Risk of hepatitis C virus transmission among people who inject prescription opioids: examining the contribution of drug use patterns and contexts

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ABSTRACT

Introduction: In developed countries, Hepatitis C Virus (HCV) is mainly transmitted through illicit drug injection. Within the last decade, a new population of People Who Inject Drugs (PWID), namely Prescription Opioids (PO) injectors, has emerged both in Canada and worldwide. However, this new group of PWID has not been sufficiently studied. Characterizing PO injectors, and defining the association between PO injection and the risk for HCV seroconversion may be useful for developing specific HCV prevention and treatment programmes.

Objectives: The study objectives were: 1) to examine sociodemographic characteristics, drug use patterns, injecting behaviors, and living contexts associated with PO injection in a cohort of PWID in Montreal, 2) to compare HCV incidence rates between PO injectors and non-PO injectors, 3) to examine the association between PO injection, with or without co-use of other drugs, and HCV seroincidence.

Methods: Data collected from PWID, who participated in a prospective cohort study (HEPCO Cohort of Montreal), were examined. Eligibility criteria were age of 18 years old or over, drug injection in the previous 6 months, and current residence in Montreal. Data were procured in 2004-2013 by means of a validated, interviewer-administered questionnaire and blood testing for HCV and HIV antibody. Baseline data were assessed in a *cross-sectional analysis* by Chi-square and Student's *t* tests. Logistic regression modeling was applied to identify the correlates of PO injection. HCV negative at baseline PWID were included in the *longitudinal analysis*. Kaplan-Meier survival and time-varying Cox regression analyses were conducted to calculate the relative rates of HCV seroincidence and examine the association between PO injection and time-to-HCV seroconversion.

Results: *Cross-sectional analysis.* Of 1243 PWID who participated between 2004 and 2011 (83.8% males; mean age: 38.2 years), 380 (30.6%) reported PO injection in the past month. In a multivariate regression analysis, characteristics and behaviors independently associated with PO injection were age (adjusted odds ratio (aOR) by 5-year increment: 0.79; 95% confidence interval [95%CI]: 0.7,0.9), co-use of heroin injection (aOR:3.03, [95%CI: 2.2,4.2]) or non-injection

amphetamines (aOR: 1.84; [95%CI: 1.2,2.9]) or non-injection tranquilizers (aOR:2.38, [95%CI: 1.8,3.2]), unstable housing conditions (aOR: 1.78, [95% CI: 1.3,2.4]), injecting in a public place (aOR:2.03, [95%CI: 1.5,2.8]), and HCV seropositivity (aOR: 1.56, [95%CI:1.1,2.2]). *Longitudinal analysis.* Of 356 participants (81.5% males; mean age: 34.7 years) who were HCV-negative at baseline and were followed up between 2004 and 2013, 123 (34.6%) reported PO injection, and 115 (32%) seroconverted to HCV. Co-use dyads associated with HCV were: PO injection with cocaine injection (crude hazard ratio (cHR): 10.86, [95%CI: 5.8,20.3] vs. use of neither drug), PO injection with crack/cocaine smoking (cHR:4.08, [95%CI: 2.5,6.7]), and PO injection with non-injection tranquilizers (cHR: 4.09, [95%CI: 2.5,6.6]). In a multivariate analysis, PO injection was independently associated with HCV infection. PWID who co-used all three drugs with PO injection had the highest risk of HCV acquisition.

Interpretation: Comprehensive harm reduction and HCV prevention strategies for PO injectors in Montreal should address young PWID. In addition, addressing co-use of PO injection with cocaine injection, crack/cocaine smoking, or non-injection use of tranquilizers may also be beneficial. PO injectors who co-use all three drugs should be identified as high priority targets for interventions.

RÉSUMÉ

Introduction: Dans les pays développés, le virus de l'hépatite C (VHC) est principalement transmis par l'injection de drogues illicites. Durant la dernière décennie, une nouvelle population des personnes utilisatrices de drogues par injection (UDIs) – les injecteurs de médicaments opioïdes (MO) – a émergé au Canada et dans le monde. Or, les caractéristiques de ce nouveau groupe d'UDIs ont été peu étudiées. Décrire les injecteurs de MO et définir le lien entre l'injection de MO et le risque de séroconversion au VHC peut être utile pour développer des programmes spécifiques de prévention et de traitement.

Objectifs: Les buts de l'étude étaient: 1)d'examiner les caractéristiques sociodémographiques, les patterns d'injection et les contextes de vie associés à l'injection de MO dans une cohorte d'UDIs à Montréal, 2)de comparer les taux d'incidence de VHC entre les injecteurs de MO et les IDUs qui ne s'injectent pas de MO, et 3)d'analyser le lien entre l'injection de MO, avec ou sans le co-usage d'autres drogues, et la séro-incidence au VHC.

Méthodologie: Les données recueillies auprès d'UDIs participant à une étude prospective de cohorte (HEPCO, Montréal) ont été examinées. Les critères d'éligibilité incluent être âgé de 18 ans et plus, l'injection de drogues durant les 6 derniers mois et la résidence à Montréal. Les données ont été collectées entre 2004-2013 par le biais d'un questionnaire (administré par un intervieweur) et d'un prélèvement sanguin pour tester le VHC. Les données d'entrée ont fait l'objet d'une analyse transversale à l'aide des tests Chi-carré et T de Student. Un modèle de régression logistique a été appliqué pour identifier les facteurs en lien avec l'injection de MO. Les UDIs qui étaient séronégatifs au VHC à leur entrée dans l'étude ont été incluses dans l'analyse longitudinale. Des analyses de survie Kaplan-Meir et de régression Cox ont été menées pour examiner la relation entre l'injection de MO et l'intervalle de temps observé avant la séroconversion au VHC.

Résultats: *Analyses transversales.* Parmi les 1243 UDIs qui ont participé à la Cohorte entre 2004-2011 (83.8% hommes; âge moyen: 38.2 ans), 380 (30.6%) se sont injecté des MO dans le dernier mois. Dans une analyse de régression multivariée, les caractéristiques et comportements suivants ont été indépendamment associés avec l'injection de MO: âge (Rapports de cote ajustés (RCA)

par tranche de 5 ans: 0.79; 95% intervalle de confiance [95%IC]:0.7,0.9), co-usage d'héroïne injectée (RCA:3.03, [95%IC:2.2,4.2]) ou d'amphétamines non-injectées (RCA:1.84; [95%IC:1.2,2.9]) ou de tranquillisants (RCA:2.38; [95%IC:1.8,3.2]), conditions de logement instables (RCA:1.78, [95%IC:1.3,2.4]), injection dans un endroit public (RCA:2.03, [95%IC:1.5,2.8]) et séropositivité au VHC (RCA:1.56; [95IC:1.1,2.2]). *Analyses longitudinales*. Parmi les 356 (81.5% hommes; âge moyen: 34.7 ans) participants (séronégatifs au VHC à l'entrée dans l'étude, suivis entre 2004-2013), 123 (34,6%) ont rapporté l'injection de MO et 115 (32%) ont séroconverti. Les dyades de co-usage qui ont été associées au VHC comprennent: l'injection de MO avec l'injection de cocaïne (Rapport des risques instantanés (RRI):10.86, [95%IC:5.8,20.3] comparé à la consommation d'aucune de ces drogues) ou avec l'usage de crack/cocaïne fumée (RRI:4.08, [95%IC:2.5,6.7]) ou avec la prise de tranquillisants (RRI:4.09, [95%IC:2.5,6.6]). Dans une analyse multivariée, l'injection de MO a été indépendamment associée à l'infection au VHC. Les UDIs qui ont fait co-usage de ces trois drogues avec l'injection de MO ont présenté le risque le plus élevé de contracter le VHC.

Discussion: Les stratégies de prévention et de réduction des méfaits pour les injecteurs de MO à Montréal devraient être adaptées pour les jeunes UDIs et aborder le co-usage de cocaïne injectée, de crack/cocaïne fumée et de tranquillisants non injectés. Les injecteurs de MO qui font co-usage de ces trois drogues devraient être des cibles prioritaires d'interventions.

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PREFACE

This MSc project is a part of a larger study based on the St. Luc / HEPCO Cohort project, a prospective, observational cohort investigation, co-led by Prof. Julie Bruneau and Prof. Élise Roy.

Study instruments (HEPCO questionnaires) and participants' consent forms were developed by the research team under the supervision of Prof. Julie Bruneau. Participant recruitment, data collection, and data entry were performed by the St. Luc Cohort team, under the guidance of Ms. Rachel Bouchard. Cleaning and management of data were carried out by Geng Zang.

The research questions of the present study were developed by Prof. Julie Bruneau with the support of Prof. Élise Roy. Statistical analyses were performed by Svetlana Puzhko under the supervision of Prof. Julie Bruneau, with the statistical guidance from Ms. Geng Zang.

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1.0 INTRODUCTION

Hepatitis C virus (HCV) infection is an escalating global health problem. HCV is endemic in many countries and is a growing burden for the society and health care systems [1]. In Canada, between 230,000 and 450,000 (0.66 – 1.3%) people are infected with HCV. Even though HCV incidence is declining in Canada thanks to the elimination of iatrogenic infections and more effective HCV control and prevention, the health care burden is increasing because of progressing of the existing cases to more serious sequelae with considerable morbidity and mortality rates [2]. Currently, in developed countries, including Canada, 80% of new cases of HCV infection occur among people who inject drugs (PWID), conditioned by their high-risk injection behaviors. Other cases of HCV infection in Canada are represented by men having sex with men, inmates, street youth, and aboriginal populations [3]. HCV acquisition through hemodialysis, tattooing, sharing of sharp instruments with an infected person and vertical transmission from mother to child are possible [3].

In the recent years, a new population of PWID who inject prescription opioids (PO) has emerged and grown in numbers both in Canada and worldwide. PO are pharmaceutical analgesic drugs designed for the treatment of pain. They are one of the most commonly misused class of prescription drugs worldwide [4]. While PO abusers can utilize these drugs in different ways, intravenous PO injections are becoming increasingly popular. Thus, in Montreal, the population of PO injectors among the HEPCO open cohort of PWID has tripled between 2004 and 2009 [5]. Although the topic is relatively new in the literature, several studies using both quantitative and qualitative methods showed that PO injectors engage in high-risk injection practices that may increase the risk of HCV seroconversion [6-13]. It was also found that PO are generally misused as part of a broader pattern of poly-drug use [6, 13-16] which is of concern given that poly-use of drugs is known to be associated with increased risk for HCV acquisition [17, 18]. However, apart from these few studies, specific characteristics and patterns of this newly emerged group of PWID did not receive sufficient attention, especially in the context of HCV transmission.

Positive association between HCV prevalence and PO misuse was reported in several studies . To our knowledge, only two studies examined the association between PO injection and HCV incidence, and obtained mixed results. Thus, Bruneau et al. [5], using a time-updated Cox proportional hazards model and a sample of PWID from Montreal, showed that PO injection is an

independent determinant of HCV infection. In a study of Hadland et al. [19], who used a PWID cohort from Vancouver, PO injection was positively associated with HCV seroconversion in a univariate analysis, but the significance of the association was lost after adjusting to other factors, including co-use of drugs. These two studies differ in their study samples and environment. In addition, co-use of different drugs may modulate, with varying magnitudes, the association between PO injection and HCV seroincidence, such that co-use of certain drugs may more strongly potentiate this association.

Prevention of HCV transmission among PWID is extremely important for public health but also poses a great challenge, especially given the current lack of vaccine against HCV. To date, no policies specifically targeting PO injectors have been implemented in Canada [4]. The existing measures, such as opioid substitution treatment (OST), needle exchange programs, and safe injection sites, rely mainly on the evidence derived from studies on heroin dependence [20, 21].

In summary, despite the fact that the population of PO injectors is growing and may markedly increase the reservoir of HCV transmission within the next few years, the association between PO injection and the risk for HCV transmission is still poorly understood and is underappreciated. In addition, the knowledge regarding specific features and behaviors of PO injectors is insufficient and mixed. Only a few studies were conducted in Canada even though the market of prescription drugs here is different from USA and Europe. In this study, we aimed at gaining insights into the association between PO injection and the risk for HCV transmission in a Canadian context, with a focus on the sample of PO injectors from Montreal as a large Canadian city. Comparing to the previous work of Bruneau et al. [5], our longitudinal analysis includes a larger sample of HCV-negative PWID who were followed for a longer period of time (a decade). In addition, special attention was paid to studying co-use of other drugs with PO injection in relationship to HCV seroincidence. The specific aims of the study were 1) to characterize PO injectors of Montreal, 2) to compare HCV incidence rates between PO injectors and non-PO injectors, and 3) to examine the association between PO injection, with or without co-use of other drugs, and HCV seroincidence. Our study may be useful to develop HCV prevention and treatment strategies specifically targeting PO injectors.

2.0 LITERATURE REVIEW

2.1 Epidemiology of hepatitis C

2.1.1 Characteristics of Hepatitis C Virus (HCV)

Hepatitis C virus (HCV), the causative agent of hepatitis C infection and disease, was first characterized in 1998 [22]. HCV belongs to the genus Hepacivirus of the family of Flaviviridae [23, 24]. It is a small, enveloped virus with the virion diameter of about 55-65 nm.

The HCV genome consists of a positive single-stranded RNA molecule of approximately 9.6 kb [24] and encodes a polyprotein of approximately 3,000 amino acids [25]. The genome is highly prone to mutations [26, 27]. HCV is classified into seven major genotypes, which exhibit up to 33 % nucleotide variation [28], and into more than 100 subtypes, which exhibit up to 20% nucleotide variation [28, 29]. The distribution of HCV genotypes varies. The genotypes 1, 2 and 3 are found worldwide, whereas the distribution of the genotypes 4 to 6 are more country-specific [24]. The most common genotypes in North America are genotypes 1 (subtypes 1a and 1b), 2, and 3. Altogether, these comprise 97% of all circulating genotypes [30]. Like most other RNA viruses, HCV consists of a heterogeneous mixture of related genomes containing a master (i.e., most frequently represented) sequence and a large spectrum of mutants referred to as quasispecies [26, 28]. Quasispecies form as a result of transcription errors by RNA polymerases which lead to accumulation of mutations in the progeny virions [31]. The variant spectrum of HCV changes depending on the progress of the disease, and analysis of patient-specific HCV variant spectra is believed to be useful to determine the management of the patient and predict response to treatment [32, 33].

2.1.2 HCV infection, natural course and clinical manifestations

Analysis of HCV RNA sequences across populations is called a phylogenetic analysis; it can provide useful insights into the pathogenesis and transmission of HCV. Phylogenetic analyses that examine evolutionary relatedness among viral sequences have been used to reconstruct the history of viral strains [34]. Thus, transfusion of contaminated blood products is specifically associated with the HCV 1b and 2a genotypes [35, 36]. Blood product screening over the past two decades led to a decrease in the prevalence of those genotypes [25]. During the same period, genotypes 1a

and 3a increased their prevalence, particularly among people who inject drugs (PWID) [35, 37-43].

In PWID, HCV phylogeny is associated with the injecting network [44, 45]. Phylogenetic analyses showed that social network structure, composition, and behaviors are linked to sharing injecting equipment [46], one of the main risk factor for HCV transmission. Since ongoing high-risk behaviors among PWID can lead to HCV re-exposure and multiple infection episodes [47-49], current and former PWID often have mixed HCV infections with multiple HCV viral strains [48]. Given this, treatment regimens covering multiple genotypes should be considered in these patients [25].

The natural history of hepatitis C is only partially understood. It is known that progression to liver cirrhosis is variable among patients [50]. Approximately 25% of HCV-infected clear HCV [51]. Spontaneous clearance is most common in females, people with favourable IL28B genotypes, and those who have acute symptoms [1]. The remaining 75% of patients progress to chronic HCV infection, defined as persistence of HCV RNA after the acute phase, in a patient with reactive anti-HCV antibody test [52]. Symptoms of chronic infection often emerge 20 years after infection [1, 50, 53, 54]. Development of chronic HCV infection may lead to progressive hepatic fibrosis, cirrhosis, and, in some patients, to complications such as liver failure or hepatocellular carcinoma if untreated [55, 56] (Figure 1).

Disease progression from fibrosis to cirrhosis and hepatocellular carcinoma is not linear over time. This is because disease progression is influenced by many factors, including time since infection, age, and alcohol consumption [56-58]. In addition, several other factors (iron, steatosis, metabolic problems, etc.) may also be involved [50]. While HCV genotype does not associate with increased risk of cirrhosis, the HCV genotype 3 is associated with a higher rate of hepatic steatosis [59], and genotype 1b with a higher rate of hepatocellular carcinoma [60].

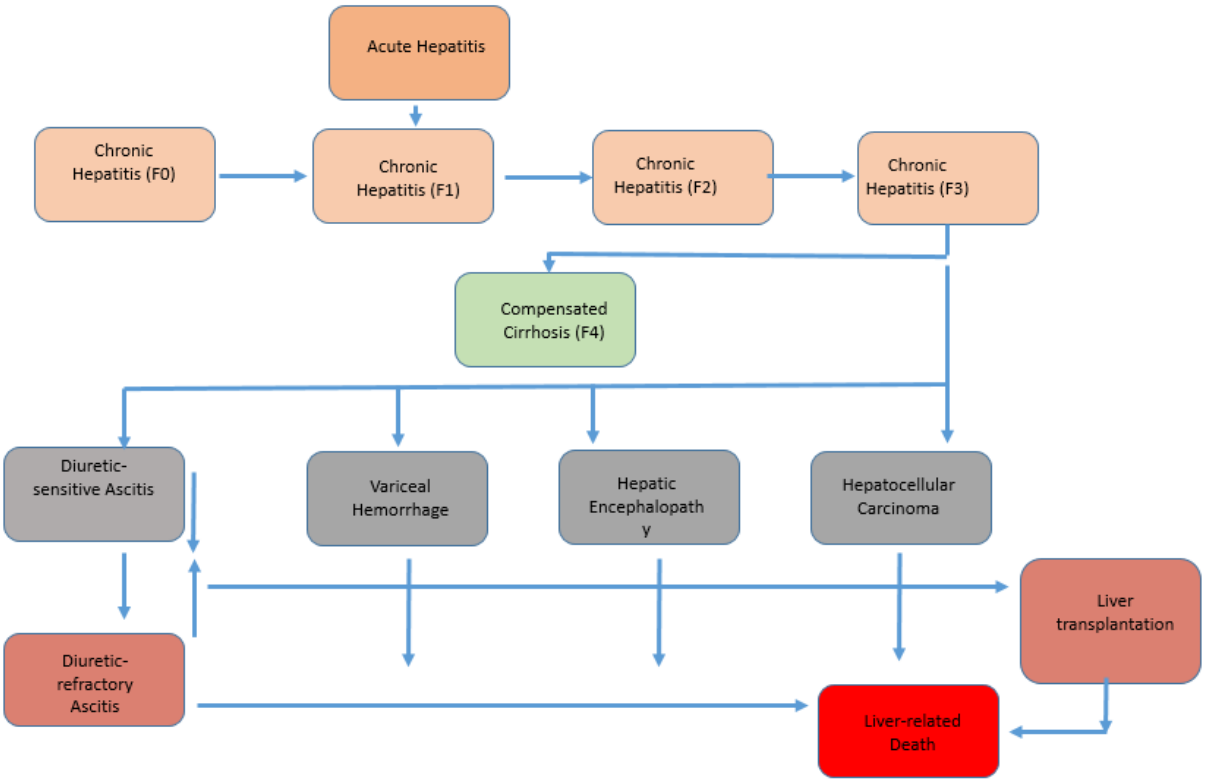
2.1.3 Epidemiology and burden of Hepatitis C

2.1.3.1 Epidemiology and burden of hepatitis C in general population

Hepatitis C is an important public health problem [61, 62]. Worldwide, three to four million people are infected each year, and 130–170 million people are estimated to live with HCV [63-65]. While the prevalence of hepatitis C is estimated to range from 0.01% to 2% in developed countries, higher prevalence rates (e.g., >3%) were reported in many countries of eastern Europe, Latin America,

former Soviet Union, Africa, the Middle East, and South Asia [63, 66-70]. In Canada, the estimated 230,000 to 450,000 (0.66%-1.3%) people are infected with HCV [71, 72]. According to the Public Health Agency of Canada (PHAC), 0.96% of the population was anti-HCV positive in 2011 [2].

Figure 1. Schematic of hepatitis C disease progression model



Modified from Myers et al., 2014

Risk factors for HCV infection include past or present injection drug use, blood transfusion, long-term hemodialysis, birth from an HCV-infected mother, intranasal drug use, getting an unregulated tattoo, and percutaneous exposures, such as in health care workers [73-75]. Sexual transmission is not the most important way of HCV acquisition [71]. Nonetheless, HCV positivity is associated with sex trade work, high (>100) number of lifetime sexual partners, previous sexually transmitted disease [76, 77], and sex or co-habitation with a partner who is an injection drug user [76, 78-80]. Additionally, during the recent years, increased risk of HCV infection was reported among the HIV-infected men having sex with men (MSM) [81-84]. This elevated risk

may be defined by seroadaptive behavior that is increasingly reported among HIV-infected MSM and that may lead to more frequent utilization of unprotected and traumatic sex behaviors [81-83].

High costs of hepatitis C are defined by chronic infection which is associated with substantial morbidity and mortality [64, 65, 67]. A lifetime health care cost for an individual with HCV infection was estimated to be $64,694 in 2013 in Canada; this number ranges from $51,946 in a patient with no fibrosis to up to $327,608 in a patient requiring liver transplantation [2].

Hepatitis C has been associated with 350,000 deaths annually since 2002, mostly due to cirrhosis and HCC [69]. In Canada, the health care burden caused by the existing cases progressing to more serious sequelae continues to increase [85]. The annual number of patients with compensated and decompensated cirrhosis, hepatocellular carcinoma, and liver-related deaths is expected to peak between 2031 and 2035. Then, an estimated 32,460 HCV-infected individuals will die of liver-related causes [2].

The difference in HCV prevalence rates between developed and developing countries is due to iatrogenic factors which remain the major determinants for HCV acquisition in developing countries but are largely eliminated in developed countries. Introduction of routine testing of donated blood in developed countries (Canada: since 1990) nearly completely eliminated transmission of HCV via blood transfusion [86]. Due to these measures, injection drug use has now become the main route of HCV transmission in Canada, accounting for the majority of new and existing infections [74, 75] (add former 88).

2.1.3.2 Prevalence and incidence of HCV among people who inject drugs (PWID)

As mentioned above, in developed countries, the majority (about 80%) of new cases of HCV infection occur among PWID [53]. High-risk injection behaviors of PWID are responsible for 55-90% of recently documented hepatitis C cases in Canada, the United States, and Australia [62, 87, 88]. In 2007, it was estimated that 16 million of people inject drugs worldwide [89], and that global prevalence of HCV among PWID is 67% [90]. In Canada, 75,000-125,000 people were estimated to inject drugs in 2000 [91, 92]. The prevalence of HCV was assessed by several studies. For example, participants of the I-Track study (cross-sectional study of people who inject drugs in Canada) had the prevalence of HCV of 69% [3]. A cohort study of PWID in Vancouver (VIDUS) demonstrated that 81.6% of participants were HCV positive [93]. In Montreal, 73% of PWID recruited in the St-Luc/HEPCO cohort were HCV positive at baseline [94]. Injection drug user

populations in Calgary and Winnipeg exhibited HCV prevalence rates of, respectively, 56% and 60% [95]. In addition, the prevalence of chronic infection with HCV in PWID is markedly higher than that of hepatitis B virus or human immunodeficiency virus (HIV) [96].

2.1.3.3 HCV transmission among PWID

The principal route for HCV infection among PWID is the use of contaminated needles, syringes, and/or other drug use injection paraphernalia, including cooker/cotton sharing [76, 87, 97-99]. HCV is at least 10 times more infectious than HIV: the risk of HCV acquisition is 3%–10% per injection compared to 0.3% for HIV [100]. Therefore, one is more likely to acquire HCV, than HIV, through contaminated paraphernalia. HCV remains infective for weeks in liquids, syringes and on inanimate surfaces, and is detectable in high concentrations on used syringes and other drug injection paraphernalia, such as filters and spoons [101-104]. The risk of hepatitis C infection through shared drug preparation equipment was found to be similar to that of shared syringes [88].

It has been shown that the risk of HCV acquisition is increased for PWID with unstable housing conditions and those presently in correction facilities or with a history of incarceration. More frequent exposure to blood in hostile environments, needle sharing, multiple sexual partners, and unprotected sex may partially explain higher prevalence rates of HCV amongst homeless drug users [105, 106]. As well, injecting drugs in prison is strongly associated with HCV seropositivity [107]. This may be due to frequent injection drug use in prisons, high proportion of HCV-infected inmates, limited access to harm-reduction interventions, unsafe body piercings, and unprotected anal sex with male injection drug users [108-111]. Moreover, a risk to acquire HCV remains high for former inmates even after release from the prison [112].

Supporting the fact that that risky sexual behaviors increase the risk of HCV acquisition among PWID, engaging in prostitution was reported among the drivers of HCV transmission [99].

Increased risk for HCV infection has also been associated with the use of specific drugs. Thus, consumption of cocaine (intravenous or intranasal) was associated with increased risk of HCV acquisition [99, 113]. This subgroup of PWID is well characterized, and it is known that cocaine users are more likely to engage in high-risk injection behaviors. As well, longer lifetime duration of injecting drugs (for cocaine and opioids injectors) [17, 76, 80, 98, 99] and higher frequency of injections (for cocaine and heroin injectors) [17, 76, 78, 98] were reported among the

drivers of HCV transmission. With regard to other substances, additional daily consumption of alcohol or benzodiazepines [78] was linked to a risk of HCV seroconversion.

Poly-use of drugs was also linked to increased risk of HCV transmission among PWID. In the study of Judd et al. [17], in a multivariate model, the individuals mainly injecting two or more drugs had twice the odds of being HCV positive compared with those who inject one drug. Furthermore, it was shown in univariate and multivariate logistic regression models that HCV-infected PWID are more likely to inject two or more types of drugs [18]. In a study of Keen et al. [114] that involved a community sample of cocaine and heroin users in Baltimore, higher prevalence of HCV, HIV, and co-infection was found in poly-drug injectors as opposed to heroin-only injectors or crack/nasal-heroin non-injection users. In addition, poly-substance use was associated with increased likelihood of risky behavior in a study by Harrel et al. [115]. These researchers used latent-class analysis to demonstrate that poly-substance users are more likely to share needles and engage in casual sex than heroin-only injectors [115]. In another study, use of more than four drugs was one of the predictors of accepting used syringes [116].

Traditionally, more attention was paid to studying the association of cocaine and heroin injection with risky behaviors in PWID. This is because problematic use of these drugs has been a major public health concern for a long period of time in a number of countries, including Canada [117]. Recently, however, a new population of drug abusers injecting prescription opioids (PO) has emerged and grown in size both in Canada and worldwide. The rising prevalence of these drug abusers and its association with the risk for HCV transmission will be reviewed in subsequent chapters.

2.2 Prescription opioids (PO) misuse and related problems

2.2.1 Increasing prevalence of PO misuse in Canada and worldwide

PO are pharmaceutical analgesic drugs designed for treatment of moderate-to-severe chronic pain. They are recognized as one of the most commonly misused class of prescription drugs [4]. PO include the following medications: oxycodone (“OxyContin®”), methadone, morphine, oxymorphone (“Opana®”), hydromorphone (“Dilaudid®”), hydrocodone/acetaminophen (“Vicodin®,” “Lortab®”), fentanyl, oxycodone/acetaminophen (“Percocet®”), oxycodone/aspirin

("Percodan®"), tramadol ("Ultram®"), tramadol/acetaminophen ("Ultracet®"), meperidine ("Demerol®"), pentazocine ("Talwin®").

The rates of prescription of these medications are growing worldwide. Interestingly, Canada and the USA have substantially higher PO consumption on a per-capita basis than any other country in the world [118]. Total PO consumed in Canada increased from 8,713 sold defined daily doses (S-DDD) in 2000-2002 to 26,380 S-DDD in 2008-2010; this represents a 203% increase, which is greater than the 112% increase observed in the USA in the same period [4, 119]. Similarly, the per capita spending on PO doubled from CDN $7.00 (1998) to CDN $14.70 (2007) [4].

Growing prescription rates may be one of the factors contributing to the growing rates of opioids misuse in the population. Following alcohol, tobacco, and cannabis, non-medical use of prescription opioids (NMPOU) has been recently estimated to be the fourth most prevalent form of substance abuse in Canada [120]. NMPOU presents with higher prevalence rates than the drugs like cocaine or heroin. Specifically, in Canada, 500,000 – 1,250,000 people are estimated to use PO non-medically, and 125,000– 200,000 of those abusers may be dependent and in need of treatment [120].

Prevalence of PO misuse is high among different population groups, including young people. Regarding the latter group, the prevalence of PO misuse has increased in high school and college student populations in the USA [21]. Similarly, the use of PO to get high is prevalent among adolescents in Canada. Several provincial Canadian surveys revealed that NMPOU was reported by 5.9%-15% of secondary students between 2008 and 2011, and the rates increased with a grade level [121, 122]. However, the high proportions (15%) reported by Fisher et al. [121] are representative for the Ontario student population and may not be generalised for Canada.

Furthermore, prevalence of PO misuse is increased in correctional facilities. In a study of Johnson et al. [123] involving 1,272 federal inmates in the Correctional Service Canada's program between 2003 and 2008, 70% of the sample reported PO misuse during a period of incarceration. The prevalence of PO misuse also increased among sex workers. For instance, of 692 sex workers in Vancouver, 18.8% reported PO misuse in the last six months [124]. The prevalence occurs at disproportionally high levels in First Nations/Aboriginal People's communities in Canada [4, 122, 125]. For example, in some of the aboriginal communities in Nothern Ontario (Nishnawbe-Aski Nation), the estimated 50%-75% of adults and approximately 50% of high school students misuse PO, and many of them have a dependency problem [126].

Overall, NMPOU in Canada is growing. A multi-site Canadian cohort OPICAN study, conducted in 2002-2005, showed that the use of PO in various forms became the predominant form of illicit opioid use in five Canadian cities (Edmonton, Toronto, Québec City, Fredericton, and St. John) [4].

2.2.2 PO misuse-related burden

In North America, PO misuse poses a substantial health burden, with an increase in opioid-related morbidity and mortality [4]. For example, emergency room visits due to misuse of oxycodone or hydrocodone increased, respectively, by 242.2% and 124.5% between 2004 and 2009 [127]. In the USA, PO-related deaths are now the second leading cause of unintentional deaths. It should be noted that overdoses from PO lead to higher number of deaths than both heroin and cocaine combined [128-130].

The harms from PO misuse in Canada have been estimated to constitute the third highest overall substance burden (after alcohol and tobacco) [120]. PO-related deaths have been crudely estimated to contribute to 30% – 50% of drug-related deaths [4, 131]. Over the five-year period between 1994 and 1999, oxycodone-related mortality in Ontario rose four-fold [132]. Out of 2,330 drug-related deaths in Ontario, 58% were attributed, either entirely or in part, to opioids [133]. In Quebec, based on the 2000 – 2009 data from the "Registre des événements démographiques and the Bureau du coroner en chef du Québec", the adjusted mortality rate attributable to PO misuse was estimated to increase from 1.9 to 3.7 deaths per 100,000 population for men and from 1.0 to 2.2 deaths per 100,000 population for women [134]. Furthermore, PO-attributable mortality rates reported for the period between 2000 and 2012 were 17.6% higher compared with the period between 2005 and 2009 [135].

Qualitative studies demonstrate that ease of access, through independent operators and without the need for personal contacts, and low prices of PO, are probably the main reasons for increased PO misuse [6]. In North America, the sourcing occurs via various routes and diversion mechanisms, including "double doctoring," prescription fraud/forgery, street drug markets, thefts and robberies, and Internet purchases [136]. Still, the majority of PO abusers source their drugs informally from family or friends [136, 137]. In Montreal, PO sales occur directly on the street, and there is no need for special personal contacts or going through intermediaries to access the sellers. PO are easily accessible and cheap, and users can buy a dose for $5 or even less [138]. In

addition to being inexpensive and available, PO are uniform in terms of quality, allowing users to better manage and control their consumption. These three abovementioned characteristics make PO increasingly popular [139]. Furthermore, the popularity of PO is supported by the fact that abusers perceive these drugs as less stigmatizing, less dangerous, and less probable to cause legal consequences compared with illicit drugs [138].

PO misuse can occur through various administration routes, and the choice of these can be influenced by demographic factors, geographical settings, and the type of PO. Thus, swallowing was shown as the most common route of administration among urban participants [140], while rural participants reported snorting as the most frequent way of administration for hydrocodone, methadone, OxyContin and oxycodone, and injection as the most frequent way of use for hydromorphone and morphine [140].

2.2.3 Rising prevalence of PO injection in Canada and related harm

It is concerning that the prevalence of illicit use of PO for intravenous injections is increasing among Canadian population [5]. While PO are primarily consumed orally in New York, Miami, and Philadelphia, PO are often injected even by crack smokers in Montreal [6]. In Quebec, the prevalence of PO injection, specifically hydromorphone tablets, increased from 27.4% to 41.8% from 2003 to 2007 among street drug users recruited through "SurvIDU" survey [5]. Furthermore, in Montreal, the proportion of PO injectors tripled between 2005 and 2011 [5]. In the qualitative study of Roy et al. [6], injection was the main mode of PO administration observed among users in Montreal.

In addition, qualitative studies demonstrate that many young people who start "popping pills" eventually switch to injecting either PO or harder drugs, such as cocaine, methamphetamine, and heroin [15, 139, 141], as they are influenced by their experiences on the street, their peers, general curiosity [14], and by desire to achieve a more potent high [15]. In PWID, the motive for transitions to injecting opioids was substituting for heroin [15] or other injectable drugs. Due to increased availability of PO on the streets of Montreal, many cocaine injectors switch from smoking crack to intravenous injection of PO [16]. Conversely, in places where heroin is more accessible, people switch to heroin injection after becoming physically and emotionally dependent on opioid pills [141]. Therefore, the relatively new trend of injecting PO can lead to maintenance

of drug injection among established PWID and initiation to injection among the never injectors [11, 16, 140, 142].

Another reason to be concerned about the rising prevalence of PO injection in Canada is that PO injectors may be more vulnerable to acquisition of blood-borne viruses' infections, such as HCV and HIV [5, 8]. In contrast to cocaine injectors, this newly emerged PWID population has not been well characterized yet. Therefore, it is unclear which features and behaviors of PO injectors may contribute to the risk for HCV infection. The overview of the existing knowledge on these issues will be discussed in the next chapters.

2.2.4 Overview of the literature regarding characteristics of people who inject PO in relation to their risk of HCV transmission

2.2.4.1 Sociodemographic characteristics of PO injectors

While several studies describe characteristics of people who misuse PO, very few have been devoted exclusively to the abusers who use an intravenous route of administration. Most study samples included participants who use PO orally and those who inject PO. PO abusers were reported to be typically young white men [5, 7, 15, 21, 139, 143]. Yet, the study by Fisher et al. [21], using a quantitative cross-sectional design and a sample of street illicit opioid users in several Canadian cities (OPICAN), made a contrasting conclusion that PO-only users and PO/heroin users were older than heroin-only users. The authors noted, though, that this difference could reflect a sampling bias [21]. In the same study, it was found that street PO abusers are more likely to receive legal income [21]. In contrast, qualitative researchers from Toronto reported that the vast majority of street-based PO users earned money by panhandling and relied heavily on monthly social assistance from the government (e.g., welfare) [14].

In a similar manner, the information about the housing status is diverse. Firestone et al. [14] conducted a qualitative study and reported that street PO injectors in Toronto had unstable housing conditions. Contrasting this, Pollini et al. [7] found in a cross-sectional study that the majority of PO abusers co-injecting heroin lived with their parents in the past six months. In a study of Lankenau et al. [144] that used a mixed methods approach, it was found that nearly all PO abusers (either injectors or "pill poppers") among the sample of street young PWID of New York and Los Angeles were homeless at some point, and most regarded themselves as "travellers," moving from city to city in search of work, housing, or adventure. Similarly, the data regarding

the education level of PO injectors are mixed. It was found by Pollini et al. [7] in a cross-sectional study that PO injectors are better educated compared with non-PO injectors. In contrast, Lankenau et al. [144] found using a mixed methods approach that most PO abusers have been expelled from school or have held back a grade.

It was stated by several researchers that PO abusers are likely to report former incarceration [5, 15]. It has also been shown in a cross-sectional study involving 540 treatment facilities in 35 states across the United States, that PO injections are positively associated with health problems, psychosocial problems, and utilization of medical services [145].

2.2.4.2 Risk-taking behaviors and contexts of PO injectors

It was found in several studies using both quantitative and qualitative designs that PO injectors are likely to report high-risk injection practices, which are known to be associated with HCV seroconversion, such as high injection frequency [6], sharing of used syringes [7, 8] and injection paraphernalia [9-12, 125], injection in public places and/or with friends [7, 14], and poly-substance abuse [14]. In addition, PO injectors perceive themselves at lower risk of overdose, and HCV and HIV infections than non-PO injectors [7]. The researchers also reported high rates of risky sexual behaviors, such as unprotected sex under the influence of oxycodone and hydrocodone, among PO injectors [9].

In addition, qualitative researchers discovered that PO injectors practice risky behaviors uniquely specific for them. These risky behaviors are derived from unique drug practices of PO injectorss, dominant outside of traditional networks of heroin or cocaine injectors. In particular, it includes reuse or trade blood-contaminated filters with a significant amount of residual PO accumulated on them due to multiple filtering (the so-called “washes”) [6, 14]. “Washes” can be shared among street drug users, or they can be sold on the streets [14]. PO require repeated injections for one single dose, which heightens the risk for contamination of filters with infected blood [139]. The second-hand use of these “washes” may increase the risk for acquiring HCV infection [5, 6]. As well, there are certain forms of PO (e.g., Fentanyl matrix patches) which are often only affordable to certain groups of PO users and, therefore, require sharing by loading syringes from a single container. This may also lead to high-risk conditions for the transmission of HCV [10, 146]. It is worth mentioning that due to the presence of pill fillers, PO typically require more water to be dissolved than heroin. As a result, unlike heroin injection, PO injection

usually requires either bigger syringes or a greater number of injections per dose, which in turn increases the likelihood of exposure to HCV [11].

Furthermore, as mentioned in several reports [5], PO injectors may be "isolated" from older and more "mature" heroin injectors' culture. Therefore, most of PO users who do not inject heroin may be less informed about the dangers of equipment sharing and advantages of harm reduction and prevention strategies, such as OST and sterile syringes. Thereby the lack of proper information may be one of the risk factors for HCV acquisition [5, 139].

2.2.4.3 Poly-substance abuse among PO injectors

One of the factors linked to increased risk for HCV acquisition is poly-substance abuse of drugs [17, 18]. Of note, several qualitative and quantitative studies found that PO were misused as part of a broader pattern of poly-drug use [6, 13-16].

Poly-substance abuse was highly prevalent among participants who reported using combinations of different PO (both *per os* and by injecting) or combinations of PO with non-opioid drugs [14, 21, 143]. PO users (both injectors and "pill poppers") may also abuse benzodiazepines [21]. In a cross-sectional study using logistic regression analysis of the sample of young adults with a history of MDMA (3,4-methylenedioxymethamphetamine)/ecstasy abuse (Ohio, USA), the use of pharmaceutical tranquilizers and pharmaceutical stimulants was shown to be the strongest predictor of illicit use of PO [147]. The study did not specify the route of PO administration. Among focus group participants in Miami, prescription drugs, including PO (administration route was not specified), were used in combination with club drugs (e.g., PO with methamphetamine, or codeine with ecstasy, or hydrocodone with cocaine) for the purpose of achieving "a better high" (administration routes were not specified) [148]. According to qualitative researchers from Montreal, people who use PO primarily by injection often co-use cocaine injection and/or smoke crack [6, 16]. It was also shown that cocaine users frequently take PO to abate the unpleasant anxiety-inducing effects of consuming high doses of cocaine during binges [14, 148]. Moreover, co-use of heroin with PO was reported by several studies. Thus, a qualitative study indicated that young PWID use both PO ("pills" or injections) and tranquilizers as substitutes for heroin when the latter is unavailable [144]. This is done to boost the high from heroin, to self-medicate in certain health conditions (e.g., untreated pain or heroin withdrawal), to curb heroin use, and to reduce the risks associated with injecting heroin [144]. In another qualitative study, it was shown that users

addicted to PO may proceed to both PO injection and heroin injection after "popping pills" to alleviate withdrawal symptoms; this is defined by the availability of the drug [141]. In a recent study from Montreal, it was demonstrated using latent class analysis that a subgroup that predominantly injected PO also co-injected heroin (in a smaller proportion). Another subgroup consumed both types of drugs through various routes of administration [149].

2.3 Overview of the published evidence regarding the association of PO injection with the risk of HCV transmission

Positive association between HCV infection and PO misuse was reported in several recent studies. However, only a few studies examined the association between PO injection and HCV incidence, and these studies reported mixed results.

Thus, high prevalence of active HCV infection (65%) was shown in a random sample of HCV-positive PO users, of whom most snorted and injected PO; the sample was drawn from a longitudinal cohort study in Appalachia [142]. Furthermore, independent association between PO injection and HCV prevalence was found in a cohort of rural Appalachian PWID [8]. In a cross sectional analysis using logistic regression, the participants who injected PO were 2.2 times more likely to be HCV seropositive after adjusting for other covariates (95% CI: 1.13,4.25). These findings are in line with another study conducted in a similar population of rural Appalachian PWID, in which self-reported HCV infection was significantly greater among PO injectors [150]. Interestingly, Appalachia is one of the USA regions with the highest opioid prescription rates, and it reports substantial increases in cases of acute hepatitis C [151]. These data suggest that PO abuse which is followed by initiation to injection may lead to increases in the rates of HCV infection among young population of nonurban settings.

In a similar manner, independent association between PO injection and prevalence of HCV was found in young drug injectors in urban settings (Cortland County, New York, USA) [152]. In that study, after adjusting for other covariates, individuals who reported PO injections were 5 times more likely to be HCV positive compared with those who injected other drugs (adjusted odds ratio (aOR): 5.53; 95%CI: 1.92,15.91) [152]. Similar findings were reported by a quantitative study from Vancouver: baseline HCV seropositivity among street-involved youth was associated with PO injection in a cross-sectional analysis (odds ratio (OR): 8.69, 95%CI: 5.01,15.1) [19].

There are only two studies were the incidence of HCV transmission among PO injectors was tested. First, it was recently shown by Bruneau et al. [5] in a longitudinal study using time-updated Cox proportional hazard regression model that PO injectors were more likely to seroconvert compared with non-PO injectors (Montreal's HEPCO cohort). Injecting PO was associated with the 3.2-fold increased risk of HCV acquisition in a univariate regression model, and PO injection remained an independent determinant of HCV infection in multivariate model with the adjusted hazard ratio (aHR) of 1.87 (95%CI: 1.16,3.03) [5]. Moreover, PO injectors who did not co-use injection heroin were at a significantly greater risk of HCV acquisition compared with those who reported injecting both drugs [5]. It was suggested that this might be due to the fact that PO injectors in Montreal are less experienced, potentially less informed and are, therefore, at higher risk of HCV infection, as opposed to PWID who are part of more "traditional" networks of heroin users and are more knowledgeable about effective outreach and prevention strategies [5]. Another study that examined HCV incidence and PO injection did not find such association. Specifically, data from a Cohort study in Vancouver that included a high proportion of Aboriginal youth showed that PO injection within the past 6 months was positively associated with HCV seroconversion in a univariate logistic regression analyses (HR: 3.48; 95%CI: 1.57,7.70). However, when adjusted for other factors, the risk of HCV acquisition from recent injection of PO did not exceed that of traditional street drugs [19]. Of note, this study was restricted by a small proportion of participants who injected PO (4.2-4.4%), limiting the power to detect marginal risk difference. In addition, possible local differences in study samples, environment, and harm reduction programs in the area may also contribute to mixed results obtained in those two studies.

Of interest, in both abovementioned longitudinal studies, the association between PO injection and HCV incidence was significant in univariate analysis, and the significance was lost in the second study after adjusting for other factors, including co-use of other drugs. It cannot be excluded that co-use of some drugs with PO injection may modulate the association between PO injection and the risk of HCV seroconversion. For public health purposes, it is important, therefore, to more precisely evaluate the effects of co-use of different drugs with PO injection in relation to HCV seroincidence, and to examine the effect of poly-substance abuse in PO injectors.

2.4 HCV prevention and access to treatment for people who inject PO in Canada

Prevention of HCV transmission among PWID is both extremely important and challenging for public health. As mentioned above, HCV is very contagious by parenteral exposure, the reservoir of HCV-infected people carrying this virus is growing, and vaccine against HCV has not been developed yet. Despite available efficient treatments, there are still serious problems regarding HCV diagnosis and management. HCV diagnosis may reinforce an individualizing discourse of blame and stigma. HCV treatment, while effective, may cause adverse effects leading to increased physical burden. In addition, the treatment may be contraindicated in case of certain comorbidities. Another potential limiting factor is the cost of the screening and traditional treatment interventions (i.e., pegylated interferon and ribavirin, PEG-IFN/ribavirin), with the costs ranging from 100,000 to 603,352 USD per quality-adjusted life-year. [153]. New and highly effective treatments with directly acting antiviral agents (DAA) are even more expensive. For example, a 12-week course of treatment with sofosbuvir costs more than $84,000 USD [154]. Therefore, prevention of HCV infection will help minimize these costs and will allow to avoid the associated substantial health and moral burden.

Public health strategies to reduce the burden of PWID-associated HCV infection include primary and secondary prevention efforts, and improvements in linkage of infected PWID to care and treatment services. The following interventions are applied as HCV preventive measures: 1) behavioral interventions, 2) substance-use treatment, including opiate-replacement therapy (ORT, OST), 3) syringe (needle)-access/exchange programs (SEP, NEP), 4) syringe disinfection with bleach, and 5) multicomponent programs [155, 156]. Furthermore, stable housing and supportive living situations seem to be important facilitators for drug use cessation in PWID [157] and can therefore be considered as preventive measures.

Unfortunately, despite a high prevalence of hepatitis C virus (HCV) infection among PWID, the vast majority of them did not engage in HCV care. This is due to a high number of obstacles [158], including barriers at the level of the patient, provider and system [159]. Furthermore, for the newly emerged population of PO injectors, additional specific obstacles may exist since traditional prevention strategies may be less efficient because of specific ways of drug acquisition and use, and some other factors [5]. However, in contrast to USA or Australia, no federal interventions aimed at NMPOU or PO injectors are currently implemented in Canada [4].

Of note, most of research supporting the effectiveness of such measures as methadone maintenance treatment, needle exchange programs and safe injection sites has been conducted predominantly among populations of heroin users [160]. The main form of treatment for opioid dependence, OST, relies mainly on the evidence originally developed for heroin dependence [20, 21].

Another problem which HCV-positive PO injectors may face is the insufficient access to HCV treatment. Studies showed that PEG-IFN/ribavirin treatment is safe and effective among PWID [62, 159]. The newly developed simple, tolerable and highly effective DAA-based therapies are even more promising for this group of population because DAA cause less side effects, and it is easier to comply to DAA-based treatment [161]. Unfortunately, HCV treatment uptake remains unacceptably low in North America (15–20 per 1000 infected in 2009–2010 in Canada) and Australia [162]. This contrasts the majority (53%–86%) of PWID reporting a willingness to receive treatment for HCV under current treatment scenarios with PEG-IFN/RBV [159, 163]. Furthermore, the willingness to undergo HCV treatment may be even higher with the newly developed, better tolerable and highly effective DAA-based therapies [161]. Barriers at different levels of healthcare system as well as at the patients' level need to be overcome to increase HCV treatment uptake among PWID [159, 161, 164]. At the population level, treatment of the groups with the highest risk of transmission may have the greatest impact on reducing the prevalence and incidence of HCV infection. Therefore, further studies are needed to identify HCV-infected individuals with the highest risk of virus transmission, as well as social/injecting networks with particularly high rates of HCV spread.

Given the evidence that PO injectors may be at increased risk of HCV transmission, there is an urgent need to investigate factors associated with PO injection, and the relationship between PO injection and HCV seroincidence, in order to develop targeted interventions and treatment strategies [21, 87].

2.5 Summary of the literature review

Hepatitis C poses an important public health burden because of substantial morbidity and mortality rates. Close to 1% of Canadian population are infected with HCV [2, 61, 64, 65]. The main route of HCV transmission in Canada is through illicit drug injection. This is aggravated by risk-taking behaviors of PWID and conditioned by other (social) determinants of HCV transmission, such as homelessness, former incarceration, poverty, etc. [62, 87, 88, 106]. Risky behaviors, patterns, and

perceptions are shaped by a complex interplay of social and environmental factors [165] that requires thorough monitoring over time.

Recently, a new population of PWID has emerged and grown in size in Canada. It consists of people who inject PO [4, 6, 21, 120]. In Montreal, the proportion of PO injection among HCV-positive participants of the HEPCO Cohort (open prospective cohort of active PWID) has more than tripled between 2004 and 2009 [5]. Qualitative studies demonstrated that on the streets of Montreal the main way of PO abuse is through intravenous injection [6]. PO injection was positively associated with HCV infection in a few cross-sectional studies [150, 152], and it was found to be an independent factor of HCV seroconversion in one longitudinal study [5]

Traditional prevention and harm reduction approaches may not be effective among this population due to the number of factors such as the ways of drug acquisition and use [5], and, possibly, younger age of PO injectors. In addition, some factors that may reduce the effectiveness of traditional HCV prevention and harm reduction strategies for PO injectors remain unknown, as this new and unique drug abuse practice is still poorly understood. There is a critical need for further studies characterizing PO injectors in order to determine the best designs for specialized multicomponent programmes, such as evaluation, care, treatment, and counseling, that target the PO injector population [5, 166]. Moreover, a better understanding of the drug-using contexts is needed to explain local differences in the modes of PO consumption [6]. This will help to design targeted prevention programs which will be effective in appropriate settings.

Also, PO are often abused as part of a broader pattern of poly-substance use [6, 13-16]. Abuse of multiple drugs was linked to increased risk of HCV infection [17, 18]. While the existing data are still inconclusive, the mixed results of the two studies researching HCV seroincidence in PO injectors ([5, 19]) allow to speculate that co-use of other drugs may be a significant factor associated with the risk of HCV acquisition in PO injectors. It is important for public health to find out those specific drugs that may predispose to increased risk for HCV acquisition when co-used with PO. In addition, it is important to examine the association between co-use of multiple drugs by PO injectors and their risk of HCV acquisition.

Characterizing PO injectors and examining the associations between their behaviors, living conditions and drug use patterns in relationship to risk of HCV acquisition will be the first step in developing effective prevention and intervention strategies for this new growing group of PWID [5, 21, 87, 166].

3. OBJECTIVES

The overall aim of this study is to examine the characteristics of people who inject PO, and to assess the association of PO injection and its combination with other drugs with the risk of HCV acquisition.

OBJECTIVES and HYPOTHESES:

Objective I. To examine sociodemographic characteristics, drug use patterns, injecting behaviors, and living contexts associated with PO injection in a cohort of PWID in Montreal.

Objective II. To compare HCV incidence rates between PWID who reported PO injection at baseline and those who did not.

Objective III. To examine PO injection, with or without co-use of other drugs, as an independent predictor of HCV transmission among PWID. Specifically, we aim to assess (i) crude and adjusted associations between PO injection and HCV seroincidence; (ii) crude associations between combination of PO injection in dyads with different drugs and HCV seroincidence; and (iii) crude and adjusted associations between co-use of multiple drugs with PO injection and HCV seroincidence .

Hypothesis for Objective I. Based on the literature, we hypothesize that, compared with non-PO injectors, PO injectors are younger and are more likely to report sharing of injection equipment and co-using PO with other drugs, including stimulants, tranquilizers, and heroin.

Hypothesis for Objective II. We hypothesize that HCV incidence rates are significantly higher among PO injectors of HEPCO cohort compared to non-PO injectors.

Hypothesis for Objective III. We hypothesize that (i) PO injection is an independent predictor of HCV acquisition; (ii) co-use of cocaine injection with PO injection increases the risk of HCV seroconversion; (iii) co-use of multiple drugs with PO injection increases the risk of HCV seroconversion.

4.0 METHODS

4.1 Design and data sources

4.1.1 Study design

The present study consisted of secondary analyses of data collected for the HEPatitis COhort (HEPCO), a prospective cohort study conducted among PWID recruited and followed in Montreal, Quebec, Canada. The main goal of this cohort study was to examine individual and contextual factors associated with HCV infection and re-infection.

Analyses for the present study utilized two datasets: 1) a cross-sectional analysis of baseline data obtained from HCV positive and HCV seronegative participants enrolled between November 2004 and March 2011 (Objective I), and 2) a longitudinal analysis of the Cohort data collected between November 2004 and December 2013 among participants who were initially HCV-seronegative at baseline (Objectives II and III).

4.1.2 Study population:

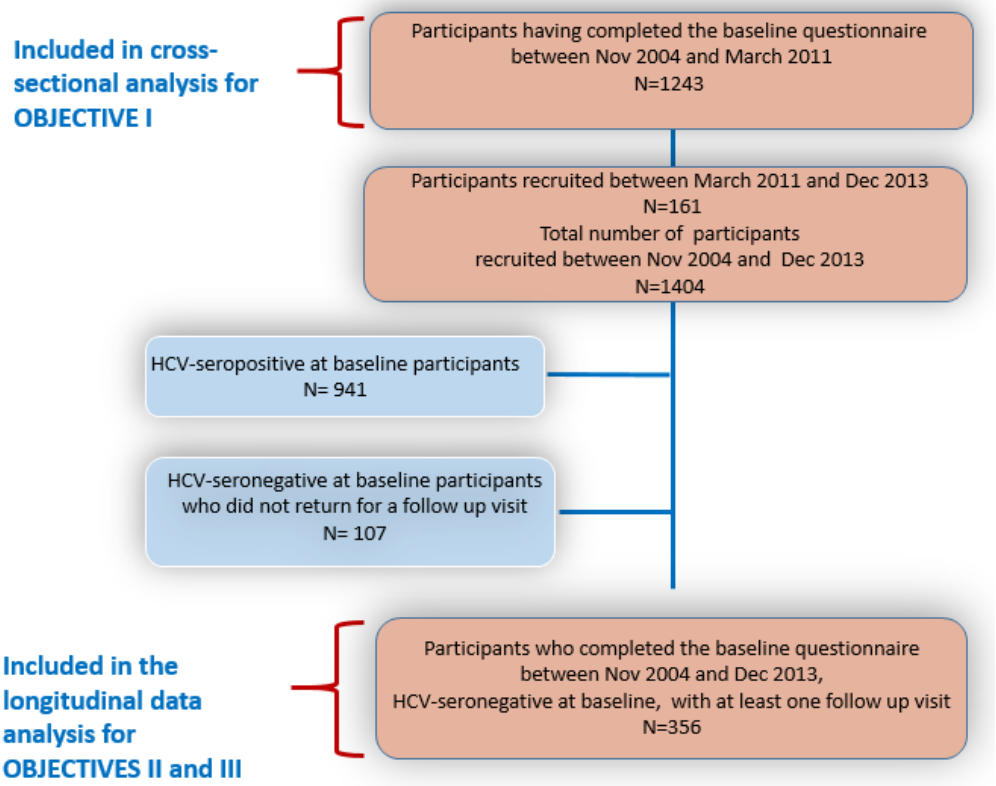
The participants of the study were members of the HEPCO, a cohort that is part of a larger research project, known as the St. Luc Cohort. The St. Luc Cohort, a CIHR/FRSQ funded prospective open cohort of PWID, was established in Montreal in 1988 to study determinants of HIV transmission [167]. In order to be eligible to St. Luc Cohort, participants must be 18 years of age or older, reside in the Montreal area, and be active injection drug users (having injected drugs within the past six months). In 2004, a new focus was added to the study's objectives, and HEPCO, an embedded cohort, was constituted to examine the individual-related and contextual factors associated with HCV infection [94].

4.1.3 Participants recruitment

Participant recruitment strategies within HEPCO were consistent with the strategies employed within the St. Luc Cohort. Participants were recruited via self-referral by word-of-mouth and street-level strategies, as well as through referrals from the St. Luc Hospital Addiction Medicine Unit and collaborating institutions (shelters, public and private rehabilitation centers, therapeutic communities, and community-based agencies including street workers). Additionally, other sources such as health care centres and private doctors were utilized.

A total of 1,243 PWID, both HCV-positive and HCV-negative at baseline, who completed baseline questionnaire between November 2004 and March 2011, were included in the cross-sectional analysis (Objective I). The incidence analyses (Objectives II and III) included HCV-negative at baseline participants of HEPCO of whom 30% were recruited from the St. Luc cohort, 36% were enrolled through street-level strategies, and 34% were enlisted through community programs. Of the 463 eligible HCV-negative PWID, 356 (76.8%) were followed up at least once between November 2004 and December 2013, and were included in the study (Objectives II and III). Figure 2 illustrates the formation of study samples, according to specific objectives.

Figure 2. Description of study sample



After signing a consent form, PWID interested to be enrolled were first screened for eligibility. During the screening process, a short questionnaire was completed, and a blood sample was collected to test for HCV status. Participants were invited to return to discuss their serostatus test results two weeks after the initial visit, at which point post-test counseling and referrals were provided. For HEPCO eligible participants, a follow-up was scheduled at 6 months intervals in

2004-2011, and, since 2012, at 3-month intervals. Follow-up visits consisted of completing the interview-administered questionnaires and blood sample collection to test the HCV serostatus (see below). Syringes and condoms were provided on request, and hepatitis B immunization was offered through the Centre Hospitalier de l'Université de Montréal (CHUM) clinic next door. All participants received a CAD20 stipend at each visit. Seroconverting participants were systematically referred to the CHUM Addiction Medicine program for medical follow-up and treatment assessment.

All participants signed an informed consent in compliance with institutional review board regulations of the Centre Hospitalier de l'Université de Montréal.

4.2 Ethical considerations

The HEPCO study received ethical approval by the CHUM's Review Ethics Board (REB), and is renewed annually upon approval of an updated report. As this MSc project involves analysis of the existing dataset, it falls within the mandate of the original project. Since no modifications have been done for this study, we did not have to submit any specific amendment for this project. Dr. Julie Bruneau, one of the instigators of the HEPCO Cohort, is a supervisor of this study, and she approved me as a researcher to perform the study. On August 28, 2013, I have signed the form consenting to full confidentiality while working with the database of the HEPCO Cohort.

Informed consents were obtained for all interviews conducted for the project. Physical risks includes a venipuncture to draw blood, a procedure involving minor discomfort. Additionally, psychological discomfort may accompany learning of positive HCV/HIV serostatus. Therefore, before collecting blood, extensive pre–post counselling was provided for the participants regarding the physical risks, and advantages and disadvantages of learning the HCV and HIV screening test results were discussed. The confidentiality was ensured by the use of unique identification codes on forms, specimens, and in our main dataset. Data containing personal identifiers were kept in locked computers with protected access, and links between these data and unique participant codes in the main dataset were accessible only by main personnel involved in cohort operations.

4.3 Data collection

4.3.1 Questionnaires

The questionnaires have been adapted from previously used, validated instruments [168, 169], and adaptations were pilot tested in the target population. Psychometric results were consistent with those of other Canadian PWID study instruments [170-172]. Closed-ended, structured interviews using this instrument were conducted with each participant. The current baseline and follow-up questionnaires have been extensively updated in 2010 to address evolving knowledge and interests specifically pertaining to HCV infection. Questionnaires were administered by trained interviewers fluent in French and English who were blinded to the viral status of the participants and who were aware of cultural issues relevant to PWID. Baseline questionnaire required 45 minutes to administer. Follow-up questionnaire, while shorter, was similar to the baseline questionnaire to allow repeated measures analyses.

Questions in a baseline questionnaire included sociodemographic information, past and current drug use, injection behaviors and drug injection patterns, sexual behavior assessment, service utilization, and a short medical care history. In general, baseline questions were designed to cover the last 6 months. Taking into account that the study population consists of PWID, to reduce the recall bias, questions related to the use of drugs and questions on highly variable behaviors covered the past month. Questions in the follow up questionnaire were designed with reference to the last 6 months for the period of 2004 - 2011, and referred to the last 3 months after 2011. A baseline questionnaire used for the present project is provided in the Appendix.

The interviews were held in interview rooms at Centre de Recherche du CHUM (CRCHUM), St Luc/HEPCO cohort building.

4.3.2 HCV and HIV testing

At study entry, after pretest counselling, a 30 ml blood sample was collected for HCV and HIV testing by venepuncture. The HCV infection status was detected as the presence of anti-HCV antibodies, detected by enzyme immunoassay assay (EIA; Abbott Laboratories, Abbott Park, IL, USA) and confirmed by reverse transcription–polymerase chain reaction (RT–PCR; Roche Diagnostic Systems, IN, USA). Specimens with indeterminate results were sent for confirmatory dual EIA and/or recombinant immunoblot assay (RIBA). These procedures were consistent with those adopted by the Infection and Immunity Research Laboratory at CHUM at the time when this

research study was conducted. All seroconverters of HEPCO Cohort had a documented negative HCV antibody test at the time of enrolment and a subsequent positive HCV antibody test during follow-up visits.

4.3.3 Follow-up procedures

Follow-up procedures were consistent with PWID cohort studies in other settings [173, 174]. Cohort staff employed various methods to ensure optimal follow-up of this difficult-to-reach population. Follow-up strategies include the following procedures.

(1) Maintenance of a tracking database of contact information. At each meeting, study participants were invited to provide the research team with the updated contact information of their relatives, friends, and the agencies where participants could be reached. Participants were guaranteed that their participation in the study will not be revealed while communicating with their contacts. (2) Systematic tracking. Cohort personnel made every effort to contact each participant by telephone or by mail one month prior to the scheduled interview. (3) In case the attempt to contact participants by phone or via mail was unsuccessful, agencies where participants could be reached given their specific consent information were contacted by the research team. Such places included addiction treatment agencies, shelters, and community organisations providing sterile injection material (e.g., Cactus, Spectre de rue). (4) Monetary incentive: CAD20 was given at each visit during the study period. (5) Additionally, linkage with government data banks such as "Social Security", after having obtained consent from the participant, has been established.

The HEPCO Cohort yielded the follow-up rates comparable to those reported among similar cohorts of PWID [175]: 75% between the first and second study visits, and >80% between each subsequent follow-up visits.

4.4 Measures. Definition of variables

4.4.1 Specific Objective I

The dataset for the cross-sectional analysis included continuous and categorical variables that described socioeconomic features, drug use patterns, risky behaviors, and contexts of drug use among PWID of HEPCO cohort collected for the period from November 2004 to March 2011. Table 1 shows the content of a baseline dataset for the Objective I of the project in accordance with the PICOT concept [176]). Of note, PICOT is a commonly used format of a study research

question that specifies study Population, Exposure or Intervention, Outcome, Comparison group, and Time.

Table 1. Description of a baseline dataset for Objective I in accordance to the PICOT concept

Relation to the PICOT	Description
Participants	HCV seronegative and HCV seropositive PO injectors of HEPCO cohort of PWID for the period 2004-2011
I (E): Exposure	Sociodemographic and behavioral characteristics, living and injecting contexts
Comparison	HCV seronegative and HCV seropositive participants of HEPCO cohort of PWID for the period 2004-2011 who do not inject PO
Outcome	PO injection during past month
Time	November 2004- March 2011

4.4.1.1 Independent variables

The choice of variables representing risky behaviors, drug use patterns, and living contexts (table 2) was informed by the literature. Sociodemographic characteristics included age, gender, ethnicity, education level, and migration to Montreal. The variable "age" has been analyzed in increments of five units (five years) to reach better practical understanding of the association with the outcome. Education level was dichotomized as college education or higher, "yes/no". "Migration to Montreal" was defined as coming to Montreal from other country/province/city at one point during the participant's lifetime. Since less than 1% of the sample (9 participants (0.72%)) were migrants from outside of Canada and USA, for subsequent bivariate comparisons and regression analyses these participants were included in a category "outside of Quebec" along with those who came from other Canadian provinces and USA. Of note, we did not include the level of income in our analysis. This is because many PWID rely heavily on inconsistent income generating sources, including illegal ones (e.g., panhandling, prostitution, drug dealing) [177]. Therefore, the level of income for the past 1-6 month may not accurately reflect the economic status among this population.

Variables representing participants' living and injecting contexts included: unstable housing conditions, former incarceration, and injecting in public places. Traditionally, unstable housing is defined as living in a short-term occupancy hotel/residence/motel, and having moved more than once in the last year. However, consistant with previous studies [178], the term "unstable

housing conditions" in the present study was defined as living in shelters, on the street, or in apartment-hotels rented on a monthly basis. This demonstrates a rapid turnover compared to typical 12-month rent standards in Montreal. Injecting in public places was defined as injecting in any of the following environments: on the streets, in the parks, bars, public restrooms, shooting galleries, and at peepshows. Based on the answers to the corresponding questions in a baseline questionnaire, a dichotomous "yes/no" variables were created. These covariates were explored with reference to the past 6 months, with the exception of "unstable housing conditions" which referred to the past month. Reference to the past month for this covariate was chosen due to the overly high variability of housing conditions over longer periods of time among PWID.

Drug use patterns and injection behaviors were assessed by questioning participants on the type of drugs used, modes of administration, and sharing practices. With regard to the use of substances, six variables were generated, each representing the use of one of the following drugs: heroin injection, cocaine injection, cocaine/crack smoking, alcohol use, and non-injection use of amphetamines and tranquilizers. Dichotomous ("yes/no") variables were created, with participants reporting consumption of the corresponding substance at least once during the previous four weeks being included in the "yes" category. "Amphetamines" were explained to the participants as "speed, meth, crystal, ice". Tranquilizers were defined as "downers, peanuts, benzos". The term "injection equipment" was explained as including the drug preparation container, water or dilution liquid, and filter or cotton. The variable "sharing syringes or other injection equipment" was explored in reference to the past six months.

Additionally, dichotomous variables representing HCV and HIV serostatus ("positive/negative") were included in the analysis. The serostatus was determined by test results at baseline. Table 2 presents a description of all of independent variables explored for specific Objective I.

Table 2. The independent variables included in the analysis related to Objective I

Variable	Description
Sociodemographic characteristics	
Age at baseline, number of years of life (bivariate comparisons), 5 year increment (logistic regression0	Numerical, continuous
Gender	Categorical, binary, male/female
Ethnicity	Categorical, binary, Caucasian/other

Education	Categorical, binary, College education or higher/no college education
Migration to Montreal	Nominal, represented by the name of the country/province/city participants came from
Behavioral factors and living contexts	
Injecting in public places past 6 months	Categorical, binary, yes/no
Unstable housing past month	
History of incarceration past 6 months	
Sharing syringes or injection equipment past 6 months	
Use of substances	
Heroin injection past month	Categorical, binary, yes/no
Cocaine injection past month	
Cocaine/crack smoking past month	
Alcohol use past month	
Amphetamine non-injection use past month	
Tranquilizers past month	
Serostatus	
HCV seropositivity	Categorical, binary, seropositive/seronegative
HIV seropositivity	

4.4.1.2 Dependent variable

Dependent variable for the cross-sectional analysis related to Objective I was "PO injection". An exhaustive list of known commercial and street denominations was given to participants to help them identify PO among substances in circulation, including opioids such as hydrocodone (Dilaudid®, "dilos"), oxycodone ("OxyContin®, "percs", "oxy"), fentanyl, etc. No detailed information on specific PO-related substances was collected. A categorical dichotomous ('yes/no") variable was created, with participants reporting consumption of PO at least once during the previous four-weeks being included in the "yes" category.

4.4.2 Specific Objectives II and III

Table 3 represents the content of a longitudinal dataset related to research Objectives II and III of the project in accordance to the PICOT concept ([176]).

Table 3. Description of a dataset for Objectives II and III in accordance to the PICOT concept

Relation to the PICOT	Description
Participants	HCV-seronegative at baseline PO-injectors participated in HEPCO between 2004 and 2013 with at least one follow up visit
I (E): Exposure*	Primary determinants: PO injection, co-use of other substances with PO injection Secondary determinants: social and behavioral characteristics, living and injecting contexts
Comparison	HCV-seronegative at baseline non-PO injectors participated in HEPCO between 2004 and 2013 with at least one follow up visit
Outcome	Time-to-HCV seroconversion
Time	November 2004 - March 2013

*"E" (exposure) relates to Objective III solely

4.4.2.1 Independent variables

To address Objective III and its three sub-objectives, the main independent variables of interest were i) "PO injection", ii) the six variables representing "co-use of PO injection in a dyad with one other drug" (see below) and iii) cumulative patterns of drug use, "cumulative pattern", representing the use of PO with incremental numbers of other drugs (table 4). Additionally, other six variables representing use of different drugs (cocaine injection, heroin injection, crack/cocaine smoking, amphetamines non-injection use, tranquilizers non-injection use, alcohol, see section 4.4.1.1) were explored for the crude association with HCV seroconversion (table 4).

The six covariates each representing co-use of PO injection in a dyad with one other drug of interest were generated as shown in table 4. To generate these covariates, we applied the dummy variable technique that is commonly used to sort data into mutually exclusive categories within the same variable. In this case, for each variable, four "dummy" categories were formed representing different combinations of either "using PO injection", or "using the drug of interest", or "co-use of the drug of interest with PO injection", with " use neither PO nor the drug of interest" as a reference category (table 4). Co-use of drugs of interest with PO injection was defined as use of the drug of interest reported at the same time period (past month) as the use of PO injection. Our instrument (HEPCO questionnaire) did not allow distinguishing between consecutive and simultaneous co-use.

We further examined the association between poly-use of drugs with HCV seroincidence in PO injectors, including only drugs that significantly changed the risk of HCV seroconversion when

co-used with PO injection. A variable "cumulative pattern" has been created through the same dummy variable technique. This variable included the following mutually exclusive "dummy" categories: "no PO injection" as a reference category, "injection PO plus 0-2 drugs", and "injection PO plus 3 drugs". This variable was chosen to be further explored in a multivariate Cox regression model because it represents patterns of drug use most relevant to the risk for HCV seroconversion among PO injectors and shows the cumulative effect of multi-drugs' use.

Table 4. The independent variables representing drug use patterns in PO injectors

Variable*	Description	
Drug use past month	PO injection	Categorical, binary, yes/no
	Heroin injection	
	Cocaine injection	
	Cocaine/crack smoking	
	Alcohol use	
	Amphetamine non-injection use	
	Tranquilizers non-injection use	
Co-use of PO injection in a dyad with each one of the abovementioned drugs past month *For clarity, a description of the categories used for analysis is provided for cocaine; this was replicated with each of the other drugs*	Categorical, includes 4 mutually-exclusive "dummy" categories 1) Use of neither PO injection nor drug of interest (e.g., cocaine) (ref) 2) Use of both PO injection and drug of interest (e.g,. cocaine) 3) Use of PO injection, but no drug of interest (e.g., cocaine) 4) Use of drug of interest (e.g., cocaine) but no PO injection	
Cumulative pattern, past month	Categorical, includes 3 mutual-exclusive "dummy" categories: 1) No PO injection (ref) 2) Co-use of PO injection with 0-2 other drugs 3) Co-use of PO injection with 3 other drugs	

*Each of these variables was explored in a separate univariate model with "time-to-HCV seroconversion" as an outcome. Only the variable "cumulative pattern" was included in the multivariate model.

In addition, other factors which may be associated with HCV seroconversion and which mayhave a confounding effect on the associations between combination of PO with co-use of other drugs and the outcome were examined. These independent variables were informed by previous

studies exploring determinants of HCV seroconversion (section 2.1.3.3) and with considerations regarding the existing sample size and the availability of variables in our dataset. As a result, the following variables were included in our analysis: age, gender, ethnicity, education, unstable housing conditions, history of incarceration, sharing syringes or injection equipment, and injecting in public places. These independent variables were defined in a manner consistent with the section 4.4.1.1. The HIV status was not included in the analysis due to the very small number of HIV-positive participants in the sample (n=3; 0.84%). In addition, migration to Montreal was also not included in the analysis. This is because our definition of migration was not a "recent migration to Montreal", but "migration to Montreal at one point in a lifetime". Therefore, we could not distinguish between recent and non-recent migration. In our multivariate model, we considered covariates associated with HCV seroconversion in previous studies which could confound the association between our primary predictor and time-to-HCV seroconversion. The non-recent migration to Montreal does not appear to be one of these factors.

Of note, independent variables reviewed in this section, except baseline age, gender, ethnicity, and education, were modelled as time-updated.

4.4.2.2 Dependent variable: time-to-HCV seroconversion

Dependent variable for the longitudinal analysis of data (Cox regression) was "time-to-HCV seroconversion". This measure was defined as the time period between the enrollment into the study and the date of HCV seroconversion. The date of seroconversion was estimated as a midpoint between the last negative and the first positive HCV antibody test which is similar to previous reports by our research group [179] and others [180, 181].

4.5 Missing values

Data were defined as missing if participants refused to answer a question, were not able to recall the answer, or the answer was not registered by the interviewer. The percentage of missing data for each explanatory variable was less than 5%, and there were no missing data in outcome variables. Every effort was made to restore the original answers by revising the database and the questionnaires and by talking to the members of the team who performed the interviews. Missing data that could not be retrieved were substituted by the most common answers; sensitivity tests showed that including imputed data did not influence p-values.

For specific Objective III, participants who were included in the study sample as having had at least one follow-up visit, were compared to those who did not return for a follow-up interview (and were therefore lost to follow-up) across all of independent variables. Study limitations due to losses to follow-up and associated differences are discussed in the corresponding sections ("Methodological considerations" and "Limitations"), and they are accounted for in the interpretation of the findings.

4.6 Overview of methods for statistical analysis

4.6.1 Cross-sectional analysis (Objective I and III)

4.6.1.1 Descriptive statistics and bivariate comparison tests

Categorical variables were described using frequencies and percentages. Continuous variables were characterized using means and standard deviations. Bivariate comparisons were made using Chi-square statistics for categorical variable and Student's t-test for continuous variables.

Chi-squared test was applied to evaluate 1) whether the proportions of PWID with the baseline characteristics represented by the categorical variables differ i)between the two groups, PO-injectors and non-PO injectors and ii) between HCV- negative PWID included in the incidence analysis and those lost to follow up after the baseline assessment.

The following assumptions of Chi-squared test were verified: 1) study groups are independent; 2) the rows and columns of the 2x2 table for each variable are mutually exclusive; 3) expected frequency in each of the four cells is at least five. The test statistics uses Chi-squared distribution. The standard Wald asymptotic confidence limits are based on the normal approximation to the binomial distribution.

The unpaired (two-sample) two-tailed Student's t-test was performed to consider the difference in means for continuous variables between the two groups, i)PO injectors and non-PO injectors, ii) HCV-negative PWID with at least one follow up visit and those lost to follow up after the baseline assessment. The two-tailed t-test was chosen because it has more statistical power than one-tailed test. The following assumptions of the t-test were verified: 1) in the population of PWID, the variable is normally distributed in each group; 2) the variances of both groups are the same. The test follows the t-distribution. The F-test was used to evaluate the equality of variance; the α of 0.05 was assigned to the comparison tests.

4.6.1.2 Logistic regression modeling

To evaluate the associations between characteristics and drug use patterns of PWID with PO injection, logistic regression modeling was applied.

Logistic regression is a special case of the generalized linear models; it describes a relationship between a categorical response/outcome variable and a set of predictor variables [182]. The relationship between the outcome and predictors is given by the logit of probability that an individual with a particular set of values for $X_1, \ldots, X_k$ has the outcome of interest [183]. The logit of this probability is the natural logarithm of the odds of an outcome of interest, i.e.

$$\text{logit}(p) = \ln(p/1\text{-}p) = \beta o + \sum_{i=1}^{k} \beta_i X_i$$

Where
- p is the probability of an outcome of interest
- βo is the estimated constant term, the "intercept"
- β_i is the estimated logistic regression coefficient representing log-odds-ratio for a unit increase in X*i*
- X*i* is the *i*th explanatory variable, *i*=1, 2, …, *k*.

The coefficients of the logistic regression model represent the log-odds-ratios. The results of logistic regression analysis are usually presented in terms of odds ratios (OR) and corresponding 95% CI [183].

This type of analysis was chosen for the cross-sectional part of our study for the following reasons: 1) there is a binary outcome of interest (PO injecting vs. no PO injecting), 2) there is one continuous independent variable (age) and several categorical independent variables, 3) there is a need to evaluate the probability that a participant with a particular covariate pattern will have the outcome of interest (PO injection), 4) there are no repeated measures in the baseline dataset or the outcome clustered on one variable [182]. The confidence interval (CI) and significance tests for individual coefficients in logistic regression model are based on *z* statistics [182]. For testing groups of parameters simultaneously, a type of Chi-square test known as likelihood ratio test was applied.

Model validation focuses on two different aspects: calibration and discrimination. *Calibration* checks whether the predicted probabilities from the model correspond closely to true

proportions of participants with the outcome (PO injection) in different subgroups of the study population. In our analysis, calibration was assessed by the Hosmer and Lemeshow method [184]. *Discrimination* described models ability to classify correctly participants of the study into groups according to their outcome (PO injectors and non-PO injectors). Model's discriminating ability was assessed by ROC ("receiver operating characteristic") curve and AUC ("area under the ROC curve") index. Additionally, the overall *goodness of fit* was evaluated by Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), both penalizing for increasing the number of parameters in the model. With both AIC and BIC, a smaller value is considered better. Assumptions of linearity for continuous covariate were evaluated by using the "plot logit" function in SAS 9.3. The assumption of independency of observation was considered satisfied because there was no more than one pair of observations on each injection drug user.

As a first step of analysis, univariate regression models were created for all explanatory variables to identify important covariates that have at least a moderate association with outcome (PO injection). Further, explanatory variables that were found to have strong to moderate associations with the outcome ($p \leq 0.25$), as well as the *a priori* confounders, were included in the full multivariate model. The full model was subsequently refitted by using a "backward selection" technique. Backward selection subsequently eliminates redundant predictors starting from weaker candidates, at each step removing the predictor with the largest p-value [183]. The process continues until all variables have been deleted from the model or the information criterion increases [185]. Since we tested a large number of covariates, a pre-defined criterion for retaining variables in the final model was set conservatively as $p \leq 0.01$. Additionally, in our study, the clinical meaning and importance of the predictors were taking into account. The *a priori* confounders informed by the literature (gender, and HCV and HIV serostatus determined by the results of blood tests) were kept in the model independently of the level of significance. The clinically meaningful interactions between the independent determinants were evaluated.

4.6.2 Analysis of longitudinal data

4.6.2.1 Calculating the incidence rates for HCV seroconversion (Objective II)

HCV seroincidence rates were evaluated in two groups of participants, PO injectors and non-PO injectors. Only HCV negative at baseline participants were included in this analysis. As follow up time varied in different study participants, the rates at which the seroincidence occurred per person

per period of time were utilized. The seroincidence rates, therefore, were calculated using person-time survival method. More specifically, the number of observed seroconversions was divided by the number of person-years of follow-up [182]. The Poisson distribution was used to calculate the 95% CI around incidence [186].

In order to compare the rates of seroconversion between the participants who reported using PO injection at baseline and those who did not, a relative rate of HCV seroconversion was calculated. For this, the incidence rate of participants exposed to PO injection at baseline was divided by the incidence rate of those unexposed to PO injection [182].

Additionally, Kaplan-Meier survival plots were generated for the HCV-negative at baseline participants. Kaplan-Meier curves were stratified according to the baseline use of PO injection and compared using the log-rank test. For all participants, follow-up time ended when either HCV seroconversion occurred or at their last visit, depending of what came first. It was assumed that those patients who were censored (lost to follow up) had the same survival prospects as those who continued to be followed, in other words, that the censoring is uninformative.

4.6.2.2 Cox proportional hazards regression modeling (Objective III)

To examine the association between PO injection with or without co-use of other drugs, and the time of HCV seroconversion, multivariable semiparametric Cox proportional hazards regression model where most of covariates were time-dependent was used. Gender, ethnicity, education, and baseline age were treated as not time dependent variables. The semi-parametric Cox model [187] is the most commonly used multivariate approach to analyse the relations between an event incidence (in this case, HCV seroincidence) and a set of covariates [188]. The use of the semi-parametric type of a model allows to avoid the need to specify the distribution of the survival times [188] and to operate several time-dependent variables simultaneously. This model also permits to handle “right-censored” data [189], in other words, to account for the time contributed by the participants who were “censored” before the occurrence of an event.

The Cox model is based on the hazard rate. Hazard is the probability of the event (in our analysis, HCV seroconversion), and hazard rate is immediate probability of the event just after time t, conditional on survival to time t [187]. In Cox regression, hazard rate relates to covariates associated with the survival through the following equation:

$$h(t, X) = h_0(t) \exp \sum_{i=1}^{p} \beta i \, Xi$$

Where $h(t, X)$ is hazard function at time t for an individual with the vector of explanatory variables X, i=1, …, p;

$h_0(t)$ is the unspecified baseline hazard function corresponding to an individual with all explanatory variables equal to 0;

βi is the regression parameter, i.e., the logarithm of the hazard ratio, associated with a unit increase in the value of the ith explanatory variable;

Xi is the ith explanatory variable, i=1, …, p

The results of Cox regression are commonly presented in terms of Hazard Ratio (HR), and corresponding 95% CI [190]. The HR is a ratio of the hazard rate for a study participant with a particular covariate pattern to the hazard rate for another participant with a different covariate pattern.

The key assumption of the Cox PH Model is the constant hazard rate: the hazard of the event (HCV seroconversion) in any group is a constant multiple of the hazard in any other group so the hazards for the groups are assumed to be proportional [189]. In our analysis, the constant hazard rate assumption was verified by using Kaplan-Meier survival plots. The regression parameters in a Cox model are estimated using the maximal partial likelihood criterion [187]. All covariates, except the age, gender, ethnicity, and education, were modelled as time-dependent variables.

Initially, each independent variable has been assessed through the univariate Cox regression model. With regard to substance use, all main variables ("PO injection", "co-use of PO injection in a dyad with one other drug of interest", and "cumulative pattern") were assessed in the univariate analysis. The variable "cumulative pattern" for the substances that showed significant difference in HR when co-used with PO injection (cocaine injection, crack/cocaine smoking, and non-injection use of tranquilizers) was further explored in a multivariate Cox regression model. This variable was chosen to be included in the final model because it shows the cumulative effect of the most relevant drug combinations co-used with PO injection in relation to the risk of HCV

seroincidence. Additionally, other confounding variables that were found significant in the univariate analysis ($p \leq 0.25$) were initially included in the multivariate model. The full model was subsequently refitted by using a "backward selection" technique. A pre-defined criterion to retain variables in the final model was $p \leq 0.01$. In addition, clinical meaning of the covariates was considered during the process of selection. Age and gender were retained in the final multivariate model as confounders that are important for clinical perspective as described in the literature [191, 192].

The estimated HR represent the risks for HCV seroincidence associated with the patterns of drug co-use in PO injectors, adjusted to their characteristics and living contexts. A likelihood statistics was used to test the null hypothesis, and no statistically significant time-by-covariate interactions were observed at a significant level of 0.05. Goodness of fit was evaluated using the Hosmer and Lemeshow test and AIC.

All statistical analyses were conducted using SAS System 9.3 and R software [193].

4.7 Calculating the sample size

For the HEPCO study, the calculation of sample size for the analysis of HCV incidence was achieved through a comprehensive computer stimulation study. A prospective cohort study was simulated with HCV seroconversion as an outcome of interest and several covariates, such as sociodemographic characteristics (e.g. age) and putative risk factors (e.g., injection frequency rate), as explanatory variables. The study was simulated with different follow-up times for different sub-cohorts and with right random censoring due to either drop out or end of the study. The sample size and incidence rates also varied in different scenarios. The strength of the putative associations of independent variables with outcome was expressed in terms of the hazard ratio (HR). For each hypothesis (main effects of independent variables or their interactions), a number of scenarios was considered. Each of these scenarios corresponded to a different combinations of relevant parameters. For every scenario, 1,000 random samples were further generated, and each sample was analyzed independently. The study power was then estimated as the proportion of the 1,000 samples in which the two-tailed Wald test, based on the appropriate Cox model, rejected the null hypothesis of interest at the 0.05 significance level [194].

According to the results of analysis, for the sample of 300 participants, there is 81% to 91% power to detect a weak to moderate associations (HR of 1.5-1.6), and 98% or more power to

detect the strong associations (HR of 1.8 or higher) between the postulated risk factors and a primary HCV infection. Therefore, the actual sample size used in the longitudinal analysis of HCV seroincidence in the present study (n=356) allows detection of even the weak associations with the power >80% at the alpha value of ≤0.05.

5. RESULTS

5.1 Description of the study sample for specific Objective I.

The sample for Objective I comprised 1,243 participants who had completed baseline questionnaire between November 2004 and March 2011. The description of the sample is presented in Table 5.

The majority of the participants (83.8%) were males and of Caucasian ethnicity (79.8%). The mean age was 38.2 (9.8) years. Most of the participants were Montrealers, but approximately one third of the sample migrated to Montreal from other places of Quebec province at one point in their lifetime, and 9% came from other Canadian provinces and USA. The majority of participants (66%) reported cocaine injection during past month, and almost half of the sample (48%) reported crack/cocaine smoking. About one third of the participants reported PO injection (30.6%) in the previous month. The majority of the participants (71.9%) had HCV-seropositive status (table 5).

Table 5. Baseline characteristics of participants (N=1243) for Objective I

Variable	Category	N (%)
Sociodemographic characteristics		
Age at baseline, number of years of life	Mean (SD) 95% CI	38.2 (9,8) 37.8, 38.7
Gender	Male Female	1041 (83.8) 202 (16.2)
Ethnicity	Caucasian Other	1116 (79.8) 127 (20.2)
Education	College degree or higher No college degree	216 (17.4) 1027 (82.6)
Migration to Montreal	Montrealers Province of Quebec Outside of Quebec province	786 (63.2) 345 (27.8) 112 (9.0)
Use of substances		
PO injection‡	Yes No	380 (30.6) 863 (69.4)
Heroin injection‡	Yes No	376 (30.3) 867 (69.7)

Cocaine injection‡	Yes No	820 (66.0) 423 (34)
Cocaine/crack smoking‡	Yes No	598 (48.1) 645 (51.9)
Alcohol use‡	Yes No	872 (70.7) 371 (29.3)
Amphetamine non - injectable‡	Yes No	122 (9.8) 1121 (90.2)
Tranquilizers‡	Yes No	419 (33.7) 824 (66.3)
Behavioral factors and living contexts		
Sharing syringes or injection equipment	Yes No	548 (44.1) 695 (55.9)
Unstable housing‡	Yes No	525 (42.2) 718 (57.8)
Incarceration†	Yes No	277 (22.3) 966 (77.7)
Injecting in public places†	Yes No	645 (51.9) 598 (48.1)
HCV and HIV serostatus		
HIV serostatus	seropositive seronegative	132 (10.6) 1111 (89.4)
HCV serostatus	seropositive seronegative	892 (71.9) 351 (28.1)

SD: standard deviation; †refers to behaviors in the past 6 months; ‡refers to behaviors in the past month.

5.2 Specific Objective I:

Sociodemographic and behavioral characteristics of people who inject PO in Montreal

5.2.1 Bivariate comparisons

According to the results of bivariate comparison tests (table 6), the mean age of PO injectors was found to be significantly lower than the mean age of non-PO injectors with the difference in the means of 6.9 years. Among PO injectors group, there were significantly less Montrealers; the

proportion of participants who migrated to Montreal from other cities of Quebec province or outside of Quebec was significantly higher. There were 5% more women among PO injectors comparing with non-PO injectors.

The proportions of those who injected heroin, and practiced non-injection use of amphetamines and tranquilizers were considerably higher in PO injectors than in non-PO injectors. In addition, higher percentage of PO injectors reported smoking crack/cocaine (table 6). The proportions of PO injectors who had shared injection equipment or syringes was also higher than in non-PO injectors. A substantially greater proportion of PO injectors reported having unstable housing conditions and injecting in public places, while only 7.3 % more PO injectors comparing to non-PO injectors reported former incarceration. We noted that PO injectors group had a 2.6 times smaller proportion of HIV positive participants (table 6).

Table 6. Baseline characteristics of PWID
stratified by the use of PO injection

Variable	Total, N=1243	PO injectors, n=380 n (%)	Non-PO injectors, n=863 n(%)	P-value*
Sociodemographic characteristics				
Age at baseline, number of years of life, **mean(SD)** **95% CI**	 38.2 (9.8) 37.8, 38.7	 33.4 (9.4) 32.4, 34.3	 40.3 (9.2) 39.7, 40.9	 <.0001
	count (%)	**count (%)**	**count (%)**	**P-value****
Male gender	1041 (83.8)	305 (80.3)	736 (85.3)	0.03
Ethnicity: Caucasians vs others	 1116 (79.8)	 350 (92.1)	 766 (88.8)	 0.07
Education College degree or higher	 216 (17.4)	 69 (18.2)	 147 (17.0)	 0.63
Migration to Montreal Montrealers Province of Quebec Outside of Quebec	 786 (63.2) 345 (27.8) 112 (9.0)	 173 (45.5) 144 (37.9) 63 (16.6)	 613(71.0) 201 (23.3) 49 (5.7)	 <.0001
Use of substances				

Heroin injection‡	376 (30.3)	204 (53.7)	172 (19.9)	<.0001
Cocaine injection‡	820 (66.0)	263 (69.2)	557 (64.5)	0.12
Cocaine/crack smoking‡	598 (48.1)	217 (57.1)	381 (44.2)	<.0001
Alcohol use‡	872 (70.7)	263 (69.2)	619 (71.7)	0.37
Amphetamine non- injectable‡	122 (9.8)	69 (18.2)	53 (6.1)	<.0001
Tranquilizers‡	419 (33.7)	178 (46.8)	241 (27.9)	<.0001
Behavioral factors and living contexts				
Sharing syringes or injection equipment	548 (44.1)	211 (55.5)	337 (39.1)	<.0001
Unstable housing‡	525 (42.2)	204 (53.7)	321 (37.2)	<.0001
Incarceration†	277 (22.3)	104 (27.4)	173 (20.1)	0.004
Injecting in public places†	645 (51.9)	286 (75.3)	359 (41.6)	<.0001
HCV and HIV serostatus				
Positive HIV test	132 (10.6)	19 (5.0)	113 (13.1)	<.0001
Positive HCV test	892 (71.9)	266 (70.0)	626 (72.7)	0.33

SD: standard deviation; **p*-value by Student's t-test, ***p*-values by Chi-squared test; †refers to behaviors in the past 6 months; ‡refers to behaviors in the past month;

5.2.2 Logistic regression analysis.

5.2.2.1 Univariate models

In a univariate logistic regression analysis, the following sociodemographic characteristics were found to have positive associations with PO injection at a 5% level of significance: young age and migration to Montreal from other places of Quebec province and outside of Quebec (table 7). Additionally, male gender had a negative association with PO injection.

With regard to drug co-use patterns, injecting heroin, and use of non-injection amphetamines and tranquilizers had especially strong associations with PO injection. Specifically, PO injectors were 4.7 times more likely to co-inject heroin, 3.4 times more likely to practice non-injection use of amphetamines, and 2.3 times more likely to co-use non-injection tranquilizers, compared with non-PO injectors. Additionally, smoking crack/cocaine was found to be significantly associated with PO injection (table 7).

PO injectors had greater odds to practice the following risky behaviors: sharing syringes or sharing injection equipment and injecting in public places. In addition, PO injectors were almost two times more likely to report having unstable housing arrangements comparing with non-PO injectors, and had higher odds to report a history of incarceration (table 7).

Table 7. Unadjusted odds ratios (aOR) and 95% confidence intervals (CI) for associations between characteristics of PWID and PO injection

Variable	Category	OR	95% CI	P value§	c (AUC)	AIC♯	BIC♯♯
Sociodemographic factors							
Age at baseline, 5-year increment	-	0.67	0.63, 0.72	<.0001	0.70	1396	1406
Male gender	Male Female	0.70 Ref.	0.51, 0.96	0.03	0.52	1530	1540
Ethnicity	Caucasian Others	1.48 Ref.	0.96, 2.27	0.07	0.52	1531	1541
Education	≥College degree No college degree	1.08 Ref.	0.79, 1.48	0.63	0.51	1534	1544
Migration to Montreal	no migration (Montrealers) province of Quebec outside of Quebec	Ref. 2.54 4.56	 1.93,3.33 3.02,6.86	<.0001	0.64	1457	1472
Behavioral factors and living contexts							
Unstable housing‡	Yes No	1.96 Ref.	1.53, 2.50	<.0001	0.58	1505	1515
Injecting in public places†	Yes No	4.27 Ref.	3.26, 5.59	<.0001	0.67	1410	1420
Incarceration†	Yes No	1.50 Ref.	1.14, 1.99	0.004	0.54	1526	1537
Sharing syringes or injection equipment	Yes No	1.95 Ref.	1.53, 2.49	<.0001	0.58	1505	1515
Use of substances							

Heroin injection‡	Yes No	4.66 Ref.	3.58,6.05	<.0001	0.67	1397	1408
Amphetamine non - injection‡	Yes No	3.39 Ref.	2.32,4.96	<.0001	0.56	1495	1505
Tranquilizers non-injection‡	Yes No	2.27 Ref.	1.77,2.92	<.0001	0.60	1493	1503
Cocaine injection‡	Yes No	1.24 Ref.	0.95,1.60	0.11	0.52	1532	1542
Cocaine/crack smoking‡	Yes No	1.68 Ref.	1.32, 2.15	<.0001	0.57	1517	1527
Alcohol‡	Yes No	0.89 Ref.	0.68,1.15	0.37	0.51	1534	1545
HCV and HIV serostatus							
HIV serostatus	Seropositive Seronegative	0.35 Ref.	0.21, 0.58	<.0001	0.54	1513	1524
HCV serostatus	Seropositive Seronegative	0.87 Ref.	0.67, 1.14	0.32	0.51	1533	1543

OR: odds ratio; c (AUC): Concordance index; §*p*-value according to the model's likelihood ratio test; #Akaike Information Criterion; AIC for model's intercept without covariates=1532; ##Bayesian Information Criterion; BIC for model's intercept without covariates =1538; †refers to behaviors in the past 6 months; ‡refers to behaviors in the past month;

5.2.2.2 Multivariate model

Variables that were found significant in the univariate models ($p \leq 0.25$) were included in the full multivariate model (table 8, column 3). After refitting using a backward selection technique (see "Methods"), the final model (table 8, column 4) retained covariates that had a *p*-value ≤ 0.01 for the strength of association with PO injection. Gender, HCV status, and HIV status were retained in a model as the *a priori* confounders independently of the *p*-value.

Young age retained its significance in the final multivariate model. More specifically, our results showed that with every 5-year increment in age, odds to inject PO decrease by 21%. Migration to Montreal from other places of Quebec province and outside of Quebec was independently associated with PO injection. With regard to drug use patterns, PO injectors were three times more likely to co-inject heroin, 2.4 times more likely to co-use tranquilizers, and 1.8 times more likely to practice non-injection use of amphetamines. In addition, PO injectors had 1.8

times greater odds to report unstable housing conditions and were two times more likely to report injecting in public places. Furthermore, PO injectors were found to be 1.6 times more likely to have the HCV seropositive status than non-PO injectors. Conversely, HIV serostatus was negatively associated with PO injection.

The Chi square of the final model was significant ($p<0.0001$). The model was found to have good calibrative, discriminative, and predictive abilities, and a good fit (Hosmer and Lemeshov test: $p=0.53$, c (AUC) =0.81; AIC and BIC decreased from 1532 and 1538 respectively for intercept to 1211 and 1273 after adding the covariates).

Table 8. The covariates-adjusted odds ratios (aOR) and 95% confidence intervals (CI) for associations between characteristics of PWID and PO injection

Variable	Category	Full model	Final model
		aOR (95% CI)	aOR (95% CI)
Sociodemographic factors			
Age at baseline, 5-year increment		0.79 (0.72,0.87)	0.79 (0.72,0.86)
Gender	Male Female	1.27 (0.86,1.88) Ref.	1.27 (0.86,1.88) Ref.
Migration to Montreal	No migration (Montrealers) Province of Quebec Outside of Quebec	Ref 1.56 (1,13,2.15) 2.36 (1.47,3.78)	Ref. 1.53 (1.11,2.11) 2.35 (1.47,3.76)
Behavioral factors and living contexts			
Unstable housing‡	Yes No	1.73 (1.27,2.37) Ref.	1.78 (1.31,2.42) Ref.
Incarceration†	Yes No	1.43 (1.02,1.99) Ref.	-
Injecting in public places†	Yes No	1.91 (1.38,2.64) Ref.	2.03 (1.47,2.80) Ref.
Sharing syringes or injection equipment†	Yes No	1.25 (0.93,1.67) Ref.	-
Use of substances			
Heroin injection‡	Yes No	3.11 (2.25,4.31) Ref.	3.03 (2.20,4.19) Ref.
Tranquilizers‡	Yes No	2.28 (1.70,3.07) Ref.	2.38 (1.78,3.20) Ref.
Amphetamine non - injectable‡	Yes No	1.71 (1.10,2.70) Ref.	1.84 (1.19,2.86) Ref.
Crack/cocaine smoking‡	Yes No	1.19 (0.88,1.62) Ref.	-

HCV and HIV serostatus			
Positive HIV test	Yes No	0.53 (0.30,0.96) Ref.	0.52 (0.29,0.92) Ref.
Positive HCV test	Yes No	1.58 (1.13,2.19) Ref.	1.56 (1.12,2.17) Ref.

aOR: adjusted odds ratio; CI: 95% confidence interval; †refers to behaviors in the past 6 months; ‡refers to behaviors in the past month

5.3 Description of the study sample for specific Objectives II and III

The HCV negative at baseline participants with at least one follow up visit were included in the sample for Objectives II and III. Table 9 describes the characteristics of the sample for this part of the project.

Table 9. Description of HCV- negative at baseline PWID
for Objectives II and III
included in the study (n=356) and lost to follow-up (n=107)

Variable	Category	Participants with ≥1 follow-up visit n (%)	Participants who did not have follow-up visits n(%)	P-value
Sociodemographic characteristics				
Age at baseline, number of years of life	Mean (SD) 95%CI	34.7 (9.4) 33.7,35.7	33.6 (10.9) 31.5,35.6	0.32
Gender	Male Female	290 (81.5) 66 (18.5)	84 (78.5) 23 (21.5)	0.50
Ethnicity	Caucasian Other	315 (88.5) 41 (11.5)	91 (85.1) 16 (15.0)	0.34
Education	College degree or higher No college degree	71 (19.9) 285 (80.1)	29 (27.1) 78 (72.9)	0.11
Use of substances				
PO injection‡	Yes No	123 (34.6) 233 (65.5)	38 (35.5) 69 (64.5)	0.85
Heroin injection‡	Yes No	133 (37.4) 223 (62.6)	47 (43.9) 60 (56.1)	0.22

Cocaine injection‡	Yes No	210 (59.0) 146 (41.0)	47 (43.9) 60 (56.1)	0.006**
Cocaine/crack smoking‡	Yes No	195 (54.8) 161 (45.2)	43 (40.2) 64 (59.8)	0.008**
Alcohol use‡	Yes No	273 (76.7) 83 (23.3)	74 (69.2) 33 (30.8)	0.11
Amphetamine non-injectable‡	Yes No	55 (15.4) 301 (84.6)	17 (15.9) 90 (84.1)	0.91
Tranquilizers‡	Yes No	121 (34.0) 235 (66.0)	26 (24.3) 81(75.7)	0.06
Behavioral factors and living contexts				
Sharing syringes or injection material	Yes No	161 (45.2) 195 (54.8)	40 (37.4) 67 (62.6)	0.15
Unstable housing‡	Yes No	152 (42.7) 204 (57.3)	41 (38.3) 66 (61.7)	0.42
Incarceration++	Yes No	54 (15.2) 302 (84.8)	8 (7.5) 99(92.5)	0.04*
Injecting in public places†	Yes No	184 (51.7) 172 (48.3)	53 (49.5) 54(50.5)	0.70
HIV serostatus				
HIV test	seropositive seronegative	3 (0.8) 353 (99.2)	3(2.8) 104 (97.2)	0.12

¥*P*-value by Student's t-test (otherwise, *p*-values were estimated by Chi-squared test);* p≤0.05, **p≤0.01; SD: standard deviation;†refers to behavior in the past 6 months; ‡refers to behaviors in the past month; ++refers to behaviors in the past 3 months

The majority of the included participants were Caucasians (88.5%) and males (81.5%). The mean age of the sample was 34.7 (9.4) years. The majority injected cocaine during past month (59.0%), and half of the sample (54.8%) smoked crack/cocaine. Thirty-five percent of the sample reported PO injection during past month (table 9).

Having unstable housing conditions was reported by 42.7% of included participants, and half of the sample (51.7%) reported having injected in public places. Close to half of the sample (45.2%) reported having shared syringes or injection equipment within the last six months, and 15.2% reported being imprisoned within past three months.

Participants who have completed the baseline questionnaire and had at least one follow-up visit (n = 356) were compared with those who have been lost to follow-up (n = 107) across all independent variables (table 9). Statistically significant differences between both were found only for three variables: cocaine injection, crack/cocaine smoking, and former incarceration. More specifically, 1.3 greater proportion of those included in the study injected cocaine,1.4 greater proportion of included participants smoked crack/cocaine, and two times greater proportion of included participants reported former incarceration. There were no statistically significant differences between the two groups regarding other covariates.

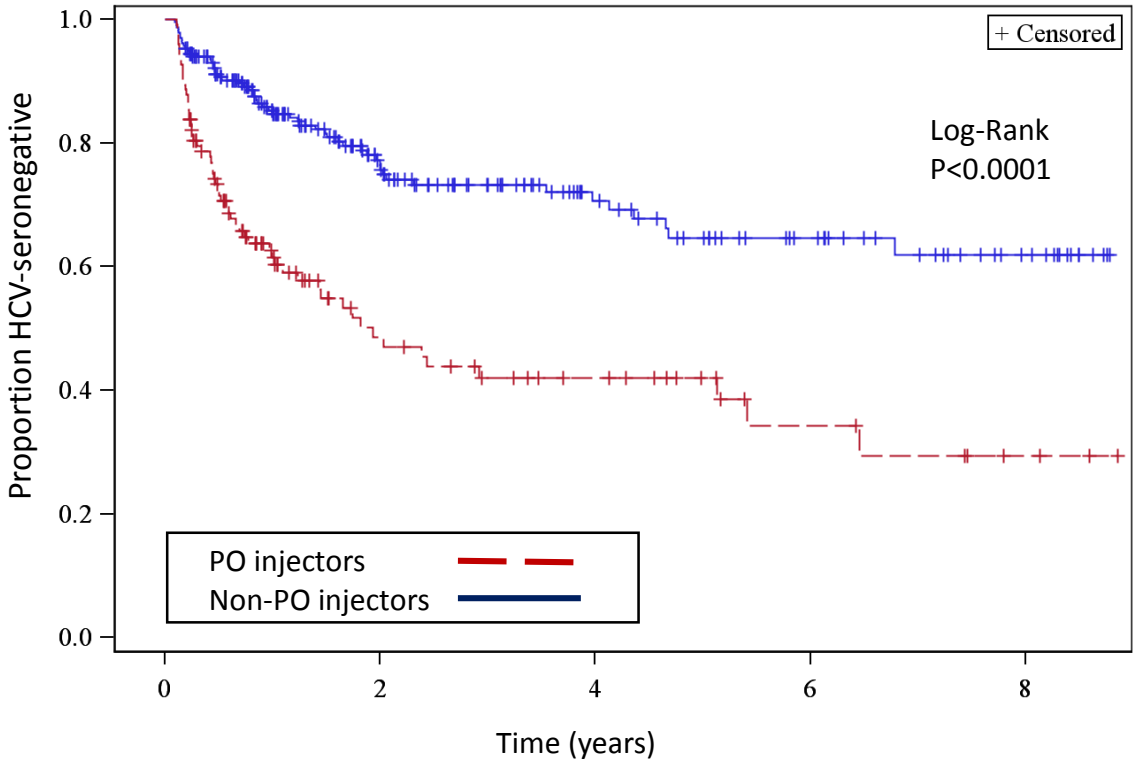
5.4 Specific Objective II:
incidence of HCV seroconversion according to PO injection

Prior to seroconversion or censoring, participating PWID contributed a total of 792.66 person-years of follow-up. One hundred and fifteen participants seroconverted to HCV during the follow-up period, yielding an incidence rate of 14.51 per 100 person-years. Based on the Poisson regression, 95% CI for HCV incidence were estimated at 12.00 and 17.41.

Participants who reported having injected PO at baseline, contributed a total of 209.72 person-years of follow-up prior to seroconversion or censoring. Sixty PO injectors seroconverted to HCV during the follow-up period, providing an incidence rate of 28.69 per 100 person-years with the 95% CI for HCV incidence of 21.83 and 36.82. Non-PO injectors contributed a total of 582.94 person-years of follow-up prior to seroconversion. Fifty-five non-PO-injectors seroconverted to HCV during the follow-up period providing an incidence rate of 9.43 per 100 person-years (95% CI: 7.11, 12.28). In order to compare the rates of seroconversion between the groups of participants who reported having injected PO at baseline and who did not, a relative rate of HCV seroconversion was calculated (described in details in “Methods” chapter) and was found to be equal to 3.04. Additionally, Kaplan–Meier survival curves for participants who did and did not report injecting PO at baseline assessment were compared using the log-rank test (Figure 3).

As shown in Figure 3, compared with participants who did not report PO injection at the baseline, those who reported PO injection were significantly more likely to be HCV-seroconverters at follow-up (p = 0.0001, log-rank test). For all participants, the study follow-up ended at their time of HCV seroconversion or at their last visit, whichever came first.

Figure 3. Kaplan-Meier survival curve for hepatitis C seroconversion among the HCV-negative at baseline participants of HEPCO stratified by the reported PO injection at baseline



5.5 Specific Objective III: examining PO injection with or without co-use of other drugs in relation to HCV seroincidence

5.5.1 Univariate Cox proportional hazards regression models

Table 10 illustrates crude ratios derived from the univariate Cox regression modeling with time-to-HCV seroconversion as an outcome. We noted a statistically significant association between our variable of interest (PO injection within past month) and time-to-HCV seroconversion. Specifically, PO injection was associated with the three fold higher risk of HCV seroconversion. Cocaine injectors were found to have the four fold higher risk of HCV seroconversion, while smoking crack/cocaine was associated with the 1.5 times greater risk to acquire HCV. Crude HR for heroin injection was estimated as 1.6. In addition, the non-injection use of tranquilizers was positively associated with the time-to-HCV seroconversion with the crude HR of 1.7. Neither use

of non-injection amphetamines nor alcohol consumption were associated with the increased risk of HCV seroconversion in PWID (table 10).

We noted that those participants who reported unstable housing arrangements and those with a history of incarceration had the two times greater risk to acquire HCV (table 10). With regard to injecting behaviors, the variable "sharing of syringes or injection equipment" heightened the risk for HCV seroconversion by two times. In relation to injecting contexts, participants who reported injecting in public places were at the nearly three times greater risk to be HCV-seroconverted.

Table 10. Unadjusted associations between time-to-HCV seroconversion and sociodemographic / behavioral factors/ co-use of drugs among the HCV-negative at baseline PWID of HEPCO

Variable	Category	Crude HR	95% CI	P value*
Sociodemographic factors				
Age	5-year increment	0.91	0.82, 1.0	0.06
Gender	Female Male	Ref. 0.97	0.61,1.54	0.89
Caucasian ethnicity	No Yes	Ref. 1.00	0.57,1.75	0.99
Education	College degree or higher No college degree	Ref. 1.58	0.92,2.71	0.08
Behavioral factors and living contexts				
Unstable housing ‡	No Yes	Ref. 2.13	1.47, 3.10	<.0001
Incarceration++	No Yes	Ref. 1.82	1.16, 2.86	0.01
Sharing injection equipment or syringes†	No Yes	Ref. 2.06	1.42, 3.00	0.0001
Injecting in public places†	No Yes	Ref. 2.71	1.83,4.01	<.0001
Use of substances				
PO injection‡	No	Ref.		

	Yes	3.14	2.16, 4.55	<.0001
Cocaine injection‡	No Yes	Ref. 4.04	2.57, 6.36	<.0001
Cocaine/crack smoking‡	No Yes	Ref. 1.54	1.06, 2.24	0.02
Heroin injection‡	No Yes	Ref. 1.63	1.13, 2.36	0.01
Tranquilizers‡	No Yes	Ref. 1.75	1.20,2.54	0.005
Amphetamines non-injection use ‡	No Yes	Ref. 1.40	0.86, 2.27	0.20
Alcohol‡	No Yes	Ref. 0.95	0.64,1.41	0.81

HR: crude hazard ratio; CI: 95% confidence interval; **p*-values represent model's likelihood ratio; †refers to behaviors in the past 6 months; ++refers to behaviors in the past 3 months; ‡refers to behaviors in the past month

We further examined the crude associations between the variables representing "co-use of PO injection in a dyad with one other drug of interest" (table 11) and HCV seroconversion. Variables were coded as dummy variables (see the "Methods" section) in order to appraise each drug-PO injection combination, with the use of neither drug as a reference category. Results showed that PWID who co-used PO injection with cocaine injection were at the nearly 11 times greater risk for HCV acquisition vs. those who used neither drug. Cocaine injectors who did not inject PO and PO injectors who did not inject cocaine had approximately four times greater risk for HCV acquisition compared with those who used neither drug.

In addition, the risk of HCV seroconversion for participants who co-used PO injection with crack/cocaine smoking was four times greater than for those who used neither of the two drugs. For those PO injectors who did not smoke crack/cocaine, the risk for HCV acquisition was only 2.6 times higher than for those who neither injected PO nor smoked crack/cocaine.

PO injectors who practiced non-injection co-use of tranquilizers were found to be at the four times greater risk of HCV seroconversion compared with PWID who did not use either of these drugs. Of interest, PO injectors who did not co-use tranquilizers were at 2.9 times higher risk of HCV seroconversion compared with those who used neither of these drugs.

With regard to heroin injection, injecting PO along with heroin yielded the nearly four times greater risk of HCV seroconversion than for participants who used neither drug of the two. The risk to acquire HCV for heroin injectors who did not co-use PO injection was only 1.5 times greater than for participants who did not inject any of these two drugs. Conversely, injecting heroin did not substantially change the hazard ratio for PO injectors.

With regard to co-use of amphetamines or alcohol with PO injection, the risk for HCV seroconversion for those who co-used these substances with PO injection were 3.5 and 3.0 times higher, respectively, compared with those who used neither of these drugs. Of interest, the hazard ratios for PWID co-using either amphetamine or alcohol with PO injection were not substantially different from hazard ratios for those PWID who used PO injection alone.

We further aimed at evaluating the effect of poly-use of drugs in PO injectors and focused on the substances that seemed to have a trend to increase hazard ratios for PO injectors when used in combination with PO injection. According to the abovementioned findings, these drugs included cocaine injection, smoking crack/cocaine, and non-injection use of tranquilizers. The results of the univariate Cox regression analysis are shown in the last row of table 11 (the variable "cumulative pattern"). It was found that participants who injected PO along with co-use of all of the three abovementioned drugs were at the highest risk for HCV seroconversion. Their risk to acquire HCV was six times greater compared with PWID who did not inject PO. PO injectors who did or did not co-use one or two of the abovementioned drugs were at the 2.5 fold greater risk for HCV acquisition than the participants who did not inject PO. The covariate "cumulative pattern" represents patterns of drug co-use that were found to be most relevant to the risk for HCV seroconversion among PO injectors in univariate model and, at the same time, shows the cumulative effect of multi-drugs' use. Therefore, we chose this variable for inclusion in the multivariate model.

Table 11. Models assessing unadjusted associations between time-to-HCV seroconversion and combination of PO injection with each drug of interest, or with the use of multiple drugs, among the HCV-negative at baseline PWID

Variable	Category	HR	95% CI	P-value*
Co-use of PO injection with cocaine injection‡	PO- Cocaine- PO+ Cocaine+ PO+ Cocaine- PO- Cocaine+	Ref. 10.86 3.98 4.44	- 5.81,20.32 2.40,8.24 1.78,8.92	- <.0001 0.0008 <.0001
Co-use of PO injection with smoking crack/cocaine‡	PO- Crack- PO+ Crack+ PO+ Crack- PO- Crack+	Ref. 4.08 2.60 1.22	- 2.51,6.65 1.46,4.64 0.73,2.03	- <.0001 0.001 0.46
Co-use of PO injection with tranquilizers‡	PO- Tr- PO+ Tr+ PO+ Tr- PO- Tr+	Ref. 4.09 2.90 1.38	- 2.52,6.62 1.78,4.73 0.79,2.43	- <.0001 <.0001 0.26
Co-use of PO injection with heroin injection‡	PO- Heroin- PO+ Heroin+ PO+ Heroin- PO- Heroin+	Ref. 3.97 3.18 1.47	- 2.43,6.48 1.93,5.25 0.86,2.50	- <.0001 <.0001 0.16
Co-use of PO injection with amphetamines‡	PO- Amph- PO+ Amph+ PO+ Amph- PO- Amph+	Ref. 3.53 2.93 0.97	- 1.95,6.41 1.93, 4.44 0.42, 2.26	- <.0001 <.0001 0.94
Co-use of PO injection with alcohol‡	PO- Alcohol- PO+ Alcohol+ PO+ Alcohol- PO- Alcohol+	Ref. 3.05 3.23 0.99	- 1.74,5.33 1.72,6.08 0.58,1.71	- <.0001 0.0003 0.98
Cumulative pattern‡	No injection PO (ref) Injection PO + 0-2 of the 3 drugs (injection cocaine, crack /cocaine smoking, non-injection tranquilizers) Injection PO + 3 drugs:	Ref. 2.54 6.01	- 1.67, 3.86 3.57, 10.14	- <.0001 <.0001

HR: crude hazard ratio; CI: 95% confidence interval; Crack- smoking crack/cocaine; Tr – non-injection tranquilizers; Amph – non-injection amphetamine; **p*-values represent model's likelihood ratio; ‡refers to behavior in the past month

5.5.2 Multivariate Cox proportional hazards regression analysis

This analyses examined the adjusted association between co-use of multiple drugs with PO injection and HCV seroincidence (table 12). Initially, the covariate "cumulative pattern"

representing co-use of multiple drugs was included in the model along with the covariates that had significant associations with HCV seroincidence in the univariate analysis ($p \leq 0.25$). The model was subsequently refitted using backwards selection technique. The final multivariate model retained variables that had a *p*-value ≤ 0.01 for the strength of association with HCV seroconversion, as well as confounders (age and gender).

The results showed that, after adjusting to other covariates, PO injection, either in combination with other drugs or not, significantly increased the risk of HCV seroconversion (table 12). However, the pattern involving co-use of cocaine injection, crack/cocaine smoking, and non-injection use of tranquilizers was associated with a five-fold increase in the risk for HCV seroconversion, while the pattern involving co-use of two or fewer of these drugs was associated with a two-fold increase.

Among other predictors, the associations between reporting unstable housing conditions and former incarceration, and time-to-HCV seroincidence retained their significance in the final multivariate model, and the strength of these associations did not change significantly after adjusting to other factors. Similarly, the association between sharing of syringes or injection equipment, and HCV seroconversion remained significant in the final multivariate model (table 12). Age and gender were forced into the model as confounders and were not found to have significant association with time-to-HCV seroconversion in the multivariate analysis.

Table12. Covariate--adjusted associations between HCV seroconversion and drug use patterns among initially HCV-negative PWID

Variables	Category	AHR	95% CI	P-value*
Drug use‡	No injection PO (ref)	Ref.	-	
	Injection PO + 0-2 of the 3 drugs (injection cocaine, crack/cocaine smoking, non-injection tranquilizers)	1.94	1.2, 3.0	0.004
	Injection PO + 3 drugs	4.94	2.9, 8.5	<.0001
Age	5-year increment	0.97	0.87, 1.08	0.54
Gender	Male Female	0.79 Ref.	0.48, 1.30 -	0.35

Unstable housing ‡	Yes No	1.96 Ref.	1.32, 2.92 -	0.0009
Incarceration++	Yes No	1.90 Ref.	1.20, 3.02 -	0.007
Sharing syringes or injection equipment †	Yes No	1.83 Ref.	1.24, 2.69 -	0.002

AHR: adjusted hazard ratio; CI: 95% confidence interval; **p*-values represent model's likelihood ratio; †refers to behaviors in the past 6 months; ‡refers to behavior in the past month; ++refers to behaviors in the past 3 months

6.0 METHODOLOGICAL CONSIDERATIONS

Research studies need to have both internal and external validity, the results should be both "correct and capable of extrapolation to the population" [195]. The internal and external validity of our study is discussed below.

6.1 Internal validity

The study is internally valid when study results are accurate for the study participants [195]. Bias weakens the internal validity of a study. To make study valid, a number of potential biases must be either avoided or taken into account. With regard to observational studies, these types can be categorized into three broad categories: selection bias, information bias, and confounding.

6.1.1 Selection bias

Selection occurs when the exposed and unexposed groups differ in some important aspect aside from the exposure. One type of selection bias is membership bias: people who choose to be members of a study may differ from others [195]. The common consequence of selection bias is that the association between exposure and outcome among study participants selected for analysis differ from the association among those who are eligible for the study [196]. In our study, approximately one third of HEPCO participants were recruited by self-referral that could have led to the membership bias. In addition to the membership bias, in observational studies, some of the participants are usually lost to follow up before the event (outcome) occurs. Study losses will be likely to bias the relative risk estimate when the exposure variable is an effect-modifier for the association of study participation (including both response and follow-up) with the outcome. The likelihood of a selection bias effect should be considered in any study; however, many experienced epidemiologists tend to regard selection bias in prospective cohort studies as generally unimportant [197]. In our study (Objectives II and III), while selection could have been related to the exposure (use of PO and co-use of other drugs), it could not be related to the outcome, because the outcome (HCV seroincidence) occurs later than the selection. With regard to the bias due to losses to follow-up, we compared the participants constituting study sample for the Objectives II and III to the participants lost to follow up across all sociodemographic and behavioral characteristics. Statistically significant differences between both groups were found for three variables: cocaine

injection, crack/cocaine smoking, and history of incarceration. Although there were no statistically significant differences between both groups regarding other covariates, these findings demonstrated that these two groups are not entirely similar. In addition, the outcome (time-to-HCV seroconversion) for the lost to follow up participants was not measured, and could be present or absent. Therefore, our data could have been influenced by losses to follow-up.

6.1.2 Information bias

Information bias, also known as observation, classification, or measurement bias, results from incorrect determination of exposure or outcome, or both [195]. In a cohort study, when the same flaws in the data collection take place regarding both groups, exposed and unexposed, it leads to non-differential misclassification bias that works as a ”noise in the system”, tending to mask real differences between the two groups in relation to the outcome [195]. By contrast, if the information was obtained in a different way for exposed and unexposed, the differential misclassification bias occurs which raises or lowers the relative risk or odds ratio dependent on the direction of the bias. In our study, the information about the exposure and the outcome was obtained the same way for both exposed and unexposed. Therefore, it is not likely that such differential information bias could have occurred. There could have been, however, some degree of the non-differential information bias because of the risk of ‘socially desirable’ responses that may occur as the study progresses and bonds form between participants and interviewers. Further, most of study data were collected by means of self-report. Taking into account that the participants were PWID, a recall bias could potentially affect the observed associations. To reduce the potential effect of the recall bias, we, whenever possible, analyzed variables that referred to the past month instead of the past three - six months.

6.1.3 Confounding

Confounding is a mixing or blurring of effects [195]. A confounding variable is associated with the exposure and, at the same time, affects the outcome, but it does not belong to the causation chain between exposure and outcome.

One of the ways to correct confounding is by using multivariate techniques, when mathematical modelling examines a potential effect of one variable while controlling for the effect of many other factors [195]. In our study, the associations between each independent variable and

the outcome were evaluated by utilization of multivariate regression models. This way, the effect of each individual covariate was calculated after adjustment for the other variables in the model. The HEPCO questionnaire provided extensive information that allowed us to explore a considerable number of potential factors that could have been associated with injecting PO (Objective I) or with HCV seroconversion (Objectives II and III). There is, however, a possibility, that our data did not capture all factors that could have explained the outcome since the HEPCO study was not specifically designed to explore factors and behaviors related to PO injection. Thus, the question regarding specific feature of PO injectors described in the qualitative literature as sharing "washes" was not measured by the HEPCO questionnaire. Therefore, we could not account for this factor. Similarly, for specific Objective III, we adjusted for several factors known to be associated with HCV-seroconversion. Still, it is possible that unmeasured factors could have had a confounding effect on the observed associations. Therefore, residual confounding of our results is possible.

6.2 External validity

External validity is "the extent to which the results of a study can be generalized to and across populations, settings, and times" [198]. In other words, even if a particular finding has high internal validity, this does not mean that it can be generalized outside of the study context. In our study, the participants were not selected randomly. Therefore, our sample cannot be considered an adequate representation of the whole population of PWID in Montreal. Moreover, the sample is overrepresented in terms of males, Caucasians, and chronic cocaine users. Additionally, since all PWID participating in the study reside within the Greater Montreal area, they may not be representative of the entire population of PWID in the province of Quebec. However, the study was conducted in a large North American city with a growing prevalence of PO injection. Therefore, it may be considered a valid representation of PO injection misuse relevant to PWID in the urban settings.

7.0 DISCUSSION

Infection with HCV poses a substantial health and economic burden in Canada and worldwide. Effective and safer direct-acting antiviral (DAA) drugs against HCV have recently been developed. However, they are expensive, and it may not be feasible to provide all infected population with DAA in the nearest future. Similarly, while recombinant vaccines against HCV are under development, a question of priority coverage will still apply to future vaccinations. PWID remain the major reservoir of HCV in developed countries, including Canada. Recent years have seen the emergence of a new population within PWID, namely, PO injectors. There is evidence indicating that a link may exist between PO injection and heightened risk of HCV transmission. There is a need to assess the role of PO injectors in HCV transmission as potential "key" transmitters of infection, and recipients of preventive and therapeutic measures aimed at curbing HCV. To this end, we characterized PO injectors of Montreal's HEPCO cohort, and examined the association between PO injection, with or without combination with other drugs, and HCV seroincidence.

7.1 Characterizing PO injectors of Montreal's HEPCO cohort

We confirmed our hypothesis that PO injectors of Montreal's HEPCO cohort are younger than non-PO injectors. Specifically, the odds to be PO injector were found to decrease with age in both uni- and multivariate analyses. Furthermore, our results show that most of PO injectors were not original Montrealers and that they came to Montreal from other places at one point of their lives. We further found that both unstable housing and injecting in public places were positively associated with PO injection in uni- and multivariate analyses. In addition, PO injectors have been found more likely to practice co-use of heroin injection, and non-injection use of tranquilizers and amphetamines, comparing to non-PO injectors. Finally, HCV seropositivity at baseline was positively associated with PO injection after adjusting to other factors.

Our results were in line with previous reports. Thus, a relatively young age of PO injectors was also reported in other studies [5, 7, 15, 21, 139, 143]. With regard to migration status and housing conditions, it was shown that PO injectors regard themselves as "travelers" [144], who often move from place to place driven by the availability of drugs on local markets, and live in unstable housing conditions [7]. Interestingly, a multisite OPICAN Cohort study, which was

conducted in 2002-2005, reported the use of PO as the predominant form of illicit opioid use in five major Canadian cities, but not in Montreal and Vancouver, which have been found to be the major heroin import points [199]. This suggests that part of the current Montreal PO users population may have immigrated from other Canadian provinces and rural Quebec, where PO use had already become predominant. With regard to injecting in public places, our findings are coherent with other reports [7, 144] which describe PO users as often injecting on the streets right after buying a dose [6, 16].

Young age, migration from other places of inhabitancy, and unstable housing conditions typically indicate increased social vulnerability and may suggest increased probability to be involved into drug abuse. Younger people typically experiment with a wide range of behaviors and lifestyles [200]. Their motivation for engagement in substance abuse may arise from wanting to establish solidarity with a particular peer group, or rebelling against parental authority, or establishing their own individual identity [200]. In addition, young age may be seen as a proxy measure for lower injecting competency and lack of information regarding risks of unsafe injection practices [12, 15, 152, 201]. Moreover, in a culture of PWID, young people often engage in social relationships by participating in risky activities, such as sharing paraphernalia, in order to gain social and economic support of older, more experienced PWID [202]. Those who came to Montreal from other places may face even more problems, including job insecurity and lack of social or financial support due to detachment from their family and friends. Living in unstable housing conditions adds additional problems to their lives. Homeless population usually has limited access to medical help and social support [106], which makes them more susceptible to diseases. Moreover, people who live on the streets are more prone to engage in risky behaviors [203, 204] and have an increased risk for HCV acquisition [106].

In addition to the above, injecting in public places, which is a well-known determinant of HCV transmission [106], adds to the risk. It was previously reported by ethnographers that young PO users usually inject in public places in a company of friends or sex partners, whom they know for some time and with whom they used PO in the past [9, 11]. In fact, this seemingly protective choice of co-injectors can be one of the reasons of the increased risk of HCV acquisition because the members of a close network are perceived by PO injectors as “clean” (i.e., uninfected with HIV or HCV) and “acceptable to share with” the equipment during syringe shortage situations [11]. This risk further increases along with the expansion of the network of drug-using individuals

as PO use progresses, often leading to inclusion of older drug injectors into the pool of "safe to inject with" peers [11, 15].

In addition to the vulnerabilities discussed above, Montreal PO injectors were found to be likely to co-use other drugs. In our analysis, PO injection was associated with co-use of heroin injection, non-injection use of tranquilizers, and non-injection use of stimulants (amphetamines). These findings are in line with previous studies which described the illicit use of PO as a part of poly-drug use practice, which often includes abuse of heroin [7, 141, 144] and prescription drugs [147, 205]. Co-use of heroin and PO injection by PWID can be explained by the following. Prescription opioids are close pharmaceutical relatives of heroin. Because of this, these two drugs are interchangeable when it comes to physical dependence and the need to avoid withdrawal [15, 141, 144]. Preference of one drug over another may reflect their current availability at the market. For example, an approximately 100% increase in heroin use was reported in 2010, when, in an attempt to decrease the abuse of PO, formulation of OxyContin® was changed in the USA which made the drug more difficult to inject [206]. According to the opinion of several authors, it is possible that illicit PO use, which is less stigmatized than heroin use [139], may serve as the gateway for transition to heroin injection and, ultimately, heroine dependence [7, 11, 141, 144].

Similar to our findings regarding tranquilizers and stimulants, other recent studies have described extensive use of prescription drugs, including opioids, tranquilizers, or stimulants, by young people [9, 122, 144]. Qualitative studies report that prescription tranquilizers, stimulants, and PO are typically viewed as relatively harmless recreational drugs, as they are perceived as 'doctor-approved' [207] and as more reliable in terms of dosage, potency, and chemical purity. Therefore, young people may mistakenly think that taking these drugs is just a "harmless" experiment.

There are important reasons to be concerned about co-use of heroin, and non-injection use of tranquilizers and amphetamines by PO injectors. With regard to heroin, simultaneous use of PO and this drug is dangerous because of a risk of overdose [144]. Furthermore, both opioids and benzodiazepine tranquilizers act as respiratory depressors and have recently emerged as the primary cause of death in drug overdose, the leading cause of death among young PWID [144]. In addition, chronic amphetamine use and use of chronic sedative-hypnotics (including benzodiazepine tranquilizers) were independently associated with suicidal attempt [208]. Furthermore, amphetamine users have poorer impulse control as compared with opiate users [209].

Since impulsive behaviors have been implicated in a substantial proportion of attempted suicides [210], it is possible that co-use of these drugs with PO injection may increase the risk of suicide. While not directly related to HCV transmission, potential increase in the risk of suicide is a concerning characteristic of this group of PWID and deserves further attention.

Interestingly, alcohol has not been associated with PO injection in our study. This is in contrast to a popular "gateway" hypothesis of progression of substance abuse from licit drugs (alcohol and/or cigarettes) and illicit drugs (cannabis) during adolescence to "harder" drugs (heroin and cocaine) in young adulthood [211, 212]. This "gateway" hypothesis has been supported by a recent study that reported that antecedent alcohol use is associated with a two to three times greater likelihood of subsequent abuse of PO in 18-25 years old [211]. However, it could also be that after establishing PO injection as a more powerful source of "getting high", PO injectors may not need to use alcohol as extensively as before.

Notably, in addition to the preceding characteristics, HCV positive serostatus has also been significantly associated with PO injection in our multivariate analysis. This is in line with previous studies that reported increased HCV prevalence in PO injectors within diverse rural and urban geographical areas in North America [5, 8, 19, 142, 150-152]. It should be mentioned that the association between HCV seropositivity and PO injection was not significant in our univariate analysis but became significant in a bivariate model after adjusting to age (data not shown). While it is concerning that PO injection and HCV seropositivity are positively associated, given the cross-sectional nature of our study, we cannot make conclusions about the causality in this association.

In contrast to HCV, HIV seropositivity at baseline was negatively associated with PO injection in both univariate and multivariate analyses. Gradual decrease of HIV incidence in the recent years, along with the fact that PO injection is a relatively new trend, may partly explain those results.

Of note, syringe or equipment sharing was found by us to be significantly associated with PO injecting only in the univariate model and lost its significance in the final multivariate model. This may be due to under-reporting of such practices. According to qualitative researchers, the common practice of PO injectors to share paraphernalia, including "washes", occurs partly because of the lack of awareness of the risk for blood borne virus infections, associated with this practice [6, 11]. Since PO users often do not consider these behaviors unsafe, they may neglect to mention such behaviors in their reports.

Therefore, the sociodemographic and behavioral characteristics, and drug use patterns associated with PO injection in our study suggest that PO injectors may be more vulnerable to the dangers of injection drug abuse, including suicide, overdose, and acquisition of HCV. The results of our cross-sectional study justify a longitudinal analysis of the associations between PO injection and HCV seroincidence.

7.2 Specific patterns of drug co-use among PO injectors of Montreal in relation to HCV seroincidence

As discussed above, baseline HCV seropositivity was associated with PO injection after adjusting to other factors, including age. Furthermore, some sociodemographic and behavioral characteristics that were associated with PO injection in our cross-sectional analysis were linked in previous reports to increased risk of HCV transmission. We next hypothesized that HCV incidence rates would be higher in PO injectors compared with non-PO injectors of HEPCO.

Our analysis showed that HCV incidence rates among PWID who reported PO injection at baseline are higher than in non-PO injectors, yielding the relative rate of HCV seroconversion of 3.04. These findings, confirmed by Kaplan-Meier survival plots, are in line with previous reports that indicated heightened risk of HCV seroincidence for PO injectors in Montreal [5].

As next step, we analyzed the association between PO injection with or without co-use of other drugs with the risk of HCV seroincidence. As discussed above, the cross-sectional nature of our preceding analysis prevented us from drawing conclusions regarding the causality in the observed association between HCV seropositivity and PO injection. These findings, along with the computed high HCV seroincidence rates, merited longitudinal study. We were interested in exploring combinations of drugs co-used with PO injection in relation to HCV seroincidence for the following reasons. In the preceding cross-sectional analysis, PO injectors were found to co-use other drugs, both injection and non-injection. Previous studies reported that use of these drugs may increase risky decision making, such as shown with tranquilizers [213, 214]. Our interest was further promoted by positive association between PO injection and HCV seroincidence, revealed in a univariate Cox regression analysis by two longitudinal studies [5, 19] that used study samples with different drug use patterns. Interestingly, after adjusting to co-use of drugs, Hadland et al. [19] no longer observed a significant association between PO injection and HCV incidence. In contrast, this association remained significant in the multivariate analysis of Bruneau et al. [5].

Based on these literature reports and the results of our cross-sectional analysis, we speculated that it is not PO injection *per se* but co-use of PO injection with other drugs that determines the risk for HCV acquisition in PWID. Moreover, poly-use of drugs, which was reported among factors linked to the risk of HCV transmission, is not sufficient to explain the difference between the two studies mentioned above. Therefore, it could be combinations of PO injection with specific drugs that are responsible for increased risk of HCV seroincidence in PO injectors abusing multiple drugs. In this regard, we identified three dyads (PO injection with cocaine injection, PO injection with crack/cocaine smoking, PO injection with non-injection use of tranquilizers) as significantly increasing the risk for HCV seroconversion.

First, our study results showed in a univariate Cox regression model that PO injection is associated with a three-fold greater risk of HCV-seroconversion. This is in line with the previous study of Bruneau et al. [5]. Subsequently, exploring drug combinations, we showed increased risk for HCV acquisition in PO injectors who co-injected cocaine (the first dyad) and smoked crack/cocaine (the second dyad) comparing to the participants who used neither of these two drugs. In addition, our results are suggestive that in dyads "PO/cocaine injection" and "PO/crack (cocaine) smoking" combination of two drugs may elevate the risk of HCV seroconversion, as compared with the use of only one drug of the two. Even though unequivocal proof was not obtained because of overlapping confidence intervals (table 11), possibly due to insufficient statistical power, these observations deserve attention. This trend may be important both for clinical practice and public health.

Consumption of cocaine (intravenous or intranasal) is a well-known driver of HCV infection [76, 99, 113, 215, 216]. It is known that cocaine users are more likely to engage in high-risk injection behaviors, such as attendance of shooting galleries, trading sex for money, and / or "booting"; last but not least, they inject frequently [217-219]. On the other hand, intravenous PO use requires either larger syringes or multiple injections for one dose, thereby leading to a routine of injecting substantial volumes of drug-containing solution [6]. It is possible that a combination of high frequency of injections and injection of large volumes make co-users less sensitive to the risks of unsafe injection practices. Furthermore, in previous studies, smoking of crack/cocaine was linked to HCV/HIV infections, possibly due to the presence of oral sores [220-222]. Smoking of crack/cocaine was also associated with risky sexual behaviors [223, 224]. The risk of acquiring infection through oral sores and risky sexual behaviors (even though sexual transmission of HCV

is not the most predominant route of spreading of this infection) may contribute to the risk for HCV acquisition in these PWID. It can be also speculated that PWID involved in PO injection and crack smoking, which both include highly social rituals (e.g. sharing a pipe [225], trading a "wash" [6]) may have wider network of potential co-injectors, which may add to their chances to acquire HCV.

The third tested dyad was PO injection with non-injection use of tranquilizers (including benzodiazepines). These participants were found to be at a greater risk for HCV seroconversion compared to those who used neither drugs of the two. In addition, as with the first two dyads, we observed a trend for PO injectors who co-used tranquilizers to be at a greater risk for HCV seroconversion compared with PO injectors who did not co-use tranquilizers. Use of tranquilizers was linked to elevated risk for HCV infection in previous studies. For example, HCV positivity was independently associated in multivariable logistic regression analysis with the use of benzodiazepines (injected or non-injected) among prisoners [226]. As mentioned above, tranquilizers increase the likelihood of risky decision making. We found for the participants of HEPCO cohort that it is the co-use of tranquilizers with PO injection, and not tranquilizers *per se*, that puts the users at increased danger for HCV acquisition. It is possible that non-injection co-use of tranquilizers in PO injectors adds to the risk for HCV acquisition by affecting their risky decision making.

In addition to the above, we also tested a combination of heroin injection and PO injection. We found that heroin injection did not substantially affect the strength of association between PO injection and HCV seroincidence. A possible explanation of these findings may be related to the fact that the older and more mature culture of heroin injectors is more knowledgeable of safe injection practices than younger and less informed culture of PO injectors. Another possible explanation is that harm reduction and HCV prevention strategies mainly target heroin injectors in Canada and may, in part, alleviate their risk for HCV infection [5].

What is very important, we confirmed our hypothesis regarding the increased risk for HCV transmission in poly-drug users abusing certain types of drugs. After adjusting to other covariates, PO injectors who reported co-use of cocaine injection and crack/cocaine smoking, and practiced non-injection co-use of tranquilizers, had a nearly five-fold increased risk for HCV seroconversion compared to those who did not inject PO. In contrast, this risk, while significant, was lower in PWID who co-used one or two of these drugs with PO injection, or used solely PO injection.

Poly-drug abuse is a complex and constantly evolving phenomenon which is on the rise in recent years [227]. Poly-drug abusers tend to outweigh immediate rewards over negative future outcomes, act impulsively [228, 229], and demonstrate poor affective-based decision making [230]. This altered decision making may be one of the factors responsible for their increased risk of HCV infection. Previously, a cumulative effect of using multiple drugs on the risk of blood born viruses transmission was reported [17, 18, 114], and positively associated with the risky injecting and sexual behaviors [115, 116]. Here we extended these observations by showing that it is not just the use of multiple drugs, but a cumulative pattern restricted to co-use of certain drugs with PO injection, that determined the risk of HCV seroconversion in PWID.

We need to mention that it was not possible for us to separate the "consecutive" from "simultaneous" use of drugs due to the lack of corresponding questions in our questionnaire. We cannot, therefore, exclude simultaneous co-use of drugs by some participants. It will be important to address this issue in future research because simultaneous use may cause serious problems to abusers due to the side effects and drug synergy. For example, benzodiazepines are notoriously known for causing death when mixed with opioids [231].

All abovementioned highlights the role of PO injectors, especially those who co-use other drugs and practice poly-use of drugs, as key transmitters of HCV. Besides placing themselves at increased risk of HCV acquisition, infected poly-drug users could also be important sources of infection. It is known that social networks facilitate transmission of HCV [44], and that PWID contact network often has specific nodes with very large numbers of contacts [232], the so-called ''hubs'' [232]. PO injectors who co-use multiple drugs may be more likely to meet other users in order to acquire those drugs, and it is possible that they build large contact networks involving abusers of different types of drugs that raises their chance of becoming the "hubs" of such social networks. These "hub" PO injectors may need to be viewed as priority candidates for preventive interventions (including vaccination when available) and DAA treatment to more efficiently lower HCV incidence rates.

In this regard, there are some current problems with existing harm reduction, addiction treatment, and HCV prevention and treatment programs for PO injectors, in particularly, those who practice poly-use of drugs. Our findings may be helpful in subsiding those problems.

Firstly, NEPs (needle exchange programs) should be able to cover different types of clientele with varying levels of risk behavior, and diverse needle exchange sources and service

delivery models are needed to maximize coverage [233]. Despite this fact, NEPs in Canada are not adjusted to the special features of PO injectors (e.g., young age) and may not work optimally for them. Secondly, OST (opioid substitution therapies) serve primarily heroin users [234, 235]. Co-use of other drugs is often an exclusion criterion from the high-threshold OST programs [236, 237]. In our study, PO injectors were found to be likely to co-use certain drugs that may put them at multiple risks including HCV acquisition. These findings suggest that, in contrast to traditional OST treatment, special low-threshold addiction treatment programs should be developed to target PO injectors, especially those who practice use of multiple drugs. For example, since there is no specific treatment for cocaine addiction, those PO who co-use cocaine should be given an access to a range of primary health care services, including health promotion, hepatitis A and B vaccination, screening and treatment for HCV, HIV and other sexually transmitted infections. In addition, benzodiazepine dependency treatment can be incorporated in the therapy regimen for PO injectors. Most importantly, poly-use of drugs should not be an exclusion criterion in OST programs for PO injectors.

In addition to the above, preventive interventions targeted at PO injectors could use resources reaching out to this younger group of population. For example, the use of social networks, such as Facebook, Twitter and Instagram, grew exponentially in the recent years. These networks are used by many young people [238]. Therefore, these social networks could be used in preventive interventions, such as information dissemination programs. Such interventions (e.g., posts that highlight the fact that the use of non-medical prescription drugs is outside of normative behavior), if shared by peers on social media platforms, may be better accepted and be thus more efficient [238].

Another intervention that may work better with younger people is “resistance skills training”, the approach based on increased awareness for various social influences to engage in substance abuse (e.g., behaviors modeled by parents, older siblings, or peers) to increase resistance to these influences [200]. Also, “restructuring the environment” could represent another approach, with engaging young people in alternative activities (e.g., team sports, hobbies, community activities, etc.) [200].

Montreal will soon host four supervised injection sites (SIS) for PWID, including three permanent locations and mobile clinic. Considering that PO injectors are likely to inject in public places and are at high risk of HCV infection, Montreal’s SIS should see this as a justification to

prioritize targeting them. Medical staff and social workers of the sites should be aware of the specifics of these drug users, including their younger age, unstable housing conditions, poly-use of drugs, and increased risk for HCV transmission. An on-site overdose prevention training focused on poly-use of drugs may be recommended, and counseling on safe injection practices should be readily available.

In summary, the number of PO injectors is growing, and we demonstrate that they are at high risk of HCV infection, an important public health problem. Development of targeted programs is required to improve prevention of HCV transmission within this group of PWID population. Our study findings may be helpful for development of specific harm reduction and HCV prevention strategies for PO injectors.

7.3 Summary of findings

We showed that PO injectors of the Montreal's HEPCO Cohort have certain sociodemographic (younger age) and behavioral (injecting in public places) characteristics and living contexts (unstable housing conditions), which may make them more vulnerable to acquisition of HCV. In our study, participants who migrated to Montreal were more likely to be PO injectors than original Montrealers. Of special interest, strong associations between PO injection and co-use of certain drugs were found, suggesting the patterns of poly-drug use among PO injectors. Specifically, besides having high odds to co-inject heroin, PO injectors are more likely to practice non-injection use of tranquilizers and stimulants (amphetamines), i.e., the substances that have been linked in previous studies to the increase of risky behaviors and suicide. The HCV seropositive status was independently associated with PO injection in a multivariate regression analysis. Furthermore, our analysis showed that HCV incidence rate is three folds higher in participants who reported PO injection at baseline compared to those who did not.

In our longitudinal analysis with the use of univariate Cox regression model, PO injection and co-use of PO injection with other substances were associated with the increased risk for HCV seroconversion. For certain drugs (cocaine injection, crack/cocaine smoking, and use of non-injection tranquilizers), we observed a trend towards increased risk for HCV seroconversion when used with PO injection, compared with the use of PO injection alone.

Moreover, using multivariate Cox regression model, we confirmed our hypothesis on increased risk for HCV transmission in poly-drug abusing PO injectors. After adjusting to other covariates, PO injection, either in combination with other drugs or not, significantly increased the risk of HCV seroconversion. However, co-use of cocaine injection. crack/cocaine smoking, and non-injection tranquilizers was associated with a five-fold increase in the risk for HCV seroconversion, while co-use of two or fewer of these drugs was associated with a two-fold increase.

7.4 Strengths

In our study, we quantitatively characterized the hard-to-reach population, a sizable group of PO injectors in Montreal, Quebec, Canada. The results may, therefore, be transferred onto population of PO injectors in the urban setting of a large North American city. We further had the opportunity to conduct analysis of HCV seroincidence among the large number of seronegative at baseline PWID who were followed up for almost a decade (2004-2013). A longitudinal study design allowed drawing conclusions about a potential causal relationship between PO injection with or without co-use of other drugs and HCV seroincidence. To our knowledge, prior to our study, there have been only two studies that addressed the problem of HCV seroincidence among PO injectors [5, 19]. Findings from our longitudinal analysis define PO injection as one of the most important risk factors for HCV acquisition. Moreover, to our knowledge, we were the first to show that distinct patterns of drug co-use in PO injectors determine their risk for HCV transmission. Also, for the first time, we showed that poly-drug abuse puts PO injectors at the highest risk for HCV seroincidence.

7.5 Limitations

Our study has limitations. Most of them, such as selection bias, information bias, and confounding bias, and issues related to external validity of our study, have already been discussed in the "Methodological Considerations" section. Furthermore, as mentioned in the "Discussion" section, we did not have the opportunity to separate the group of exclusive PO injectors for our analysis due to a small number of those PWID in our Cohort. The structure of our Cohort, however, may be more reflective of the general structure of PWID populations in an urban setting, as most of drug injectors do not exclusively use one type of drug. Furthermore, it was not possible to separate

"consecutive" and "simultaneous" co-use of drugs due to the lack of corresponding questions in our questionnaire. Nonetheless, we were able to assess drugs co-used within the recent, relatively short period of time (past month) which gave us insight into the effect of drug combinations on the risk of HCV seroconversion.

8.0 CONCLUSION

8.1 Main conclusions:

The following conclusions can be drawn from the present study:

- PO injectors participating in Montreal's HEPCO Cohort are younger than non-PO injectors, with a difference in means of 6.9 years, and are more likely to have unstable housing conditions and to inject in public places, than non-PO injectors. These two factors are known as determinants of HCV transmission.
- PWID who migrated to Montreal are more likely to be PO injectors than original Montrealers.
- After adjusting to other covariates, HCV seropositive status was independently associated with PO injection in a logistic regression analysis.
- Besides having high odds to co-inject heroin, PO injectors are more likely to practice non-injection co-use of tranquilizers and stimulants (amphetamines), substances that have been linked to the increase of risk taking and suicide in the previous studies.
- HCV incidence rate among participants of HEPCO followed up between 2004 and 2013, who reported PO injection at baseline, was three times higher than in those who did not report PO injection. In coherence with these findings, in a longitudinal analysis using the univariate time-updated Cox regression model, PO injection was associated with a three-fold increased risk of HCV-seroincidence.
- It was further found that the odds for PO injectors to be HCV-seroconverted depend on the type of the drug co-used with PO injection. PWID who combined PO injection with cocaine injection were at nearly 11 times greater risk for HCV acquisition, and PO injectors who smoked crack/cocaine or who practiced non-injection co-use of tranquilizers were at four times greater risk for HCV seroconversion compare with PWID who did not use either of these drugs.
- With all three abovementioned dyads of drug co-use, we observed a trend for a combination of two drugs to increase the risk for HCV seroconversion compared with the use of only one drug of the two.

- Poly-use of drugs plays important role in the risk of HCV transmission in PO injectors. Participants who injected PO along with co-use of cocaine injection, crack/cocaine smoking, and non-injection tranquilizers, were at the highest risk for HCV seroconversion.

8.2 Future research directions

In our study, we characterized PO injectors of Montreal's HEPCO cohort and examined factors that may put them at increased risk for HCV infection. More extensive research will be needed to further examine unique features of PO injectors, such as their habit to trade "washes" described by ethnographers. We have not been able to evaluate these quantitatively due to the lack of such variables in our initial questionnaires. In addition, characterization of the group of exclusive PO injectors may add to the knowledge in this field.

In our study, we observed a trend for certain drugs to increase the risk of HCV seroconversion for PO injectors when co-used in dyad with PO injection. There is a need to further evaluate these patterns of drug co-use in PO injectors and their association with the risk for HCV seroconversion (e.g., by cluster analysis). In addition, "consecutive" vs. "simultaneous" drug co-use patterns in PO injectors should be investigated separately. More research needs to be done to understand the causes of the increased risk of HCV seroconversion in PWID practicing poly-use of drugs.

Furthermore, PO injectors who use multiple drugs and may be involved in social networks with a large number of contacts including individuals who abuse different types of drugs. It is possible that these PO injectors may become the so-called "hubs" [232] of social networks, which will increase their potential as HCV transmitters once infected. This will be another reason to appropriately rank PO injectors to maximize the efficacy of prevention and treatment strategies. It is therefore important to study the place of PO injectors practicing poly-drug abuse within PWID social networks.

8.3 Public health implications

Canada is facing a major public health crisis regarding PO misuse and related harms [4]. PO abusers are quickly discovering that the most intense opiate high is achieved through injecting [14]. Given the rise in PO abusers who use intravenous injection, and their risk for HCV acquisition, substantial efforts to build intervention strategies for reducing disease transmission in

this community are needed [239-242]. Designing such strategies requires more extensive knowledge of specific characteristics of PO injectors [156]. In response to this need, here we characterized PO injectors of a large open cohort of PWID in Montreal.

According to our findings, PO injectors of Montreal's HEPCO cohort are younger than non-PO injectors. Therefore, in Montreal, harm reduction and prevention strategies may benefit from tailoring to the needs of younger groups of PO injector community. It is possible that many of young PO injectors are at the beginning of their injecting "career". As the highest incidence rates of HCV infection occur in individuals who recently initiated injection drug use, primary prevention interventions need be able to reach out to new injectors [155, 239-244] and prevent their HCV acquisition. This could include the use of Internet platforms such as Facebook, Twitter and Instagram as means of information dissemination [238]. Other choices of interventions that may work better for the younger population may be "resistance skills training" which teaches young people how to resist social influences to engage in substance abuse, or engagement young people in activities alternative to substance abuse rituals (team sports, hobbies, social services).

Furthermore, one of the factors positively associated with PO injection in our study was unstable housing conditions. It is known that homelessness and substance abuse are highly interrelated [106, 245]. Housing is an intermedial structural factor that could serve as a marker of other social determinants of HCV transmission, including unemployment, poverty, and poor access to a medical care [106, 246]. Providing stable housing conditions for PO injectors may facilitate prevention of HCV infection among them [106, 110, 111]. Further, injection in public places, a well-known determinant of HCV transmission, was found to be associated with PO injection. Opening supervised injection sites in Montreal may contribute to reducing the harm related to this risky behavior of PO injectors. The effectiveness of these programs for the growing population of PO injectors may gain from adjusting to their sociodemographic and behavioral characteristics.

In addition, we were able to show that, besides co-using heroin, PO injectors of Montreal's HEPCO Cohort are more likely to practice non-injection co-use of drugs, more specifically, tranquilizers and amphetamines. These are the substances that have previously been associated with increased risk taking behavior and suicidal attempts. Addressing problems related to abuse of these drugs, including risk of suicide, should be part of the harm reduction strategies for PO injectors.

Our findings confirmed a previous report [5] that defined PO injection as an independent determinant of HCV seroincidence. Moreover, using longitudinal analysis, we found that co-use of certain drugs with PO injection is associated with increased risk of HCV seroconversion, and showed that PO injectors practicing poly-use of these drugs are at the highest risk for HCV transmission. This knowledge will be helpful to increase the effectiveness of existing HCV preventive and treatment programs such as, for example, NEPs and SIS, by adjusting them to the needs of PWID abusing these drugs. Further, our study showed that there is a need to develop special low-threshold addiction treatment programs specifically for PO injectors, with the individual approach to those who practice poly-use of drugs. For those PO who co-use cocaine, since specific treatment for cocaine addiction is not available, the access to a comprehensive range of primary health care services should be granted, including screening and treatment for HIV, HCV, and sexually transmitted infections, as well as hepatitis A and B vaccination. Furthermore, our findings suggested that benzodiazepine dependency treatment should be addressed in the therapy regime for those who practice co-use of PO with non-injection tranquilizers. Most important, poly-drug abuse should not be an exclusion criterion in OST programs for PO injectors.

In the time of new effective, but expensive treatments, and with HCV vaccine under development, it is important for public health to identify groups of population representing the most crucial reservoir of the virus. Our findings place PO injectors among the population groups with the highest risk for HCV transmission and will help prioritize future prevention and treatment strategies within PO injector community. Thus, developing programmes for HCV prevention and treatment that target specific subgroups of PO injector community (e.g., cocaine co-users or poly-drug users) may potentiate the effectiveness of control and elimination of HCV transmission both among PWID and in Canada in general.

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Appendix

Baseline questionnaire of HEPCO cohort

(version 2005-06-28)

Version 2005-06-28

ÉPIDÉMIOLOGIE DE L'INFECTION AU VIH ET AU VHC PARMI LES UDIs DE MONTRÉAL

QUESTIONNAIRE D'ENTRÉE

Codes du sujet: Coller ici

Nom de l'interviewer: _____

Date de l'entrevue : _____

Lieu de recrutement :

1. ☐ Désintoxication non médicale :_____
2 ☐ 4e Rolland-Bock :_____
3 ☐ Centre Dollard-Cormier
4 ☐ Méthadone Désintoxication 10e St-Luc
5 ☐ Méthadone maintenance :_____
6 ☐ Hôpital St-Luc
7 ☐ Autre Hôpital :_____
8 ☐ Thérapie :_____
9 ☐ Organisme Communautaire :_____
10 ☐ Autres (précisez) _____
11 ☐ Bouche à oreille (rue)

SECTION 1 : ATTITUDE FACE AU RISQUE D'ATTRAPER L'HÉPATITE C ET CONNAISSANCES

1A- Pour chacun des énoncés qui suivent, veuillez nous indiquer dans quelle mesure vous êtes d'accord ou pas à partir des choix suivants :

	1.Fortement en accord	2.En accord	3.En désaccord	4.Fortement en désaccord	5.Hépatite C positif
a) La possibilité de contracter l'hépatite C me préoccupe.					
b) Ma vie sera complètement désorganisée si j'attrape l'hépatite C.					
c) Je devrai changer plusieurs de mes habitudes de vie si j'attrape l'hépatite C.					
d) Je serai très affecté émotionnellement si j'attrape l'hépatite C.					
e) Je serai rejeté par certaines personnes de mon entourage si j'attrape l'hépatite C					

1B- Selon vos comportements actuels, quelle est la probabilité que vous contractiez l'hépatite C?

1. ☐ Très probable
2. ☐ Probable
3. ☐ Peu probable
4. ☐ Très peu probable (très improbable)
5. ☐ Improbable
6. ☐ Hépatite C positif

1C- Peut-on guérir seul de l'hépatite C?

1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

1D- Existe-t-il des traitements pour guérir de l'hépatite C?

1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

1E- Peut-on attraper l'hépatite C en partageant la fourchette de quelqu'un d'autre?

1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

1F- Est-ce qu'il y a plus de risque pour un injecteur de drogue d'attraper le virus de l'hépatite C que le VIH?

1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

1G- Existe-t-il un vaccin pour l'hépatite C?

1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

1H- Quelle est la probabilité d'attraper l'hépatite C par des rapports sexuels?

1. ☐ Très probable
2. ☐ Probable
3. ☐ Peu probable
4. ☐ Très peu probable (très improbable)
5. ☐ Improbable
6. ☐ Ne sait pas

SECTION 2 : REVENU

2A- Dans les six derniers mois, quelles étaient vos sources de revenus et combien d'argent avez-vous obtenu de chacune de ces sources ?

****DÉBUTER EN INSCRIVANT LES DATES COUVERTES POUR CHAQUE PÉRIODE DE 1 MOIS EN COMPTANT À PARTIR DE LA DATE DE L'ENTREVUE****

Le mois dernier → **Il y a 6 mois**

	Sources de revenu		Du : ____ Au : ____	Du : ____ Au : ____	Du : ____ Au : ____	Du : ____ Au : ____	Du : ____ Au : ____	Du : ____ Au : ____
☐	Sécurité du revenu		$	$	$	$	$	$
	Autre revenu institutionnel	2 ☐ Chômage 3 ☐ CSST 4 ☐ SAAQ 5 ☐ Autre_____	$	$	$	$	$	$
	Travail régulier légal	1 ☐ professionnel 2 ☐ technicien 3 ☐ services de bureau 4 ☐ autres services 5 ☐ travailleur manuel 6 ☐ hom/fem d'affaires	$	$	$	$	$	$
☐	Revenu alternatif (quête, prostitution, travail au noir ou tout autre revenu) :_____		$	$	$	$	$	$
☐	Revenu provenant d'activités criminelles		$	$	$	$	$	$

******PASSER À LA QUESTION 2D SI AUCUN REVENU DE LA SÉCURITÉ DU REVENU******

2B- Combien de temps votre chèque dure-t-il en moyenne? _____/_____
heures / jours

2C- ÊTES-VOUS ADMINISTRÉ? 1 ☐ OUI 2 ☐ NON → *PASSER À 2D*

***Si oui,* qui administre votre chèque?**

1 ☐ Accueil Bonneau
2 ☐ Maison du Père
3 ☐ Centre Dollard Cormier
4 ☐ Autre _____

Combien de fois par mois recevez-vous de l'argent sur ce chèque?

1 ☐ plus d'une fois par semaine
2 ☐ une fois par semaine
3 ☐ toutes les deux semaines
4 ☐ une fois par mois
5 ☐ autre
6 ☐ à la demande

2D- Dans les six derniers mois, quel a été votre revenu mensuel total en moyenne? $ _____

2E- Dans les quatre dernières semaines, combien pensez-vous avoir dépensé d'argent pour les drogues? $ _____

SECTION 3 : CONSOMMATION DE DROGUES

3A- a) Avez-vous déjà consommé les drogues suivantes?

b) Si oui, à quel âge avez-vous débuté votre consommation?

c) En avez-vous consommé dans les six derniers mois?

	Âge 1ère consommation	Dans les derniers six (6) mois
1. ☐ Alcool	_____	☐
2. ☐ Héroïne IV	_____	☐
3. ☐ Héroïne fumée ou inhalée	_____	☐
4. ☐ Cocaïne IV	_____	☐
5. ☐ Cocaïne fumée (freebase / crack)	_____	☐
6. ☐ Cocaïne inhalée	_____	☐
7. ☐ Speedball	_____	☐
8. ☐ Méthadone prescrite	_____	☐
9. ☐ Méthadone de rue	_____	☐
10. ☐ Autres opiacés_____	_____	☐
11. ☐ Autres opiacés IV_____	_____	☐
12. ☐ Amphétamines (speed, crystal, meth, Ice)	_____	☐
13. ☐ Amphétamines IV(speed, crystal, meth)	_____	☐
14. ☐ Barbituriques(barbs, goofball)	_____	☐
15. ☐ Barbituriques IV(barbs, goofball)	_____	☐
16. ☐ Tranquillisants (downers, peanuts, benzos)	_____	☐
17. ☐ Marijuana, hashish, pot, herbe	_____	☐
18. ☐ Drogues psychédéliques LSD, PCP, Mescaline, MDA, MDMA, Ecstasy, DMT, Mushrooms	_____	☐
19. ☐ Talwin et/ou ritalin IV	_____	☐
20. ☐ Talwin et/ou ritalin	_____	☐
21. ☐ Autre _____	_____	☐

3A- d) Quelle était votre drogue préférée dans les six derniers mois? _____ *INSCRIRE LE NUMÉRO DE LA LISTE PRÉCÉDENTE*

3B- ALCOOL

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de l'alcool, combien de jours en avez-vous consommé :

de 1 à 4 fois par jour _____
de 5 à 10 par jour _____
plus de 10 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé de l'alcool?_____

3C-HÉROÏNE IV

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé de l'héroïne IV, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé de l'héroïne IV?_____

3D-HÉROÏNE FUMÉE OU INHALÉE

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de l'héroïne fumée ou inhalée, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour _____

Dans les six derniers mois, combien de jours avez-vous consommé de l'héroïne fumée ou inhalée?_____

3E-COCAÏNE IV

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé de la cocaïne IV, combien de jours en avez-vous consommé :

de 1 à 9 fois par jour_____

de 10 à 20 par jour _____

plus de 20 par jour _____

Dans les six derniers mois, quelle a été votre consommation de cocaïne IV?

	Nomb. de jours	Nomb. d'inject.
Ce mois-ci		
Il y a 2 mois		
Il y a 3 mois		
Il y a 4 mois		
Il y a 5 mois		
Il y a 6 mois		

Dans les 6 derniers mois, durant les_____ jours où vous vous êtes injecté de la cocaïne, combien de jour vous êtes-vous injecté de la cocaïne?

de 1 à 9 fois par jour_____

de 10 à 20 par jour _____

plus de 20 par jour _____

3F-COCAÏNE FUMÉE (FREEBASE OU CRACK)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de la cocaïne fumée, combien de jours en avez-vous consommé :

de 1 à 9 fois par jour _____

de 10 à 20 par jour _____

plus de 20 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé de la cocaïne fumée?_____

3G-COCAÏNE INHALÉE

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de la cocaïne inhalée, combien de jours en avez-vous consommé :

de 1 à 9 fois par jour _____

de 10 à 20 par jour _____

plus de 20 par jour _____

Dans les six derniers mois, combien de jours avez-vous consommé de la cocaïne inhalée?_____

3H-SPEEDBALL

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé du speedball, combien de jours en avez-vous consommé :

de 1 à 9 fois par jour _____
de 10 à 20 par jour _____
plus de 20 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé du speedball?_____

3I-MÉTHADONE PRESCRITE

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Dans les six derniers mois, combien de jours avez-vous consommé de la méthadone prescrite?_____

3J-MÉTHADONE DE RUE

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de la méthadone de rue, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour_____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé de la méthadone de rue?_____

3K- AUTRES OPIACÉS NON IV_____

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé des opiacés non IV, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour _____

Dans les six derniers mois, combien de jours avez-vous consommé des opiacés NON IV?_____

3L-OPIACÉS IV_____

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé des opiacés IV, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour _____

Dans les six derniers mois, combien de jours avez-vous consommé des opiacés IV?_____

3M- AMPHÉTAMINES (speed, meth, crystal, ice)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé des amphétamines, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé des amphétamines?_____

3N- AMPHÉTAMINES IV (speed, meth, crystal)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé des amphétamines IV, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé des amphétamines IV?_____

3O- BARBITURIQUES (barbs, goofballs)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé des barbituriques, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour _____

Dans les six derniers mois, combien de jours avez-vous consommé des barbituriques?_____

3P- BARBITURIQUES IV (barbs, goofballs)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé des barbituriques IV, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour _____

Dans les six derniers mois, combien de jours avez-vous consommé des barbituriques IV?_____

3Q-TRANQUILLISANTS (downers, peanuts, benzos)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé des tranquillisants, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé des tranquillisants?_____

3R-MARIJUANA, HASHISH, POT, HERBE

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de la marijuana, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé de la marijuana?_____

3S- DROGUES PSYCHÉDÉLIQUES (LSD, PCP, Mescaline, MDA, MDMA, Ecstasy, DMT, mushrooms)

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé des drogues psychédéliques, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé des drogues psychédéliques?_____

3T- TALWIN ET/OU RITALIN IV

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total injections :** ☐

Durant ces jours où vous avez consommé du Talwin et/ou ritalin IV, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé du Talwin et/ou ritalin IV?_____

3U- TALWIN ET/OU RITALIN

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé du Talwin et/ou ritalin, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé du Talwin et/ou Ritalin?_____

3V- AUTRE DROGUE _____

Au cours des quatre dernières semaines, combien en avez-vous pris?

Total jours : ☐ **Total consommations :** ☐

Durant ces jours où vous avez consommé de la _____, combien de jours en avez-vous consommé :

de 1 à 3 fois par jour _____
de 4 à 6 par jour _____
plus de 6 par jour_____

Dans les six derniers mois, combien de jours avez-vous consommé cette drogue?_____

SECTION 4 : PROFIL D'INJECTION

4A- Vous êtes-vous déjà injecté des drogues? 1 ☐ Oui 2 ☐ Non

****SI LA PERSONNE NE S'EST JAMAIS INJECTÉE COMPLÉTER LE QUESTIONNAIRE ET LUI DIRE À LA FIN DE L'ENTREVUE QU'ELLE N'EST PAS ADMISSIBLE****

4B- À QUEL ÂGE VOUS ÊTES-VOUS INJECTÉ OU VOUS A-T-ON INJECTÉ POUR LA PREMIÈRE FOIS? _____

4C- La première fois où vous vous êtes injecté, combien de personnes étaient avec vous?

1 ☐ personne
2 ☐ une autre personne
3 ☐ 2 ou 3 personnes
4 ☐ 4 à 6 personnes
5 ☐ plus de 6 personnes
6 ☐ ne sait pas / ne se souvient pas

4D- La première fois où vous vous êtes injecté, qui était avec vous?

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)
2 ☐ Membres de la famille
3 ☐ Ami(e)s proches
4 ☐ Partenaire de cotation/ consommation
5 ☐ Connaissances (dealer, personne de passage,….)
6 ☐ Étrangers
7 ☐ Détenus
8 ☐ Autre : _____

4E- La première fois où vous vous êtes injecté ou qu'on vous a injecté, avez-vous utilisé une seringue que quelqu'un avait déjà utilisée? 1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas / Ne se souvient plus

4F- Selon vous, quelles sont les principales raisons pour lesquelles vous avez commencé à vous injecter?

1 ☐ des amis / d'autres m'ont initié
2 ☐ je voulais essayer pour voir
3 ☐ j'aime ça être high
4 ☐ pour oublier mes problèmes
5 ☐ curieux de l'effet
6 ☐ trouver un meilleur moyen de prendre des drogues
7 ☐ expérience
8 ☐ pour arrêter d'autres drogues
9 ☐ j'avais de l'argent pour le faire
10 ☐ ne sait pas / ne se souvient plus
11 ☐ suicidaire
12 ☐ je ne voulais pas m'injecter
13 ☐ autre _____
14 ☐ autre _____

4G- Dans les six derniers mois, avez-vous arrêté de vous injecter volontairement ou par obligation?

****RÉPONDRE OUI, MÊME SI L'ARRÊT DÉBUTE AVANT LA PÉRIODE DE SIX MOIS**** 1 ☐ Oui 2 ☐ Non

PASSER À 4H

Est-ce que c'était volontairement ou par obligation?

1 ☐ Volontairement : désintox/thérapie

2 ☐ Par obligation : thérapie obligatoire, prison, voyage, autre

Quelle était la dernière fois (Date du début)? ____ ____ _____ (jour mois année)

Combien de jours? _____

4H- Quand vous êtes-vous injecté la dernière fois? _____/_____/_____
ÊTRE COHÉRENT AVEC LE TABLEAU SUR LES DROGUES DES P.5-11. jour mois année

4I- Durant les quatre dernières semaines, quelles ont été vos habitudes d'injection?

Total jours d'injection : _____

Nombre d'injections par jour en moyenne (les jours où vous vous êtes injectés) : _____

****SI LA PERSONNE NE S'EST PAS INJECTÉ DURANT LES 4 DERNIÈRES SEMAINES, COMPLÉTER LE QUESTIONNAIRE ET LUI DIRE À LA FIN DE L'ENTREVUE QU'ELLE N'EST PAS ADMISSIBLE****

Donc si je fais le calcul, dans les quatre dernières semaines vous vous êtes injecté _____ fois?
VÉRIFIER AUPRÈS DE LA PERSONNE SI LE NOMBRE CORRESPOND EFFECTIVEMENT AU NOMBRE D'INJECTIONS. SINON REVENIR AUX QUESTIONS PRÉCÉDENTES

4J- Dans les six derniers mois, combien de jours vous êtes vous injecté?_____

4K- Pendant les jours où vous vous injectiez, quelle a été votre fréquence mensuelle moyenne d'injection?

****INSCRIRE LE NUMÉRO CORRESPONDANT DU TABLEAU DES FRÉQUENCES****

le mois dernier _____
il y a 2 mois _____
il y a 3 mois _____
il y a 4 mois _____
il y a 5 mois _____
il y a 6 mois _____

FRÉQUENCES

0	**AUCUNE INJECTION**
1	**1 À 3 / JOUR**
2	**4 À 6 / JOUR**
3	**7 À 10 / JOUR**
4	**PLUS DE 10 FOIS / JOUR**

4L- Pendant les jours où vous vous injectiez, quelle a été votre fréquence globale d'injection dans les six derniers mois? _____
****INSCRIRE LE NUMÉRO CORRESPONDANT DU TABLEAU DES FRÉQUENCES****

4M- Dans les six derniers mois, dans quelle ville ou quel arrondissement de Montréal, vous êtes-vous injecté le plus souvent?_____
CONSULTER LA CARTE POUR TROUVER L'ARRONDISSEMENT ET INSCRIRE LE NUMÉRO CORRESPONDANT

4N- Dans les six derniers mois, vous êtes-vous injecté dans les endroits suivants et quel pourcentage d'injections y avez-vous effectué? *LE TOTAL DOIT DONNER 100%*

	% injection		% injection
1 ☐ chez vous (chambre / appartement)	%	7 ☐ bar / restaurant	%
2 ☐ toilettes publiques	%	8 ☐ chez le «dealer»	%
3 ☐ chez un ami	%	9 ☐ au sauna	%
4 ☐ crack house/piqueries/shooting gallery	%	10 ☐ en prison, dans un centre de détention	%
5 ☐ rue (ruelle / perron)	%	11 ☐ peepshow	%
6 ☐ parc	%	12 ☐ autre _____	%

SECTION 5: EXCÈS DE DROGUE

5A- Dans les six derniers mois, avez-vous fait une overdose accidentelle? 1 ☐ Oui 2 ☐ Non

Combien de fois? _____ *PASSER À 5B*

À quand remonte la dernière fois? _____/_____/_____
jour mois année

Avez-vous reçu une attention médicale (ambulance, urgence, etc.)? 1 ☐ Oui 2 ☐ Non

5B- Avez-vous déjà consommé par excès en perdant le contrôle de votre consommation, en vous injectant plus que d'habitude? 1 ☐ Oui 2 ☐ Non → *PASSER À LA SECTION 6 (P.16)*

Si oui, quand l'avez-vous fait la première fois? _____/_____
mois année

5C- Dans les six derniers mois, vous est-il arrivé de consommer par excès, de perdre le contrôle de votre consommation, en vous injectant plus que d'habitude? 1 ☐ Oui 2 ☐ Non

PASSER À LA *SECTION 6 (P.16)*

***Si oui,* à quelle fréquence avez-vous eu ces excès?** *(Au besoin faire la moyenne)*

1 ☐ plus d'une fois par semaine
2 ☐ une fois par semaine
3 ☐ 1 fois par 2 semaines
4 ☐ 1 fois par 3 semaines
5 ☐ 1 fois par mois
6 ☐ 1 fois par 2 mois
7 ☐ 1 fois par 3 mois
8 ☐ 1 fois par 4 mois
9 ☐ 1 fois par 5 mois
10 ☐ 1 fois par 6 mois

5D- Dans les six derniers mois, combien de temps, en général, duraient vos excès?

_____
de jours

5E- Pendant ces excès, combien de fois par jour en moyenne, vous injectez-vous?

_____
injections / jour

5F- Pendant ces excès, quelle(s) est(sont) la (les) drogue(s) principale(s) que vous vous injectez?

1 ☐ héroïne IV
2 ☐ cocaïne IV
3 ☐ Speedball
4 ☐ autres opiacés IV (Morphine)
5 ☐ amphétamines IV
6 ☐ Talwin et Ritalin IV
7 ☐ autres _____

5G- Est-ce qu'il y avait d'autres personnes? 1 ☐ Oui 2 ☐ Non
PASSER À 5H

***Si oui,* qui?**

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)
2 ☐ Membres de la famille
3 ☐ Ami(e)s proches
4 ☐ Partenaire de cotation/ consommation
5 ☐ Connaissances (dealer, personne de passage,….)
6 ☐ Étrangers
7 ☐ Détenus
8 ☐ Autre : _____

5H- Pendant ces excès, est-ce que vous arrivez à suivre la trace de vos aiguilles?
1 ☐ Oui 2 ☐ Non

5I- Pendant ces excès, est-ce que vous avez utilisé des seringues déjà utilisées par quelqu'un d'autre?
1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

5J- Pendant ces excès, prenez-vous d'autres drogues que vous ne vous injectez pas?

1 ☐ Marijuana
2 ☐ Crack
3 ☐ Speed
4 ☐ LSD
5 ☐ Ts & Rs
6 ☐ Tranquillisants
7 ☐ Ecstasy
8 ☐ T3's (Tylénol Xtra fort ou avec codéine)
9 ☐ Autre _____
10 ☐ Alcool
11 ☐ Aucune

SECTION 6: ÉCHANGE DE SERINGUES

6A- Dans les six derniers mois, avez-vous obtenu vos seringues aux sources suivantes

SI OUI, COCHER ET INDIQUER LE POURCENTAGE DE SERINGUES OBTENUES À CETTE SOURCE

	% seringues		% seringues
a ☐ Cactus	%	i ☐ Amis / partenaires	%
b ☐ Anonyme	%	j ☐ Clinique	%
c ☐ Spectre	%	k ☐ CLSC	%
d ☐ Pré-fixe	%	l ☐ Infirmier(ière) de rue	%
e ☐ Pharmacies	%	m ☐ Travailleur(se) de rue	%
f ☐ Autres programmes échange seringues	%	n ☐ Piqueries	%
g ☐ Achetées dans la rue	%	o ☐ Autres_____	%
h ☐ Dealer	%		

****LE TOTAL DOIT DONNER 100%****

****SI LA PERSONNE OBTIENT SES SERINGUES DE QUELQU'UN QUI VA LES CHERCHER POUR ELLE, C'EST CETTE PERSONNE QUE L'ON DOIT INDIQUER DANS LE TABLEAU****

6B- Dans les programmes d'échanges de seringues, en général, est-ce que vous pouvez échanger autant de seringues que vous voulez?

1 ☐ Oui 2 ☐ Non 3 ☐ N/A

***Si non,* pourquoi? _____**

6C- Dans les 28 derniers jours, combien de fois vous êtes-vous procuré des seringues neuves en allant vous-même au programme d'échange de seringues? _____

Combien de seringues neuves vous êtes-vous procuré? _____

6D- Dans les six derniers mois, combien de fois quelqu'un d'autre s'est rendu au programme d'échange pour échanger des seringues pour vous?

1 ☐ toujours (100%) 2 ☐ souvent (> 75%) 3 ☐ parfois (26 – 74%)
4 ☐ rarement (< 25%) 5 ☐ jamais (0%)

6E- Dans les six derniers mois, combien de fois êtes-vous allé au programme d'échange pour échanger des seringues pour quelqu'un d'autre?

1 ☐ toujours (100%) 2 ☐ souvent (> 75%) 3 ☐ parfois (26 – 74%)
4 ☐ rarement (< 25%) 5 ☐ jamais (0%)

6F- Dans les six derniers mois, combien de fois vous êtes-vous procuré vos seringues dans une pharmacie?

1 ☐ toujours (100%) 2 ☐ souvent (> 75%) 3 ☐ parfois (26 – 74%)
4 ☐ rarement (< 25%) 5 ☐ jamais (0%)

6G- Dans les six derniers mois, est-ce qu'on vous a refusé des seringues dans une pharmacie?
1 ☐ Oui 2 ☐ Non 3 ☐ Jamais essayé

6H- En ce moment, est-ce que vous trouvez difficile de vous procurer des seringues neuves quand vous en avez besoin? 1 ☐ Oui 2 ☐ Non 3 ☐ Parfois 4 ☐ N/A

Si oui ou parfois, **pourquoi?**_____

SECTION 7: PARTAGE DE SERINGUES ET DE MATÉRIEL

7A- Dans les six derniers mois, avez-vous utilisé le même matériel de consommation que quelqu'un d'autre, peu importe que cette personne l'ait utilisé avant ou après vous?

1-	**Contenant de préparation sans chauffage (cuiller, bouchon, sac de plastique, wash …)**	1 ☐ Oui	2 ☐ Non
2-	**Cooker (contenant chauffé)**	1 ☐ Oui	2 ☐ Non
3-	**Eau (contenant)**	1 ☐ Oui	2 ☐ Non
4-	**Garrot, Sling**	1 ☐ Oui	2 ☐ Non
5-	**Filtre, Tampon, Coton**	1 ☐ Oui	2 ☐ Non
6-	**Joint, Pipe, Toker, Bunk, Chilloum**	1 ☐ Oui	2 ☐ Non
7-	**Paille, billet de banque, clé**	1 ☐ Oui	2 ☐ Non

7B- Dans les six derniers mois, combien de fois (%) vous êtes-vous injecté seul?

1 ☐ toujours (100%) 2 ☐ souvent (> 75%) 3 ☐ parfois (26 – 74%) 7 ☐ N/A (pas d'injection)
4 ☐ rarement (< 25%) 5 ☐ jamais (0%) 6 ☐ ne sait pas

7C- Dans les six derniers mois, vous êtes-vous injecté en présence des personnes suivantes?

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)
2 ☐ Membres de la famille
3 ☐ Ami(e)s proches
4 ☐ Partenaire cotation/ consommation
5 ☐ Connaissances (dealer, personne de passage,….)
6 ☐ Étrangers
7 ☐ Détenus
8 ☐ Autre : _____
9 ☐ Seul
10 ☐ N/A (pas d'injection)

7D- Dans les quatre dernières semaines, vous êtes-vous injecté en présence d'au moins une autre personne qui s'injectait durant la même période d'injection?

1 ☐ Oui 2 ☐ Non 3 ☐ N/A (pas d'injection)

** COMPLÉTER LE QUESTIONNAIRE **DERNIER ÉPISODE D'INJECTION** À LA FIN DE CE QUESTIONNAIRE**

Lire les définitions suivantes au participant avant de poser les questions de cette section.

UTILISER UNE SERINGUE AYANT DÉJÀ ÉTÉ UTILISÉE PAR QUELQU'UN D'AUTRE FAIT RÉFÉRENCE À TOUTE PRATIQUE INCLUANT UNE SERINGUE AYANT SERVI À L'INJECTION OU AYANT ÉTÉ EN CONTACT DIRECT OU INDIRECT AVEC DU SANG: PAR EXEMPLE, S'INJECTER AVEC UNE SERINGUE AVEC LAQUELLE QUELQU'UN S'EST DÉJÀ INJECTÉ, FAIRE DU BACKLOADING, REMPLIR VOTRE SERINGUE À PARTIR DE LA SERINGUE SOUILLÉE PAR DU SANG, MÉLANGER LA DROGUE DANS UNE MÊME SERINGUE AYANT DÉJÀ SERVI POUR L'INJECTION ….

7E- Avez-vous déjà utilisé une seringue utilisée par quelqu'un d'autre? 1 ☐ Oui 2 ☐ Non
PASSER À Q7G

Quand avez-vous partagé des seringues la 1ere fois? _____/_____/_____
jour mois année

Si oui, est-ce que vous avez partagé des seringues dans les six derniers mois?

1 ☐ aucune
2 ☐ une fois
3 ☐ < 5
4 ☐ 6-10
5 ☐ > 10
6 ☐ > 100

De combien de personnes venaient ces seringues? _____

Quand avez-vous partagé la dernière fois? _____/_____/_____
jour mois année

Dans les six derniers mois, combien de fois vous êtes-vous injecté avec une seringue qui a été utilisée par quelqu'un d'autre qui a fait du booting (pomper, tirer du sang dans la seringue avant de s'injecter)?

1 ☐ toujours (100%)
2 ☐ souvent (> 75%)
3 ☐ parfois (26 – 74%)
4 ☐ rarement (< 25%)
5 ☐ jamais (0%)
6 ☐ ne sait pas

7F- Dans les 28 derniers jours, de combien de personnes différentes avez-vous utilisé des seringues avec lesquelles elles s'étaient déjà injectées? _____

Qui étaient ces personnes?

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)
2 ☐ Membres de la famille
3 ☐ Ami(e)s proches
4 ☐ Partenaires de cotation/ consommation
5 ☐ Connaissances (dealer, personne de passage,…)
6 ☐ Étrangers
7 ☐ Détenus
8 ☐ Seringues trouvées
9 ☐ Incertain
10 ☐ Autre : _____

Qui la plupart du temps? *INSCRIRE LE CHIFFRE DU TABLEAU PRÉCÉDENT* _____

7G- Avez-vous déjà utilisé du matériel d'injection utilisé par quelqu'un d'autre? 1 ☐ Oui 2 ☐ Non

PASSER À Q7H

Quand l'avez-vous fait la dernière fois? ____/_____/_____
jour mois année

Combien de fois l'avez-vous fait dans les six derniers mois?

1 ☐ aucune
2 ☐ une fois
3 ☐ < 5
4 ☐ 6-10
5 ☐ > 10
6 ☐ > 100

Qui avait déjà utilisé ce matériel d'injection?

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)
2 ☐ Membres de la famille
3 ☐ Ami(e)s proches
4 ☐ Partenaires de cotation/ consommation
5 ☐ Connaissances (dealer, personne de passage,…)
6 ☐ Étrangers
7 ☐ Détenus
8 ☐ Matériels trouvés
9 ☐ Incertain
10 ☐ Autre : _____

Qui la plupart du temps? *INSCRIRE LE CHIFFRE DU TABLEAU PRÉCÉDENT* _____

7H- Avez-vous déjà prêté à quelqu'un des seringues que vous avez utilisées? 1 ☐ Oui 2 ☐ Non

PASSER À Q7I

***Si oui,* est-ce que vous avez fait cela dans les six derniers mois?**

1 ☐ aucune
2 ☐ une fois
3 ☐ < 5
4 ☐ 6-10
5 ☐ > 10
6 ☐ > 100

À qui en avez-vous prêté?

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)
2 ☐ Membres de la famille
3 ☐ Ami(e)s proches
4 ☐ Partenaire cotation/ consommation
5 ☐ Connaissances (dealer, personne de passage,….)
6 ☐ Étrangers
7 ☐ Détenus
8 ☐ Incertain
9 ☐ Autre : _____

À qui en avez-vous prêté la plupart du temps? *INSCRIRE LE CHIFFRE DU TABLEAU PRÉCÉDENT* _____

7I- Dans les six derniers mois, en général, est-ce que vous avez utilisé une seule fois vos seringues?
1 ☐ Oui 2 ☐ Non
PASSER À 7J

Sinon, combien de fois en moyenne utilisez-vous la même seringue? _____

7J- Est-ce que vous nettoyez vos seringues entre les injections?
1 ☐ Oui 2 ☐ Non 3 ☐ Usage unique (100% DES FOIS)

PASSEZ À 7K

Qu'est-ce que vous utilisez pour les nettoyer?

a ☐ de l'alcool
b ☐ les faire bouillir ou les chauffer
c ☐ les laver à l'eau de javel et trousse
d ☐ les rincer à l'eau seulement
e ☐ autre_____

7K- Dans les 28 derniers jours, quel est le pourcentage de vos injections faites avec des seringues neuves, jamais utilisées? _____% ☐ N/A (pas d'injection dans les 28 derniers jours)

7L- Dans les six derniers mois, combien de fois avez-vous eu besoin de l'aide de quelqu'un pour vous injecter

1 ☐ toujours (100%)
2 ☐ souvent (> 75%)
3 ☐ parfois (26 – 74%)
4 ☐ rarement (< 25%)
5 ☐ jamais (0%)
6 ☐ ne sait pas

***Pourquoi* avez-vous besoin d'aide pour vous injecter?** _____

7M- Dans les six derniers mois, êtes-vous allé dans des endroits où vous ne connaissez pas les gens et où vous vous injectez en groupe comme dans des crack houses ou des piqueries?

1 ☐ jamais
2 ☐ une fois
3 ☐ < 5
4 ☐ 6-10
5 ☐ > 10
6 ☐ > 100

7N- Dans les 6 derniers mois, quel est le maximum de personnes avec lesquelles vous avez partagé des seringues ou du matériel d'injection en une seule occasion? _____

7O- Dans les six derniers mois, avez-vous partagé vos seringues avec une (des) personne(s) séropositive(s) au VIH? 1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

Si oui, combien de fois? _____

Saviez-vous que cette (ces) personne(s) étai(en)t séropositive(s)? 1 ☐ Oui 2 ☐ Non

7P- Dans les six derniers mois, avez-vous partagé le matériel d'injection avec une (des) personne(s) séropositive(s) au VIH? 1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

Si oui, combien de fois? _____

Saviez-vous que cette (ces) personne(s) étai(en)t séropositive(s)? 1 ☐ Oui 2 ☐ Non

7Q- Dans les six derniers mois, avez-vous partagé vos seringues avec une (des) personne(s) infectée(s) par l'hépatite C? 1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

Si oui, combien de fois? _____

Saviez-vous que cette (ces) personne(s) étai(en)t infectée(s) par l'hépatite C? 1 ☐ Oui 2 ☐ Non

7R- Dans les six derniers mois, avez-vous partagé le matériel d'injection avec une (des) personne(s) infectée(s) par l'hépatite C? 1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

Si oui, combien de fois? _____

Saviez-vous que cette (ces) personne(s) étai(en)t infectée(s) par l'hépatite C? 1 ☐ Oui 2 ☐ Non

7S- Dans vos connaissances, combien de personnes sont séropositives ou ont le sida? _____

7T- Dans vos connaissances, combien de personnes sont infectée(s) par l'hépatite C? _____

SECTION 8 : COMPORTEMENTS SEXUELS

8A- Quelle est votre orientation ou préférence sexuelle?

1 ☐ Hétérosexuelle 3 ☐ Bisexuelle
2 ☐ Homosexuelle 4 ☐ Refuse de répondre

8B- À quel âge avez-vous commencé à avoir des relations sexuelles complètes (pénétration vaginale, orale ou anale)? _____

8C- Avez-vous déjà fait de la prostitution? 1 ☐ Oui 2 ☐ Non → *PASSER À 8D*

***Si oui,* quand la première fois?** _____/_____/_____ (jour / mois / année)

***Si oui,* avez-vous cessé de faire de la prostitution?** 1 ☐ Oui 2 ☐ Non

***Si oui,* quand avez-vous cessé?** _____/_____/_____ (jour / mois / année)

8D- Dans les six derniers mois, avez-vous eu des relations sexuelles? 1 ☐ Oui 2 ☐ Non → *PASSER À LA SECTION 9(P.32)*

POUR LES FEMMES, ***RÉPONDRE À LA Section 8.1***

POUR LES HOMMES

AVEZ-VOUS EU DES RELATIONS AVEC DES FEMMES SEULEMENT? DES HOMMES SEULEMENT? AVEC LES DEUX?

☐ *Si avec des **FEMMES** seulement,* ***RÉPONDRE UNIQUEMENT À LA SECTION 8.1***

☐ *Si avec des **HOMMES** seulement,* ***RÉPONDRE UNIQUEMENT À LA SECTION 8.2***

☐ *Si avec des **HOMMES et des FEMMES,***

RÉPONDRE AUX SECTIONS 8.1, POUR LES RELATION AVEC DES FEMMES

RÉPONDRE AUX SECTIONS 8.2, POUR LES RELATION AVEC DES HOMMES

SECTION 8.1: RELATIONS HÉTÉROSEXUELLES, BISEXUELLES OU LESBIENNES

PARTENAIRE RÉGULIER(ÈRE)

LIRE LA DÉFINITION SUIVANTE AVANT DE POSER LES QUESTIONS :

UN PARTENAIRE RÉGULIER EST UNE PERSONNE AVEC QUI L'ON A ÉTÉ PENDANT PLUS DE TROIS MOIS.

8.1A- a) Dans les six derniers mois avez-vous eu un(e) partenaire sexuel(le) régulier(ère)? 1 ☐ Oui 2 ☐ Non → *QUESTION 8.1B*

Ce(tte) partenaire est-il(elle) du sexe opposé? 1 ☐ Oui 2 ☐ Non

b) En ce moment, avez-vous un(e) partenaire sexuel(le) régulier(ère)? 1 ☐ Oui 2 ☐ Non

QUESTION 8.1B

***Si oui*, depuis quand?** _____/_____/_____
jour mois année

Ce(tte) partenaire est-il(elle) du sexe opposé? 1 ☐ Oui 2 ☐ Non

c) Quelles pratiques sexuelles avez-vous avec votre partenaire régulier(ère)?

LES QUESTIONS SUIVANTES CONCERNENT LE/LA PARTENAIRE SEXUEL(LE) RÉGULIER LE/LA PLUS RÉCENT(E) QUE VOUS AVEZ EU

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
	# /jour	# /sem.	# /mois	#/6 mois	Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
					1	2	3	4	5
Vaginale									
Orale									
Anale									

FRÉQUENCE DES RAPPORTS SEXUELS: *INDIQUER* ***1 SEUL CHIFFRE*** *DANS LA PÉRIODICITÉ PERTINENTE*
FRÉQUENCE UTILISATION DU CONDOM : *INDIQUER LE CHIFFRE CORRESPONDANT*

d) Est-ce que votre partenaire régulier(ère) s'injecte des drogues?
1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

e) Votre partenaire régulier(ère) a-t-il(elle) des activités de prostitution?
1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

f) Est-ce que votre partenaire régulier(ère) est séropositif(ve) au VIH?
1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

g) En ce moment avez-vous plus d'un(e) partenaire sexuel(le) régulier(ère)?
1 ☐ Oui 2 ☐ Non

PARTENAIRE(S) OCCASIONNEL(LES)

LIRE LA DÉFINITION SUIVANTE AVANT DE POSER LES QUESTIONS :

ON CONSIDÈRE COMME PARTENAIRE OCCASIONNEL, TOUT PARTENAIRE AVEC LEQUEL IL N'Y A PAS EU UNE RELATION DE PLUS DE TROIS MOIS. CETTE RELATION NE DOIT PAS ÊTRE DANS UN CONTEXTE DE PROSTITUTION, AVEC ÉCHANGE D'ARGENT.

8.1B- a) Dans les six derniers mois, avez-vous eu des partenaires occasionnel(le)s?

1 ☐ Oui 2 ☐ Non → *PASSER À 8.1C*

***Si oui,* combien? _____**

***Quel* est le sexe de votre(vos) partenaire(s) occasionnel(les)?**

1 ☐ sexe opposé 2 ☐ même sexe

POUR LES HOMMES, SI L'HOMME A DES PARTENAIRES OCCASIONNELS MASCULINS SEULEMENT, VOUS DEVEZ RÉPONDRE À LA SECTION 8.2. SI L'HOMME A DES PARTENAIRES OCCASIONNEL(LE)S MASCULINS ET FÉMININES, VOUS DEVEZ RÉPONDRE À 8.1B. POUR LES PARTENAIRES FÉMININES SEULEMENT ET À LA SECTION 8.2 POUR LES PARTENAIRES MASCULINS.

b) Quelles pratiques sexuelles avez-vous avec votre(vos) partenaire(s) occasionnel(les)?

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
					Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
	# /jour	# /sem.	# /mois	#/6 mois	1	2	3	4	5
Vaginale									
Orale (homme-femme)									
Orale (femme-femme)									
Anale									

***FRÉQUENCE DES RAPPORTS SEXUELS**: INDIQUER **1 SEUL CHIFFRE** DANS LA PÉRIODICITÉ PERTINENTE*
***FRÉQUENCE UTILISATION DU CONDOM** : INDIQUER LE CHIFFRE CORRESPONDANT*

c) Est-ce que l'un(e) de vos partenaires occasionnel(le)s s'injecte des drogues?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

d) Est-ce que l'un(e) de vos partenaires occasionnel(le)s a des activités de prostitution?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

e) Est-ce que l'un(e) de vos partenaires occasionnel(le)s est séropositif(ve) au VIH?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

ACTIVITÉS DE PROSTITUTION

*POUR LES HOMMES : SI L'HOMME A DES ACTIVITÉS DE PROSTITUTION AVEC DES **HOMMES SEULEMENT**, PASSER À LA SECTION 8.2.*
*SI L'HOMME A DES ACTIVITÉS DE PROSTITUTION AVEC DES **HOMMES ET DES FEMMES**, VOUS DEVEZ RÉPONDRE À 8.1C, 8.1D, 8.1E POUR LES ACTIVITÉS DE PROSTITUTION AVEC DES FEMMES ET À LA SECTION 8.2 POUR LES PARTENAIRES MASCULINS.*

8.1C- a) Dans les six derniers mois, avez-vous payé quelqu'un pour avoir des relations sexuelles?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

→ *QUESTION 8.1D*

***b) Si oui,* quelles pratiques sexuelles avez-vous eues?**

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
					Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
	# /jour	# /sem.	# /mois	#/6 mois	1	2	3	4	5
Vaginale									
Orale (homme-femme)									
Orale (femme-femme)									
Anale									

***FRÉQUENCE DES RAPPORTS SEXUELS**: INDIQUER **1 SEUL** CHIFFRE DANS LA PÉRIODICITÉ PERTINENTE*
***FRÉQUENCE UTILISATION DU CONDOM** : INDIQUER LE CHIFFRE CORRESPONDANT*

8.1D- a) Dans les six derniers mois, avez-vous été payé(e) pour avoir des relations sexuelles?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

→ *PASSER À 8.3*

***b) Si oui*, quelles pratiques sexuelles avez-vous eues?**

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
					Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
	# /jour	# /sem.	# /mois	#/6 mois	1	2	3	4	5
Vaginale									
Orale (homme-femme)									
Orale (femme-femme)									
Anale									

***FRÉQUENCE DES RAPPORTS SEXUELS**: INDIQUER **1 SEUL CHIFFRE** DANS LA PÉRIODICITÉ PERTINENTE*
***FRÉQUENCE UTILISATION DU CONDOM** : INDIQUER LE CHIFFRE CORRESPONDANT*

SECTION 8.2: RELATIONS ENTRE HOMMES

PARTENAIRE(S) SEXUEL(S) MASCULIN(S) RÉGULIER(S).

LIRE LA DÉFINITION SUIVANTE AVANT DE POSER LES QUESTIONS :

UN PARTENAIRE SEXUEL RÉGULIER EST QUELQU'UN AVEC QUI VOUS AVEZ EU AU MOINS DEUX RENCONTRES SEXUELLES ET QUE VOUS AVEZ (AVIEZ) L'INTENTION DE REVOIR.

8.2A- a) Dans les six derniers mois, combien de partenaires réguliers avez-vous eu environ?

1 ☐ aucun *PASSER À 8.2C*
2 ☐ seulement 1
3 ☐ entre 2 et 5
4 ☐ entre 6 et 19
5 ☐ entre 20 et 49
6 ☐ 50 ou plus

b) Quelles pratiques sexuelles avez-vous avec votre partenaire régulier(ère)?

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
	# /jour	# /sem.	# /mois	#/6 mois	Toujours 1	La plupart du temps 2	Quelques fois 3	Rarement 4	Jamais 5
Orale									
Anale									

***FRÉQUENCE DES RAPPORTS SEXUELS**: INDIQUER **1 SEUL CHIFFRE** DANS LA PÉRIODICITÉ PERTINENTE*
***FRÉQUENCE UTILISATION DU CONDOM** : INDIQUER LE CHIFFRE CORRESPONDANT*

c) Dans les six derniers mois, lors de vos relations anales avec ce(s) partenaire(s) régulier(s), est-il arrivé?

a) que le condom s'enlève ou se déchire	b) que vous utilisiez du lubrifiant avec le condom	c) que vous ayez des saignements à l'anus
1 ☐ jamais	1 ☐ jamais	1 ☐ jamais
2 ☐ rarement	2 ☐ rarement	2 ☐ rarement
3 ☐ quelquefois	3 ☐ quelquefois	3 ☐ quelquefois
4 ☐ assez souvent	4 ☐ assez souvent	4 ☐ assez souvent
5 ☐ très souvent	5 ☐ très souvent	5 ☐ très souvent
8 ☐ nous n'avons jamais utilisé le condom	8 ☐ nous n'avons jamais utilisé le condom	8 ☐ mon partenaire ne m'a pas pénétré dans l'anus

d) Est-ce que votre(vos) partenaire(s) régulier(s) s'injecte(nt) des drogues?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

e) Votre(vos) partenaire(s) régulier(s) a(ont)-t-il(s) des activités de prostitution?

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

PARTENAIRE(S) SEXUEL(S) MASCULIN(S) RÉGULIER(S). dont vous étiez sûr qu'il(s) étai(en)t infecté(s) par le virus du sida

8.2B- a) Dans les six derniers mois, parmi vos partenaires réguliers, combien environ y en avait-il dont vous étiez sûr qu'ils étaient infectés par le virus du sida ou qu'ils avaient le sida?

1 ☐ aucun *PASSER À 8.2C*
2 ☐ seulement 1
3 ☐ entre 2 et 5
4 ☐ 5 ou plus

b) Dans les six derniers mois, quelles pratiques sexuelles avez-vous avec vos partenaires réguliers dont vous étiez sûr qu'ils étaient infectés par le virus du sida ou qu'ils avaient le sida?

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
	# /jour	# /sem.	# /mois	#/6 mois	Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
					1	2	3	4	5
Orale									
Anale									

FRÉQUENCE DES RAPPORTS SEXUELS: *INDIQUER* ***1 SEUL CHIFFRE*** *DANS LA PÉRIODICITÉ PERTINENTE*
FRÉQUENCE UTILISATION DU CONDOM *: INDIQUER LE CHIFFRE CORRESPONDANT*

c) Dans les six derniers mois, lors de vos relations anales avec ce(s) partenaire(s) régulier(s), dont vous étiez sûr qu'il(s) étai(en)t infecté(s) par le virus du sida ou qu'il(s) avai(en)t le sida est-il arrivé?

a) que le condom s'enlève ou se déchire	b) que vous utilisiez du lubrifiant avec le condom	c) que vous ayez des saignements à l'anus
1 ☐ jamais	1 ☐ jamais	1 ☐ jamais
2 ☐ rarement	2 ☐ rarement	2 ☐ rarement
3 ☐ quelquefois	3 ☐ quelquefois	3 ☐ quelquefois
4 ☐ assez souvent	4 ☐ assez souvent	4 ☐ assez souvent
5 ☐ très souvent	5 ☐ très souvent	5 ☐ très souvent
8 ☐ nous n'avons jamais utilisé le condom	8 ☐ nous n'avons jamais utilisé le condom	8 ☐ mon partenaire ne m'a pas pénétré dans l'anus

PARTENAIRE(S) MASCULIN(S) OCCASIONNEL(S).

LIRE LA DÉFINITION SUIVANTE AVANT DE POSER LES QUESTIONS :
UN PARTENAIRE OCCASIONNEL EST QUELQU'UN AVEC QUI VOUS AVEZ EU UNE SEULE RENCONTRE SEXUELLE («ONE NIGHT STAND») ET QUE VOUS N'AVEZ PAS CHERCHÉ À REVOIR NÉCESSAIREMENT. SI VOUS L'AVEZ REVU DANS LE CONTEXTE D'UNE AUTRE RENCONTRE SEXUELLE, C'EST PAR HASARD.

8.2C- a) Dans les six derniers mois, combien de partenaires occasionnels avez-vous eu environ?

1 ☐ aucun *PASSER À 8.2E*
2 ☐ seulement 1
3 ☐ entre 2 et 5
4 ☐ entre 6 et 19
5 ☐ entre 20 et 49
6 ☐ 50 ou plus

b) Quelles pratiques sexuelles avez-vous avec votre(vos) partenaire(s) occasionnel(s)?

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
					Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
	# /jour	# /sem.	# /mois	#/6 mois	1	2	3	4	5
Orale									
Anale									

FRÉQUENCE DES RAPPORTS SEXUELS*: INDIQUER* ***1 SEUL CHIFFRE*** *DANS LA PÉRIODICITÉ PERTINENTE*
FRÉQUENCE UTILISATION DU CONDOM *: INDIQUER LE CHIFFRE CORRESPONDANT*

c) Dans les six derniers mois, lors de vos relations anales avec ce(s) partenaire(s) occasionnel(s), est-il arrivé?

a) que le condom s'enlève ou se déchire	b) que vous utilisiez du lubrifiant avec le condom	c) que vous ayez des saignements à l'anus
1 ☐ jamais	1 ☐ jamais	1 ☐ jamais
2 ☐ rarement	2 ☐ rarement	2 ☐ rarement
3 ☐ quelquefois	3 ☐ quelquefois	3 ☐ quelquefois
4 ☐ assez souvent	4 ☐ assez souvent	4 ☐ assez souvent
5 ☐ très souvent	5 ☐ très souvent	5 ☐ très souvent
8 ☐ nous n'avons jamais utilisé le condom	8 ☐ nous n'avons jamais utilisé le condom	8 ☐ mon partenaire ne m'a pas pénétré dans l'anus

<u>PARTENAIRE(S) MASCULIN(S) OCCASIONNEL(S)</u> dont vous étiez sûr qu'il(s) étai(en)t infecté(s) par le virus du sida?

8.2D- a) Dans les six derniers mois, avez-vous eu des partenaires occasionnels infectés par le virus du sida ou qui avaient le sida? 1 ☐ oui 2 ☐ non, pas que je sache

PASSER À 8.2E

Si oui, combien?_____

b) Quelles pratiques sexuelles avez-vous eues?

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
					Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
	# /jour	# /sem.	# /mois	#/6 mois	1	2	3	4	5
Orale									
Anale									

FRÉQUENCE DES RAPPORTS SEXUELS*: INDIQUER* ***1 SEUL CHIFFRE*** *DANS LA PÉRIODICITÉ PERTINENTE*
FRÉQUENCE UTILISATION DU CONDOM *: INDIQUER LE CHIFFRE CORRESPONDANT*

c) Dans les six derniers mois, lors de vos relations anales avec ce(s) partenaire(s) occasionnel(s), dont vous étiez sûr qu'il(s) étai(en)t infecté(s) par le virus du sida ou qu'il(s) avai(en)t le sida est-il arrivé?

a) que le condom s'enlève ou se déchire	b) que vous utilisiez du lubrifiant avec le condom	c) que vous ayez des saignements à l'anus
1 ☐ jamais	1 ☐ jamais	1 ☐ jamais
2 ☐ rarement	2 ☐ rarement	2 ☐ rarement
3 ☐ quelquefois	3 ☐ quelquefois	3 ☐ quelquefois
4 ☐ assez souvent	4 ☐ assez souvent	4 ☐ assez souvent
5 ☐ très souvent	5 ☐ très souvent	5 ☐ très souvent
8 ☐ nous n'avons jamais utilisé le condom	8 ☐ nous n'avons jamais utilisé le condom	8 ☐ mon partenaire ne m'a pas pénétré dans l'anus

d) Est-ce que l'un de vos partenaires occasionnels s'injecte des drogues?
1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

e) Est-ce que l'un de vos partenaires occasionnels a des activités de prostitution?
1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

PRATIQUES SEXUELLES EN ÉCHANGE D'ARGENT, DE DROGUE, DE BIENS OU DE SERVICES

8.2E- a) Dans les six derniers mois, avez-vous donné à quelqu'un de l'argent ou d'autre chose pour avoir des relations sexuelles? 1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

Si oui, combien d'hommes ?_____ *PASSER À 8.2F*

b) Si oui, quelles pratiques sexuelles avez-vous eues?

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
	# /jour	# /sem.	# /mois	#/6 mois	Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
					1	2	3	4	5
Orale									
Anale									

***FRÉQUENCE DES RAPPORTS SEXUELS**: INDIQUER **1 SEUL CHIFFRE** DANS LA PÉRIODICITÉ PERTINENTE*
***FRÉQUENCE UTILISATION DU CONDOM** : INDIQUER LE CHIFFRE CORRESPONDANT*

c) Avez-vous DONNÉ plus d'argent, de drogues, de biens ou de services pour avoir des pratiques anales non protégées, c'est-à-dire sans condom?
1 ☐ Oui 2☐ Non 3 ☐ J'ai toujours utilisé le condom

8.2F- a) Dans les six derniers mois, avez-vous REÇU de l'argent, de la drogue, des biens ou des services pour avoir des relations sexuelles? 1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

PASSER À 8.3

***b) Si oui*, quelles pratiques sexuelles avez-vous eues?**

	Fréquence des rapports sexuels				Fréquence utilisation du condom				
	# /jour	# /sem.	# /mois	#/6 mois	Toujours	La plupart du temps	Quelques fois	Rarement	Jamais
					1	2	3	4	5
Orale									
Anale									

***FRÉQUENCE DES RAPPORTS SEXUELS**: INDIQUER **1 SEUL CHIFFRE** DANS LA PÉRIODICITÉ PERTINENTE*
***FRÉQUENCE UTILISATION DU CONDOM** : INDIQUER LE CHIFFRE CORRESPONDANT*

c) Avez-vous REÇU plus d'argent, de drogues, de biens ou de services pour avoir des pratiques anales non protégées, c'est-à-dire sans condom?

1 ☐ Oui 2 ☐ Non 3 ☐ J'ai toujours utilisé le condom

SECTION 8.3: NOMBRE TOTAL DE PARTENAIRES SEXUEL(LE)S

8.3- Dans les six derniers mois, combien de partenaires sexuels différents avez-vous eu?

a) sexe masculin _____

b) sexe féminin _____

SECTION 9 : DÉTENTION

9A- Avez-vous déjà séjourné en prison? 1 ☐ Oui 2 ☐ Non 3 ☐ Refuse de répondre

PASSER À LA SECTION 10 (P.34)

***Si oui,* combien de temps depuis 1978** _____
jour mois année

9B- Dans les six derniers mois, avez-vous été en prison? 1 ☐ Oui 2 ☐ Non 3 ☐ Refuse de répondre

Section 10 (p.34)

Combien de temps au total dans les 6 derniers mois _____/_____
jour mois

Pour quelle raison? _____ _____

Quand et où étiez-vous en prison ou en centre de détention jeunesse?

	Centre de détention jeunesse	Local	Provincial	Fédéral
	1	2	3	4
Le mois dernier				
Il y a 2 mois				
Il y a 3 mois				
Il y a 4 mois				
Il y a 5 mois				
Il y a 6 mois				

9C- Avez-vous consommé des drogues durant votre séjour? 1 ☐ Oui 2 ☐ Non

PASSER À 9H

9D- Dans les six derniers mois, durant votre détention, avez-vous utilisé le même matériel de consommation que quelqu'un d'autre, peu importe que cette personne l'ait utilisé avant ou après vous?

1-	**Contenant de préparation sans chauffage (Cuiller, bouchon, sac de plastique, wash)**	1 ☐ Oui	2 ☐ Non
2-	**Cooker (Contenant chauffé)**	1 ☐ Oui	2 ☐ Non
3-	**Eau, contenant à eau**	1 ☐ Oui	2 ☐ Non
4-	**Garrot, Sling**	1 ☐ Oui	2 ☐ Non
5-	**Filtre, Tampon d'alcool, Coton**	1 ☐ Oui	2 ☐ Non
6-	**Joint, Pipe, Toker, Bunk, Chilloum**	1 ☐ Oui	2 ☐ Non
7-	**Paille, billet, clef, etc.**	1 ☐ Oui	2 ☐ Non

9E- Vous êtes-vous injecté des drogues durant votre séjour? 1 ☐ Oui 2 ☐ Non

↓

QUESTION 9H

9F- Dans les six derniers mois, pendant que vous étiez en prison, combien de fois vous êtes-vous injecté?

1 ☐ une fois 2 ☐ 2-5 3 ☐ 6-10 4 ☐ 11-100 5 ☐ > 100

Avez-vous utilisé une aiguille neuve à chaque fois? 1 ☐ Oui 2 ☐ Non

↓

PASSER À 9G

***Si non,* où/auprès de qui les avez-vous obtenues?** _____

Les avez-vous nettoyées? 1 ☐ Oui 2 ☐ Non

***Si oui*, comment?**

a ☐ de l'alcool
b ☐ les faire bouillir ou les chauffer
c ☐ les laver à l'eau de javel et trousse
d ☐ les rincer à l'eau seulement
e ☐ autre _____

9G- Avez-vous partagé vos seringues utilisées avec d'autres personnes? 1 ☐ Oui 2 ☐ Non

9H- Avez-vous eu des relations sexuelles avec des codétenu(e)s? 1 ☐ Oui 2 ☐ Non

9I- Dans les six derniers mois, lorsque vous étiez en prison, avez-vous eu des tatouages ou du perçage (body piercing)? 1 ☐ Oui 2 ☐ Non 3 ☐ Ne se souvient pas/incertain

***Si oui,* l'équipement était-il stérile?** 1 ☐ Oui 2 ☐ Non 3 ☐ Parfois 4 ☐ Ne sait pas

SECTION 10 : TRAITEMENT POUR LES DROGUES ET L'ALCOOL

10A- Avez-vous déjà été en contact avec un service d'aide pour un problème de drogues ou d'alcool?

1 ☐ Oui 2 ☐ Non

↓

PASSER À 10C

Si oui, à quel âge avez-vous été en contact avec un service d'aide pour votre problème de dépendance la 1e fois? _____

Combien de temps dans toute votre vie avez-vous passé au total en traitement?

_____

semaine mois année

10B- Dans les six derniers mois, avez-vous suivi un traitement pour l'alcool ou les drogues?

1 ☐ Oui 2 ☐ Non

↓

PASSER À 10C

De quel type?

1 ☐ désintoxication non médicale(sevrage)
2 ☐ désintoxication médicale (unité de désintox.)
3 ☐ méthadone désintox (48 jours)
4 ☐ méthadone maintenance
5 ☐ hospitalisation en unité de soins
6 ☐ communauté thérapeutique
7 ☐ groupe d'entraide (AA, NA et autre)
8 ☐ thérapie externe
9 ☐ thérapie interne
10 ☐ autre _____
11 ☐ autres services de l'hôpital _____

Dans les six derniers mois, quelle est la période la plus longue pendant laquelle vous avez suivi un traitement?

_____

jour semaine mois

10C- Dans les six derniers mois, avez-vous essayé d'entrer dans un programme de traitement pour l'alcool ou d'autres drogues, sans y parvenir? 1 ☐ Oui 2 ☐ Non

PASSER À 10D

***Si oui,* de quel type?**

1 ☐ désintoxication non médicale
2 ☐ désintoxication médicale (unité de désintox.)
3 ☐ méthadone désintox (48 jours)
4 ☐ méthadone maintenance
5 ☐ hospitalisation en unité de soins
6 ☐ communauté thérapeutique
7 ☐ groupe d'entraide
8 ☐ thérapie externe
9 ☐ thérapie interne
10 ☐ autre _____
11 ☐ autres services de l'hôpital _____

Si vous n'êtes pas parvenu à entrer dans un programme, qu'est-ce qui vous en a empêché?

_____

10D- Est-ce que vous avez cessé de consommer <u>TOUTE DROGUE, INJECTÉE OU NON</u>? 1 ☐ Oui 2 ☐ Non

Si Oui, depuis quand? _____/_____/_____
jour mois année

<u>POUR LES CONSOMMATEURS D'OPIACÉS.</u> *(SI PAS CONSOMMATEUR RÉGULIER D'OPIACÉS, PASSER À LA SECTION 11)*

10E- En ce moment, suivez-vous un programme de méthadone? 1 ☐ Oui 2 ☐ Non

Question 10F

***Si non,* voudriez-vous suivre un programme de méthadone?**

1 ☐ Oui 2 ☐ Non 3 ☐ Pas certain

PASSER À LA SECTION 11

<u>POUR LES USAGERS ACTUELS DE MÉTHADONE.</u>

10F- Depuis combien de temps êtes-vous dans ce programme de méthadone?

_____/_____/_____
jour semaine mois

10G- Dans quelle clinique ou avec quel médecin?

1 ☐ CRAN
2 ☐ Hôpital général juif
3 ☐ Hôpital St-Luc
4 ☐ Médecin de famille
5 ☐ CLSC
6 ☐ Relais Méthadone
7 ☐ Autre _____

10H- Quelle est la dose actuelle que le médecin vous prescrit? _____ mg.

10I- Combien de jours par semaine recevez-vous la méthadone à la pharmacie? _____

10J- La dose que vous recevez est-elle?

1 ☐ correcte 2 ☐ trop faible ☐ 3 trop forte

10K- Dans le programme de méthadone, donnez-vous régulièrement un échantillon d'urine?

1 ☐ Oui 2 ☐ Non

10L- Si vous avez été en prison dans les six derniers mois, avez-vous continué la méthadone?

1 ☐ Oui 2 ☐ Non 3 ☐ N/A

***Si non,* pourquoi?** _____

10M- Vous est-il arrivé de vendre de la méthadone? 1 ☐ Oui 2 ☐ Non

SECTION 11 : JOURNAL

LES QUESTIONS SUIVANTES DÉTAILLENT VOTRE CONSOMMATION DE DROGUES DES SEPT JOURS QUI ONT PRÉCÉDÉ VOTRE DERNIER JOUR DE CONSOMMATION.

Quelle était la date de votre dernier jour de consommation? _____/_____/_____
Jour Mois Année

1 Alcool
2 Héroïne IV
3 Héroïne inhalée ou fumée
4 Cocaïne IV
5 Cocaïne fumée
6 Cocaïne inhalée
7 Speedball
8 Méthadone prescrite
9 Méthadone de rue
10 Opiacés
11 Autres opiacés IV
12 Amphétamines
13 Amphétamines IV
14 Barbituriques
15 Barbituriques IV
16 Tranquillisants
17 Marijuana, Hashish
18 Drogues psychédéliques
19 Autres
20 Talwin/Ritalin IV
21 Talwin/Ritalin

	1 jour avant	2 jours avant	3 jours avant	4 jours avant	5 jours avant	6 jours avant	7 jours avant
Date (jour)							
Drogues							
Nombre d'injections							
Nombre d'injections avec seringues déjà utilisées par quelqu'un d'autre							
Nombre de seringues prêtées que vous aviez déjà utilisées							
Nombre d'utilisation de matériels d'injection déjà utilisés par quelqu'un d'autre							
Nombre de visites au programme d'échange de seringues							
Nombre de seringues reçues lors de la visite au programme d'échange de seringues							
Nombre de relations sexuelles							

SECTION 12 : CONTACTS AVEC LES SERVICES SOCIAUX

12A- Dans les six derniers mois, à quel rythme avez-vous fréquenté les programmes de repas?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si vous les fréquentez,* où allez-vous le plus souvent?** _____

12B- Dans les six derniers mois, à quel rythme avez-vous fréquenté les banques alimentaires?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si vous les fréquentez,* où allez-vous le plus souvent?** _____

12C- Dans les six derniers mois, à quel rythme avez-vous fréquenté un groupe de soutien, sans compter les AA/NA/CA?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si vous en fréquentez un,* où allez-vous le plus souvent?** _____

12D- Dans les six derniers mois, à quel rythme avez-vous fréquenté un centre de jour(drop-in)?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si vous les fréquentez,* où allez-vous le plus souvent?** _____

12E- Dans les six derniers mois, à quel rythme avez-vous dormi dans un refuge?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si vous les fréquentez,* où allez-vous le plus souvent?** _____

12F- Dans les six derniers mois, avez-vous été contacté par un travailleur de rue?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si oui,* d'où venai(en)t-il(s)?** _____

12G- Dans les six derniers mois, avez-vous vu une infirmière de rue (avoir un test sanguin, être traité pour une condition médicale)?

1 ☐ jamais 2 ☐ tous les jours 3 ☐ 2-3 fois/semaine
4 ☐ chaque semaine 5 ☐ chaque mois 6 ☐ rarement

***Si oui,* d'où venai(en)t-elle(s)?** _____

Quel était le problème? _____

SECTION 13 : SANTÉ GLOBALE

13A-En général, comment est votre santé?

1 ☐ excellente 2 ☐ très bonne 3 ☐ bonne 4 ☐ correcte 5 ☐ mauvaise

13B- a) Avez-vous eu un test de dépistage pour une ou plusieurs des infections suivantes dans les 6 derniers mois? *(Si oui, cocher la(les) case(s) appropriée(s))*

☐ VIH ☐ Hépatite B ☐ Hépatite C (Anti-HCV)

b) Si vous n'avez pas eu de test de dépistage dans les six derniers mois pour l'une ou plusieurs de ces infections, quelle est la date de votre dernier test?

c) Quel était le résultat de votre dernier test de dépistage?

Infections	Date du dernier test de dépistage	Résultat
VIH	___ ____ mm aaaa ☐ Jamais	1 ☐ Positif 2 ☐ Négatif 4☐ Ne sait pas
Hépatite B	___ ____ mm aaaa ☐ Jamais	1 ☐ Positif 2 ☐ Négatif 4 ☐ Ne sait pas
Hépatite C (Anti-HCV)	___ ____ mm aaaa ☐ Jamais	1 ☐ Positif 2 ☐ Négatif 4 ☐ Ne sait pas

13C-Dans les six derniers mois, avez-vous été malade? 1 ☐ Oui 2 ☐ Non → *PASSER À 13D*

Avez-vous vu quelqu'un? 1 ☐ Oui 2 ☐ Non

Si oui, de qui s'agit-il

1 ☐ travailleur social
2 ☐ infirmière de rue
3 ☐ travailleur de rue
4 ☐ programme d'échange de seringues
5 ☐ Médecin
6 ☐ autre _____

13D- Dans les six derniers mois, avez-vous vu un médecin? 1 ☐ Oui 2 ☐ Non

PASSER À 13E

***Si oui,* lesquels?**

1 ☐ votre médecin de famille
2 ☐ un médecin de CLSC
3 ☐ un médecin dans une clinique
4 ☐ un médecin du sida (Clinique Actuel, Quartier latin)
5 ☐ un médecin spécialiste dans un hôpital
6 ☐ un médecin de l'urgence
7 ☐ un médecin en toxicomanie
8 ☐ un psychiatre
9 ☐ un autre médecin

Combien de fois avez-vous vu votre médecin de famille? _____

Combien de fois avez-vous vu les autres médecins? _____

13E- Avez vous déjà suivi un traitement pour le VIH/SIDA? 1 ☐ Oui 2 ☐ Non → *PASSER À 13F*

De quel type de traitement s'agissait-il? *INSCRIRE TOUS LES TRAITEMENTS SUIVIS*

_____

Quand a débuté le dernier traitement? _____/_____/_____
Jour Mois Année

Combien de temps a-t-il durée? _____/_____ ☐ Encore en traitement
Jour Mois

13F- Avez vous déjà suivi un traitement pour l'Hépatite C? 1 ☐ Oui 2 ☐ Non → *PASSER À 13G*

De quel type de traitement s'agissait-il? *INSCRIRE TOUS LES TRAITEMENTS SUIVIS*

_____

Quand a débuté le dernier traitement? _____/_____/_____
Jour Mois Année

Combien de temps a-t-il durée? _____/_____ ☐ Encore en traitement
Jour Mois

Quel a été le résultat? 1 ☐ Guéri 2 ☐ Toujours infecté 3 ☐ En cours
4 ☐ Abandon 5 ☐ Ne sait pas

13G-Dans les six derniers mois, avez-vous pris des médicaments ou avez-vous suivi un traitement? (antibiotique, asthme, maladie de la peau…)

1 ☐ Oui 2 ☐ Non ☐ Ne sait pas

PASSER À *13H*

Si oui, Pourquoi?	**Date de début (peut être avant le six mois**	**Combien de jours dans six derniers mois?**	**Quels médicaments ou traitements?**
3 ☐ Sevrage	___ ____ ____ jour mois année	_____	_____
4 ☐ Anxiété	___ ____ ____ jour mois année	_____	_____
5 ☐ Dépression	___ ____ ____ jour mois année	_____	_____
6 ☐ _____	___ ____ ____ jour mois année	_____	_____
7 ☐ _____	___ ____ ____ jour mois année	_____	_____

13I-Dans les six derniers mois, avez-vous été diagnostiqué(e) pour une des maladies suivantes?

1 ☐ Oui 2 ☐ Non *PASSER À 13J*

1 ☐ Herpès
2 ☐ Condylomes
3 ☐ Hépatite
4 ☐ VIH
5 ☐ Chlamydia
6 ☐ Gonorrhée
7 ☐ Tuberculose

13J-Dans les six derniers mois, avez-vous été vacciné(e)?

1 ☐ Oui 2 ☐ Non 3 ☐ Ne sait pas

Passer à 13K

Si oui, Pour quoi?	**Quand la dernière dose reçue?**
1 ☐ Hépatite A	____ ____ _____ jour/mois/année
2 ☐ Hépatite B	____ ____ _____ jour/mois/année
3 ☐ Twinrix (Hépatite A et B)	____ ____ _____ jour/mois/année
4 ☐ Pneumovac	____ ____ _____ jour/mois/année
5 ☐ Anti-grippe :_____	____ ____ _____ jour/mois/année
6 ☐ Autres :_____	____ ____ _____ jour/mois/année

13K- Dans les six derniers mois, avez-vous eu la jaunisse (hépatite virale)? 1 ☐ Oui 2 ☐ Non

QUESTION POUR FEMMES SEULEMENT

13L- Êtes-vous enceinte en ce moment? 1 ☐ Oui 2 ☐ Non 3 ☐ Incertaine

13M- Avez-vous eu des enfants DEPUIS 1978? 1 ☐ OUI 2 ☐ NON

***Si oui,* quel âge ont-ils ? (mettre 99 si l'enfant est décédé)**

_____ _____ _____ _____ _____ _____

13N- Dans les six derniers mois, avez-vous fait une tentative de suicide? 1 ☐ Oui 2 ☐ Non

Combien de fois? _____

Qui avez-vous consulté lors de la dernière tentative?

1 ☐ votre médecin
2 ☐ un médecin dans une clinique sans rendez-vous
3 ☐ un travailleur social
4 ☐ un psychologue
5 ☐ un ami
6 ☐ une autre ressource
7 ☐ urgence de l'hôpital
8 ☐ aucune personne

Avez-vous reçu un suivi médical par la suite? 1 ☐ Oui 2 ☐ Non

13O- Est-ce qu'un médecin a déjà diagnostiqué un désordre psychologique (ex. schizophrénie)? 1 ☐ Oui 2 ☐ Non

Si oui, lequel? _____

13P- Dans les six derniers mois, avez-vous été hospitalisé(e) dans un département de psychiatrie? 1 ☐ Oui 2 ☐ Non

Combien de fois ? _____

Combien de temps en tout? _____

jour semaine mois

13Q- Dans les six derniers mois, avez-vous été à l'urgence de l'hôpital? 1 ☐ Oui 2 ☐ Non

Combien de fois êtes-vous resté moins de 24 heures _____

Combien de fois êtes-vous resté plus de 24 heures _____

13R- Dans les six derniers mois, avez-vous séjourné à l'hôpital ailleurs qu'à l'urgence ou en désintox?
1 ☐ Oui 2 ☐ Non

Pourquoi? _____

Combien de fois? _____

Combien de temps (nombre de jours ou de semaines, en tout)? _____
jour semaine

13S- Dans les six derniers mois, avez-vous eu des tatouages ou du body piercing en excluant ceux ayant été fait en détention? 1 ☐ Oui 2 ☐ Non

PASSER À LA SECTION 14

Si oui, l'équipement était-il stérile? 1 ☐ Oui 2 ☐ Non 3 ☐ Parfois 4 ☐ Ne sait pas

SECTION 14 : DONNÉES SOCIO-DÉMOGRAPHIQUES

14A- Quelle est votre date de naissance?

_____
jour mois année

14B- Êtes-vous né(e) au Canada? 1 ☐ Oui 2 ☐ Non

***Si non*, dans quel pays êtes-vous né(e)?** _____

En quelle année êtes-vous arrivé(e) au Canada? _____

14C- Dans quel pays sont nés vos parents?

mère : _____ ☐ Ne sait pas

père : _____ ☐ Ne sait pas

14D- À quel groupe ethnique vous identifiez-vous?

1 ☐ Caucasien/Blanc
2 ☐ Amérique latine (préciser) _____
3 ☐ Afrique de l'Ouest (ex. Sénégal, Bénin)
4 ☐ Afrique autre (préciser) _____
5 ☐ Caraïbes (ex. Jamaïque)
6 ☐ Haïti
7 ☐ Europe de l'Est (ex. Russie, Serbie)
8 ☐ Europe de l'Ouest (ex. Grèce, Italie)
9 ☐ Asie du Sud Est (ex. Vietnam, Thaïlande)
10 ☐ Asie de l'Ouest (Inde, Pakistan)
11 ☐ Asie autre (préciser) _____
12 ☐ Autochtone
13 ☐ Inuit
14 ☐ Métis
15 ☐ autre _____

14E- Dans quelle langue êtes-vous le plus à l'aise?

1 ☐ français
2 ☐ anglais
3 ☐ espagnol
4 ☐ créole
5 ☐ vietnamien
6 ☐ italien
7 ☐ grec
8 ☐ autre _____

14F Quel est le plus haut niveau d'étude que vous avez COMPLÉTÉ?

1- ☐ aucun
2- ☐ élémentaire
3- ☐ école technique (DEP, AEP)
4- ☐ secondaire (secondaire 4 complété)
5- ☐ cégep
6- ☐ université
7- ☐ diplôme supérieur
8- ☐ autre_____

14G À quel sexe vous identifiez-vous ?

1 ☐ masculin 2 ☐ féminin 3 ☐ transsexuel(le)

14H En ce moment, habitez-vous sur l'île de Montréal? 1 ☐ Oui 2 ☐ Non

Si non, où habitez-vous?

1 ☐ Laval
2 ☐ Rive Sud (Longueuil, Brossard, Saint-Lambert, Saint-Hubert)
3 ☐ Montérégie (ailleurs)
4 ☐ Laurentides
5 ☐ Lanaudière
6 ☐ autre _____

14I Avez-vous déménagé sur l'île de Montréal? 1 ☐ Oui 2 ☐ Non

***Si oui,* depuis combien de jours?** _____ jour

Où habitiez-vous avant?

Ville :_____

Province :_____

Pays :_____

Pourquoi êtes-vous venu ici?

1 ☐ meilleures drogues (qualité)
2 ☐ drogues moins chères
3 ☐ ne sait pas / incertain
4 ☐ famille ici
5 ☐ amis/partenaire ici
6 ☐ bonne place pour vivre
7 ☐ devait partir/s'enfuir
8 ☐ travail/occasions
9 ☐ services/bien-être social
10 ☐ nouveau départ
11 ☐ mandat d'arrestation
12 ☐ autre_____

14J Dans quel type d'endroit avez-vous habité la majorité du temps dans les six derniers mois?

UTILISER LA LISTE ET INSCRIRE LE CHIFFRE CORRESPONDANT AU LIEU DIRECTEMENT DANS LE TABLEAU OU PRÉCISER DIRECTEMENT DANS LE TABLEAU S'IL S'AGIT D'UN LIEU NON MENTIONNÉ DANS LA LISTE (CHOIX 9).

1= MAISON
2= APPARTEMENT
3= MAISON D'HÉBERGEMENT / DE TRANSITION
4= APPARTEMENT SUPERVISÉ
5= REFUGE
6= CHAMBRE D'HÔTEL/MAISON DE CHAMBRES
7= SDF / RUE
8= PRISON
9= AUTRE

Le mois dernier		Il y a 4 mois	
Il y a 2 mois		Il y a 5 mois	
Il y a 3 mois		Il y a 6 mois	

14K- Dans quel arrondissement ou dans quelle ville avez-vous habité dans les six derniers mois?

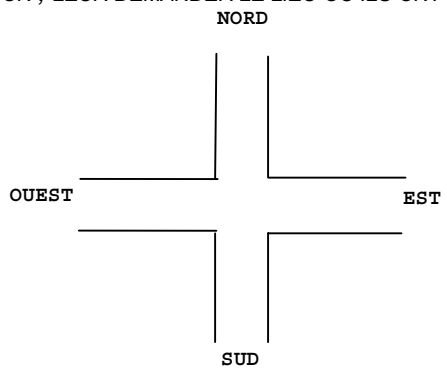
Le mois dernier	
Il y a 2 mois	
Il y a 3 mois	
Il y a 4 mois	
Il y a 5 mois	
Il y a 6 mois	

14M- Quel est le code postal du lieu où vous avez dormi la majorité du temps dans les 4 dernières semaines?

****POUR TOUS LES PARTICIPANTS IL DOIT Y AVOIR UN CODE POSTAL.*

REFUGES : *POUR CEUX QUI Y HABITNTENT, INSCRIRE LE CODE POSTAL DU REFUGE.*

SDF / DANS LA RUE : *POUR CEUX QUI SONT DANS CETTE SIUTATION , LEUR DEMANDER LE LIEU OÙ ILS ONT DORMI LE PLUS SOUVENT DANS LE DERNIER MOIS****



14N- Quel est votre état civil?

1 ☐ marié(e) légalement
2 ☐ divorcé(e)
3 ☐ veuf(ve)
4 ☐ célibataire
5 ☐ séparé(e)
6 ☐ conjoint(e) de fait (+ de 3 mois de cohabitation)

14O- Depuis quand vivez-vous dans cette situation? _____/_____/_____
jour mois année

14P- Habitez-vous seul en ce moment? **1 ☐ Oui** **2 ☐ Non** **3 ☐ N/A**

Section 15

14Q- En ce moment, combien de personnes vivent avec vous? _____

Qui sont ces personnes?

1 ☐ Conjoint(e)/blonde/ partenaire sexuel(le)	6 ☐ Étrangers (ex : refuge)
2 ☐ Membres de la famille	7 ☐ Détenus
3 ☐ Ami(e)s proches	8 ☐ Autre : _____
4 ☐ Partenaires de cotation/ consommation	
5 ☐ Connaissances (dealer, personne de passage,….)	

SECTION 15 : JOURNAL II

Les questions suivantes détaillent votre consommation de drogues au moment où vous avez reçu votre dernier chèque mensuel ou le chèque significatif du mois (même si vous ne le recevez pas vous-même).

1 Alcool
2 Héroïne IV
3 Héroïne inhalée ou fumée
4 Cocaïne IV
5 Cocaïne fumée
6 Cocaïne inhalée
7 Speedball
8 Méthadone prescrite
9 Méthadone de rue
10 Autres opiacés
11 Autres opiacés IV
12 Amphétamines
13 Amphétamines IV
14 Barbituriques
15 Barbituriques IV
16 Tranquillisants
17 Marijuana, Hashish
18 Drogues psychédéliques
19 Autres
20 Talwin/Ritalin IV
21 Talwin/Ritalin

	Les 2 jours précédant le chèque	**Le jour du chèque et le lendemain**
Drogues consommées durant les deux jours		
Nombre d'injections durant les deux jours		
Nombre d'injections avec seringues déjà utilisées par quelqu'un d'autre durant les deux jours		
Nombre d'utilisation de matériels d'injection déjà utilisés par quelqu'un d'autre		
Nombre de seringues prêtés que vous aviez déjà utilisées		
Nombre de consommations d'alcool durant les deux jours		
Étiez-vous dans votre propre logement / refuge? Oui = 1 Non = 2		

MERCI DE VOTRE COLLABORATION!