

The Role of Peer Drug Users' Social Networks and Harm Reduction Programs in Changing the Dynamics of Life for People Who Use Drugs in the Downtown Eastside of Vancouver, Canada

by

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Abstract

The Downtown Eastside (DTES) of Vancouver, Canada has been the epicentre of HIV, hepatitis C and drug overdose related to people who inject drugs (PWIDs) since the mid-1990s. In response to the growing government inaction, numbers of peer-run organizations were formed. This dissertation was conducted to capture the genesis and influence of peer drug users, their networks and harm reduction programs over the past 18 years in shaping the neighborhood. Semi-structured qualitative interviews were conducted with peers from various harm reduction volunteer locations in the DTES. Moreover, various drug users were recruited from a controversial harm reduction program in the DTES that provides pharmaceutical heroin. Interviews were analyzed thematically using two methods of coding analysis. Findings suggest that peers were taking on important education and safety roles, and were able to alter the behaviour, attitude, and intention of injection drug users within the DTES area of the city. Further, peer injection drug users were able to reach individuals who were reluctant to seek medical help, housing, and prevention services.

Peers serve as an agent of change in the DTES to disseminate information and risk reduction skills to the most marginalized people. Peer drug users have not only been able to change the discriminatory rhetoric but they have been able to reduce the suffering that drug users have endured as a consequence of the war on drugs. Attending heroin trials in Vancouver has been particularly effective in creating a unique microenvironment where PWIDs who have attended heroin trials have been able to form a collective identity advocating for their rights.

In physical terms, the DTES has become cleaner and safer for its residents because of availability of an injection facility and numerous peer-run harm reduction programs. In conceptual terms, PWIDs are less likely to experience discrimination by the city, hospital, and police. Moreover, the residents in the new DTES are more likely to be involved in their civic issues and raise concerns in a new political arena. Peer-run harm reduction programs have given a voice to the most marginalized members of society who otherwise would not be represented. The result of this dissertation and costing analyses conducted point to the need for the expansion of the peer and harm reduction programs beyond the current location in the DTES to other locations in Canada such as Montreal, Ottawa, Toronto, Saskatoon and Victoria.

Keywords: Supervised injection facility; Injection drug users; Peers; Harm reduction, the Downtown Eastside;

Dedication

This dissertation is for drug users who lost their lives due to HIV, hepatitis C, drug overdose, poverty and homelessness.

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I would like to take this opportunity to thank my senior supervisor, Dr. Martin A. Andresen for his outstanding supervision, mentorship and patience. Dr. Andresen has been my senior supervisor during my M.A. and PhD work. However, I was first introduced to health policy work during my undergraduate time at Simon Fraser University (S.F.U) when under his supervision I conducted a cost-benefit/cost-effectiveness of expansion Insite in the Downtown Eastside. This work ignited my interest regarding injection drug users' health issues. Dr. Andresen has been an extraordinary mentor and guide throughout my time at S.F.U and has done a great job of motivating, refining and focusing my research. We have collaborated on numerous research projects that resulted in a number of peer reviewed published papers.

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List of Acronyms

DTES	Downtown Eastside
HAT	Heroin assisted treatment
HCV	hepatitis C virus
HIV	human immunodeficiency virus
MMT	methadone maintenance therapy
PWIDs	People who inject drugs
SIF	Supervised injection facility
VANDU	Vancouver Area Network of Drug Users

Preface

All the chapters (except chapter one) in this dissertation are presently at various stages of publication in peer-reviewed journals. A total of nine manuscripts have been accepted for publication from the content of this manuscript. Details of each manuscript, including the journal, the list of co-authors and the year of publication is listed below.

Chapter two as whole is published in *Journal of Substance Use* in 2014:

- Jozaghi, E. (2014). The role of drug users' advocacy group in changing the dynamics of life in the Downtown Eastside of Vancouver, Canada. *Journal of Substance Use*, 19(1–2), 213–218.

Chapter three as a whole is published in the *Canadian Journal of Criminology and Criminal Justice* in 2014:

- Jozaghi, E., & Reid, A. A. (2014). A case study in transformation in the Downtown Eastside of Vancouver, Canada by peer injection drug users. *Canadian Journal of Criminology and Criminal Justice*, 56(5), 563-594.

Chapter four as a whole is published in *International Journal of Qualitative Studies on Health and Well-being* in 2014:

- Jozaghi, E. (2014). 'SALOME gave my dignity back': the role of randomized heroin trials in transforming lives in the Downtown Eastside of Vancouver, Canada. *International Journal of Qualitative Health and Well-being*, 9(23698), 1-9.

Chapter five results are published in multiple peer-reviewed studies. The result for the city of Montreal is published in *Substance Abuse Treatment, Prevention, and Policy* in 2013:

- Jozaghi, E., Reid, A. A., & Andresen, M. A. (2013). A cost-benefit/cost-effectiveness analysis of proposed supervised injection facilities in Montreal, Canada. *Substance Abuse Treatment, Prevention, and Policy*, 8 (25), 1-8.

The result for the city of Ottawa in **chapter 5** is published in *Substance Abuse Treatment, Prevention, and Policy* in 2014:

- Jozaghi, E., Reid, A. A., Andresen, M. A., & Juneau, A. (2014). A cost-benefit/cost-effectiveness analysis of proposed supervised injection facilities in

Ottawa, Canada. *Substance Abuse Treatment, Prevention, and Policy*, 9(31), 1-13.

Chapter 5 also includes results for city of Saskatoon currently in press in *International Journal of Health Policy and Management*, but published online on March 29, 2015:

- Jozaghi, E., & Jackson, A. (2015). Examining the potential role of a supervised injection facility in Saskatoon, Saskatchewan, to avert HIV among people who inject drugs. *International Journal of Health Policy and Management*, in press. Doi:10.15171/ijhpm.2015.73

In addition to the noted items mentioned above, the result for the city of Toronto in **chapter 5** is currently in press in *International Criminal Justice Review*.

- Jozaghi E., & Reid, A. A. (2015). The potential role for supervised injection facilities in Canada's largest city, Toronto. *International Criminal Justice Review*. in press. DOI: 10.1177/1057567715583516

Finally the result for the city of Victoria in **chapter five** is in press in *Urban Geography*:

- Jozaghi, E., Hodgkinson, T., & Andresen, M.A. (2015). Is there a role for potential supervised injection facilities in Victoria, British Columbia, Canada?. *Urban Geography*, in press.

Part of **chapter six** is a peer-reviewed letter to the editor of the *Journal of Substance Use* currently in press, but published online on December 05, 2014:

- Jozaghi, E. (2016). Morality versus the scientific evidence: The story behind Bill C-2. *Journal of Substance Use*, in press. DOI: 10.3109/14659891.2014.987837

Chapter 1.

Introduction

Drug use in general, and specifically the consequences of Injection drug use is a significant health policy concern. The spread of infectious diseases from needle sharing and deaths due to overdoses are just two of the detrimental consequences associated with injection drug use that have been attributed to the war on drugs and the prohibition of illicit drugs. A comprehensive review and meta-analysis that considered studies from regions around the world including South America, Asia, Western Europe, Australia, Eastern Europe, and North America suggested that several co-morbidities including Human Immunodeficiency Virus (HIV) and hepatitis C (HCV) were among the main contributing factors to death cases among people who inject drugs (Mathers et al., 2013). The seriousness of this concern is compounded by the extent of the problem. According to the World Health Organization, there are approximately 16 million people in the world who inject drugs and of those, 3 million live with HIV (World Health Organization, 2013). Although only about 22 percent of the total population of injection drug users (PWIDs) are from developed nations, first world countries too, face difficult challenges with respect to these problems (Committee on the Prevention of HIV Infection Among Injecting Drug Users in High-Risk Countries, 2007).

The research in the area of substance use and public health has demonstrated that PWIDs are not all equally at risk of needle sharing. For example, recent research has demonstrated that those who are involved in needle sharing are at higher risk of HCV (Korthuis et al., 2012). Burt, Thiede, and Hagan (2009) also demonstrated that HCV awareness encourages PWIDs to share their needles with others who were also HCV positive. In addition, Yang, Tobin and Latkin (2011) suggest that 82% of HIV positive PWIDs, similar to their HCV counterparts, are likely to share their needles within their networks that also include HIV-negative PWIDs. Finally, Lau, Feng, Lin, Wang, and

Tsui (2005) demonstrated that knowledge about HIV status was associated with lower needle sharing behaviour.

Similar to the noted studies that described the association of needle sharing with the knowledge of HIV and HCV, there are numerous other factors that are associated with needle sharing. For example, several studies have pointed out that racial/ethnic minorities are at a greater risk of needle sharing. Ward et al. (2011) reported that indigenous PWIDs in Australia are more likely to share needles or inject in public. Choi, Cheung and Jiang (2007), likewise, demonstrated that ethnic minority PWIDs in China are at greater risk of AIDS due to their risky injection behaviour. The noted studies attributed higher risky behaviour amongst minorities to the discrimination they may suffer.

In addition to race/ethnicity and the knowledge of HIV/HCV, place of birth and the location of residence can also influence needle sharing behaviour. Zerden, Lopez and Lundgren (2010), for instance, found that Puerto Ricans residing in the U.S. are less likely to share their needles compared to those residing in the Island. In fact, PWIDs born and living in the Island were four times more likely to have shared needles compared to their U.S. counterparts. Williams and Metzger (2010) also conducted “geobehavioral” analysis to understand how distance from needle exchange programs influences needle sharing. The study concluded that the distance between an PWIDs and a needle exchange centre is an important predictor of needle sharing behaviour.

Moreover, needle sharing has been more common among women who inject drugs. According to Brook, Brook, Richter, Masci and Roberto (2000) “females were more likely than males to report sharing needles, sharing needles with someone they later found out was HIV positive, injecting more frequently and having more sexual partners” (p. 264). Barnard (1993) also reported that women PWIDs are at a greater risk of HIV transmission, mainly due to their risky injection behaviour. Finally, Gu et al. (2009) and Hottes, Bruneau and Daniel (2011) found significant difference among male and female PWIDs in their risky behaviours and situational risk factors.

Mental illness has also been reported by numerous studies to play a significant role in moderating needle sharing amongst PWIDs. Chan, Passetti, Garner, Lioyd, and

Dennis (2011) for example reported that adolescent PWIDs with mental health problems are at a greater risk of HIV because of their needle sharing behaviours. Mandell, Kim, Latkin and Suh (1999) and Wagner et al. (2009) also reported that PWIDs who suffer from depressive symptoms and low self-esteem are at a greater risk of needle sharing. Finally, Lundgren, Amodeo and Chassler (2005) reported that PWIDs who suffer from anxiety disorders are more likely to engage in needle sharing behaviour.

Other demographic factors aside from race/ethnicity, place of residence, gender, mental illness and knowledge of HIV have been found to be significant factor in determining needle sharing. For instance, recent studies have highlighted the role of age as a significant predictor of needle sharing. Zhang et al. (2010) reported that new PWIDs who tended to be younger were at the greater risk of needle sharing. Furthermore, Tassiopoulos, Bernstein & Bernstein (2013) reported that younger age was associated with higher prevalence of needle sharing. According to Tassiopoulos et al. (2013), the reasons for the observed association between younger age and sharing may be due to young PWIDs' relative inexperience in injecting, as they may require help from older injectors. Additionally, younger PWIDs "may have been adequately exposed to prevention messages about the risk of sharing. Additionally younger users may learn to inject in the context of strong social networks that encourage sharing and where trust and friendship make sharing more comfortable and less risky" (Tassiopoulos et al., 2013, p.2).

Needle sharing has also been found to be associated with usage/attendance of needle exchange programs. A meta-analysis conducted by Ksobiech (2006) found that needle exchange programs were weakly associated with decreases in needle sharing. After comparing a neighbourhood in Tehran with a neighborhood without a needle exchange program, Zamani et al. (2010) reported that PWIDs in the neighborhood with the needle exchange program were significantly less likely to share their needles. Bryant et al. (2010), after comparing PWIDs who use needle exchange programs versus the pharmacies to access their needles, reported that PWIDs who access the needle exchange programs were less likely to share their needles. In addition, a recent randomized control trial amongst Mexican PWIDs found that expanding free access to needles, in combination with harm reduction education, was sufficient for risk reduction

(Strathdee et al., 2013). Moreover, Kerr et al. (2010) reported that more open access needle exchange policy where PWIDs are not required to bring their old syringes for exchanges with new syringes appears to be more effective policy in reducing needle sharing.

Finally, various research suggests that needle sharing could be reduced by introducing heroin or methadone maintenance programs. For example, Gowing, Hickman and Degenhardt (2013) reported that methadone or buprenorphine was associated with reduction in needle sharing. A study by Turner et al. (2011) also showed that participation in opiate substitution therapy reduced needle sharing by 48%. And a recent study by Jozaghi (2014a) also demonstrated that heroin maintenance therapy reduced the risky behavior of participants.

Canada is no exception in this regard; for example, illegal drug use in 2002 accounted for large numbers of overdose cases, exceeding 1600 deaths in total (Rehm et al., 2006). Furthermore, in 2002, 87 deaths in Canada have been contributed to deaths related to HIV that has been contracted through injection drug use (e.g., needle sharing, borrowing or lending) (Rehm et al., 2006). In addition, more than 70 percent of HCV morbidities in Canada are directly linked to injection drug use (Canadian Center on Substance Abuse, 2011). Canada's urban areas are particularly vulnerable to these problems because PWIDs populations are large and concentrated in certain environs. This is particularly true in the Downtown Eastside (DTES) of Vancouver, Canada, with a population estimated to be around 4300 and 8,000 individuals (Maas et al., 2007). Ironically, the DTES once held the title as the most impoverished and drug infested neighborhood in Canada (Kerr et al., 2003; Jozaghi, 2012a, Jozaghi, 2014a).

During the late 1990s this small ten block area was compared to third world countries such as Botswana for having one of the highest HIV and HCV rates in the developed world as a consequence of needle sharing in shooting galleries (Kerr et al., 2003; Strathdee et al., 1997; Woolford, 2001; Wood & Kerr, 2006). However, there are indications that this neighborhood has transformed as a result of long standing harm reduction programs (Ti et al., 2013). In fact, a recent longitudinal study indicates that fewer people are injecting drugs and the rate of needle sharing had dropped from 40% in

1996 to as low as 2.7% by 2011 (Ti et al., 2013). Life expectancy in the DTES has also improved and reached 79.5 years in 2011, compared with 71.4 years during 1997 (Smith, 2012). According to Ti et al. (2013) the improvements in the DTES have been the result of harm reduction programs and not the war on drugs.

Harm reduction according to Maralatt (1998) means viewing individuals as both recipients of environmental influences and as agents of their own choices. As a result a harm reduction approach seeks to reduce the harm that results from unhealthy behavior (Brown, Luna, Ramirez, Vail & Williams, 2005). In other words, harm reduction is a movement intended to empower the consumer and patient of health services where individuals are treated with human dignity regardless of their background and medical condition (Brown et al., 2005). Sheon (2004) applied harm reduction principles for practice that includes:

Policies must be pragmatic, realistic, informed by, and relevant to the individuals and communities most affected. Harm reduction practice involves a prioritization of goals, in which immediate and realizable goals take priority. Harm reduction interventions are nondirective and involve a collaboration and exchange of ideas between participants. Each individual owns his or her own agenda and each individual facilitates the agenda but does not implement it upon another person ... Harm reduction interventions and collaborations view the individual as capable of taking a greater degree of control in his or her life. It praises each accomplishment and validates every attempt to reach the goal. Harm reduction practice means bringing services to where people are at, as well as increasing access to services by reducing impediments such as bureaucracy (as cited in Brown et al., 2005, p. 318).

The most well-known of the harm reduction programs in the DTES has been North America's first and only officially-sanctioned supervised injection facility (SIF) known as Insite. The operation of the facility has been the subject of more than 60 peer-reviewed studies. Generally speaking, the results of these studies have been overwhelmingly positive. In fact, Insite has shown major success in reducing overdose deaths, needle sharing, improving service uptake, and improved public order within the DTES (Kerr, Tyndall, Li, Montaner, & Wood, 2005; Kerr et al., 2003; Marshall, Milloy, Wood, Montaner, & Kerr, 2011). Additionally, Insite has shown to be economically viable by saving tax payers money through the prevention of HIV, HCV and overdose deaths

(Andresen & Boyd, 2010; Andresen & Jozaghi, 2012; Bayoumi & Zaric, 2008; Pinkerton, 2010).

An obvious question that is of great concern to public health officials is: which factors have contributed to the reduced risks of morbidity and mortality in the DTES? As a result, chapter two of this dissertation will consider the role of drug users in transforming the DTES. In response to growing government inaction, a drug user-run organization known as Vancouver Area Network of Drug Users (VANDU) was formed. This chapter was written to capture the genesis and influence of VANDU over the past 18 years in shaping the neighborhood.

Chapter three of this dissertation will identify some of factors that are contributing to reduce morbidity and mortality. Specifically this chapter was conducted to explore not only how peer drug users who are employed by the Portland Hotel Society intervene to shape social networks but to capture the transformative role of peer led intervention by the local needle exchange programs and SIF in Vancouver, Canada. The current work presents findings from an analysis of narratives that were collected through semi-structured interviews with peer PWIDs. The interviews were designed to solicit narrative accounts from participants on several themes related to their experiences in the DTES community of Vancouver.

After recognizing factors that are contributing to the reduction of risks in morbidity and mortality in Vancouver's DTES, this dissertation will turn its attention to a ground breaking clinical trials that has proven controversial in its treatment of addiction. While numerous studies on heroin-assisted treatment (HAT) have been published in leading international journals, little attention has been given to HAT's clients, their stories, and what constitutes the most influential factor in the treatment process. Chapter four investigates the role of HAT in transforming the lives of PWIDs in Vancouver, Canada. This study is qualitative focusing on 16 in-depth interviews with patients from the randomized trials of HAT.

Finally chapter five of this dissertation examines the potential feasibility of expanding the only legally sanctioned SIF in North America beyond its DTES location in British Columbia and to other Canadian cities such as Ottawa, Toronto, Victoria,

Montreal, and Saskatoon. In summary, all the noted chapters of this dissertation will provide important information for policy makers who seek practical, cost-effective solutions to serious health care problems in a climate of scarce public resources. It is my hope that the results of this dissertation will prove useful for facilitating preventative work among PWIDs and development of better interventions to reduce needle sharing and drug overdose deaths. It is my hope that other North American cities look at the transformation in Vancouver and adopt a harm reduction perspective as one of the pillars of their drug enforcement. The last chapter of this dissertation will turn its focus on the dangerous trend that the current conservative federal government has taken toward Insite and the future of such facilities in Canada.

Chapter 2.

The Role of Vancouver Area Network of Drug Users in Changing the Dynamics of Life in the Downtown Eastside

2.1. Introduction

According to Barnes and Sutton (2009), Vancouver's DTES history began more than a century ago when the neighbourhood was the city's commercial core for culture, commerce, and growth. City of Vancouver's highest office towers were located in the DTES (Barnes & Sutton, 2009). However, shortly after the Second World War, the DTES became a haven for the most marginalized population (Andresen & Jozaghi, 2012). Dooling and Rachlis (2010) describe how the DTES area around East Hastings became a refuge for unemployed men who were drawn to the area by cheap housing and cheap liquor. By the 1960s, the housing that remained predominately comprised single room occupancy hotel rooms (Dooling & Rachlis, 2010). Many of these hotels—such as the Marble Arch, Golden Crown, American, Pender, Burns Block, St Helens, Balmoral, Sheldon, Regent, Afton, Wonder, Lucky, Lodge, and 10 more unidentified hotels—were bug and rat infested with tiny rooms (e.g., 140 square feet) that offered little by way of facilities for food preparation and often had only communal toilet facilities (Dooling & Rachlis, 2010; Piccini, 2012).

In the 1960s and 1970s, heroin and later crack cocaine joined alcohol as problems facing this 10 block neighbourhood (Jozaghi, 2012a). With high concentrations of PWIDs, the mentally ill, the homeless, the elderly, sex workers, the unemployed, troubled youth and immigrants, the neighbourhood has been identified as the most impoverished urban neighbourhood in Canada (Holland et al., 2009). Presently it is estimated that out of 8,000 PWIDs who reside in Vancouver, 4700 reside in the DTES

(Maas et al., 2007). Consequently, the DTES has a denser population of PWIDs than any other neighbourhood in Canada, which has compounded the risk of HIV, HCV, and overdose deaths (Jozaghi, 2012a). In fact, an explosive HIV and HCV epidemic in the late 1990s was the highest in the Western world, rivalling third world countries such as Botswana (Jozaghi, 2012a; Tyndall et al., 2001). Vancouver's DTES also documented an explosive rate of overdose death related to illicit drugs during the late 1990s (Fischer, Rehm & Blitz-Miller, 2000).

In response to general lack of government and public health interventions for drug users in the DTES, a social mobilization started to form within former and current drug users in an effort to prevent the ongoing spread of HIV and overdose among their peers (Hayashi et al., 2010; Wood et al., 2003). Their efforts led to the creation of VANDU in 1997 (Wood et al., 2003). For their direct action on HIV/AIDS, VANDU has been the recipient of number of international awards such as the Kaiser Foundation (Kerr et al., 2006). Previous studies in North America have shown that drug user organizations can help extend the reach and effectiveness of harm reduction programs (Broadhead et al., 1995; Cottier et al., 1998; Grund et al., 1992). According to Broadhead et al. (1998), countries with effective community outreach and peer-work have been able to keep their HIV prevalence low. The present chapter sought to assess how drug user organizations such as VANDU intervene to help shape neighborhoods and capture the transformative role of peer led intervention in the lives of PWIDs in the DTES.

2.2. Methods

2.2.1. Participants

VANDU operates a storefront office in the DTES along East Hastings Street and has over 1,300 members and over 800 volunteers (Small et al., 2012; Wood et al., 2003). VANDU is overseen by a Board of Directors comprised of current and former users (Small et al., 2012). According to Wood et al. (2003), Internationally, VANDU has been recognized as one the most effective and successful peer-based drug user organization. VANDU is funded through Vancouver Coastal Health with an annual

operating budget of \$200,000 (Austin, 2012). VANDU operates a variety of programs in the DTES that are tailored towards drug-user-led harm reduction programs, including a former unsanctioned SIF, a needle exchange, and outreach patrol programs (Kerr et al., 2005; Kerr et al., 2006). Volunteers who help run VANDU or who participate in weekly meetings are provided with a small stipend.

The current study and consent statement were designed based on the Wigmore's (1905) criteria to protect confidentiality of participants and provide anonymity (Palys & Lowman, 2002). This study was approved by the Simon Fraser University's Research Ethics Board. In accordance with VANDU's philosophy and its members' demands that all projects directly involve them, the researcher employed a community-based case study methodology to achieve the study objectives. As a result, the study was also approved by VANDU's Executive Board. Beginning in September 2012, participants living in DTES, who had volunteered at VANDU in the previous month were recruited to participate in the study. Being 19 years or older while providing an oral consent were some of the requirements for this study. To protect confidentiality, all identifying information was removed from interview transcripts and all names used in this paper are pseudonyms.

A peer designated by the VANDU Board of Directors helped the researcher in gathering data using various methods and sources. For example, in order to explore peer PWIDs's perspectives, the study drew upon data from semi-structured qualitative interviews with seven executive board members and four PWIDs who use the services at VANDU. In addition to attending VANDU board meetings, the researcher attended various VANDU peer education groups. Moreover, the researcher attended weekly meetings at which VANDU members actively participated. The researcher also observed the demonstrations held by members of VANDU such as "The war stops here: Ending drug prohibition in the DTES and beyond". Following or during these activities, field notes were recorded in my note book. This form of observation allowed the researcher to validate and triangulate responses given by the participants during the interview.

The researcher and the board members had a pre-existing relationship that was established during the researcher's previous volunteer work in the DTES . To protect the

confidentiality of the seven board members, only the demographic characteristics of the four PWIDs who used the services at VANDU and participated in the study are shown in Table 2.1.

Table 2-1. Demographic characteristics of the sample of VANDU users

Pseudonym	Age	Gender	Ethnicity	Medical condition	Drug of choice
Alex	46	Male	First Nation	HIV & HCV	Crystal Meth
Monica	47	Female	First Nation	Asthma	Crack
Bryan	41	Male	White	Epilepsy	Crack
Bob	44	Male	White	HCV & Mental illness	Crack and heroin

Participants were told by the board members that the researcher was a student. None of those who were invited to participate refused. In fact, the referral by the VANDU board member and prior approval by the board allowed the participants to feel comfortable and open up more easily about their experiences.

2.2.2. Materials

An interview guide was used to ease the interviewing process. The themes that were followed throughout the interview and conversation involved seven dimensions: (1) experience as a peer VANDU worker; (2) injection behaviour of their clients; (3) overdose risk reductions; (4) drug use culture; (5) harm reduction education; (6) activism in the community; and (7) an open discussion about anything raised during the interview. Dragon Naturally Speaking software was utilized to transcribe tapes and responses verbatim. This technique is described in Palys and Atchison (2012). The Interview guide for VANDU board members focused on their work as a peer PWIDs at VANDU, the impact they believe their work has had in the community, the DTES situation prior to VANDU, the DTES after the establishment of VANDU, and suggestions related to the ways risky behaviours could be reduced.

The same interview guide was used for users, except the emphasis was placed on their experiences at VANDU, the relationship with board members, the help they are able to receive and the ways their risky behaviour has been reduced by VANDU. Other than for a few key questions, participants were encouraged to discuss the issues as they

saw fit. In other words, I learned that “the person sitting across from ... [me] would tell a good story, if only ... [I] knew the right question to bring them out” (Margolis, 1994, p. 7). In fact, each interview took on a story of its own. All participants seemed genuinely interested in the interview and had stories to share and used individual examples that shaped the direction of the interview. In all the interviews, topics came out of natural conversation and, as suggested by Berg (2009), deviations were explored as they arose.

Interviews ranged from 20 to 70 minutes. I decided to use a digital voice recorder (Olympus WS-700M) in conjunction with a small notebook so I could jot down key words or phrases during the interview. This approach allowed me to pay attention to participants and retain the flow of the interview. Palys and Atchison (2007) suggested that “most respondents expect you to write something down every so often ... and notes give you some backup in case a technical foul-up renders the tape useless” (p. 158). Also, immediately after each interview and observation, I took time to sit and record field notes about questions to ask in future interviews, my impressions of the interview/observation, and interesting themes to consider during the analysis. This strategy allowed for the recording of rich details about the interview/observation. Interviews were conducted in a conversational format while VANDU board members were actively involved in their routine activities.

As Palys and Atchison (2012) suggest, a wireless microphone was used to facilitate this method of interviewing. In effect, not having to worry about being restricted spatially, not having any obvious hardware that would draw third-party attention, and not having the visual distraction of the recording device present, all put participants at ease, and made it much easier to establish a rapport and trust that resulted in the typical interview lasting well over 45 minutes (Palys & Atchison, 2012). This strategy also allowed a triangulation of responses to conversational topics as participants walked in the alleys and neighbourhood (Bourgois et al., 2006). Periodic visits by the researcher to VANDU to observe their weekly meetings, educational seminars and demonstrations allowed for further triangulation of data.

The qualitative transcripts were reviewed, and all text segments were subsequently subjected to a thematic analysis using NVivo 9 software. This software has

been used by numerous researchers to sort and code photos, videos, tapes and recorded text. NVivo software is particularly effective by coding transcripts and facilitating the researchers to look for patterns and themes in various documents. In addition, the software allows the researchers to search for similarities within various documents. By relying on the software, the researcher can create “nodes”. Nodes are themes that are coded for their content. 22 types of nodes were created. An inductive search resulted in creation of “tree” nodes. Unique categories were created based on the general observations. The deductive searches were categorized as “free” nodes because they were discovered through open coding. A word frequency query was also completed to view the most frequently used words. At a later date, the most frequently reported words were used to search the transcript for common themes and phrases.

2.2.3. Procedure

Interviews with users were undertaken in VANDU’s kitchen. Interviews with board members were taken as participants were involved in their daily activities at the front desk and in alleys surrounding the vicinity. This strategy proved to be extremely effective in reducing the anxiety many participants experienced before the interview and helped to establish trust. In fact, according to Esterberg (2002), research involving marginalized populations is all about “gaining trust and develop[ing] relationships with people in [the] setting” (p. 69). It appeared that all participants were truthful and comfortable talking to me, as indicated by the sensitivity of the information they were sharing. For example, many participants not only revealed their HIV or HCV status, but they talked elaborately about how they thought they might have contracted the disease. Also, I shook participants’ hands before the conversations and kept constant eye contact to demonstrate my interest. In essence, I knew I “can learn more by showing an interest and by being open to what they have to say” (Esterberg, 2002, p. 70). I reminded the participants that I want to hear their stories and experiences.

Despite my earlier attempt to elicit participation based on my relationship and rapport, the VANDU board requested that some sort of monetary reimbursement be provided to participants as they provide stipends to anybody who participates in any of their activities. Accordingly, all participants received CAD\$ 10 for their participation.

However, paying participants, specifically in the context of marginalized peoples is a significant topic for debate. In essence, according to Esterberg (2002) although we are taking people's time, "people appreciate the opportunity to talk about their lives; they feel that they have an important story to tell ... [and as researchers] we can do small favours" (p. 69).

2.3. Findings

2.3.1. The DTES Change

The most common theme was related to the dire situation in the DTES prior to the establishment of VANDU. As one of the board members who has lived in the DTES for more than 35 years describes:

Back then 30 years ago there was no needle depot there was no Insite there was no VANDU ... You hold onto [your needle] as much as you could, sometimes you give it to your buddies to use because they didn't have one ... So many people died or contracted HIV and hepatitis C. You had to buy [needles] on the street for 5 to 10 bucks back then in 1983 ... Nobody knew what harm reduction was. It was like sucking water out of the mud. You take your chances ... so many people died of overdose, people were dropping like flies ... You had 300 people in these alleys left and right doing dope back then 24 hours a day ... they were selling dope and doing dope, defecating and urinating everywhere ... you'd see people sharing needles all the time. You go into an alley, make your score, you look for water you look for a drain or pot hole, the alleys are so crowded the needles are everywhere ... There was this the weeping hysteria if they knew the list of people who were alive it was shorter than people who have died. We had about 250 [overdose] deaths every year right in the city of Vancouver

The board member's recollection is verified in overdose data assembled by Cain (1994), who notes the number of drug overdose death in Vancouver jumped from 18 in 1988 to over 200 in 1993. The rate of HIV/AIDs also increased dramatically, rising from seven percent to as high as 23% (Roe, 2003). According to one of the co-founders of VANDU, it was the dire situation of the DTES, coupled with grass root activism that helped to establish VANDU:

VANDU was basically formed by accident during our activism ... We were part of the radical group of people who were organizing and we decided to focus on the drug issue in the Downtown Eastside ... We got a small grant ... and rented a little storefront. We saw how many people were getting HIV and hepatitis and how many people were dying of overdose so we opened up the table right up at the corner of Main and Hastings and we just started handing out rigs ... A lot of drug users coming into the meeting said that they need to have a place to inject safely and we started doing a guerilla injection site ... You're not going to stand by where your brothers and sisters are dying of HIV or overdosing because they had no one to go to and no one to help.

According to Boyd, MacPherson, & Osborn (2009), after VANDU received a modest grant from the Vancouver Health Board in 1998, it became the first public health supported organization of current and former drug users in North America. As Kerr, Oleson, and Wood (2004) describe, a key part of the larger movement to establish a SIF in Vancouver involved the operation of illegal SIFs by local drug users and community activists such as VANDU that eventually forced the federal government to open North America's first sanctioned SIF. The group soon succeeded in raising funds to provide peer-based support to local PWIDs in the DTES. For example, Wood et al.'s (2003) evaluation of VANDU's unsanctioned syringe distribution in front of Carnegie Community Centre found that the use of the exchange was strongly associated with higher rates of safe syringe disposal.

However, the exchange program was shut down after nine months by the Vancouver Police Department on the basis that VANDU did not have a permit to operate the service (Vancouver Sun, 2002). However, VANDU would not stop its harm reduction program and it went on to operate at least two unsanctioned peer-run SIFs (Kerr et al., 2004). Among the more notable was the 327 Carrall Street SIF, which is described in detail in Kerr et al. (2004). According to one of the board members, establishing unsanctioned SIFs and the group's activism served to sustain pressure on policy makers to establish effective harm reduction programs in the DTES:

Our philosophy is that Canadians are normally good people and if they knew what was happening to drug users they would change their views so what we needed to do was to try to talk to the public and we did that with these demonstrations and we did get coverage ... And then after all the overdose deaths in the Downtown Eastside we decided to put a thousand crosses in the Oppenheimer Park and also at the City Hall and

it was a great coverage by the media and the newspapers. The media were able to take our message to the people in Vancouver that there is something wrong in this area something needs to be done about it ... Also media reported on how we were constantly being harassed by the police because we operated an injection site ...

According to Kerr et al. (2006), VANDU also brought considerable attention to the issues facing local PWIDs by demonstrating at Vancouver City Hall and the front steps of the BC Legislature. At both of these events a large red banner with the phrase 'The Killing Fields: Federal Action Now' was displayed (Kerr et al., 2006). VANDU members during such events "would often produce large black coffins and placards that pleaded with government to 'act now' to stop the continuing deaths from drug overdoses" (Kerr, MacPherson & Wood, 2012, p. 114). VANDU also pleaded with city councillors and the mayor to do whatever they could to stop the unnecessary drug related death and HIV epidemic by "interrupting Council business one day by parading into Council chambers with a coffin and staging an impromptu speech" (Kerr et al., 2012, p. 114). However, the work of VANDU did not stop after the opening of Insite in 2003, as one of board members describes:

We still do a lot of work in the community ... we do a lot of activism like going to the City Hall fighting to change the speed limit in the Downtown Eastside from 50 km to 30 km because a lot of residents were getting hit when they were crossing the streets ... One of the biggest campaigns that was really good a few years ago was the ticketing ... The police handed out in one month 1100 tickets so we created this campaign so people would bring their tickets to us and we ended up having a working group that coordinated with the city and the Pivot Legal Society and the Crown; we had about 600 to 800 people with jaywalking tickets totally thrown out.

In addition to making the DTES safer for residents and reducing the ticketing, VANDU members have been involved in improving environmental conditions in the DTES. VANDU members are involved in alley patrols where they pick up garbage and needles in the DTES. According to one of the board members, they have also been involved in a campaign to force city hall to provide more public bathrooms for the homeless in the DTES:

So what happens is that a lot of people use the lanes for their bathrooms ... so [a] lot of people don't have a home ... and ... most people try to find a dark place in the lane so people get ticketed for \$200 ticket for urinating

in the lanes ... we petitioned City Hall to spend some money to let us keep the washrooms in the Downtown Eastside open at night there is one in the Oppenheimer Park, there is one in the Victory Square and there is one in the Pigeon Park. The city agreed to keep the washrooms open until midnight. They used to close between nine in the morning and seven at night ... Now they're open 24hrs. We also monitor the washrooms on the weekend so our volunteers watch the washrooms on the weekends.

According to Latkin et al. (2005), changing the environmental conditions of the DTES by VANDU members through their activism may influence the general health of residents because characteristics of urban neighbourhoods such as physical decay, litter and human waste influences the feeling of hopelessness, stressors and helplessness.

2.3.2. Changes in Behaviour

VANDU's impacts have been felt at the individual level as well by providing an avenue where members form friendships, access social support and make a difference in their community through volunteerism. For example, for one of the board members, VANDU has been about empowerment:

VANDU is all about empowerment ... and it's working with people and showing them that they're not a piece of shit, that ... there are people who care ... you feel that you're part of something bigger ... most people in the Downtown Eastside are depression prone to very negative thinking so for me that was a hard thing to do because when I came in I was able to stand up and talk about my experience when I was molested as a child and how people come up to me afterwards and thanking me for saying that and say[ing] that it happened to [them] too. People will start talking about their own experience in an atmosphere around people that are nonjudgmental and very open and friendly and compassionate ... now they feel better about themselves because they're able to talk about that and that's usually the biggest stumbling blocks for people moving on and reducing the drug use.

According to Boyd et al. (2009), a significant accomplishment of VANDU was to encourage its members to recognize that their lives have value, dignity, worth, and to heal the misery that addicts have endured for more than a century. For many of the participants who volunteer or participate in VANDU's activities, their work and involvement in their community has been a real life transformation. These

transformations can sometimes translate into changes in drug using behaviour. As one of the board members describes:

I think our biggest contribution to the Downtown Eastside has been the education part. We have been really successful and educating junkies regarding how to safely inject what not to do and how to save lives. I actually seen changes in people's behaviour injecting: they don't shake and bake anymore. Even one girl who told me she's been doing it for years, she now basically because of what I told her many times she will cook the dope up properly ... People don't share anymore ... now most people have CPR training and VANDU boards and people that worked on the desk and in the injection room know how to revive someone from overdose situation and we finally gotten Narcan in our office.

Boyd et al. (2009) describe how user groups such as VANDU encourage "risk reduction among ... PWIDs, and disseminate information about availability of medical and other services" (p. 79). Consequently, it seems that peers have a far more overarching effect. Therefore, peers who work at VANDU can effectively address many of the micro-environmental factors that drive sharing behaviour or overdose risk and enhance individual ability to employ overdose prevention practices. Furthermore, peers at VANDU play a substantial role in managing and reducing overdose within the street based drug scene of the DTES. According to one of the board members, VANDU is able to help the most marginalized PWIDs:

Like we had the injection support team that traveled the alleys especially women who needed help, they have the highest HIV rate because they needed help to inject themselves and people usually take advantage of them. People were getting ripped off in the alleys: people put in a Gypsy switch when they're doctoring their friends and injecting their friends with water or dirty needle. And there, women were likely to be violated and they ask for help in the alleys in the Downtown Eastside. Every step they had to make from getting their drugs to injecting was a step toward violence. So basically all of us got together and we decided to go on and travel the alleys and help people to inject.

VANDU also used to provide an unsanctioned injection room for people who required assistance injecting. The injection room also attracted people who were banned or did not like to travel to Insite. Monica, one of the participants who used the services at VANDU, believes that its services have helped her to reduce her drug use:

It's helping me to get back on my feet slowly and getting involved in the society and I feel like I'm part of the Downtown Eastside community and I've been able to reduce my drug use because before I used to be jonesing all the time. Attending these meetings and saying that everybody else's doing the same ... VANDU is helping me in so many areas emotionally. I am more stable. My self-esteem and just the people around [are] really helping me I'm thinking that I'm not alone ... I'm here to participate. I'm totally involved in the activities because its keeping me out of trouble and keeps me out of the drug.

Accordingly, the peers' new roles as a consequence of self-empowerment have the potential to reduce morbidity and mortality cases within the DTES, and eventually transform lives amongst the most marginalized residents of the DTES. The study conducted by Wood et al. (2003) reported that "drug user organizations can play a major role in reducing harm among their peers by reaching the highest risk drug users" (p. 455). Such marginalized groups according to Wood et al. (2005) have been shown to be at an elevated risk of blood-borne infections and overdose. Peer drug users play a critical role in initiating membership, labelling, and shared values, which is a fundamental step toward a collective identity (Jozaghi, 2012a).

2.3.3. Change in stigmatization

In addition to changes at the micro (individual) and macro (community) levels in the DTES, VANDU has been able to transform the view of the general public about drug users and residents of the DTES. For example, according to one of the co-founders:

We fought every step of the way, people have self-hatred towards drug users and it's being reinforced every time that these users want to get help ... I am telling you that hatred is unbelievable towards drug users especially towards injecting drug users ... so when this shift came because of our activism and it's a very gradual thing so people started to listen to us, read newspapers about our demonstrations and the first thing that changed was the fact that funding came in for a drug using organization.

Recent research suggests that PWIDs are dehumanized by others such as police officers, health care workers, and the general public because they are often perceived as "the dregs of society who steal to support their behaviour and drug related illness" (Hippel & Brener, 2012, p. 1030). A growing number of studies have suggested that

stigma and discrimination may act as a key barrier to health access (Cohan et al., 2006; Hippel & Brener, 2012; Jozaghi, 2013). In fact, as one of the board members describes:

When someone says, “What did you expect you junkie whore?”, which is kind of the stuff they were saying at the time and there would be a phone call [from VANDU and] the whole hospital decided to redo the whole mission it was because of our activism. We went to the hospital, we met with the hospital board; we show them our concerns. So the hospital board started training their staff to respectfully deal with injection drug users who come to hospitals for treatment. If you hate them now you better keep it to yourself because you might lose your job.

According to Boyd et al. (2009), the first task of VANDU when it was established was to “change the demonizing rhetoric they endured, using community meetings, demonstrations, education and fearlessness in the face of repression” (p. 43). The VANDU has also been advocating for residents of the DTES when dealing with the Vancouver police department. In many instances, VANDU members will help a complainant to find legal assistance. Their actions have forced the city and the police to change their practices. For example, according to one of the board members:

There was one guy who got four vending tickets. He was selling his stuff on the sidewalk just because either he was homeless or he was living in a building where there is no backyard. Because most people that have backyards, they can sell their stuff in their backyards like a garage sale or something; but people in the Downtown Eastside don't have that luxury. So they are forced to come to the street, but the police gives them \$250 ticket ... So we took this issue to City Hall and we took this issue to the police board. And that's how we got the Sundays market close to pigeon Park on Carrel street. We are the organizing committee for [the] Sunday market

VANDU has also been instrumental in giving voice to people in Vancouver who might have no other way to express themselves. VANDU has allowed PWIDs to form a collective identity and be able to make a difference in the way they are treated by police, members of society and government organizations. For instance as Bryan declares:

We were involved last weekend with the Women's March so every year we get involved with a different demonstration. Few months ago there was an international police brutality day so it was basically VANDU who marched along the streets and we went to Main and Hastings and made a giant circle and cut off traffic and then we had ... [an open forum] where people could come up and talk about their own experience with the police

brutality. And then people could talk about what they could do to change this attitude of police towards injection drug users. We've done actions around methadone too. There was a time where pharmacies were basically ripping people off so we had a big march and marched to the office where the College of Pharmacists and Physicians is located.

According to Austin (2012), members of VANDU are very active politically and they have recently been protesting “in front of the Vancouver Police station on Cambie street over what they say is [Vancouver's city] council's misdirection of funds towards policing and a new roof for B.C. place, instead of [social] housing for [the] poor” (p. 1). In doing so, peers and drug user organizations in the DTES have countered stereotypical constructions of “the drug user” and the residents of the DTES who, according to Capitanio and Herek (1999) attracts particularly harsh condemnation. VANDU's activism in the DTES, according to Boyd et al. (2009), “can provide information about development in drug use that may be useful for the prevention of epidemics” (p. 79).

2.4. Discussion

A handful of studies have evaluated VANDU's programs including its peer-run syringe exchange (Hayashi et al., 2010; Wood et al., 2003), harm reduction programs (Kerr et al., 2006), and the injection support team (Small et al., 2012). Yet to date, there has been no systematic evaluation of VANDU's influence over the past 18 years of its operation in the DTES. The results from the current study in this chapter suggest that VANDU has been able to reduce risky injection behaviour and reduce risk of overdose death by establishing unsanctioned SIF. The social support provided by a drug organization like VANDU, helps PWIDs maintain lower-risk injection behaviour. Therefore, social activism to embed safety norms among one's peers can help PWIDs avoid high risk situations (Friedman et al., 2011).

According to social norms theory, “much of people's behaviour is influenced by their perception of how other members of their social group behave” (Haines, 2009, p. 1). If drug users misperceive the harmful effects of needle sharing and public injection through their peers, they are significantly more likely to partake in that type of behaviour because “if unhealthy behaviour is perceived to be the standard in a social group, the

social urge to conform will negatively affect overall behaviour of group members” (Haines, 2009, p.1). Also, according Koram et al. (2011), observing and associating with peers helps in the ego’s adaptation/non-adaptation of behaviour. Neaigus et al. (1990) found that PWIDs who, through social interaction with their peers, learn about HIV risk reduction and reduce their needle risk behaviour. Stephens, Feutch & Rowan (1991) observed that peer education is extremely effective in reducing HIV risk even several months past the intervention.

However, the most important role of VANDU that has not been discussed thus far in any peer reviewed studies has been its social activism. The significant success of VANDU has been to encourage its members that their life has value, worth and dignity (Boyd et al., 2009). Similar to Massey (1995) who provides examples about how the nature of labour process can have an important influence on location, I suggest that the creation of VANDU over the past 18 years has been powerful enough to contribute to changes in key factors both at the micro and macro levels of life in the DTES. In effect, according to Erikson (1961), “accumulation of decisions made by the community over a long period of time ... gradually gathers enough moral influence to serve as a precedent for future decisions” (p. 310). I suggest that each year of work and activism by members of VANDU brings with it potentially new social organization, new structural capacities, and new overall positions for PWIDs in society.

The new DTES represents new sets of power relations, new spatial forms of social organisation, new dimensions of inequality, and new relations of dimensions of dominance and dependence. Therefore, peer work over the past 18 years in the DTES has contributed to the creation of new physical and conceptual space. In physical terms, the DTES has become cleaner and safer for its residents because of availability of an injection facility and more public bathrooms. According to Parkin & Coomber (2009), PWIDs reported “a sense of shame and degradation in the practice of public drug use” that is directly or indirectly linked with the public injection situation and environment (p. 393). In conceptual terms, PWIDs are less likely to experience discrimination by the city, hospital, and police. Moreover, the residents in the new DTES are more likely to be involved in their civic issues and raise concerns in a new political arena. VANDU has

given a voice to the most marginalized members of society who otherwise would not be represented.

Consequently, more than 18 years ago, a group of marginalized but courageous former and current drug users started a controversial organization known as VANDU. Through public information, group activism, meetings, and public disobedience, their first task was to change the demonizing rhetoric they endured (Boyd et al., 2009). They have not only been able to change the rhetoric but they have been able to reduce the misery that addicts have endured through poverty, police violence and the war on drugs. Despite the challenges, they have been able to push the boundaries and continuously strive to represent the concerns of drug users in the DTES. Today, more than 5,000 PWIDs of the DTES have a political voice that has been able to advocate for their rights in their immediate community and the community at large. Findings from this chapter highlight the important role that drug user organizations can play to change the dynamics of life for the most marginalized members of society.

Chapter 3.

Transformative Role of Supervised Injection Facility and a Needle Depot in Vancouver, British Columbia

3.1. Introduction

The injection drug user population has a long and troubled history in Vancouver's DTES community. In fact, despite the operation of North America's largest Needle Depot, between 1992 and 2000, an explosive outbreak of HIV forced the local health authority to declare a public emergency in 1997 (Editorial, 2006). Kerr et al. (2010) and Editors of the *International Journal of Drug Policy* (2006) attributed the outbreak of HIV to several factors including a rigid one-for-one syringe exchange policy (i.e., only 1 sterile syringe is distributed for every used syringe returned) and limited hours of the needle exchange operation. In the years following, a number of additional harm reduction strategies were put in place. In an effort to reduce rates of syringe sharing, maximize sterile syringe access, and slow the spread of HIV between 2000 and 2002 for example, the Vancouver health authority modified its needle exchange program policies by shifting from a focus on syringe exchange to a focus on syringe distribution (BC Harm Reduction Strategies and Services, 2012). This shift included the opening of the Washington Needle Depot (WND) – an extension of the Portland Hotel Society's existing needle distribution services in an alley in the DTES.

Another significant development in the realm of harm reduction was the establishment of North America's first and only government sanctioned SIF. Insite opened its doors on September 22, 2003. Operating on a harm-reduction model, Insite is a supervised injection facility where people may inject pre-obtained illicit drugs and connect with a variety of health care services without fear of arrest (Vancouver Coastal Health, 2013). To date, a considerable body of research has demonstrated the

effectiveness of Insite and the other harm reduction programs in the community (for a concise summary of the research see Small, 2010). The policy change toward improving access to sterile syringes and the operation of Insite for example, have been found to contribute to reductions in syringe sharing, drug overdose deaths and HIV incidence in the DTES (Kerr et al., 2010; Marshall, Milloy, Wood, Montaner & Kerr, 2011).

While such findings reveal health-related outcomes of the harm reduction programs, there has yet to be research that explores the specific impact of peer influence with respect to the injection drug user population. This, however, is an important area of inquiry. Because the DTES is densely populated, the social networks of PWIDs and their peers – in addition to unique environmental conditions – create circumstances that allow peers to shape and influence risky injection practices such as sharing and reusing needles, and overdosing.

Such results have been found in similar studies where, for example, drug users have helped extend the reach and effectiveness of harm reduction programs (Broadhead et al., 1998; Des Jarlais & Semaan, 2008; Grund et al., 1992). As a result, it is important to assess not only how peers intervene to shape social networks, but to capture the transformative role of peer-led interventions in the lives of PWIDs. This marks the departure point of the current chapter. Adopting a qualitative methodology, the current chapter presents findings from an analysis of narratives that were collected through semi-structured interviews with peer PWIDs. The interviews were designed to solicit narrative accounts from participants on several themes related to their experiences in the DTES community of Vancouver.

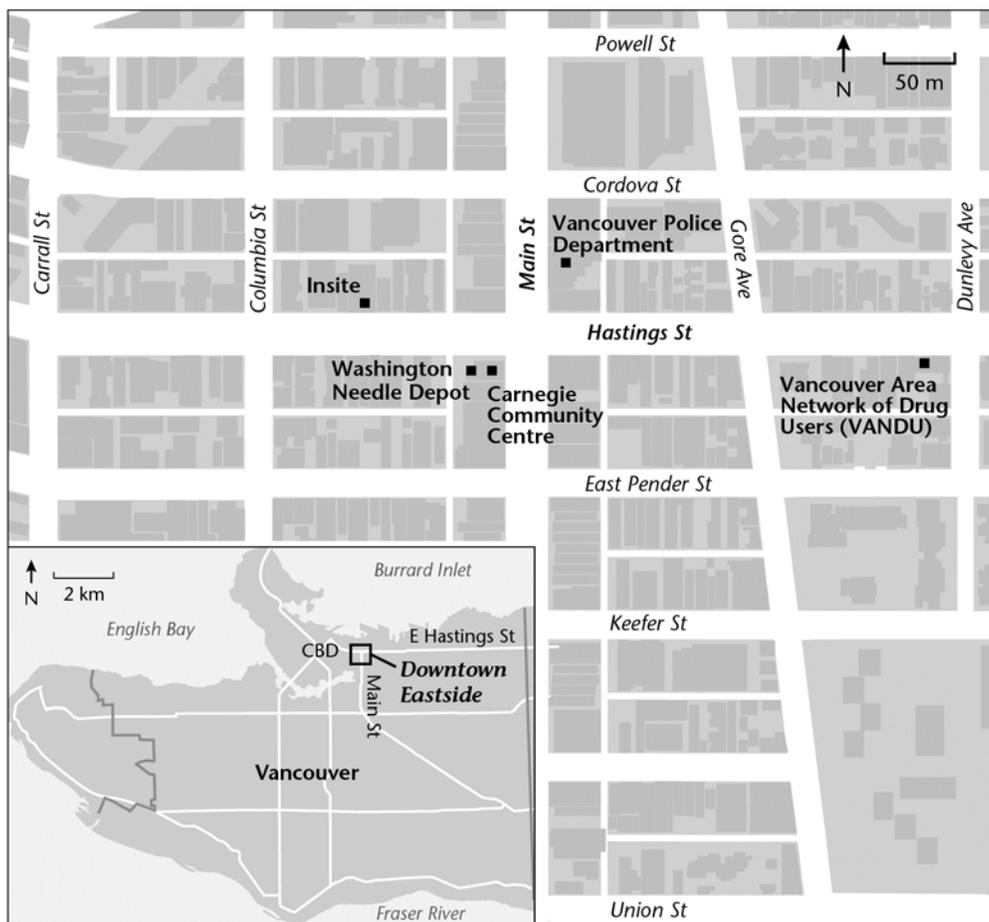
3.2. Methods

3.2.1. Participants

The sample of participants for the current study included peer PWIDs affiliated with Insite or the WND. Insite is located on East Hastings Street in the heart of the DTES (see Figure 3.1). Insite currently serves approximately 4,700 of Vancouver's estimated 8,000 PWIDs (Maas et al., 2007). The facility consists of a registration/waiting area, an

injection room, and a 'chill lounge'. Inside the chill lounge, peer PWIDs are employed to provide coffee and juice. In addition, peers talk and socialize with users, and watch for signs of overdose. Some peers also work as peer counsellors. Each pair of peers works an 8-hour shift and receives a small volunteer stipend. Peer PWIDs who work in the chill room must be current or former users themselves so that they are better able to understand, connect and interact with cliental who may be homeless, HIV positive and/or suffer from drug psychosis.

Figure 3.1. Map of the DTES



source: Jozaghi & Reid, 2014

The WND is also located on East Hastings Street in close proximity to Insite (see Figure 3.1). It provides needles and ancillary equipment (e.g., different sizes of insulin syringes with attached needles, sterile water containers for injection, male and female

latex condoms, alcohol swaps, disposal boxes, mouth pieces, crack pipes, push sticks, filters, vitamin C, and cookers) 24 hrs per day, seven days per week. The WND also conducts daily patrols in the alleys of the DTES which historically, have proven to be difficult due to the displacement of homeless PWIDs during police crackdowns in the area (Wood et al., 2004a; Eby, 2006). Each pair of peers works 4-hour shifts and receives a small volunteer stipend. Similar to Insite, all volunteers are current or former users.

Beginning in September 2012, peers living in the DTES who had worked at Insite or the WND within the previous month were approached to participate in the study. Initial contact with potential participants was facilitated by two gatekeepers who had worked at the facilities and had direct knowledge about those who would meet the inclusion criteria for the study. The two gatekeepers were known by the researcher who had also worked at one of the facilities for a period of time. The recruitment of participants was completed through a non-probabilistic sampling method. Specifically, the sample was formed through introductions to potential participants via the gatekeepers (Biernacki & Waldorf, 1981). The gatekeepers' knowledge of, and subsequent introductions to, volunteers were extremely effective in ensuring variation in facility membership within the sample. Participants were eligible for participation if they were 19 years or older and provided informed written consent. The consent statement (as well as the broader methodological approach) was designed based on the Wigmore criteria to protect confidentiality of participants and to provide anonymity (Palys & Lowman, 2002). The study was approved by Simon Fraser University's Research Ethics Board.

In total, 32 peer PWIDs were interviewed. Table 3.1 provides descriptive statistics of the sample. As is evident from the table, the sample included a mix of participant work experiences – some had worked at Insite, some at the WND, some at both, and some at these as well as other PWIDs groups such as the VANDU. The sample was predominantly Caucasian, heterosexual males over the age of 40.

Table 3-1. Characteristics of the sample of peer injection drug users in Vancouver who participated in the study.

N=32	n	%
Age		
20-30	3	9.4
31-40	2	6.3
41-50	10	31.3
51-70	17	53.1
Gender		
Male	24	75.0
Female	8	25.0
Ethnicity		
Caucasian	21	65.6
Black	3	9.4
First Nation	8	25.0
Years of injection (Y)		
Y≤5	8	25.0
5<Y≤10	3	9.4
Y>10	21	65.6
Medical Condition		
Nil	4	12.5
HIV & HCV	2	6.3
HCV	16	50.0
Mental illness	6	18.8
Mental illness and HCV	4	12.5
Drug of choice		
Cocaine	5	15.6
Cocaine and Herion	4	12.5
Herion	8	25.0
Other	15	46.9
High school Education		
Yes	17	53.1
No	15	46.9
Place of volunteering		
Insite	10	31.3
WND	10	31.3

N=32	n	%
Insite & WND	4	12.5
Insite, WND & VANDU	3	9.4
VANDU & Insite	2	6.3
WND & VANDU	3	9.4
Principal Dwelling place		
Private residence or other's house	31	96.9
Street	1	3.1
Criminal Record		
Yes	28	87.5
No	4	12.5
Unemployed		
Yes	32	100
No	0	0
Years of residing in the DTES (Z)		
1≤Z≤15	22	68.8
15<Z≤25	7	21.9
Z>25	3	9.3
Hours of volunteer work per week (β)		
β≤4	15	46.9
4<β≤15	8	25.0
β=40	9	28.1

3.2.2. Interview Process

The researcher who conducted the interviews adopted a semi-structured interview style to ensure that all of the interviews would be focused on the same general topics, while allowing the opportunity for participants to raise additional topics that they felt may be relevant. To ensure that all participants had the opportunity to respond to questions surrounding key topical areas, the researcher used an interview guide that was developed prior to data collection and modified throughout the collection process. Themes that were raised during the interviews included the following six dimensions: (1) experience as a peer worker; (2) injection of their clients; (3) overdose risk reductions (4)

drug use culture; (5) harm reduction education; and (6) an open discussion about anything raised during the interview.

To reduce distortion of data due to socially desirable responses, interviews were conducted in a conversational format while peer PWIDs were involved in their routine work activities such as foot patrols or needle distribution in the community. This strategy proved to be useful as it allowed for conversational prompts as participants walked in the alleys and streets of their community (Bourgois et al., 2006). All responses were audio recorded and ranged from 20 to 70 minutes. As Palys and Atchison (2012) suggested, a wireless microphone was used to facilitate this method of interviewing. Not having to worry about noticeable hardware that may draw third-party attention and not having the visual distraction of a recording device, seemed to put participants at ease. This made it easy for the interviewer to establish a rapport and trust with participants. In addition, the researcher took time to record field notes about his impressions of the interview immediately following each meeting. The interviewer also noted questions to ask in future interviews, and interesting themes to consider during analysis. This strategy led to the documentation of rich detail for each interview and promoted reflexivity.

3.2.3. Data Coding and Analysis

In order to explore peer PWIDs perspectives, this study drew on data obtained from the semi-structured qualitative interviews. All interviews that were recorded were subsequently transcribed verbatim via Dragon Naturally Speaking software and analysed using qualitative content analysis methods. To ensure reliability and reduce bias, two different coding methods were used. The initial coding method involved identifying themes without the assistance of computer software. In other words, the transcripts were printed and analysed visually to identify common words and themes. This process was accomplished with a colour-based highlighter coding scheme. The themes identified during this initial stage of coding were later compared to themes that were identified using computer software.

The second stage of coding was performed via NVivo 9 software. The procedure used was in line with that proposed by Leech and Onwuegbuzie (2008) where the goal is

to develop a theory or set of themes from the data. The first stage in this process was open coding. The analyst grouped information into smaller sections, then provided a descriptive name for each. The second stage was axial coding where the sections were grouped into common themes. The third stage was selective coding where the researcher drew conclusions from the organization of the data. In the current study, this process was performed iteratively until all interview transcripts had been assessed and all new or developing themes had reached a point of saturation.

In total, 26 types of nodes were created in the open coding process. During the selective coding process, “tree” nodes were created for general themes resulting from an inductive search. “Free” nodes were deductive or emergent, and came from general observations. This part of the coding process produced more specific categories. Free nodes were created after tree nodes were searched. Silverman & Marvasti (2008) warned analysts about the tendency for coding schemes to become “powerful conceptual grid[s] from which it is difficult to escape” (p.225). As a result, each time a theme was referenced, the software gave it a number and percentage so it could be tracked. A word frequency query was also carried out to assess the most frequently used words. In later stages of the analysis, the most frequently reported words were used to search the transcripts for common themes and phrases. This process allowed for the most dominant themes to be identified.

3.3. Findings and Discussion

Findings of the current study are organized into the six themes that emerged from the data analyses. These findings are discussed in relation to relevant previous research and theory. To aid in organization of the results, Table 3.3 provides a summary of the most notable findings from previous research as they relate to findings of the current work.

3.3.1. Activism

The DTES of Vancouver has been the epicenter for illicit drug use and homelessness in the province of British Columbia since the 1970s, and an explosive HIV

epidemic in the neighbourhood had at one point, marked the area as the most impoverished urban area in Canada (Wood et al., 2003). According to participants of this study, however, despite the poverty, homelessness and drug use, there is a real sense of community that has empowered a lot of PWIDs to take an active role in supporting their peers. Michael, for example, was part of the group that set up an unsanctioned needle depot in the heart of the DTES. This form of activism, according to Michael, led to the creation of the first SIF in North America:

Before we had Insite, we had a real problem: Rigs were all over the place. People didn't have access to clean rigs ... It was like a hell on high wheels ... We used to find people shooting up all over places. Every second person you talked down here at that time had HIV and was not on medication. A lot people that I know died from HIV. We saw a lot of people really harming themselves so we decided to do something about it and that's how VANDU was created ... We fought for Insite, we fought for more funding. We created the first unsanctioned [supervised injection facility] in North America ... We created injection support team that traveled the alleys to provide education, supplies and help.

Many of the peers at VANDU have continued their volunteer work in the DTES by becoming peers at Insite and the WND. Many of them, like Adam, have advocated for safe injection practices in the DTES and have helped to transform the lives of PWIDs in the process:

We are God's little angels in the [Downtown Eastside]: We socialize with a lot of drug users. If they ask me questions, like how to get help, how to get food, how to get housing for the night, how to see a doctor, and I could steer them to certain places ... I walked down the street ... and usually people ask me you have a rig and I give it to them ... There have been cases where peers have gone for their alley patrols and have found people in the alleys overdosing. And because of our work we have been able to save lives in the alleys.

This supports earlier claims such as that made by Kerr et al. (2006), where peers in the DTES were said to have “demonstrated that drug users can organize themselves and make valuable contributions to their community” (p. 67). In addition, some of the peers have extended their activism by voicing concerns about quality of life issues with respect to PWIDs and residents of the community. This appears to have generated a degree of political attention to these issues. For example according to Joe:

We fight for housing, we fight for higher welfare rates. We were even able to change the speed limit from 50 to 30 last year because too many pedestrians were dying ... We also got timing on pedestrian lights ... So VANDU is all about ... changes in the community for the better. Like get social housing built for people and not condos, and that's another big issue down here. Like right across Insite a guy bought the land about a year ago and he wants to build 195 suites right in the heart of the [Downtown Eastside] ... He was going to open a display suite in March of this year and he hasn't been able to open it yet because of all the protests by VANDU. I think the [Downtown Eastside] has changed for the better because we are fighting and making headways with the housing and shelters and harm reduction.

Similarly, Austin (2012) noted that members of VANDU are very politically active and have participated in numerous rallies in Vancouver to raise awareness about the poor and the marginalized people in the DTES.

In conjunction with these efforts, peers and drug user organizations in the DTES have attempted to counter stereotypical misconstructions of “the drug user” and residents of the community who have received particularly harsh condemnation (Capitanio and Herek, 1999). Injection drug users are often viewed as “dregs of society who steal to support their habit and pollute mainstream society with their chaotic behaviour and drug related illness” (Hippel & Brener, 2012, p. 1030). Encouragingly, peers who started VANDU and continued their efforts at Insite and the WND have developed what Castells (1996) referred to as, “project identities”. In effect, project identities serve to redefine the negative connotations associated with these individuals and their positions in society, and have helped injection drug users alter the structural and cultural dimensions of power relations that create disproportionate suffering in the community (Jozaghi, 2012a). We suggest that this empowerment of peers in the DTES—built upon their enhanced work on health care issues, social services, counseling and support—has been very influential and has likely contributed to the transformation of the community over the past decade.

3.3.2. Needle distribution

All of the participants recalled the public injection scenes of the DTES during the 1990s. They remembered seeing people sharing injectable equipment, discarding

needles in public, and engaging in various other risky behaviours. Nick, for example, describes how drug users were forced to engage in unsafe injection practices:

When I first came to Vancouver, DEYAS [local needle exchange operator] ... was the first needle exchange in the [Downtown Eastside] and you were allowed to exchange 14 syringes a week. And shooting cocaine people were going through that a day ... So If you had to use the 14 rig on one day you had to reuse rigs, or use somebody else's rig. And everybody was sharing needles back then ... When DEYAS was still running, we stopped the needle exchange van, and told them that there was three of us ... and the guy gave us two syringes for three people. Like huh? Somebody is suppose to use somebody else's rig?

As Hayashi, Wood, Wiebe, Qi and Kerr (2010) argue, Vancouver experienced an epidemic of HIV and HCV amongst injection drug users, despite the presence of one of the largest needle exchange programs in North America at the time. Similar to the participants in this study, Kerr et al. (2010) point to a few explanations for this paradox. A rigid one-for-one syringe exchange policy and limited hours of the needle exchange program operation, for example, made it difficult for people to access safe injection equipment. In the case of Jeffrey, sharing needles contributed to his HIV diagnosis in the early 2000s:

Oh boy, sharing needles [laughs], I used to share down here and that's how I got AIDS. You look out of your hotel window and all the back alleys were full of people injecting. People were desperate to do a fix so they used to suck water out of the puddle. God knows what's been inside that water: People pissing or defecating. Back then it was really tough getting needles down here because there was no Insite or WND. I mean you used to have to buy one off the street. And if they didn't have money to buy one, they'd be taking one off the ground and [you] could see a whole lot of dirty rigs everywhere.

All of the peers who have been long term residents of the DTES, however, believe that risky drug use behaviour has been reduced since the establishment of Insite and the WND. They attribute much of the change in this type of behaviour to their volunteer work including the distribution of clean injection supplies. For example, according to Bob:

There is a lot less sharing in the [Downtown Eastside]. Now that we have more needles there is no reason in the world that you got to use your old one or borrow a rig ... Before ... the needle exchange had a limit. And before that needle exchange there was nothing. So people had to share,

you had to go and lie and say you were a diabetic in order to get needles. And you can only get so many, so [you] had to share ... But now days you can go to a needle depot or Insite in the [Downtown Eastside] and ask a peer to get one hundred needles, no strings attached. We also provide unlimited water, cookers, tie, filters, crack pipes and alcohol swap from our main office and during our patrols.

It appears logical then, that establishing SIFs has helped to reduce risky behaviour because according to Stoltz et al.'s (2007) study, "more consistent SIF use is associated with positive changes in injecting practices, including less reusing of syringes, use of sterile water, [and] cooking/filtering [of] drugs" (p. 35). Further, research on needle exchange programs such as the WND, has demonstrated their effectiveness with respect to reducing the incidence of HIV infection (Bastos & Strathdee, 2000; Des Jarlais, 2000; Ksobiech, 2003; Vlahov et al., 2010).

3.3.3. Overdose

The most common narrative offered by study participants was that needle exchange facilities and SIFs reduce overdose deaths. Most participants such as Rob, recalled the extent of drug overdoses in the DTES prior to the opening of Insite:

Before Insite there was a lot of ODs in the [Downtown Eastside] especially on a welfare night. A lot of people dying. We had people dropping like flies all over Vancouver. We had at least 18 or 19 people go under, die every month. They had a place down here called Means Room, we used to call it the mob, people used to die there every month. Insite did a lot to save lives.

This type of description is consistent with official reports. Overdose-related deaths increased from 39 cases in 1988 to over 370 cases in 1998 in the province of British Columbia (Fischer et al., 2000). Further, overdose from injection drug use was identified as the leading cause of death for adults between the ages of 30 and 49 in British Columbia (Miller, 1998). All of the participants affiliated with Insite, however, agreed that their volunteer work was a major factor that contributed to the decline of overdose deaths in recent years. Bob, for example, noted:

It is safer at Insite ... There have been so many overdoses, but no deaths. In the chill room for example, I am constantly watching people for

overdose, if I see a colour change, for example, if they're turning white or turning blue, I go over there and shake them. If they're not moving my job is to call the nurse right away. The nurse comes with Narcan and oxygen tank. They start checking the vital signs to make sure you're OK. If they're not OK they will Narcan you. While they're working on the patient, they call me to call the ambulance.

According to Marshall et al. (2011), overdose fatalities have been reduced by 35% within 500 meters of Insite. This finding is consistent with statements provided by participants in the current study. The influential role of peers in preventing overdoses is also evident from VANDU's former non-sanctioned SIF. For instance, according to Irina:

He came in and used the room and he was all fine. He hung out for a bit. Then he decided to leave. He got between VANDU and First United Church and he fell ... Then we called the ambulance ... Another member of the board [VANDU] was there and we had to get him off his back pack and place him flat on the ground. And we were just talking to him. He couldn't talk and he was gurgling in his chest ... And he started turning blue ... His eyes stopped blinking. His lips turn bright blue. And he stopped moving and that's when we hit him with Narcan ... And then we started doing CPR and we just tried to get his heart going, we hit him with Narcan another time and still no results. We were still doing chest compression ... But after the fourth time we hit him with Narcan the ambulance had finally arrived, and his lips got their colour back, his eyes started blinking and he started breathing.

Participants also noted that VANDU is a key venue for injection drug users who have been banned from Insite. Some of VANDU's users who used to go to the former unsanctioned SIF because they did not feel comfortable at Insite while others went because the peers know they can help users inject—a behaviour that is not permitted at Insite. Therefore, VANDU had extended the reach of public health efforts by connecting with injection drug users who may not be well served by other service delivery options. Many of the participants who work at the WND, such as Alex, have been able to extend overdose prevention work into the alleys where the most marginalized injection drug users exist:

During my patrols I had to give somebody mouth to mouth because he had ODeD and since then I carry a pocket mask with me all the time [interview take the mask out of his bag]. So the person was face on their back, I pulled him over on their side, and I make them comfortable, one leg straight out, one kind of bent. I put a coat underneath their head. And I made sure his airway is not blocked, then I took his pulse and then I

started mouth to mouth CPR. I have certified first Aid level two. And my partner called the ambulance ... And we stayed with him making sure he doesn't get robbed.

Marshall et al. (2011) demonstrated that overdose mortality was reduced by 9% in other areas of the DTES and that may too, be attributed to alley patrol work by peers. By providing support to those who experience overdose in alleys, peers who work for the WND are reaching a vulnerable population who may not have been sufficiently engaged through existing efforts to reduce unsafe injecting practices.

3.3.4. Education

The previous discussion has outlined, albeit implicitly, some of the ways that peer injection drug users have contributed to reduced morbidity and mortality incidence. It has also described the activism of peers in the DTES. According to Nick, however, peers have done more than save lives and reduce HIV incidence; they have modified the drug use culture of the community, including the social dynamics among injection drug users through ongoing education:

We are getting more people out of the alley ways and indoors to do their drugs where they are supervised by registered nurse. If they go under, there are people that can help them. And what's happening lately we have taught people to break the top of their syringe so nobody else can use it. People are also more aware of diseases that go around because we tell people about it. We tell people that you shouldn't share you're crack pipe, or if you do, use a mouth piece. We tell people to cook their drugs, we tell people to use alcohol swap before injecting. We tell people to go to Insite. We tell people to never share their rigs. Like a lot of people come and asked for one syringe, and I'll always tell them to take two in case one plugs or something so you can use the second one. Or people will ask us for syringes, and we always tell them to take extra ones.

This is consistent with Wood et al.'s (2004b) study that found Insite was independently associated with improvements in several measures of public order including reduced public injection, drug use, and public syringe disposal. In addition, Tyndall et al.'s (2006) study reported that Insite attracted a large number of marginalized injection drug users and presented an excellent opportunity to enhance HIV prevention. The participants in this study also reported that the provision of sterile syringes, ancillary injection

equipment and safer injecting advice by peers, has served to reinforce the permanent adoption of safer injecting practices. As Fabian insisted:

People are getting more educated because we tell them ... And it's a slow process for a lot of people. So we tell them that if they do shakers without cooking you're going to get endocarditis. And a lot of people have no idea what endocarditis is. If you just do a shaker without cooking your stuff you're going to have bacteria and shit in there that causes infectious of heart tissue. We tell people that never share a syringe, always try your drug before injecting. We tell people that HIV virus dies once it hits air. But the Hep C virus can live for 30 days. And we tell people that when you fix always cap your rig, put it in a rig box ... so people can't use it the second time.

As a result, most of those who described injecting with clean needles at Insite would not be willing to share needles in the future. In other words, once safe injecting habits are established within the supervised facility, they are more likely to become adopted outside of the supervised environment. This change of behaviour outside of Insite—in accordance with the theory of Planned Behaviour—is suggested to be influenced by the difficulty drug users perceive towards adopting or maintaining risky behaviour or the intention of not reusing another injection drug user's syringes (Côté, Godin, Mercure, Noël & Alary, 2006). In essence, injection drug users who visit Insite, the WND or VANDU perceive themselves as being in control in situations where high risk behaviours are likely to take place (Côté et al., 2006). Furthermore, in comparing themselves to others, users believe that peers play an important role in initiating labelling, membership and shared values. This is a critical step toward the development of a collective identity.

Peers have also been effective in educating injection drug users about overdose risk. Many of the peers, such as Jack, have been effective in teaching users what to do to reduce overdose risks or what to do if they see somebody overdosing:

There is less overdose and less overdose deaths. Because we have posters and we advertise in alleys, hotels to never fix alone, always try or taste the dope before fixing, or go to Insite. A lot of places have courses about what to do if somebody overdoses. Because of VANDU's work, the city has also placed emergency phones in the alleys for people to use in the case of emergencies. So we're educating people and the people educate more people then you have this ripple effect in the community where people are fixing safer and they're more knowledgeable and less people will die, or get infected.

Consequently, it seems that peers may have a far reaching effect. Those who work at Insite or the WND can effectively address many of the micro-environmental factors that drive overdose risk. They can also enhance an individual's ability to employ overdose prevention practices. Furthermore, we suggest that peers play an important role in managing and reducing overdoses within the street-based drug scene of the DTES.

3.3.5. Relationships

Participants' accounts also indicated that peers, nurses, and staff at Insite and the WND have gained awareness into holistic strategies that go beyond simply providing care. That is, peers have been able to create trusting bonds that build foundations for change through personal empowerment. According to Alex:

They know that we are current or former users. They don't mind talking to us, where other places they feel uncomfortable talking to people because they're not talking to someone who is the same as them. Like this French fellow who was about 19 and he could hardly speak English. He was dope sick and he wanted to kick it really bad and I just happened to pump into him when he came to the window [at WND] ... So I phoned this guy and I told him the story and he phoned somebody and then I called detox and they said bring the guy in at 2 o'clock. So he got in about an hour later.

The study by Deering et al. (2011) also highlighted the important role that peers and outreach programs can play in facilitating relationships that promote access to and use of, drug treatment services. In another example, a 12-city US study estimated that 68% of injection drug users had been referred to addiction treatment by peers or outreach programs (Needle et al., 2005). More locally, Wood et al. (2006) found that SIFs in Vancouver have improved the use of detoxification and other addiction treatments. Consequently, for many injection drug users, the peers and staff at Insite, the WND or VANDU were more than friends; they were the only people that participants could rely upon for help. According to Bob, Insite has 'become more than a place to do a fix':

Insite and VANDU are amazing environments to get help. It started as simple injection site, people where just coming here to fix. But over the years people have come to respect the place. It has become more than a place to fix. It has become part of our identity. Over the eight and a half years I've been working here and there have only been very few fights.

There has been no stabbing. And Insite and VANDU are places where most of their clients have been in prison or just got out of prison. But Insite is such a non-violent place that it's hard to believe ... But people respect Insite. Maybe it is because Insite has become more than a community center than an injection site.

For many participants then, Insite is not a stand-alone facility. Instead, it is a critical part of a complex continuum of addiction services that tries to reduce suffering and misery. For people with longstanding drug addiction, Insite is “the first rung on the ladder from chronic drug addiction to recovery; from being ill to becoming well” (Vancouver Coastal Health, 2007, p. 1). Others view Insite as their community center, a place where injection drug users congregate for acknowledgment and support. It is a place that according to Jeffrey, has given injection drug users a collective voice and identity over the past eight years:

Insite is giving people confidence because we are down here and we are so beaten. People down here in the ghetto have no hope. And when you go to places like Insite, you got people like Darwin, Ross, Monica, Rebecca and James and they are nothing but positive affirmation. They treat you with kindness and they're killing you with unconditional love, and you can't help but like the people and feel good about yourself. The staff and peers actually listen to you and treat you with decency. It's almost like a family.

Given statements such as this, it should not be surprising that many injection drug users view peers as mentors and strive to be like them by reducing risk or changing their behaviour. The relationships that exist between peers and injection drug users at Insite have facilitated more than 2,000 referrals to addiction services, with 800 of these referrals to addiction counselling (Vancouver Coastal Health, 2007).

Social bond theory offers a way to conceptualize how peers change risky behaviour. Norms and socially acceptable behaviours (such as not sharing or reusing needles, and not injecting or discarding needles in public) are “by definition shared by members of society ... [and to] violate a norm, is therefore, to act contrary to the wishes and expectations of other people” (Hirschi, 2002, p. 18). However, this chapter delves deeper than social norms, suggesting that peers have created unexpressed standards among injection drug users. Safe injection practices have become unwritten codes or rules that are upheld because of attachments to peers that users are not willing to

jeopardize. Small, Wood, Liloyd-Smith, Tyndall, and Kerr (2008) suggest that further benefits may be gained by expanding the contact between injection drug users and staff through increased nursing and counselling care via outreach services.

3.3.6. Changes in Behaviour

For many of the peers who volunteer at Insite or the WND, their work and involvement in the community have been influential in producing lifestyle transformation. For Bob, who has been volunteering at Insite for more than eight years, work has helped him to abstain from his own drug use for six years:

I see a big change in people's behaviour and attitude every day. Number one, the big change in me, I was a hard core addict for 33 years, but I have been clean for six years after I started working here. I used the detox center called Onsite upstairs right above Insite and I was able to finally quit.

Peers who work at these facilities not only see changes in their own behaviour, they have noticed changes among others' behaviours in the community. Fabian, for example, believes that peer volunteer work has caused a shift in behavior that has resulted in fewer public injections, fewer discarded needles, and less human waste in the alleys:

Before, people simply didn't care. They defecated, they urinated everywhere, they left their garbage and rigs all over the place where as today people are more careful, they feel that this is their neighbourhood ... When I first moved down here, public injection was everywhere. People with rigs in their arms, flagging blood and leaving their rigs behind. Today if we see somebody in the lane fixing we ask him, are you barred from Insite? If they are we invite them to come to VANDU ... For a lot of people who live here they have concern, they don't want to see programs lost. Like program like this [WND] could be lost if too many people through rigs on the ground around the facility, and people have come to understand ... So they always bring their rig back or they put it in the boxes in the alleys. So a lot of people when they see somebody through a rig on the ground, they give him shit ... don't through the fucking rig on the ground.

Further, Jack notes that many injection drug users have started to take a preventative approach to harm reduction:

You just hear the vibe. And people always ask us for spare syringes because they tell us people can't find them in the middle of the night ...

So they make sure they have extra rigs in their bag so if somebody is looking for a syringe in the middle of night they can help them out.

According to the symbolic interactionism perspective, human beings are creative social actors who, given the socio-cultural conditions in which they live, act according to the meaning they assign to other people's expectations and actions (Becker, 1963; Blumer, 1986; Sandstorm, Martin & Fin, 2006). In the case of peers in the DTES, these meanings and expectations are formed on a daily basis during interactions with injection drug users. Participants' involvement at Insite and the WND therefore, has likely contributed to changes in the culture of drug use and the behaviours of injection drug users in their community. It is these changes that may reduce risks for HIV, HCV, osteomyelitis, and endocarditis.

Table 3-2. Summary of findings from previous related research

Theme	Finding	Study
Activism	Peers in the DTES have "demonstrated that drug users can organize themselves and make valuable contributions to their community".	Kerr et al., 2006, p. 67
Activism	Members of VANDU have protested "in front of the Vancouver Police station on Cambie Street over what they say is [Vancouver's city] council's misdirection of funds toward policing and a roof for B.C. place, instead of housing for poor".	Austin, 2012, p. 1
Needle Distribution	"[M]ore consistent supervised injection facility use is associated with positive changes in injecting practices, including less reusing of syringes, use of sterile water, [and] cooking/filtering [of] drugs".	Stoltz et al., 2007, p. 35
Needle Distribution	Research on needle exchange programs has demonstrated their effectiveness with respect to reducing the incidence of HIV infection.	Bastos & Strathdee, 2000; Des Jarlais, 2000; Ksobiech, 2003; Vlahov et al., 2010
Overdose	Overdose fatalities have been reduced by 35% within 500 meters of Insite.	Marshall et al., 2011
Overdose	Overdose mortality was reduced by 9% in other areas of the DTES.	Marshall et al., 2011
Education	Insite was independently associated with improvements in reduced public injection, drug use, and public syringe disposal.	Wood et al., 2004b

Theme	Finding	Study
Education	Insite attracted a large number of marginalized injection drug users and presented an opportunity to enhance HIV prevention.	Tyndall et al., 2006
Relationships	SIFs in Vancouver have improved the use of detoxification and other addiction treatments.	Wood et al., 2006
Changes in Behaviour	Human beings are creative social actors who, given the socio-cultural conditions in which they live, act according to the meaning they assign to other people's expectations and actions.	Becker, 1963; Blumer, 1986; Sandstorm, Martin & Fin, 2006

3.4. Conclusions

Peer interventions have been used with a number of marginalized populations including sex workers (Basu et al., 2004; Morisky, Stein & Chaio, 2006) youths, (Agha & van Rossem, 2004; Brieger, Delano, Lane, Oladepo & Oyediran, 2001), and injection drug users (Hayashi et al., 2010; Smyrnov, Broadhead, Datsenko & Matiyash, 2012; Tobin, Kuramoto, Rothwell & Latkin, 2010). Yet to date, there has been no evaluation specific to peer injection drug user influence as it relates to the knowledge, attitudes, intentions, and behaviours of injection drug user populations. This chapter has uncovered a number of important findings in this regard.

Specifically, this chapter has demonstrated that peer injection drug users who work at Insite and the WND engage in important education and safety roles, and are able to influence behaviour (specifically, attitude and intention) of injection drug users. Peer injection drug users are able to reach individuals who are reluctant to seek medical help, housing, and prevention services directly. Peers serve as an agent of change in the DTES to disseminate information and risk reduction skills to the most marginalized people, specifically those who are homeless, HIV or HCV positive, and at risk of overdose.

According to Cox et al. (2008), perceptions, attitudes and norms about drug-related risks (such as HIV, HCV, abscesses, osteomyelitis, endocarditis, and high rates of overdose mortality) are shaped in part by knowledge of associated infections. As Cox et al. (2008) suggest, "one's intention and commitment to reduce injecting risk are in turn

determined by such factors as perceived benefits and barriers [and] social norms” (p. 211). The findings in this paper suggest that peer injection drug users who have been volunteering in the DTES are likely to have played a considerable role in the transformation of the area. Their involvement, either directly or indirectly, is present in many peers’ accounts. In fact, it seems likely that peers’ relationship building skills, harm reduction knowledge, and emergency care abilities have made the drug use culture of the community safer. Peers have been able to change behaviour that places injection drug users at increased risk of morbidity and mortality. In addition, peers are likely to have saved lives through their emergency care response at Insite, the WND or in the alleys of the DTES.

There are, however, some limitations to this study. Given that all of the participants were volunteers (and not paid employees) at either Insite or the WND, they are likely to have held strong positive views about the facilities with which they chose to devote their time. This may have led to participants exaggerating the magnitude of their individual contributions in hopes that they would benefit the interests of the broader organizations. As was revealed in many of the direct quotations included in this paper, however, participant accounts were often supported by detailed descriptions of their own specific experiences. This, along with the consistency among participant perceptions, lends considerable support for the credibility of the narrative accounts.

Ultimately this paper suggests that there has been a social change in the community. The social structure of the DTES not only impacts people, but people influence the broader social structure. It is perhaps important to emphasize that the flow of influence can operate from the bottom up. Indeed according to Risman (2004), social change is “created not by mysterious forces, but by human action” (p. 432). The new culture of the DTES represents a degree of social organisation. Peer work over the past 18 years has contributed to the creation of an environment where injection drug users are less likely to inject or discard needles in public, catch blood born infections, and die of overdose. Moreover, injection drug users are more likely to have better access to health professionals, counsellors, and other forms of social support. Residents of the DTES are also more likely to be involved in the political arena to advocate for civic issues.

In summary, the findings in this study indicate that drug user organizations and drug user-led interventions have much to contribute to their immediate community. Peer led intervention in Vancouver was characterised by a long history of public health problems that contributed to grass-roots activism in the DTES. Peers who started VANDU and continued their work at Insite and the WND have created project identities that serve to redefine positions in society and have helped injection drug users alter the structural and cultural dimensions of power relations that manifest disproportionate suffering in the DTES. It is one of the central arguments of this paper that the importance of the establishment of major harm reduction initiatives in the DTES during the late 1990s and early 2000s has contributed to major cultural and social changes that have been largely unknown until now.

Chapter 4.

A Case Study into SALOME (Study to Assess Longer-term Opiate Medication Effectiveness)

4.1. Introduction

The DTES of Vancouver, Canada, has the center of North America's open illicit drug scene for decades (Kerr, MacPherson, & Wood, 2008; Jozaghi, 2014b; Jozaghi, 2012a). During the mid-1990s, the area's problems escalated when several factors, such as an increase in the availability of powder cocaine, lack of social housing, and deinstitutionalization resulted in a multiple epidemic of injection drug use, HIV and drug overdose deaths (Jozaghi, 2012a). What differentiated Vancouver from other North American cities was the magnitude of the outbreak; for example, between (1990) and (2000) HIV prevalence rate among PWIDs rose from 4% to up to 40% (O'Shaughnessy, Hogg, Strathdee, & Montaner, 2012). At the same time, a growing overdose epidemic was taking place within the PWIDs population in Vancouver, with 1200 deaths occurring between 1992 and 2000 (Kerr, MacPherson, Wood, 2008).

According to Kerr, Small, Hyshka, Maher and Shannon (2013), Vancouver "has long been home to dual epidemics of heroin injection and heroin related overdose" (p. 108). In fact, there have been numerous public warnings regarding heroin related deaths in Vancouver (Kerr et al., 2013). In addition to overdose deaths, there are numerous costs to the health care, the criminal justice, and the welfare system when dealing with the numerous challenges that opioid/heroin users pose for the government (Gartry, Oviedo-Joekes, Laliberte, & Schechter, 2009). A recent Auditor General's report estimated illicit drug use to cost Canadian tax payers an estimated \$5 billion dollars annually (Miller et al., 2004). In an Auditor General's report, the societal cost of untreated heroin addiction exceeds \$45,000 per person each fiscal year (Status report, 2008).

Since the 1970s in Canada, methadone maintenance therapy (MMT) has been the main substitute for heroin and opioid addiction (Dole & Nyswander, 1965).

MMT has been shown to be effective in decreasing the incidence of illicit opioid use, and cravings; additionally, in some cases, MMT may lead to abstinence (Gartry et al., 2009). However, several factors have suggested the inefficiency of MMT for some users. For example, “inadequate methadone doses; user fees; punitive urine testing, and a lack of high associated with MMT” have all been cited (Gartry et al., 2009, p. 2). Additionally, MMT is not effective in all cases; between 15% and 25% of patients do not respond to MMT, especially among long-term, high risk patients (Brink et al., 2003; Mino, Page, Dumont, & Broers, 1998).

In response to the growing number of addicts who do not respond to traditional MMT programs, numerous European countries have started experimenting with pharmaceutical heroin. For example, since 1926, addiction treatment in the United Kingdom has included heroin prescription (Gartry et al., 2009). In the Netherlands and Switzerland, HAT clinics have been in operation since the 1990s, and Germany is in the process of creating a centralized system for Diamorphine (Gartry et al., 2009). The scientific evaluation of HAT has been very positive in European countries (Gartry et al., 2009).

Canada has also taken notice of the success of the HAT program in Europe. In September 1998, the first North American Opiate Medication Initiative (NAOMI) working group was formed (Gartry et al., 2009). Recruitment in Montreal and Vancouver began in March of 2005 and ended in April 2007 (Gartry et al., 2009). The 12 month program ended in June 2008, with 251 of the most marginalized and chronic opioid users entering the program (Gartry et al., 2009). Evaluation of the NAOMI according to numerous peer reviewed studies has been positive (Bohdan et al., 2012; Kahn, Srivastava & Conway, 2011 Nosyk et al., 2010).

In the interim, another set of trials, the Study to Assess Long-term Opioid Medication Effectiveness (SALOME), has begun to test whether people affected by chronic opioid addiction, who are not improving sufficiently from other treatments, will benefit from hydromorphone (a licenced medication), and whether hydromorphone is as

effective in treating addiction as diacetylmorphine (Mickleburgh, 2012; Oviedo-Joekes et al., 2006; Oviedo-Joekes et al., 2009). SALOME began active recruitment in December 2011 (Boyd, 2012). After one year of participating in the program, participants will be encouraged to take part in conventional treatment, such as MMT and detox, during a period of transition (Boyd, 2012). The current chapter seeks to determine the transformative role of HAT in the lives of injection drug users. Specifically, this chapter will account for (1) experience prior to the SALOME trial; (2) injection behaviour of clients before enrolling in the programs; (3) injection behaviour post enrollment into SALOME; (4) health status before and after the enrollment; (5) activism in the community; and (6) an open discussion regarding how the program was successful. This is the first qualitative study of SALOME. It is believed that participants' accounts generated by qualitative narratives create opportunities for discovering a rich detailed description. This chapter will show the behaviour of participants in the SALOME project in the DTES to be shaped by a complex interplay of individual and social factors, which are not amenable to quantitative measurements (Rhodes & Treloar, 2008).

4.2. Methods

4.2.1. Participants

This study was approved by Simon Fraser University's Research Ethics Board. Beginning in May 2013, participants living in the DTES, and those who in the previous week had attended SALOME were recruited to participate in the study. Participants were eligible for the study if they were 19 years or older and provided oral consent. To protect confidentiality, all identifying information was removed from interview transcripts and all names used in this paper are pseudonyms.

The study was facilitated through recruitment of participants through purposive sampling via key informants. The researcher and the key informants had a pre-existing relationship that was established during the researcher's previous volunteer work in the DTES. The first key informant was one of the co-founders of NAOMI Patients Association. The researcher had met her through the VANDU. The second key informant was a volunteer at WND in the DTES, where the researcher also volunteered for two

years. To protect the confidentiality of participants, this research only reported the demographic characteristics of the participants in a quantitative manner (see Table 4.1).

Table 4-1. Characteristics of the sample of SALOME in Vancouver who participated in the qualitative interviews.

N=16	n	%
Age		
20-30	1	6.25
31-40	1	6.25
41-50	9	56.25
51-61	5	31.25
Gender		
Male	9	56.25
Female	7	43.75
Ethnicity		
Caucasian	12	75.0
First Nation	4	25.0
Sexual Orientation		
Heterosexual	15	93.75
Homosexual	1	6.25
Number of injection per day (X)		
X=0 (oral)	5	31.25
2<x≤3	9	56.25
x>3	2	12.5
Years of injection (Y)		
Y≤10	2	12.5
10<Y≤20	4	25.0
Y>20	10	62.5
Medical Condition		
Nil	3	18.75
Hepatitis B	1	6.25
HCV	10	62.5
Mental illness	1	6.25
Mental illness and HCV	1	6.25
Dosage per day in mL (μ)		

N=16	n	%
10< μ ≤20	1	6.25
20< μ ≤200	2	12.5
20< μ ≤500	5	31.25
500< μ ≤1000	8	50.0
High school Education		
Yes	6	37.5
No	10	62.5
Sex trade in the last 6 months		
Yes	1	6.25
No	15	93.75
Money/drugs for sex in the last 6 months		
Yes	3	18.75
No	13	81.25
Relationship Status		
Single/divorced	14	87.5
Married/common Law	2	12.5
Months in the program (α)		
0< α ≤2	2	12.5
2< α ≤6	3	18.75
α >6	11	68.75
Principal Dwelling place		
Private residence or other's house	15	93.75
Street/shelter	1	6.25
Criminal Record		
Yes	15	100.0
No	0	0.0
Unemployed		
Yes	15	93.75
No	1	6.25
Years of residing in the DTES (Z)		
2≤Z≤15	11	68.75
15<Z≤25	4	25.0
Z>25	1	6.25

Participants were told by key informants that the interviewer was a student. None of those who were invited to participate refused. In fact, the referral by the key informants allowed the participants to feel comfortable and open up more easily about their experiences. Sixteen purposefully chosen PWIDs were found to be eligible for this study. When the interview took place, 6 participants had been in the program for more than 6 months, 3 participants had been in the program for 4 months and the remainder of the participants were recruited into the program 2 months ago.

4.2.2. Procedure

Open-ended, semi-structured interviews were conducted through the use of an interview guide. Using Dragon Naturally Speaking software, all the transcripts were transcribed verbatim. Apart from a few key questions, participants were encouraged to discuss the issues as they saw fit. Each interview took on a story of its own. All participants indicated genuine interest in the interview by using individual examples, and had unique stories to shape the direction of the interview. As suggested by Berg (2009), deviations were explored in all the interviews, since topics arose from natural conversation.

A digital voice recorder (Olympus WS-700M) and a small notebook were used to allow the researcher to jot down key words or phrases during the interview. This strategy allowed the researcher to pay attention to the participants and take occasional notes to retain the flow of the interview. Also, the researcher took time to record field notes after each interview, including impressions of the interview, questions to ask in future interviews, and interesting themes to consider during the analysis. This strategy allowed for the recording of rich details about each interview.

4.2.3. Data Analysis

After reviewing the qualitative data (such as notes and transcripts), NVivo 10 software was used for thematic analysis. Before importing the data in NVivo 10, interviews were listened to several times. By relying on NVivo 10, themes were coded as nodes. The first stage involved in this process was open coding. During this stage

through deductive and general observation using a word frequency query, “free” nodes were created which resulted in more specific categories. Free nodes were created after key words—identified during the word frequency query—were searched in the transcript. The researcher grouped information into smaller sections at this stage, and then provided a descriptive name for each.

For example, 19 free nodes were identified, and labelled as the following: (1) Relationships, (2) Negative effects, (3) Beginning; (4) Oral; (5) Health; (6) Methadone; (7) NAOMI/SALOME history; (8) Changes in behaviour; (9) Dosage; (10) Overdose; (11) Services; (12) Transition; (13) Normal life; (14) Life prior to HAT; (15) Change; (16) Activism; (17) Crime and (18) Frustration.

Through an inductive search, a “tree” node was created for general themes, in which the sections were grouped into common categories. This process was performed iteratively until all interview transcripts had been accounted for, and all new or developing themes had reached a saturation point. In order to avoid overrepresentation of themes, the most dominant themes were identified through the organization and analysis of the data.

In addition, the coding was conducted via colour highlighters. Analyzing the data via highlighters was a rather natural process and resembled “the spiralling research approach” (Berg, 2009, p.26). For example, as I was transcribing the interviews and later analyzing them via highlighters, it did not take long to realize possible themes that were emerging and what these themes may mean in terms of the existing literature. Further, during the writing process I was still engaged in the process of coding, and analysis, as I was thinking of new themes, reframing themes, and re-visiting the tapes and transcripts for elaboration or conformation.

4.3. Findings

In order to illustrate the central themes that emerged in the cross-case analysis, excerpts from the qualitative interviews are presented below. Dominant themes included the following: Activism, health, social tenure, and crime. Although the systematic

analysis with NVivo 10 software confirmed a broad overlap across thematic areas among study participants, data were analyzed from each participant independently.

4.3.1. Activism

The SALOME project could not be comprehended without considering the NAOMI project's influence on many participants after the program ended. Although participants praise the NAOMI project for their efforts to provide heroin prescription in the DTES, they also remain critical of the program for its lack of exit strategy. For example, according to Lila:

Once NAOMI study ended I was devastated ... The ethics behind what they did is wrong ... out of the 97 of us that were on the needle side 13 people died ... that's like 15% of people died because they couldn't cope with a life outside anymore ... people were just devastated they could not cope with the hustling again with selling their bodies or committing crime. After NAOMI ended a lot of girls turned into the street to support their habit. And so many guys started the hustling again and turned into the life of crime.

According to Boyd and NAOMI Patients Association (2013), the NAOMI project's conclusion was questionable on many issues, including its failure to provide a permanent program, the absence of an exit strategy, and lack of informed consent. Boyd and NAOMI Patients Association (2013) also point to the Helsinki Declaration on international ethical standards where "at the conclusion of a study, every patient ... should be assured access to the best ... methods identified by the study" (p. 7). According to Lila, the failure of the NAOMI project to ensure an exit strategy and the approval of a similar study to be conducted in the DTES, ignited the creation of an advocacy group called the NAOMI patients association (NPA):

The people who were on NAOMI decided to form a group and we started talking and we heard SALOME was coming in place and we were not going to stop and let them do the same thing that they did to us. This time it's going to be 360 people who were going to be on this program. And that's why we found the NPA. We decided to recruit people who were known to us and bring them to the meetings at VANDU. They wanted to make sure that SALOME gets the proper procedure and so that they're not going to screw us all over again. We learned over the years that peer groups work.

Currently, members of NPA have weekly meetings at the VANDU, where they discuss the issues facing the participants at SALOME (Boyd & NAOMI Patients Association, 2013). To achieve their goals, members of NPA have been politically active their community. As Lila describes:

And as part of [NPA] we went to rallies ... we went to Providence Health, we went to the Vancouver Coastal Health meetings so they could hear our voice: not just academics, but also people like us, junkies on the street that are affected by these programs every day. And it worked, they listened to us. At first it was only 4 to 5 of us. But within six months we were able to get hold of 40 people who were part of the project. The group got bigger by that time. ... We have gone through different conferences talking about our cause.

Some members of NPA are not only dedicated to and focused on supporting their members, but they are also involved in advocacy work and political empowerment in the DTES. The NPA, according to Boyd and NAOMI Patients Association (2013), is also involved in education of its members and the general public. Therefore, after advocating for their rights since January 2011, NPA has recently been successful in forcing the government to extend the program for those who will remain on the oral use of hydromorphone through court challenges.

4.3.2. Increased Health

All 16 participants indicated that their health and wellbeing has improved drastically since enrolling in SALOME. Many of the participants have been able to improve their nutrition, reduce their stress, and risky behaviour such as sex work. For some of the participants such as Monique, SALOME has even allowed her to look for a job:

Life is less stressful, I don't have to worry about my next fix I don't have to worry about getting sick. It has enabled me to do other things like look for a job or volunteer work in the Downtown Eastside. Before I had to go get ready to go to work every night on the Street and I don't have to do that anymore.

Miller et al's (2004) study also demonstrated that a medical heroin prescription program has the potential to moderately increase employment rates for these DTES

residents. For some of the participants such as Joe, the program has helped them to recover from long term illness and struggle with addiction:

My health was really bad ... I was always in pain and constantly in and out of hospital. And when you're down and shit like that and you're sick and in pain all the time, it's a shitty way to live your life. This was the God work for me to get on the program. Don't necessarily get high on the program but get well, to manage my pain now way better than before. Now I have a lot more energy before I was sick all the time. All of a sudden I have that energy, I have the drive, I have that motivation.

Previous studies have also demonstrated that heroin prescription programs are able to reduce hospital stay times and the number of emergency room visits (Miller et al., 2004; van den Brink et al., 2003). The study by Nosyk et al. (2010) also showed that the motivational status of patients was instrumental in creating a more favourable response to treatment. Many of the participants indicated that because of SALOME, they have been able to change their life around and reduce daily stress. This is particularly important for participants such as Nicole who suffered from a mental illness:

SALOME gave my dignity back. Didn't make me feel like ... I was a loser ... Now I have a better relationship with my adult children. All of a sudden when you realize you're an addict and you hide it, and you finally get the chance to tell somebody. And this is what SALOME has done for me. And they allowed me and encouraged me to tell my story. It's hard to get used to it at first that your opinion counts. Give me a chance to do something about my life and finally change my life for the better. I do think if it wasn't for SALOME at this point in my life I would be very depressed. I used to suffer from depression.

According to Small and Drucker (2006), prescription heroin programs reach a refractory group of addicts who, through their interaction with staff and doctors in the clinics, are able to improve their health status. Furthermore, as stated above, heroin prescription trials enable and empower their clients to contact their families (Small & Drucker, 2006).

4.3.3. Social Tenure

For all participants, the relationships they have been able to established with the social workers, nurses, and doctors at SALOME have enabled them to move beyond

their addiction needs. One participants, Arthur, received much needed help for his HCV condition:

They helped me to get full dietary for my Hep C. With the help of SALOME I had a lot of dental work done ... And they helped me ... to get my life get on track. SALOME helps me in regards to my use, and addiction. I was fixing about eight points a day where today I only fix one point a day. I feel like that I accomplished so much since I've been on this program. They are decreasing my dose right now where I'm hoping by the end of it, I will be able to go on detox and quit using drugs.

Previous research (Miller et al., 2004) supports this study's findings that heroin prescription programs lead to reduce drug use. Furthermore, European studies, including ones from Switzerland, Germany, Spain, and the Netherlands, have shown that opiate addicts prescribed heroin under supervision have successfully reduced their drug use (Gartry et al., 2009). Many of the participants indicate that their life has been transformed for the better due to the kind relationships the staff has fostered with their clients. For instance, according to Ashley:

SALOME people help us to get housing, we got evicted from our place where we lived and they went to arbitration with us. They did our taxes. They even came to the Ministry so I could see my son. And if I go on two different appointments they stay with me and calm me down because I have an anxiety disorder and talked with me because of my anxiety problem ... And I come from a very disadvantaged family, where there was a lot of incest in my family, and the person that I felt comfortable talking about my experience was at SALOME with the counselors and the doctor there and they were very supportive of me.

Oviedo-Joekes et al.'s (2008) study also suggests that the NAOMI cohort comprised a higher proportion of marginalized populations, such as those residing in unstable housing. The relationship building efforts of the staff could be one of the influential factors contributing to the improved social functioning of participants. Additionally, nurses at the facility have been successful in reducing the possibility of drug overdose death with participants at the facility. For example, according to Monica:

I was Narcaned for the first time at SALOME, and if I wasn't at SALOME, I'd be dead because I usually fix alone ... Also my ex-husband overdosed numerous times and they saved his life too ... They also gave me training to use Narcan. The pharmacist at SALOME actually gave us a speech

and told us how to use it. People drop in the Downtown Eastside, people pretend that they're helping them, but they are robbing them instead.

Injecting outside of SALOME carries association of fear, overdose, and death, which reinforce the security and safety that participants have come to associate with the facility. In fact, all the participants who have used SALOME have seen an overdose or have experienced an overdose at SALOME, and all of them agree that the quick responses of nurses to an overdose situation has reduced the possibility of overdose deaths. Furthermore, the relationship between patients, nurses, social workers and doctors at the facility has facilitated harm reduction education.

4.3.4. Diminished Criminality

The most common theme across the analysis was related to illicit behaviour of participants prior to enrolling into SALOME program. As shown in Table 1, all the participants had some sort of reported criminal record. For female participants, such activities usually involved sex work and drug dealing. For male participants, they usually involved breaking-and-entering, shoplifting, drug dealing and robbery. According to Michael, criminal activity prior to SALOME is tied to the vicious cycle of addiction or as he puts it, 'the dope sickness' :

My main concern every day, all day was making sure I was going to be able to get some kind of opiates right ... So I was constantly looking to make the money for my dope, and it just consumes you. Doesn't matter about anything else, the only biggest concern is to get the money so you wouldn't get dope sick. My life was a fucking mess because the only thing I cared about was dope sickness. It was all about getting that money. It wouldn't matter, I would stay awake for days so I would be able to get the money. As soon as you pass that point that you're sick, then you're scored ... Sometimes it's friends; other times, desperation kicks in. And when you're desperate, anything goes.

The Vancouver Board of Trade estimated in 2005 that property crime was costing the city's taxpayers \$125 million annually (Park, 2009). The majority of property crimes, according to the Vancouver Police Department, are committed by addicts who can require \$100 or more daily for purchasing drugs (O'Connor, 2009). The DTES of Vancouver is the crime's 'ground zero' where in 2008 the area accounted for 16 percent

of sexual assaults, 22 percent of robberies, and 34.5 percent of serious assaults (O'Connor, 2009). However, SALOME altered the criminogenic behaviour of participants such as Rob:

I used to do a lot of debt collection for a lot of dealers down here -- that was my job before SALOME. But now my job is freelance reporter in the Downtown Eastside community. I was a very violent person but now I have taken a different route and I have been able to manage my anger and work through my problems. So SALOME has allowed me to take a step back and say to myself: "There is something that needs to be done". And that's how I've been able to change my life, because SALOME has provided the stability and security where I don't have to hustle, hurt people and break into the cars to support my habit.

According to DeBeck et al.'s (2007) research, the costs associated with illicit drugs are "compelling PWIDs, specifically those possessing markers of higher intensity addiction, to engage in prohibited income generating activities" (p. 50). However, as suggested by Rob above, once participants are enrolled in the SALOME program, they no longer feel the urge to commit criminal activity to support their habit. Some of the participants, such as Jack, have been able to not only reduce their illicit behaviour, but turn their lives around:

I am not as aggressive as before because of SALOME. My personality is much more bearing. I don't get hyper. I don't have to get up early to go hustle. I am more calm and reserved. And because I don't have to be rushed to make that extra buck, it gives you hope that people are not treating you as a disease and a piece of shit ... I didn't even like myself before the SALOME. But now I can look into a mirror and see a totally changed person. I like myself now. Talking to doctors and social workers at Salomé had affected me the most because they are not only giving you the drug, they also talk to you, they treat you like a human being ... They help you with better housing ...[and] how to get healthy, and they are there for you if you just want to talk to someone.

Miller et al. (2004) estimate that medically prescribed heroin programs have the potential to decrease criminal activity, hospital, and emergency costs by \$9,650, a 63% reduction. Also according to Dr. Schechter, while the SALOME program may cost each addict \$7,500, this is a bargain compared to the estimated \$50,000 each untreated addict costs the health care system (Skelton, 2008).

4.4. Discussion and Conclusions

This chapter set out to investigate whether SALOME was successful in improving the lives of its participants. Specifically, this chapter was interested to account for (1) experience prior to the SALOME trial; (2) injection behaviour of clients before enrolling in the programs; (3) injection behaviour post enrollment into SALOME; (4) health status before and after the enrollment; (5) activism in the community; and (6) an open discussion regarding how the program was successful. The findings revealed a reported positive change in many respects: SALOME reduces criminal activity, sex work, and illicit drug use. In addition, SALOME has improved the health, and social functioning of its clients, with some participants acquiring work or volunteer positions. Many of the participants have re-connected with their family members, an unlikely feat before SALOME.

Furthermore, the relationship between the staff and patients at SALOME has helped to transform the behaviour of participants. The staff has been able to establish trust amongst the participants that has ultimately helped participants get much needed medical help for their undiagnosed medical conditions such as mental illness or endocarditis. The close bond and the relationship that exists between the staff and patients at SALOME has increased nursing, counselling care, and harm reduction education. The social workers at SALOME have also been able to improve the housing and financial situations of participants through social housing and income assistance. The findings of this study also suggest that in order for the benefits to continue, the program needs to become permanent, in order to avoid the same consequences as the NAOMI project.

The most prominent finding of this study has been the identification of social activism by PWIDs who have attended the randomized trials. According to Capitanio and Herek (1999), drug users have received particularly harsh condemnation over the past century through labelling; PWIDs, and drug users in general, are viewed as “dregs of society who steal to support their habit and pollute mainstream society with their chaotic behavior and drug related illness” (Hippel & Brener, 2012, p. 1030). Further, Harris and Fiske (2006) claim that PWIDs are often dehumanized by others in society. These

repressive measures and labelling of drug users can be understood through social constructionism. From a social constructionist perspective, meaning is assigned to an act or a behavior through a process of labeling by groups who seek to elicit a particular response. That is, something is defined as a social problem not based on the inherent nature of the behavior, but based on social responses to the behavior often instigated by the claim making of a particular group.

According to Derlega and Barbee (1999), once PWIDs and drug users have been judged as socially illegitimate, they are excluded or ignored altogether. However, members of SALOME trials have been able to move beyond the demonizing rhetoric they endured as a consequence of war on drugs. They have not only been able to change the dynamic of power relation that manifests in disproportionate suffering, but they have been able to reduce the misery that many PWIDs experienced after the NAOMI project ended. Now they have a political voice through the NPA where they are able to discuss their weekly encounters with nurses, doctors and social workers and raise their collective voice if they see any unfairness.

During their weekly meetings they are able to educate themselves and others about the benefits of HATs. They have been able to raise awareness about their cause through public demonstrations, writing poems and inviting media to their meetings, Despite the challenges in the future, their collective identity will help them to push the boundaries and continuously strive to represent the concerns of SALOME patients. For example, with the help of the NPA and the Pivot Legal Society, some of the PWIDs have filed a lawsuit against the Canadian federal government's decision to stop doctors prescribing heroin to patients who have transitioned into oral diacetylmorphine (Woo, 2013).

Despite the noted findings above, the current study has several limitations that should be acknowledged. First while this study reports many commentaries related to experiences, perspectives, and values of participants at SALOME, due to access and the time spent in the field, triangulation was limited. For example, the researcher would have preferred to supplement many of the interviews with more observations, especially regarding to interactions between the participants and staff within the SALOME location.

Second, although purposive sampling has shown to be instrumental, additional participants would ultimately be required. Consequently, all the participants referred to the researcher had similar viewpoints regarding the role of SALOME. Finally, despite this study's attempts to reduce the social desirability effect—by reminding the participants that there are no right or wrong answers and avoiding leading questions—its influence on participants was unavoidable. Consequently, some positive responses in regard to SALOME can be attributed to the social desirability effect. Moreover, the way the interviewer asked the questions, directed the conversation, closed the conversation, determined what constituted a correct or complete answer, and paid the participants, may have influenced participants' responses (Jozaghi, 2012a). In addition, many of the participants were recruited from a clinical trial where considerable resources are put in and “enthusiasm” factor may well have influenced the positive treatment outcome. Some studies has gone as far as suggesting that up to 14% of difference between responses can be attributed to enthusiasm and social desirability effect (Heerwing & McCabe, 2009).

In summary, the current study was meant to generate discussion around the controversial SALOME experiment in Vancouver which is still ongoing. The current study demonstrated some societal, health, and criminal justice benefits that have derived from the SALOME experiment. Furthermore, the present study provided a snapshot of benefits for those participants who not only have engaged in long term illicit drug use, but also have not benefited from effective methadone therapy. However, the most significant finding of this study lies in the activism of PWIDs, who have organized themselves to advocate for their rights. Despite the challenges in the future, their collective identity will help them to push the boundaries and continuously strive to represent the concerns of SALOME patients. It is my hope that continuing qualitative research will provide some of the critical information needed for government and health policy makers to make informed decisions, thereby reducing the harms and costs of opiate addiction in our society.

Chapter 5.

Is There a Role for Potential Supervised Injection Facilities Outside of the Downtown Eastside in British Columbia, Canada?

5.1. Introduction

North America's first and only SIF known as Insite is a harm reduction program in the DTES. The operation of the facility has been the subject of more than 50 peer-reviewed studies. Generally speaking, the results of these studies have been overwhelmingly positive. In fact, North America's first SIF is successful in preventing and reducing overdose deaths in and around the facility (Marshall et al., 2011). Moreover, Insite in Vancouver has shown success in reducing needle sharing, improving service uptake, and improving public order within the DTES (DeBeck et al., 2011; Kerr, Tyndall, Li, Montaner & Wood, 2005; Wood, Tyndall, Montaner, & Kerr, 2006). Additionally, Insite has shown to be economically viable by saving taxpayers money through the prevention of HIV, HCV and overdose deaths (Andresen & Boyd, 2010; Bayoumi and Zaric, 2008; Pinkerton 2010; Pinkerton, 2011). However, according to a new study by Jozaghi and Andresen (2013), injection drug use is prevalent in all major cities and SIF's like Insite need to be expanded across the country in order to reduce needle sharing, overdose deaths and hospital emergency care.

These problems are of particular concern in municipalities where PWIDs populations are significantly large or complex (e.g., high rates of needle sharing, lending or borrowing prevalent within the PWIDs). Although there is research regarding the cost-effectiveness and cost-efficiency of SIFs in Canada showing potential savings in public health expenditures (Bayoumi & Strike, 2012; Jozaghi, Reid & Andresen, 2013; Jozaghi et al., 2014), each Canadian city is unique with a different drug culture and,

consequently, requiring its own assessment. This issue is of critical importance because the Canadian federal government has recently established a new legislation, *Bill C-65* (now *Bill C-2: the Respect for Communities Act*, requiring the economic viabilities of SIFs (Galloway, 2012). This legislation seems to contradict obvious ethical duties to protect life and prevent death (Hyshka, Bubela, & Wild, 2006; Jozaghi, 2015). But there is more to policy implementation than legislation.

Harm reduction, as a drug policy to move illicit drug use from the criminalization arena to the public health arena, is a process that changes from place to place. More specifically, because of different social, political, and drug cultures, any harm reduction policy is necessarily a geographical process (McCann, 2013; McCann and Temenos, in press; Robinson, 2011; Ward, 2006). As such, from a geographical perspective, local policy mobility becomes critical in understanding if and when a “global” harm reduction policy can be applied “locally”. The urban policy mobility literature has shown that policy mobility is governed through various spatial scales, communities, and institutions that impact policy implementation (McCann, 2008, 2011; Peck, 2011; Temenos and McCann, 2012). It is because of all this that investigations into local conditions need to be undertaken in order to better understand how harm reduction policies may be applied in different places.

In Montreal, Quebec for example, the PWID population has been estimated at between 4,300 and 12,500 individuals (Archibald et al., 2001). This elevated PWIDs population translates into increased infection rates. In fact, HIV and HCV prevalence rates for PWIDs in Montreal have been estimated to be as high as 18 percent and 68 percent, respectively (Roy et al., 2012).. Despite having various harm reduction strategies implemented in the greater Montreal area (such as 11 needle depots, 11 community support centres/drop in centres, PWIDs continue to share their injection drug equipment (De et al., 2009; Morissette et al., 2007). Recent data from Montreal indicates rising incidents of HIV and HCV among PWIDs from 2004 to 2006 (Bruneau et al., 2008; Jozaghi, 2012b). Recognizing these growing concerns, the Quebec government has shown interest in adopting further strategies to reduce the spread of infectious diseases in its PWIDs population. Buoyed by this most recent Supreme Court of Canada ruling, and in order to reduce the public health and fiscal impacts of injection drug use, the

Quebec government has shown interest in opening SIFs in Montreal (Andresen, & Jozaghi, 2012). According to Quebec's Health and Social Services Minister, Yves Bolduc, SIFs "will offer services that will monitor the health of drug addicts and encourage them to seek detoxification and rehabilitation" (Jozaghi, 2012b). Health officials in the City of Montreal have already proposed three SIFs plus a mobile SIF that will attempt to reach the PWIDs population (Jozaghi, 2012b).

Similar to Montreal, Ottawa is also facing a growing HIV and HCV epidemics contributed to its PWID population. A report published in 2004 citing personal communication with Professor Robert Remis, stated that the PWID population in Ottawa, Ontario comprised between 3,000 and 5,000 individuals (Millson, Leonard, Remis, Strike, & Challacombe, 2004). Ottawa's PWID population currently has some of the highest rates of new HIV and HCV infections (Bayoumi, & Strike, 2012). Studies have estimated HIV prevalence ranging from 11% to 21% and HCV prevalence between 55% and 76% (Bayoumi & Strike, 2012; Leonard, DeRubeis, & Strike, 2008). These rates are both higher than those found in Toronto, which is Canada's largest city with a population of over 6 million persons residing in the Greater Toronto Area (Bayoumi & Strike, 2012). Leonard et al. found that among Ottawa PWIDs, 37% of women and 31% of men said they injected with used needles in the six months preceding their interview with the researchers (Leonard, DeRubeis, & Strike, 2008). More troubling is the fact that the rates of infection and unsafe injection practices are so high despite the widespread use of NEPs and other harm reduction strategies.

Given this data, it can be argued that new strategies should be considered to help reduce these rates and prevent new infections from occurring in PWID population in Ottawa. In effect, the Sandy Hill Community Health Centre and partners in Ottawa planned to submit an exemption application for many years but it has been delayed because both Mayor Jim Watson and police Chief Charles Bordeleau have opposed the idea. Dr. Mark Tyndall, chief of infectious diseases at the Ottawa Hospital, told an audience at a recent rally at the Canadian Parliament hill that "a site would send a message of care to addicts and reduce harm. Tyndall said many drug users in Ottawa are not accessing existing services, and says a site would connect them" (Mills, 2014, p. 1). Moreover, a group of community members that advocate for the opening of safer

consumption sites in Ottawa for PWID has been formed and they opine that “the most effective response to problematic drug use includes harm reduction, expanded social and health care services, preventative measures to address communicable diseases, and evidence-based drug policies” (CSCS Ottawa, p.1).

Interestingly, Canada’s largest urban metropolis, Toronto, has not been found to have indicators of problematic injection drug use that greatly exceed other large city centres. In fact,

[t]here is research evidence of significant declines in sharing of both needles and other injection equipment in Toronto since the early 1990’s. Toronto has also experienced a stable prevalence of HIV infection, indicating that although new HIV infections occurred, they have not outpaced the numbers of deaths and dropouts from injecting. (Millson et al., 2004, p. 11).

Researchers have suggested that this pattern may be attributable to differences in needle exchange policies. A comparison of needle exchange policies between Toronto and Ottawa, for example, found that

the lower HIV and HCV prevalence in Toronto may be linked to early initiation of services, including outreach and peer workers, relatively decentralized services, and especially with relatively liberal exchange policies (not requiring 1:1 exchange, no limits on numbers of needles exchanged) and distribution of other injection materials (sterile water, filters, cookers). (Millson et al., 2004, p. 11-12).

Despite these relatively improved conditions, and lower prevalence of HIV and HCV, a team of University of Toronto researchers conducted a study that concluded the operation of three SIFs in Toronto would prevent the spread of HCV and HIV, save money, and further reduce sharing of needles within the PWID population (Moses, 2000). Similar to Bayoumi and Zaric (2008), the Bayoumi and Strike’s (2012) study employed a complex dynamic compartmental simulation model that accounted for a wide range of variables. While the model proposed by Bayoumi and Strike (2012) was comprehensive in terms of its design and specification, it is argued here that the inclusion of variables such as smoking related drug use, is not directly related to the intended purpose of a SIF and thus, make it difficult to tease out the effect of proposed SIFs. In addition, a static model with fewer variables can be more compelling (and

potentially accurate) to policy makers who must understand the “science” behind empirical research.

However, the contraction and spread of HIV via PWID is not a problem exclusive to large cities and municipalities as small and medium sized towns have reported an increase in HIV infection rates (Jozaghi & Andresen, 2013). Incidences of HIV increase is particularly salient in Saskatoon, Saskatchewan, Canada, where the number of HIV test reports is rapidly on the rise (Lemstra, Rogers, Thompson, Moraros, & Buckingham, 2012; Lemstra, Rogers, Thompson, Moraros, & Buckingham, 2011). City of Saskatoon population is estimated to be around 224,300 (Lang et al., 2013). In Saskatoon, HIV reports were more than three times that of the national average. The annual incidence report for Saskatoon was 31.3 per 100,000 persons in comparison to the national average of 9.3 per 100,000 persons (Lemstra et al., 2012; Lemstra et al., 2011). Additionally, the majority of Saskatoon’s HIV reports were attributed to PWIDs (76.9%), while the nation’s average of PWIDs contribution to HIV was 18.9 percent (Lemstra et al., 2011). Despite the success of needle exchange programs in Saskatoon, recent data indicates a high incidence of HIV trend among PWIDs (Laurence Thompson Strategic Consulting, 2008). This is particularly true among the Aboriginal population in Saskatoon, where despite representing only 9.2% of the overall population, 76.3% of HIV positive test were attributed to this group (Lemstra et al., 2012).

Similar to Saskatoon, another small municipality, Victoria, British Columbia, the PWID population has been estimated at between 1,500 and 2,000 individuals (Stajduhar et al., 2004), a sizable portion of the total Victoria population, 2.5%. Moreover, PWIDs in Victoria have very high rates of infection and prevalence of HIV and HCV: the rates of HIV and HCV have been estimated to be as high as 21% and 63% respectively (Ivsins et al., 2012; Stajduhar et al., 2004). Despite long established harm reduction strategies such as needle exchange programs in the Greater Victoria area, PWIDs are still at risk of drug overdose death and many continue to share their needles. Data from Victoria in 2008 – 2009 indicates increasing incidents of needle sharing among PWIDs from 10% to 23% (Ivsins et al. 2010)—in fact, all of the increase in needle sharing occurred during the 2009 waves of the research.

As a result, the current chapter conducts a cost-benefit and cost-effectiveness analysis of potential SIFs in Montreal, Ottawa, Toronto, Saskatoon, and Victoria. This chapter predicts the number of HIV and HCV reduction as a result of establishing SIFs in all the noted municipalities except Saskatoon where the analysis only focused on HIV cases. Moreover, the overdose prevented cases will be predicted if a SIF is established in Victoria. The dollar costs of illnesses avoided and lives saved are compared to the operational cost of a SIF in the noted Canadian municipalities. Furthermore, based on the cost savings of prevented cases of infection diseases and overdose deaths (in Victoria only), the analysis examines the possibility of additional SIFs' cost-effectiveness in each municipality.

5.2. Literature Review

Much research – albeit mathematical and not scientific for obvious ethical harm reduction reasons – has been conducted to demonstrate the economic benefits of SIFs. While mathematical models are limited, they are realistic when comparing different and marginalized populations. In order to discuss the economic benefits, agreed upon costs must be discussed. Bayoumi and Zaric (2008) estimate that a new HIV infection costs CDN \$210, 555. An SIF such as Insite in Vancouver, has an annual operation cost of approximately CDN \$1.53 million a year (Bayoumi & Zaric, 2008). This conservative cost estimate includes salaries for staff, equipment costs such as syringes, sterile water bottles, alcohol swabs and latex condoms, the cost of syringe disposal and property costs (Bayoumi & Zaric, 2008).

Economic analysis of Insite was first conducted by Bayoumi and Zaric (2008) using a complex dynamic compartmental simulation model to predict new cases of HIV and HCV. They claimed the service offered a savings of over \$25 million annually. With Insite annual operation costs around \$1.5 million this finding provided a cost-benefit ratio of 16.84. However, about 140 PWID-related HIV cases were reported in all of British Columbia in the five years before Insite opened (BC Centre for Disease Control, 2005, 2009). As such, their findings would claim to prevent over 80% of HIV cases related to PWIDs for BC. Recall that only a small portion of injection drug use in the DTES occurs in Insite and thus their findings are too good to be true. Des Jarlais et al. (2008)

responded to Bayoumi and Zaric's (2008) findings by performing a simple model utilizing the new HIV infection and Insite cost structures. However, their estimates of Insite's annual prevention of new HIV infections were much more conservative – between 20 and 30. Accordingly, they offer a cost-benefit ratio of 2.81 to 4.21.

Subsequently, using four types of mathematical modelling to estimate the number of prevented HIV infections and related deaths, Andresen and Boyd (2010) conducted an analysis of Insite for cost-benefit and cost-effectiveness. Mathematical models are used to analyze change before and after the introduction of a new policy using public statistics. Depending on the model, they demonstrate that annually 35 new cases of HIV are avoided on average (models ranged from 19 to 57). Their cost-benefit ratio demonstrated an average of 3.56 (models ranged from 1.94 to 5.8).

Alternatively, Pinkerton using Kaplan's needle circulation theory (Kaplan & O'Keefe, 1993) found a cost benefit ratio of 0.37 and 0.8 (Pinkerton, 2010; 2011). However these studies fail to include changes in PWID's needle sharing behaviour, which other research has shown to be lower among Insite users compared to non-Insite users (Kerr et al. 2003). Much evidence demonstrates the continued validity of Insite. However, further researcher has been done to measure the effectiveness of expanding Insite to other locations.

Mathematical modeling research on the expansion of SIFs across Vancouver demonstrated up to five additional SIFs would be useful as long as they were tailored to geographical need (Andresen & Jozaghi, 2012). However, expanding the hours of the current Insite location to 24 from 18 only demonstrated modest benefits. Further models were conducted to address the usefulness of introducing SIFs into Montreal, Quebec, Canada (Jozaghi, Reid, & Andresen, 2013). Findings indicate each SIF would contribute a cost savings of CDN \$686,000 for new HIV infections and \$800,000 for HCV infections per annum. This expectation was only valid for a maximum of three SIFs (Jozaghi, Reid, & Andresen, 2013). A study using similar methods was also conducted for Ottawa, Ontario, Canada (Jozaghi et al. 2014). They found justification for the introduction of two new SIFs. However, cost effectiveness was apparently only when considering the

combined prevention effects on both HIV and HCV new infections. See table 5.1 for list of costing studies conducted on SIFs.

Table 5-1. Summary of costing studies conducted on SIFs

Study	Cost-effectiveness model	Variables included	Findings
The cost-effectiveness of Vancouver's SIF (Bayoumi, & Zaric, 2008).	Dynamic compartmental model; 10-year time horizon	<ul style="list-style-type: none"> ▪ PWIDs, non-users, persons with HIV and HCV, those with combinations of these states 	<ul style="list-style-type: none"> ▪ Over 10-year time horizon, the introduction of a SIF in Vancouver would prevent 1191 cases of HIV and 54 cases of HCV
		<ul style="list-style-type: none"> ▪ Sexual transmission, transmission through needle sharing 	<ul style="list-style-type: none"> ▪ Negative net cost of SIF
		<ul style="list-style-type: none"> ▪ Population, population shifts 	<ul style="list-style-type: none"> ▪ Vancouver SIF would save money and increase life expectancy
		<ul style="list-style-type: none"> ▪ Annual costs 	
A cost-benefit and cost-effectiveness analysis of Vancouver's SIF (Andresen, & Boyd 2010).	Mathematical modelling	<ul style="list-style-type: none"> ▪ Number of PWIDs in population, number of sharing partners, participation rate at Insite 	<ul style="list-style-type: none"> ▪ Insite has a positive impact on the health outcomes of PWID population
		<ul style="list-style-type: none"> ▪ Number of needles used per client-year, number of needles in circulation, percentage of HIV infected needles, percentage of needles not cleaned 	<ul style="list-style-type: none"> ▪ Vancouver SIF prevents 35 new cases of HIV and almost 3 deaths annually.
		<ul style="list-style-type: none"> ▪ Number and rate of shared injections per year 	<ul style="list-style-type: none"> ▪ Provides societal benefit in excess of \$6 million per year after programme costs are taken into account
		<ul style="list-style-type: none"> ▪ Probability of HIV infection from a single injection, cumulative probability of HIV infection, HIV prevalence rate 	<ul style="list-style-type: none"> ▪ Average benefit-cost ratio of 5.12:1
		<ul style="list-style-type: none"> ▪ Reduction of risk from participation 	

Study	Cost-effectiveness model	Variables included	Findings
<p>Is Vancouver Canada's supervised injection facility cost-saving? (Pinkerton, 2010)</p>	<p>Mathematical modelling 1-year time frame</p>	<ul style="list-style-type: none"> ▪ PWIDs living in Vancouver 	<ul style="list-style-type: none"> ▪ If Insite were closed, HIV infections among Vancouver PWID would increase from 179.3 (1.6% annual incidence) to 262.8 (2.3% incidence)
		<ul style="list-style-type: none"> ▪ Prevalence of HIV infection (%), annual incidence of HIV infection (%) 	<ul style="list-style-type: none"> ▪ This represents a difference of 83.5 infections per year
		<ul style="list-style-type: none"> ▪ Injections per PWID, per year, injections with borrowed syringes (%), SIFs, per year 	<ul style="list-style-type: none"> ▪ These preventable infections would be associated with \$17.6 million in life-time HIV-related medical costs
		<ul style="list-style-type: none"> ▪ Syringes distributed in Vancouver, per year, syringes distributed by Insite SEP, syringes distributed by 	<ul style="list-style-type: none"> ▪ The savings in cost exceeds Insite's annual operating costs of approximately \$3 million.
		<ul style="list-style-type: none"> ▪ non-Insite sources ▪ Annual operating cost (Canadian \$) 	<ul style="list-style-type: none"> ▪ Most infections were prevented thanks to Insite's syringe exchange program, which would prevent 80.7 infections
<p>How many HIV infections are prevented by Vancouver Canada's supervised injection facility? (Pinkerton, 2011).</p>	<p>Mathematical modelling</p>	<ul style="list-style-type: none"> ▪ Number of PWIDs 	<ul style="list-style-type: none"> ▪ Vancouver SIF prevents approximately 5–6 infections per year, with a range of 4–8 prevented infections
		<ul style="list-style-type: none"> ▪ HIV prevalence, per injection transmission rate 	<ul style="list-style-type: none"> ▪ Insite SIF reduces HIV incidence among DTES PWID by 6-11%
		<ul style="list-style-type: none"> ▪ Incidence rate without Insite, incidence reduction ▪ Syringes contaminated with HIV, decontamination rate 	

Study	Cost-effectiveness model	Variables included	Findings
		<ul style="list-style-type: none"> ▪ Borrows per PWID per year with Insite, reduction in number of borrows ▪ SIF injections per PWID per year 	
<p>Potential role of safer injection facilities in reducing HIV and HCV infections and overdose mortality in the United States (Semaan, Fleming, Worrell, Stolp, Baack, & Miller 2011).</p>	<p>Six-factor Kass ethical framework for public health programs (goals, effectiveness, concerns, minimization of concerns, fair implementation, and balancing of benefits and concerns)</p>	<ul style="list-style-type: none"> ▪ Public health goals of SIFs and need for SIFs ▪ Effectiveness of SIFs in achieving public health goals ▪ Potential concerns ▪ Minimization of concerns and role of other programs ▪ Fair implementation of important ethical and contextual factors that influence the ethical deliberations and operational aspects of public health programs 	<ul style="list-style-type: none"> ▪ SIFs provide settings and public health interventions that support safer behaviors and aim to prevent and reduce HIV, HBV and HCV infections, infection disparities, overdose mortality, and injection-related bacterial infections ▪ SIFs are cost-saving and cost-effective, prevent accidental needle-stick injuries in community members, and reduce public nuisance and litter ▪ SIFs provide unique and complimentary services to other public health interventions that promise to improve the health of PWIDs and the public order and safety of communities blighted by public injection ▪ SIFs provide sterile injection and drug preparation equipment at time of injection, a safe and medically attended environment, and on-site counseling or referrals to health and social services, including addiction treatment and housing
<p>The point of diminishing returns: an examination of expanding</p>	<p>Mathematical modelling (Jacobs et al. (1999) mathematical model)</p>	<ul style="list-style-type: none"> ▪ Expanding Insite's hours of operation 	<ul style="list-style-type: none"> ▪ Insite operational for 18 hours predicts that 22 new cases of HIV are averted annually

Study	Cost-effectiveness model	Variables included	Findings
Vancouver's Insite (Andresen, Jozaghi, 2012).		▪ Increasing the number of SIFs	▪ Insite is cost-saving. The cost-benefit ratio is 3.09. The number of new HIV infections averted, and the associated cost-savings, are more than enough to cover Insite's annual operating costs
		▪ Proportion of PWIDs HIV-negative	▪ Insite operational for 24 hours does not prevent any new HIV infections
		▪ Number of needles in circulation	▪ Expansions of Insite only prevent 1 or 2 additional new cases of HIV infection
		▪ Rate of needle-sharing	

5.3. Methods

5.3.1. Models

In order to determine the influence of introducing SIFs in Victoria, BC, this chapter will utilize two models. Model one, developed by Jacobs et al. (1999) and applied by subsequent researchers (Andresen & Boyd, 2010; Andresen & Jozaghi, 2012; Jozaghi, Reid, & Andresen, 2013; Jozaghi et al. 2014; Jozaghi, 2014c), is an economic evaluation of need exchange programs. The values for model one and model two are derived from peer-reviewed studies reported on the city of Montreal, Ottawa, Toronto, Saskatoon and Victoria' injection drug use situation (see table 5.2., table 5.3, table 5.4, table 5.5 and table 5.6).

Table 5-2. Sources for variables used in mathematical modelling for city of Montreal

Variable	Value	Source
Proportion of PWIDs HIV- (l)	81.20%	Généreux et al. (2010); Broadhead, Kerr, Grund & Altice (2002)
Rate of Needle sharing (s)	35%	Bruneau et al. (2008); Généreux et al. (2010); De et al. (2009)
Number of needles in circulation (N)	800000	Morissette et al. (2007)
Percentage of needles not cleaned (d)	17.00%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)
Probability of HIV infections from a single injection (t)	0.67%	Kaplan and O'Keefe (1993)
Number of sharing partners (m)	1.38	Jacobs et al. (1999)
Proportion of PWIDs HIV+ (q)	18.80%	Généreux et al. (2010); Broadhead et al. (2002)
Proportion PWIDs HCV- (l)	30.00%	De et al. (2009); Généreux et al. (2010); Broadhead et al. (2002)
Proportion of PWIDs HCV+ (q)	70.00%	De et al. (2009); Généreux et al. (2010); Broadhead et al. (2002)
Probability of HCV infection from single injection(t)	3%	Gore & Bird (1998)

Table 5-3. Sources for variables used in mathematical modeling for city of Ottawa

Variable	Value	Source
Proportion of PWID HIV- (I)	88.00%	Bayoumi & Strike (2012); Pilon et al. (2011)
Proportion of PWID HCV- (I)	39.40%	Bayoumi & Strike (2012); Pilon et al. (2011)
Rate of Needle sharing (s) or (λ)	14%	Bayoumi & Strike (2012)
Number of needles in circulation (N)	837931	City of Ottawa (2013)
Percentage of needles not cleaned (d)	17.00%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)
Probability of HIV infections from a single injection (t) or (α)	0.67%	Kaplan and O'Keefe (1993)
Probability of HCV infections from a single injection (t)	3%	Gore & Bird (1998)
Number of sharing partners (m)	1.38	Jacobs et al. (1999)
Proportion of PWID HIV + (q) or (π)	12.00%	Bayoumi & Strike (2012); Pilon et al. (2011)
Proportion of PWID HCV + (q)	60.60%	Bayoumi & Strike (2012); Pilon et al. (2011)
Proportion of HIV or HCV infected needles (β)	40.50%	Kaplan and O'Keefe (1993)
Probability of needles cleaned (θ)	83%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)

Table 5-4. Sources for variables used in mathematical modeling for city of Toronto

Variable	Value	Source
Proportion of PWIDs HIV- (I)	96.00%	Bayoumi & Strike (2012)
Rate of Needle sharing (s) or (λ)	20%	Bayoumi & Strike (2012)
Number of needles in circulation (N)	800,000	Ontario Harm Reduction Program (2013); Millson et al. (2004)
Percentage of needles not cleaned (d)	17.00%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)
Probability of HIV infections from a single injection (t) or (α)	0.67%	Kaplan and O'Keefe (1993)
Number of sharing partners (m)	1.38	Jacobs et al. (1999)
Proportion of PWIDs HIV+ (q) or (π)	4.00%	Bayoumi & Strike (2012)
Proportion PWIDs HCV- (I)	30.00%	Bayoumi & Strike (2012)
Proportion of PWIDs HCV+ (q)	70.00%	Bayoumi & Strike (2012)
Probability of HCV infection from single injection(t)	3%	Gore & Bird (1998)
Proportion of HIV infected needles (β)	40.50%	Kaplan and O'Keefe (1993)
Probability of needles cleaned (θ)	83%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)

Table 5-5. Sources for Variables Used in Mathematical Modeling for city of Saskatoon

Variable	Value	Source
Proportion of PWIDs HIV- (I)	85.00%	Laurence Thompson Strategic Consulting (2008)
Rate of Needle sharing (s) or (λ)	24%	Laurie & Green (2000)
Number of needles in circulation (N)	1000000	Warren (2010)
Percentage of needles not cleaned (d)	17.00%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)
Probability of HIV infections from a single injection (t) or (α)	0.67%	Kaplan and O'Keefe (1993)
Number of sharing partners (m)	1.38	Jacobs et al. (1999)
Proportion of PWIDs HIV+ (q) or (π)	15.00%	Laurence Thompson Strategic Consulting (2008)
Proportion of HIV infected needles (β)	40.50%	Kaplan and O'Keefe (1993)
Probability of needles cleaned (θ)	83%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)

Table 5-6. Sources for variables used in mathematical modelling for city of Victoria

Variable	Value	Source
Proportion of PWIDs HIV- (I)	79%	Ivsins et al. (2012); VIHA. (2010); Stajduhar et al. (2004)
Rate of Needle sharing (b) or (λ)	23%	Ivsin et al. (2010); Ivsin et al. (2012)
Number of needles in circulation (N)	30,000	Ivsin et al. (2010)
Percentage of needles not cleaned (d)	17.00%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)
Probability of HIV infections from a single injection (t) or (α)	0.67%	Kaplan and O'Keefe (1993)
Number of sharing partners (m)	1.38	Jacobs et al. (1999)
Proportion of PWIDs HIV+ (q)	21%	Ivsins et al. (2012); VIHA. (2010); Stajduhar et al. (2004)
Proportion PWIDs HCV- (I)	36.9%	Ivsins et al. (2012); VIHA. (2010)
Proportion of PWIDs HCV+ (q)	63.1%	Ivsins et al. (2012); VIHA. (2010)
Probability of HCV infection from single injection(t)	3%	Gore & Bird (1998)
Proportion of HIV infected needles (β)	40.50%	Kaplan and O'Keefe (1993)
Probability of needles cleaned (θ)	83%	Kaplan and O'Keefe (1993); Jacobs et al. (1999)

The number of new HIV/HCV infections avoided, (A), is calculated as follows:

$\text{New HIV/HCV infections (A)} = INsd[1 - (1 - qt)^m]$	(1)
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where (q) is the HIV or HCV prevalence in the PWID population, (I) is the PWID population that is HIV or HCV negative, (m) is the number of sharing partners when injections are shared, (N) is the number of needles in circulation, (t) is the probability of HIV or HCV transmission when using an HIV/HCV infected needles, (d) is the percentage of needles not cleaned before use, and (s) is the rates of needle sharing. Model two, developed in 1993 (Kaplan & O’Keefe) and applied in subsequent SIF research in 2010 by Andresen and Boyd, and in 2014 by Jozaghi et al., calculates how many new HIV infections have been avoided (A):

$\text{New HIV infection rate (A)} = (1 - \pi)\lambda(1 - \theta)\beta\alpha$	(2)
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where (π) is the prevalence of HIV infections in the neighborhood, (λ) is the rate of needle sharing, (θ) is the probability that a borrowed syringe is decontaminated, (β) is the percent HIV infected needles, and (α) is the probability of acquiring HIV from a single injection with contaminated syringe. Using these two models will allow for comparison between the models and across the current research literature.

5.3.2. Infectious Disease Cases Prevented

Based on previous costing studies, it is safe to presume that SIFs are able to prevent ‘dirty’ or shared injections (Andresen & Boyd, 2010; Jozaghi, Reid & Andresen, 2013; Pinkerton, 2010). Furthermore, previous literature has highlighted the important role of behavioral change for those who attend SIFs (Andresen & Boyd, 2010; Bayoumi & Zaric, 2008; Jozaghi, Reid, & Andresen, 2013; Jozaghi et al., 2014; Pinkerton, 2010). Consequently, the current study, similar to Andresen and Boyd (2010), Andresen and Jozaghi (2012), Jozaghi, Reid, and Andresen, (2013), Jozaghi et al. (2014) and Jozaghi

(2014c) employs a point estimate of 0.3 for behavioral change. The odds ratio of 0.3 was only employed twice (for the first and second potential SIFs in all the noted cities) to provide a more conservative estimate; this was done simply because we cannot expect all PWIDs to start using such facilities and subsequently change their injecting behavior. Consequently, by using 0.3 odds ratio, I limit the number of new users to Montreal, Ottawa, Toronto, Saskatoon and Victoria's SIFs. As with the study of Vancouver's SIF, Montreal's potential SIF, and Ottawa's potential SIFs, the secondary transmission impact from SIFs, such as those through sexual contact, will not be considered in this chapter because reliable data are not available (Andresen & Jozaghi, 2012; Jozaghi, Reid, & Andresen, 2013; Jozaghi et al., 2014; Pinkerton, 2010; Pinkerton, 2012).

5.3.3. The Medical Cost of New HIV

The range of lifetime cost (in 2013 Canadian dollars) from averted cases of HIV could be substantial. At CAN\$289,970, the most expensive form of treatment for HIV infection is the successful HAART program (Werb et al., 2011). Other forms of treatment range from CAN\$174,410 (Gold, Gafni, Nelligan, & Millson, 1997) to US\$200,000 (Chen et al., 2006; Holtgrave & Pinkerton, 1997; Pinkerton & Holtgrave, 1998). However, the current study uses the value of \$CDN210, 555 assuming a lower cost-savings for HIV infections among PWIDs. This lower cost assumption is based on the recognition that PWIDs may experience societal limitations or certain self-imposed barriers making it less likely for an PWIDs to take full advantage of the medical system. This value is based on the most recent research in this area (Andresen & Jozaghi, 2012; Jozaghi, Reid, & Andresen, 2013; Jozaghi et al., 2014; Pinkerton, 2010; Pinkerton, 2011).

5.3.4. The Medical Cost of a New HCV

According to the World Health Organization, HCV infection is a leading risk for liver disease, affecting more than 170 million people worldwide (World Health Organization, 1998), and since the 1980s, PWIDs have been found at higher risk for contracting the virus (Hagan, 1998; Roy et al., 2002). Approximately 8,000 PWIDs are newly infected with the virus each year and most of the infected PWIDs will become chronically infected (Remis, 2007; Zou, Tepper, & El Saadany, 2000). For example, of

those chronically infected, many will develop cirrhosis, liver failure, hepatocellular carcinoma and death (Krajden et al., 2010). Therefore, determining the cost of infected individuals for the local health care could be substantial because HCV could have numerous complications.

The costing studies in the realm of HCV range from CAN\$20,000 per completed patient course of treatment (Krajden et al., 2010) to CAN\$30,000 (Werb et al., 2011) to more than CAN\$69,188 (Martin et al., 2012). However, this paper uses \$35,143 (2013 CDN Dollars) reported in Jozaghi, Reid, and Andresen (2013), Jozaghi et al. (2014), Jozaghi (2014c) and National Centre in HIV Epidemiology and Clinical Research (2010) because these recent studies are more conservative regarding the complications arising from HCV, not considering the costs for liver failure, hepatocellular carcinoma and liver transplant cases.

5.3.5. Value of a Prevented Death

The value of death prevention is based on tangible costs, such as loss of wages/productivity, medical costs and quality of life. Miller, Cohen & Wiersema (1996) estimated this to be \$4,854,368 (2013 US dollars). Alternatively, when contingent valuation is taken into account, the value of a prevented death is in excess of US\$10 million (Cohen, Rust, Steen & Tidd, 2004). However, for the purpose of this study we only consider the tangible costs as shown in Andresen and Boyd's (2010) costing study of Insite in Vancouver. Tangible costs may be calculated from the contribution of individual to the economy. The gross domestic product per capita (CAN\$33,640) in British Columbia is used (considering a discount rate of 3 percent) such that the value of lost productivity/wages is the sum of the income lost (Andresen & Boyd, 2010; Laufer, 2001). Because the average age of a SIF user is 35 years, (assuming the retirement at 65), there are 30 years of lost productivity/wages (Andresen & Boyd, 2010; Kerr et al, 2006). These values lead to a loss to society of CAN\$978,924 (2013 Dollars). Despite being a large number when considering a typical SIF user in Victoria, this value is a highly conservative value of life.

5.3.6. Cost of SIFs

Insite offers the only North American SIF from which to draw cost-estimating comparisons for Victoria. Per annum Insite costs CAN\$3 million (Jozaghi, Reid & Andresen, 2013; Jozaghi et al., 2014; Health Canada, 2008; Pinkerton, 2010). This CAN\$3 million considers all of the operating costs of Insite from public health screening to health, education, counselling (both addiction and peer), housing assistance (Jozaghi, Reid & Andresen, 2013; Jozaghi et al., 2014; Health Canada, 2008; Pinkerton, 2010). However, the costs of Insite drop significantly (to \$1.53 million) when only accounting for equipment, staff and property costs (Jozaghi, Reid & Andresen, 2013; Jozaghi et al., 2014). If Insite expands their hours from 18 to 24, this cost increases to CAN\$2.182 million (Andresen & Jozaghi, 2012). Thus for the purposes of this chapter, I assume that Montreal, Ottawa, Toronto, Saskatoon and Victoria could and would replicate these base costs of Vancouver's Insite, including the 24 hour expansion with a total SIF annual costs of CAN\$2.182 million.

5.4. Results for city of Montreal

The model one was only used here (Jacobs et al., 1999). This model predicted the number of new HIV and HCV cases prevented based on the needle sharing rate. This included the impact of behavioral changes in injection activities outside of the SIF. The behavioral change, according to Table 5.7 and Table 5.8, was only considered twice (once for the first SIF and later for the second SIF)—this modeling decision is apparent in the marginal number of new HIV cases averted in Tables 5.8, 5.11, and 5.12. This calculation of behavioral impact is based on a conservative odds-ratio that falls within the limit specified by Kerr et al. (2005).

Table 5-7. The Cumulative Annual Cost Saving, Cost - Effectiveness and Cost – Benefit of SIF in Montreal using Jacobs et al.’s (1999) model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	HIV Cost Saved	HCV Cost Saved	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$2,182,800	28%	14	84	\$764,970	\$769,212	\$25,986	\$155,914	1.35	1.35
Two SIF	\$4,365,600	21%	26	162	\$1,108,830	\$1,327,566	\$26,948	\$167,908	1.25	1.25
Three SIF	\$6,548,400	18%	32	195	\$189,360	\$304,485	\$33,582	\$204,637	1.03	1.03
Four SIF	\$8,731,200	16%	37	227	-\$940,665	-\$753,739	\$38,463	\$235,978	0.89	0.89
Five SIF	\$10,914,000	13%	43	261	-\$1,860,135	-\$1,741,677	\$41,816	\$253,814	0.83	0.83
Six SIF	\$13,096,800	10%	48	294	-\$2,990,160	-\$2,764,758	\$44,547	\$272,850	0.77	0.77
Seven SIF	\$15,279,600	7%	53	327	-\$4,120,185	-\$3,787,839	\$46,727	\$288,294	0.73	0.73

Table 5-8. The Marginal Annual Cost Saving, Cost - Effectiveness and Cost – Benefit of SIF in Montreal using Jacobs et al.’s (1999) model

Variables	Annual cost of operation	Sharing rate	Marginal							
			#of HIV averted	#of HCV averted	HIV Cost Saved	HCV Cost Saved	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$2,182,800	28%	14	84	\$764,970	\$769,212	\$25,986	\$155,914	1.35	1.35
Two SIF	\$2,182,800	21%	12	78	\$343,860	\$558,354	\$27,985	\$181,900	1.26	1.16
Three SIF	\$2,182,800	18%	6	33	-\$919,470	-\$1,023,081	\$66,145	\$363,800	0.53	0.57
Four SIF	\$2,182,800	16%	5	32	-\$1,130,025	-\$1,058,224	\$38,463	\$436,560	0.52	0.48
Five SIF	\$2,182,800	13%	6	34	-\$1,200,540	-\$987,938	\$41,816	\$363,800	0.55	0.58
Six SIF	\$2,182,800	10%	5	33	-\$1,130,025	-\$1,023,081	\$66,145	\$436,560	0.53	0.57
Seven SIF	\$2,182,800	7%	5	33	-\$919,470	-\$1,023,081	\$66,145	\$436,560	0.53	0.57

Table 5-9. The Sensitivity Analysis at 45% Sharing Rate for Cumulative Annual Cost Saving, Cost - Effectiveness and Cost – Benefit of SIF in Montreal

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	HIV Cost Saved	HCV Cost Saved	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$2,182,800	35%	19	115	\$1,817,745	\$1,858,645	\$18,980	\$114,884	1.85	1.8
Two SIF	\$4,365,600	27%	35	214	\$3,003,825	\$3,155,002	\$20,400	\$124,731	1.7	1.7
Three SIF	\$6,548,400	23%	42	256	\$2,294,910	\$2,448,208	\$25,580	\$155,914	1.4	1.4
Four SIF	\$8,731,200	20%	49	299	\$1,585,995	\$1,776,557	\$29,201	\$178,188	1.2	1.2
Five SIF	\$10,914,000	16%	56	341	\$877,080	\$1,069,763	\$32,006	\$194,893	1.1	1.1
Six SIF	\$13,096,800	12%	63	384	\$168,165	\$398,112	\$34,106	\$207,886	1	1
Seven SIF	\$15,279,600	8%	70	427	-\$540,750	-\$273,539	\$35,784	\$218,280	0.96	0.98

Table 5-10. The Sensitivity Analysis at 25% Sharing Rate for Cumulative Annual Cost Saving, Cost - Effectiveness and Cost – Benefit of SIF in Montreal

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	HIV Cost Saved	HCV Cost Saved	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$2,182,800	20%	10	64	-\$77,250	\$66,352	\$34,106	\$218,280	1.03	1
Two SIF	\$4,365,600	15%	19	119	-\$365,055	-\$183,583	\$36,686	\$229,768	0.96	0.92
Three SIF	\$6,548,400	13%	23	142	-\$1,705,635	-\$1,558,094	\$46,156	\$284,713	0.76	0.74
Four SIF	\$8,731,200	11%	27	166	-\$3,046,215	-\$2,897,462	\$52,598	\$323,377	0.67	0.65
Five SIF	\$10,914,000	9%	31	190	-\$4,386,795	-\$4,236,830	\$57,442	\$352,065	0.61	0.6
Six SIF	\$13,096,800	7%	35	213	-\$5,727,375	-\$5,611,341	\$61,487	\$374,194	0.57	0.56
Seven SIF	\$15,279,600	5%	39	237	-\$7,067,955	-\$6,950,709	\$71,735	\$436,560	0.55	0.54

Table 5-11. The Sensitivity Analysis at 45% Sharing Rate for Marginal Annual Cost Saving, Cost - Effectiveness and Cost – Benefit of SIF in Montreal

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	HIV Cost Saved	HCV Cost Saved	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$2,182,800	35%	19	115	\$1,817,745	\$1,858,645	\$18,980	\$114,884	1.85	1.8
Two SIF	\$2,182,800	27%	16	99	\$1,186,080	\$1,296,357	\$22,048	\$136,425	1.6	1.5
Three SIF	\$2,182,800	23%	7	43	-\$708,915	-\$671,651	\$50,763	\$311,829	0.7	0.68
Four SIF	\$2,182,800	20%	7	43	-\$708,915	-\$671,651	\$50,763	\$311,829	0.7	0.68
Five SIF	\$2,182,800	16%	7	43	-\$708,915	-\$671,651	\$50,763	\$311,829	0.7	0.68
Six SIF	\$2,182,800	12%	7	43	-\$708,915	-\$671,651	\$50,763	\$311,829	0.7	0.68
Seven SIF	\$2,182,800	8%	7	43	-\$708,915	-\$671,651	\$50,763	\$311,829	0.7	0.68

Table 5-12. The Sensitivity Analysis at 25% Sharing Rate for Marginal Annual Cost Saving, Cost - Effectiveness and Cost – Benefit of SIF in Montreal

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	HIV Cost Saved	HCV Cost Saved	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$2,182,800	20%	10	64	-\$77,250	\$66,352	\$34,106	\$218,280	1.03	1
Two SIF	\$2,182,800	15%	9	55	-\$287,805	-\$249,935	\$39,687	\$242,533	0.89	0.87
Three SIF	\$2,182,800	13%	4	24	-\$1,340,580	-\$1,339,368	\$90,950	\$545,700	0.39	0.39
Four SIF	\$2,182,800	11%	4	24	-\$1,340,580	-\$1,339,368	\$90,950	\$545,700	0.39	0.39
Five SIF	\$2,182,800	9%	4	24	-\$1,340,580	-\$1,339,368	\$90,950	\$545,700	0.39	0.39
Six SIF	\$2,182,800	7%	4	24	-\$1,340,580	-\$1,339,368	\$90,950	\$545,700	0.39	0.39
Seven SIF	\$2,182,800	5%	4	24	-\$1,340,580	-\$1,339,368	\$90,950	\$545,700	0.39	0.39

As expected, the results presented in Table 5.7 and Table 5.8 show that increasing the scope of SIFs through site expansion would result in a decrease of HIV infection cases. The model predicts: 14–53 fewer HIV cases and 84–327 fewer HCV cases annually, with the marginal range being much smaller: 5–14 fewer HIV cases and 33–84 fewer HCV cases annually.

This range disparity, as outlined in Table 5.7 and Table 5.8, translates into substantial differences between the economic evaluation of SIFs with respect to the cumulative versus marginal estimates: the total effect of establishing SIFs and the effect of establishing each subsequent SIF, respectively.

For example, according to Table 5.7, the cumulative annual estimates of new HIV cases averted, translates into a cost savings for society ranging from \$0.764 million (benefit) for the first SIF to -\$4.1 million (loss) for the seventh SIF. Benefit-cost ratios range from 1.35 to 0.73, and cost-effectiveness values range from \$155,914 to \$288,294 (cost per lifetime treatment). The cumulative annual estimates of new HCV cases

averted translate into a cumulative cost savings that range from \$0.769 million (benefit) for the first SIF to -\$3.7 million (loss) for the seventh SIF. Benefit-cost ratios range from 1.35 to 0.73, and incremental cost-effectiveness values range from \$25,986 to \$46,727 (cost per lifetime treatment).

In contrast, the marginal estimates of Montreal's SIF expansion translate into a much smaller return. This is particularly true with respect to its benefit-cost and cost-effectiveness ratios. For instance, the marginal benefit-cost ratio varies from 1.35 to 0.77 for HIV and 1.35 to 0.76 for HCV. The marginal cost-effectiveness value for HIV ranges from \$155,914 to \$436,560 (cost per life- time treatment). The HCV marginal cost-effectiveness value ranges from \$25,986 to \$66,145 (cost per lifetime treatment).

Furthermore, Table 5.7 and Table 5.8 show that both cumulative benefit-cost ratios dwindle after the third SIF. For example, Table 5.7 shows that a cost savings of \$189,360 is present for the third SIF (HIV) results, but the further expansion to four SIFs leads to a \$0.940 million loss. A similar loss due to SIF expansion can be seen for HCV where a \$304,485 cost saving (for the third SIF) changes to a 0.753 million dollar loss (for the fourth SIF). More specifically, the benefit-cost ratio for both HIV and HCV diminish after the third SIF (from 1.03 to 0.89). Incremental cost-effectiveness ratios also diminish after the third SIF with HIV (\$204,637 to \$235,978 cost per lifetime treatment) and HCV (\$33,582 to \$38,463 cost per life- time treatment). This means that they both exceed their cost-effectiveness ratios of \$210, 555 and \$35,143 respectively.

Finally, sensitivity analysis was conducted for the models employed. These employed different initial needle-sharing rates (see Table 5.9, 5.10, 5.11, & 5.12). Similar to (Andresen & Boyd, 2010) and (Andresen & Jozaghi, 2012), the current analysis used 20 and 40 per cent initial needle-sharing rates. Convincingly, the results from both the baseline and sensitivity analysis in these analyses demonstrate that the establishment of an SIF program in Montreal would save tax payers money.

The estimates of 130–140 HIV reductions and 840 HCV reductions over 10 years (with consideration for growth in PWID population) is still cost effective for the first three SIFs. Results ranged from \$155,914 to \$204,638 for HIV (cost per lifetime treatment) and \$33,582 to \$33,582 for HCV (cost per lifetime treatment). Further, the benefit-cost

ratio is above 1 for both HIV and HCV for the first three SIF over 10 years of establishment (see Table 5.13).

Table 5-13. The Cumulative ten years Cost - Effectiveness and Cost – Benefit of SIF in Montreal using Jacobs et al.’s (1999) model

Variables	Annual cost of operation	# of HIV averted	# of HCV averted	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Cost-benefit ratio HCV	Cost-benefit ratio HIV
Post SIF	\$21,828,000	140	840	\$25,986	\$155,914	1.35	1.35
Two SIF	\$43,656,000	260	1620	\$26,948	\$167,908	1.25	1.25
Three SIF	\$65,484,000	320	1950	\$33,582	\$204,637	1.03	1.03
Four SIF	\$87,312,000	370	2270	\$38,463	\$235,978	0.89	0.89
Five SIF	\$109,140,000	430	2610	\$41,816	\$253,814	0.83	0.83
Six SIF	\$130,968,000	480	2940	\$44,547	\$272,850	0.77	0.77
Seven SIF	\$152,796,000	530	3270	\$46,727	\$288,294	0.73	0.73
Average	\$87,312,000	360	2210	\$39,508	\$242,533	0.87	0.87

5.5. Results for city of Ottawa

Results of the current section focus on the cost-benefits and cost-effectiveness of proposed SIFs in Ottawa, Ontario. These results are based solely on the prevention of new HIV and HCV cases, taking into account needle sharing rates and the PWIDs behavioural changes that would occur outside the SIFs. The results presented in Table 5.14 and Table 5.15 show that the establishment of SIFs in Ottawa would result in a decrease in the number of new HIV and HCV cases. Specifically, the cumulative annual cost model (Table 5.14) indicates that 5 to 19 HIV cases may be averted while 48 to 191 HCV cases may be averted depending on the number of SIFs established. The prevention impact of the marginal annual cost model (Table 5.15) is not nearly as powerful with ranges of 2 to 5 and 21 to 48 cases of HIV and HCV being averted, respectively.

Table 5-14. The Cumulative Annual Cost - Effectiveness and Benefit-Cost of SIF in Ottawa Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Benefit-cost ratio HCV	Benefit-cost ratio HIV	Cost-benefit ratio Total
Post SIF	\$2,182,800	11%	5	48	\$45,475	\$436,560	0.77	0.48	1.26
		(14%, 7%)	(6, 3)	(65, 31)	(\$33,581, \$70,413)	(\$363,800, \$727,600)	(1.1, 0.5)	(0.58, 0.3)	(1.63, 0.79)
Two SIF	\$4,365,600	8%	9	88	\$49,609	\$485,067	0.71	0.43	1.14
		(11%, 5%)	(12, 6)	(120, 57)	(\$36,380, \$76,589)	(\$383,800, \$727,600)	(1, 0.46)	(0.58, 0.3)	(1.54, 0.75)
Three SIF	\$6,548,400	6%	11	112	\$58,468	\$595,309	0.6	0.35	0.95
		(9%, 4%)	(15, 7)	(148, 70)	(\$44,246, \$93,549)	(\$436,560, \$936,486)	(0.8, 0.38)	(0.48, 0.22)	(1.28, 0.6)
Four SIF	\$8,731,200	5%	13	129	\$67,683	\$671,631	0.52	0.31	0.83
		(7%, 3%)	(17, 8)	(175, 83)	(\$49,893, \$105,195)	(\$513,600, \$1,091,400)	(0.7, 0.33)	(0.41, 0.19)	(1.11, 0.5)
Five SIF	\$10,914,000	3%	15	150	\$72,760	\$727,600	0.48	0.29	0.77
		(5%, 2%)	(20, 9)	(203, 96)	(\$53,764, \$113,688)	(\$545,700, \$1,212,667)	(0.65, 0.31)	(0.39, 0.17)	(1.04, 0.48)
Six SIF	\$13,096,800	2%	17	170	\$77,040	\$770,400	0.46	0.27	0.73
		(3%, 1%)	(23, 10)	(232, 110)	(\$569,426, \$119,062)	(\$569,426, \$1,309,680)	(0.62, 0.3)	(0.37, 0.16)	(0.99, 0.46)
Seven SIF	\$15,279,600	1%	19	191	\$79,998	\$804,189	0.44	0.26	0.70
		(1%, 1%)	(26, 12)	(259, 123)	(\$58,995, \$124,224)	(\$587,677, \$1,273,300)	(0.6, 0.28)	(0.36, 0.16)	(0.55, 0.45)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (19 per cent sharing rate, 9 percent sharing rate).

Table 5-15. The Marginal Annual Cost - Effectiveness and Benefit-Cost of SIF in Ottawa Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Benefit-cost ratio HCV	Benefit-cost ratio HIV	Cost-benefit ratio Total
Post SIF	\$2,182,800	11%	5	48	\$45,475	\$436,560	0.77	0.48	1.26
		(14%, 7%)	(6, 3)	(65, 31)	(\$33,581, \$70,413)	(\$363,800, \$727,600)	(1.1, 0.5)	(0.58, 0.3)	(1.63, 0.79)
Two SIF	\$2,182,800	8%	4	41	\$53,239	\$545,700	0.66	0.39	1.05
		(11%, 5%)	(6, 3)	(55, 26)	(\$39,687, \$83,954)	(\$363,800, \$727,600)	(0.89, 0.42)	(0.58, 0.3)	(1.46, 0.71)
Three SIF	\$2,182,800	6%	2	24	\$90,950	\$1,091,400	0.39	0.19	0.58
		(9%, 4%)	(3, 1)	(28, 14)	(\$77,957, \$155,914)	(\$727,600, \$2,182,800)	(0.45, 0.23)	(0.29, 0.1)	(0.74, 0.32)
Four SIF	\$2,182,800	5%	2	17	\$128,400	\$1,091,400	0.27	0.19	0.47
		(7%, 3%)	(3, 1)	(28, 13)	(\$77,957, \$167,908)	(\$727,600, \$2,182,800)	(0.45, 0.21)	(0.29, 0.1)	(0.74, 0.31)
Five SIF	\$2,182,800	3%	2	21	\$103,943	\$1,091,400	0.34	0.19	0.53
		(5%, 2%)	(3, 1)	(28, 13)	(\$77,957, \$167,908)	(\$727,600, \$2,182,800)	(0.45, 0.21)	(0.29, 0.1)	(0.74, 0.31)
Six SIF	\$2,182,800	2%	2	21	\$103,943	\$1,091,400	0.34	0.19	0.53
		(3%, 1%)	(3, 1)	(28, 13)	(\$77,957, \$167,908)	(\$727,600, \$2,182,800)	(0.45, 0.21)	(0.29, 0.1)	(0.74, 0.31)
Seven SIF	\$2,182,800	1%	2	21	\$103,943	\$1,091,400	0.34	0.19	0.53
		(1%, 1%)	(3, 1)	(28, 13)	(\$77,957, \$167,908)	(\$727,600, \$2,182,800)	(0.45, 0.21)	(0.29, 0.1)	(0.74, 0.31)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (30 per cent sharing rate, 10 percent sharing rate).

With respect to the fiscal implications of these results, the decrease in HIV and HCV cases are not enough to independently cover the cost of SIF operations. In fact, when considering the operation of the first two SIFs in Tables 5.14 and 5.15, where behavioural change impacts the rate of needle sharing, both the cumulative and marginal cost-benefit ratios are below unity. Specifically, the cumulative cost-effectiveness for HIV cases (Table 5.14) ranges from CDN\$436,560 to CDN \$804,189 where the costs associated with a single HIV case is CDN\$210, 555. The cumulative cost-effectiveness for HCV (Table 5.14) ranges from CDN \$45,475 to CDN \$79,998

where the cost of a single HCV case is CDN\$35,143. Both of these ratios are far above the estimated cost per HIV and HCV case resulting in cost-benefit ratios below 1.0. However, when the cost-benefit ratios considering both HIV and HCV are considered simultaneously, there is a financial justification for at least two SIFs, if not three SIFs with the last cost-benefit-ratio being 0.95—close enough to 1.0 in this conservative modeling methodology. This highlights the importance of considering the additive effects of HIV and HCV from the establishment of a SIF. In fact, as can be seen in Table 5.15, the driver of the cost savings in these models is HCV, ignored by many of the recent cost evaluations of the Vancouver SIF. However, as indicated before, owing to the lack of a definitive demonstration of a relationship in the scientific literature, the result that HCV is a driving factor in the cost saving must be interpreted with caution.

Others have also estimated decreases in HCV from SIFs (Bayoumi & Strike, 2012), but this was derived from a mathematical model. The independent marginal cost-effectiveness for both HIV and HCV (Table 5.15) are also far above the estimated cost per HIV and HCV case. The marginal cost-effectiveness ranges from CDN\$436,560 to CDN\$1,091,400 for HIV and from CDN\$45,475 to CDN\$103,943 for HCV. Again, with costs associated with an HIV case set at CDN\$210, 555 and an HCV case set at CDN\$35,143, cost-benefit ratios are below 1.0 and thus, the models do not support the establishment of SIFs when HIV and HCV are considered independently. But from a total cost-benefit perspective, two SIFs can be justified when considering their marginal impacts on HIV and HCV.

A sensitivity analyses conducted at different baseline sharing rates (9 and 19 per cent), however, demonstrates that changes to the needle sharing rates influence the results in an important way (see Tables 5.14 to 5.15). Specifically, the cumulative (Table 5.18) and marginal (Table 5.15) annual cost models with 9% sharing rates do not support the establishment of any SIFs as cost-benefit ratios are all below unity. The cost-effectiveness ratios for HIV and HCV cases, however, support the establishment of as many as five (or even six) SIFs when the sharing rate is set at 19% (see Table 5.14 and 5.15). However, if one were to only consider HIV or HCV independently, the establishment of a SIF would only be considered as “cost saving” in the case of HCV, with a maximum of two SIFs. The marginal annual cost model with a 19% sharing rate

supports the establishment of a single SIF with a cost-benefit ratio of 1.1 for only HCV. However, it accounts for two SIFs when considering the additive impact of HIV and HCV. Given that the baseline sharing rate of 14% used here is likely to be an underestimation, it can be argued that the establishment of SIFs should be given serious consideration.¹

Finally, Tables 5.16 present results of the cost-effectiveness and cost-benefit of proposed SIFs using the Kaplan and O'Keefe (1993) model that focuses on prevented HIV cases. As is evident from this table, the number of HIV cases prevented is not enough to cover the cost of operating a SIF. Moreover, the cumulative and marginal cost-benefit ratios are below 1.0 in all SIF scenarios. The same may be said for the marginal and cumulative cost-effectiveness ratios.

Table 5-16. The Cumulative and Marginal Cost - Effectiveness and Cost – Benefit of SIF in Ottawa Using the Second Model

Variables	Annual cost of operation	Sharing rate	# of HIV averted	Cost-effectiveness ratio HIV	Benefit-cost ratio HIV
Post SIF	\$2,182,800	11%	7	\$311,829	0.68
	(\$2,182,800)		(7)	(\$311,829)	(0.68)
Two SIF	\$4,365,600	8%	13	\$335,815	0.63
	(\$2,182,800)		(6)	(\$363,800)	(0.6)
Three SIF	\$6,548,400	6%	16	\$409,275	0.51
	(\$2,182,800)		(3)	(\$727,600)	(0.3)
Four SIF	\$8,731,200	5%	18	\$485,067	0.43
	(\$2,182,800)		(2)	(\$1,091,400)	(0.19)
Five SIF	\$10,914,000	3%	21	\$519,714	0.4
	(\$2,182,800)		(3)	(\$727,600)	(0.3)
Six SIF	\$13,096,800	2%	24	\$545,700	0.38
	(\$2,182,800)		(3)	(\$727,600)	(0.3)
Seven SIF	\$15,279,600	1%	27	\$565,911	0.37
	(\$2,182,800)		(3)	(\$727,600)	(0.3)

Note: The numbers in parentheses represent the marginal results.

5.6. Results for city of Toronto

Both models, based on the needle-sharing rate, predicted the number of HIV cases prevented. The first model also predicted the number of HCV cases prevented. Table 5.17 and Table 5.18 demonstrate that increasing the scope of SIFs increases the number of HIV and HCV prevented. However, these increases are not enough to cover the cost of the program.

Table 5-17. The Cumulative Annual Cost - Effectiveness and Benefit-Cost of SIF in Toronto Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	Cost-effective ratio HCV	Cost-effective ratio HIV	Benefit-cost ratio HCV	Benefit-cost ratio HIV	Benefit-Cost ratio total
Post SIFs	\$2,182,800	17%	2	41	\$53,239	\$1,091,400	0.7	0.2	0.85
		(25%, 8%)	(3, 1)	(61, 21)	(\$35,784, 103,943)	(\$727,600, 2,182,800)	(1, 0.3)	(0.3, 0.1)	(1.2, 0.4)
Two SIFs	\$4,365,600	14%	4	77	\$56,696	\$1,091,400	0.6	0.2	0.81
		(20%, 7%)	(5, 2)	(115, 38)	(\$37,961, 114,884)	(\$873,120, 2,182,800)	(0.9, 0.3)	(0.2, 0.1)	(1.1, 0.4)
Three SIFs	\$6,548,400	13%	4	85	\$77,040	\$1,637,100	0.5	0.1	0.6
		(19%, 6%)	(5, 2)	(128, 42)	(\$51,159, 155,914)	(\$1,309,680, 3,274,200)	(0.7, 0.2)	(0.2, 0.06)	(0.8, 0.3)
Four SIFs	\$8,731,200	12%	4	95	\$91,907	\$2,182,800	0.4	0.1	0.5
		(18%, 6%)	(6, 2)	(142, 47)	(\$61,487, 185,770)	(\$1,455,200, 4,365,600)	(0.6, 0.2)	(0.1, 0.05)	(0.7, 0.2)
Five SIFs	\$10,914,000	11%	4	104	\$104,942	\$2,728,500	0.3	0.08	0.4
		(17%, 6%)	(6, 2)	(156, 52)	(\$69,961, 209,885)	(\$1,819,000, 5,457,000)	(0.5, 0.2)	(0.1, 0.04)	(0.6, 0.2)
Six SIFs	\$13,096,800	10%	5	113	\$115,900	\$2,619,360	0.3	0.08	0.4
		(16%, 5%)	(7, 2)	(164, 57)	(\$79,858, 229,768)	(\$1,870,971, 6,548,400)	(0.4, 0.1)	(0.1, 0.03)	(0.5, 0.1)
Seven SIFs	\$15,279,600	9%	5	122	\$125,243	\$3,055,920	0.3	0.07	0.3
		(15%, 5%)	(7, 3)	(182, 61)	(\$83,953, 250,485)	(\$2,182,800, 5,093,200)	(0.4, 0.1)	(0.1, 0.04)	(0.5, 0.1)
Average	\$8,731,200	12%	4	91	\$89,281	\$2,058,068	0.44	0.12	0.4
		(18%, 6%)	(6, 2)	(135, 45)	(\$60,023, 178,664)	(\$1,462,624, 4,157,714)	(0.6, 0.2)	(0.2, 0.06)	(0.7, 0.2)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (30 per cent sharing rate, 10 percent sharing rate).

The model predicts that the number of cases averted would be: 2-5 for HIV and 41-122 for HCV with the marginal range being much smaller: 0.4-2 for HIV and 9-41 for HCV.

Table 5-18. The Marginal Annual Cost - Effectiveness and Benefit-Cost of SIF in Toronto Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Benefit-cost ratio HCV	Benefit-cost ratio HIV	Benefit-cost ratio total
Post SIFs	\$2,182,800	17%	2	41	\$53,239	\$1,091,400	0.7	0.2	0.9
		(25%, 8%)	(3, 1)	(61, 21)	(\$35,784, \$103,943)	(\$727,600, \$2,182,800)	(1, 0.3)	(0.3, 0.1)	(1.3, 0.4)
Two SIFs	\$2,182,800	14%	2	36	\$60,633	\$1,091,400	0.6	0.2	0.7
		(20%, 7%)	(2, 1)	(54, 18)	(\$40,422, \$121,267)	(\$1,091,400, \$2,182,800)	(0.9, 0.3)	(0.2, 0.1)	(1.1, 0.4)
Three SIFs	\$2,182,800	13%	0.4	9	\$242,533	\$5,474,500	0.1	0.04	0.2
		(19%, 6%)	(0.5, 0.2)	(13, 5)	(\$167,907, \$436,560)	(\$4,365,600, \$10,914,000)	(0.2, 0.08)	(0.05, 0.02)	(0.3, 0.1)
Four SIFs	\$2,182,800	12%	0.4	9	\$242,533	\$5,474,500	0.1	0.04	0.2
		(18%, 6%)	(0.5, 0.2)	(14, 5)	(\$155,914, \$436,560)	(\$4,365,600, \$10,914,000)	(0.2, 0.08)	(0.05, 0.02)	(0.3, 0.1)
Five SIFs	\$2,182,800	11%	0.4	9	\$242,533	\$5,474,500	0.1	0.04	0.2
		(17%, 6%)	(0.5, 0.2)	(14, 5)	(\$155,914, \$436,560)	(\$4,365,600, \$10,914,000)	(0.2, 0.08)	(0.05, 0.02)	(0.3, 0.1)
Six SIFs	\$2,182,800	10%	0.4	9	\$242,533	\$5,474,500	0.1	0.04	0.2
		(16%, 5%)	(0.5, 0.2)	(14, 5)	(\$155,914, \$436,560)	(\$4,365,600, \$10,914,000)	(0.2, 0.08)	(0.05, 0.02)	(0.3, 0.1)
Seven SIFs	\$2,182,800	9%	0.4	9	\$242,533	\$5,474,500	0.1	0.04	0.2
		(15%, 5%)	(0.5, 0.2)	(14, 5)	(\$155,914, \$436,560)	(\$4,365,600, \$10,914,000)	(0.2, 0.08)	(0.05, 0.02)	(0.3, 0.1)
Average	\$2,182,800	13%	1	17	\$189,505	\$4,222,185	0.3	0.08	0.4
		(19%, 6%)	(1, 0.4)	(26, 9)	(\$123,967, \$344,001)	(\$3,378,142, \$8,419,371)	(0.4, 0.14)	(0.1, 0.04)	(0.5, 0.2)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (30 per cent sharing rate, 10 percent sharing rate).

As outlined in Table 5.17 and Table 5.18, there is a substantial difference between the economic evaluation of SIFs with respect to the cumulative (the total impact of SIFs considered) versus marginal estimates (the impact of adding more SIF). Benefit-cost ratios range from 0.2 to 0.07, and cost-effectiveness values range from \$1,091,400 to \$3,055,920 (cost per lifetime treatment). The cumulative annual estimates of new HCV cases averted translate into cumulative benefit-cost ratios that range from 0.7 to 0.3, and incremental cost-effectiveness values range from \$53,239 to \$125,343 (cost per lifetime treatment). In contrast, the marginal estimates of Toronto's SIF expansion translate into a much smaller return. This is particularly true with respect to its benefit-cost and cost-effectiveness ratios.

Furthermore, Table 5.17 and Table 5.18 show that based on cost-effectiveness and benefit-cost ratios, establishment of a SIF may not be economically viable. However, sensitivity analysis conducted for the model demonstrated that the establishment of SIFs saves tax payers money. The sensitivity analysis employed different initial needle-sharing rates (see Table 5.17 and 5.18). Similar to Andresen and Boyd (2010), Andresen and Jozaghi (2012), Bayoumi and Strrike (2012), Jozaghi, Ried, & Andresen (2013), and Jozaghi et al. (2014) the current analysis used 10 and 30 percent initial needle-sharing rates.

Table 5-19. The Cumulative Cost - Effectiveness and Benefit-cost of SIF in Toronto Using the Second Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	Cost-effectiveness ratio HIV	Benefit-cost ratio HIV
Post SIF	\$2,182,800	17%	6	\$363,800	0.60
Two SIFs	\$4,365,600	14%	5	\$873,120	0.20
Three SIFs	\$6,548,400	13%	2	\$3,274,200	0.06
Four SIFs	\$8,731,200	12%	1	\$8,731,200	0.02
Five SIFs	\$10,914,000	11%	1	\$10,914,000	0.02
Six SIFs	\$13,096,800	10%	1	\$13,096,800	0.02
Seven SIFs	\$15,279,600	9%	1	\$15,279,600	0.01
Average	\$8,731,200	13%	2	\$7,972,417	0.13

This chapter used the second mathematical model as a secondary sensitivity analysis (see Table 5.19). Therefore, based on the first and second model, establishing at least two SIFs in Toronto is cost-effective. On average, benefit-to-cost ratios are never below unity for the first two facilities with an average of 1.1.

5.7. Results for city of Saskatoon

The number of HIV prevented was predicted based needle sharing rates. Table 5.20, and 5.21 demonstrated that increasing the scope of SIFs in Saskatoon also increases the number of HIV prevented. Based on Table 5.20, cost-saving does not disappear for SIFs in Saskatoon when the cumulative data is taken into consideration. In fact, the cost-saving ranges from \$1,529,940 for the second SIF to a low value of \$533,220 for the fourth potential SIF. Based on cumulative cost-effectiveness results, SIFs establishment is cost-effective up to four facilities in Saskatoon. For example, the cumulative cost-effectiveness ranges from \$198,436 to \$145,520. The cumulative benefit-cost ratio is also above unity for the first four facilities. For instance, the cumulative benefit-cost ratios for HIV ranges from 1.44 to 1.06.

Table 5-20. The Cumulative Annual Cost - Effectiveness and Cost – Benefit of SIF in Saskatoon Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	HIV Cost saved	Cost-effectiveness ratio HIV	Cost-benefit ratio HIV
First SIF	\$2,182,800	17%	15	\$975,525	\$145,520	1.44
		(24%, 10%)	(21, 9)	(\$2,238,855, - 287,805)	(\$103,943, \$242,533)	(2.03, 0.87)
Two SIFs	\$4,365,600	10%	28	\$1,529,940	\$155,914	1.35
		(14%, 6%)	(39, 16)	(\$3,846,045, - \$996,720)	(\$272,850, \$272,850)	(1.9, 0.77)
Three SIFs	\$6,548,400	6%	36	\$1,031,580	\$181,900	1.16
		(9%, 4%)	(51, 21)	(\$4,189,905, - \$2,126,745)	(\$128,400, \$311,829)	(1.6, 0.68)
Four SIFs	\$8,731,200	2%	44	\$533,220	\$198,436	1.06
		(3%, 1%)	(63, 26)	(4,533,765, - \$3,256,770)	(\$138,590, \$335,815)	(1.5, 0.63)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (34 per cent sharing rate, 14 percent sharing rate).

According to Table 5.21, the marginal cost savings are more modest. In fact, after the second facility, cost savings diminishes. Similarly, the marginal cost-effectiveness shown in Table 5.21 indicates that after the second facility, the expansion will not be cost-effective. For example, the marginal cost-effectiveness ratios for HIV range from \$145,520 to \$272,850. Based on Table 5.21, the marginal benefit-cost ratio for HIV is above unity for the first two facilities. For instance, the marginal benefit-cost ratios according to Table 5.21 range from 1.44 to 0.77 for HIV cases.

Table 5-21. The Marginal Annual Cost - Effectiveness and Cost – Benefit of SIF in Saskatoon Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	HIV Cost-saved	Cost-effectiveness ratio HIV	Cost-benefit ratio HIV
First SIF	\$2,182,800	17%	15	\$975,525	\$145,520	1.44
		(24%, 10%)	(21, 9)	(\$2,238,855, -\$287,805)	(\$103,943, \$242,533)	(2.03, 0.87)
Two SIFs	\$2,182,800	10%	13	\$554,415	\$167,908	1.25
		(14%, 6%)	(18, 8)	(\$1,607,190, -\$498,360)	(\$121,267, \$272,850)	(1.74, 0.77)
Three SIFs	\$2,182,800	6%	8	-\$498,360	\$272,850	0.77
		(9%, 4%)	(12, 5)	(\$343,860, -1,130,025)	(\$181,900, \$436,560)	(1.16, 0.48)
Four SIFs	\$2,182,800	2%	8	-\$498,360	\$272,850	0.77
		(3%, 1%)	(12, 5)	(\$343,860, -1,130,025)	(\$181,900, \$436,560)	(1.16, 0.48)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (34 per cent sharing rate, 14 percent sharing rate).

Moreover, the cost-savings diminishes after the second facility. For example, the cost-saving of \$975,525 diminishes to a loss of \$498,360.

Sensitivity analyses conducted at different baseline sharing rates also demonstrated that establishing SIFs based on HIV averted may save tax payers' dollars (see Table 5.20 & 5.21). The current analysis used 14 and 34 per cent initial needle-

sharing rates for the sensitivity analysis. Second model also demonstrated that establishing more than one SIF in Saskatoon may save tax payers money. As shown in Table 5.22, the cumulative cost-effectiveness ratios range from \$155,914 to \$207,886 and the cumulative benefit to cost ratios are again above unity for the first four potential SIFs. Based on Table 5.22, the marginal values of the second model are also similar to the cumulative values, supporting the establishment of SIFs in Saskatoon. For example, the cost-effectiveness ratios range from \$155,914 to \$272,850 and benefit-cost ratios are above unity for the first two potential SIFs. Therefore, based on the first and second models, establishing at least 2 SIFs in Saskatoon is cost-effective. In effect, on average, benefit-to-cost ratios are never below unity for the first two facilities with an average of 1.32.

Table 5-22. The Cumulative and Marginal Cost - Effectiveness and Cost – Benefit of SIF in Saskatoon Using the Second Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	Cost-effectiveness ratio HIV	Cost-benefit ratio HIV
First SIF	\$2,182,800	17%	14	\$155,914	1.4
	(\$2,182,800)	(17%)	(14)	(\$155,914)	(1.4)
Two SIFs	\$4,365,600	10%	26	\$167,908	1.3
	(\$2,182,800)	(10%)	(12)	(\$181,900)	(1.2)
Three SIFs	\$6,548,400	6%	34	\$192,600	1.1
	(\$2,182,800)	(6%)	(8)	(\$272,850)	(0.77)
Four SIFs	\$8,731,200	2%	42	\$207,886	1.01
	(\$2,182,800)	(2%)	(8)	(\$272,850)	(0.77)

Note: The numbers in parentheses represent the marginal results.

5.8. Results for city of Victoria

Both models, based on the needle-sharing rate, predicted the number of HIV prevented. The first model also predicted the number of HCV prevented. Table 5.23 and Table 5.24 demonstrate that increasing the scope of SIFs increases the number of HIV and HCV prevented. However, these increases are not enough to cover the cost of the program. In fact, the cumulative cost-effectiveness ratios for HIV range from \$4,365,600 to \$6,548,400. For HCV, according to Table 5.23, the cumulative cost-effectiveness

ratios range from \$623,657 to \$873,120. The cumulative benefit-cost ratio is also below unity for both HIV and HCV in all SIF scenarios. According to Table 5.27, cumulative benefit-cost ratios for HIV range from 0.03 to 0.05. The same can also be said regarding the HCV cumulative benefit-cost ratios, ranging from 0.06 to 0.04.

Table 5-23. The Cumulative Annual Cost - Effectiveness and Benefit-Cost of SIF in Victoria Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Benefit-cost ratio HCV	Benefit-cost ratio HIV	Cost-benefit ratio total
Post SIF	\$2,182,800	16%	0.5	3	\$727,600	\$4,365,600	0.05	0.05	0.1
		(23%, 9%)	(1, 0.3)	(5, 2)	(\$436,560, 1,091,400)	(\$2,182,800, \$7,276,000)	(0.08, 0.03)	(0.1, 0.03)	(0.2, 0.06)
Two SIF	\$4,365,600	10%	1	7	\$623,657	\$4,365,600	0.06	0.05	0.1
		(14%, 6%)	(1.5, 0.6)	(9, 4)	(\$485,067, \$1,091,400)	(\$2,910,400, \$7,276,000)	(0.07, 0.03)	(0.07, 0.03)	(0.1, 0.06)
Three SIF	\$6,548,400	6%	1	8	\$818,550	\$6,548,400	0.04	0.03	0.08
		(8%, 3%)	(2, 0.7)	(12, 5)	(\$545,700, \$1,309,680)	(\$3,274,200, \$9,354,857)	(0.06, 0.03)	(0.06, 0.02)	(0.1, 0.05)
Four SIF	\$8,731,200	2%	2	10	\$873,120	\$4,365,600	0.04	0.05	0.09
		(3%, 1%)	(2, 0.9)	(15, 6)	(\$582,080, \$1,455,200)	(\$4,365,600, \$9,701,333)	(0.06, 0.02)	(0.05, 0.02)	(0.1, 0.04)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (33 per cent sharing rate, 13 percent sharing rate).

Table 5-24. The Marginal Annual Cost - Effectiveness and Benefit Cost of SIF in Victoria Using the First Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	#of HCV averted	Cost-effectiveness ratio HCV	Cost-effectiveness ratio HIV	Benefit-cost ratio HCV	Benefit-cost ratio HIV	Cost-benefit ratio total
Post SIF	\$2,182,800	16%	0.5	3	\$727,600	\$4,365,600	0.05	0.05	0.1
		(23%, 9%)	(0.8, 0.3)	(5, 2)	(\$436,560, \$1,091,400)	(\$2,728,500, \$7,276,000)	(0.08, 0.03)	(0.08, 0.03)	(0.2, 0.06)
Two SIFs	\$2,182,800	10%	0.5	3	\$727,600	\$4,365,600	0.05	0.05	0.1
		(14%, 6%)	(0.7, 0.3)	(4, 2)	(\$545,700, \$1,091,400)	(\$3,118,286, \$7,276,000)	(0.06, 0.03)	(0.07, 0.03)	(0.1, 0.06)
Three SIFs	\$2,182,800	6%	0.3	2	\$1,091,400	\$7,276,000	0.03	0.03	0.06
		(8%, 3%)	(0.4, 0.2)	(3, 1)	(\$727,600, \$2,182,800)	(\$5,457,000, \$10,914,000)	(0.05, 0.02)	(0.04, 0.02)	(0.09, 0.04)
Four SIFs	\$2,182,800	2%	0.3	2	\$1,091,400	\$7,276,000	0.03	0.03	0.06
		(3%, 1%)	(0.4, 0.2)	(3, 1)	(\$727,600, \$2,182,800)	(\$5,457,000, \$10,914,000)	(0.05, 0.02)	(0.04, 0.02)	(0.09, 0.04)

Note: The numbers in parentheses represent the results of the sensitivity analysis: (33 per cent sharing rate, 13 percent sharing rate).

According to Table 5.24, the marginal increases in values for both HIV and HCV predicted by Jacobs et al.'s (1999) model demonstrate that the establishment of SIFs may not cover the cost of the program. For example, the cost-effectiveness ratios for HIV range from \$4,365,600 to \$7,276,000. According to Table 5.24, HCV's marginal cost-effectiveness ratios range from \$727,600 to \$1,091,400. Based on Table 5.24, the marginal benefit-cost ratio for both HIV and HCV is still below unity. For instance, the marginal benefit-cost ratios according to Table 5.24 range from 0.03 to 0.05 for both HIV and HCV.

Table 5-25. The Cumulative and Marginal Cost - Effectiveness and Cost – Benefit of SIF in Victoria Using the Second Model

Variables	Annual cost of operation	Sharing rate	#of HIV averted	Cost-effectiveness ratio HIV	Benefit-cost ratio HIV
Post SIF	\$2,182,800 (\$2,182,800)	16%	13 (13)	\$167,908 (\$176,908)	1.3 (1.3)
Two SIFs	\$4,365,600 (\$2,182,800)	10%	24 (11)	\$181,900 (\$198,436)	1.2 (1.1)
Three SIFs	\$6,548,400 (\$2,182,800)	6%	31 (7)	\$211,239 (\$311,829)	1.0 (0.7)
Four SIFs	\$8,731,200 (\$2,182,800)	2%	38 (7)	\$229,768 (\$311,829)	0.9 (0.7)

Note: The numbers in parentheses represent the marginal results.

Sensitivity analyses conducted at different baseline sharing rates also demonstrated that the Jacobs et al (1999) model suggests that establishing a SIF based on HIV and HCV may not save tax payers' dollars (see Table 5.23 & 5.24). The current analysis used 13 and 33 per cent initial needle-sharing rates. However, when Kaplan & O'Keefe, (1993) model is employed, based on HIV cases prevented, establishing at least two SIFs in Victoria appears to be cost-effective. As shown in Table 5.25, the cumulative cost-effectiveness ratios range from \$167,908 to \$251,861 and the cumulative benefit to cost ratios are above unity for the first two potential SIFs. Based on Table 5.25, the marginal values are also similar to the cumulative values, supporting the establishment of SIFs in Victoria. For example, the cost-effectiveness ratios range from \$167,908 to \$311,829 and benefit-cost ratios are above unity for the first two potential SIFs.

Table 5-26. Cost-savings, Cost-effectiveness and Cost-benefit Ratio of Estimated Annual Death Prevented as a result of a SIF in Victoria

Variables	Annual cost of operation	#of overdose death averted	Cost-saving	Cost-effectiveness ratio death prevented	Cost-benefit ratio death prevented
Post SIF	\$2,182,800	2.3	\$2,251,525	\$949,044	1.03

The number of overdose deaths in Victoria is calculated according to the following method. There are 1,826,000 injections (2000 PWIDs * 913 injections per year) estimated in Victoria (Andresen & Boyd, 2010 Jacobs et al., 1999; Holtgrave et al., 1998;

Laufer, 2001; McClean, 2002). With an estimated 1.3 overdose cases per 1000 injections at Insite, a potential SIF in Victoria is able to deter an estimated 307 overdose cases (Tyndall et al., 2003, Tyndall et al, 2006). Subsequently I predict that there are 2,374 [1,826,000 X 0.0013] overdose cases in the city of Victoria each year. By limiting the calculation to those that 'stop breathing' as a potentially fatal overdose (16.4% of overdoses) this leads to a lower a number of 389 in the city of Victoria (Andresen & Boyd, 2010). With 2.16% of potential fatal overdoses leading to an actual death, 8.4 overdoses in Victoria are estimated to lead to a death. This number is much lower than the average number of illicit drug overdose deaths in Victoria reported by the Corners Service (2012) to be on average 19 per year. Finally because 34% of PWIDs were estimated to use SIF in Victoria based on user rates in Vancouver, 2.3 overdose deaths are estimated to be prevented at the first potential SIF in Victoria (Tyndall et al., 2003).

Consequently, according to Table 5.26, the cost saving as a consequence of saving 2.3 overdose deaths is in excess of CAN\$2.251 million. Based on Table 5.26, a SIF in Victoria is cost-saving and benefit-cost ratio is above 1. Therefore, based on Kaplan and O'Keefe, (1993) model and overdose death reductions, establishing at least 2 SIFs in Victoria is cost-effective. In effect, on average, benefit-to-cost ratios are never below unity for the first two facilities with an average of 1.18.

5.9. Discussion

In summary, the findings in this chapter underscore the important contribution of SIFs in saving lives and reducing infectious diseases such as HIV and HCV. This chapter's results suggested that, a potential SIF in Montreal, Ottawa Toronto, Saskatoon and Victoria will on average prevent dozens of HIV and HCV infections. Moreover, the establishment of SIFs in British Columbia's capital city appears to be cost-effective through the prevention of overdose death cases. In fact, cost-effective and cost-benefit ratios suggest that the establishment of at least two SIF in Victoria, Ottawa, Toronto will save tax payers' dollars for the resources they consume. In Montreal, the cost-benefit ratios pointed to at least three SIFs. Due to inherent methodological differences, it is difficult to compare cost-benefit studies. But when responding to the growing problem of PWIDs, it is important to place our results alongside other costing studies.

Costing studies of Montreal, Quebec demonstrate a benefit-to-cost ratio for introducing one SIF of 1.35 up to 1.03 for three SIFs (Jozaghi et al. 2013). Costing studies of expanding the Vancouver Insite to three sites demonstrated benefit-to-cost ratios between 3.09 and 1.26 (Andresen & Jozaghi, 2012). Costing studies of Toronto and Ottawa (first two SIFs respectively) demonstrate the possibility of preventing 2-3 and 6-10 cases of HIV respectively (Bayoumi & Strike, 2012). 15-20 cases of HCV could also be prevented in Toronto saving almost \$50,000 for the first facility. Ottawa has the potential to save almost \$20,000 (Bayoumi & Strike, 2012). Moreover, a recent costing study in Ottawa demonstrated that there are potential cost saving measures in excess of 1 million dollars for the first facility in terms of prevented cases of HIV and HCV (Jozaghi et al., 2014).

Surely the success or failure of the program depends on the decrease or increase in HIV infections, HCV infections, and overdose rates within the PWID population who will benefit from the targeted expansion. Even if PWIDs fail to change their behavior, the rate of new HIV and HCV infections will fall in proportion to the increased accessibility of more SIFs, lowering the level of infections from the needles circulating among PWID participants. In addition, according to Andresen and Jozaghi (2012) “changed injection behaviour and decreases in HIV infections will impact the level of HIV incidence over time and, potentially, the cleaning of needles and the number of sharing partners” (p. 12).

This brings my discussion back to the local geography of each city’s injection drug scene. Previous research on Vancouver and the expansion of Insite has discussed the importance of local geography in the context of willingness to travel to an injection facility, waiting times, and geographical segregation (self-imposed) based on different social strata within the PWID community (Andresen and Jozaghi, 2012). Other research on Vancouver and its drug scene has described the importance of place in shaping the social aspect of injecting drugs, considering factors such as economic deprivation, homelessness, and understanding local environments as places that can have a therapeutic impact (Insite) for PWID (Jozaghi, 2012a). And in the context of Toronto and Ottawa, Bayoumi and Strike (2012) have shown how the differences in drug-injecting practices between these two cities can impact economic assessments.

A qualitative study undertaken by Jozaghi and Andresen (2013) noting that PWIDs in Victoria are willing to travel to a SIF if one were to open for “safety reasons, [while] others emphasized the need to avoid hazards of the street, [and] many stated they would use a supervised injection facility to stay alive” (p. 8). This chapter’s specific information for Victoria, Ottawa, Toronto, Saskatoon and Montreal is along the lines of Bayoumi and Strike (2012)—the local conditions in each city and how they impact the establishment of local harm reduction policy. For example, in Victoria, probably the most pertinent information regarding the local drug scene is the closure of its needle exchange in 2008. This has led to a large magnitude increase in shared injections. Additionally, the drug scene in Victoria more commonly has the use of drugs that require more frequent injection than heroin (Ivsins et al., 2010). This is critical because the frequency of injection used to calculate the models, above, was based on the average number of heroin injections. Because of the local drug culture in Victoria and most of the Canadian municipalities mentioned in this chapter, any benefits shown in these models are, therefore, an underestimate.

And lastly, many of the noted municipalities has officially subscribed to the “Four Pillars” approach to street drug use that is supposed to include enforcement, prevention, treatment, and harm reduction. This is mainly due to pressures from local residents and business owners. In recent years the establishment of “no-service-areas” and/or “no-go-zones” have been established for some public health services. This only highlights the importance of understanding urban policy mobilities, particularly in a harm reduction context with local politics at play (McCann, 2008; McCann and Temenos, in press; Temenos and McCann, 2012).

In sum, through the use of Jacobs et al. (1999) and Kaplan and O’Keefe (1993) mathematical models this chapter has shown that SIFs in Victoria, Montreal, Toronto, Saskatoon and Ottawa are indeed cost-saving. The models in this chapter are similar to that used by Andresen and Boyd (2010), Andresen and Jozaghi (2012), Jozaghi, Reid and Andresen (2013), Jozaghi et al. (2014) and Jozaghi (2014c) that also show cost-savings in terms of SIF expansion. This chapter shows that the number of new HIV and HCV infections averted, and the associated cost-savings in terms of overdose death cases prevented, is more than enough to cover the cost of operating more than one SIF

in large and small Canadian cities. This chapter examined different drug culture from the east coast cities such as Montreal, Ottawa, and Toronto through a prairie city and finally the west coast city of Victoria. While some people will always oppose SIFs, it is my hope that this chapter has opened new avenues for healthy discussions regarding SIF outside of the DTES in British Columbia.

Chapter 6.

Conclusion

Risk associated with injection drug use is a significant challenge for health policy-makers around the world in their efforts to combat morbidity and mortality factors tied to this chronic and relapsing behaviour (Jozaghi & Andresen, 2013). Of the estimated 16 million injection drug users (PWIDs) globally, approximately 8 million are infected with chronic HCV and 3 million are living with HIV (Mathers et al., 2008; Grebely & Dore, 2011). Although the rate of HIV infection have been slowly declining in Vancouver, Canada, due to effective harm reduction programs, this phenomena has not been replicated in other Canadian jurisdictions (Jozaghi, 2014b; Ti et al., 2013).

On September 22, 2003, North America's first officially-sanctioned SIF, known as 'Insite', opened its doors (Jozaghi & Andresen, 2013). Located in Vancouver's DTES, Insite was meant to reduce the twin burdens of blood borne diseases and health related costs (Kerr et al. 2003). So far, Insite has been visited by more than 2 million clients in the DTES, and is currently optimal use is being made of this facility (Hyshka, Bubela & Wild, 2013; Kerr, Small, Moore & Wood, 2007; Jozaghi & Andresen; Jozaghi, 2012b). At present, there are more than 15,000 unique PWIDs who are registered to use the facility – with the average user of Insite visiting the facility more than 11 times per month (Rennie, 2011). Through hygienic and safe environment, Insite provide a space for PWIDs to inject the previously obtained illicit drugs (Fast, Small, Wood & Kerr, 2008). Through registered nurses, PWIDs are typically taught about safe injection behaviour and are provided with sterile injection equipment for drug use. These include cases of sterile water for injection, insulin syringes that includes various sizes, latex male/female condoms, alcohol swaps, filters, tie, vitamin C, boxes for disposal and cookers (Wood et al. 2005). Furthermore, coffee, food, water as well as emergency care (in case of

overdose) are provided in the chill lounge. Referrals to addiction services are provided through counselors and registered social workers (Wood et al. 2005).

Insite's operation has been controlled by strict regulations set out by Health Canada, including regulations that does not allow any help during the injections and prohibits sharing of drugs by PWIDs (Kerr et al., 2007). Moreover, the facility is required to register all the participants who use the services (Kerr et al., 2007). Throughout a typical day at Insite-- it is open 7days a week from 10-4 AM – 600 injections are supervised by a nurse and the staff within the small 12 individual booths in the injection room (Kerr et al. 2007). As of 2013, more than 92 SIFs have been opened in 61 cities (Dooling & Rachlis, 2010; Hyshka et al., 2013). However, Insite opened as a pilot project only after 1) overriding some of the provisions of the *Controlled and Substances Act* established by the Canadian Liberal federal government, and 2) obtaining recommendations from a federal task force (Dooling & Rachlis, 2010). Furthermore, faith in Insite as a medical experiment hinged on the condition that its impact would be rigorously evaluated (Hathaway & Tousaw, 2007). Incidentally, since its operation, there have been more than 50 peer reviewed studies conducted to evaluate Insite from various angles. It should be noted that none of the studies have been able to highlight any adverse effects.

Ironically, however, the operation and scientific evaluation of the Vancouver's SIF has been challenged by Canada's conservative federal government publically: both in the media and in courts (Wood, Kerr, Tyndall, Montaner, 2008). In effect, despite the support of the City of Vancouver and BC's provincial government, the federal government, since May 2008, has leaned towards closing the facility (Rennie, 2011). The federal government has rejected the scientific evidence supporting Insite, arguing in turn that the facility fosters addictions (Rennie, 2011). According to former federal health minister, Tony Clement, "we have given it due process, we've looked at all the evidence, and our position is that the exemption should not be continued ... in terms of public policy, it was clear: a better thing to do is to treat people, to prevent people from going on the drugs in the first place" (Rennie, 2011, p. S1).

Tackling the constant threat of closure from the federal government, the operators of Insite were compelled to take the federal government of Canada to the Supreme Court of British Columbia in 2007. The Supreme Court of BC, and in the later legal battle the British Columbia Court of Appeal, ruled that Insite should remain open. Both courts ruled that the “*Controlled Drugs and Substances Act* in Canada is unconstitutional as it pertains to Insite because the closure of the program under the Act would impede PWIDs from receiving lifesaving healthcare” (Small, 2010, p. 2). Despite these rulings in favour of Insite, the federal government decided to pursue the case further and take it to the Supreme Court of Canada (*Attorney General of Canada v. PHS Community Service Society*, 2011). The Supreme Court of Canada finally ruled in favour of Insite on September 2011 (Andresen & Jozaghi, 2012).

The rulings highlighted the legal implications for the establishment and expansion of similar SIFs in Canada in the near future (Jozaghi, 2012b). The ruling states: “On future applications, the Minister must exercise that discretion within the constraints imposed by the law and the Charter, aiming to strike the appropriate balance between achieving public health and public safety.” (*Canada v. PHS Community service society*, 2011). In light of the Supreme Court of Canada’s unanimous decision on Insite, recognizing the right of such facilities as a necessary medical facility for marginalized populations, the Canadian federal government introduced the *Bill C-65* (now *Bill C-2*) – an act to amend *the Controlled Drugs and Substances Act*. Many have raised concern about the *Bill C-2* because they believe that the legislation ignores the benefits of SIFs, in the interest of community safety, restricting the access to those who need it the most.

Bill C-2 is now proposing 26 new kinds of criterion that must be met before an exemption can be granted by the Minister of Health. However, placing an emphasis on the “expression of community support or opposition” imposes a significant barrier to the marginalized population in terms of accessing the life-saving healthcare services. Ultimately, *Bill C-2* will make the most marginalized population facing the risk of overdose and infectious diseases dependent more on perception and feeling rather than on reliable and empirical evidence. The *bill* will not only pit the marginalized and vulnerable groups’ rights against the general population, it will facilitate the rise of voices

of dissent based on a moral ideology and NIMBYism, the latter of which refers to the “not in my backyard” attitude.

In addition, the result of this dissertation demonstrated that drug users advocacy groups, not the law enforcement has been instrumental in improving conditions of the DTES, altering the risky injection behaviour of its members. Moreover, drug user advocacy groups have given a voice to the most marginalized members of society who otherwise would not be represented. Findings from this dissertation highlighted the important role that a drug user organization can play in creating new physical and conceptual space.

Moreover, findings suggest that peer drug users who volunteer in the DTES were taking on important education and safety roles, and were able to alter the behaviour, attitude, and intention of PWIDs within the DTES area of the city. Further, peer PWIDs were able to reach individuals who were reluctant to seek medical help, housing, and prevention services. Peers serve as an agent of change in the DTES to disseminate information and risk reduction skills to the most marginalized people.

Finally, a controversial harm reduction program in the DTES has provided new insight into effectiveness of harm reduction programs. Randomized heroin trials reduce criminal activity, sex work, and illicit drug use. In addition, the trials improved the health and social functioning of its clients, with some participants acquiring work and/or volunteer positions. Many of the participants have been able to re-connect with their family members, that was not possible before the program. Furthermore, the relationship between the staff and patients at the project appears to have transformed the behaviour of participants. Attending HAT in Vancouver has been particularly effective in creating a unique microenvironment where PWIDs who have attended HAT have been able to form a collective identity advocating for their rights. The result of this research points to the need for continuation of the project beyond the current study, leading towards a permanent program.

The findings in the current dissertation when taken as whole points to the effectiveness of harm reduction programs. It is well known that city, provincial, and federal governments spend more money on policing and drug-enforcement than the

harm reduction programs (Wood et al., 2003; Hathaway & Tousaw, 2007). For instance, illicit drug harm reduction programs in 2004–2005 received less than 3 percent (\$10 million) of total funding marked for drug use services (DeBeck, Wood, Montaner, & Kerr, 2007). This level of funding is particularly worrisome when compared to ever increasing law enforcement funding that has been linked to increased harm and violence in the drug market, especially increases in risky injection behaviour amongst PWIDs (Kerr, Small & Wood, 2005).

However, this dissertation has demonstrated that employing former and current illicit drug users—through small stipends and funding harm reduction peer-driven organization—has the most effective influence on the risky behaviour of the people who use drugs. Such programs, as demonstrated in this dissertation, have the potential to reduce many of the well-known risk factors described in this dissertation. Moreover, the noted programs have the potential to give a marginalized population a space where they feel empowered to advocate for their rights and issues that may affect their health and well-being. This is very important in the realm of drug policy in Vancouver because such activism on behalf of PWIDs by drug users themselves have pushed many boundaries that have previously brought disproportionate suffering for illicit drug users.

And the cornerstone of the harm reduction program in Vancouver that has brought the most attention is the SIF. The SIF in Vancouver is unique in its application and operation where peers are employed to provide education, support and counselling to PWIDs. VANDU and WND also provide much needed employment and support to the PWID population of the DTES. It should be noted, however, that the SIF in Vancouver may be applied in smaller scale as a continuum of expanded health care program throughout Canada. A perfect example is Dr. Peter AIDS foundation/centre where the small injection room also operates as part of the overall services being provided at the centre.

Therefore, any expansion of SIFs or harm reduction programs in other Canadian cities need not to be conducted after consulting the community such as provincial, civic and police officials essentially giving a veto to health care services to cities, police, community opponents and Ministries of Public Safety. The benefit of SIFs are known :

SIFs are effective in reducing injections in public and they simultaneously lower the rates of overdose fatalities and infectious diseases (Broadhead et al., 2002; Kerr et al., 2007; Wood et al., 2005; Andresen & Boyd, 2010). Also, SIFs have not increased crime, drug dealing, public injection, public syringe disposal or contributed to the disturbance of public order in any way (Hathaway & Tousaw, 2007; Drucker, 2006; Stoltz et al., 2007). The federal government has the opportunity to revise its policy and base its legislation on the best scientific evidence available, while providing disease prevention services and supporting the marginalized members of society. Policy maker should start considering SIFs as an expansion of a health care program.

Bill C-2 must recognize that the access to SIFs is a human rights issue that is based on the principles of harm reduction and proven efficient, evidence-based practices in public health. Accordingly, “concerns that arise out of prejudice and ignorance for which there are no sound arguments should be set aside” (Zlotorzynska, Wood, Montaner, & Kerr, 2013, p. 1304). As this dissertation has recounted the lived stories of many PWIDs, harsher and stricter policies toward drug users will make the overall health of this population much worse because it will increase discrimination, risky behavior and make the health care delivery more difficult.

The rate of needle sharing was not reduced because of more emphasises on strict policies, rather it was attributed to more relaxed polices that recognized that harm reduction should be given more attention. As this dissertation has shown, treating PWIDs with more dignity, kindness and empathy will improve their overall quality of life. Program such as HAT will reduce crime, and improve the health and social tenure of PWIDs because addiction is viewed as a health issue rather than a criminal justice or public nuisance. When PWIDs are connected to their peers, they will begin to ask for housing, social services and slowly improve their living conditions. This will ultimately help in conceptualizing the injection drug use as a public health issue, rather than a moral one (Zlotorzynska, Wood, Montaner, & Kerr, 2013).

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