of sex do you have?  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Condom use</th>
</tr>
</thead>
<tbody>
<tr>
<td>#/wk #/mo #/6mo</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Vaginal</th>
<th>Oral</th>
<th>Anal</th>
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<tbody>
<tr>
<td>Always</td>
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<td>Usually</td>
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<td>Sometimes</td>
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<td>Occasionally</td>
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<tr>
<td>Never</td>
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</tbody>
</table>

J5. Does your regular partner use injection drugs?  
☐ Yes  
☐ No  
☐ Unsure

J6. Is your regular partner HIV positive?  
☐ Yes  
☐ No  
☐ Unsure

J6b. Does your regular partner have Hep C?  
☐ Yes  
☐ No  
☐ Unsure

J7. Have you had any casual sex partners in the past 6 months?  
☐ Yes  
☐ No  
If no, go to J12

J8. What sex were these casual partners?  
☐ Opposite sex  
☐ Same sex  
☐ Both sexes

J9. What kind of sex do you have?  

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Condom use</th>
</tr>
</thead>
<tbody>
<tr>
<td>#/wk #/mo #/6mo</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Vaginal</th>
<th>Oral</th>
<th>Anal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
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<tr>
<td>Usually</td>
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<td>Sometimes</td>
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<tr>
<td>Never</td>
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</tr>
</tbody>
</table>

J10. Do any of your casual partners use injection drugs?  
☐ Yes  
☐ No  
☐ Unsure

J11. Were any of your casual partners HIV positive?  
☐ Yes  
☐ No  
☐ Unsure

J11b. Do any of your casual partners have Hep C?  
☐ Yes  
☐ No  
☐ Unsure
J12. Did you pay someone for sex in the past 6 months?
   □ Yes
   □ No

 If yes, what kind of sex do you have?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Condom use</th>
</tr>
</thead>
<tbody>
<tr>
<td>wpk #/mo</td>
<td>Always</td>
</tr>
<tr>
<td></td>
<td>Usually</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
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<tr>
<td></td>
<td>Occasionally</td>
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<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

J13a. Have you ever been paid by someone in exchange for sex?
   □ Yes
   □ No       
   □ Unsure/Don’t know
   □ Refused

 If yes, how old were you when you were first paid for sex by someone? __________

J13. Have you been paid for sex in the last 6 months?
   □ Yes
   □ No       
   □ Unsure/Don’t know
   □ Refused

 If yes, what kind of sex do you have?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Condom use</th>
</tr>
</thead>
<tbody>
<tr>
<td>wpk #/mo</td>
<td>Always</td>
</tr>
<tr>
<td></td>
<td>Usually</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
</tr>
<tr>
<td></td>
<td>Occasionally</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

J14. Where do you usually work?
   □ DTES - core
   □ DTES - bars
   □ Franklin
   □ DTS
   □ Kingsway
   □ New Westminster
   □ Surrey
   □ Burnaby
   □ Just see regulars (no street work)
   □ Other: ______________________
   □ Refused

J14a. How often are your clients from outside the DTES?
   □ Always [100% of the time]
   □ Usually [over 75% of the time]
   □ Sometimes [26-74% of the time]
   □ Occasionally [under 25% of the time]
   □ Never [0% of the time]
   □ Refused

J14b. In the past 6 months, how often have clients/johns asked you to find or introduce them to kids for paid sex? 

   □ Never
   □ Once
   □ Twice
   □ 3-5 times
   □ 6-10 times
   □ More than 10 times

J16. Has anyone ever offered you more money to not use a condom?
   □ Yes
   □ No       
   □ Unsure/Can’t remember
   □ Refused

 If yes, did you agree?
   □ Yes
   □ No
   □ Refused
   □ Unsure/Can’t remember
J16a). Have you ever used drugs with a client?
- Yes
- No If no, go to J18
- Unsure/Can’t remember
- Refused

If yes, what did you use?

If yes, how many?

J17. Have you ever shared a rig with a client or john?
- Yes
- No If no, go to J18
- Unsure/Can’t remember Go to J18
- Refused Go to J18

If yes, when was the last time?
- <1 month ago
- 1-6 months ago
- 7-12 months ago
- 1-5 years ago
- 6-9 years ago
- 10+ years ago

If yes, how many?

J18. Have you ever had a bad date?
- Yes
- No If no, go to T1
- Unsure/Can’t remember Go to T1
- Refused Go to T1

If yes, how many?

When was the last time?
- <1 month ago
- 1-6 months ago
- 7-12 months ago
- 1-5 years ago
- 6-9 years ago
- 10+ years ago

J19. What happened the last time?
Check all that apply:
- Ripped off
- Raped
- Strangled
- Assault (beating)
- Assault with weapon
- Assault with gun
- Other (specify: )

J20. Who did you report this to?
Check all that apply:
- No one
- Police
- Health Van / DEYAS / NE
- Hospital
- WISH
- PACE
- Other sex trade workers
- Unsure/Can’t remember
- Other (specify: )
J21. Did you receive medical attention from anyone?
   □ Yes
   □ No
   □ Unsure/Can’t remember
   If yes, whom?
   Check all that apply:
   □ Drop-in clinic
   □ Emergency
   □ Health Van
   □ Street nurse
   □ Ambulance
   □ Other (specify: ______________________)

J22. Did you ever talk to anyone about this?
   □ Yes
   □ No
   □ Unsure/Can’t remember
   If yes, whom?
   □ Crisis Line
   □ Counselor
   □ Social Worker
   □ Nurse
   □ Other sex trade workers
   □ Friends
   □ Family
   □ Other Agency Worker
   □ Other (specify: ______________________)
T1. In the past 6 months, have you been in any kind of alcohol or drug treatment (including methadone)?

- Yes
- No

If no, go to T2

If yes, what kind?

READ OUT LIST

- Detox/Youth detox
- Recovery house
- Treatment centre
- Counselor
- NA/CA/AA
- Methadone program
- Other (specify: ____________)

T2. In the past 6 months, have you ever tried to access any treatment program but were unable?

- Yes
- No

If no, go to T3a

If yes, what kind?

READ OUT LIST

- Detox/Youth detox
- Recovery house
- Treatment centre
- Counselor
- NA/CA/AA
- Methadone program
- Other (specify: ____________)

T3. If you could not access a drug/alcohol program, what was the problem?

- Waiting list
- Don’t know of any programs
- Behaviour problems
- Failed too many times
- Other (specify: ____________)

T3a. If a structured prescription heroin program similar to methadone was available, would you use it?

- Yes
- No
- Unsure
- Not applicable (don’t use opiates)

Why? ____________ 

T3b. If a supervised safe injection site was available, would you use it?

- Yes
- No
- Unsure
- Not applicable (don’t inject)

Why? ____________ 

T3c. Was there any time in the last 6 months when you wanted to stop using drugs?

- Yes, wanted to quit
- Yes, quit
- No
- Unsure

If you have not quit, what would work for you? ____________ 

If you have quit, what worked for you? ____________
ALL RESPONDENTS

T: Drug or Alcohol Treatment (continued)

T4. Have you ever been in a methadone treatment program?
   □ Yes
   □ No
   [If no, go to T7]

T6. Are you in a methadone treatment program right now?
   □ Yes
   If yes, when did you start?
   (mm/yyyy: __________________)
   □ No
   If no, why did you stop?
   □ Didn’t want to take it anymore
   □ Side effects
   □ Could not get to the pharmacy
   □ Didn’t comply with the program and taken off by my doctor
   □ Went to jail
   □ Other (specify: __________________)
   [If yes, go to T13]

T7. Would you like to go on methadone?
   □ Yes
   □ No
   □ Unsure
   □ N/A - not using
   [If no or unsure, why not? __________________]

T13. Which clinic or doctor do you currently attend?
   □ Doctor (specify: __________________)
   □ Clinic (specify: __________________)
   □ Other (specify: __________________)

T15. What is the current dose of methadone given to you by your doctor?
   _____________________/mg

T16. Is the dose of methadone you receive:
   □ About right
   □ Too low
   □ Too high

T17. Do you have any health or lifestyle concerns about taking methadone?
   □ Yes
   □ No
   □ If yes, what? __________________

T18. As part of the methadone program, how often do you provide a urine specimen?
   □ Weekly
   □ Biweekly
   □ Monthly
   □ Every 2 or 3 months
   □ Every 6 months
   □ Rarely

T19. In the past 6 months, how often have you given a bad sample?
   □ Never
   □ Once
   □ 2-5 times
   □ 6-10 times
   □ More than 10 times
   □ N/A (haven’t given a sample)

T20. If your doctor knows or thinks that the urine will test positive, do you give it anyway?
   □ Yes
   □ No

T21a). How often have you given urine that is not your own in the past 6 months?
   □ Always [100% of the time]
   □ Usually [over 75% of the time]
   □ Sometimes [26-74% of the time]
   □ Occasionally [under 25% of the time]
   □ Never [0% of the time]

T22. If you’ve been in jail since your last visit, did you continue taking your methadone in jail?
   □ N/A - no jail
   □ Yes
   □ No
   [If no, why not? __________________]
T23. How has methadone changed your drug use?

**Injection Heroin**
- [ ] Increased
- [ ] Decreased
- [ ] The same
- [ ] Stopped
- [x] N/A (never used it)

**Injection Cocaine**
- [ ] Increased
- [ ] Decreased
- [ ] The same
- [ ] Stopped
- [x] N/A (never used it)

**Crack**
- [ ] Increased
- [ ] Decreased
- [ ] The same
- [ ] Stopped
- [x] N/A (never used it)

**Alcohol**
- [ ] Increased
- [ ] Decreased
- [ ] The same
- [ ] Stopped
- [x] N/A (never used it)

**Other**
- [ ] Increased
- [ ] Decreased
- [ ] The same
- [ ] Stopped
- [x] N/A (never used it)

Do you have any concerns or comments about the methadone program?
### V1. Have you been attacked, assaulted, or suffered any kind of violence in the last 6 months?
- Yes
- No
- Unsure/Can't remember
- Refused

If yes, how many times? ____________

### V2. Who has attacked you?

Check all that apply:

<table>
<thead>
<tr>
<th>Ever READ OUT LIST</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stranger</td>
<td></td>
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<tr>
<td>Dealer</td>
<td></td>
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<tr>
<td>Police</td>
<td></td>
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<tr>
<td>Someone known to you</td>
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<tr>
<td>Sex trade worker</td>
<td></td>
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<tr>
<td>Don't know</td>
<td></td>
</tr>
<tr>
<td>Friend</td>
<td></td>
</tr>
<tr>
<td>Other (specify: ___)</td>
<td></td>
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<tr>
<td>Other (specify: ___)</td>
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</tbody>
</table>

### V3. What type of attack was it?

Check all that apply:

<table>
<thead>
<tr>
<th>Ever READ OUT LIST</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beating</td>
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<tr>
<td>Attacked with weapons (club, knife, belt)</td>
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<tr>
<td>Strangled</td>
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<tr>
<td>Attacked or threatened with a gun</td>
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<tr>
<td>Robbery (rolling for drugs or money)</td>
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<tr>
<td>Other (specify: ___)</td>
<td></td>
</tr>
<tr>
<td>Other (specify: ___)</td>
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</tbody>
</table>

### V9. Have you been physically abused by a boyfriend, girlfriend, sex partner or date in the last 6 months? (ie. domestic violence, no sex trade)
- Yes
- No
- Unsure/Can't remember
- Refused

### V10. Who did this to you?

Check all that apply:
- Boyfriend
- Girlfriend
- Regular sex partner
- Casual sex partner
- Wife (legal/common law)
- Husband (legal/common law)
- Other (specify: ___)

### V12. In the last 6 months, have you been forced to have sex against your will?
- Yes
- No
- Unsure/Can't remember
- Refused

If yes, who did this to you?
- Boyfriend/Spouse
- Girlfriend/Spouse
- Father
- Mother
- Other family member
- Male known to me
- Stranger
- Female known to me
- Other (specify: ___)

How many times did it happen in the last 6 months?
- Once
- 2-5 times
- More than 5 times
- Unsure/Can't remember

### V13. In the past 6 months, did you get counseling for sexual abuse?
- Yes
- No

If yes, are you still in counseling?
- Yes
- No
V13a). Would you like to get counseling for sexual abuse?

☐ Yes
☐ No
☐ Unsure
To help us understand drug use and injection behaviour better, we would like to ask you some more questions about your first injection experience.

B1. The first time you fixed, how old were you?
   [ ] __________ years old
   [ ] Unsure/Don’t remember

B2. The first time you fixed, what neighbourhood or city were you in?
   [ ] Unsure/Don’t remember

B2a). The first time you fixed, what type of setting were you in? (ie. street, party, car, etc.)
   [ ] Unsure/Don’t remember

B3. What drug did you inject?
   [ ] Cocaine
   [ ] Heroin
   [ ] Speed
   [ ] MDA
   [ ] Talwin/Ritalin
   [ ] Can’t recall
   [ ] Other (specify: ______________________)

B3a). Were you using other drugs or alcohol on that day?
   [ ] Yes
   [ ] No
   [ ] Unsure

If yes, what were you using?
   i) __________________________
   ii) __________________________
   iii) __________________________

B3b). Did you inject yourself?
   [ ] Yes
   [ ] No
   [ ] Unsure

If no, who did?
   [ ] Your regular sex partner
   [ ] A casual sex partner
   [ ] Close friend
   [ ] Casual friend/acquaintance
   [ ] Family member
   [ ] Someone you didn’t know
   [ ] Inmate
   [ ] Other (specify: ______________________)

B5. The first time you fixed, did you use a needle that someone else had used?
   [ ] Yes
   [ ] No
   [ ] Unsure
   [ ] Can’t remember

B6. Why did you inject the first time that day?
   [ ] __________________________

B7. When you were growing up, did you parents or caregivers drink alcohol heavily?
   [ ] Yes
   [ ] No
   [ ] Don’t know
   [ ] Refused

B8. When you were growing up, did you parents or caregivers use injection drugs?
   [ ] Yes
   [ ] No
   [ ] Don’t know
   [ ] Refused

If yes, what drugs? __________________________
B9. Do your brothers or sisters inject drugs now or did they in the past? (include cousins, foster siblings living in the same household)
  - Yes
  - No
  - Don’t know
  - N/A (Don’t have any)
  - Refused

B10. Have you ever been removed from your home, placed in foster care or had the government as your legal guardian?
  - Yes
  - No

If yes, how old were you?____________________
  - Don’t remember
  - Refused
V4. As a child, were you ever physically abused?
- Yes
- No
- Unsure/Can’t remember
- Refused

How old were you when this first happened?
- Unsure/Can’t remember

V5. When this happened, who did this to you?
*Check all that apply:*
- Father
- Mother
- Brother
- Sister
- Stepfather
- Stepmother
- Foster parent
- Male relative
- Female relative
- Male known to me
- Female known to me
- Male stranger
- Female stranger
- Male date (not sex trade)
- Female date (not sex trade)
- Other (specify: __________________)
- Refused

V6. After the first time, how often did this happen?
- Daily
- 1-3 times a week
- 1-3 times a month
- Once every 3-6 months
- Only a few times
- Unsure/Can’t remember
- Refused

V7. Have you ever been physically abused by a boyfriend, girlfriend, sex partner or date (ie. domestic violence, not sex trade)
- Yes
- No
- Unsure/Can’t remember
- Refused

V8. Who did this to you?
*Check all that apply:*
- Boyfriend
- Girlfriend
- Regular sex partner
- Casual sex partner
- Wife (legal/common law)
- Husband (legal/common law
- Other (specify:__________________)

V8a. After the first time, how often did this happen to you?
- Daily
- 1-3 times a week
- 1-3 times a month
- Once every 3-6 months
- Only a few times
- Unsure/Can’t remember
- Refused
V11. Have you ever been forced to have sex against your will?

- Yes
- No If no, go to U1
- Unsure/Can't remember Go to U1
- Refused Go to U1

*If yes*, who did this to you?

*Check all that apply:*
- Father
- Mother
- Brother
- Sister
- Stepfather
- Stepmother
- Foster parent
- Male relative
- Female relative
- Male known to me
- Female known to me
- Male stranger
- Female stranger
- Male date (not sex trade)
- Female date (not sex trade)
- Other (specify: ____________________)
- Refused

After the first time, how many times did this happen?

- Once
- 2-5 times
- 6-10 times
- 11-20 times
- More than 20 times
- Unsure/Can’t remember

V13a. Would you like to get counseling for sexual abuse?

- Yes
- No
- Unsure

V13. In the past 6 months, did you get counseling for sexual abuse?

- Yes
- No

*If yes*, are you still in counseling?

- Yes
- No
U1. How often have you attended a meal program in the past 6 months?
- Never
- Daily
- Weekly
- 2-3 times/wk
- Monthly
- Only a few times

*If ever*, which one do you go to most often?

U2. How often have you visited a food bank in the past 6 months?
- Never
- Daily
- Weekly
- 2-3 times/wk
- Monthly
- Only a few times
- None around/Don’t know of any

*If ever*, which one do you go to most often?

U3. How often have you attended a support group, not counting AA/NA, in the past 6 months?
- Never
- Daily
- Weekly
- 2-3 times/wk
- Monthly
- Only a few times
- Don’t know of any

*If ever*, which group did you go to?

U5. How often have you had contact with a street nurse or outreach worker in the past 6 months?
- Never
- Daily
- Weekly
- 2-3 times/wk
- Monthly
- Only a few times

*If ever*, which group did you go to?

The following questions are about what you would do if you developed certain symptoms.

U11. Suppose you developed a large bump under your skin with a red, warm area around it and a fever. Would you...
- go to the emergency room
- go to the doctor’s office the same day
- schedule a special appointment on another day
- wait until the next scheduled appointment
- give it a chance to get better before seeing a doctor

U7. Are there any other supports or services which would improve your life?
1.
2.
3.
1. Weight: ____ lbs
2. In general, how is your health?
   - Excellent
   - Very good
   - Good
   - Fair
   - Poor
3. Compared to 6 months ago, how is your health?
   - Much better
   - Better
   - Same
   - Worse
   - Much worse
4. Have you seen a doctor or nurse at a clinic in the past 6 months (besides methadone)?
   - Yes
   - No
   - Doctor (specify: ____________)
   - Clinic (specify: ____________)
   - Other (specify: ____________)
   How many times? ___/wk__/mo__/6mo
5. Have you gone to a hospital ER in the past 6 months?
   - Yes
   - No
   If yes:

<table>
<thead>
<tr>
<th>Time</th>
<th>Reason</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. Have you been admitted to a hospital in the past 6 months?
   - Yes
   - No
   If yes:

<table>
<thead>
<tr>
<th>Adm</th>
<th>Hosp</th>
<th>Day</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. Have you been helped by an ambulance in the past 6 months?
   - Yes
   - No
   If yes:

<table>
<thead>
<tr>
<th>Time</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td></td>
</tr>
<tr>
<td>Time 2</td>
<td></td>
</tr>
<tr>
<td>Time 3</td>
<td></td>
</tr>
</tbody>
</table>
8. Have you been helped by a health van in the past 6 months?
   - Yes
   - No
   How many times? ___/wk__/mo__/6mo
9. Have you been helped by a street nurse outside a clinic in the past 6 months?
   - Yes
   - No
   If yes:

<table>
<thead>
<tr>
<th>Time</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1</td>
<td></td>
</tr>
<tr>
<td>Time 2</td>
<td></td>
</tr>
<tr>
<td>Time 3</td>
<td></td>
</tr>
</tbody>
</table>
11. In the past 6 months, have you had any bouts of depression, anxiety, and/or other mental health illness?
   - Yes
   - No
   If yes, have you been given a prescription for this in the past 6 months?
   - Yes
   - No
   If yes, what prescription?
   - Unsure

11a). In the past 6 months, have you ever seriously thought of taking your own life?
   - Yes
   - No
   - Unsure
   - Refused
   If yes, in the last 6 months have you actually attempted suicide?
   - Yes
   - No
   - Unsure
   - Refused

12. In the past 6 months, did you have any of the following health problems that lasted at least 3 days in a row?

   **READ OUT LIST**
   - Headaches
   - Fevers
   - Diarrhoea
   - Cough
   - Rash

Any of the following problems at all?
   - Thrush
   - Pneumonia
   - Abcesses
   - Seizures
   - Endocarditis
   - Cellulitis
   - Teeth infection
   - Shingles

12a) Have you ever been diagnosed with any of the following health conditions?
   - lactose intolerance
   - Cancer
   - Diabetes
   - Asthma
   - Emphysema

13. In the past 6 months, have you had any of the following STDs (Sexually Transmitted Diseases)?

   **READ OUT LIST**
   - Herpes
   - Genital Warts
   - Syphilis
   - Gonorrhoea
   - Chlamydia

14. Have you been treated for an STD in the past 6 months?
   - Yes
   - No
   - Unsure
   If yes, by whom?

15a). After your last VIDUS visit, did you return for your blood test results?
   - Yes, received them from VIDUS
   - Yes, received them from elsewhere
   - Unsure
   - No, did not return for them
   If no why not?
   - Knew status - Go to Q#18
   - Believed negative
   - Forgot
   - Afraid/nervous/confused
   - Out of area
   - In jail
   - Get them next visit
   - Phone interview
   - Other

16. Have you been tested for HIV anywhere other than VIDUS in the past 6 months?
   - Yes
   - No
   If yes, what was the main reason that led you to be tested again for HIV?
   If yes, where?

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17. Do you know the result of your last HIV test?
   - Yes, positive
   - Yes, negative
   - No, didn't ask
   - No, didn't return
   - No, don't remember
   \* If not HIV Positive, go to Q#23

18. What was your last CD4 (T-Cell) count?
   - Never had one
   - Unsure

19. What was your last Viral Load count?
   - Undetectable
   - Never had one
   - Unsure
   When were these counts taken? (mm/yy)
   - Unsure

20. Have you ever been on antiretroviral therapy?
   - Yes
   - No
   \* If no, go to Q#21
   - Unsure

   \* If yes, are you on them now?
   - Yes
   - No
   - Unsure

   \* If yes, when did you start them?
   - mm/yy
   - Unsure

   \* If yes, can you tell me the drugs you are on?
   - Don't know
   Specify:
   1.
   2.
   3.
   4.
   5.
   6.

In the last 6 months, did you take your meds as prescribed?
   - Always [100%]
   - Usually [over 75%]
   - Occasionally [26-74%]
   - Sometimes [under 25%]
   - Never

In the last 6 months, has your drug therapy changed?
   - Yes
   - No
   - Unsure
   - Refused

   \* If yes, Why?

   \* If not on antiretrovirals anymore, why did you stop?
   - Out of area
   - Fed up
   - Sick
   - Methadone
   - Stopped on own
   - Other (specify: _________________)

21. Would you be interested in going on ART?
   - Yes
   - N/A (currently on ART)
   - No
   - Unsure

   \* If no or unsure, why not?

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23. Do you know the result of your last Hepatitis C test?
- Yes, positive
- Yes, negative if neg, go to #24
- No, did not return
- No, don’t remember
- N/A – not done

If positive, do you think that your Hep C is affecting you?
- Yes
- No
- Unsure

If yes, how?

Ever READ OUT LIST Most

- Fatigue ........................................
- Liver pain ...................................
- Nausea ........................................
- Night sweats .................................
- Stomach/abdominal pain ..............
- Weight loss ...................................
- Other (specify: ____________________)

If yes, have you ever been offered treatment for Hep C?
- Yes
- No
- Unsure

If yes, did you agree?
- Yes
- No
- Unsure

24. Do you know the result of your last TB skin test?
- Yes, positive
- Yes, negative
- No, did not return
- No, don’t remember
- N/A – not done

26. In the past 6 months, have you been offered medication to prevent TB?
- Yes
- No
- Unsure

26a). Are you currently using any birth control (including condoms)?
- Yes
- No
- N/A

If yes, what are you using?
- Condoms only
- Tubal ligation
- Birth control pills
- Hysterectomy
- Depo-Provera
- Abstinence

26b). Do you have regular periods?
- Yes
- No

If no, when was your last period? _____ mm/yy
- Unsure

27. Have you ever had a pap smear?
- Yes
- No

If yes, when was your last pap smear?
Within
- 1 year
- 1-3 years
- 3-5 years
- < 10 years
- > 10 years
- Unsure

27a). Have you ever had an abnormal pap smear?
- Yes
- No
- unsure

If yes, were you treated?
- Yes
- No

28. Are you pregnant now?
- Yes
- No
- Unsure

29. Have you been pregnant in the past 6 months?
- Yes
- No
- Did not ask

If yes, how did things work out? ____________________________
29a). Have you ever heard of the female condom?
- Yes
- No
- Unsure

If yes, did you ever receive a female condom?
- Yes
- No
- Unsure

Did you use it?
- Yes
- No
- Unsure

30. How many people do you know who are HTV positive?
- None
- 1
- 2 - 5
- 6 - 10
- 11 - 20
- 20 - 50
- 50+

31. What percentage of the people in your neighbourhood do you think are HIV positive?
- <10%
- 10 - 20%
- 21 - 50%
- Over 50%
- No idea

32). Have you ever had a needle stick injury?
- Yes
- No
- Unsure can’t remember

If yes, where did it occur?

Did you go to the emergency room and get treated?
- Yes
- No
- wasn’t worried- already HepC+/HIV+

If no, why not

33). Do you use any “complementary therapies”?

READ OUT LIST
- Acupuncture
- yoga
- medical marijuana- prescribed
- medical marijuana- not prescribed
- herbal remedies
- vitamins/supplements
- massage/reiki
- tai chi
- exercise program (working out)
- Traditional Chinese Medicine
- Other (specify)
- none

35). Have you ever been restricted from seeing more than 1 doctor (or clinic, etc)?
- Yes
- No
- Unsure
- Refused

If yes why?

Did you ever seek medical treatment and were refused because of this restriction?
- Yes
- No
- Unsure
- N/A
- Refused

If yes why?

Have you ever been restricted to one pharmacy?
- Yes
- No
- Unsure
- Refused

If yes why?
36. Have you ever gone to ER and been refused treatment?
   - Yes
   - No
   - Unsure
   - Refused
   If yes, why?

TO BE ANSWERED BY THE NURSE:

How would you rate the overall quality of the interview?
   - High
   - Low
   - Medium
   - Very low