

**EVALUATION OF A DRUG USER-LED SAFER INJECTING
EDUCATION CAMPAIGN**

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Abstract

Background: Unsafe injection practices remain a significant source of morbidity and mortality among people who inject drugs (IDU), this thesis sought to: review the literature outlining the ways in which people inject unsafely, the health consequences associated with unsafe practices, the factors that influence injection practices, and the interventions that have been designed to address these problems; describe a drug user-led safer injecting education campaign; and finally, examine the facilitators' and participants' perceptions of a unique user-led intervention.

Methods: Qualitative data was derived from semi-structured qualitative interviews conducted with eight members of the Injection Support (IS) Team who developed and facilitated a series of safer injecting education workshops and 20 individuals who participated in these workshops. Interviews were transcribed verbatim and a thematic analysis was conducted.

Results: A literature review identified numerous specific unsafe injection practices, which are associated with negative health outcomes, including HIV, hepatitis C, bacterial infections, and venous damage. Research demonstrates that various individual, physical, social, and structural factors influence injection practices, and has identified a number of interventions (e.g. syringe distribution, education) that reduce negative health consequences. Results indicate that IDU typically learn about injecting by watching or sharing experiences with other IDU and that significant gaps in knowledge regarding safer injecting practices persist. Accounts of IDU suggest that the unique process and structure of IS Team workshops enabled effective communication of information about safer injecting practices, while targeting the unsafe practices of workshop participants. Facilitators' identity as IDU

enhanced their ability to relate to workshop participants, most of whom expressed that they prefer user-led interventions to other approaches. Facilitators reported gaining knowledge, skills, and positive feelings about themselves from their involvement in the campaign, while many participants reported that they acquired new knowledge that would alter their future injecting practices.

Discussion: The IS Team education campaign focuses on health issues relevant to IDU that are not being adequately addressed by existing public health programs. This study demonstrates the feasibility and benefits of involving IDU in educational initiatives targeting unsafe injecting. Increased involvement of IDU in interventions designed to address unsafe injecting is urgently required.

Preface

This statement is to certify that the work presented in this thesis was conceived, conducted, and written by Cody Callon (CC). All research described in this thesis was approved by the University of British Columbia/Providence Health Care Research Ethics Board (certificate number H05-50186). The co-authors of the manuscripts that partially constitute this thesis, including Dr. Thomas Kerr (TK), Dr. Grant Charles (GC), and Dr. Will Small (WS) made contributions only as is commensurate with committee, collegial or co-author duties. This project was conducted as a portion of a larger community-based research collaboration between investigators at the BC Centre for Excellence in HIV/AIDS and the Vancouver Area Network of Drug Users (VANDU) to evaluate the VANDU Injection Support Team. The principal investigator of the larger research program from which the studies in this thesis were derived (TK) had access to all of the data and as a corresponding author takes full responsibility for the integrity of the results. With guidance and input from TK, GC, and WS, CC was responsible for overall study design, data collection, data analysis, and preparation of initial drafts of all manuscripts. All manuscripts contained in this thesis were prepared and written by CC. Final drafts of manuscripts were prepared following the inclusion of material based on comments and critical evaluations offered by co-authors. At this time none of the manuscripts presented in this thesis have been submitted for publication.

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Chapter 1

Background and Research Objectives

1.1 Injection Drug Use and Drug-related Harm

Injection drug use is a growing public health concern internationally. Recent estimates suggest that there are 15.9 million people who inject drugs (IDU) in 148 different countries worldwide (Mathers, et al., 2008). Within Canada it is estimated that there are between 75,000 and 125,000 IDU, with approximately 15,000 of those individuals residing in Vancouver (Canadian Centre of Substance Abuse, 2008). Injection drug use continues to be associated with an array of severe health and social harms for individuals and communities throughout the world.

Globally, IDU make up a subpopulation that experience much higher levels of morbidity and mortality than the general population (Copeland, Budd, Robertson, & Elton, 2004; UNAIDS, 2007). This is due in part to the ongoing criminalization of this population (Maher & Dixon, 1999; Small, Kerr, Charette, Schechter, & Spittal, 2006), as well as low rates of access to recommended prevention programs and technologies (Mathers, et al., 2010). For example, it is estimated that only 60% of IDU globally have access to essential HIV prevention programs recommended by the World Health Organization and the United Nations Programme on HIV/AIDS (WHO, UNODC, & UNAIDS, 2009). Mortality estimates among IDU are reported to be 13 times greater than in non-drug using populations (Copeland, et al., 2004; Hulse, English, Milne, & Holman, 1999), and IDU are known to suffer from exceptionally high rates of preventable illness, including high rates of blood-borne diseases such as HIV and hepatitis C (Aceijas & Rhodes, 2007; Mathers, et al., 2008). Research has shown significant variation in HIV prevalence among IDU with estimates

ranging from 12% to over 40% across geographic regions, and approximately three million HIV positive IDU worldwide (Mathers, et al., 2008). Available regional estimates of hepatitis C infection among IDU highlight even greater variation with prevalence ranging between 2% and 100%, and 48 of the 57 countries examined reporting prevalence estimates of 50% or higher (Aceijas & Rhodes, 2007).

Injection drug use also places IDU at risk of contracting a wide range of other infections including but not limited to abscesses, cellulitis, tuberculosis, myositis, pyomyositis, necrotizing fasciitis, tetanus, wound botulism, endocarditis, osteomyelitis, and septicaemia (Gordon & Lowy, 2005; Johnston & Keogan, 2004). These injection-related infections have been shown to account for the majority of emergency room visits and acute hospitalizations of IDU in several settings (Kerr, et al., 2004; Lloyd-Smith, Wood, et al., 2010; Palepu, et al., 2001; Takahashi, Merrill, Boyko, & Bradley, 2003). Chronic venous disease is another damaging long-term effect of injection drug use (Pieper, Kirsner, Templin, & Birk, 2007). The study of a large sample of persons receiving methadone treatment in the United States, found that 87% exhibited clinical evidence of chronic venous disease (Pieper, et al., 2007; Pieper & Templin, 2001). Overall, injection-related complications have been found to be relatively common, with a recent study of a large sample of IDU from across Australia revealing that 69% of participants reported lifetime prevalence of injecting-related injury and disease (Salmon, Dwyer, et al., 2009).

1.2 Unsafe Injection Practices and Individual, Physical, Social, and Structural Causes

A small body of ethnographic and epidemiological research describes the unsafe injection practices that lead to increased levels of morbidity and mortality among IDU. Proper preparation and administration of a drug by injection is a multi-step process, the

incorrect application of which increases likelihood of viral and bacterial infections, blood-borne disease transmission, as well as circulatory and soft tissue damage. The sharing of injection paraphernalia such as syringes and ancillary injecting equipment (e.g., cookers, filters, water), as well as splitting drug solutions, are the unsafe injection practices that have received the most attention in the literature as a result of their role in blood-borne disease transmission (Koester, Booth, & Zhang, 1996; Koester, 1994; Needle, et al., 1998; Wood, et al., 2001). Poor hygiene surrounding the preparation process, as well as adulterants or bacteria present in drugs or injection preparations can lead to venous damage and infection (Gordon & Lowy, 2005; Grund, 2005; Salmon, Dwyer, et al., 2009; Scott, 2005; Topp, Iversen, Conroy, Salmon, & Maher, 2008). Inadequate injection technique such as creating larger punctures than necessary, repeated use of damaged sites, or injecting into an artery can result in circulatory system damage (Grund, 2005; Scott, 2005; Woodburn & Murie, 1996). Many of the aforementioned complications are preventable given adequate provision of injecting equipment, as well as proper preparation and administration of injection drugs.

Historically, discussions regarding unsafe injection practices and harm reduction interventions, especially in western industrialized nations, have centred on individual risk and behaviour change (Rhodes, 2002). More recently, there has been widespread recognition that individually-focused models (e.g., health belief models, social learning theory) that emphasize knowledge, behavioural intentions, and self-efficacy to engage in risk reduction strategies are unable to account for the full variability in risk of HIV and other injection related harms across drug using populations (Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005; Sumartojo, 2000). In response to these concerns, several authors have argued that injection related harm is the product of complex and dynamic interactions

between individual behaviour and micro and macro level features of the physical, social, and structural environment(s) in which drug use occurs (Galea & Vlahov, 2002; Rhodes, 2002; Rhodes, et al., 2005; Singer, et al., 2000; Strathdee, et al., 2010). Among the most well developed analytic tools for understanding the complexities of injection risk behaviour and guiding more effective responses is Rhodes' "Risk Environment Framework" which emphasizes how environmental conditions in specific contexts shape drug-related harms and the impact of related interventions (Rhodes, 2002, 2009; Rhodes & Simic, 2005; Rhodes, et al., 2005; Rhodes, et al., 1999; Strathdee, et al., 2010). As such, the Risk Environment Framework provides a useful model for delineating the individual, physical, social, and structural forces that promote and reduce unsafe injection practices.

A large body of literature has documented a range of factors that are associated with unsafe injection practices. At the individual level, factors such as sexuality (Kral, et al., 2005; Marshall, Wood, Li, & Kerr, 2007), gender (Miller, Spittal, et al., 2002; Spittal, et al., 2002), ethnicity (Stachowiak, et al., 2006; Zhang, et al., 2007), mental health status (Davidson, et al., 2001), experiences of abuse (Plotzker, Metzger, & Holmes, 2007), self-efficacy for risk reduction (Kang, Deren, Andia, Colon, & Robles, 2004), and the types of drug used and technical practices employed in preparation (Ciccarone & Bourgois, 2003; Tyndall, et al., 2003) have all been shown to influence injecting practices. Influential factors related to the physical environment include neighbourhood level disadvantage (Maas, et al., 2007; Nandi, et al., 2010), homelessness (Metraux, Metzger, & Culhane, 2004), unstable housing conditions (Des Jarlais, Braine, & Friedmann, 2007), the availability of illicit drugs in a geographic area and local consumption practices (Ciccarone & Bourgois, 2003; Kerr, Kiatying-Angsulee, et al., 2010), and specific locations in which drugs are used (Kerr,

Kimber, & Rhodes, 2007; Rhodes, Kimber, et al., 2006). Social influences on injecting practices have predominantly focused on the structure of social networks (Prithwish, Cox, Boivin, Platt, & Jolly, 2007), including the size and density of networks (Latkin, Mandell, Vlahov, Oziemkowska, & Celentano, 1996), the individual characteristics of network members (Bailey, et al., 2007; Davey-Rothwell & Latkin, 2007), and types of relationships between network members (Unger, et al., 2006), as well as broader experiences of social stigma and discrimination (Jackson, Parker, Dykeman, Gahagan, & Karabanow, 2010; Simmonds & Coomber, 2009). At the structural level, poor socioeconomic conditions (Genereux, Bruneau, & Daniel, 2010), availability of adequate housing (Coady, et al., 2007), legal restrictions on syringe exchange and distribution (Des Jarlais, et al., 2009), policing practices (Maher & Dixon, 1999; Small, Kerr, et al., 2006), and the availability of treatment and prevention services (Metzger, Navaline, & Woody, 1998; Wood, Spittal, Li, et al., 2004) have been shown to interact with micro-level factors to “structure” the context in which injection risk and harm is produced. Accordingly, the Risk Environment Framework calls for a broad set of interventions that seek to address the social, structural, and environmental production of risk among IDU.

1.3 Safer Injecting Interventions

As the evidence base describing the harms associated with unsafe injection practices has evolved, a variety of interventions have been developed and implemented as a means of reducing the associated negative health consequences. Common interventions designed specifically to target unsafe injection practices include distribution of syringes and injection paraphernalia (Des Jarlais, et al., 2009; Mathers, et al., 2010; Wodak & Cooney, 2006), outreach programs (Coyle, Needle, & Normand, 1998; Needle, et al., 2005), supervised

injection facilities (MSIC Evaluation Committee, 2003; Hedrich, 2004; Kerr, Kimber, Debeck, & Wood, 2007), educational and behavioural interventions (Abou-Saleh, et al., 2008; Purcell, et al., 2007; Zule, Costenbader, Coomes, & Wechsberg, 2009), and educational materials such as posters and pamphlets (Horyniak, et al., 2010; The Chicago Recovery Alliance, 2011; Wu, et al., 2007). Despite the recognized value of these approaches, their limitations have also been noted. For example, the limitations of educational and behavioural health interventions focused on the individual have been well established (Fee & Krieger, 1993; Karpati, Galea, Awerbuch, & Levins, 2002; Madray & Van Hulst, 2000; Moore & Dietze, 2005; Rhodes, 1997) predominantly due to their failure to address contextual factors exogenous to the individual that shape risk and adverse health outcomes. Syringe and paraphernalia distribution as well as outreach programs address structural barriers related to access to clean injection paraphernalia, but often offer limited coverage and fail to deal with other structural issues, as well as aspects of the physical environment which shape health outcomes among IDU. Although supervised injection facilities are designed to address aspects of the physical environment, research has shown that their capacity is often insufficient in comparison to the size of injecting populations (Kimber, Hickman, Degenhardt, van Beek, & Coulson, 2005; Small, Rhodes, Wood, & Kerr, 2007).

Given the limitations of predominant approaches, there has been a growing interest in the involvement of IDU in initiatives that address unsafe injecting practices and the associated adverse health consequences. Researchers in a number of settings internationally have implemented peer-driven network oriented HIV prevention interventions in which public health experts train peer leaders to disseminate prevention information and supplies

through micro and macro networks of IDU (Booth, et al., 2009; Broadhead, et al., 2009; Broadhead, et al., 1998; Broadhead, et al., 2006; Latkin, 1998; Weeks, et al., 2009). The primary focus of these interventions is to identify various drug-using social networks and address the risks of specific practices occurring within these networks. Evaluation of these approaches have shown that peers are viewed as credible and influential sources of information, and that these approaches typically reach hidden and diverse populations of IDU with prevention information and supplies in settings where high-risk behaviours occur (Broadhead, Heckathorn, Grund, Stern, & Anthony, 1995; Broadhead, et al., 1998; Dickson-Gomez, Weeks, Martinez, & Convey, 2006; Grund, et al., 1992; Latkin, 1998). These approaches have also been shown to be highly cost-effective (Broadhead, et al., 1998; Latkin, 1998).

A further alternative includes interventions that have been organized, designed, and implemented by formal and informal groups of IDU targeting drug-related harms in their own communities (Carruthers, 2007; Crofts & Herkt, 1995; Friedman, de Jong, et al., 2007; Kerr, Hayashi, et al., 2010; Kerr, et al., 2006; Trautmann, 1995). Although descriptions of user-led organizations in various settings are available in the literature (Carruthers, 2007; Crofts & Herkt, 1995; Friedman, de Jong, et al., 2007; Trautmann, 1995), there have been few evaluations of the initiatives developed by these groups. Exceptions include evaluations of the Mitsampan Harm Reduction Centre operated by the Thai Drug Users Network in Bangkok, Thailand, and programs organized by the Vancouver Area Network of Drug Users (VANDU) in Vancouver, Canada, which show that these user-led initiatives extend the reach and effectiveness of harm reduction services available in these areas (Hayashi, Wood, Wiebe, Qi, & Kerr, 2010; Kerr, Hayashi, et al., 2010; Kerr, Oleson, Tyndall, Montaner, & Wood,

2005; Kerr, et al., 2006; Wood, Kerr, Spittal, Small, et al., 2003). Such interventions represent an important, and often under-utilized, strategy to extend the scope and reach of harm reduction programming targeting IDU. Given existing indications of the value of user-led approaches in addressing the harms associated with injection drug use, and the paucity of research describing and evaluating these approaches, further evaluation and description of user-led initiatives is urgently required.

1.4 Study Objectives, Setting, and Outline

The primary objectives of this thesis are to describe a unique drug user-led safer injecting education campaign, and to examine participants' and facilitators' experiences with this campaign. This research was conducted as part of a larger community-based research collaboration between the British Columbia Centre for Excellence in HIV/AIDS and the VANDU Injection Support Team (IS Team).

1.4.1 Injection drug use in Vancouver's Downtown Eastside.

Estimates suggest that 15,000 IDU reside in the Vancouver area (Canadian Centre of Substance Abuse, 2008; McInnes, et al., 2009). Residents of Vancouver's Downtown Eastside (DTES) experience particularly high levels of socioeconomic deprivation, as well as a wide range of health and social problems, many of which are linked to injection drug use (Wood & Kerr, 2006). Current health and social problems in the DTES emerged in part due to public policies of previous decades which reduced the availability of social housing within Vancouver and concentrated a large population of the city's most marginalized individuals within this small geographic area (Wood & Kerr, 2006). These conditions led to the emergence of a unique risk environment in the DTES, which included a large public drug market and outdoor injecting scene, an active sex trade, and large numbers of IDU living in

unstable housing conditions in single room occupancy hotels (O'Shaughnessy, Hogg, Strathdee, & Montaner, 2009; Wood & Kerr, 2006). These factors combined with high levels of cocaine injection and inadequate access to syringes (Wood, Lloyd-Smith, et al., 2007) to create conditions that allowed for the rapid spread of blood borne disease and high rates of fatal overdose among IDU in this neighbourhood (O'Shaughnessy, et al., 2009; Wood & Kerr, 2006). Previous research in this setting has shown prevalence rates of HIV and hepatitis C among IDU to be 17% and 87.6% respectively (Tyndall, et al., 2006; Wood, Kerr, et al., 2005). Research, strong political leadership, and activism on the part of community organizations have combined in this setting to direct the implementation of numerous public health interventions focused on addressing health concerns among IDU. However, despite the existence of a supervised injection facility, large scale syringe distribution, a street nurse program, and a whole host of longstanding outreach and educational approaches, including those sponsored by the regional health authority, recent research indicates that high rates of unsafe injecting persist (Debeck, Small, et al., 2009; Fairbairn, Small, Van Borek, Wood, & Kerr, 2010; Hoda, Kerr, Li, Montaner, & Wood, 2008; Rachlis, Lloyd-Smith, et al., 2010).

1.4.2 VANDU and the Injection Support Team.

There is a long history of organizing and advocacy by people who use drugs in the city of Vancouver, stemming primarily from the activities of VANDU. VANDU formed in 1998 in response to the health crisis among IDU and continued government inaction (Kerr, et al., 2006). The organization operates a storefront office in the DTES, has over 1,000 members, and is overseen by a Board of Directors who are all people with current or former experience using drugs (Kerr, et al., 2006). The activities of VANDU are constantly

informed by ongoing consultation with the broader community of people who use drugs, as weekly Board meetings and monthly general meetings are open to all members. VANDU is active in direct action and advocacy, and has run a variety of user-led programs, including needle distribution and recovery, an outreach-based alley patrol program, and various support groups (Kerr, et al., 2006). Several of VANDU's needle distribution and recovery programs have been subjected to external evaluations which demonstrate that these programs have extended the reach and effectiveness of syringe distribution by contacting IDU traditionally underserved by conventional programs and those at highest risk of HIV infection (Hayashi, et al., 2010; Kerr, Small, et al., 2010; Wood, Kerr, Spittal, Small, et al., 2003).

Following the expansion of syringe access and implementation of the supervised injection facility in the DTES, the practice of requiring assistance with injections emerged as a key consumption practice driving drug-related harm in this setting. Cohort based studies have previously found that approximately 40% of local injectors reported requiring assistance with injections at least once in the previous six months (O'Connell, et al., 2005), and individuals requiring this form of assistance are at heightened risk for overdose (Kerr, Fairbairn, et al., 2007), syringe sharing (Wood, Spittal, et al., 2003) and HIV infection (O'Connell, et al., 2005; Wood, Tyndall, Spittal, Li, Hogg, Montaner, et al., 2002). Notably, the current supervised injection facility cannot fully address the harms stemming from this practice as existing federal guidelines governing the facility require self-administration of injection, and assisted injections are not permitted (Pearshouse & Elliott, 2007). In response to the harms associated with assisted and unsafe injection practices, VANDU expanded their alley patrol program in August 2005 to include the IS Team. The IS Team is composed of nine individuals who are recognized as "hit doctors"; individuals who are regularly asked to

provide assistance with injections, and who facilitate injecting education and engagement with large numbers of IDU.

The mission of the IS Team is to provide “peer-to-peer education and assistance to promote safer injecting practices.” Through advocacy and outreach the IS Team seeks to reduce the harms resulting from unsafe injection and preserve the health of IDU. Initially, the IS Team was an outreach-based program performing regular patrols of the local alleys, streets and parks, in order to provide education and support to individuals who experience difficulties with injecting or require assistance with injections. More recently, the IS Team developed curriculum, training materials, and novel demonstration processes for five workshops promoting safer injecting, which they launched in November 2009. Specific workshop topics include: dangerous injection practices (e.g., jugular and assisted injection); the results of unsafe injecting (e.g., viral infections, venous damage, and bacterial infections); injecting skills and techniques; process for cooking and preparation of injections; as well as HIV and hepatitis C prevention and treatment.

This thesis seeks to address three objectives:

- 1) **To describe the format and content of the IS Team education workshops, which have been developed as an intervention to promote safer injecting.** Chapter 3 contains a brief description of the IS Team education campaign including the topics covered by each workshop and the types of educational processes used to communicate information to workshop participants.
- 2) **To explore the IS Team members’ experiences as facilitators of this series of educational workshops.** Chapter 3 contains a qualitative exploration of facilitators’ experiences leading IS Team education workshops.

3) To explore the workshop participants' perceptions of IS Team education workshops in relation to their own experiences and as compared to their previous interactions with safer injecting education. Chapter 4 contains a qualitative exploration of participants' perceptions of IS Team education workshops with explicit focus on how the information provided in these workshops relates to their own experiences and how this campaign compared to their previous experiences receiving safer injecting information.

This thesis is divided into five chapters, including three manuscripts (Chapters 2, 3 and 4), an introductory section (Chapter 1), and a concluding discussion section (Chapter 5). The first manuscript is a literature review outlining: the ways in which people inject unsafely and the health consequences associated with such practices; an examination of the individual, physical, social, and structural factors that are thought to influence injection practices; and a discussion of the interventions that seek to reduce the negative health consequences associated with injection drug use. Chapters 3 and 4 are qualitative research papers that describe the IS Team education campaign and examine the facilitators' and participants' perceptions of this unique user-led intervention targeting unsafe injection practices. Finally, Chapter 5 provides a synthesis of the findings presented in chapters 3 and 4 and discusses these findings in relation to other research on peer-driven and user-led interventions targeting unsafe injecting. This chapter also outlines the limitations of this work, and highlights the associated implications for practice, policy, and future research. All research presented within this thesis has received ethical approval from the Providence Health Care/University of British Columbia Research Ethics Board.

Chapter 2

Unsafe Injection Practices: Description, Consequences, Causes, and Interventions

2.1 Introduction

Injection drug use continues to present a major public health challenge in urban settings around the world (Aceijas, Stimson, Hickman, & Rhodes, 2004; Drucker, 1999). IDU are vulnerable to an array of health related harms, including but not limited to HIV, hepatitis C, bacterial and fungal infections, and venous damage (Gordon & Lowy, 2005; Salmon, Dwyer, et al., 2009; Thorpe, et al., 2002; Topp, et al., 2008; UNAIDS, 2007; Woodburn & Murie, 1996). Many of these come from unsafe injecting practices. Unsafe injection occurs in many ways and as a result of many causes. The objectives of this paper are to review current research concerning unsafe injection practices and the related health consequences, while also considering the various factors that cause these practices and the interventions that have been designed and implemented to address them.

This paper begins with a brief review of the ways in which people inject unsafely. This is followed by a description of the literature outlining the health consequences associated with unsafe injection practices. The bulk of this paper will concentrate on the individual, physical, social, and structural factors that are thought to influence the injection risk practices of IDU. This paper will conclude with a discussion regarding the interventions that seek to reduce the negative health consequences associated with injection drug use. This will include a section on interventions that directly involve IDU in their implementation and those that have been organized by IDU themselves.

2.2 Methods

Published studies were identified through computerized literature searches of PubMed, EBSCO Databases (Academic Search Complete, Biomedical Reference Collection, CINAHL, MEDLINE, PsycINFO, Social Work Abstracts), and Google Scholar, with no language or date specified in the search criteria. A wide variety of terms were used to find relevant peer-reviewed articles, examples include “injection drug use”, “injection drug user”, “IDU”, “intravenous”, “injection risk behaviour”, “unsafe injection practices”, “injection harm”, “illicit”, “drug”, “HIV”, “hepatitis C”, “infection”, and “disease”. Additional articles were obtained through reference lists of published manuscripts. This review concentrated primarily on peer-reviewed published literature; however, in some cases internet-based searches of relevant government documents, grey literature, and other reports were also conducted.

2.3 Unsafe Injection Practices

There are many ways in which people can inject unsafely. Ethnographic work examining the mechanics of injecting rituals uncovers significant variation in preparation and injection practices among IDU (Grund, 2005). As such, injection risks may vary significantly depending on the injecting environment, drug used, available equipment, and the knowledge and skill of the injector. This section will outline the growing body of literature describing the ways in which people inject unsafely.

Proper preparation and administration of a drug by injection is a multi-step process that requires knowledge, skill, and a number of injection materials including syringes, alcohol wipes, water, cooker, filter, acidifier, tourniquet, and a preparation surface (The Chicago Recovery Alliance, 2011). This multi-step process provides many opportunities for

mistakes and skipped steps, which is concerning given that incorrect application of proper preparation and injection procedure increases the chances of circulatory system and soft tissue damage, as well as increases the likelihood of viral and bacterial infections and blood-borne disease transmission.

The preparation of an illicit drug or pharmaceutical requires a number of procedures to convert the substance from solid form into a solution suitable for injection. Poor hygiene surrounding the preparation process such as unsterile preparation surface, syringes, water, and other paraphernalia have been identified as risks for related infection and injury (Gordon & Lowy, 2005; Grund, 2005; Salmon, Dwyer, et al., 2009; Scott, 2005; Topp, et al., 2008). Adulterants as well as bacteria remaining in the drugs themselves or injection preparations if not removed can lead to venous damage and infection (Gordon & Lowy, 2005; Grund, 2005; Salmon, Dwyer, et al., 2009; Scott, 2005; Topp, et al., 2008). Injection of pharmaceuticals is particularly risky because tablets and capsules, which are crushed to make injections, are formulated to be swallowed and may be harmful if injected as a result of greater insoluble particle content within preparations (Scott, 2005). Illicit drugs available in a base form (e.g. crack, black tar heroin) for smoking purposes require the addition of acid during the preparation process. A variety of acids have been reported to be used by IDU for this purpose including citric acid, ascorbic acid and acid-containing household items such as lemon juice, vinegar and kettle descaler (Ponton & Scott, 2004; Scott, 2005; Scott, Winfield, Kennedy, & Bond, 2000). The amount and type of acid used has been identified as an important health consideration for people who inject these types of drugs (Grund, 2005; Scott, 2005). Proper use of a filter, which is a cotton or cigarette used to reduce the amount of insoluble cut and other undesirable substances (e.g. material from the original source, such

as the opium poppy plant, or from added bulking agents such as magnesium silicate) drawn into the syringe, is important because it has been shown to reduce particulate contamination in drug preparations (Ponton & Scott, 2004; Scott, 2005; Scott, Kennedy, Winfield, & Bond, 1998). However, if prepared with unwashed hands, or stored and re-used, filters provide an additional source of infection (Grund, 2005; Racz, Gyarmathy, Neaigus, & Ujhelyi, 2007; Scott, 2005). One unhygienic practice involving the omission of important cooking and filtering processes is the “shaker” in which drugs and water are directly mixed in the syringe barrel and then shook to create a solution for injection (Rhodes, Kimber, et al., 2006). It is worth noting that individual idiosyncrasies in preparation process, such as licking the tip of the needle prior to injection, may serve as additional sources of infection. Some research has indicated that such unsafe practices may occur frequently, as recent analysis of video recorded injection episodes from the Sydney Medically Supervised Injecting Centre found that common unsafe injection practices included: not washing hands before injecting, using fingers to stop bleeding, wiping (rather than applying pressure to) the injection site with a swab to stop bleeding, and using the same swab to wipe multiple sites (Treloar, et al., 2008).

The sharing of injection paraphernalia such as syringes and ancillary injecting equipment (e.g., cookers, filters, water), as well as splitting drug solutions, are the unsafe injection practices that have received the most attention in the literature as a result of their role in blood-borne disease transmission (Koester, et al., 1996; Koester, 1994; Needle, et al., 1998; Wood, et al., 2001). One example of a commonly described risky sharing practice is “backloading” in which one individual will use their syringe to mix drugs and then transfer a portion of the solution into the syringes of other IDU (Jose, et al., 1993). In eastern Africa a new high-risk needle sharing practice called “flashblood” was recently identified (McCurdy,

Ross, Williams, Kilonzo, & Leshabari, 2010; McCurdy, Williams, Kilonzo, Ross, & Leshabari, 2005). This entails drawing a full barrel of the first blood back into a syringe following an injection and passing the syringe to a companion who injects the blood to alleviate withdrawal symptoms (McCurdy, et al., 2010; McCurdy, et al., 2005). Although syringe sharing has received the most attention (Kerr, Tyndall, Li, Montaner, & Wood, 2005; Koester, et al., 1996; Strathdee, Patrick, Archibald, et al., 1997; Strathdee, Patrick, Currie, et al., 1997; Wood, et al., 2001) studies taking a closer look at specific HIV and hepatitis C risk behaviours, have found that practices such as backloading and sharing cookers, cotton, and water are far more common than sharing syringes themselves (Koester, Booth, & Wiebel, 1990; Koester, Glanz, & Baron, 2005; Needle, et al., 1998; Thiede, et al., 2007; Thorpe, Bailey, Huo, Monterroso, & Ouellet, 2001; Thorpe, et al., 2002).

The administration of the injection itself requires proper hygiene and correct venipuncture technique. Failure to clean hands and injection sites prior to injection has been identified as increasing risks for related infection (Gordon & Lowy, 2005; Grund, 2005; Salmon, Dwyer, et al., 2009; Scott, 2005; Topp, et al., 2008). Many IDU experience complications as a result of inadequate injection technique including creating larger punctures than necessary, repeated use of damaged sites, improper use of a tourniquet, or improper needle placement and manipulation resulting in “missed” (outside the vein) or arterial injections (Grund, 2005; Pieper & Templin, 2001; Scott, 2005; Woodburn & Murie, 1996). As a result of venous collapse, scarring, and difficulty finding veins, research has indicated that some IDU inject in less conventional locations. Research has shown that many IDU who lack viable veins resort to “skin popping” which is the injection of drugs into subcutaneous or intramuscular tissues rather than directly into a vein (Ebright & Pieper,

2002; Gordon & Lowy, 2005; Johnston & Keogan, 2004). Recent work has indicated that femoral (groin) injection is a high-risk injection location that is being used by an increasing number of IDU in the United Kingdom (Rhodes, Stoneman, et al., 2006; Zador, et al., 2008). The injection of drugs into the jugular vein is another high-risk injection location that has been reported in a number of urban centres across the globe (Chowdhury, Bloom, Black, & Alnoury, 1990; Cohen, Persky, & Reede, 1985; Espiritu & Medina, 1980; Hoda, et al., 2008; Lin, Reeck, & Murr, 2004; Myers, Kirkland, & Mickey, 1988; Sheikh, Topoulos, & Deitcher, 2002). Evidence indicates that both groin and jugular injections often occur when conventional sites become unusable and are perceived by IDU as quick and easy hits that provide an expedient high (Hoda, et al., 2008; Rhodes, Briggs, Kimber, Jones, & Holloway, 2007; Rhodes, Stoneman, et al., 2006; Wood, Spittal, et al., 2003; Zador, et al., 2008).

Loss of accessible veins, drug withdrawal symptoms, and lack of injecting knowledge or skill leaves some IDU in a position in which they require assistance with injections (Fairbairn, Small, Stoltz, Li, & Kerr, 2006). Recent research has indicated that a substantial proportion of IDU in various settings internationally receive manual assistance with injections (Fairbairn, et al., 2006; Jackson, et al., 2010; Kral, Bluthenthal, Erringer, Lorvick, & Edlin, 1999; O'Connell, et al., 2005). The practice of assisted injection has been identified as posing specific health risks (e.g., increased risk of HIV infection and overdose) to individuals who receive assistance with injections (Fairbairn, et al., 2006; Kral, et al., 1999; O'Connell, et al., 2005; Wood, Spittal, et al., 2003). Research has demonstrated that many IDU frequently rush their injections due to drug related variables such as withdrawal symptoms or the need to inject frequently, and contextual variables such as injecting in public and police presence (Rachlis, Lloyd-Smith, et al., 2010). Rushed injections are of

particular concern because an expedited process significantly increases the likelihood of improper preparation procedure and injection technique.

In sum, injection of illicit drugs and pharmaceuticals is a multi-step process that requires both skill and a range of injection materials. Contamination of injection paraphernalia or the drugs themselves, as well as failure to correctly implement preparation and injection techniques can result in adverse health consequences.

2.4 The Consequences of Unsafe Injection Practices

Within healthcare, medicines are generally given by injection when no other route of administration is suitable. Other routes are generally preferable because they offer some form of defence against potential hazards such as microbiological or chemical contaminants whereas injecting directly into the bloodstream bypasses the body's natural defence mechanisms (Scott, 2005). Contamination of injections can cause serious viral, bacterial, and fungal infections, and the presence of tiny particles can cause strokes as well as damage to veins and internal organs (Scott, 2005). The illegal status and covert nature of injection drug use means that clear cause and effect relationships between particular injection practices and medical outcomes can be difficult to delineate (Grund, 2005). The remainder of this section will outline the major health related complications that have been associated with unsafe injection practices.

Injection drug use carries significant risk for overdose because harmful or lethal doses of drugs can be directly administered over a short period of time resulting in unintended side effects or death (Grund, 2005). Overdose is the primary cause of death among IDU in many settings and is a leading cause of accidental death among the general population (Copeland, et al., 2004; Darke & Hall, 2003; Davidson, et al., 2003; Scott, Thomas, Pollack, & Ray,

2007; Tyndall, et al., 2001; Webb, et al., 2003). The effects of overdose vary significantly based on the drug(s) consumed. For example, heroin's depression stops breathing, while cocaine's stimulation is more likely to result in a seizure or heart attack (Darke & Hall, 2003; Grund, 2005; Mittleman & Wetli, 1984; Staley, Hearn, Ruttenger, Wetli, & Mash, 1994). The experience of non-fatal overdose has also been shown to be relatively common among IDU and can result in a number of medical complications including aspiration pneumonia, hypoxic brain injury, rhabdomyolysis and renal failure (Darke & Hall, 2003; Kerr, Fairbairn, et al., 2007; Warner-Smith, Darke, & Day, 2002). As a result of issues such as overdose, infections and viruses obtained through incorrect preparation and administration of injections, and other lifestyle variables (e.g. inadequate nutrition, homelessness, unstable housing) frequently associated with injection drug use, IDU globally make up a subpopulation that experience much higher levels of morbidity and mortality than the general population (Copeland, et al., 2004; UNAIDS, 2007). Mortality estimates among IDU are reported to be 13 times greater than in non-drug using populations (Copeland, et al., 2004; Hulse, et al., 1999).

The sharing of injection paraphernalia and drug solutions continues to be the primary route of blood-borne disease transmission fuelling epidemics of HIV and hepatitis C among IDU (Des Jarlais & Friedman, 1998; Garfein, Vlahov, Galai, Doherty, & Nelson, 1996; Koester, et al., 1996; Patrick, et al., 2001; Thorpe, et al., 2002; UNAIDS, 2007; Wood, et al., 2001). Globally, research has shown significant variation in HIV prevalence among IDU, with estimates ranging from 12% to over 40% across geographic regions, and approximately 3 million HIV positive IDU worldwide (Mathers, et al., 2008). Available regional estimates of hepatitis C infection among IDU highlight even greater variation with prevalence ranging

between 2% and 100%, and 48 of the 57 countries examined reporting prevalence estimates of 50% or higher (Aceijas & Rhodes, 2007). HIV and hepatitis C co-infection is of growing concern in a number of countries. China, Poland, Puerto Rico, Russia, Spain, Switzerland, Thailand, and Vietnam have estimated that the prevalence of co-infection among IDU has reached 90% (Aceijas & Rhodes, 2007).

Poor hygiene practices or injection of non-sterile preparations expose IDU to a range of bacterial, fungal, and parasitic pathogens that cause localized or systemic infections (Gordon & Lowy, 2005; Grund, 2005; Salmon, Dwyer, et al., 2009; Scott, 2005; Topp, et al., 2008). Skin and soft-tissue infections such as abscesses and cellulitis are the most common infections experienced by IDU and may increase individuals' risk for distant infection and other more serious complications (Binswanger, Kral, Bluthenthal, Rybold, & Edlin, 2000; Gordon & Lowy, 2005; Lloyd-Smith, et al., 2005; Salmon, Dwyer, et al., 2009; Topp, et al., 2008). Recently, soft-tissue infections among IDU have been identified as containing methicillin-resistant staphylococcus aureus (MRSA) (Huang, et al., 2008; Lloyd-Smith, Hull, et al., 2010). It is also possible for infections to develop in bones and joints of IDU through direct dissemination of pathogens via the blood or untreated soft-tissue infection (Contoreggi, Rexroad, & Lange, 1998; Crossley, 2003; Lowy & Miller, 2002). Other potential complications arising from unsanitary injection practices or preparations include but are not limited to tuberculosis, myositis, pyomyositis, necrotizing fasciitis, tetanus, wound botulism, endocarditis, osteomyelitis, and septicaemia (Gordon & Lowy, 2005; Johnston & Keogan, 2004). Endocarditis is among the most serious complications of unsafe injecting, and remains a particular risk for IDU as venous blood travels toward the heart taking any injected particles or bacteria with it (Gordon & Lowy, 2005; Grund, 2005). In various settings,

research has found that injection-related infections account for the majority of emergency room visits and acute hospitalizations of IDU (Kerr, et al., 2004; Lloyd-Smith, Wood, et al., 2010; Palepu, et al., 2001; Takahashi, et al., 2003).

Damage to veins may result from injection technique, repeated penetration, or chemical damage resulting from the preparations injected (Salmon, Dwyer, et al., 2009; Topp, et al., 2008; Woodburn & Murie, 1996). As a result of these factors, prolonged injection drug use leads to venous scarring and collapse, nerve and muscle damage, and lymphatic blockage (Kirchenbaum & Midenberg, 1982; Pieper, et al., 2007). Chronic venous disease is one of the major long-term effects of injection drug use (Pieper, et al., 2007). In a large sample of persons receiving methadone treatment in the United States, 87% exhibited clinical evidence of chronic venous disease, the most common causes of which are superficial vein regurgitation and deep vein obstruction or thrombosis (Pieper, et al., 2007; Pieper & Templin, 2001). These researchers found that chronic venous disease occurs at a young age in IDU and results in decreased mobility, pain, and venous ulcers, which continue to evolve even after drug use has ceased (Pieper, et al., 2007; Pieper & Templin, 2001). Research on cerebral strokes from an urban hospital setting in the US demonstrates that cocaine injection can cause subarachnoid hemorrhage and results in significantly poorer outcomes when compared to subarachnoid hemorrhage patients with no exposure to cocaine (Simpson, Fischer, Narayan, Cech, & Robertson, 1990).

It has been suggested that many IDU use excess acid when preparing drugs that are obtained in base form for injection (Ponton & Scott, 2004; Scott, 2005). The physiochemical risks from injecting acidic solutions involve irritation at the site of injection and damage to veins, surrounding tissue, and muscle (Scott, 2005). Lemon juice used by some IDU as an

acidifier has been connected to candidal infection, which leads to loss of vision, severe illness, and death (Bisbe, et al., 1992; Etienne, Nemery, Darcis, Pierard, & Demonty, 1986; Hay, 1986; Newtonjohn, Wise, & Looke, 1984; Scott, 2005). The use of kettle descaler is of particular concern because it contains strong acids which are likely to cause severe irritation to veins (Scott, 2005).

Research on pharmaceuticals has shown that tablets and capsules prepared by IDU for injection contain increased particulate matter, which can precipitate blood clots and aggravate veins (Ponton & Scott, 2004; Scott, 2005; Scott, et al., 1998). In an Australian study, injection of pharmaceutical preparations was found to be independently associated with lifetime prevalence of a variety of injecting related injuries and diseases (Topp, et al., 2008). Proper use of a filter during preparation has been shown to reduce particulate contamination in illicit drugs and diverted pharmaceuticals (Ponton & Scott, 2004; Scott, 2005; Scott, et al., 1998). Unfortunately, the moist conditions within used filters provide ideal conditions for bacterial growth and have been associated with “cotton fever”, a benign acute febrile condition seen in IDU (Harrison & Walls, 1990; Scott, 2005).

Inadequate injection technique and absence of easy peripheral venous access has been connected to a series of other injection related risks. Intra-arterial injection is a common mistake made by IDU, and can cause severe bruising and result in limb ischaemia and tissue necrosis (Grund, 2005; Woodburn & Murie, 1996). Poor technique and injection of non-sterile preparations has also been associated with infected venous pseudoaneurysm and arterial pseudoaneurysm (Woodburn & Murie, 1996). Improper needle placement and manipulation can also cause bone cells to grow on muscle fiber, resulting in myositis ossifications, also referred to as “drug abusers” elbow (Deutsch, 1971; Grund, 2005). People

who inject drugs into subcutaneous or intramuscular tissues, purposefully through the practice of skin-popping or by mistakenly missing the intended vein, are at increased risk for primary soft-tissue infections such as cellulitis and abscess as well as secondary effects such as septic arthritis, tenosynovitis, osteomyelitis, and fistula formation (Ebright & Pieper, 2002; Gordon & Lowy, 2005; Johnston & Keogan, 2004; Meador, Sharon, & Lewis, 1979; Vega & Lucas, 1979). One study from San Francisco found that IDU who reported “skin popping” within the preceding 30 days had a higher incidence of soft-tissue infections than those who injected only intravenously (Binswanger, et al., 2000).

In response to a lack of venous access and difficulty finding veins, some IDU resort to less conventional injection locations. Injections into the femoral and jugular veins are identified as high risk because they increase IDU risk for infections, venous and arterial damage, and other complications. Deep venous thrombosis, pseudoaneurysm, accidental arterial injection, venous ulceration and local infections have all been connected to femoral injection (Mackenzie, Laing, Douglas, Greaves, & Smith, 2000; Rhodes, Kimber, et al., 2006; Woodburn & Murie, 1996; Zador, et al., 2008). Injection into the jugular vein has been associated with pneumothorax, superficial and deep neck infection, laryngeal nerve injury, and jugular vein, subclavian artery, and carotid artery thrombosis and aneurysm (Hoda, et al., 2008; Espiritu & Medina, 1980; Cohen, et al., 1985; Lin, et al., 2004; Myers, et al., 1988; Sheikh, et al., 2002; Chowdhury, et al., 1990).

Jugular injection is also a known risk factor that has been associated with the process of assisted injection (Fairbairn, et al., 2006; Hoda, et al., 2008). Individuals who provide as well as receive assistance with injections have been shown to be significantly more likely to report sharing syringes and other paraphernalia than other IDU (Fairbairn, et al., 2006; Kral,

et al., 1999; Wood, Spittal, et al., 2003). In Vancouver, receiving assistance with injections has been identified as a strong independent predictor of HIV seroconversion and non-fatal overdose (Kerr, Fairbairn, et al., 2007; O'Connell, et al., 2005; Wood, Spittal, et al., 2003). One study of the impact of assisted injection on HIV found that 41% of IDU reported requiring assistance with injecting during the previous six months and that these individuals were twice as likely to contract HIV infection over a 36 month follow-up period (O'Connell, et al., 2005). Flashblood is another recently reported phenomenon that greatly magnifies the risk of disease transmission of needle sharing (McCurdy, et al., 2010; McCurdy, et al., 2005). If the first injector in this practice is infected with HIV, hepatitis C, or another virus, the amount of blood passed directly into the bloodstream of the second injector puts them at particularly high risk of infection (McCurdy, et al., 2005).

In summary, the process of injecting drugs and pharmaceuticals exposes IDU to a wide range of health-related harms. In a sample of nearly 2000 IDU from across Australia, researchers found that 69% of participants reported lifetime prevalence of injecting-related injury and disease (Salmon, Dwyer, et al., 2009). Although experience with injecting related harm is common among IDU, many individuals do not seek treatment until serious complications or crises emerge (Morrison, Elliott, & Gruer, 1997; Topp, et al., 2008). Ongoing risks and harms associated with unsafe injection practices, combined with barriers to accessing healthcare and low uptake of treatment services, indicates that evidence based solutions are urgently needed to address this public health problem.

2.5 The Causes of Unsafe Injection Practices

2.5.1 Risk Environment Framework.

Rhodes' "Risk Environment Framework" (Rhodes, 2002, 2009; Rhodes & Simic, 2005; Rhodes, et al., 2005; Rhodes, et al., 1999; Strathdee, et al., 2010) provides a useful model for delineating the various forces that cause unsafe injecting. This model reflects recent theorizing in the field of health and social behaviour exploring how the environment – whether social or physical – links to risk behaviour and health inequality (Rhodes, 2002, 2009; Rhodes, et al., 2003). Research focusing on the risk environment of IDU has described the ways in which physical, social, and structural factors interact with individual factors at micro and macro levels to mediate injection risk practices (Rhodes, 2002, 2009; Rhodes, et al., 2005).

The Risk Environment Framework represents an explicitly ecological model of injection-related risk in attempt to correct the over-emphasis on individual level behaviour that has historically characterized public health perspectives on drug use. Developed as an analytic tool for guiding more effective responses, the risk environment emphasizes how environmental conditions in specific contexts shape the character of drug use in those contexts, as well as responses to injection drug use, and the impact of interventions that are implemented. Risk is defined within this framework as the product of complex and dynamic interactions between individuals and micro and macro level features of the physical, social, and structural environment(s) in which drug use occurs (Rhodes, 2002; Rhodes, et al., 2005). The interactions amongst various environmental levels and types of influence have been shown to heavily impact rates of blood-borne disease transmission, the distribution of disease within sub-populations of IDU, and the success of public health interventions (Rhodes, et al.,

2005). As such, this model helps to identify potential cause and effect pathways which in turn may illuminate opportunities for new or more comprehensive interventions.

Although the Risk Environment Framework allows for a complex understanding of how IDU interact with their environments at various levels of influence to produce and reduce harm, it is important to note that while these distinctions may serve a useful analytic purpose, risks associated with injection drug use may be best understood as a product of interplay, with individual, physical, social, and structural factors intermingling in the production of injection risk behaviours (Rhodes, et al., 2005). As per Rhodes' Risk Environment Framework, the following sections will outline the individual, physical, social, and structural factors that mediate unsafe injection practices and related health consequences as they are described in the literature.

2.5.2 Individual determinants of unsafe injecting practices.

A large body of research has documented a range of individual factors that are correlated with unsafe injection practices and the consequences of such unsafe practices. Research has demonstrated that individual injection drug risk can vary depending on the type of drug used, injecting frequency and patterns, and technical practices employed in preparing drug solutions. Most prominently, cocaine injection has been associated with increased risk for HIV infection (Anthony, et al., 1991; Battjes, Pickens, Haverkos, & Sloboda, 1994; Bux, Lamb, & Iguchi, 1995; Chaisson, et al., 1989; Guadagnino, et al., 1995; Hankins, Alary, Parent, Blanchette, & Claessens, 2002; Joe & Simpson, 1995; Meandzija, O'Connor, Fitzgerald, Rounsaville, & Kosten, 1994; Nemoto, 1994; O'Connell, et al., 2005; Strathdee, et al., 2001). Associations between cocaine injection and HIV infection have been attributed to more frequent injections (Anthony, et al., 1991; Nelson, et al., 2002; Spittal, et al., 2002;

Strathdee, Patrick, Currie, et al., 1997; Tyndall, et al., 2003), higher-risk injection practices (Greenfield, Bigelow, & Brooner, 1992; Rachlis, Lloyd-Smith, et al., 2010), increased sexual risk (Bux, et al., 1995; Hudgins, Mccusker, & Stoddard, 1995), and injecting binges (Strathdee, Patrick, Currie, et al., 1997). In Vancouver, Tyndall et al. (2003) found that injecting cocaine was predictive of HIV infection in a dose-dependent fashion. Specifically, participants who averaged more than three injections per day were seven times more likely to contract HIV (Tyndall, et al., 2003).

Research has also shown that heroin, or more particularly the type of heroin used by IDU may affect HIV risk (Ciccarone & Bourgois, 2003; Clatts, et al., 1999). Evidence indicates that people who inject black tar heroin may reduce their HIV risk due to differences in paraphernalia selection and drug preparation practices (Ciccarone & Bourgois, 2003; Clatts, et al., 1999). For example, more time spent heating cookers to promote dissolution of black tar heroin has been shown to reduce HIV virus below detectable levels (Clatts, et al., 1999). Research from Canada and Australia has documented increased injection of prescription opioids by IDU (Brands, Blake, Sproule, Gourlay, & Busto, 2004; Degenhardt, et al., 2006; Firestone & Fischer, 2008; Fischer, Patra, Cruz, Gittins, & Rehm, 2008). This is concerning due to connections identified in the previous section between injection of pharmaceuticals and injecting related injuries and infections (Scott, 2005; Topp, et al., 2008).

In recent years, the growing popularity of methamphetamine has garnered increased attention (Degenhardt, et al., 2010; Fairbairn, et al., 2007). A large cross sectional study of syringe exchange programs across the US found that rates of both receptive and distributive syringe sharing were higher among people who inject amphetamines compared to other participants (Braine, Des Jarlais, Goldblatt, Zadoretzky, & Turner, 2005). Another recent

study of IDU under age 30 in five US cities has connected injecting methamphetamine to HIV infection and the authors suggest that methamphetamine may be replacing cocaine as the drug most associated with HIV seroprevalence among young IDU (Rondinelli, et al., 2009). Locally, methamphetamine injection has been independently associated with syringe sharing practices and non-fatal overdose (Fairbairn, et al., 2007; Fairbairn, et al., 2008). Although injection of crack cocaine has only recently been described in the literature, it has been associated with increases in injection paraphernalia sharing and increased rates of hepatitis C (Hickman, et al., 2007; Judd, et al., 2005; Wilkins, Bissell, & Meier, 2010). Research has also indicated that a lack of drugs may result in increased risk of blood borne disease transmission. A recent study from the US suggests that experiences of opiate withdrawal can increase risk by undermining IDU willingness to inject safely by increasing their likelihood of attending risky settings and number of injection partners (Mateu-Gelabert, Sandoval, Meylakhs, Wendel, & Friedman, 2010).

A smaller body of literature suggests that lack of knowledge regarding unsafe injection practices puts IDU at increased risk for injecting related morbidity. Data related to injection drug use from the 2008 reporting round of the United Nations General Assembly Special Session on HIV/AIDS highlights wide divergence in HIV knowledge and risk behaviours among IDU in low and middle income countries, with only 45% of IDU demonstrating correct HIV prevention knowledge (Mathers, et al., 2009). In wealthier nations the level of educational achievement may affect HIV risk behaviour, as studies from North America and Europe have connected low levels of education (ie., less than high school) with HIV infection in IDU (March, Oviedo-Joekes, & Romero, 2007; Strathdee, et al., 2001). In Denver, unsafe needle practices have been associated with a lack of exposure

to AIDS interventions, suggesting that uninformed individuals may remain unaware of the negative implications of their practices (Booth, 1994). Research from the US has also noted significant gaps in knowledge about hepatitis C among IDU and connected low levels of hepatitis knowledge with increases in risk behaviour (Heimer, et al., 2002; Stein, Maksad, & Clarke, 2001; Thiede, et al., 2007). In Vancouver, lack of knowledge regarding safer injecting practices has been found to be a major contributing factor in the need for assistance with injections, which has also been shown to be one of the greatest risk factors for HIV infection among IDU in this setting (O'Connell, et al., 2005; Wood, Spittal, et al., 2003).

Closely related to knowledge regarding injection practices is self-efficacy for risk reduction behaviours, which involves one's perception of one's ability to successfully execute proposed health behaviours (Wagner, Unger, Bluthenthal, Andreeva, & Pentz, 2010). A number of studies have shown that high self-efficacy to reduce injection related risk is associated with safer injection practices (Brown, 1998; Celentano, Cohn, Davis, & Vlahov, 2002; Falck, Siegal, Wang, & Carlson, 1995; Gibson, Choi, Catania, Sorensen, & Kegeles, 1993; Longshore, Stein, & Anglin, 1997; Longshore, Stein, & Conner, 2004). Conversely, lower or decreased self-efficacy for risk reduction has been associated with sharing of syringes and other injection paraphernalia (Kang, et al., 2004; Racz, et al., 2007; Thiede, et al., 2007). Noting the social dimension of injection equipment sharing, a recent study of IDU in Montreal found that sharing injection paraphernalia was associated with low self-efficacy to convince others to inject more safely (Cox, et al., 2008).

Reports from a number of different settings have found high prevalence of mental health concerns among IDU (Dietze, et al., 2010; Fischer, et al., 2005; Gu, et al., 2010; Plotzker, et al., 2007). As well, large-scale examinations of people with mental health

disorders have consistently shown high levels of substance use within this population (Davidson, et al., 2001; Osher, et al., 2003; Rosenberg, et al., 2003). Cognitive and behavioural impairments experienced by some people with mental health disorders may cause affected individuals to act impulsively and be less concerned with issues of self care which puts them at higher risk for injecting related harm (Davidson, et al., 2001; Davis, 1998; Hercus, Lubman, & Hellard, 2005; Osher, et al., 2003; Rosenberg, et al., 2001). This is concerning given that recent research from the US has documented high prevalence of psychotic symptoms among individuals who abuse or are dependent upon illicit substances (Smith, Thirthalli, Abdallah, Murray, & Cottler, 2009), while other researchers have connected cocaine use in people with psychotic disorders with increases in risk taking behaviour and decreases in the affect of anticipated loss (Duva, Silverstein, & Spiga, 2011). Such connections between mental health and illicit drug use have been proposed as partially responsible for heightened seroprevalence of HIV, hepatitis B, and hepatitis C among individuals with severe mental illness (Davidson, et al., 2001; Osher, et al., 2003; Rosenberg, et al., 2001; Susser, et al., 1996). Several studies of depression among IDU have reported significant and independent associations between depression and unsafe injection practices (Braine, et al., 2005; Mandell, Kim, Latkin, & Suh, 1999; Plotzker, et al., 2007; Stein, Solomon, Herman, Anderson, & Miller, 2003).

Closely related to mental health are experiences of childhood sexual abuse and other forms of maltreatment, which increase individual risk for adverse outcomes related to injecting. In a study of women who inject drugs in Philadelphia, more than half the women reported experiencing childhood sexual and physical abuse, and these experiences were associated with increased drug and sexual risk for HIV infection (Plotzker, et al., 2007). In

Vancouver, two large prospective cohort studies of drug using youth have identified high rates of childhood maltreatment within this population, and one of these examinations found that childhood physical abuse was specifically associated with initiation into injection (Kerr, et al., 2009; Pearce, et al., 2008; Spittal, et al., 2007). Furthermore, a previous study of needle-sharing behaviour among IDU in Vancouver found that IDU that report borrowing syringes were more than three times as likely to report having been forced to have sex in their lifetime (Strathdee, Patrick, Archibald, et al., 1997).

Ethnicity is another important individual factor as research from various settings internationally has shown that IDU from ethnic minority groups experience an elevated risk of blood borne disease transmission when compared to IDU from ethnic majority groups in the same setting. Reports from China and the US show that HIV prevalence is significantly higher among IDU from minority ethnic groups (Des Jarlais, et al., 2009; Ouellet, et al., 2000; Rondinelli, et al., 2009; Ruan, et al., 2007; Zhang, et al., 2008; Zhang, et al., 2007). Ethnographic and survey data from China indicates that higher prevalence of HIV among minority ethnic IDU is due to decreased ability to obtain syringes, lack of HIV prevention knowledge, as well as social disadvantage and discrimination (Choi, Cheung, & Jiang, 2007; Zhang, et al., 2007). A recent meta-analysis of race and ethnicity in relation to hepatitis C distribution among IDU found that minority status was linked to higher rates of hepatitis C infection, with the greatest disparity existing between Aboriginal IDU in Canada and Australia as compared to white IDU in these countries (Lelutiu-Weinberger, et al., 2009). Ethnographer Philippe Bourgois (2003) has used Agar's "trend theory" (Agar, 2003; Agar & Reisinger, 2001) to explain how historical drug use patterns have intersected with the broader marginalization of ethnic minority groups in urban centres to result in substantial harms to

these groups stemming from unsafe crack smoking in the United States and cocaine injection in Canada.

A number of studies have described gendered dimensions in the distribution of injection related risks and harms. Reports from Canada and numerous other countries indicate that HIV disproportionately affects females who inject drugs (Mesquita, et al., 2001; Miller, Spittal, et al., 2002; Spittal, et al., 2002; Strathdee, et al., 2008; Zhang, et al., 2008). Within Vancouver, various studies have highlighted increased prevalence and incidence of HIV infection, as well as elevated mortality rates among females who inject drugs (Miller, et al., 2006; Miller, Spittal, et al., 2002; Miller, Tyndall, et al., 2002; Spittal, et al., 2002; Spittal, et al., 2006; Wood, Lloyd-Smith, et al., 2007). It is noteworthy that several unsafe injection practices have been shown to elevate risk of HIV and other infections among females who inject drugs, including requiring assistance with injections and injecting into the jugular vein (Hoda, et al., 2008; O'Connell, et al., 2005; Spittal, et al., 2002). As an example, cohort data from Vancouver examining the incidence of HIV among IDU over a 48 month follow-up period found that rates among females were about 40% higher than those of their male counterparts and further that specific unsafe injection practices, such as frequent cocaine injection and requiring help with injecting, were independent predictors of time to seroconversion (Spittal, et al., 2002). Studies have also documented that females who inject drugs may be at increased risk of acquiring other blood borne diseases such as hepatitis B and hepatitis C (Bourgois, Prince, & Moss, 2004; Evans, et al., 2003; Miller & Neaigus, 2001; Ruan, et al., 2007). In one study of unsafe injection behaviours among young IDU in San Francisco, females were found to be more likely to engage in needle borrowing, ancillary equipment sharing, and being injected by someone else than their male counterparts despite

equivalent frequency of injecting (Evans, et al., 2003). Additional examinations of abscesses and other injection related infections among IDU have found that females are more likely to experience infections than males (Lloyd-Smith, et al., 2005; Salmon, Dwyer, et al., 2009). Although females who inject drugs experience increased vulnerability to HIV and other infections in Vancouver and many other settings internationally, it is notable that reports from a limited number of settings have associated male gender with increased risk of HIV infection among subpopulations of IDU (Jia, et al., 2008; Salmon, van Beek, Amin, Grulich, & Maher, 2009; Zhang, et al., 2008). This may be in part due to connections between sexuality and injection risk in these settings.

Several large-scale studies of IDU from across the US have noted associations between sexuality, HIV, and related unsafe injection practices. In general, males who inject drugs and have sex with men have been found to be more likely to engage in higher risk behaviours and to be HIV infected (Bull, Piper, & Rietmeijer, 2002; Diaz, Vlahov, Greenberg, Cuevas, & Garfein, 2001; Kral, et al., 2001; Kral, et al., 2003; Maslow, Friedman, Perlis, Rockwell, & Des Jarlais, 2002; Ouellet, et al., 2000; Rondinelli, et al., 2009; Shafer, et al., 2002; Strathdee, et al., 2001), with studies in the US citing increased unsafe injection practices among this population such as frequent shooting gallery attendance and elevated rates of syringe sharing (Celentano, et al., 1991; Deiss, et al., 2008; Kral, et al., 2005; Maslow, et al., 2002; Tobin & Latkin, 2008). Notably, a few studies have demonstrated that among male injection drug users, having sex with men is strongly and independently associated with syringe borrowing (Marshall, et al., 2007; Strathdee, Patrick, Archibald, et al., 1997). Evidence has also been presented to support a link between psychostimulant use, unsafe injection practices, and sexual risk behaviours among men who

have sex with men (Bull, et al., 2002; Patterson, Semple, Zians, & Strathdee, 2005; Semple, Patterson, & Grant, 2004). Researchers from Denver suggest that high rates of cocaine and methamphetamine injection used to stimulate sexual desire within this population may have a synergistic effect on HIV transmission by increasing both sexual and injection risk behaviour (Bull, et al., 2002).

It is noteworthy that ethnicity, gender, and sexuality may also interact with structural influences of injection risk behaviour. For the purposes of this review these characteristics have been included as individual level factors due to their underlying nature as endogenous to the individual, while the following sections focus on exogenous factors. That said, it is important to recognize that the individual vulnerability influenced by these characteristics may be far removed from individuals' control, yet still have a strong impact due to the racism, sexism, heterosexism, discrimination, and stigmatization directed towards these groups in various settings (Rhodes, et al., 2005; Sumartojo, 2000).

2.5.3 Unsafe injecting and the physical environment.

A growing body of evidence from industrialized countries highlights how neighbourhood disadvantage in the form of high poverty rates, low levels of educational attainment, and inequitable distribution of prevention, treatment, and other health services combined with urban development resulting in destruction of low income housing, and shrinking of social networks can lead to increases in injection drug use and may influence unsafe injection practices (Akukwe, 2001; Fuller, et al., 2005; Genereux, et al., 2010; Nandi, et al., 2010; Rhodes, et al., 2005). Several studies from urban settings in the US have shown that neighbourhood disadvantage and gentrification can influence injecting behaviour and associated harms, especially among disadvantaged populations (Bluthenthal, et al., 2007;

Hembree, et al., 2005; Latkin, Williams, Wang, & Curry, 2005; Nandi, et al., 2010; Roberts, et al., 2010; Singer, 1994). For example, residence in the Downtown Eastside of Vancouver, Canada's poorest urban neighbourhood, has been shown to be an independent predictor of HIV seroconversion (Maas, et al., 2007). Conversely, recent work has shown that injection risk taking behaviour declines when IDU migrate out of the Greater Vancouver area (Rachlis, Wood, Li, Hogg, & Kerr, 2010). Although the impact of neighbourhood environments is being increasingly recognized, less is known about how geographic neighbourhoods contribute to injection risk. One hypothesis provided by Latkin et al (2005) in an examination of how neighbourhood social disorder in Baltimore led to transmission of HIV infection among IDU is that psychological distress is higher in more socially disordered neighbourhoods, and that distress leads to greater injecting frequency and equipment sharing.

Availability of illicit drugs in a geographic area and local consumption practices are additional characteristics of the physical environment that mediate injection practices (Ciccarone & Bourgois, 2003; Rhodes, et al., 2003; Stachowiak, et al., 2006). For example, in a multi-method analysis of geographic distribution of HIV among IDU in the United States, Ciccarone and Bourgois (2003) suggest that geographic differences may be structured by the type of heroin available which in turn shapes injecting practices. In areas where heroin is unavailable or the purity is low, research indicates that IDU may switch to injecting prescription opioids, which carry additional risks (Firestone & Fischer, 2008; Fischer, et al., 2008). Recent research from Thailand has documented rapidly increasing popularity of midazolam, a legal, rapid onset, short duration benzodiazepine (Kerr, Kiatying-Angsulee, et al., 2010; Martin, et al., 2010; Van Griensvan, et al., 2005; Werb, et al., 2009). Injection of midazolam in this region is of particular concern given a lack of access to sterile injecting

paraphernalia to properly prepare these pills for injection, the lack of which is resulting in increases in venous damage, abscesses and soft-tissue infections, and a high proportion of risky groin injections (Kerr, Kiatying-Angsulee, et al., 2010).

Housing conditions are an important aspect of the physical environment that have been shown to affect injection practices. A number of studies from across the US have connected homelessness to increases in unsafe injection practices among IDU, such as needle sharing and backloading (Andia, et al., 2001; Coady, et al., 2007; Metraux, et al., 2004). Data from urban centres across Canada has also linked the experience of homelessness with higher rates of overdose among IDU (Fischer, et al., 2004; Kerr, Fairbairn, et al., 2007). A large portion of IDU that do have permanent shelter are found in unstable and inadequate housing conditions. A wealth of evidence from various settings indicates that IDU residing in unstable housing are at significantly elevated risk of HIV, hepatitis C, and other injection related infections (Coady, et al., 2007; Corneil, et al., 2006; Des Jarlais, et al., 2007; Kim, et al., 2009; Lloyd-Smith, et al., 2008, 2009; Patrick, et al., 1997; Shannon, Ishida, Lai, & Tyndall, 2006). In a national sample of IDU derived from US syringe exchange programs, participants living in unstable housing were approximately twice as likely to report receptive syringe sharing than stably housed participants (Des Jarlais, et al., 2007). It is clear that housing conditions play an important role in the health and injection practices of IDU. Negative outcomes associated with homelessness and unstable housing may be partially explained by a lack of clean and safe places to inject for IDU that find themselves in these situations.

The locations in which drug injecting occurs often determine whether IDU have access to sterile injecting equipment and the ability to implement safer injecting practices

(Kerr, Kimber, & Rhodes, 2007; Rhodes, Kimber, et al., 2006; Rhodes, et al., 2005). Public spaces are the most visible injecting locations and research suggests that public injecting inhibits safer injecting practices and negatively impacts the overall health of IDU (Klee & Morris, 1995; Rhodes, Kimber, et al., 2006; Small, et al., 2007). Ethnographic work describing public injection settings in Vancouver identifies a large network of highly visible alleyways which are often unsanitary and constrain opportunities to inject in a hygienic fashion (Small, et al., 2007). Such public injections leave IDU preoccupied with fears of being intercepted by the police, physically assaulted, or robbed which influences IDU to employ expedient preparation techniques rather than adhering to safer injection practices (Small, et al., 2007). As a result of these concerns a large body of evidence has indicated that people who frequently inject in public are at increased risk for unsafe injecting, HIV and hepatitis C transmission, abscesses, overdoses, sharing injecting equipment, and vascular damage (Darke, Kaye, & Ross, 2001; Dovey, Fitzgerald, & Choi, 2001; Friedman, Jose, Deren, Des Jarlais, & Neaigus, 1995; Green, Hankins, Palmer, Boivin, & Platt, 2003; Klee & Morris, 1995; Latkin, et al., 1994; McKnight, et al., 2007; Navarro & Leonard, 2004; Suh, Mandell, Latkin, & Kim, 1997; Weeks, et al., 2001). Several studies have linked injecting in public with material and structural factors including homelessness, urban disadvantage, and fear of police arrest (Debeck, Small et al., 2009; Dovey, et al., 2001; Klee & Morris, 1995; McKnight, et al., 2007; Rhodes, Kimber, et al., 2006; Rhodes, et al., 2005; Small, et al., 2007). Although there remains a dearth of evidence about public injecting in many countries, the public injecting scenes in urban centres across Canada have been well described. Research from Montreal, Ottawa, and Vancouver shows that more than half of IDU report public injecting in these settings (Green, et al., 2003; Kerr, Wood, Small, Palepu, & Tyndall,

2003; Navarro & Leonard, 2004). Recent reports from Vancouver have found significant associations between public injecting, homelessness, and a number of injecting related unsafe injection practices including syringe lending, requiring help injecting, and failure to cook and filter drugs prior to injection (Debeck, Small et al., 2009; McKnight, et al., 2007).

Another body of literature focused on physical injecting environments identifies “shooting galleries” as locations that place IDU at increased risk for unsafe injecting and associated harms (Chitwood, et al., 1990; Deren, Kang, Colon, Andia, & Robles, 2004; Des Jarlais & Friedman, 1990; Fuller, et al., 2003; Klein & Levy, 2003; Marmor, et al., 1987; Metsch, et al., 1999; Nelson, et al., 2002; Page, 1990; Philbin, et al., 2008; Wylie, Shah, & Jolly, 2006). The term shooting gallery is used to describe a variety of locations in which injectors gather to inject themselves while gaining some privacy and security from street based drug scenes (Klein & Levy, 2003; Koester, 1994; Ouellet, Jimenez, Johnson, & Wiebel, 1991; Rhodes, et al., 2005). Payment, in the form of money, drugs, or sex is frequently exchanged for entrance to shooting galleries, and injecting equipment stored for re-use is often rented or sold by the management and shared amongst visitors (Carlson, 2000; Celentano, et al., 1991; Ouellet, et al., 1991). Epidemiological and ethnographic research has associated injecting in shooting galleries with a number of unsafe injection practices including syringe sharing, use of used syringes to prepare shared drugs, and sharing of cottons, cookers, and water (Fuller, et al., 2003; Gibson, et al., 1993; Koester, et al., 1990; Latkin, et al., 1994; Neaigus, et al., 1994; Wiebel, 1996). Although the associations between shooting gallery attendance and risk of blood-borne disease transmission have been well described, ethnographic work from Chicago and Ohio highlights that shooting gallery typologies differ significantly across geographic and socioeconomic space and thus are

subject to considerable local and cultural variation (Carlson, 2000; Ouellet, et al., 1991). For example, reports from Eastern Europe and Central Asia describe injection settings where drugs, often cooked dried poppy heads or ephedrine-based medications, are prepared in a communal container and collectively shared among IDU (Grund, 2005; Rhodes, et al., 2003; Rhodes & Simic, 2005). Although this process of self-production is rooted in older cultural traditions, it greatly increases the opportunity for transmission of blood-borne diseases and other infections (Grund, 2005). This highlights the importance of social context in shared drug use environments as social roles, norms, and beliefs of IDU help to create and reinforce a context of injection risk in physical settings such as shooting galleries (Carlson, 2000; Klein & Levy, 2003; Ouellet, et al., 1991). As stated previously, experience of opiate withdrawal symptoms can increase individual risk by encouraging attendance at riskier injection locations including public places and shooting galleries to obtain drugs (Mateu-Gelabert, et al., 2010).

The relationship between injecting drugs while in prison and increased risk for blood-borne disease transmission has been well documented internationally (Buavirat, et al., 2003; Dolan & Wodak, 1999; Hagan, 2003; Hammett, Harmon, & Rhodes, 2002; March, et al., 2007; Small, Wood, Jurgens, & Kerr, 2005; Taylor, 1994; Wood, Li, et al., 2005; Zamani, et al., 2005). Research suggests that the scarcity of syringes and other injecting paraphernalia in jails creates an environment in which paraphernalia may be shared and re-used on multiple occasions (Edwards, Curtis, & Sherrard, 1999; Koulierakis, Gnardellis, Agrafiotis, & Power, 2000; Pollini, et al., 2009; Rotily, Galinier-Pujol, & Vernay-Vaisse, 1995; Small, Kain, et al., 2005; Small, Wood, et al., 2005). For example, studies from the UK, Greece, and Mexico, have shown that between 73% and 83% of inmates who injected drugs reported having

shared syringes while in prison (Edwards, et al., 1999; Koulierakis, et al., 2000; Pollini, et al., 2009). Although injections tend to occur less frequently in prison, the injections that do occur are generally riskier due to significantly higher rates of needle sharing compared to injections that occur in the community (Dolan, 1996; Forester, Bruneau, & Zunzunegui, 2002; Small, Kain, et al., 2005). Longitudinal analyses of syringe sharing in prisons by IDU in Vancouver found that having been incarcerated in the previous six months was independently associated with syringe lending among HIV positive IDU and syringe borrowing among HIV negative IDU (Wood, Li, et al., 2005). Further qualitative work by Small, Kain et al. (2005) highlights the high prevalence of drug use and syringe sharing among IDU in Canadian prisons, while also identifying the important role of social connections within large networks of inmates who share injection equipment.

2.5.4 Social influences on injecting practices.

While a large body of research has documented the influences of physical environments on injecting practices, more recent research has turned to social characteristics and peer group affiliations as potential determinants of unsafe injection practices. In many ways the unsafe practice of sharing may be conceptualized as a social exchange – when sharing occurs it is often shaped by some social dynamic. As such, many of the associations reported in this section focus on the sharing of injection paraphernalia.

The structure of social networks has been identified as an important determinant of blood borne disease transmission among IDU (Latkin, Mandell, Oziemkowska, et al., 1995; Prithwish, et al., 2007; Rothenberg, et al., 2000; Rothenberg, et al., 1998). Increased size and density of injecting networks has been associated with higher rates of injection paraphernalia sharing (Friedman, et al., 2000; Friedman, et al., 1997; Latkin, Mandell, Vlahov, et al., 1995;

Latkin, et al., 1996; Mandell, et al., 1999; Rothenberg, et al., 2000), while decreases in network size and density has been found to result in fewer instances of paraphernalia sharing (Rothenberg, et al., 1998). An individual's network position is another important factor, as those central to the network core have been shown to be more likely to engage in injection paraphernalia sharing (Friedman, et al., 1997; Lovell, 2002; Wylie, Shah, & Jolly, 2007). Furthermore, instability in network structure characterized by high member turnover has been linked to more frequent unsafe injection practices (Costenbader, Astone, & Latkin, 2006; Hoffmann, Su, & Pach, 1997; Rothenberg, et al., 1998; Wylie, et al., 2007).

The individual characteristics of network members such as younger age and recent onset of injecting (Buxton, et al., 2004; Fennema, Van Ameijden, Van Den Hoek, & Coutinho, 1997), ethnic homogeneity (Kottiri, Friedman, Neaigus, Curtis, & Des Jarlais, 2002), and limited resources for acquiring drugs or paraphernalia (Bourgois, 1998; Jackson, et al., 2010; Zule, 1992) have all been correlated with injection paraphernalia sharing and related unsafe injection practices (Andia, Deren, Robles, Kang, & Colon, 2008; Bailey, et al., 2007; Davey-Rothwell & Latkin, 2007; Latkin, et al., 2009; Latkin, Kuramoto, Davey-Rothwell, & Tobin, 2010; Stein, Charuvastra, & Anderson, 2002; Thiede, et al., 2007; Thorpe, et al., 2001; Tobin, Davey-Rothwell, & Latkin, 2010). Conversely, improved drug use behaviour and practice of safer injection techniques has been associated with a decreased number of IDU in one's social network and more frequent contact with people who do not use drugs (Costenbader, et al., 2006; Cox, et al., 2009; Davey-Rothwell & Latkin, 2007; El-Bassel, Cooper, Chen, & Schilling, 1998; Gogineni, Stein, & Friedmann, 2001; Latkin, et al., 2009; Latkin, Mandell, Oziemkowska, et al., 1995; Latkin, Kuramoto, et al., 2010; Neaigus, et al., 1994; Prithwish, et al., 2007; Stein, et al., 2002; Zapka, Stoddard, & McCusker, 1993).

On the other hand, peer norms for safer injecting practices have been associated with lower frequencies of unsafe injection practices (Friedman, Mateu-Gelabert, et al., 2007; Hawkins, Latkin, Mandel, & Oziemkowska, 1999; Jamner, Corby, & Wolitski, 1996; Metsch, et al., 2007). Furthermore, the specific drug of choice and patterns of consumption within networks can influence the extent of member interaction and the subsequent probability of paraphernalia sharing related to withdrawal symptoms or frequency of injections (Latkin, Knowlton, & Sherman, 2001; Sherman, Latkin, & Gielen, 2001; Smyth, Barry, & Keenan, 2001; Wylie, et al., 2006).

It is important to note that sharing of injection paraphernalia does not occur randomly within social networks, but rather injection partners are frequently chosen based on strength of social ties (Hunter, Donoghoe, Stimson, Rhodes, & Chalmers, 1995; Jackson, et al., 2010; Klee, Faugier, Hayes, & Morris, 1991; Neaigus, et al., 1994; Smyth, et al., 2001; Unger, et al., 2006; Valente & Vlahov, 2001). Gender has been shown to be an important variable in delineating these relationships, as males tend to report sharing most often with close friends (Barnard, 1993; Unger, et al., 2006), while women share more frequently than men, often within their intimate relationships (Cruz, et al., 2007; Dwyer, et al., 1994; Jackson, et al., 2010; Sherman, et al., 2001; Unger, et al., 2006). Research on injection drug use and violence suggests that higher risk experienced by females may be driven by dynamics of gendered violence and power relations with drug-using intimate partners that directly impact their ability to negotiate both drug and sexual risk reduction (Bourgois, et al., 2004; Shannon, Kerr, et al., 2008). Sexual relationships between IDU have been described by several studies as influencing increased sharing of injection paraphernalia and preparations (Fairbairn, et al., 2010; Hunter, et al., 1995; Klee, et al., 1991; Rhodes, 1998; Suh, et al., 1997; Thiede, et al.,

2007). Familial ties may also play an important role as researchers have observed that interactions between drug injecting family members can increase the likelihood of injection paraphernalia sharing (Sherman, et al., 2001; Suh, et al., 1997). An additional body of literature has associated injecting with an increased number of partners with injection equipment sharing, HIV, and hepatitis C infection (El-Bassel, et al., 1998; Latkin, et al., 1994; Shapatava, Nelson, Tsertsvadze, & del Rio, 2006; Thiede, et al., 2007). As stated previously, experiences of opiate withdrawal can increase risk by increasing the number of injecting partners an individual has in order to obtain drugs (Mateu-Gelabert, et al., 2010). Sharing injection paraphernalia is not the only risky social exchange that can occur between IDU. Obtaining assistance with injections from other IDU is a well described social practice which has been identified as placing those requiring assistance at heightened risk for syringe sharing and blood-borne disease transmission (Cruz, et al., 2007; Fairbairn, et al., 2010; Jackson, et al., 2010; Kral, et al., 1999; O'Connell, et al., 2005; Wood, Spittal, et al., 2003).

Stigmatization and discrimination are additional social factors that have been shown to affect the healthcare choices of IDU in Canada and internationally (Bobrova, et al., 2006; Jackson, et al., 2010; Simmonds & Coomber, 2009; Treloar & Wen, 2005). Importantly, negative or stigmatizing experiences and the related desire to remain anonymous reduce the likelihood of contact between IDU and programs that seek to promote safer injecting, such as needle exchange and methadone (Bobrova, et al., 2006; Ho & Maher, 2008; Jackson, et al., 2010; Radcliffe & Stevens, 2008; Razani, et al., 2007; Simmonds & Coomber, 2009; Treloar & Wen, 2005). Not only do IDU potentially avoid health and harm reduction services due to perceived stigma, NIMBY (“not in my back yard”) attitudes in North America have been connected to institutional and community resistance toward establishing and maintaining

safer injecting programs (such as syringe exchange), which consequently limit access to sterile injecting equipment and other health services for many IDU (Strike, Myers, & Millson, 2004; Tempalski, Friedman, Keem, Cooper, & Friedman, 2007). Research in Victoria Canada and elsewhere has found positive links between unsafe injection practices and societal stigmatization of injection drug use (Latkin, Srikrishnan, et al., 2010; Stajduhar, et al., 2004). Qualitative investigation of stigma among IDU has uncovered further stigmatization within this subpopulation as IDU tend to construct less stigmatized self-identities to differentiate themselves from the stigmatized category (Furst, Johnson, Dunlap, & Curtis, 1999; Radcliffe & Stevens, 2008; Simmonds & Coomber, 2009). It has been suggested that such differentiation may impact the way in which IDU relate to important messages about injection risk and safety (Simmonds & Coomber, 2009; Smith, Lillie Tle, & Latkin, 2007).

2.5.5 Structural determinants of unsafe injecting.

Structural factors are defined as the social, economic, policy, or organizational systems which combine with micro-level factors to “structure” the context in which injection risk and harm is produced (Rhodes, et al., 2005; Sumartojo, 2000). Within urban settings, poor socioeconomic conditions have been associated with increases in injection drug use, unsafe injection practices, vulnerability to blood-borne disease transmission, and higher rates of HIV infection (Bluthenthal, et al., 2007; Genereux, et al., 2010; Maas, et al., 2007; Rhodes, et al., 2005; Roberts, et al., 2010; Singer, 1994; Zierler, et al., 2000). It has been suggested that socioeconomic circumstances may play a role in determining behavioural norms and high risk practices of IDU, while also shaping access to health care services and the quality of health care received (Galea & Vlahov, 2002). Unfortunately, for many IDU

opportunities to improve socioeconomic circumstances are limited. A recent examination of employment among a cohort of IDU in Vancouver found an employment rate between 9% and 12.4% over a four year study period (Richardson, Wood, Li, & Kerr, 2010). Notably, unemployment in this study was associated with frequent injecting and injecting in public (Richardson, et al., 2010).

The availability of and access to adequate housing is an important structural determinant of injection practices, and a large body of research has connected both homelessness and unstable housing conditions to poor health and increases in unsafe injection practices among IDU (Andia, et al., 2001; Bourgois, 1998; Briggs, et al., 2009; Coady, et al., 2007; Corneil, et al., 2006; Des Jarlais, et al., 2007; Metraux, et al., 2004; Shannon, et al., 2006). As well, previous work has suggested that the high concentration of unstably housed IDU in single room occupancy hotels in Vancouver facilitated widespread syringe sharing and contributed to the rapid emergence of an HIV epidemic in this setting (Corneil, et al., 2006). Some single room occupancy hotels also often operate as shooting galleries in which suboptimal access to injection paraphernalia have been exacerbated by hotel policies such as “exit fees” which discourage IDU from leaving buildings at night (Evans & Strathdee, 2006; O'Shaughnessy, et al., 2009; Rhodes, 2002).

In recent years, prohibitionist and enforcement-based policies that target drug trafficking, possession, and consumption have been receiving increased attention for their role in increasing risk behaviour and disease transmission among IDU, while also deterring IDU from accessing harm reduction and health care services. Research from the US and elsewhere identifies laws regulating syringe distribution as structural determinants of unsafe injection practices (Burriss, et al., 2004; Neaigus, et al., 2008; Rhodes, et al., 2005; Taussig,

Weinstein, Burris, & Jones, 2000). Reports from areas where laws prohibit the possession of drug paraphernalia indicate that IDU may be unwilling to carry syringes for fear of being stopped by police (Bluthenthal, 1999; Bourgois, 1998; Gleghorn, Jones, Doherty, Celentano, & Vlahov, 1995; Grund, Heckathorn, Broadhead, & Anthony, 1995; Koester, 1994; Neaigus, et al., 2008; Waldorf, Reinerman, & Murphy, 1990; Zule, 1992). Additionally, some studies report that these legal pressures reduce attendance at available syringe exchange programs and serve to limit appropriate expansion of these programs (Bluthenthal, Kral, Lorvick, & Watters, 1997; Burris, et al., 2004; Davis, Burris, Kraut-Becher, Lynch, & Metzger, 2005; Heimer, Bluthenthal, Singer, & Khoshnood, 1996). Comparative analyses of policy environments show higher levels of both syringe sharing and HIV infection among IDU in areas where legal restrictions on syringe exchange exist as compared to areas without such restrictions (Beckwith, et al., 2006; Bluthenthal, 1999; Calsyn, Saxon, Freeman, & Whittaker, 1991; Des Jarlais, et al., 2009; Friedman, Perlis, & Des Jarlais, 2001; Hurley, Jolley, & Kaldor, 1997; Rich, et al., 2007).

Research from settings that support harm reduction indicate that discretionary practices by police can discourage IDU from carrying paraphernalia (Bluthenthal, et al., 1997; Bray, Lawson, & Heimer, 2001; Cooper, Moore, Gruskin, & Krieger, 2005; Des Jarlais, 2000; Small, Kerr, et al., 2006; Wood, Kerr, Small, et al., 2003). Policing practices and fear of the criminal justice system can directly affect the unsafe injection practices of IDU by affecting access to sterile equipment as well as the physical and social environments in which drugs are injected (Aitken, 2002; Cooper, et al., 2005; Davis, et al., 2005; Dovey, et al., 2001; Fitzgerald, 2005; Friedman, et al., 2006; Kerr, Small, & Wood, 2005; Miller, et al., 2008; Rhodes, et al., 2003; Shannon, Kerr, et al., 2008; Shannon, Rusch, et al., 2008; Werb,

et al., 2008; Wood, Kerr, Small, et al., 2003; Wood, Kerr, Spittal, Tyndall, et al., 2003). Qualitative research from Vancouver and Sydney Australia highlights that police presence is associated with injecting in riskier environments, discouraging safer injection practices, and more opportunistic and hurried injections in public settings (Maher & Dixon, 1999; Small, Kerr, et al., 2006). Police practices can also have an indirect effect on injection risk by displacing IDU away from syringe distribution programs as well as safer injecting locations and other health and treatment services (Burriss & Strathdee, 2006; Shannon, Rusch, et al., 2008; Wood, Spittal, Small, et al., 2004). Actual arrest of IDU further increases risk of unsafe practices and blood borne disease transmission through exposure to prison environments. As stated previously, prison environments are key sites for the transmission of blood borne viruses resulting from the scarcity of injecting equipment in these institutions (Burriss, et al., 2004; Pollini, et al., 2009; Small, Kain, et al., 2005; Small, Wood, et al., 2005; Wood, Montaner, & Kerr, 2005).

Among the most effective mechanisms for the prevention of unsafe injecting is the provision of treatment and distribution of prevention services. A number of different forms of treatment including opiate substitution therapy, detoxification, and counselling have been recognized as effective in decreasing unsafe injection practices by reducing frequency of injection and subsequently the prevalence of risk factors for infection or other complications (Bruce, 2010; DeBeck, Kerr, et al., 2009; Evans, Hahn, Lum, Stein, & Page, 2009; Hartel & Schoenbaum, 1998; Johnson, et al., 2000; Kwiatkowski & Booth, 2001; Metzger, et al., 1998; Rosenbaum, Washburn, Knight, Kelley, & Irwin, 1996; Sullivan, Metzger, Fudala, & Fiellin, 2005; Teesson, et al., 2008; Vlahov, Robertson, & Strathdee, 2010; Wood, Kerr, Spittal, Tyndall, et al., 2003). Two separate prospective cohorts of IDU in Vancouver have

shown independent associations between inability to access treatment and syringe borrowing (Milloy, et al., 2010; Wood, Spittal, Li, et al., 2004). However, it is important to note that policies restricting the volume of syringes exchanged at these services can work to further limit the coverage of syringe distribution (Bray, et al., 2001; Heimer, et al., 1996; Lurie & Drucker, 1997). For example, when the HIV outbreak occurred in Vancouver, the needle exchange program operated on a strict one-for-one syringe exchange policy and restricted hours to daytime operation which effectually limited access to sterile syringes for local IDU (Spittal, et al., 2004; Wood, Tyndall, Spittal, Li, Hogg, O'Shaughnessy, et al., 2002; Wood, Tyndall, Spittal, Li, Hogg, Montaner, et al., 2002).

There is a substantial body of research suggesting that programs based on harm reduction approaches have greater success in minimizing unsafe injection practices than those programs that seek to promote abstinence as a primary objective (Bobrova, et al., 2006; Csete, 2010; Lee & Zerai, 2010; Lennings, 2000; Van Den Berg, Smit, Van Brussel, Coutinho, & Prins, 2007). Some authors have suggested that the most effective of these services are those that directly involve IDU in program design and implementation (Carruthers, 2007; Des Jarlais, 2000; Friedman, de Jong, et al., 2007; Friedman, et al., 2004). Importantly, the sum of this research indicates that the availability and coverage of both treatment and prevention materials and services, informed by a philosophy that is acceptable to IDU themselves, are structural factors that affect the health and safety of IDU.

2.6 Interventions

Over the past 25 years, the evidence base surrounding injection drug use, the harms associated with unsafe injection practices, and the factors that mediate individual, group, and community susceptibility and vulnerability to these harms has grown exponentially. Parallel

to the development of this evidence base policy makers, health care providers, and community groups have initiated a variety of interventions aimed at reducing the negative health consequences associated with injection drug use. A number of these interventions, such as detoxification, addiction treatment programs, and opiate maintenance therapy attempt to reduce unsafe injecting by promoting abstinence or reductions in drug use. However, for this review, the focus will be exclusively on interventions designed specifically to target unsafe injection practices. Although programs targeting reductions in use may be useful for some individuals, they provide little for those who continue to inject drugs.

2.6.1 Distribution of syringes and injection paraphernalia.

One of the primary interventions aimed at reducing the harms associated with unsafe injection practices is the distribution of syringes and other injection paraphernalia. In a number of different settings, needle and syringe programs have been shown to be effective at reducing syringe sharing as well as HIV prevalence among IDU (Beckwith, et al., 2006; Bluthenthal, Kral, Gee, Erringer, & Edlin, 2000; Des Jarlais, 2000; Des Jarlais, et al., 2009; Hurley, et al., 1997; Rich, et al., 2007). Comprehensive review of international evidence has shown that needle and syringe programs reduce HIV infection among IDU (Wodak & Cooney, 2006), yet there remains inadequate access to these programs internationally. A recent systematic review of the global, regional, and national coverage of needle and syringe programs shows that such programs have been implemented in 82 countries, and that substantial variation in coverage exists (Mathers, et al., 2010). Internationally, Australia distributes the most syringes at a rate of 202 syringes per IDU per year, followed by central Asia (92 syringes per IDU per year), and western Europe (59 syringes per IDU per year), while Canada (46 syringes per IDU per year), and the US (22 syringes per IDU per year)

distribute significantly less, many regions including Latin America and the Caribbean (0.3 syringes per IDU per year), the Middle East and North Africa (0.5 syringes per IDU per year), and sub-Saharan Africa (0.1 syringes per IDU per year) continue to provide little to no syringe access for IDU (Mathers, et al., 2010). Even in areas where IDU do have access to needle and syringe programs, it is not in and of itself sufficient to eliminate unsafe injection practices and the associated health costs for IDU. For example, the HIV epidemic observed among IDU in the mid to late 1990s in Vancouver occurred despite the presence of a well established, high volume syringe exchange program (Schechter, et al., 1999; Strathdee, Patrick, Currie, et al., 1997; Wood, Tyndall, Spittal, Li, Hogg, O'Shaughnessy, et al., 2002). Despite the availability of syringes through this program, research has shown that syringe sharing persisted in this context (Strathdee, Patrick, Currie, et al., 1997; Wood, Tyndall, Spittal, Li, Hogg, Montaner, et al., 2002; Wood, et al., 2001). Research has shown that even when sterile syringes are accessible through syringe distribution programs, many IDU continue to report having difficulty accessing sterile syringes, and various factors such as binge drug use, frequent cocaine injection, requiring help injecting, and being away from the area where syringes are exchanged continue to perpetuate syringe sharing (Wood, Tyndall, Spittal, Li, Hogg, O'Shaughnessy, et al., 2002; Wood, Tyndall, Spittal, Li, Hogg, Montaner, et al., 2002; Wood, et al., 2001). Additional factors associated with syringe exchange programs themselves such as hours of operation and policies restricting the volume of syringes exchanged can work to further limit the coverage of syringe distribution (Bray, et al., 2001; Spittal, et al., 2004; Wood, Tyndall, Spittal, Li, Hogg, O'Shaughnessy, et al., 2002). Given evidence of the limitations of needle and syringe programs, researchers have argued that provision of sterile injecting equipment should be considered one component of a

more comprehensive harm reduction intervention (Hankins, 1998; Strathdee, Patrick, Currie, et al., 1997; Vlahov, et al., 2010).

2.6.2 Educational and behavioural interventions.

The use of behavioural interventions as a means of targeting and changing risky injection practices have been implemented and evaluated in a number of different settings. Researchers in the UK, US, and Australia have conducted randomized controlled trials comparing various forms of enhanced or multi-session behavioural interventions to standard or brief educational interventions as a means of reducing HIV and hepatitis C risk behaviour among IDU (Abou-Saleh, et al., 2008; Baker, Heather, Wodak, Dixon, & Holt, 1993; Hershberger, Wood, & Fisher, 2003; McCusker, Stoddard, Zapka, & Lewis, 1993; Purcell, et al., 2007; Rotheram-Borus, Rhodes, Desmond, & Weiss, 2010; Tucker, et al., 2004; Zule, et al., 2009). Although a few of these studies have reported increased efficacy of enhanced interventions (Hershberger, et al., 2003; Purcell, et al., 2007; Rotheram-Borus, et al., 2010), most trials have reported similar levels of risk reduction for participants in both types of intervention (Abou-Saleh, et al., 2008; Baker, et al., 1993; Tucker, et al., 2004; Zule, et al., 2009). For example, a recently published review of behavioural strategies to reduce injection and sexual risk among people who use drugs suggested that support for multi-session psychosocial interventions is limited, yet found that both multi-session and standard educational interventions result in large pre-post intervention changes, indicating that both are effective in reducing risk behaviours (Meader, Li, Des Jarlais, & Pilling, 2010). In Vancouver, safer injecting education offered within the supervised injection facility has been found to be effective at targeting unsafe injection practices, especially amongst IDU most at risk for injection related harm (Fast, Small, Wood, & Kerr, 2008; Wood, Tyndall, Stoltz, et

al., 2005; Wood, et al., 2008). The sum of this body of literature seems to suggest that exposure to various forms of educational and behavioural interventions leads to reductions in unsafe injection practices. As such, IDU should be considered capable of learning basic information about HIV, hepatitis C, and other risks associated with unsafe injecting and modifying their behaviour to protect themselves and those around them.

2.6.3 Outreach.

Outreach based interventions have been implemented in a variety of settings as a means of combining distribution of injection paraphernalia with safer injecting education in areas where IDU congregate. Outreach is designed to reach hidden populations of IDU in their communities rather than waiting for them to attend clinics or access other services, to engage them in a process to reduce unsafe injection practices and to provide them with the means to enable risk reduction (Needle, et al., 2005). Accordingly, outreach programs are often a first step in establishing prevention, healthcare, treatment, and support programs for IDU. These programs often involve current or former IDU, or other community workers to access IDU that are out-of-treatment, establish trust and rapport, initiate risk reduction activities, and make referrals to adjunct services (Needle, et al., 2005). Accumulated evidence from a previous review of more than 40 different studies mostly from the US indicates that outreach-based interventions have been effective in reaching out-of-treatment IDU and providing the means for effective behaviour change at a relatively low-cost (Coyle, et al., 1998). Specifically, research has consistently reported follow-up reductions in unsafe injection practices such as frequency of injection (Neaigus, et al., 1990; Weeks, et al., 1996) and sharing of syringes and other injection paraphernalia (Booth, Koester, Brewster, Weibel, & Fritz, 1991; Colon, 1993; Stephens, Feucht, & Roman, 1991; Wechsberg, Cavanaugh,

Dunteman, & Smith, 1994; Weeks, et al., 1996), while also documenting increases in needle disinfection (Colon, 1993; Rietmeijer, et al., 1996; Stephens, et al., 1991; Watters, 1987), and in some cases total cessation of injection drug use (Colon, 1993; Neaigus, et al., 1990; Siegal, Falck, Carlson, & Wang, 1995; Stephens, et al., 1991; Weeks, et al., 1996). In one prospective study of an intensive street-based outreach intervention in Chicago, Wiebel et al. (1996) also demonstrated that reductions in unsafe injection practices associated with outreach resulted in fewer HIV infections. These authors reported a decline in unsafe injection practices among IDU in the intervention group from 54% to 14% and decline in seroincidence from 8.4 to 2.4 per 100 person years over a four year study period, while the non-equivalent control group exhibited consistent unsafe injection practices over the study period (Wiebel, et al., 1996). Although results may vary based on the specific intervention and services available in a selected area, evaluations from a variety of settings have shown that outreach interventions are an effective strategy to reach hidden and marginalized populations of IDU to effectively change their injection risk behaviours.

Although not specific to injection drug use, street nurses in settings across Canada offer an extension of outreach services by providing nursing care in both traditional and non-traditional locations to homeless and otherwise marginalized individuals. Street nurses meet the clients where they are with a mandate to: provide hands-on nursing care including infectious disease testing, wound care, distribution of harm reduction supplies, and education directed towards safer drug use and sexual behaviour; advocating for clients within the health and social service system including referral to treatment and support of clients involved in treatment or other health services; and advocating politically for the changes needed to improve the health of clients such as those required to eliminate homelessness (Hardill, 2007;

Hilton, Thompson, & Moore-Dempsey, 2009). Evaluation of street nurse programs has demonstrated that clients likely decrease morbidity and mortality by improving knowledge of HIV and available options, receiving essential supplies to reduce harm and promote health, changing behaviour to reduce disease transmission, improving feelings about themselves, improving feelings of support, receiving earlier attention for health problems, and making major changes in their drug use (Hilton, et al., 2009; Hilton, Thompson, Moore-Dempsey, & Hutchinson, 2001).

2.6.4 Educational materials.

Resulting from reports documenting gaps in the individual knowledge of IDU regarding correct injection procedures (Booth, 1994; Heimer, et al., 2002; Stein, et al., 2001; Thiede, et al., 2007), educational materials such as posters, pamphlets, and cards describing drug preparation and injection procedures, overdose management, and reminders about how to avoid infection have become popular modes of educating IDU (Horyniak, et al., 2010; The Chicago Recovery Alliance, 2011; Wu, et al., 2007). Despite the widespread implementation of these types of educational materials as a way of promoting safer injecting practices, there remain very few evidence-based evaluations of these approaches. One randomized trial evaluating a needle social marketing intervention in China involving pamphlets, posters, photos, and educational videos, found a 35.3% drop in needle sharing among trial participants that received the intervention (Wu, et al., 2007). An Australian evaluation of an overdose campaign featuring stickers, wallet cards, and posters aimed at increasing awareness of overdose risks and prevention strategies found that the campaign had a minimal impact as less than one quarter of all campaign messages were mentioned by the exposure group at follow-up (Horyniak, et al., 2010). Given the popularity of this form of education as

a safer injecting intervention, further research is urgently required to determine the efficacy of these approaches.

2.6.5 Supervised injection facilities.

An increasingly popular intervention applied to reduce the harms associated with injection drug use is the establishment of supervised injection facilities. A number of these facilities are currently in operation in Europe and Australia (Bravo, et al., 2009; Broadhead, Kerr, Grund, & Altice, 2002; Dolan, et al., 2000; Dubois-Arber, Benninghoff, & Jeannin, 2008; Hedrich, 2004; Kimber, Dolan, & Wodak, 2005; van der Poel, Barendregt, & van de Mheen, 2003), while only one such sanctioned facility exists in North America (Wood, Kerr, Lloyd-Smith, et al., 2004; Wood, Tyndall, Montaner, & Kerr, 2006). Within a supervised injection facility, IDU can typically inject pre-obtained drugs under the supervision of medical staff, and be provided with sterile syringes and injection paraphernalia, information on safer injecting techniques, onsite overdose management, primary healthcare and referrals to treatment and other health and social services (Kerr, Kimber, Debeck, et al., 2007; Wood, Tyndall, Montaner, et al., 2006).

A comprehensive European report on drug consumption rooms published by the European Monitoring Centre for Drugs and Drug Addiction found that supervised injection facilities result in decreases in unsafe injecting behaviours (e.g. syringe sharing, injecting in unhygienic and public environments, and unsafe syringe disposal), decreased morbidity and mortality (e.g. infectious disease and overdose), increased uptake of health and social services (e.g. medical care and drug treatment), and reduced public drug use and neighbourhood nuisance (e.g. crime and public injecting), while this report further found that arguments stating that supervised injection facilities increase drug use or initiate new users

are unfounded (Hedrich, 2004). The final evaluation of the Sydney Medically Supervised Injecting Centre in Australia concluded that the centre was successful in making contact with IDU in the area including many who had no prior treatment for drug dependence, caused no increase in risk of blood borne virus transmission, managed overdoses that may have been fatal in other settings, and caused no overall loss of public amenity or increase in crime (MSIC Evaluation Committee, 2003; van Beek, Kimber, Dakin, & Gilmour, 2004). A more recent review of the literature examining the role of supervised injection facilities in response to HIV/AIDS among IDU shows that supervised injection facilities attract many IDU who inject unsafely, including those at risk for HIV, bacterial, and other infections resulting from factors such as frequent injecting and injecting in public (Kerr, Kimber, Debeck, et al., 2007). This report highlights that supervised injection facilities have also been shown to reduce syringe sharing, reduce injection related illness and mortality, and promote cessation of injection through enrolment into withdrawal and addiction treatment programs (Kerr, Kimber, Debeck, et al., 2007).

North America's first government-sanctioned supervised injection facility, known as "InSite", opened in Vancouver's Downtown Eastside in September of 2003 (Small, Palepu, et al., 2006; Wood, Kerr, Lloyd-Smith, et al., 2004). InSite has been the subject of rigorous evidence-based evaluation and a number of health and social impacts have been documented as stemming from its establishment, including reductions in public injecting (Petrar, et al., 2007; Stoltz, et al., 2007; Wood, Kerr, Small, et al., 2004), reductions in syringe sharing and other unsafe injection practices among IDU who use the facility (Kerr, Tyndall, et al., 2005; Stoltz, et al., 2007), decreases in overdose mortalities (Milloy, Kerr, Tyndall, Montaner, & Wood, 2008), provision of safer injecting education (Fast, et al., 2008; Wood, Tyndall,

Stoltz, et al., 2005; Wood, et al., 2008), and increased uptake of addiction treatment programs by InSite clients (Debeck, et al., 2011; Wood, Tyndall, Zhang, Montaner, & Kerr, 2007; Wood, Tyndall, Zhang, et al., 2006). Limitations of the facility relate to its relatively small capacity in comparison to the large open drug scene (Small, et al., 2007), as well as specific operational regulations that prohibit the sharing of drugs between clients and assisted injections within the facility (Wood, Tyndall, Spittal, Li, Hogg, O'Shaughnessy, et al., 2002).

2.6.6 Limitations of predominant interventions.

In summary, distribution of syringes and other injection paraphernalia, educational and behavioural interventions, outreach, and supervised injection facilities are the predominant interventions used internationally to address unsafe injection practices and the associated health consequences. It is important to note that there remains significant variation in accessibility and coverage of these health services for IDU in various settings due in large part to policy and economic circumstances. Even in areas where coverage is good, these interventions have their limitations. When evaluating the impact of these interventions, it is important to consider the unique, physical, social, and structural context in which IDU and unsafe injection practices are situated. The limitations of educational and behavioural health interventions focused on the individual have been well established (Fee & Krieger, 1993; Karpati, et al., 2002; Madray & Van Hulst, 2000; Moore & Dietze, 2005; Rhodes, 1997) predominantly due to their failure to address contextual factors exogenous to the individual. Syringe and paraphernalia distribution as well as outreach programs address structural barriers related to clean injection paraphernalia, but often offer limited coverage and fail to deal with other structural issues, as well as aspects of the physical environment. The limitations of these interventions are evidenced by the fact that high rates of unsafe

injecting persist in many settings. In a setting like Vancouver that has a supervised injection facility, large scale syringe distribution and recovery, an award winning street nurse program, and a whole host of longstanding outreach and educational approaches including those sponsored by the regional health authority, high rates of unsafe injecting persist (Debeck, Small, et al., 2009; Fairbairn, et al., 2010; Hoda, et al., 2008; Lloyd-Smith, et al., 2008; Rachlis, Lloyd-Smith, et al., 2010). In light of the persistent problems of unsafe injecting, many people have sought to involve drug users in the delivery of interventions to extend their reach and effectiveness. Given these ongoing problems, there is a growing interest in community-based and drug user-led initiatives to address unsafe injecting practices and the health costs to IDU.

2.6.7 Peer-driven interventions.

Researchers in a number of settings internationally have utilized theories of social influence to implement peer-driven network oriented HIV prevention interventions (Broadhead, et al., 1995; Broadhead, et al., 1998; Latkin 1998; Latkin, et al., 2003; Broadhead, et al., 2006; Dickson-Gomez, et al., 2006; Garfein, et al., 2007; Booth, et al., 2009; Broadhead, et al., 2009; Weeks, et al., 2009). These social network interventions maintain a focus specifically on HIV prevention and are implemented by experts in the field of public health who train peer leaders to disseminate prevention information and supplies through micro and macro networks of IDU. The primary focus of these interventions is on specific drug-using social networks and the risks of specific practices such as syringe and paraphernalia sharing occurring within these networks (Latkin, 1998).

A number of these interventions have been evaluated in various settings internationally. Broadhead et al. (1995; 1998) conducted a comparative analysis in eastern

Connecticut in which a peer-driven intervention involving the training of IDU to carry out outreach activities including information about reducing unsafe sharing practices surrounding syringes, cookers, filters, and water, motivated by the offer of financial incentives to recruit and educate other IDU was compared to a traditional HIV prevention outreach model. Importantly, all participants recruited into the peer intervention in this model were trained and provided with the opportunity to recruit and educate three more IDU (Broadhead, et al., 1995; Broadhead, et al., 1998). The authors of this study concluded not only that IDU are willing and capable of working to prevent HIV but when they are compared to traditional outreach, they recruit subjects from a larger geographic area that are more ethnically representative of the community, they are more effective educators influencing greater reductions in HIV risk behaviour, and they are more cost effective (Broadhead, et al., 1995; Broadhead, et al., 1998). More recently, Broadhead has demonstrated the effectiveness of this style of peer-driven intervention in Russia, China, and Vietnam (Broadhead, et al., 2006; Broadhead, et al., 2009).

In Baltimore Maryland, Latkin et al. (1998) trained 36 identified peer leaders in the community of IDU through a ten session training program aimed at promoting HIV prevention information, including messages about syringe sharing and proper sterilization of equipment using bleach, among their contacts within and beyond their social networks. Based on the suggestion that overpayment reduces intrinsic motivation, peer leaders were paid for training but not for outreach activities (Latkin, 1998). Baseline and follow-up interviews were conducted with leader's network members and compared to a no treatment control condition (Latkin, 1998). Results of this study suggest that volunteers in the community of IDU are able to disseminate HIV prevention information to their network

members and others, that peer leaders have greater influence over HIV related behaviours, that they are able to enter a greater diversity of settings across a wider geographical area, and that they are more cost effective, when compared to professionals (Latkin, 1998). Latkin et al. (1998) additionally identify an empowerment dimension of their work suggesting that this training may provide the leaders with effective pro-social roles. Latkin and colleagues have subsequently demonstrated the effectiveness of this model of intervention in unsafe injection practices through a larger trial in Baltimore (Latkin, et al., 2003) and another in the Ukraine (Booth, et al., 2009).

Another community research project in Hartford Connecticut utilized Latkin's peer training curriculum to train IDU to be active leaders in promoting HIV, hepatitis, and sexually transmitted infection prevention information (Dickson-Gomez, et al., 2006). These authors found that peer health advocates actively conducted harm reduction outreach both when partnered with staff and on their own time, that they were seen as trusted and credible by their drug using peers, and that they were effective at providing IDU with harm reduction materials at critical moments in places where unsafe practices were likely to occur (Dickson-Gomez, et al., 2006). Furthermore, qualitative analysis of recipients of peer health advocacy suggests that it sets in motion a feedback and diffusion process that supports continued work of the advocate and adoption of harm reduction and mimicking of health advocacy by their peers (Weeks, et al., 2009). It is important to note that IDU trained to do this work will not all do it equally, and factors such as age, HIV serostatus, and altruism have been identified as influencing individual likelihood and motivation for conducting HIV prevention work (Latkin, Hua, & Davey, 2004; Convey, Dickson-Gomez, Weeks, & Li, 2010).

2.6.8 User-led interventions.

A further alternative to peer-driven interventions designed and implemented by public health experts is the active involvement of IDU themselves in the organization, design, and implementation of health promotion in their communities. IDU in a number of settings internationally have collectively organized themselves to promote improved health and injection risk reduction among their peers (Carruthers, 2007; Crofts & Herkt, 1995; Friedman, de Jong, et al., 2007; Kerr, Hayashi, et al., 2010; Kerr, et al., 2006; Trautmann, 1995). Sam Friedman and his colleagues have repeatedly emphasized the potential of this type of health promotion by highlighting the existing knowledge that many IDU have about HIV and the ways in which groups of IDU have often acted at the community level to protect themselves and each other from HIV and other harms (Friedman, et al., 1987; Friedman, de Jong, et al., 2007; Friedman, de Jong, & Wodak, 1993; Friedman, et al., 2004; Sufian, Friedman, Curtis, Neaigus, & Stepherson, 1991).

Importantly, the structure of organizing among IDU has varied significantly depending upon the context in which it occurs. In settings with a high degree of repressiveness towards IDU such as the United States, Central Asia, and South America, organization of IDU to prevent HIV and other health complications has not involved formal groups but rather has been limited to family, friendship groups, and social networks (Friedman, de Jong, et al., 2007). Despite this lack of formal organization, evidence indicates that important indigenous harm reduction activities, such as syringe distribution and education, have occurred amongst IDU in these settings since the early years of the HIV epidemic (Friedman, de Jong, et al., 2007). In a more supportive context, the roots of the first formal organization of IDU can be traced to the Junkiebonden that surfaced in the

Netherlands in the early 1970s (Trautmann, 1995). The work of this and other similar groups in the Netherlands led officials to acknowledge the contributions of IDU to stopping the spread of HIV, which resulted in financial support from various governmental ministries and local authorities (Trautmann, 1995). Subsequently, organizations of IDU expanded to a number of different cities in the Netherlands and other countries in the European Union. These organizations have paid staff members, and offer a range of services including, space where IDU can talk and seek answers to their questions, free distribution of syringes and other paraphernalia, training courses and education, outreach activities, and are often effective at a political level influencing authorities to implement new facilities or services that promote safer injecting (Trautmann, 1995).

In Australia, organizations of IDU are recognized as being partially responsible for maintaining low HIV prevalence rates among IDU (Carruthers, 2007). All Australian states and territories now have incorporated and funded community-based organizations of IDU that provide a range of tasks and services such as testing for blood-borne diseases and sexually transmitted infections, in house and outreach based education and information resources, information about and referrals to treatment services, liaison with local authorities and state health departments, and political advocacy (Carruthers, 2007; Crofts & Herkt, 1995). Despite widespread implementation of drug user-led initiatives to address unsafe injecting practices and a range of other issues impacting the lives of IDU in these areas, there remains a notable lack of evaluation of these approaches.

As such, it is important to highlight a couple examples of existent user-led initiatives that have received evaluation in the literature. One example of successful organizing by IDU within a repressive context can be found in the Mitsampan Harm Reduction Centre operated

by the Thai Drug Users Network in Bangkok, Thailand (Kerr, Hayashi, et al., 2010). The centre provides IDU with various forms of support such as syringe distribution, food, peer support, information about health services, and safer injecting and overdose prevention education (Kerr, Hayashi, et al., 2010). Recent evaluation of this facility reported that it has been successful in expanding the scope of harm reduction in Thailand by serving 500-600 visitors a month, including those who report difficulty accessing sterile syringes (Kerr, Hayashi, et al., 2010). In Thailand, as with many of these other examples, harm reduction responses by IDU have often preceded public health response to issues related to injection drug use and in many cases serve a political purpose by encouraging governments and health practitioners to improve their response (Friedman, de Jong, et al., 2007).

As another example, VANDU emerged in Vancouver in 1998 in response to epidemics of HIV and hepatitis C among IDU and continued government inaction. VANDU is active in direct action and advocacy, and runs a variety of programs organized by IDU, including needle distribution and recovery, an outreach-based alley patrol program, and various education and support groups (Kerr, et al., 2006). VANDU has previously been responsible for initiating novel harm reduction approaches in Vancouver such as an unsanctioned all-night needle exchange program and a supervised injection facility operated by IDU themselves (Kerr, Oleson, et al., 2005; Wood, Kerr, Spittal, Small, et al., 2003). VANDU's needle distribution and recovery programs have been subjected to external evaluations which demonstrate that their contributions have extended the reach and effectiveness of syringe distribution by contacting IDU traditionally underserved by conventional programs and those that remain at highest risk of HIV infection while also increasing safer syringe disposal and decreasing re-use of syringes (Hayashi, et al., 2010;

Kerr, Small, et al., 2010; Wood, Kerr, Spittal, Small, et al., 2003). In demonstrating the feasibility of a low-threshold supervised injection facility operated by IDU, VANDU proved that they could provide culturally appropriate service by accommodating drug sharing and assisted injection within the facility (Kerr, Oleson, et al., 2005), two high-risk activities that are prohibited within the sanctioned supervised injection facility, and that have recently been identified as major barriers to using the facility among some IDU (Small, Ainsworth, Wood, & Kerr, 2011).

Despite widespread recognition of the value of peer-based approaches, there is a remarkable lack of description and evaluation of safer injecting and other health promotion programs that have been designed and implemented with the direct involvement of IDU themselves.

2.7 Summary

In summary, the preparation and administration of injection drugs is a multi-step process, during which numerous unsafe injection practices can occur. A large body of literature reveals increases in morbidity and mortality experienced by IDU as a result of unsafe injection practices. Historically, there has been an over-emphasis on individual risk factors within most public health approaches to drug use. Therefore, there is a need for more ecologically focused approaches with potential to unpack the multifactoral determinants of unsafe injection practices among IDU. Ecological approaches will assist in moving beyond a strictly individual focus by reflecting the influence of several environmental systems including the physical, social, and structural environments, which interact with individual factors at multiple levels of influence to mediate injection risk behaviour. To date various initiatives have been implemented with the aim of reducing unsafe injecting practices,

including the distribution of syringes and paraphernalia, educational and behavioural interventions, outreach, supervised injection facilities, peer-driven interventions, and those that have been implemented by IDU themselves. However, the limitations of predominant interventions suggest that future interventions and evaluations need to consider the multi-level and complex intersection of individual, environmental, social, and structural factors that influence injection practices of IDU, as well as the ways in which such interventions address harms associated with unsafe injecting.

Despite the availability of existing interventions, unsafe injecting remains a persistent public health problem internationally. As such, new and innovative approaches to address this problem are urgently required. Initiatives that directly involve IDU may provide opportunities for innovation in interventions by providing a unique opportunity to connect with hard to reach IDU not being served by traditional healthcare services. Such approaches may also facilitate better understanding of the intended and unintended impacts of various interventions, as well as the ongoing challenges and barriers to behaviour change. In order to reduce the burden of excess morbidity and mortality among IDU, ecologically focused approaches need to be combined with new and expanding interventions aimed at reducing unsafe injecting.

Chapter 3

Facilitators' Experiences Running a Drug User-led Safer Injecting Education Campaign

3.1 Introduction

Injection drug use is a growing public health concern, and is associated with considerable morbidity and mortality (Copeland, et al., 2004; Darke & Hall, 2003; Hulse, et al., 1999; UNAIDS, 2007; Webb, et al., 2003). IDU are vulnerable to an array of health related harms, including but not limited to HIV, hepatitis C, bacterial and fungal infections, and venous damage (Aceijas & Rhodes, 2007; Gordon & Lowy, 2005; Grund, 2005; Pieper, et al., 2007; UNAIDS, 2007). Many of these health harms are the result of unsafe injection practices, which are preventable given proper preparation and administration of drugs by injection.

In response to increased concern for the health and well being of IDU, a number of intervention and prevention strategies have been implemented to address the harms stemming from injection drug use. Most prominent among these are distribution of sterile syringes and injection paraphernalia (Des Jarlais, et al., 2009; Mathers, et al., 2010; Wodak & Cooney, 2006), harm reduction outreach programs (Coyle, et al., 1998; Needle, et al., 2005), supervised injection facilities (MSIC Evaluation Committee, 2003; Hedrich, 2004; Kerr, Kimber, Debeck, et al., 2007), and educational and behavioural interventions (Abou-Saleh, et al., 2008; Purcell, et al., 2007; Zule, et al., 2009). Educational materials such as posters and pamphlets are a mainstay of educational initiatives, and many public health initiatives are founded on the assumption that IDU lack knowledge regarding correct injection procedures (Heimer, et al., 2002; Thiede, et al., 2007). However, there is a

pronounced lack of evidence-based evaluation of these materials. Despite implementation of all of the aforementioned intervention and prevention strategies in Vancouver Canada, research shows that high rates of unsafe injecting persist (Debeck, Small et al., 2009; Fairbairn, et al., 2010; Hoda, et al., 2008; Rachlis, Lloyd-Smith, et al., 2010).

Given ongoing injection related problems, there is a growing interest in the involvement of IDU in initiatives that address unsafe injecting practices and the associated adverse health consequences and costs. Researchers in a number of settings internationally have implemented peer-driven network oriented HIV prevention interventions in which public health experts train peer leaders to disseminate prevention information and supplies through micro- and macro- networks of IDU (Booth, et al., 2009; Broadhead, et al., 2009; Broadhead, et al., 1998; Broadhead, et al., 2006; Latkin, 1998; Weeks, et al., 2009). Evaluation of these approaches highlights several advantages of peers over traditional outreach methods. Peers are often viewed as more credible and influential sources of information (Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Latkin, 1998), and also have the ability to use already established networks to reach more hidden and diverse populations of IDU (Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Grund, et al., 1992; Latkin, 1998). In addition, peers are able to reach IDU with prevention information and supplies in places and at times when high-risk behaviours are most likely to occur (Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Latkin, 1998), and peer-based education is often more cost effective than traditional outreach programs (Broadhead, et al., 1998; Latkin, 1998).

Much less is known about the effectiveness of interventions that have been developed by IDU, which have emerged from drug user-led efforts to address the harms

associated with unsafe injecting. Although descriptions of user-led organizations of IDU in Europe and Australia are available in the literature (Carruthers, 2007; Crofts & Herkt, 1995; Friedman, de Jong, et al., 2007; Trautmann, 1995), there are few evaluations of the educational initiatives developed by these groups. Evaluations of the Mitsampan Harm Reduction Centre operated by the Thai Drug Users Network in Bangkok, Thailand, and programs organized by VANDU in Vancouver, Canada, show that these user-led initiatives extend the reach and effectiveness of harm reduction services available in these areas (Hayashi, et al., 2010; Kerr, Hayashi, et al., 2010; Kerr, Oleson, et al., 2005; Kerr, et al., 2006; Wood, Kerr, Spittal, Small, et al., 2003).

Given the lack of description and evaluation of user-led approaches to reducing the harms associated with injection drug use, as well as a lack of literature describing the perspectives of IDU that lead user-led interventions, we conducted a qualitative exploration of facilitators' experiences leading a user-led safer injecting education campaign.

3.2 Background

3.2.1 The VANDU Injection Support Team.

VANDU is active in direct action and advocacy, and has run a variety of drug user-led programs, including needle distribution and recovery, an outreach-based alley patrol program, as well as various action, education, and support groups (Kerr, et al., 2006). In response to the harms associated with assisted and unsafe injection practices, VANDU expanded their alley patrol program in August 2005 to develop the IS Team. The IS Team is composed of nine individuals who are recognized as "hit doctors", individuals who are regularly asked to provide assistance with injections, who facilitate education and

engagement with large numbers of IDU. Following their formation, the IS Team developed a mission statement emphasizing their basic purpose and activities:

The VANDU IS Team is a user-led program that provides peer-to-peer education and assistance to promote safer injecting practices. Through advocacy and outreach the IS Team seeks to reduce the harms resulting from unsafe injection and preserve the health of injection drug users.

3.2.2 The IS Team education campaign.

Utilizing a participatory education approach (Freire, 2000; Sauve, 1987) drawing on research findings, outreach activities, and community consultation, the IS Team developed a curriculum, training materials, and novel demonstration processes for five 90 minute workshops promoting safer injecting practices. The IS Team education campaign was implemented between November 2009 and April 2010 at five separate locations in Vancouver's DTES including, the VANDU storefront office, two NGO operated single room occupancy hotels, and two public drop-in centres.

The first workshop in this campaign described various unsafe injection practices (e.g., sharing syringes and other paraphernalia, jugular injections, and assisted injection), provided an overview of the history, training, and outreach activities of the IS Team, and outlined the format and content of upcoming workshops. The second workshop focused on the consequences of unsafe injecting including, information on how bacteria gets introduced during the injection process, adulterants and additives commonly contained in illicit drugs, and description of the viral infections, venous damage, and bacterial infections resulting from unsafe injection practices. This workshop concluded with a discussion of the locations where participants can access relevant healthcare services. The third workshop involved step-by-step hands on demonstrations and practice of injecting skills and techniques concurrent with a discussion of why each step is important. Common barriers and

challenges to safe injecting (e.g., lack of supplies, not having a safe place to inject, and police surveillance and interference) were discussed, as were strategies that can be used to inject safely more often. The fourth workshop provided step-by-step demonstrations on how to correctly prepare various drugs common in the local context including heroin, cocaine, crack, methamphetamine, and a range of diverted pharmaceuticals¹ for injection. The final workshop covered transmission and prevention of HIV and hepatitis C, attempted to dispel common myths about these diseases, and provided information about where testing, treatment, and other services are available.

Each workshop was facilitated by three IS Team members who divided responsibilities based on individual interest and expertise. The IS Team education campaign utilized a mixture of visual learning materials, including PowerPoint slides, poster sized images, and handouts, to visually communicate step-by-step processes, various symptoms of illnesses, and modes of disease transmission. In workshops involving demonstrations, facilitators divided participants into three smaller groups where they discussed, demonstrated, and supervised proper technique and procedure for preparation and administration of injections. IS Team members' facilitation style involved a participatory education approach in which facilitators and workshop participants engaged as equals and co-learners in the education process. Drawing on the collective knowledge and experiences of each group, facilitators provided contextually appropriate safer injecting

¹ Given that varied forms of pharmaceuticals require different preparation procedures, specific information was provided on how to prepare morphine eslon capsules, morphine kadian capsules, hydromorphone, talwin and ritalin, and methadone for injection.

education while using real life stories and scenarios to stimulate broader discussion of relevant myths as well as the challenges and barriers to safer injecting practices. Within workshops, facilitators aimed to promote mutual support based on shared experience and equality, while emphasising a harm reduction approach focused on caring and self-preservation. Facilitators were compensated \$20 (CAD) for each workshop and workshop participants received \$3 (CAD) for their participation.

3.3 Methods

This project utilized a community-based research approach (Harper & Salina, 2000; Harris, 2006) involving active collaboration with members of the IS Team throughout the planning, development, and implementation of the project. A member of the research team (CC) attended all planning and development meetings related to the IS Team education campaign, observed all IS Team education campaign workshops, and actively sought team member's opinions and feedback on research process and emerging themes.

In-depth interviews were conducted with IS Team members to discuss their perceptions of the workshops they facilitated, their experiences being a facilitator, and their perspective on the overall IS Team education campaign. All IS Team members who facilitated education campaign workshops were invited to participate in an interview. All interviews lasted between 50 and 80 minutes and were conducted between June and August 2010.

Interviews were facilitated using a semi-structured topic guide to encourage discussion of how IS Team members viewed the format and content of the education campaign, how this compared to their previous experiences with safer injecting education, how they perceived their role within the campaign, and perspectives on facilitating drug

user-led safer injecting education. All interviews were audio-recorded and transcribed verbatim. A qualitative descriptive methodology was employed for the analysis of these interviews (Sandelowski, 2000). Analysis began with a detailed open coding of transcripts and theoretical memoing in Atlas.ti software, then validated through systematic review using a constant comparative analysis (Corbin & Strauss, 2008; Glaser & Strauss, 1967). Emergent themes and relevant excerpts from the interviews were shared and discussed with all IS Team members to ensure accuracy of interpretations.

Every IS Team member interviewed provided informed consent to participate, and the study was undertaken with appropriate ethical approval granted by the Providence Healthcare/University of British Columbia Research Ethics Board. IS Team members were compensated for their time in the research interview with a \$20 (CAD) honorarium. There were no refusals of the offer to participate in the interview, and no drop-outs occurred during the interview process.

3.4 Results

In total 340 unique individuals attended IS Team education workshops, including 157 (46%) women, 177 (52%) men, and 6 (2%) transgendered individuals. IS Team members who participated in qualitative interviews included 3 females and 5 males. The median age of IS Team members was 47.5 (range = 35-59 years). The IS Team included a mix of Caucasian and Aboriginal members as to reflect the demographic of the local drug using population. One of the nine IS Team members was not asked to participate because he withdrew from the team early in the development phase of this education campaign. Representative excerpts from the qualitative interviews are presented below in order to

illustrate the central themes that emerged in the analysis. Considerable overlap was observed across thematic areas.

3.4.1 Format and content of IS Team educational workshops – “it taught the nitty gritty of what you’re doing”.

IS Team facilitators described a number of aspects of this education campaign that contributed to their ability to communicate information about safer injecting practices while identifying and addressing the unsafe practices of workshop participants. Facilitators expressed that an important aspect of the curriculum was that it went beyond the mechanics of safe injection, to describe why each step is important, and the consequences that can arise from incorrect implementation.

That’s why our workshops were so successful, because it taught the nitty gritty of what you’re doing and what you’re doing wrong ... tell ‘em why it’s not right you know, and make it so the right thing fits into their ritual. Not to stop doing it, but make it fit into their ritual. (Female Facilitator #1)

The participatory and interactive nature of these workshops was seen as a critical factor in engaging participants. This enabled discussion of the realities of individual’s injecting rituals, the context in which they use, and the strategies that can be implemented to improve injecting practices.

You could tell some people got really jazzed when they were talking about personal experiences and stuff. Which I thought was a really good thing ... because people’s own experiences, that’s what it’s all about right? ... Cause we’re talking about it from a, this is the way it should be, not necessarily the way it is, and they’re talking about it from the way it is. So I think it was really important. (Male Facilitator #2)

An example of a common barrier to enacting risk reduction practices frequently identified within workshops was the inability to access sterile cookers necessary to correctly prepare drugs for injection. IS Team facilitators emphasized the importance of always mixing and

filtering drugs prior to injection, and a common solution they proposed was to carry a metal spoon or use the concaved bottom of a beverage can for mixing, while always being sure to disinfect the preparation surface with an alcohol swab.

Most facilitators reported that facilitating with two other IS Team members was a strength of the education format. Working in groups of three created structure among facilitators, while allowing them to educate based on their topics of expertise, and enhancing opportunities to incorporate stories with their explanations.

I was the more structured one and he was the more off the cuff type of guy. Like when questions came up and stuff he had more information because of his experience. (Male Facilitator #2)

The use of various forms of education materials and different teaching styles were described as major strengths of the campaign because it engaged a wide range of participants with different learning needs. It is notable that the images utilized were described as particularly useful for communicating the severity of the consequences of unsafe injecting, and assisted facilitators in maintaining their focus when interacting with workshop participants.

The shock value of the pictures and then being able to note how not to let that happen to yourself, it was really good ... it also gave us something to focus on ... if we got lost on something we could just turn to the pictures. (Female Facilitator #1)

3.4.2 Shared identity of facilitators and participants – “In the same sort of head space”.

All IS Team facilitators expressed that their knowledge and experience as IDU fostered a sense of shared identity and equality with workshop participants, which encouraged trust and rapport. This also allowed them to present safer injecting information with examples and language that was appropriate and easy to understand.

The people that were facilitating it and the people that were the members, they're more or less on the same level. So you could understand, [you] don't have to ask questions or why they didn't get that, you just know right. Cause you're both in the same sort of headspace, you're street people right. (Male Facilitator #3)

Many facilitators described their familiarity with workshop participants as increasing their credibility and making participants more comfortable asking questions or sharing information.

I sound like I'm just talking with buddies cause I'm just sitting there talking to people that I know ... And there's the other part of it, I'm not at the front of the room because I'm more important than you, I'm just the one that's doing most of the talking, but you guys kick in when you can cause you guys want answers as do we, and I'm trying to draw them out and get them to participate. (Male Facilitator #6)

Facilitators identified how having IDU as facilitators minimized power dynamics that frequently exist between educators and learners. Facilitators expressed that their approach differed from their previous experiences receiving safer injecting information.

We're them, it's not like we're gonna preach to them ... Most of them [formal educators] kind of seem older or else like they're trying to talk at them, talk down to them. It's more of a classroom type way they talk instead of talking like friends or drug users talk to each other, the same way we're talking ... You can pick up more that way cause you don't feel like you're being lectured to. (Male Facilitator #4)

3.4.3 Facilitator's personal gains – “It was a really good experience for me”.

IS Team facilitators articulated various personal gains from their involvement with the campaign, as most expressed that facilitating these workshops improved their overall confidence and public speaking skills. Facilitators also expressed that workshops enhanced interpersonal social skills and network connections, as well as changing their attitude towards dealing with other organizations and professionals.

I'd gotten into pretty much a mode where I'd just hang out by myself so I didn't really talk to anybody. This ... got me back on meeting people, and

talking to people, and realizing the common ground with other people in the community. (Male Facilitator #7)

I have developed a more professional attitude when dealing with professionals. I'm more polite, courteous, well-spoken, time to listen. I'll do everything but wear the tie and nametag. (Male Facilitator #6)

Facilitators also described the positive feelings they gained from the realization that they were making a difference by helping people to protect their health.

The idea of imparting knowledge to people that is hopefully going to do something positive for them, I mean, what's better than that ... Especially when you know there's a need for it. ... Like I said, when I first got into it, it was just for the financial thing, but once I got into it, knowing that you're actually making a difference, that you might actually help someone or something, that's a good feeling. I've never done that type of thing, so it was a really good experience for me. (Male Facilitator #2)

A few facilitators reported the added benefit of making changes to their own injecting practices based on information they learned through the development and implementation of the campaign. For example, facilitators reported using alcohol swabs and ties more consistently and avoiding the re-use of their own syringes.

3.4.4 Campaign impact – “It works ... it's better”.

IS Team facilitators overwhelmingly felt that this campaign provided participants with valuable safer injecting information, some of which including information on prevention of bacterial infections and how to correctly prepare various drugs for injection, is not currently available anywhere else. Most facilitators articulated that educational workshops not only change injection practices, but also have the added benefit of connecting IDU with VANDU and other health services.

I hear it from people every day. Every day somebody comes up to me and says something. Oh, I tried this, I tried that. It works, it works, it's better. Can I go to treatment? Where do I go to treatment? You know just questions that were all brought up from those workshops. And it brought a lot of people to VANDU. (Female Facilitator #1)

Although all IS Team facilitators spoke of the value of providing IDU with accurate information about preparation and administration of injections, they also emphasized numerous contextual barriers and challenges that can make injecting safely difficult. Most commonly, facilitators identified not having a safe place to inject and fear of the police as the predominant contextual factors that can make it difficult to implement safer injecting knowledge.

If people don't have a home, if they don't have a sterile place, if they're forced to try to hide in a back alley, or in a bush, or some other place where they can't be found cause they're so scared of cops. How do you expect any part of that to be clean or safe? (Female Facilitator #8)

Given the limits of education in addressing contextual factors that perpetuate unsafe injecting, facilitators articulated a desire to expand and improve their activities to pursue broader change beyond education. Their suggestions predominately focused around opening a user-led facility and further expanding their outreach activities.

Just a separate spot off the VANDU property that people could come to get assisted injection and have a coffee, you know stuff like that ... A safe [inhalation] site, a safe injection site, that's not run by government frigging employees. (Male Facilitator #7)

Numerous facilitators suggested that it would be beneficial to expand their outreach activities beyond provision of harm reduction supplies and safer injecting education to assist with finding housing, offer teaching and support in relation life skills, assistance finding employment, and support in accessing healthcare and addictions services.

3.4.5 Criticisms and suggestions – “I wanted to do more”.

Criticisms of the campaign varied from facilitator to facilitator based on their experiences and the specific workshops they facilitated. A number of the facilitators identified other facilitators arriving at workshops sick, or not showing up, as major issues

that impacted the rest of the facilitator's ability to properly cover workshop curriculum.

Sometimes she would be sick when she came in, and she wasn't very together, so that's when I'd have to prolong the workshop I was doing. (Female Facilitator #1)

A few people didn't show up to do it ... they'd go and do something else. (Male Facilitator #7)

Although facilitators spent a significant amount of time developing workshop curriculum, no time was spent prior to the implementation of the campaign developing the facilitation skills of the IS Team members. A few facilitators noted that managing a large group of IDU can be difficult, and that they would have benefited from more time spent developing facilitation skills before starting the campaign.

I'd of had better preparation for the facilitators ... maybe it would be a practice class. I don't know how to solve the problem. (Male Facilitator #6)

Facilitators noted that information on overdoses was missing from the curriculum and could have been added to strengthen the overall campaign.

I wanted to do more things to let people know to give mouth to mouth if your buddy goes down [overdoses] in a hotel room. Cause through Christmas time we lost a few people just because they didn't breathe. Nobody gave them mouth-to-mouth. (Female Facilitator #5)

Culture and gender specific issues were also identified as important types of information that were missing from the curriculum. While information regarding issues commonly experienced by female injectors (e.g., assisted injection) was included in the workshops, some felt that it would be beneficial to incorporate increased emphasis on particular elements to better address gender-specific educational needs.

There's issues that women deal with that are different from men. Like maybe they don't know how to inject because they've always been hit (injected) by their boyfriend ... With the women you can have information based on juggling and why this is more common ... more information on the different reasons people use, you know women are more affected by emotional things, we could talk about that. (Female Facilitator #8)

One of the facilitators of the HIV and hepatitis C workshop felt that they were not fully prepared to respond in-depth to participants' questions about these diseases and treatments available.

It should've been two workshops. One on hep C and one on HIV because I don't know all that much about HIV ... And maybe a nurse with it because there's lots of HIV facts and stuff that you need a nurse to tell you about, your medications and stuff, that I just wasn't prepared for. (Female Facilitator #1)

Facilitators of this particular workshop felt that it could have been improved by incorporating the technical expertise of a professional educator alongside IS Team members.

3.5 Discussion

In this study, facilitators described how aspects of IS Team workshop structure and content, including the participatory approach, facilitating in groups, and the variety of educational materials used, helped facilitators communicate information about safer injecting practices while addressing the realities of participants' injecting rituals. Facilitators felt that their knowledge and experience as IDU increased their credibility and allowed them to communicate with workshop participants in clear and understandable ways. Most IS Team facilitators reported gaining knowledge, skills, and positive feelings about themselves from their involvement in this education campaign. Overall, facilitators felt that this campaign provided IDU with valuable and necessary safer injecting information, however; facilitators also offered criticisms and suggestions for future improvement.

The findings that facilitators' experiences as IDU increased their credibility as educators is consistent with other studies demonstrating that knowledge from personal experience and trust are important aspects of peer interventions, which contribute to greater credibility and influence over behaviour change (Dickson-Gomez, et al., 2006; Kerr, et al.,

2006; Latkin, 1998; Trautmann, 1995). Given considerable local variation among cultures and histories of IDU, researchers have argued that successful interventions targeting this population need to involve IDU with extensive knowledge and local experience (Friedman, et al., 2004; Kerr, et al., 2006). Previous research on interventions involving IDU as educators and outreach workers suggests that these individuals have important knowledge and information about the experiences and current practices of IDU (Broadhead, et al., 1998; Kerr, et al., 2006; Latkin, 1998; Trautmann, 1995). This is supported by study results indicating that IS Team facilitators utilized their existing knowledge of commonly occurring unsafe injecting practices to identify mistakes made by local IDU during preparation and administration of injections. Based on their own experiences, facilitators were able to adopt a pragmatic approach to discussing various injection practices by identifying why each step is important, potential consequences of unsafe practice, and discussing the contextual factors that can make following these steps difficult, as well as the strategies that can be used to address them. Through their focus on common barriers to safer injecting and navigating common situations experienced by local IDU, the IS Team campaign not only expands the reach of safer injecting education, but also incorporates novel elements which are not currently available elsewhere. Furthermore, examinations of peer-driven interventions from other settings have shown that IDU involvement provides built-in accommodation to the cultural and ethnic diversity of the IDU population by couching prevention and intervention messages in locally appropriate terms (Broadhead, et al., 1995; Broadhead, et al., 1998; Convey, et al., 2010). The results of this study further these findings by showing that IS team facilitators were able to communicate and share information in a language accessible to workshop participants, and were successful in

drawing from their own experience to enable discussions of the realities of participants' injecting rituals. Facilitators emphasized that this mutual understanding minimized unequal power dynamics often existing between educators and learners, which have been identified by other researchers as being counterproductive to educational goals (Broadhead, et al., 1995; Trautmann, 1995).

Previous research has found that peer involvement in prevention and advocacy work leads to positive identity and pro-social role development, engendering a sense of purpose and self-respect among IDU, which contrasts the stigma often imposed on them by society (Convey, et al., 2010; Kerr, et al., 2006; Latkin, Sherman, & Knowlton, 2003). The present study supports these findings as most facilitators reported developing social and professional skills as a result of their involvement in IS Team workshops. Furthermore, many facilitators described the positive feelings they gained from realizing that they were making a difference in their community by helping people to protect their health. This is consistent with research on motivation among peer workers showing that concern for one's own community and gaining satisfaction from helping others are major motivators for conducting peer prevention work (Convey, et al., 2010; Latkin, 1998). Facilitators also reported improving their own injection practices following the IS Team education campaign. This is consistent with studies of peer leaders within larger social network interventions showing that peers involved in education and outreach report the greatest reductions in injection risk behaviours after a follow-up period (Broadhead, et al., 1998; Convey, et al., 2010; Latkin, 1998; Latkin, et al., 2003; Weeks, et al., 2009). The results of this study suggest that employing non-users in prevention and intervention work restricts IDU from receiving the aforementioned benefits of this type of work, while evidence

indicates that they may in fact be the most suitable candidates to deliver educational messages.

Results of the present study indicate that the IS Team education campaign provided participants with culturally appropriate safer injecting education that addressed issues relevant to local IDU. In this way, the IS Team continues a tradition of education and support programs at VANDU that meet the immediate needs of IDU locally (Hayashi, et al., 2010; Kerr, Oleson, et al., 2005; Kerr, et al., 2006). This is consistent with research on the harm reduction and prevention activities of user groups and IDU in other settings demonstrating that IDU are capable of active participation in their individual and collective health and often develop novel interventions that extend the range of existing services (Friedman, de Jong, et al., 2007; Friedman, et al., 1987; Friedman, et al., 2004; Kerr, Hayashi, et al., 2010; Kerr, Oleson, et al., 2005; Kerr, et al., 2006). Facilitators' experiences in this campaign also raised a few practical considerations for the development and delivery of these types of programs in the future. First, facilitator's participation was frequently impacted by instabilities such as illness and competing priorities, which are common in the lives of IDU, and must be planned for and navigated within the development and implementation of user-led projects. Second, although the facilitators spend a large amount of time on curriculum development, there was a greater need to develop their presenting skills before starting the campaign, and workshops involving detailed medical information would have benefited from the addition of a professional educator such as a nurse. Overall, the findings of this study indicate that greater efforts are needed to support existing user-led initiatives and to promote their growth and development as a means of providing education and services to IDU. Furthermore, health authorities and service

providers developing services for IDU should incorporate the perspectives of IDU in service development and implementation to improve the relevance and cultural appropriateness of these services.

The present study has a number of limitations. First, the study focused exclusively on the perspective of individuals who were directly involved in the development and facilitation of IS Team education workshops. As such, the views presented by IS Team members may not be representative of the experiences of IDU involved in other interventions. Second, although IS Team members were told that their identity would be kept confidential and were encouraged to provide open and honest feedback on their participation, some participants may have been inclined to provide overly positive evaluations given their association with the campaign. However, an overly positive evaluation does not appear to be reflected in the findings, as facilitators provided numerous critiques of their own efforts and expressed a desire to improve and expand their existing activities to address additional issues facing local IDU. Finally, this study sought the feedback and impressions of workshop facilitators, yet it is also important to evaluate the perspective of the recipients of this education. Data capturing the perspective of IS Team educational workshop participants has been collected, and analysis of this material has been presented in a separate manuscript.

In conclusion, this study demonstrates the feasibility of involving IDU in educational initiatives targeting unsafe injecting. Our findings demonstrate that involving IDU in prevention activities improves relevance and cultural appropriateness of interventions while providing individual, social, and professional benefits to IDU directly involved in development and implementation of such interventions.

Chapter 4

Perceptions of a Drug User-led Safer Injecting Education Campaign

4.1 Introduction

Despite growing implementation of harm reduction programs internationally, unsafe injection practices remain common among IDU. Such practices include sharing or re-use of paraphernalia, poor hygiene practices, injection of non-sterile preparations, and repeated penetration of veins, which can result in increased risk for HIV, hepatitis C, bacterial and fungal infections, and venous damage (Des Jarlais & Friedman, 1998; Gordon & Lowy, 2005; Koester, 1994; Topp, et al., 2008; UNAIDS, 2007; Wood, et al., 2001; Woodburn & Murie, 1996). Further, as a result of problems with injecting, many IDU rely on others for assistance with injections. Previous cohort based studies have found that individuals who require help with injections are at heightened risk for overdose (Kerr, Fairbairn, et al., 2007), syringe sharing (Wood, Spittal, et al., 2003) and HIV infection (O'Connell, et al., 2005; Wood, Tyndall, Spittal, Li, Hogg, Montaner, et al., 2002).

As in many other settings with large populations of IDU, in Vancouver, Canada, a number of strategies have been implemented to address the harms stemming from injection drug use. These include a large-scale syringe distribution program (Harvard, Hill, & Buxton, 2008; Strathdee, Patrick, Currie, et al., 1997), programs that offer safer injecting education (Fast, et al., 2008; Hilton, et al., 2009; Wood, Tyndall, Stoltz, et al., 2005; Wood, et al., 2008), a street nurse outreach program (Gold, 2009; Hardill, 2007; Hilton, et al., 2009), a supervised injection facility (Wood, Kerr, Lloyd-Smith, et al., 2004), and a host of other education and outreach programs. Despite this multi-faceted response to unsafe injecting, problems with coverage remain, (Small, et al., 2007) and local IDU continue to report high

rates of unsafe injecting (Debeck, Small, et al., 2009; Fairbairn, et al., 2010; Hoda, et al., 2008; Rachlis, Lloyd-Smith, et al., 2010).

The aforementioned local health and harm reduction services operate primarily under the “provider-client” model. The limitations of this approach have become increasingly recognized. For example, many such services focus strictly on individual behaviour and thus ignoring the social and environmental determinants of risk taking. As well, marginalization can limit IDU’s ability or willingness to participate in prevention programs, creating difficulties reaching IDU through these initiatives (Broadhead & Heckathorn, 1994; Broadhead, et al., 1995; Broadhead, et al., 1998; Latkin, et al., 2003). In response to these limitations and persistent drug related harm internationally, drug users in several settings have organized (Crofts & Herkt, 1995; Friedman, et al., 1993; Kerr, et al., 2006; Trautmann, 1995) to address gaps in conventional service delivery and to expand the reach and effectiveness of syringe exchange, and educational and outreach programs. Previous evaluations suggest that drug-user led programs have potential to be more acceptable to IDU than conventional provider-delivered services (Broadhead, et al., 1995; Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Friedman, et al., 1993; Grund, et al., 1992; Latkin, 1998).

4.1.1 The VANDU Injection Support Team.

In Vancouver, VANDU emerged in 1998 in response to the health crisis among IDU and continued government inaction (Kerr, et al., 2006). VANDU is active in direct action and advocacy, and has run a variety of drug user-led programs, including needle distribution and recovery, an outreach-based alley patrol program, and various support groups (Kerr, et al., 2006). Several of VANDU’s needle distribution and recovery programs have been

subjected to external evaluations which demonstrate that these programs have extended the reach and effectiveness of syringe distribution by contacting IDU traditionally underserved by conventional programs and those that remain at highest risk of HIV infection (Hayashi, et al., 2010; Kerr, Small, et al., 2010; Wood, Kerr, Spittal, Small, et al., 2003). In response to the harms associated with assisted and unsafe injection practices, VANDU expanded their alley patrol program in August 2005 to develop the IS Team. The IS Team is composed of nine individuals who are recognized as “hit doctors”; individuals who are regularly asked to provide assistance with injections, and who facilitate education and engagement with large numbers of IDU. The mission of the IS Team is to provide “peer-to-peer education and assistance to promote safer injecting practices.” Through advocacy and outreach the IS Team seeks to reduce the harms resulting from unsafe injection and preserve the health of IDU.

4.1.2 The IS Team education campaign.

Utilizing a participatory education approach (Freire, 2000; Sauve, 1987) that drew on research findings, outreach activities, and community consultation, the IS Team developed curriculum, training materials, and novel demonstration processes for five workshops that promote safer injecting. Specific workshop topics include: dangerous injection practices (e.g., jugular and assisted injection); the results of unsafe injecting (e.g., viral infections, venous damage, and bacterial infections); injecting skills and techniques; process for cooking and preparation of injections; as well as HIV and hepatitis C prevention and treatment. Each workshop is facilitated by three IS Team members and draws on the personal experiences of facilitators as well as workshop participants to provide contextually appropriate education while raising awareness of the individual, social, and environmental factors that perpetuate

unsafe injecting. Educational approaches included large group presentations and discussions, use of visual materials and handouts, demonstrations, small group discussions, and hands on practice. In workshops focused on preparation and administration of injections, facilitators provided physical demonstrations of proper technique and procedure and then supervised participants as they engaged in hands on practice of these methods in small groups. The IS Team education campaign was facilitated at five separate locations in Vancouver's DTES between November 2009 and April 2010. Locations included the VANDU storefront office, two NGO-operated single room occupancy hotels, and two public drop-in centres.

While previous research has demonstrated the value of peer-driven and user-led HIV prevention interventions for drug using populations (Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Hayashi, et al., 2010; Kerr, Oleson, et al., 2005; Latkin, 1998), there remains a dearth of evaluations of user-led education initiatives that specifically target unsafe injecting through educational approaches. For the present study, we undertook a qualitative exploration of participants' perceptions of IS Team education workshops in relation to their own experiences and as compared to their previous encounters with safer injecting education.

4.2 Methods

This project utilized a community-based research approach (Harper & Salina, 2000; Harris, 2006) involving active collaboration with members of the IS Team throughout the planning, development, and implementation of the project. A member of the research team (CC) attended all planning and development meetings related to the IS Team education campaign and actively sought team member's opinions and feedback on research process and emerging themes.

In total 20 in-depth interviews were conducted with participants of IS Team education workshops to discuss their perceptions of the workshops they participated in. Participants were recruited directly from IS Team education workshops. Recruiting efforts utilized a theoretical sampling strategy that sought to include perspectives reflective of the age, gender, and ethnic backgrounds of individuals who attended IS Team education workshops. All interviews lasted between 30 and 100 minutes and were conducted between January and April 2010.

Participant interviews were facilitated using a semi-structured topic guide to encourage discussion of previous experiences receiving safer injecting information, as well as perceptions and perceived impact of the IS Team education workshops. All interviews were audio-recorded and transcribed verbatim. A qualitative descriptive methodology was employed for the analysis of these interviews (Sandelowski, 2000). Analysis began with a detailed open coding of transcripts and theoretical memoing in Atlas.ti software, then validated through systematic review using a constant comparative analysis (Corbin & Strauss, 2008; Glaser & Strauss, 1967). Emergent themes and relevant excerpts from the interviews were shared and discussed with IS Team members to improve accuracy of interpretations.

All participants provided informed consent to participate, and the study was undertaken with appropriate ethical approval granted by the Providence Healthcare/University of British Columbia Research Ethics Board. Participants were compensated for their time with a \$20 (CAD) honorarium. There were no refusals of the offer to participate in the interview, and no drop-outs occurred during the interview process.

4.3 Results

In total 340 unique individuals attended IS Team education workshops, including 157 (46%) women, 177 (52%) men, and 6 (2%) transgendered individuals. The sample of qualitative interview participants was composed of 8 women, 11 men and 1 trans-gendered individual. The median age of participants was 39.3 (range = 30-53 years). Further information regarding the age, gender, and ethnicity of the complete qualitative sample are displayed in Table 4.1. Excerpts from the qualitative interviews are presented below in order to illustrate the central themes that emerged in the analysis. Considerable overlap was observed across thematic areas.

Table 4.1

Characteristics of qualitative study sample of workshop participants

	Qualitative Interview Participants
Total Number	20
Median Age (range)	39.3 (30 - 53)
Gender	
Female, n (%)	8 (40)
Male, n (%)	11 (55)
Trans-gendered, n (%)	1 (5)
Aboriginal Ethnicity	
Yes, n (%)	12 (60%)
No, n (%)	8 (40%)

4.3.1 Learning from other users – “People were showing me what they knew”.

Most participants reported that they had little or no previous experience with formal safer injecting education. Participants expressed that their primary source of information about injecting practices has been other IDU, with this information often being acquired in a passive fashion.

If you're going to do it and you want to get high you have to learn for yourself, so you know I just watched people ... it's pretty basic. (Female Participant #10)

Participants described learning about injecting practices by simply observing other injectors and subsequently mimicking their behaviour. Other participants recalled learning about injecting through information sharing with other IDU in situations where drugs were being used.

For me it was all, it was from using drugs and the people were showing me what they knew and I showed them what I knew. (Male Participant #12)

4.3.2 Gaps in injecting knowledge – “I had no idea”.

Many participants were able to, for the first time, identify various gaps in their injecting knowledge after participating in IS Team education workshops. Most participants were unaware that their practices were “unsafe”. The following participant reported engaging in ‘jugging’ (injections in the jugular vein) and explained that he was surprised to learn how dangerous such injections could be.

I had no idea you had valves in your neck. I had no idea that one way went up and one way went down. Um, yeah it just really, the whole, the jugging thing. That's what really took me aside. I did not realize how dangerous it was, that it went right to your brain if you went to the one wrong side. You know, no idea, just totally new information for me. (Male Participant #18)

Several participants indicated that IS Team educational workshops provided them with information about bacterial infections that they were not previously aware of. Some

participants reported having seen signs and symptoms of these infections in the past, but did not know how people contracted them, how they should be treated, or that they are associated with unsafe injection practices.

There's a few things today that I needed a reminder on. Like the alcohol swab and the tie off, cause sometimes it's, 'ppfft whatever,' go and trying to find one [a vein], and poke and poke and poke. But last week about all the different infections you could end up with, I didn't know of half of them. Like the bone one, I didn't know about that ... I just knew about abscesses and I didn't know how you got them or how to clean them. So I learned that, you know, and I learned about the bone one and the heart one I didn't know about ... now I know that, hey if it's going like this, I may have this, so it's been very informative. (Male Participant #17)

4.3.3 Participation as education – “A hands on kind of thing”.

Accounts of interview participants indicate that they enjoyed the structure and format of IS Team education workshops. Many participants articulated that they liked the variety of approaches and materials used to present the educational information. Participants emphasized that they valued the participatory education approach and collaborative learning environment in which both facilitators and participants play dual roles as teachers and learners.

I like the fact that it's people who know and use the drugs themselves or have used them. They can give hands on information and I really like the way their eyes light up when someone tells them something that they didn't know while they're passing on information. That's the most enlightening thing. Ding! ... you know, everyone's learning something and that's awesome ... When someone's talking about a particular thing, that the people that are sitting around are allowed to impart and put all the little pieces together like a jigsaw puzzle. Throw it all together real quick. Nobody has to go out and research after and come back next week with the answer. All the pieces come together, you know. (Female Participant #3)

This participant's response highlights how knowledge in these workshops is derived from the collective experience of facilitators and workshop participants. The provision of physical

demonstrations and hands on practice of safer injecting techniques were repeatedly identified as important and unique aspects of IS Team education by several workshop participants.

I liked the fact that they got people involved. Like they broke us into two groups and handed out the materials just to give you a mock injection I guess you would say. You can show people what not to do from the front of the room but until they actually have hands on, sometimes that's better for people to have the hands on, and actually get it. Makes it stick to their brain a lot better. Like being able to see it right there like which way the bevel is ... it just makes it click a little better and makes it a little more real and yeah, a hands on kind of thing. (Female Participant #4)

4.3.4 The value of people who use drugs as educators – “I can take what they say for gold”.

Almost all participants expressed that they prefer user-led interventions to traditional approaches because they feel they can trust and relate to the IS Team workshop facilitators. A number of participants described the facilitators as “on the level”, articulating that the workshop facilitators show more empathy and compassion, and are seen as having a greater understanding of them and their drug use.

I seek out services that's ... addicts helping addicts. You know, cause that's where I know I'm going to get the nicest treatment. Where I'm not going to leave pissed off or go in pissed off. (Male Participant #7)

The way that they're doing it is good. It's because like the girl yesterday at the other one. She goes, 'do these guys even use?' And then once I said to her, 'yeah I get high with D all the time.' Then she shut her mouth, and then she started listening to them. I think that's a big thing down here is getting taught by peers. It's really important down here. (Female Participant #6)

Participants described the facilitators as credible and worth listening to because they speak from lived experience, and because they have been through relevant situations themselves and are passing on information and lessons they have learned.

Yeah ... these facilitators are sharing with us what we really need to know because they've been down that road. They've gone through that or they're going through that and so you know I can take what they say for gold, because

that's exactly what it is. I mean, they're genuine, you know, they're realistic.
(Female Participant #8)

In contrast, healthcare professionals and service providers without these experiences were described as being “not the same level”, and many participants noted the stigma or discrimination they perceive from individuals in these positions.

... a nurse you know, more than likely, she's never been addicted to drugs ... Yeah she can inject people, but they already have a thing in their head against all drug users you know what I mean. Obviously it's not healthy, it's against the law, dah, dah, dah ... but if you're not a user, you have a image in your head of a drug user, so it's not the same level. (Female Participant #10)

Like this woman, a number of participants articulated assumptions about the perspectives and drug use history of healthcare professionals and service providers, demonstrating views that are tainted by past experiences of stigma and discrimination. In some instances, this appeared to be due to the abstinence-based perspectives that can be common among some workers and within certain healthcare facilities:

Most doctors just ask if you want to try and get into rehabilitation, or see an AD counsellor, or whatever. If you say you don't, you know the specialist, the doctor, they don't bother trying to pass on harm reduction to you, they just kind of move on to the next thing and that's about it ... they'll leave the note in your file. (Male Participant #15)

4.3.5 Acquiring new knowledge and scrutinizing practices – “I'm not gonna do that anymore”.

Knowledge acquired by participants appeared to vary according to their pre-existing knowledge and experience. Many participants emphasized the new knowledge they gained from attending IS Team education workshops which better equipped them to scrutinize their future injection practices and deal with health complications as they arise.

I've learned more today and last week than I've learned since my entire using. Like the abscess, you know it was weird, we had the seminar on it and then I get one. I've never had one, and I had the knowledge to go ‘Ok, this is

what I need to do to make this better so it doesn't get worse.' (Male Participant #7)

A large majority of participants reported gaining some new knowledge from their participation in IS Team workshops. Although most participants had basic awareness about HIV and hepatitis C transmission and that they should not share paraphernalia, a few participants reported learning that they should not share ancillary injecting equipment such as cookers, filters, and water.

Interviewer: Do you think that what you learned here will change anything about the way that you're injecting in the future?

Respondent: Mmm, for my future injecting? Probably yeah, I won't be sharing rig waters for one, that's a big one. (Male Participant #19)

In a number of cases participants reported gaining new knowledge or receiving important reminders about smaller steps of their injecting procedure that they often report skipping or forgetting about such as proper use of alcohol wipes and ties, which can prevent bacterial infections and decrease venous damage.

I usually finish and then take it off [the tie]. I should probably take it off before I finish injecting so that's something that, that came to my attention today anyways. (Male Participant #2)

Several participants indicated that they gained new knowledge about the etiology and prevention of bacterial infections, including infections such as cellulites and endocarditis, which are very common among local drug users:

I: What would you say you found most useful out of the workshops that you've seen so far?

R: The cellulites, because I've seen that quite a bit, and I was actually scared of being around people because I didn't know if it was contagious cause there's so many people that have it and how they got it. Cause I didn't understand what it was or where it came from, just everybody has it. (Female Participant #1)

Don't leave your blood in a syringe. I didn't know that. I mean I've taken it out and thought 'phew I would've OD'd [overdosed] on that one if I would've done the whole thing', and then leave it. I, I'm not gonna do that anymore cause she said that could be uh, endo something, whatever that disease is, and you've got old blood in there, so yeah I did learn something today. (Male Participant #13)

Although many participants indicated that they would change their injecting practices as a result of the information provided through the IS Team educational workshops, a number of participants emphasized the impact of environmental factors on their ability to follow these steps.

Like I mentioned in the workshop, part of the problem too is actually safely injecting takes longer. You know if you're somewhere where it's illegal to be injecting then the longer you're sitting out there trying to set up your dope, the longer it is to have the police to come, or you're just worried someone will come out and try to rob you or whatever right. Certain things are just more of an issue for certain people. Like people that already have warrants out don't wanna to be spending that much more time doing something they know is gonna get their name run. People who are female, or just weaker people, that get robbed more often, they just wanna get it setup as quickly as possible ... If you're wired to heroin or any other kinds of opiates like that, you know, you need your fix right away. (Male Participant #15)

To various degrees, concerns such as police interference, threat of robbery or physical violence, and dopesickness were said to significantly impact an individual's injection practices. Several participants explained that having a safe place to inject was integral to their ability to follow safer injecting practices.

4.4 Discussion

In the present study we found that IDU primarily learn about injecting by watching or sharing experiences with their peers, and that significant gaps in knowledge regarding safer injecting practices persist. These gaps in knowledge and practice persist in this setting despite the widespread implementation of various educational efforts that seek to address unsafe injecting. The perspectives of study participants revealed that the drug user-led IS Team

education workshops allow local IDU to identify and address gaps in their knowledge through educational processes and structure that are unique to this educational campaign, including the variety of educational materials and demonstrations used, and the “hands on” participatory education approach which incorporates active collaboration and knowledge sharing between facilitators and participants. Importantly, a large majority of participants expressed that they prefer user-led interventions to traditional approaches because they see IS Team facilitators as more credible, empathic, and understanding than educators who do not share similar experiences. Although individual learning outcomes differed based on previous knowledge and experience, most participants were able to identify new knowledge that they gained from IS Team education workshops and expressed that this knowledge would alter their future injecting practices.

Despite the availability of safer injecting education in Vancouver (Fast, et al., 2008; Hilton, et al., 2009; Wood, Tyndall, Stoltz, et al., 2005; Wood, et al., 2008), participant responses suggest that many IDU have had little contact with formal safer injecting education. These findings suggest that IS Team education workshops are consistent with other peer driven interventions in that they extend the reach of public health efforts by contacting drug users who may not be well served by traditional service delivery (Broadhead, et al., 1995; Broadhead, et al., 1998; Grund, et al., 1992; Hayashi, et al., 2010). Participants’ identification of gaps in their injecting knowledge is consistent with cohort data indicating that high rates of harmful microinjecting practices continue locally (Debeck, Small, et al., 2009; Fairbairn, et al., 2010; Hoda, et al., 2008; Rachlis, Lloyd-Smith, et al., 2010). While messages about HIV and syringe sharing were known, more detailed understanding of other unsafe injection practices such as sharing water were not. This finding is consistent with

other studies demonstrating that the sharing of cookers, cotton, and water is far more common than the sharing of syringes (Needle, et al., 1998; Thorpe, et al., 2001; Thorpe, et al., 2002).

Lack of accurate safer injecting knowledge and practice leaves IDU vulnerable not only to HIV and hepatitis C, but also venous damage and a wide range of viral and bacterial infections (Dwyer, et al., 2009; Gordon & Lowy, 2005; Salmon, Dwyer, et al., 2009; Woodburn & Murie, 1996). These types of infections are the primary cause of emergency room and acute hospital bed use among local IDU (Kerr, et al., 2004; Palepu, et al., 2001). Participant responses emphasizing gaps in knowledge about the etiology and prevention of bacterial infections suggest that IDU are often unaware of their own risk behaviour and that novel and ongoing education and health interventions are needed. Results from this study reveal gaps in knowledge pertaining to a variety of microinjecting practices, and indicate that future interventions should do more than simply target paraphernalia sharing, and address a range of practices, including preparation techniques, vein access, and bacterial infections. By identifying and addressing these issues, the IS Team education campaign is like other drug user organizations and user-led interventions in Vancouver and elsewhere (Crofts & Herkt, 1995; Friedman, de Jong, et al., 2007; Friedman, et al., 1993; Hayashi, et al., 2010; Kerr, Oleson, et al., 2005; Wood, Kerr, Spittal, Small, et al., 2003), in which user-led efforts focus on health issues relevant to IDU that are not adequately being addressed by existing public health programs.

Much of the existing research on peer-based interventions among IDU has focused primarily on HIV or hepatitis C and have involved social network interventions in which IDU are trained as peer educators and then followed up in the community (Booth, et al.,

2009; Broadhead, et al., 2009; Broadhead, et al., 1998; Broadhead, et al., 2006; Garfein, et al., 2007; Latkin, 1998; Latkin, et al., 2003; Weeks, et al., 2009). The IS Team education workshops were unique as they drew on the indigenous knowledge and experiences of drug users themselves rather than experts to identify and address a full range of health concerns related to injecting in this setting. Importantly, IS Team members engaged in a grass-roots curriculum development process that combined various sources of knowledge about unsafe injecting practices including their own experiences, research findings, and community consultation. IS Team members ability to organize and successfully implement this education campaign is consistent with other work showing that IDU can be actively engaged in reducing drug-related harm at the community level (Carruthers, 2007; Crofts & Herkt, 1995; Friedman, de Jong, et al., 2007; Friedman, et al., 2004). The relevance of the information provided in IS Team workshops was highlighted by participants subsequent ability to identify a broad range of gaps in their injecting knowledge as well as their intended behaviour change. Participants expression of a preference for IS Team members as facilitators is consistent with previous research indicating that peer driven interventions can be more acceptable to IDU than conventional health programs (Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Latkin, 1998). In contrast, perceptions of stigma and discrimination from health care professionals and service providers who do not have experience with injection drug use corresponds with other literature demonstrating that experiences of stigma and discrimination affect the healthcare choices and injection risk behaviours of IDU (Jackson, et al., 2010; Latkin, Srikrishnan, et al., 2010; Simmonds & Coomber, 2009; Stajduhar, et al., 2004; Treloar & Wen, 2005). Such results highlight the usefulness of IDU as educators and provide evidence that the knowledge and experience of

IDU may be a valuable addition to the planning, development, and implementation of other types of harm reduction interventions.

Although the philosophy regarding education and facilitation at VANDU evolved organically without explicit reference to educational theory, it is notable that the approach used in the development and implementation of IS Team education workshops is similar to that outlined by Freire's ideas of democratic and empowering education. Freire emphasizes that education takes place in the context of people's lives and proposes a dialogic approach in which everyone participates as equals and co-learners to create social knowledge (Freire, 2000; Shor & Freire, 1987). This perspective assumes that knowledge does not come from experts, but rather that collective knowledge emerges from a group sharing experiences and understanding the social influences that affect their lives (Freire, 2000; Wallerstein & Bernstein, 1988). Previous research has noted that this participatory approach to education has value for community development work (Abah, 2007; Castelloe & Watson, 1999), including educational efforts involving marginalized populations such as those at risk for HIV (Campbell & MacPhail, 2002; Mcquiston, Sung, & Clawson, 2001) and young people engaged in high-risk substance use (Wallerstein & Bernstein, 1988; Wallerstein & Sanchez-Merki, 1994). The IS Team's perspective on education is also consistent with drug user organizations in Europe who emphasize mutual support based on shared experience and equality, and suggest that participants in education should not be lectured to but rather stimulated to take part in discussions and activities that affect them (Trautmann, 1995). Participants in the present study reported that they valued the participatory and democratic nature of the drug user-led workshops, noting that this approach to education was useful in allowing both facilitators and workshop participants to identify and address unsafe injection

practices, while also reinforcing educational messages through active participation. As such, the participatory education approach used in this education campaign has been shown to generate contextually appropriate discussions involving the specific microinjecting practices relevant to this community. This suggests that participatory education may be a useful approach for harm reduction and safer injecting education initiatives elsewhere.

Although not a central theme in this analysis, it is notable that a small number of participants identified various structural constraints on injecting practice. According to the study participants, even when IDU have access to materials and an intention to inject safely, other factors in the environment such as police presence (Friedman, et al., 2006; Kerr, Small, et al., 2005; Small, Kerr, et al., 2006) often constrain one's ability to inject safely. Indeed there is a large and growing body of literature pointing to various factors in the broader risk environment of IDU that shape injecting practices and promote drug-related harm (Rhodes, 2002, 2009; Rhodes, et al., 2005).

The present study has several limitations that warrant acknowledgement. First, this study focused exclusively on the perspective of individuals who participated in the IS Team education workshops. While efforts were made to ensure that the study sample reflects the demographic characteristics of the individuals that attended IS Team workshops, the views represented in this sample may not be representative of the broader group of IDU who participated in the workshops or of the larger population of IDU in Vancouver's Downtown Eastside. Second, although interviewees were told that their identity would be kept confidential and were encouraged to provide open and honest feedback on their participation in the IS Team education campaign, it is possible that social desirability bias affected the responses of some participants. Third, through this study we sought the feedback and

impressions of workshop participants, and cannot determine whether participation in IS Team education workshops results in actual changes in short- or long-term injection practices. Further evaluation of this work could include an examination of changes in injecting behaviour as a result of participation in IS Team education workshops.

In summary, the results of this study indicate that the IS Team education campaign has been effective in targeting unsafe injection practices by helping participants to identify and address gaps in their injecting knowledge. The IS Team education campaign facilitates the delivery and adoption of educational messages through a participatory educational approach that encourages discussion that is highly relevant to workshop participants. Consistent with previous work, results from this study indicate that drug user-led intervention is preferred by IDU and represents a micro-social intervention with significant potential to reduce the harms associated with unsafe injecting. Importantly, this study contributes to the development of knowledge regarding the value of drug user-led interventions as an alternative mechanism for connecting IDU with safer injecting education information.

Chapter 5

Discussion, Implications, Directions for Future Research, and Conclusions

5.1 Summary of Study Findings

This research project sought to evaluate the IS Team's safer injecting education campaign, which is a unique drug user-led campaign designed specifically to target unsafe injecting practices in Vancouver, Canada. Using a community-based research approach and qualitative research methods, this project has described the format and content of the IS Team education campaign and evaluated facilitators' experiences and participants' perceptions of this unique educational intervention. As discussed in the following sections, the results of this work provide additional insight into the value of user-led educational approaches, and may be used to inform future interventions and policies that seek to reduce the consequences of unsafe injection practices, especially as they pertain to user-led efforts.

The first phase of this project began with a review of unsafe injection practices and the health consequences associated with such practices. This review went on to highlight a considerable body of literature outlining the large number of individual (e.g., gender, ethnicity, types of drugs used), environmental (e.g., homelessness, locations in which drugs are used), social (e.g., structure of social networks, stigma and discrimination), and structural factors (e.g., poor socioeconomic conditions, policing practices) that predict unsafe injection practices. This was followed by an examination of the numerous interventions such as distribution of syringes and injection paraphernalia, outreach programs, and supervised injection facilities that have been implemented in a variety of settings to reduce the harms associated with unsafe injecting, however, it also noted the limitations of these interventions and indicated that unsafe injecting persists in many settings despite their implementation.

This review concluded by drawing attention to the small body of literature evaluating interventions involving peers and those that have been developed by groups of IDU, which shows that such interventions are highly influential, effective in reaching hidden and high-risk populations of IDU, and more cost-effective than conventional interventions.

In Chapter 3, I described the curriculum content, educational format, training materials, and novel demonstration processes used for the IS Team's five workshop series promoting safer injecting practices. Chapter 3 also includes an analysis of IS Team members experiences leading this series of educational workshops. IS Team Facilitators expressed that the workshop's structure and content, including the participatory approach, facilitating in groups, and the variety of educational materials used helped them communicate information about safer injecting practices while addressing the realities of participant's injection practices. Overall, IS Team members' felt that their knowledge and experience as IDU fostered a sense of shared identity with workshop participants, which encouraged trust and rapport, and subsequently increased their credibility. This level of knowledge and experience allowed them to present safer injecting information with examples and language that was appropriate and accessible to workshop participants. IS Team members also reported gaining knowledge and skills from their involvement in the campaign, as well as positive feelings about themselves from the realization that they were helping people to protect their health.

The analysis presented in chapter 4 examines participants' perceptions of IS Team education workshops in relation to their own experiences and as compared to their previous interactions with safer injecting education. Participant responses presented in this analysis indicate that IDU primarily learn about injecting by watching or sharing experiences with their peers, and that significant gaps in knowledge regarding safer injecting practices persist

for most IDU. Participants' narratives support the value of the IS Team's approach, indicating that the variety of educational materials and demonstrations used, as well as the "hands on" participatory education approach allowed them to identify and address gaps in their injecting knowledge. A large majority of participants expressed that they prefer user-led interventions to traditional approaches because they see IS Team facilitators as more credible, empathic, and understanding than educators who do not share similar experiences. Most study participants were able to identify new knowledge that they gained from IS Team education workshops and expressed that this knowledge would alter their future injecting practices.

Previous research has predominantly focused on social relationships among IDU in relation to their role in influencing unsafe injection practices within social networks of IDU (Costenbader et al., 2006; Jackson et al., 2010; Prithwish et al., 2007; Rothenberg et al., 2000). In contrast, the findings of this study further the small body of literature identifying the positive aspects of social relations among IDU by indicating that IDU are capable of organizing interventions to protect one another from injection related harms and to improve their own individual and collective health (Friedman, de Jong, et al., 2007; Friedman, et al., 2004; Kerr, Hayashi, et al., 2010; Kerr, Oleson, et al., 2005; Kerr, et al., 2006). The findings of this study are consistent with other research on peer driven interventions demonstrating that peers are more credible and influential sources of information and peer driven interventions are more acceptable to IDU than conventional health programs (Broadhead, et al., 1998; Dickson-Gomez, et al., 2006; Kerr, et al., 2006; Latkin, 1998; Trautmann, 1995).

5.2 Unique Contributions

Collectively, these research findings offer important insight into the value of drug user-led interventions in addressing the harms associated with unsafe injection practices. Although the value and impact of network oriented HIV prevention interventions involving IDU have been well described (Broadhead, et al., 1998; Latkin, 1998; Latkin, et al., 2003; Broadhead, et al., 2006; Garfein, et al., 2007; Booth, et al., 2009; Broadhead, et al., 2009, Weeks, et al., 2009), to my knowledge this is the first evaluation of a user-led intervention targeting unsafe injecting. Previous research evaluating peer-driven interventions targeting HIV and related unsafe injection practices has focused specifically on interventions that are designed and implemented by experts in the field of public health who train peer leaders to disseminate prevention information and supplies through social networks of IDU. The IS Team education campaign is unique in that it was developed and implemented by active IDU who incorporated research findings as well as input from the broader membership of VANDU into their curriculum development process. The curriculum covered in this campaign was not developed by experts or professionals, but rather formulated by IDU in response to emerging health concerns and unsafe injection practices common in their local environment. The result of this process was a unique education curriculum that went beyond routine messages about HIV prevention to address a wide range of unsafe injection practices common in the local community. Furthermore, this evaluation was unique in that it focused not only on the perspectives of participants involved in this education campaign, but also evaluated the experiences and perspectives of the facilitators who designed and implemented the campaign curriculum. It is my hope that this research will inform the development of

further interventions to reduce the harms associated with unsafe injecting and encourage increased involvement of active IDU in the design and implementation of such interventions.

5.3 Study Limitations

While each of the study chapters (3-4) presenting novel research findings include a description of the limitations associated with each individual work, several of these issues warrant consideration in relation to the project as a whole. First, this research project focused exclusively on the perspectives of facilitators and participants involved in IS Team education workshops. Although efforts were made to ensure that the sample of workshop participants reflected the demographic characteristics of individuals that attended IS Team workshops, and all IS Team members that participated as workshop facilitators were interviewed, the views presented in this research may not be representative of a broader range of IDU. Given that in-depth interviews were conducted with a relatively small sample of IDU involved in these workshops, they cannot be generalized to the larger population of IDU in Vancouver or elsewhere.

Second, the IS Team education campaign was developed to address unsafe injecting practices occurring in the Downtown Eastside of Vancouver and consequently is largely specific to this setting. Although the unsafe injecting practices addressed by this campaign were important in the local context, the Downtown Eastside of Vancouver is unique in that it is characterized by a large open drug scene and many innovative harm reduction programs, and although the curriculum content had value in this setting, it may be insufficient elsewhere. A further contextual consideration is that this intervention was undertaken by VANDU, which has existed in this context for over a decade and made drawing participants

to these education workshops easy. However, it is uncertain whether a less established drug user organization in a different setting would have similar results.

Third, although all interviewees were told that their identity would be kept confidential and were encouraged to provide open and honest feedback on their participation in this campaign, it is possible that social desirability bias affected the responses of some participants. Specifically, both workshop participants and facilitators were aware that this project was an evaluation of the IS Team education campaign and may have been inclined to provide overly positive responses as a way of supporting the work of the IS Team or VANDU more generally.

Fourth, this project sought the feedback and impressions of workshop facilitators and participants immediately following IS Team workshops, and cannot determine whether participation in the IS Team campaign resulted in actual behaviour change or acquisition of new skills. Finally, since this evaluation elicited perspectives on the IS Team workshops and education campaign as a whole, it was not able to assess the relative value of individual components of the education curriculum.

5.4 Recommendations for Policy and Practice

The findings of this project point to several recommendations for future interventions aimed at reducing the harms associated with unsafe injection practices in Vancouver and elsewhere. This project reveals that IDU are especially well placed to design and implement safer injecting interventions because they have insider knowledge, are seen as credible sources of information, and can speak in language and use examples that are relevant to other IDU. Based on the results of this study, IDU may be the most suitable candidates to provide education to other IDU, and further efforts should be made to support their formal and

informal education activities. However, the findings of the research presented herein also point to a role professionals can play in supporting user-led educational initiatives, as IS Team facilitators noted that they would have been in a better position to answer questions regarding HIV if a nurse had been present to support them.

Results of this project highlight the need for future interventions to go beyond messages about HIV and syringe sharing to address the details of lesser known microinjecting practices such as not sharing ancillary injecting equipment, how to properly cook and prepare drugs for injection, and proper use of alcohol wipes and ties. Future interventions should expand messages that focus on viral infections as the main consequences of unsafe injection practices to include discussions of bacterial infections and venous damage. Although existing public health interventions have succeeded in telling IDU what not to do, this research shows that it is important to base these discussions in participant's lived experience and explain why particular steps are important, while describing and demonstrating feasible alternatives.

Given the considerable local variation that exists among cultures and histories of IDU, it is important for policy makers, health authorities, and public health practitioners to incorporate the perspectives of IDU in service development and implementation to ensure cultural relevance and to minimize the risk of unintended negative consequences. The findings of this project demonstrate the success of a user-led intervention in focusing on emerging health issues among local IDU that are not adequately being addressed by existing public health programs. Given their value in identifying emerging health concerns relevant to local IDU and their proven track record of acting ahead of public health in responding to these concerns, it is clear that more formal support for drug user involvement and organizing

is merited. While health authorities and health funding agencies are often supportive of drug user organizations, they are frequently subject to considerable instability, and often have difficulty securing financial support on an ongoing basis (Crofts & Herkt, 1995). The challenges related to financial support and organizational capacity of drug user organizations and activities often threatens their longevity, as well as their continued ability to represent highly marginalized IDU (Friedman, de Jong, et al., 2007). Given the demonstrated value of drug user organizations, future efforts should be made to better align research and programmatic activities with those of drug user organizations to create a cyclical process in which the activities of IDU inform research and practice, while also responding to the gaps and issues that research and practice identify.

Although not a central theme in this project, it is notable that some participants and facilitators identified various environmental and structural constraints on injecting practice. Since educational interventions are unable to address contextual factors such as homelessness (Metraux, et al., 2004), unstable housing (Des Jarlais, et al., 2007), poor socioeconomic conditions (Genereux, et al., 2010), and policing practices (Maher & Dixon, 1999; Small, Kerr, et al., 2006) that perpetuate unsafe injecting, there is an urgent need for programs and policies that address these environmental and structural factors. Examples of potential environmental-structural interventions could include the expansion of supervised injection facilities (Broadhead, et al., 2002; Small, Shoveller, et al., 2011), increased access to safe and stable housing (Kidder, et al., 2007; Sadowski, Kee, VanderWeele, & Buchanan, 2009; Shah, Galai, Celentano, Vlahov, & Strathdee, 2006), decriminalizing the possession of drugs (Hughes & Stevens, 2010; Rolles, 2009), as well as ongoing advocacy efforts to help promote relevant policy reform. Another important structural consideration closely linked to

unsafe injection practices is the situational unavailability of injection supplies. Research from Canada as well as many other settings internationally has demonstrated that insufficient coverage of syringe distribution is a major barrier to the implementation of hygienic injecting practices (Mathers, et al., 2010; Harvard, et al., 2008). Further efforts are required to monitor and ensure appropriate availability of injecting supplies for IDU.

5.5 Future Research

This project has several important implications for future research on the effectiveness of user-led interventions in reducing the harms associated with unsafe injecting. Given that this was a qualitative exploration of facilitators' and participants' experiences directly following their participation in IS Team education workshops, I was unable to determine whether information provided in workshops resulted in actual changes in short- or long-term injection practices. Future evaluation of this work should include examination of changes in injecting behaviour directly resulting from IS Team education workshops. Prospective cohort studies could be used to evaluate changes in behaviour among individuals exposed to the intervention. Specifically, pre and post within subject analyses could be used to determine whether the intervention prompted changes in injecting behaviour. As well, if possible, individuals exposed to the intervention could be compared to those not exposed to the intervention so that a case-control-based analyses could be undertaken. Interventional designs, including randomized controlled trials would likely provide the highest level of evidence for this purpose. Specifically, individuals could be randomized to receive the intervention or a control condition (e.g., conventional educational materials) to determine whether this type of intervention confers benefits post-intervention. Longitudinal follow-up

through cohort- or intervention-based analysis could then be used to determine the durability of the intervention effect.

Similar methods could be used to examine long-term impacts on the injecting behaviour of the facilitators. The findings that facilitators improved the safety of their own injecting practices is consistent with previous research of large social network interventions showing that peers involved in education and outreach report the greatest reductions in their injection risk behaviours (Broadhead, et al., 1998; Convey, et al., 2010; Latkin, 1998; Latkin, et al., 2003; Weeks, et al., 2009). Follow-up investigation of facilitators would be useful to determine the intensity and durability of these effects. Further evaluation could also be conducted to examine the longer-term impacts of self-empowerment and new skills acquired on the facilitators involved in this campaign. For example, future efforts could seek to assess whether or not participation in this campaign led to other meaningful opportunities for the workshop facilitators.

Although evaluations of peer-driven HIV interventions have demonstrated reductions in HIV risk behaviour amongst peer educators and members of their social networks (Broadhead, et al., 1998; Latkin, 1998; Latkin, et al., 2003; Weeks, et al., 2009), there is a paucity of knowledge regarding the extent to which user-led interventions challenge group norms and encourage social and behavioural change. Further assessment is needed to determine how prevention messages transfer from user-led educational workshops to natural settings with consideration given to the ability of these messages to alter local norms and social relations surrounding unsafe injection practices. For example, it would be helpful to evaluate whether the benefits of the intervention extend to partners and peers of individuals exposed to the initial intervention.

In order to optimize this intervention, it would also be useful to evaluate specific components of the intervention to determine which are the most potent. This could be achieved by exposing groups of individuals to different components of the workshop curriculum then comparing the relative benefits. With this in mind, some facilitators felt that it would be beneficial to incorporate increased emphasis on particular workshop elements to better address gender- and culture-specific educational needs. Future research should be conducted to examine how similar interventions can best meet the gender- and culture-specific educational needs of female and ethnic minority IDU in this setting and elsewhere.

Another direction for future research would be to identify ways in which drug user organizations can be optimized in relation to existing programs, services, and policies, with a view towards identifying how user-led interventions can complement, support, and enhance existing health and social services. This should involve examination of how user-led organizations and programs can link marginalized IDU to health and social service professionals. This would help to clarify the role of user-led initiatives within the broader framework of existing services. This could also help determine how user-led activities can best be situated to garner ongoing support from existing structures and organizations.

Further research is also required to provide detailed descriptions of the formation and development of drug user groups and activities. There are few if any well-researched guidelines that outline factors necessary for effective organization of IDU or user-led activities, such as methods of recruitment and training, the nature of users' involvement, methods of developing program content and delivery, funding sources, and staffing support. Careful documentation of a theory and model for user-led organizations and activities would be invaluable in informing the formation of drug user-led organizations and initiatives in

other settings. Future research should also focus on ways to improve the sustainability of drug user organizations. Given the body of literature pointing to the fact that drug user organizations are subject to considerable instability and problems related to funding (Crofts & Herkt, 1995; Friedman, de Jong, et al. 2007), research should be undertaken to identify the factors that promote the health and sustainability of these organizations, as well as the factors that threaten or inhibit their longevity.

Finally, given findings indicating the numerous contextual constraints on implementing safer injecting practices, future research should identify the full range of social, structural, and environmental factors that shape unsafe injecting. This research should also seek to identify potential policy and programmatic responses to these factors.

5.6 Conclusions

The primary objectives of this research were to describe a user-led education campaign designed to target unsafe injecting practices and to explore IS Team facilitators' and workshop participants' experiences and perceptions of this unique educational intervention. This project makes important contributions to the development of knowledge regarding the feasibility and value of user-led interventions as an alternative mechanism for connecting IDU with safer injecting information. Given previous research findings that high rates of harmful microinjecting practices persist in this setting, and current findings that considerable gaps in the injecting knowledge of IDU continue to exist locally, innovative and ongoing strategies to address these concerns are urgently required. Future interventions targeting unsafe injecting in this setting and elsewhere should directly involve IDU in program development and implementation to improve the relevance and cultural appropriateness of these interventions. Ongoing research in this area is needed to determine

how to optimize user-led activities as micro-social interventions to reduce the harms of unsafe injecting, and to develop theory and recommendations to guide the design, integration, and sustainability of user-led organizations and activities in the future. In order to ensure the most effective response to the severe harms associated with unsafe injecting among IDU, it is imperative that future interventions be based on sound evidence and be evaluated to the highest standards of scientific rigour.

References

- Abah, O. (2007). Vignettes of community in action: An exploration of participatory methodologies in promoting community development in Nigeria. *Community Development Journal*, 42(4), 435-448.
- Abou-Saleh, M., Davis, P., Rice, P., Checinski, K., Drummond, C., Maxwell, D., et al. (2008). The effectiveness of behavioural interventions in the primary prevention of hepatitis C amongst injecting drug users: A randomised controlled trial and lessons learned. *Harm Reduction Journal*, 5(1), 25.
- Aceijas, C., & Rhodes, T. (2007). Global estimates of prevalence of HCV infection among injecting drug users. *International Journal of Drug Policy*, 18(5), 352-358.
- Aceijas, C., Stimson, G. V., Hickman, M., & Rhodes, T. (2004). Global overview of injecting drug use and HIV infection among injecting drug users. *AIDS*, 18(17), 2295-2303.
- Agar, M. (2003). The story of crack: Towards a theory of illicit drug trends. *Addiction Research and Theory*, 11(1), 3-29.
- Agar, M., & Reisinger, H. S. (2001). Using trend theory to explain heroin use trends. *Journal of Psychoactive Drugs*, 33(3), 203-211.
- Aitken, C., Moore, D, Higgs, P, Kelsall, J, Kerger, M,. (2002). The impact of a police crackdown on a street drug scene: Evidence from the street. *International Journal of Drug Policy*, 13(3), 189-198.
- Akukwe, C. (2001). The need for an urban HIV/AIDS policy in the United States. *Journal of Health and Social Policy*, 12(3), 1-15.

- Andia, J. F., Deren, S., Kang, S. Y., Robles, R. R., Colon, H. M., Oliver-Velez, D., et al. (2001). Residential status and HIV risk behaviors among Puerto Rican drug injectors in New York and Puerto Rico. *American Journal of Drug and Alcohol Abuse*, 27(4), 719-735.
- Andia, J. F., Deren, S., Robles, R. R., Kang, S. Y., & Colon, H. M. (2008). Peer norms and sharing of injection paraphernalia among Puerto Rican injection drug users in New York and Puerto Rico. *AIDS Education and Prevention*, 20(3), 249-257.
- Anthony, J. C., Vlahov, D., Nelson, K. E., Cohn, S., Astemborski, J., & Solomon, L. (1991). New evidence on intravenous cocaine use and the risk of infection with human immunodeficiency virus type 1. *American Journal of Epidemiology*, 134(10), 1175-1189.
- Bailey, S. L., Ouellet, L. J., Mackesy-Amiti, M. E., Golub, E. T., Hagan, H., Hudson, S. M., et al. (2007). Perceived risk, peer influences, and injection partner type predict receptive syringe sharing among young adult injection drug users in five U.S. cities. *Drug and Alcohol Dependence*, 91(Suppl 1), S18-29.
- Baker, A., Heather, N., Wodak, A., Dixon, J., & Holt, P. (1993). Evaluation of a cognitive-behavioural intervention for HIV prevention among injecting drug users. *AIDS*, 7(2), 247-256.
- Barnard, M. A. (1993). Needle sharing in context: Patterns of sharing among men and women injectors and HIV risks. *Addiction*, 88(6), 805-812.
- Battjes, R. J., Pickens, R. W., Haverkos, H. W., & Sloboda, Z. (1994). HIV risk factors among injecting drug users in five US cities. *AIDS*, 8(5), 681-687.

- Beckwith, C. G., Moreira, C. C., Aboshady, H. M., Zaller, N., Rich, J. D., & Flanigan, T. P. (2006). A success story: HIV prevention for injection drug users in Rhode Island. *Substance Abuse Treatment, Prevention, and Policy, 1*(1), 34.
- Binswanger, I. A., Kral, A. H., Bluthenthal, R. N., Rybold, D. J., & Edlin, B. R. (2000). High prevalence of abscesses and cellulitis among community-recruited injection drug users in San Francisco. *Clinical Infectious Diseases, 30*(3), 579-581.
- Bisbe, J., Miro, J. M., Latorre, X., Moreno, A., Mallolas, J., Gatell, J. M., et al. (1992). Disseminated candidiasis in addicts who use brown heroin: Report of 83 cases and review. *Clinical Infectious Diseases, 15*(6), 910-923.
- Bluthenthal, R. N. (1999). Drug paraphernalia laws and injection-related infectious disease risk among drug injectors. *Journal of Drug Issues, 29*(1), 1-16.
- Bluthenthal, R. N., Do, D. P., Finch, B., Martinez, A., Edlin, B. R., & Kral, A. H. (2007). Community characteristics associated with HIV risk among injection drug users in the San Francisco Bay Area: a multilevel analysis. *Journal of Urban Health, 84*(5), 653-666.
- Bluthenthal, R. N., Kral, A. H., Gee, L., Erringer, E. A., & Edlin, B. R. (2000). The effect of syringe exchange use on high-risk injection drug users: A cohort study. *AIDS, 14*(5), 605-611.
- Bluthenthal, R. N., Kral, A. H., Lorvick, J., & Watters, J. K. (1997). Impact of law enforcement on syringe exchange programs: A look at Oakland and San Francisco. *Medical Anthropology, 18*(1), 61-83.

- Bobrova, N., Rhodes, T., Power, R., Alcorn, R., Neifeld, E., Krasiukov, N., et al. (2006).
Barriers to accessing drug treatment in Russia: a qualitative study among injecting
drug users in two cities. *Drug and Alcohol Dependence*, 82(Suppl 1), S57-63.
- Booth, R., Koester, S., Brewster, J. T., Weibel, W. W., & Fritz, R. B. (1991). Intravenous
drug users and AIDS: Risk behaviors. *American Journal of Drug and Alcohol Abuse*,
17(3), 337-353.
- Booth, R. E. (1994). Predictors of unsafe needle practices: injection drug users in Denver.
Journal of Acquired Immune Deficiency Syndromes, 7(5), 504-508.
- Booth, R. E., Lehman, W. E. K., Latkin, C. A., Brewster, J. T., Sinitsyna, L., & Dvoryak, S.
(2009). Use of a peer leader intervention model to reduce needle-related risk
behaviors among drug injectors in Ukraine. *Journal of Drug Issues*, 39(3), 607-625.
- Bourgois, P. (1998). The moral economies of homeless heroin addicts: Confronting
ethnography, HIV risk, and everyday violence in San Francisco shooting
encampments. *Substance Use and Misuse*, 33(11), 2323-2351.
- Bourgois, P. (2003). US inner-city apartheid: The contours of structural and interpersonal
violence. In N. B. Scheper-Hughes, P. (Ed.), *Violence in war and peace: an
anthology* (pp. 297-303). Oxford: Blackwell Publishing.
- Bourgois, P., Prince, B., & Moss, A. (2004). The everyday violence of hepatitis C among
young women who inject drugs in San Francisco. *Human Organization*, 63(3), 253-
264.
- Braine, N., Des Jarlais, D. C., Goldblatt, C., Zadoretzky, C., & Turner, C. (2005). HIV risk
behavior among amphetamine injectors at U.S. syringe exchange programs. *AIDS
Education and Prevention*, 17(6), 515-524.

- Brands, B., Blake, J., Sproule, B., Gourlay, D., & Busto, U. (2004). Prescription opioid abuse in patients presenting for methadone maintenance treatment. *Drug and Alcohol Dependence, 73*(2), 199-207.
- Bravo, M. J., Royuela, L., De la Fuente, L., Brugal, M. T., Barrio, G., & Domingo-Salvany, A. (2009). Use of supervised injection facilities and injection risk behaviours among young drug injectors. *Addiction, 104*(4), 614-619.
- Bray, S., Lawson, J., & Heimer, R. (2001). Doffing the cap: Increasing syringe availability by law but not in practice. *International Journal of Drug Policy, 12*, 221-235.
- Briggs, D., Rhodes, T., Marks, D., Kimber, J., Holloway, G., & Jones, S. (2009). Injecting drug use and unstable housing: Scope for structural interventions in harm reduction. *Drugs: Education, Prevention, and Policy, 16*(5), 436-450.
- Broadhead, R., Hammett, T. M., Kling, R., Ngu, D., Wei, L., Yi, C., et al. (2009). Peer-driven interventions in Vietnam and China to prevent HIV: A pilot study targeting injection drug users. *Journal of Drug Issues, 39*(4), 829-850.
- Broadhead, R. S., & Heckathorn, D. D. (1994). AIDS prevention outreach among injection drug users: Agency problems and new approaches. *Social Problems, 41*(3), 473-495.
- Broadhead, R. S., Heckathorn, D. D., Grund, J. C., Stern, L. S., & Anthony, D. L. (1995). Drug users versus outreach workers in combating AIDS: Preliminary results of a peer-driven intervention. *Journal of Drug Issues, 25*(3), 531-564.
- Broadhead, R. S., Heckathorn, D. D., Weakliem, D. L., Anthony, D. L., Madray, H., Mills, R. J., et al. (1998). Harnessing peer networks as an instrument for AIDS prevention: Results from a peer-driven intervention. *Public Health Reports, 113*(Suppl 1), 42-57.

- Broadhead, R. S., Kerr, T. H., Grund, J. P. C., & Altice, F. L. (2002). Safer injection facilities in North America: Their place in public policy and health initiatives. *Journal of Drug Issues, 32*(1), 329-355.
- Broadhead, R. S., Volkanevsky, V. L., Rydanova, T., Ryabkova, M., Borch, C., van Hulst, Y., et al. (2006). Peer-driven HIV interventions for drug injectors in Russia: First year impact results of a field experiment. *International Journal of Drug Policy, 17*(5), 379-392.
- Brown, E. J. (1998). Female injecting drug users: Human immunodeficiency virus risk behavior and intervention needs. *Journal of Professional Nursing, 14*(6), 361-369.
- Bruce, R. D. (2010). Methadone as HIV prevention: High volume methadone sites to decrease HIV incidence rates in resource limited settings. *International Journal of Drug Policy, 21*(2), 122-124.
- Buavirat, A., Page-Shafer, K., Van Griensven, G. J., Mandel, J. S., Evans, J., Chuaratanaphong, J., et al. (2003). Risk of prevalent HIV infection associated with incarceration among injecting drug users in Bangkok, Thailand: case-control study. *British Medical Journal, 326*(7384), 308.
- Bull, S. S., Piper, P., & Rietmeijer, C. (2002). Men who have sex with men and also inject drugs profiles of risk related to the synergy of sex and drug injection behaviours. *Journal of Homosexuality, 42*(3), 31-51.
- Burris, S., Blankenship, K. M., Donoghoe, M., Sherman, S., Vernick, J. S., Case, P., et al. (2004). Addressing the "risk environment" for injection drug users: The mysterious case of the missing cop. *Milbank Quarterly, 82*(1), 125-156.

- Burris, S., & Strathdee, S. A. (2006). To serve and protect? Toward a better relationship between drug control policy and public health. *AIDS*, 20(1), 117-118.
- Bux, D. A., Lamb, R. J., & Iguchi, M. Y. (1995). Cocaine use and HIV risk behavior in methadone maintenance patients. *Drug and Alcohol Dependence*, 37(1), 29-35.
- Buxton, M. B., Vlahov, D., Strathdee, S. A., Jarlais, D. C. D., Morse, E. V., Ouellet, L., et al. (2004). Association between injection practices and duration of injection among recently initiated injection drug users. *Drug and Alcohol Dependence*, 75(2), 177-183.
- Calsyn, D. A., Saxon, A. J., Freeman, G., & Whittaker, S. (1991). Needle-use practices among intravenous drug users in an area where needle purchase is legal. *AIDS*, 5(2), 187-193.
- Campbell, C., & MacPhail, C. (2002). Peer education, gender and the development of critical consciousness: participatory HIV prevention by South African youth. *Social Science and Medicine*, 55(2), 331-345.
- Canadian Centre of Substance Abuse. (2008). Injection drug users overview. Retrieved from <http://www.ccsa.ca/Eng/Topics/Populations/IDU/Pages/InjectionDrugUsersOverview.aspx>
- Carlson, R. G. (2000). Shooting galleries, dope houses and injection doctors: Examining the social ecology of HIV risk behaviours among drug injectors in Dayton, Ohio. *Human Organization*, 59, 325-333.
- Carruthers, S. (2007). The organization of a community: Community-based prevention of injecting drug use-related health problems. *Substance Use and Misuse*, 42(12-13), 1971-1977.

- Castelloe, P., & Watson, T. (1999). Participatory education as a community practice method: A case example from a comprehensive head start program. *Journal of Community Practice, 6*(1), 71-89.
- Celentano, D., Cohn, S., Davis, R. O., & Vlahov, D. (2002). Self-efficacy estimates for drug use practices predict risk reduction among injection drug users. *Journal of Urban Health, 79*(2), 245-256.
- Celentano, D. D., Vlahov, D., Cohn, S., Anthony, J. C., Solomon, L., & Nelson, K. E. (1991). Risk factors for shooting gallery use and cessation among intravenous drug users. *American Journal of Public Health, 81*(10), 1291-1295.
- Chaisson, R. E., Bacchetti, P., Osmond, D., Brodie, B., Sande, M. A., & Moss, A. R. (1989). Cocaine use and HIV infection in intravenous drug users in San Francisco. *Journal of the American Medical Association, 261*(4), 561-565.
- Chitwood, D. D., McCoy, C. B., Inciardi, J. A., McBride, D. C., Comerford, M., Trapido, E., et al. (1990). HIV seropositivity of needles from shooting galleries in south Florida. *American Journal of Public Health, 80*(2), 150-152.
- Choi, S. Y., Cheung, Y. W., & Jiang, Z. Q. (2007). Ethnicity and risk factors in needle sharing among intravenous drug users in Sichuan Province, China. *AIDS Care, 19*(1), 1-8.
- Chowdhury, K., Bloom, J., Black, M. J., & Alnoury, K. (1990). Spontaneous and nonspontaneous internal jugular-vein thrombosis. *Head and Neck, 12*(2), 168-173.
- Ciccarone, D., & Bourgois, P. (2003). Explaining the geographical variation of HIV among injection drug users in the United States. *Substance Use and Misuse, 38*(14), 2049-2063.

- Clatts, M. C., Heimer, R., Abdala, N., Goldsamt, L. A., Sotheran, J. L., Anderson, K. T., et al. (1999). HIV-1 transmission in injection paraphernalia: Heating drug solutions may inactivate HIV-1. *Journal of Acquired Immune Deficiency Syndromes*, 22(2), 194-199.
- Coady, M. H., Latka, M. H., Thiede, H., Golub, E. T., Ouellet, L., Hudson, S. M., et al. (2007). Housing status and associated differences in HIV risk behaviors among young injection drug users (IDUs). *AIDS and Behavior*, 11(6), 854-863.
- Cohen, J. P., Persky, M. S., & Reede, D. L. (1985). Internal jugular vein-thrombosis. *Laryngoscope*, 95(12), 1478-1482.
- Colon, H., Robles, RR, Freeman, D, Matos, T,. (1993). Effects of HIV risk reduction education program among injection drug users in Puerto Rico. *Puerto Rico Health Sciences Journal*, 12(1), 27-34.
- MSIC Evaluation Committee. (2003). *Final report of the evaluation of the sydney medically supervised injecting centre*. (NCJ Publication No. 204895). Sydney, Australia.
- Contoreggi, C., Rexroad, V. E., & Lange, W. R. (1998). Current management of infectious complications in the injecting drug user. *Journal of Substance Abuse Treatment*, 15(2), 95-106.
- Convey, M. R., Dickson-Gomez, J., Weeks, M. R., & Li, J. (2010). Altruism and peer-led HIV prevention targeting heroin and cocaine users. *Qualitative Health Research*, 20(11), 1546-1557.
- Cooper, H., Moore, L., Gruskin, S., & Krieger, N. (2005). The impact of a police drug crackdown on drug injectors' ability to practice harm reduction: A qualitative study. *Social Science and Medicine*, 61(3), 673-684.

- Copeland, L., Budd, J., Robertson, J. R., & Elton, R. A. (2004). Changing patterns in causes of death in a cohort of injecting drug users, 1980-2001. *Archives of Internal Medicine*, *164*(11), 1214-1220.
- Corbin, J., & Strauss, A. (2008). *Basics of qualitative research (3rd Ed.)*. Los Angeles: Sage.
- Corneil, T. A., Kuyper, L. M., Shoveller, J., Hogg, R. S., Li, K., Spittal, P. M., et al. (2006). Unstable housing, associated risk behaviour, and increased risk for HIV infection among injection drug users. *Health and Place*, *12*(1), 79-85.
- Costenbader, E. C., Astone, N. M., & Latkin, C. A. (2006). The dynamics of injection drug users' personal networks and HIV risk behaviors. *Addiction*, *101*(7), 1003-1013.
- Cox, J., De, P., Morissette, C., Tremblay, C., Stephenson, R., Allard, R., et al. (2008). Low perceived benefits and self-efficacy are associated with hepatitis C virus (HCV) infection-related risk among injection drug users. *Social Science and Medicine*, *66*(2), 211-220.
- Cox, J., Morissette, C., Prithwish, D., Tremblay, C., Allard, R., Graves, L., et al. (2009). Access to sterile injecting equipment is more important than awareness of HCV status for injection risk behaviors among drug users. *Substance Use and Misuse*, *44*(4), 548-568.
- Coyle, S. L., Needle, R. H., & Normand, J. (1998). Outreach-based HIV prevention for injecting drug users: a review of published outcome data. *Public Health Reports*, *113*(Suppl 1), 19-30.
- Crofts, N., & Herkt, D. (1995). A history of peer-based drug-user groups in australia. *Journal of Drug Issues*, *25*(3), 599-616.

- Crossley, M. (2003). Temperate pyomyositis in an injecting drug misuser. A difficult diagnosis in a difficult patient. *Emergency Medicine Journal*, 20(3), 299-300.
- Cruz, M. F., Mantsios, A., Ramos, R., Case, P., Brouwer, K. C., Ramos, M. E., et al. (2007). A qualitative exploration of gender in the context of injection drug use in two US-Mexico border cities. *AIDS and Behavior*, 11(2), 253-262.
- Csete, J. (2010). *From the mountaintops: What the world can learn from drug policy change in switzerland*. Switzerland: Open Society Institute.
- Darke, S., & Hall, W. (2003). Heroin overdose: Research and evidence-based intervention. *Journal of Urban Health*, 80(2), 189-200.
- Darke, S., Kaye, S., & Ross, J. (2001). Geographical injecting locations among injecting drug users in Sydney, Australia. *Addiction*, 96(2), 241-246.
- Davey-Rothwell, M. A., & Latkin, C. A. (2007). Gender differences in social network influence among injection drug users: Perceived norms and needle sharing. *Journal of Urban Health*, 84(5), 691-703.
- Davidson, P. J., McLean, R. L., Kral, A. H., Gleghorn, A. A., Edlin, B. R., & Moss, A. R. (2003). Fatal heroin-related overdose in San Francisco, 1997-2000: A case for targeted intervention. *Journal of Urban Health*, 80(2), 261-273.
- Davidson, S., Judd, F., Jolley, D., Hocking, B., Thompson, S., & Hyland, B. (2001). Risk factors for HIV/AIDS and hepatitis C among the chronic mentally ill. *Australian New Zealand Journal of Psychiatry*, 35(2), 203-209.
- Davis, C. S., Burris, S., Kraut-Becher, J., Lynch, K. G., & Metzger, D. (2005). Effects of an intensive street-level police intervention on syringe exchange program use in Philadelphia, PA. *American Journal of Public Health*, 95(2), 233-236.

- Davis, S. (1998). Injection drug use and HIV infection among the seriously mentally ill: A report from Vancouver. *Canadian Journal of Community Mental Health, 17*(1), 121-127.
- Debeck, K., Kerr, T., Bird, L., Zhang, R., Marsh, D., Tyndall, M., et al. (2011). Injection drug use cessation and use of North America's first medically supervised safer injecting facility. *Drug Alcohol Dependence, 113*(2-3), 172-176.
- DeBeck, K., Kerr, T., Li, K., Milloy, M. J., Montaner, J., & Wood, E. (2009). Incarceration and drug use patterns among a cohort of injection drug users. *Addiction, 104*(1), 69-76.
- Debeck, K., Small, W., Wood, E., Li, K., Montaner, J., & Kerr, T. (2009). Public injecting among a cohort of injection drug users in Vancouver, Canada. *Journal of Epidemiology and Community Health, 63*(1), 81-86.
- Degenhardt, L., Black, E., Breen, C., Bruno, R., Kinner, S., Roxburgh, A., et al. (2006). Trends in morphine prescriptions, illicit morphine use and associated harms among regular injecting drug users in Australia. *Drug and Alcohol Review, 25*(5), 403-412.
- Degenhardt, L., Mathers, B., Guarinieri, M., Panda, S., Phillips, B., Strathdee, S. A., et al. (2010). Methamphetamine use and associated HIV: Implications for global policy and public health. *International Journal of Drug Policy, 21*(5), 347-358.
- Deiss, R. G., Brouwer, K. C., Ma, O. L., Lozada, R. M., Ramos, R., Cruz, M. A. F., et al. (2008). High-risk sexual and drug using behaviors among male injection drug users who have sex with men in 2 Mexico-US border cities. *Sexually Transmitted Diseases, 35*(3), 243-249.

- Deren, S., Kang, S. Y., Colon, H. M., Andia, J. F., & Robles, R. R. (2004). HIV incidence among high-risk Puerto Rican drug users: A comparison of East Harlem, New York, and Bayamon, Puerto Rico. *Journal of Acquired Immune Deficiency Syndromes*, 36(5), 1067-1074.
- Des Jarlais, D. C. (2000). Structural interventions to reduce HIV transmission among injecting drug users. *AIDS*, 14(Suppl 1), S41-46.
- Des Jarlais, D. C., Arasteh, K., Hagan, H., McKnight, C., Perlman, D. C., & Friedman, S. R. (2009). Persistence and change in disparities in HIV infection among injection drug users in New York city after large-scale syringe exchange programs. *American Journal of Public Health*, 99(S2), S445-S451.
- Des Jarlais, D. C., Braine, N., & Friedmann, P. (2007). Unstable housing as a factor for increased injection risk behavior at US syringe exchange programs. *AIDS and Behavior*, 11(6 Suppl), 78-84.
- Des Jarlais, D. C., & Friedman, S. R. (1990). Shooting galleries and AIDS: infection probabilities and 'tough' policies. *American Journal of Public Health*, 80(2), 142-144.
- Des Jarlais, D. C., & Friedman, S. R. (1998). Fifteen years of research on preventing HIV infection among injecting drug users: What we have learned, what we have not learned, what we have done, what we have not done. *Public Health Reports*, 113(Suppl 1), 182-188.
- Deutsch, I. (1971). Myositis ossificans: complication of drug abuse. *Journal of the American Medical Association*, 216(6), 1035.

- Diaz, T., Vlahov, D., Greenberg, B., Cuevas, Y., & Garfein, R. (2001). Sexual orientation and HIV infection prevalence among young Latino injection drug users in Harlem. *Journal of Women's Health and Gender-Based Medicine, 10*(4), 371-380.
- Dickson-Gomez, J., Weeks, M., Martinez, M., & Convey, M. (2006). Times and places: Process evaluation of a peer-led HIV prevention intervention. *Substance Use and Misuse, 41*(5), 669-690.
- Dietze, P., Stoove, M., Miller, P., Kinner, S., Bruno, R., Alati, R., et al. (2010). The self-reported personal wellbeing of a sample of Australian injecting drug users. *Addiction, 105*(12), 2141-2148.
- Dolan, K. (1996). Evidence about HIV transmission in prison. *Canadian HIV/AIDS Policy and Law Newsletter, 3*(4), 44-46.
- Dolan, K., Kimber, J., Fry, C., Fitzgerald, J., McDonald, D., & Trautmann, F. (2000). Drug consumption facilities in Europe and the establishment of supervised injecting centres in Australia. *Drug and Alcohol Review, 19*(3), 337-346.
- Dolan, K. A., & Wodak, A. (1999). HIV transmission in a prison system in an Australian State. *Medical Journal of Australia, 171*(1), 14-17.
- Dovey, K., Fitzgerald, J., & Choi, Y. (2001). Safety becomes danger: Dilemmas of drug-use in public space. *Health and Place, 7*(4), 319-331.
- Drucker, E. (1999). Drug prohibition and public health: 25 years of evidence. *Public Health Reports, 114*(1), 14-29.
- Dubois-Arber, F., Benninghoff, F., & Jeannin, A. (2008). Typology of injection profiles of clients of a supervised drug consumption facility in Geneva, Switzerland. *European Addiction Research, 14*(1), 1-10.

- Duva, S. M., Silverstein, S. M., & Spiga, R. (2011). Impulsivity and risk-taking in co-occurring psychotic disorders and substance abuse. *Psychiatry Research, 186*(2-3), 351-355.
- Dwyer, R., Richardson, D., Ross, M. W., Wodak, A., Miller, M. E., & Gold, J. (1994). A comparison of HIV risk between women and men who inject drugs. *AIDS Education and Prevention, 6*(5), 379-389.
- Dwyer, R., Topp, L., Maher, L., Power, R., Hellard, M., Walsh, N., et al. (2009). Prevalences and correlates of non-viral injecting-related injuries and diseases in a convenience sample of Australian injecting drug users. *Drug and Alcohol Dependence, 100*(1-2), 9-16.
- Ebright, J. R., & Pieper, B. (2002). Skin and soft tissue infections in injection drug users. *Infectious Disease Clinics of North America, 16*(3), 697-712.
- Edwards, A., Curtis, S., & Sherrard, J. (1999). Survey of risk behaviour and HIV prevalence in an English prison. *International Journal of STD and AIDS, 10*(7), 464-466.
- El-Bassel, N., Cooper, D. K., Chen, D. R., & Schilling, R. F. (1998). Personal social networks and HIV status among women on methadone. *AIDS Care, 10*(6), 735-749.
- Espiritu, M. B., & Medina, J. E. (1980). Complications of heroin injections of the neck. *Laryngoscope, 90*(7), 1111-1119.
- Etienne, M., Nemery, A., Darcis, J. M., Pierard, G. E., & Demonty, J. (1986). Disseminated candidiasis in heroin addicts. Report of two cases and review of the literature. *Acta Clinica Belgica, 41*(1), 18-22.

- Evans, J. L., Hahn, J. A., Lum, P. J., Stein, E. S., & Page, K. (2009). Predictors of injection drug use cessation and relapse in a prospective cohort of young injection drug users in San Francisco, CA (UFO Study). *Drug and Alcohol Dependence*, *101*(3), 152-157.
- Evans, J. L., Hahn, J. A., Page-Shafer, K., Lum, P. J., Stein, E. S., Davidson, P. J., et al. (2003). Gender differences in sexual and injection risk behavior among active young injection drug users in San Francisco (the UFO Study). *Journal of Urban Health*, *80*(1), 137-146.
- Evans, L., & Strathdee, S. A. (2006). A roof is not enough: Unstable housing, vulnerability to HIV infection and the plight of the SRO. *International Journal of Drug Policy*, *17*(2), 115-117.
- Fairbairn, N., Kerr, T., Buxton, J. A., Li, K., Montaner, J. S., & Wood, E. (2007). Increasing use and associated harms of crystal methamphetamine injection in a Canadian setting. *Drug Alcohol Depend*, *88*(2-3), 313-316.
- Fairbairn, N., Small, W., Van Borek, N., Wood, E., & Kerr, T. (2010). Social structural factors that shape assisted injecting practices among injection drug users in Vancouver, Canada: A qualitative study. *Harm Reduction Journal*, *7*, 20.
- Fairbairn, N., Wood, E., Stoltz, J. A., Li, K., Montaner, J., & Kerr, T. (2008). Crystal methamphetamine use associated with non-fatal overdose among a cohort of injection drug users in Vancouver. *Public Health*, *122*(1), 70-78.
- Fairbairn, N. Wood, E., Small, W., Stoltz, J., Li, K., & Kerr, T. (2006). Risk profile of individuals who provide assistance with illicit drug injections. *Drug and Alcohol Dependence*, *82*(1), 41-46.

- Falck, R. S., Siegal, H. A., Wang, J., & Carlson, R. G. (1995). Usefulness of the health belief model in predicting HIV needle risk practices among injection drug users. *AIDS Education and Prevention, 7*(6), 523-533.
- Fast, D., Small, W., Wood, E., & Kerr, T. (2008). The perspectives of injection drug users regarding safer injecting education delivered through a supervised injecting facility. *Harm Reduction Journal, 5*, 32.
- Fee, E., & Krieger, N. (1993). Understanding AIDS: Historical interpretations and the limits of biomedical individualism. *American Journal of Public Health, 83*(10), 1477-1486.
- Fennema, J. S. A., Van Ameijden, E. J. C., Van Den Hoek, A., & Coutinho, R. A. (1997). Young and recent-onset injecting drug users are at higher risk for HIV. *Addiction, 92*(11), 1457-1465.
- Firestone, M., & Fischer, B. (2008). A qualitative exploration of prescription opioid injection among street-based drug users in Toronto: Behaviours, preferences and drug availability. *Harm Reduct Journal, 5*(1), 30.
- Fischer, B., Brissette, S., Brochu, S., Bruneau, J., el-Guebaly, N., Noel, L., et al. (2004). Determinants of overdose incidents among illicit opioid users in 5 Canadian cities. *Canadian Medical Association Journal, 171*(3), 235-239.
- Fischer, B., Patra, J., Cruz, M. F., Gittins, J., & Rehm, J. (2008). Comparing heroin users and prescription opioid users in a Canadian multi-site population of illicit opioid users. *Drug and Alcohol Review, 27*(6), 625-632.
- Fischer, B., Rehm, J., Brissette, S., Brochu, S., Bruneau, J., El-Guebaly, N., et al. (2005). Illicit opioid use in Canada: Comparing social, health, and drug use characteristics of

- untreated users in five cities (OPICAN study). *Journal of Urban Health*, 82(2), 250-266.
- Fitzgerald, J. (2005). Policing as a public health menace in the policy struggles over public injecting. *International Journal of Drug Policy*, 16(4), 203-206.
- Forester, M., Bruneau, J., & Zunzunegui, M. V. (2002). *The role of prison in HIV risk behaviors among injecting drug users*. Paper presented at the 11th Annual Canadian Conference on HIV/AIDS Research, Winnipeg, Manitoba.
- Freire, P. (2000). *Pedagogy of the oppressed* (30th anniversary ed.). New York: Continuum.
- Friedman, S., Des Jarlais, D., Sotheran, J. L., Garber, J., Cohen, H., & Smith, D. (1987). AIDS and self-organization among intravenous drug users. *Substance Use and Misuse*, 22(3), 201-219.
- Friedman, S. R., Cooper, H. L., Tempalski, B., Keem, M., Friedman, R., Flom, P. L., et al. (2006). Relationships of deterrence and law enforcement to drug-related harms among drug injectors in US metropolitan areas. *AIDS*, 20(1), 93-99.
- Friedman, S. R., de Jong, W., Rossi, D., Touze, G., Rockwell, R., Des Jarlais, D. C., et al. (2007). Harm reduction theory: Users' culture, micro-social indigenous harm reduction, and the self-organization and outside-organizing of users' groups. *International Journal of Drug Policy*, 18(2), 107-117.
- Friedman, S. R., de Jong, W., & Wodak, A. (1993). Community development as a response to HIV among drug injectors. *AIDS*, 7(Suppl 1), S263-269.
- Friedman, S. R., Jose, B., Deren, S., Des Jarlais, D. C., & Neaigus, A. (1995). Risk factors for human immunodeficiency virus seroconversion among out-of-treatment drug

- injectors in high and low seroprevalence cities. *American Journal of Epidemiology*, 142(8), 864-874.
- Friedman, S. R., Kottiri, B. J., Neaigus, A., Curtis, R., Vermund, S. H., & Des Jarlais, D. C. (2000). Network-related mechanisms may help explain long-term HIV-1 seroprevalence levels that remain high but do not approach population-group saturation. *American Journal of Epidemiology*, 152(10), 913-922.
- Friedman, S. R., Maslow, C., Bolyard, M., Sandoval, M., Mateu-Gelabert, P., & Neaigus, A. (2004). Urging others to be healthy: "Intravention" by injection drug users as a community prevention goal. *AIDS Education and Prevention*, 16(3), 250-263.
- Friedman, S. R., Mateu-Gelabert, P., Curtis, R., Maslow, C., Bolyard, M., Sandoval, M., et al. (2007). Social capital or networks, negotiations, and norms? A neighborhood case study. *American Journal of Preventative Medicine*, 32(Suppl 1), S160-170.
- Friedman, S. R., Neaigus, A., Jose, B., Curtis, R., Goldstein, M., Ildefonso, G., et al. (1997). Sociometric risk networks and risk for HIV infection. *American Journal of Public Health*, 87(8), 1289-1296.
- Friedman, S. R., Perlis, T., & Des Jarlais, D. C. (2001). Laws prohibiting over-the-counter syringe sales to injection drug users: Relations to population density, HIV prevalence, and HIV incidence. *American Journal of Public Health*, 91(5), 791-793.
- Fuller, C. M., Borrell, L. N., Latkin, C. A., Galea, S., Ompad, D. C., Strathdee, S. A., et al. (2005). Effects of race, neighborhood, and social network on age at initiation of injection drug use. *American Journal of Public Health*, 95(4), 689-695.
- Fuller, C. M., Vlahov, D., Latkin, C. A., Ompad, D. C., Celentano, D. D., & Strathdee, S. A. (2003). Social circumstances of initiation of injection drug use and early shooting

- gallery attendance: Implications for HIV intervention among adolescent and young adult injection drug users. *Journal of Acquired Immune Deficiency Syndromes*, 32(1), 86-93.
- Furst, R. T., Johnson, B. D., Dunlap, E., & Curtis, R. (1999). The stigmatized image of the "crack head": A sociocultural exploration of a barrier to cocaine smoking among a cohort of youth in New York City. *Deviant Behavior*, 20(2), 153-181.
- Galea, S., & Vlahov, D. (2002). Social determinants and the health of drug users: Socioeconomic status, homelessness, and incarceration. *Public Health Reports*, 117(Suppl 1), S135-145.
- Garfein, R. S., Golub, E. T., Greenberg, A. E., Hagan, H., Hanson, D. L., Hudson, S. M., et al. (2007). A peer-education intervention to reduce injection risk behaviors for HIV and hepatitis C virus infection in young injection drug users. *AIDS*, 21(14), 1923-1932.
- Garfein, R. S., Vlahov, D., Galai, N., Doherty, M. C., & Nelson, K. E. (1996). Viral infections in short-term injection drug users: The prevalence of the hepatitis C, hepatitis B, human immunodeficiency, and human T-lymphotropic viruses. *American Journal of Public Health*, 86(5), 655-661.
- Genereux, M., Bruneau, J., & Daniel, M. (2010). Association between neighbourhood socioeconomic characteristics and high-risk injection behaviour amongst injection drug users living in inner and other city areas in Montreal, Canada. *International Journal of Drug Policy*, 21(1), 49-55.

- Gibson, D. R., Choi, K. H., Catania, J. A., Sorensen, J. L., & Kegeles, S. (1993). Psychosocial predictors of needle sharing among intravenous drug users. *Substance Use and Misuse, 28*(10), 973-981.
- Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. London: Wiedenfeld and Nicholson.
- Gleghorn, A. A., Jones, T. S., Doherty, M. C., Celentano, D. D., & Vlahov, D. (1995). Acquisition and use of needles and syringes by injecting drug users in Baltimore, Maryland. *Journal of Acquired Immune Deficiency Syndromes, 10*(1), 97-103.
- Gogineni, A., Stein, M. D., & Friedmann, P. D. (2001). Social relationships and intravenous drug use among methadone maintenance patients. *Drug and Alcohol Dependence, 64*(1), 47-53.
- Gold, F. (2009). Street Nursing. *American Journal of Nursing, 109*(7), 28-32.
- Gordon, R. J., & Lowy, F. D. (2005). Bacterial infections in drug users. *New England Journal of Medicine, 353*(18), 1945-1954.
- Green, T., Hankins, C., Palmer, D., Boivin, J. F., & Platt, R. (2003). Ascertaining the need for a supervised injecting facility (SIF): The burden of public injecting in Montreal, Canada. *Journal of Drug Issues, 33*(3), 713-731.
- Greenfield, L., Bigelow, G. E., & Brooner, R. K. (1992). HIV risk behavior in drug users: Increased blood "booting" during cocaine injection. *AIDS Education and Prevention, 4*(2), 95-107.
- Grund, J. P. (2005). *The Eye of the Needle: an Ethno-Epidemiological Analysis of Injecting Drug Use*. Malden, MA: Blackwell Publishing Inc.

- Grund, J. P., Blanken, P., Adriaans, N. F., Kaplan, C. D., Barendregt, C., & Meeuwssen, M. (1992). Reaching the unreached: Targeting hidden IDU populations with clean needles via known user groups. *Journal of Psychoactive Drugs*, 24(1), 41-47.
- Grund, J. P., Heckathorn, D. D., Broadhead, R. S., & Anthony, D. L. (1995). In eastern Connecticut, IDUs purchase syringes from pharmacies but don't carry syringes. *Journal of Acquired Immune Deficiency Syndromes*, 10(1), 104-105.
- Gu, J., Lau, J. T., Chen, H., Chen, X., Liu, C., & Liu, J. (2010). Mental health and interpersonal factors associated with HIV-related risk behaviors among non-institutionalized female injection drug users who are also sex workers in China. *Women and Health*, 50(1), 20-36.
- Guadagnino, V., Zimatore, G., Izzi, A., Caroleo, B., Rocca, A., Montesano, F., et al. (1995). Relevance of intravenous cocaine use in relation to prevalence of HIV, hepatitis B and C virus markers among intravenous drug abusers in southern Italy. *Journal of Clinical and Laboratory Immunology*, 47(1), 1-9.
- Hagan, H. (2003). The relevance of attributable risk measures to HIV prevention planning. *AIDS*, 17(6), 911-913.
- Hammett, T. M., Harmon, M. P., & Rhodes, W. (2002). The burden of infectious disease among inmates of and releasees from US correctional facilities, 1997. *American Journal of Public Health*, 92(11), 1789-1794.
- Hankins, C., Alary, M., Parent, R., Blanchette, C., & Claessens, C. (2002). Continuing HIV transmission among injection drug users in Eastern Central Canada: The SurvUDI Study, 1995 to 2000. *Journal of Acquired Immune Deficiency Syndromes*, 30(5), 514-521.

- Hankins, C. A. (1998). Syringe exchange in Canada: Good but not enough to stem the HIV tide. *Substance Use and Misuse*, 33(5), 1129-1146.
- Hardill, K. (2007). From the grey nuns to the streets: A critical history of outreach nursing in Canada. *Public Health Nursing*, 24(1), 91-97.
- Harper, G. W., & Salina, D. D. (2000). Building collaborative partnerships to improve community-based HIV prevention research. *Journal of Prevention and Intervention in the Community*, 19(1), 1-20.
- Harris, G. E. (2006). Practicing HIV/AIDS community-based research. *AIDS Care*, 18(7), 731-738.
- Harrison, D. W., & Walls, R. M. (1990). "Cotton fever": A benign febrile syndrome in intravenous drug abusers. *Journal of Emergency Medicine*, 8(2), 135-139.
- Hartel, D. M., & Schoenbaum, E. E. (1998). Methadone treatment protects against HIV infection: Two decades of experience in the Bronx, New York City. *Public Health Reports*, 113(Suppl 1), 107-115.
- Harvard, S. S., Hill, W. D., & Buxton, J. A. (2008). Harm reduction product distribution in British Columbia. *Canadian Journal of Public Health*, 99(6), 446-450.
- Hawkins, W. E., Latkin, C., Mandel, W., & Oziemkowska, M. (1999). Do actions speak louder than words? Perceived peer influences on needle sharing and cleaning in a sample of injection drug users. *AIDS Education and Prevention*, 11(2), 122-131.
- Hay, R. J. (1986). Systemic candidiasis in heroin addicts. *British Medical Journal*, 292(6528), 1096.

- Hayashi, K., Wood, E., Wiebe, L., Qi, J., & Kerr, T. (2010). An external evaluation of a peer-run outreach-based syringe exchange in Vancouver, Canada. *International Journal of Drug Policy, 21*(5), 418-421.
- Hedrich, D. (2004). *European report on drug consumption rooms*. European Monitoring Centre for Drugs and Drug Addiction. Retrieved from <http://www.centromedicinapreventiva.org/comunicazioni/news/ven2203045.pdf>
- Heimer, R., Bluthenthal, R. N., Singer, M., & Khoshnood, K. (1996). Structural impediments to operational syringe-exchange programs. *AIDS and Public Policy Journal, 11*(4), 169-184.
- Heimer, R., Clair, S., Grau, L. E., Bluthenthal, R. N., Marshall, P. A., & Singer, M. (2002). Hepatitis-associated knowledge is low and risks are high among HIV-aware injection drug users in three US cities. *Addiction, 97*(10), 1277-1287.
- Hembree, C., Galea, S., Ahern, J., Tracy, M., Markham Piper, T., Miller, J., et al. (2005). The urban built environment and overdose mortality in New York City neighborhoods. *Health and Place, 11*(2), 147-156.
- Hercus, M., Lubman, D. I., & Hellard, M. (2005). Blood-borne viral and sexually transmissible infections among psychiatric populations: What are we doing about them? *Australian and New Zealand Journal of Psychiatry, 39*(10), 849-855.
- Hershberger, S. L., Wood, M. M., & Fisher, D. G. (2003). A cognitive-behavioral intervention to reduce HIV risk behaviors in crack and injection drug users. *AIDS and Behavior, 7*(3), 229-243.

- Hickman, M., Hope, V., Brady, T., Madden, P., Jones, S., Honor, S., et al. (2007). Hepatitis C virus (HCV) prevalence, and injecting risk behaviour in multiple sites in England in 2004. *Journal of Viral Hepatitis*, *14*(9), 645-652.
- Hilton, A. B., Thompson, R., & Moore-Dempsey, L. (2009). Evaluation of the AIDS prevention street nurse program: One step at a time. *The Canadian Journal of Nursing Research*, *41*(1), 238-258.
- Hilton, B. A., Thompson, R., Moore-Dempsey, L., & Hutchinson, K. (2001). Urban outpost nursing: The nature of the nurses' work in the AIDS prevention street nurse program. *Public Health Nursing*, *18*(4), 273-280.
- Ho, H. T., & Maher, L. (2008). Co vay co tra (What goes around comes around): Culture, risk and vulnerability to blood-borne viruses among ethnic Vietnamese injecting drug users. *Drug and Alcohol Review*, *27*(4), 420-428.
- Hoda, Z., Kerr, T., Li, K., Montaner, J. S. G., & Wood, E. (2008). Prevalence and correlates of jugular injections among injection drug users. *Drug and Alcohol Review*, *27*(4), 442-446.
- Hoffmann, J. P., Su, S. S., & Pach, A. (1997). Changes in network characteristics and HIV risk behavior among injection drug users. *Drug and Alcohol Dependence*, *46*(1-2), 41-51.
- Horyniak, D., Higgs, P., Lewis, J., Winter, R., Dietze, P., & Aitken, C. (2010). An evaluation of a heroin overdose prevention and education campaign. *Drug and Alcohol Review*, *29*(1), 5-11.

- Huang, H., Cohen, S. H., King, J. H., Monchaud, C., Nguyen, H., & Flynn, N. M. (2008). Injecting drug use and community-associated methicillin-resistant *Staphylococcus aureus* infection. *Diagnostic Microbiology and Infectious Disease*, *60*(4), 347-350.
- Hudgins, R., Mccusker, J., & Stoddard, A. (1995). Cocaine use and risky injection and sexual behaviors. *Drug and Alcohol Dependence*, *37*(1), 7-14.
- Hughes, C. E., & Stevens, A. (2010). What can we learn from the portuguese decriminalization of illicit drugs? *British Journal of Criminology*, *50*(6), 999-1022.
- Hulse, G. K., English, D. R., Milne, E., & Holman, C. D. J. (1999). The quantification of mortality resulting from the regular use of illicit opiates. *Addiction*, *94*(2), 221-229.
- Hunter, G. M., Donoghoe, M. C., Stimson, G. V., Rhodes, T., & Chalmers, C. P. (1995). Changes in the injecting risk behaviour of injecting drug users in London, 1990-1993. *AIDS*, *9*(5), 493-501.
- Hurley, S. F., Jolley, D. J., & Kaldor, J. M. (1997). Effectiveness of needle-exchange programmes for prevention of HIV infection. *The Lancet*, *349*(9068), 1797-1800.
- Jackson, L., Parker, J., Dykeman, M., Gahagan, J., & Karabanow, J. (2010). The power of relationships: Implications for safer and unsafe practices among injection drug users. *Drugs: Education, Prevention, and Policy*, *17*(3), 189-204.
- Jamner, M. S., Corby, N. H., & Wolitski, R. J. (1996). Bleaching injection equipment: Influencing factors among IDUs who share. *Substance Use and Misuse*, *31*(14), 1973-1993.
- Jia, Y., Lu, F., Zeng, G., Sun, X., Xiao, Y., Lu, L., et al. (2008). Predictors of HIV infection and prevalence for syphilis infection among injection drug users in China:

- Community-based surveys along major drug trafficking routes. *Harm Reduction Journal*, 5, 29.
- Joe, G. W., & Simpson, D. D. (1995). HIV risks, gender, and cocaine use among opiate users. *Drug and Alcohol Dependence*, 37(1), 23-28.
- Johnson, R. E., Chutuape, M. A., Strain, E. C., Walsh, S. L., Stitzer, M. L., & Bigelow, G. E. (2000). A comparison of levomethadyl acetate, buprenorphine, and methadone for opioid dependence. *New England Journal of Medicine*, 343(18), 1290-1297.
- Johnston, C., & Keogan, M. T. (2004). Imaging features of soft-tissue infections and other complications in drug users after direct subcutaneous injection ("skin popping"). *American Journal of Roentgenology*, 182(5), 1195-1202.
- Jose, B., Friedman, S. R., Neaigus, A., Curtis, R., Grund, J. P., Goldstein, M. F., et al. (1993). Syringe-mediated drug-sharing (backloading): A new risk factor for HIV among injecting drug users. *AIDS*, 7(12), 1653-1660.
- Judd, A., Hickman, M., Jones, S., McDonald, T., Parry, J. V., Stimson, G. V., et al. (2005). Incidence of hepatitis C virus and HIV among new injecting drug users in London: Prospective cohort study. *British Medical Journal*, 330(7481), 24-25.
- Kang, S. Y., Deren, S., Andia, J., Colon, H. M., & Robles, R. (2004). Effects of changes in perceived self-efficacy on HIV risk behaviors over time. *Addictive Behaviors*, 29(3), 567-574.
- Karpati, A., Galea, S., Awerbuch, T., & Levins, R. (2002). Variability and vulnerability at the ecological level: Implications for understanding the social determinants of health. *American Journal of Public Health*, 92(11), 1768-1772.

- Kerr, T., Fairbairn, N., Tyndall, M., Marsh, D., Li, K., Montaner, J., et al. (2007). Predictors of non-fatal overdose among a cohort of polysubstance-using injection drug users. *Drug and Alcohol Dependence*, 87(1), 39-45.
- Kerr, T., Hayashi, K., Fairbairn, N., Kaplan, K., Suwannawong, P., Zhang, R., et al. (2010). Expanding the reach of harm reduction in Thailand: Experiences with a drug user-run drop-in centre. *International Journal of Drug Policy*, 21(3), 255-258.
- Kerr, T., Kiatying-Angsulee, N., Fairbairn, N., Hayashi, K., Suwannawong, P., Kaplan, K., et al. (2010). High rates of midazolam injection among drug users in Bangkok, Thailand. *Harm Reduction Journal*, 7, 7.
- Kerr, T., Kimber, J., Debeck, K., & Wood, E. (2007). The role of safer injection facilities in the response to HIV/AIDS among injection drug users. *Current HIV/AIDS Reports*, 4(4), 158-164.
- Kerr, T., Kimber, J., & Rhodes, T. (2007). Drug use settings: An emerging focus for research and intervention. *International Journal of Drug Policy*, 18(1), 1-4.
- Kerr, T., Oleson, M., Tyndall, M. W., Montaner, J., & Wood, E. (2005). A description of a peer-run supervised injection site for injection drug users. *Journal of Urban Health*, 82(2), 267-275.
- Kerr, T., Small, W., Buchner, C., Zhang, R., Li, K., Montaner, J., et al. (2010). Syringe sharing and HIV incidence among injection drug users and increased access to sterile syringes. *American Journal of Public Health*, 100(8), 1449-1453.
- Kerr, T., Small, W., Peeace, W., Douglas, D., Pierre, A., & Wood, E. (2006). Harm reduction by a "user-run" organization: A case study of the Vancouver Area Network of Drug Users (VANDU). *International Journal of Drug Policy*, 17(2), 61-69.

- Kerr, T., Small, W., & Wood, E. (2005). The public health and social impacts of drug market enforcement: A review of the evidence. *International Journal of Drug Policy*, 16(4), 210-220.
- Kerr, T., Stoltz, J. A., Marshall, B. D., Lai, C., Strathdee, S. A., & Wood, E. (2009). Childhood trauma and injection drug use among high-risk youth. *Journal of Adolescent Health*, 45(3), 300-302.
- Kerr, T., Tyndall, M., Li, K., Montaner, J.S., & Wood, E. (2005). Safer injection facility use and syringe sharing in injection drug users. *The Lancet*, 366(9482), 316-318.
- Kerr, T., Wood, E., Grafstein, E., Ishada, T., Shannon, K., Lai, C., et al. (2004). High rates of primary care and emergency department use among injection drug users in Vancouver. *Journal of Public Health*, 27(1), 62-66.
- Kerr, T., Wood, E., Small, D., Palepu, A., & Tyndall, M. W. (2003). Potential use of safer injecting facilities among injection drug users in Vancouver's Downtown Eastside. *Canadian Medical Association Journal*, 169(8), 759-763.
- Kidder, D. P., Wolitski, R. J., Royal, S., Aidala, A., Courtenay-Quirk, C., Holtgrave, D. R., et al. (2007). Access to housing as a structural intervention for homeless and unstably housed people living with HIV: Rationale, methods, and implementation of the housing and health study. *AIDS and Behavior*, 11(6 Suppl), 149-161.
- Kim, C., Kerr, T., Li, K., Zhang, R., Tyndall, M. W., Montaner, J. S., et al. (2009). Unstable housing and hepatitis C incidence among injection drug users in a Canadian setting. *BMC Public Health*, 9, 270.

- Kimber, J., Dolan, K., & Wodak, A. (2005). Survey of drug consumption rooms: Service delivery and perceived public health and amenity impact. *Drug and Alcohol Review*, 24(1), 21-24.
- Kimber, J., Hickman, M., Degenhardt, L., van Beek, I., & Coulson, T. (2005). *Estimating the size of the local IDU population using client visits to the Sydney Medically Supervised Injecting Centre*. Paper presented at the 16th International Conference on the Reduction of Drug Related Harm, Belfast, Germany.
- Kirchenbaum, S. E., & Midenberg, M. L. (1982). Pedal and lower-extremity complications of substance abuse. *Journal of the American Podiatry Association*, 72(8), 380-387.
- Klee, H., Faugier, J., Hayes, C., & Morris, J. (1991). Risk reduction among injecting drug users: Changes in the sharing of injecting equipment and in condom use. *AIDS Care*, 3(1), 63-73.
- Klee, H., & Morris, J. (1995). Factors that characterize street injectors. *Addiction*, 90(6), 837-841.
- Klein, H., & Levy, J. A. (2003). Shooting gallery users and HIV risk. *Journal of Drug Issues*, 33(3), 751-767.
- Koester, S., Booth, R., & Wiebel, W. (1990). Risk of HIV transmission from sharing water, drug mixing containers and cotton filters among intravenous drug users. *International Journal of Drug Policy*, 1(6), 28-30.
- Koester, S., Booth, R. E., & Zhang, Y. (1996). The prevalence of additional injection-related HIV risk behaviors among injection drug users. *Journal of Acquired Immune Deficiency Syndromes*, 12(2), 202-207.

- Koester, S., Glanz, J., & Baron, A. (2005). Drug sharing among heroin networks: Implications for HIV and hepatitis B and C prevention. *AIDS and Behavior*, 9(1), 27-39.
- Koester, S. K. (1994). Copping, running, and paraphernalia laws: Contextual variables and needle risk behavior among injection drug users in Denver. *Human Organization*, 53(3), 287-295.
- Kottiri, B. J., Friedman, S. R., Neaigus, A., Curtis, R., & Des Jarlais, D. C. (2002). Risk networks and racial/ethnic differences in the prevalence of HIV infection among injection drug users. *Journal of Acquired Immune Deficiency Syndromes*, 30(1), 95-104.
- Koulierakis, G., Gnardellis, C., Agrafiotis, D., & Power, K. G. (2000). HIV risk behaviour correlates among injecting drug users in Greek prisons. *Addiction*, 95(8), 1207-1216.
- Kral, A. H., Bluthenthal, R. N., Erringer, E. A., Lorvick, J., & Edlin, B. R. (1999). Risk factors among IDUs who give injections to or receive injections from other drug users. *Addiction*, 94(5), 675-683.
- Kral, A. H., Bluthenthal, R. N., Lorvick, J., Gee, L., Bacchetti, P., & Edlin, B. R. (2001). Sexual transmission of HIV-1 among injection drug users in San Francisco, USA: Risk-factor analysis. *The Lancet*, 357(9266), 1397-1401.
- Kral, A. H., Lorvick, J., Ciccarone, D., Wenger, L., Gee, L., Martinez, A., et al. (2005). HIV prevalence and risk behaviors among men who have sex with men and inject drugs in San Francisco. *Journal of Urban Health*, 82(1 Suppl 1), i43-50.
- Kral, A. H., Lorvick, J., Gee, L., Bacchetti, P., Rawal, B., Busch, M., et al. (2003). Trends in human immunodeficiency virus seroincidence among street-recruited injection drug

- users in San Francisco, 1987-1998. *American Journal of Epidemiology*, 157(10), 915-922.
- Kwiatkowski, C. F., & Booth, R. E. (2001). Methadone maintenance as HIV risk reduction with street-recruited injecting drug users. *Journal of Acquired Immune Deficiency Syndromes*, 26(5), 483-489.
- Latkin, C., Donnell, D., Celentano, D. D., Aramrattna, A., Liu, T. Y., Vongchak, T., et al. (2009). Relationships between social norms, social network characteristics, and HIV risk behaviors in Thailand and the United States. *Health Psychology*, 28(3), 323-329.
- Latkin, C. A., Hua, W., & Davey, M. A. (2004). Factors associated with peer HIV prevention outreach in drug-using communities. *AIDS Education and Prevention*, 16(6), 499-508.
- Latkin, C., Mandell, W., Oziemkowska, M., Celentano, D., Vlahov, D., Ensminger, M., et al. (1995). Using social network analysis to study patterns of drug-use among urban drug-users at high-risk for HIV/AIDS. *Drug and Alcohol Dependence*, 38(1), 1-9.
- Latkin, C., Mandell, W., Vlahov, D., Knowlton, A., Oziemkowska, M., & Celentano, D. (1995). Personal network characteristics as antecedents to needle-sharing and shooting gallery attendance. *Social Networks*, 17(3-4), 219-228.
- Latkin, C., Mandell, W., Vlahov, D., Oziemkowska, M., & Celentano, D. (1996). People and places: Behavioral settings and personal network characteristics as correlates of needle sharing. *Journal of Acquired Immune Deficiency Syndromes*, 13(3), 273-280.
- Latkin, C., Mandell, W., Vlahov, D., Oziemkowska, M., Knowlton, A., & Celentano, D. (1994). My place, your place, and no place: Behavior settings as a risk factor for

- HIV-related injection practices of drug users in Baltimore, Maryland. *Am J Community Psychology*, 22(3), 415-430.
- Latkin, C., Srikrishnan, A. K., Yang, C., Johnson, S., Solomon, S. S., Kumar, S., et al. (2010). The relationship between drug use stigma and HIV injection risk behaviors among injection drug users in Chennai, India. *Drug and Alcohol Dependence*, 110(3), 221-227.
- Latkin, C. A. (1998). Outreach in natural settings: The use of peer leaders for HIV prevention among injecting drug users' networks. *Public Health Reports*, 113(Suppl 1), 151-159.
- Latkin, C. A., Knowlton, A. R., & Sherman, S. (2001). Routes of drug administration, differential affiliation, and lifestyle stability among cocaine and opiate users: Implications to HIV prevention. *Journal of Substance Abuse*, 13(1-2), 89-102.
- Latkin, C. A., Kuramoto, S. J., Davey-Rothwell, M. A., & Tobin, K. E. (2010). Social norms, social networks, and HIV risk behavior among injection drug users. *AIDS and Behavior*, 14(5), 1159-1168.
- Latkin, C. A., Sherman, S., & Knowlton, A. (2003). HIV prevention among drug users: Outcome of a network-oriented peer outreach intervention. *Health Psychology*, 22(4), 332-339.
- Latkin, C. A., Williams, C. T., Wang, J., & Curry, A. D. (2005). Neighborhood social disorder as a determinant of drug injection behaviors: A structural equation modeling approach. *Health Psychology*, 24(1), 96-100.
- Lee, H. S., & Zerai, A. (2010). "Everyone deserves services no matter what": Defining success in harm-reduction-based substance user treatment. *Substance Use and Misuse*, 45(14), 2411-2427.

- Lelutiu-Weinberger, C., Pouget, E. R., Des Jarlais, D. D., Cooper, H. L., Scheinmann, R., Stern, R., et al. (2009). A meta-analysis of the hepatitis C virus distribution in diverse racial/ethnic drug injector groups. *Social Science Medicine*, 68(3), 579-590.
- Lennings, C. J. (2000). Harm minimization or abstinence: An evaluation of current policies and practices in the treatment and control of intravenous drug using groups in Australia. *Disability and Rehabilitation*, 22(1-2), 57-64.
- Lin, D., Reeck, J. B., & Murr, A. H. (2004). Internal jugular vein thrombosis and deep neck infection from intravenous drug use: Management strategy. *Laryngoscope*, 114(1), 56-60.
- Lloyd-Smith, E., Hull, M. W., Tyndall, M. W., Zhang, R., Wood, E., Montaner, J. S., et al. (2010). Community-associated methicillin-resistant *Staphylococcus aureus* is prevalent in wounds of community-based injection drug users. *Epidemiology and Infection*, 138(5), 713-720.
- Lloyd-Smith, E., Kerr, T., Hogg, R. S., Li, K., Montaner, J. S., & Wood, E. (2005). Prevalence and correlates of abscesses among a cohort of injection drug users. *Harm Reduction Journal*, 2(1), 24.
- Lloyd-Smith, E., Wood, E., Zhang, R., Tyndall, M. W., Montaner, J. S., & Kerr, T. (2008). Risk factors for developing a cutaneous injection-related infection among injection drug users: a cohort study. *BMC Public Health*, 8, 405.
- Lloyd-Smith, E., Wood, E., Zhang, R., Tyndall, M. W., Montaner, J. S., & Kerr, T. (2009). Determinants of cutaneous injection-related infection care at a supervised injecting facility. *Annals of Epidemiology*, 19(6), 404-409.

- Lloyd-Smith, E., Wood, E., Zhang, R., Tyndall, M. W., Sheps, S., Montaner, J. S., et al. (2010). Determinants of hospitalization for a cutaneous injection-related infection among individuals who inject drugs: A cohort study. *BMC Public Health, 10*(1), 327.
- Longshore, D., Stein, J. A., & Anglin, M. D. (1997). Psychosocial antecedents of needle/syringe disinfection by drug users: A theory-based prospective analysis. *AIDS Education and Prevention, 9*(5), 442-459.
- Longshore, D., Stein, J. A., & Conner, B. T. (2004). Psychosocial antecedents of injection risk reduction: A multivariate analysis. *AIDS Education and Prevention, 16*(4), 353-366.
- Lovell, A. M. (2002). Risking risk: The influence of types of capital and social networks on the injection practices of drug users. *Social Science and Medicine, 55*(5), 803-821.
- Lowy, F. D., & Miller, M. (2002). New methods to investigate infectious disease transmission and pathogenesis - Staphylococcus aureus disease in drug users. *The Lancet Infectious Diseases, 2*(10), 605-612.
- Lurie, P., & Drucker, E. (1997). An opportunity lost: HIV infections associated with lack of a national needle-exchange programme in the USA. *The Lancet, 349*(9052), 604-608.
- Maas, B., Fairbairn, N., Kerr, T., Li, K., Montaner, J. S., & Wood, E. (2007). Neighborhood and HIV infection among IDU: Place of residence independently predicts HIV infection among a cohort of injection drug users. *Health and Place, 13*(2), 432-439.
- Mackenzie, A. R., Laing, R. B. S., Douglas, J. G., Greaves, M., & Smith, C. C. (2000). High prevalence of iliofemoral venous thrombosis with severe groin infection among injecting drug users in North East Scotland: Successful use of low molecular weight heparin with antibiotics. *Postgraduate Medical Journal, 76*(899), 561-565.

- Madray, H., & Van Hulst, Y. (2000). Reducing HIV/AIDS high-risk behaviour among injection drug users: Peer vs. education. *Journal of Drug Education, 30*(2), 205-211.
- Maher, L., & Dixon, D. (1999). Policing and public health: Law enforcement and harm minimization in a street-level drug market. *British Journal of Criminology, 39*(4), 488-512.
- Mandell, W., Kim, J., Latkin, C., & Suh, T. (1999). Depressive symptoms, drug network, and their synergistic effect on needle-sharing behavior among street injection drug users. *American Journal of Drug and Alcohol Abuse, 25*(1), 117-127.
- March, J. C., Oviedo-Joekes, E., & Romero, M. (2007). Factors associated with reported hepatitis C and HIV among injecting drug users in ten European cities. *Enfermedades Infecciosas y Microbiologia Clinica, 25*(2), 91-97.
- Marmor, M., Des Jarlais, D. C., Cohen, H., Friedman, S. R., Beatrice, S. T., Dubin, N., et al. (1987). Risk factors for infection with human immunodeficiency virus among intravenous drug abusers in New York City. *AIDS, 1*(1), 39-44.
- Marshall, B. D., Wood, E., Li, K., & Kerr, T. (2007). Elevated syringe borrowing among men who have sex with men: A prospective study. *Journal of Acquired Immune Deficiency Syndromes, 46*(2), 248-252.
- Martin, M., Vanichseni, S., Suntharasamai, P., Mock, P. A., van Griensven, F., Pitisuttithum, P., et al. (2010). Drug use and the risk of HIV infection amongst injection drug users participating in an HIV vaccine trial in Bangkok, 1999-2003. *International Journal of Drug Policy, 21*(4), 296-301.
- Maslow, C. B., Friedman, S. R., Perlis, T. E., Rockwell, R., & Des Jarlais, D. C. (2002). Changes in HIV seroprevalence and related behaviors among male injection drug

- users who do and do not have sex with men: New York City, 1990-1999. *American Journal of Public Health*, 92(3), 382-384.
- Mateu-Gelabert, P., Sandoval, M., Meylaks, P., Wendel, T., & Friedman, S. R. (2010). Strategies to avoid opiate withdrawal: Implications for HCV and HIV risks. *International Journal of Drug Policy*, 21(3), 179-185.
- Mathers, B. M., Degenhardt, L., Adam, P., Toskin, I., Nashkoev, M., Lyerla, R., et al. (2009). Estimating the level of HIV prevention coverage, knowledge and protective behavior among injecting drug users: What does the 2008 UNGASS reporting round tell us? *Journal of Acquired Immune Deficiency Syndromes*, 52(Suppl 2), S132-142.
- Mathers, B. M., Degenhardt, L., Ali, H., Wiessing, L., Hickman, M., Mattick, R. P., et al. (2010). HIV prevention, treatment, and care services for people who inject drugs: A systematic review of global, regional, and national coverage. *The Lancet*, 375(9719), 1014-1028.
- Mathers, B. M., Degenhardt, L., Phillips, B., Wiessing, L., Hickman, M., Strathdee, S. A., et al. (2008). Global epidemiology of injecting drug use and HIV among people who inject drugs: A systematic review. *The Lancet*, 372(9651), 1733-1745.
- McCurdy, S. A., Ross, M. W., Williams, M. L., Kilonzo, G. P., & Leshabari, M. T. (2010). Flashblood: Blood sharing among female injecting drug users in Tanzania. *Addiction*, 105(6), 1062-1070.
- McCurdy, S. A., Williams, M. L., Kilonzo, G. P., Ross, M. W., & Leshabari, M. T. (2005). Heroin and HIV risk in Dar es Salaam, Tanzania: Youth hangouts, mageto and injecting practices. *AIDS Care*, 17(Suppl 1), 65-76.

- McCusker, J., Stoddard, A. M., Zapka, J. G., & Lewis, B. F. (1993). Behavioral outcomes of AIDS educational interventions for drug users in short-term treatment. *American Journal of Public Health, 83*(10), 1463-1466.
- McInnes, C. W., Druyts, E., Harvard, S. S., Gilbert, M., Tyndall, M. W., Lima, V. D., et al. (2009). HIV/AIDS in Vancouver, British Columbia: A growing epidemic. *Harm Reduction Journal, 6*, 5.
- McKnight, I., Maas, B., Wood, E., Tyndall, M. W., Small, W., Lai, C., et al. (2007). Factors associated with public injecting among users of Vancouver's supervised injection facility. *American Journal of Drug and Alcohol Abuse, 33*(2), 319-325.
- Mcquiston, C., Sung, C., & Clawson, M. (2001). Protegiendo nuestra comunidad: Empowerment participatory education for HIV prevention. *Journal of Transcultural Nursing, 12*(4), 275-283.
- Meader, N., Li, R., Des Jarlais, D. C., & Pilling, S. (2010). Psychosocial interventions for reducing injection and sexual risk behaviour for preventing HIV in drug users. *Cochrane Database of Systematic Reviews, 1*, CD007192.
- Meador, K. H., Sharon, Z., & Lewis, E. J. (1979). Renal amyloidosis and subcutaneous drug abuse. *Annals of Internal Medicine, 91*(4), 565-567.
- Meandzija, B., O'Connor, P. G., Fitzgerald, B., Rounsaville, B. J., & Kosten, T. R. (1994). HIV infection and cocaine use in methadone maintained and untreated intravenous drug users. *Drug and Alcohol Dependence, 36*(2), 109-113.
- Mesquita, F., Kral, A., Reingold, A., Bueno, R., Trigueiros, D., & Araujo, P. J. (2001). Trends of HIV infection among injection drug users in Brazil in the 1990s: The

- impact of changes in patterns of drug use. *Journal of Acquired Immune Deficiency Syndromes*, 28(3), 298-302.
- Metraux, S., Metzger, D. S., & Culhane, D. P. (2004). Homelessness and HIV risk behaviors among injection drug users. *Journal of Urban Health*, 81(4), 618-629.
- Metsch, L. R., McCoy, C. B., Shultz, J. M., Page, J. B., Philippe, E., & McKay, C. (1999). Gender comparisons of injection drug use practices in shooting galleries. *Population Research and Policy Review*, 18(1-2), 101-117.
- Metsch, L. R., Pereyra, M., Purcell, D. W., Latkin, C. A., Malow, R., Gomez, C. A., et al. (2007). Correlates of lending needles/syringes among HIV-seropositive injection drug users. *Journal of Acquired Immune Deficiency Syndromes*, 46, S72-79.
- Metzger, D. S., Navaline, H., & Woody, G. E. (1998). Drug abuse treatment as AIDS prevention. *Public Health Reports*, 113(Suppl 1), 97-106.
- Miller, C., Firestone, M., Ramos, R., Burris, S., Ramos, M., Case, P., et al. (2008). Injecting drug users' experiences of policing practices in two Mexican-U.S. border cities: Public health perspectives. *International Journal of Drug Policy*, 19(4), 324-331.
- Miller, C. L., Kerr, T., Frankish, J. C., Spittal, P. M., Li, K., Schechter, M. T., et al. (2006). Binge drug use independently predicts HIV seroconversion among injection drug users: Implications for public health strategies. *Substance Use and Misuse*, 41(2), 199-210.
- Miller, C. L., Spittal, P. M., LaLiberte, N., Li, K., Tyndall, M. W., O'Shaughnessy, M. V., et al. (2002). Females experiencing sexual and drug vulnerabilities are at elevated risk for HIV infection among youth who use injection drugs. *Journal of Acquired Immune Deficiency Syndromes*, 30(3), 335-341.

- Miller, C. L., Tyndall, M., Spittal, P., Li, K., LaLiberte, N., & Schechter, M. T. (2002). HIV incidence and associated risk factors among young injection drug users. *AIDS*, *16*(3), 491-493.
- Miller, M., & Neaigus, A. (2001). Networks, resources and risk among women who use drugs. *Social Science and Medicine*, *52*(6), 967-978.
- Milloy, M. J., Kerr, T., Tyndall, M., Montaner, J., & Wood, E. (2008). Estimated drug overdose deaths averted by North America's first medically-supervised safer injection facility. *PLoS One*, *3*(10), e3351.
- Milloy, M. J., Wood, E., Lloyd-Smith, E., Grafstein, E., Tyndall, M., Montaner, J., et al. (2010). Recent incarceration linked to cutaneous injection-related infections among active injection drug users in a Canadian setting. *Journal of Community Health*, *35*(6), 660-666.
- Mittleman, R. E., & Wetli, C. V. (1984). Death caused by recreational cocaine use. An update. *Journal of the American Medical Association*, *252*(14), 1889-1893.
- Moore, D., & Dietze, P. (2005). Enabling environments and the reduction of drug-related harm: Re-framing Australian policy and practice. *Drug and Alcohol Review*, *24*(3), 275-284.
- Morrison, A., Elliott, L., & Gruer, L. (1997). Injecting-related harm and treatment seeking behaviour among injecting drug users. *Addiction* *92*(10), 1349-1352.
- Myers, E. M., Kirkland, L. S., & Mickey, R. (1988). The head and neck sequelae of cervical intravenous drug abuse. *Laryngoscope*, *98*(2), 213-218.

- Nandi, A., Glass, T. A., Cole, S. R., Chu, H., Galea, S., Celentano, D. D., et al. (2010). Neighborhood poverty and injection cessation in a sample of injection drug users. *American Journal of Epidemiology*, *171*(4), 391-398.
- Navarro, C., & Leonard, L. (2004). Prevalence and factors related to public injecting in Ottawa, Canada: Implications for the development of a trial safer injecting facility. *International Journal of Drug Policy*, *15*(4), 275-284.
- Neaigus, A., Friedman, S. R., Curtis, R., Des Jarlais, D. C., Furst, R. T., Jose, B., et al. (1994). The relevance of drug injectors' social and risk networks for understanding and preventing HIV infection. *Social Science and Medicine*, *38*(1), 67-78.
- Neaigus, A., Sufian, M., Friedman, S. R., Goldsmith, D. S., Stepherson, B., Mota, P., et al. (1990). Effects of outreach intervention on risk reduction among intravenous drug users. *AIDS Education and Prevention*, *2*(4), 253-271.
- Neaigus, A., Zhao, M., Gyarmathy, V. A., Cisek, L., Friedman, S. R., & Baxter, R. C. (2008). Greater drug injecting risk for HIV, HBV, and HCV infection in a city where syringe exchange and pharmacy syringe distribution are illegal. *Journal of Urban Health*, *85*(3), 309-322.
- Needle, R. H., Burrows, D., Friedman, S. R., Dorabjee, J., Touze, G., Badrieva, L., et al. (2005). Effectiveness of community-based outreach in preventing HIV/AIDS among injecting drug users. *International Journal of Drug Policy*, *16*(Suppl 1), S45-57.
- Needle, R. H., Coyle, S., Cesari, H., Trotter, R., Clatts, M., Koester, S., et al. (1998). HIV risk behaviors associated with the injection process: multiperson use of drug injection equipment and paraphernalia in injection drug user networks. *Substance Use and Misuse*, *33*(12), 2403-2423.

- Nelson, K. E., Galai, N., Safaeian, M., Strathdee, S. A., Celentano, D. D., & Vlahov, D. (2002). Temporal trends in the incidence of human immunodeficiency virus infection and risk behavior among injection drug users in Baltimore, Maryland, 1988-1998. *American Journal of Epidemiology*, 156(7), 641-653.
- Nemoto, T. (1994). Patterns of cocaine use and HIV infection among injection drug users in a methadone clinic. *Journal of Substance Abuse*, 6(2), 169-178.
- Newtonjohn, H. F., Wise, K., & Looke, D. F. M. (1984). Role of the lemon in disseminated candidiasis of heroin abusers. *Medical Journal of Australia*, 140(13), 780-781.
- O'Connell, J. M., Kerr, T., Li, K., Tyndall, M. W., Hogg, R. S., Montaner, J. S., et al. (2005). Requiring help injecting independently predicts incident HIV infection among injection drug users. *Journal of Acquired Immune Deficiency Syndromes*, 40(1), 83-88.
- O'Shaughnessy, M., Hogg, R., Strathdee, S., & Montaner, J. (2009). *Deadly public policy: the inadvertent facilitation of an HIV outbreak among IDUs in Vancouver, Canada*. Paper presented at the 5th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention, Cape Town, South Africa.
- Osher, F. C., Goldberg, R. W., McNary, S. W., Swartz, M. S., Essock, S. M., Butterfield, M. I., et al. (2003). Substance abuse and the transmission of hepatitis C among persons with severe mental illness. *Psychiatric Services*, 54(6), 842-847.
- Ouellet, L., Jimenez, A. D., Johnson, W. A., & Wiebel, W. W. (1991). Shooting galleries and HIV disease: Variations in places for injecting drugs. *Crime and Delinquency*, 37(1), 64-85.

Ouellet, L. J., Thorpe, L. E., Huo, D., Bailey, S. L., Jimenez, A. D., Johnson, W. A., et al.

(2000). Prevalence and incidence of HIV among out-of-treatment injecting drug users, Chicago 1994-1996. *Journal of Acquired Immune Deficiency Syndromes*, 25(5), 443-450.

Page, J. B. (1990). Shooting scenarios and risk of HIV-1 infection. *American Behavioral Scientist*, 33(4), 478-490.

Palepu, A., Tyndall, M. W., Leon, H., Muller, J., O'Shaughnessy, M. V., Schechter, M. T., et al. (2001). Hospital utilization and costs in a cohort of injection drug users. *Canadian Medical Association Journal*, 165(4), 415-420.

Patrick, D. M., Strathdee, S. A., Archibald, C. P., Ofner, M., Craib, K. J., Cornelisse, P. G., et al. (1997). Determinants of HIV seroconversion in injection drug users during a period of rising prevalence in Vancouver. *International Journal of STD and AIDS*, 8(7), 437-445.

Patrick, D. M., Tyndall, M. W., Cornelisse, P. G., Li, K., Sherlock, C. H., Rekart, M. L., et al. (2001). Incidence of hepatitis C virus infection among injection drug users during an outbreak of HIV infection. *Canadian Medical Association Journal*, 165(7), 889-895.

Patterson, T. L., Semple, S. J., Zians, J. K., & Strathdee, S. A. (2005). Methamphetamine-using HIV-positive men who have sex with men: correlates of polydrug use. *Journal of Urban Health*, 82(1 Suppl 1), i120-126.

Pearce, M. E., Christian, W. M., Patterson, K., Norris, K., Moniruzzaman, A., Craib, K. J. P., et al. (2008). The Cedar Project: historical trauma, sexual abuse and HIV risk among

- young Aboriginal people who use injection and non-injection drugs in two Canadian cities. *Social Science and Medicine*, 66(11), 2185-2194.
- Pearshouse, R., & Elliott, R. (2007). *A Helping Hand: Legal Issues Related to Assisted Injection at Supervised Injection Facilities*. Toronto: Canadian HIV/AIDS Legal Network.
- Petrar, S., Kerr, T., Tyndall, M. W., Zhang, R., Montaner, J. S., & Wood, E. (2007). Injection drug users' perceptions regarding use of a medically supervised safer injecting facility. *Addictive Behaviors*, 32(5), 1088-1093.
- Philbin, M., Pollini, R. A., Ramos, R., Lozada, R., Brouwer, K. C., Ramos, M. E., et al. (2008). Shooting gallery attendance among IDUs in Tijuana and Ciudad Juarez, Mexico: correlates, prevention opportunities, and the role of the environment. *AIDS and Behavior*, 12(4), 552-560.
- Pieper, B., Kirsner, R. S., Templin, T. N., & Birk, T. J. (2007). Injection drug use: An understudied cause of venous disease. *Archives of Dermatology*, 143(10), 1305-1309.
- Pieper, B., & Templin, T. (2001). Chronic venous insufficiency in persons with a history of injection drug use. *Research in Nursing and Health*, 24(5), 423-432.
- Plotzker, R. E., Metzger, D. S., & Holmes, W. C. (2007). Childhood sexual and physical abuse histories, PTSD, depression, and HIV risk outcomes in women injection drug users: A potential mediating pathway. *American Journal on Addictions*, 16(6), 431-438.
- Pollini, R. A., Alvelais, J., Gallardo, M., Vera, A., Lozada, R., Magis-Rodriguez, C., et al. (2009). The harm inside: Injection during incarceration among male injection drug users in Tijuana, Mexico. *Drug and Alcohol Dependence*, 103(1-2), 52-58.

- Ponton, R., & Scott, J. (2004). Injection preparation processes used by heroin and crack cocaine injectors. *Journal of Substance Abuse, 9*(1), 13.
- Prithwish, D., Cox, J., Boivin, J. F., Platt, R. W., & Jolly, A. M. (2007). The importance of social networks in their association to drug equipment sharing among injection drug users: A review. *Addiction, 102*(11), 1730-1739.
- Purcell, D. W., Garfein, R. S., Latka, M. H., Thiede, H., Hudson, S., Bonner, S., et al. (2007). Development, description, and acceptability of a small-group, behavioral intervention to prevent HIV and hepatitis C virus infections among young adult injection drug users. *Drug and Alcohol Dependence, 91*(Suppl 1), S73-80.
- Rachlis, B., Lloyd-Smith, E., Small, W., Tobin, D., Stone, D., Li, K., et al. (2010). Harmful microinjecting practices among a cohort of injection drug users in Vancouver Canada. *Substance Use and Misuse, 45*(9), 1351-1366.
- Rachlis, B. S., Wood, E., Li, K., Hogg, R. S., & Kerr, T. (2010). Drug and HIV-related risk behaviors after geographic migration among a cohort of injection drug users. *AIDS and Behavior, 14*(4), 854-861.
- Racz, J., Gyarmathy, V. A., Neaigus, A., & Ujhelyi, E. (2007). Injecting equipment sharing and perception of HIV and hepatitis risk among injecting drug users in Budapest. *AIDS Care, 19*(1), 59-66.
- Radcliffe, P., & Stevens, A. (2008). Are drug treatment services only for 'thieving junkie scumbags'? Drug users and the management of stigmatised identities. *Social Science and Medicine, 67*(7), 1065-1073.

- Razani, N., Mohraz, M., Kheirandish, P., Malekinejad, M., Malekafzali, H., Mokri, A., et al. (2007). HIV risk behavior among injection drug users in Tehran, Iran. *Addiction*, *102*(9), 1472-1482.
- Rhodes, T. (1997). Risk theory in epidemic times: Sex, drugs, and the social organization of 'risk behaviour'. *Sociology of Health and Illness*, *19*(2), 208-227.
- Rhodes, T. (2002). The 'risk environment': a framework for understanding and reducing drug-related harm. *International Journal of Drug Policy*, *13*(2), 85-94.
- Rhodes, T. (2009). Risk environments and drug harms: A social science for harm reduction approach. *International Journal of Drug Policy*, *20*(3), 193-201.
- Rhodes, T., Briggs, D., Kimber, J., Jones, S., & Holloway, G. (2007). Crack-heroin speedball injection and its implications for vein care: Qualitative study. *Addiction*, *102*(11), 1782-1790.
- Rhodes, T., Kimber, J., Small, W., Fitzgerald, J., Kerr, T., Hickman, M., et al. (2006). Public injecting and the need for 'safer environment interventions' in the reduction of drug-related harm. *Addiction*, *101*(10), 1384-1393.
- Rhodes, T., Mikhailova, L., Sarang, A., Lowndes, C. M., Rylkov, A., Khutorskoy, M., et al. (2003). Situational factors influencing drug injecting, risk reduction and syringe exchange in Togliatti City, Russian Federation: A qualitative study of micro risk environment. *Social Science and Medicine*, *57*(1), 39-54.
- Rhodes, T., & Simic, M. (2005). Transition and the HIV risk environment. *British Medical Journal*, *331*(7510), 220-223.

- Rhodes, T., Singer, M., Bourgois, P., Friedman, S. R., & Strathdee, S. A. (2005). The social structural production of HIV risk among injecting drug users. *Social Science and Medicine*, *61*(5), 1026-1044.
- Rhodes, T., Stimson, G. V., Crofts, N., Ball, A., Dehne, K., & Khodakevich, L. (1999). Drug injecting, rapid HIV spread, and the 'risk environment': Implications for assessment and response. *AIDS*, *13*(Suppl A), S259-269.
- Rhodes, T., Stoneman, A., Hope, V., Hunt, N., Martin, A., & Judd, A. (2006). Groin injecting in the context of crack cocaine and homelessness: From 'risk boundary' to 'acceptable risk'? *International Journal of Drug Policy*, *17*(3), 164-170.
- Rhodes, T. Q., A. (1998). Drug users' sexual relationships and the social organisation of risk: The sexual relationship as a site of risk management. *Social Science and Medicine*, *46*(2), 157-169.
- Rich, J. D., Hogan, J. W., Wolf, F., DeLong, A., Zaller, N. D., Mehrotra, M., et al. (2007). Lower syringe sharing and re-use after syringe legalization in Rhode Island. *Drug and Alcohol Dependence*, *89*(2-3), 292-297.
- Richardson, L., Wood, E., Li, K., & Kerr, T. (2010). Factors associated with employment among a cohort of injection drug users. *Drug and Alcohol Review*, *29*(3), 293-300.
- Rietmeijer, C. A., Kane, M. S., Simons, P. Z., Corby, N. H., Wolitski, R. J., Higgins, D. L., et al. (1996). Increasing the use of bleach and condoms among injecting drug users in Denver: Outcomes of a targeted, community-level HIV prevention program. *AIDS*, *10*(3), 291-298.
- Roberts, E. T., Friedman, S. R., Brady, J. E., Pouget, E. R., Tempalski, B., & Galea, S. (2010). Environmental conditions, political economy, and rates of injection drug use

- in large US metropolitan areas 1992-2002. *Drug and Alcohol Dependence*, 106(2-3), 142-153.
- Rolles, S. (2009). *After the war on drugs: Blueprint for regulation*. London: Transform Drug Policy Foundation.
- Rondinelli, A. J., Ouellet, L. J., Strathdee, S. A., Latka, M. H., Hudson, S. M., Hagan, H., et al. (2009). Young adult injection drug users in the United States continue to practice HIV risk behaviors. *Drug and Alcohol Dependence*, 104(1-2), 167-174.
- Rosenbaum, M., Washburn, A., Knight, K., Kelley, M., & Irwin, J. (1996). Treatment as harm reduction, defunding as harm maximization: The case of methadone maintenance. *Journal of Psychoactive Drugs*, 28(3), 241-249.
- Rosenberg, S. D., Goodman, L. A., Osher, F. C., Swartz, M. S., Essock, S. M., Butterfield, M. I., et al. (2001). Prevalence of HIV, hepatitis B, and hepatitis C in people with severe mental illness. *American Journal of Public Health*, 91(1), 31-37.
- Rosenberg, S. D., Swanson, J. W., Wolford, G. L., Osher, F. C., Swartz, M. S., Essock, S. M., et al. (2003). The five-site health and risk study of blood-borne infections among persons with severe mental illness. *Psychiatr Services*, 54(6), 827-835.
- Rothenberg, R. B., Long, D. M., Sterk, C. E., Pach, A., Potterat, J. J., Muth, S., et al. (2000). The Atlanta Urban Networks Study: A blueprint for endemic transmission. *AIDS*, 14(14), 2191-2200.
- Rothenberg, R. B., Potterat, J. J., Woodhouse, D. E., Muth, S. Q., Darrow, W. W., & Klovdahl, A. S. (1998). Social network dynamics and HIV transmission. *AIDS*, 12(12), 1529-1536.

- Rotheram-Borus, M. J., Rhodes, F., Desmond, K., & Weiss, R. E. (2010). Reducing HIV risks among active injection drug and crack users: The safety counts program. *AIDS and Behavior, 14*(3), 658-668.
- Rotily, M., Galinier-Pujol, A., & Vernay-Vaisse, C. (1995). Risk behaviours of inmates in south-eastern France. *AIDS Care, 7*(Suppl 1), S89-93.
- Ruan, Y., Qin, G., Yin, L., Chen, K., Qian, H. Z., Hao, C., et al. (2007). Incidence of HIV, hepatitis C and hepatitis B viruses among injection drug users in southwestern China: A 3-year follow-up study. *AIDS, 21*(Suppl 8), S39-46.
- Sadowski, L. S., Kee, R. A., VanderWeele, T. J., & Buchanan, D. (2009). Effect of a housing and case management program on emergency department visits and hospitalizations among chronically ill homeless adults: A randomized trial. *Journal of the American Medical Association, 301*(17), 1771-1778.
- Salmon, A. M., Dwyer, R., Jauncey, M., van Beek, I., Topp, L., & Maher, L. (2009). Injecting-related injury and disease among clients of a supervised injecting facility. *Drug and Alcohol Dependence, 101*(1-2), 132-136.
- Salmon, A. M., van Beek, I., Amin, J., Grulich, A., & Maher, L. (2009). High HIV testing and low HIV prevalence among injecting drug users attending the Sydney Medically Supervised Injecting Centre. *Australian and New Zealand Journal of Public Health, 33*(3), 280-283.
- Sandelowski, M. (2000). Focus on research methods: Whatever happened to qualitative description? *Research in Nursing & Health, 23*(4), 334-340.
- Sauve, V. L. (1987). *From one educator to another: A window on participatory education*. Edmonton: Grant MacEwan Community College.

- Schechter, M. T., Strathdee, S. A., Cornelisse, P. G., Currie, S., Patrick, D. M., Rekart, M. L., et al. (1999). Do needle exchange programmes increase the spread of HIV among injection drug users an investigation of the Vancouver outbreak. *AIDS*, *13*(6), F45-51.
- Scott, G., Thomas, S. D., Pollack, H. A., & Ray, B. (2007). Observed patterns of illicit opiate overdose deaths in Chicago, 1999-2003. *Journal of Urban Health*, *84*(2), 292-306.
- Scott, J. (2005). *Pharmaceutical Aspects of Injecting*. Malden, MA: Blackwell Publishing Inc.
- Scott, J., Kennedy, E. J., Winfield, A. J., & Bond, C. (1998). Investigation into the effectiveness of filters for use by intravenous drug users. *International Journal of Drug Policy*, *9*(3), 181-186.
- Scott, J., Winfield, A., Kennedy, E., & Bond, C. (2000). Laboratory study of the effects of citric and ascorbic acids on injections prepared with brown heroin. *International Journal of Drug Policy*, *11*(6), 417-422.
- Semple, S. J., Patterson, T. L., & Grant, I. (2004). A comparison of injection and non-injection methamphetamine-using HIV positive men who have sex with men. *Drug and Alcohol Dependence*, *76*(2), 203-212.
- Shafer, K. P., Hahn, J. A., Lum, P. J., Ochoa, K., Graves, A., & Moss, A. (2002). Prevalence and correlates of HIV infection among young injection drug users in San Francisco. *Journal of Acquired Immune Deficiency Syndromes*, *31*(4), 422-431.
- Shah, N. G., Galai, N., Celentano, D. D., Vlahov, D., & Strathdee, S. A. (2006). Longitudinal predictors of injection cessation and subsequent relapse among a cohort of injection drug users in Baltimore, MD, 1988-2000. *Drug Alcohol Dependence*, *83*(2), 147-156.

- Shannon, K., Ishida, T., Lai, C., & Tyndall, M. W. (2006). The impact of unregulated single room occupancy hotels on the health status of illicit drug users in Vancouver. *International Journal of Drug Policy, 17*(2), 107-114.
- Shannon, K., Kerr, T., Allinott, S., Chettiar, J., Shoveller, J., & Tyndall, M. W. (2008). Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work. *Social Science and Medicine, 66*(4), 911-921.
- Shannon, K., Rusch, M., Shoveller, J., Alexson, D., Gibson, K., & Tyndall, M. W. (2008). Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among substance-using women in street-level sex work. *International Journal of Drug Policy, 19*(2), 140-147.
- Shapatava, E., Nelson, K. E., Tsertsvadze, T., & del Rio, C. (2006). Risk behaviors and HIV hepatitis B, and hepatitis C seroprevalence among injection drug users in Georgia. *Drug and Alcohol Dependence, 82*(Suppl 1), S35-S38.
- Sheikh, M. A., Topoulos, A. P., & Deitcher, S. R. (2002). Isolated internal jugular vein thrombosis: risk factors and natural history. *Vascular Medicine, 7*(3), 177-179.
- Sherman, S. G., Latkin, C. A., & Gielen, A. C. (2001). Social factors related to syringe sharing among injecting partners: A focus on gender. *Substance Use and Misuse, 36*(14), 2113-2136.
- Shor, I., & Freire, P. (1987). What is the "dialogical method" of teaching? *Journal of Education, 169*(3), 11-31.
- Siegal, H. A., Falck, R. S., Carlson, R. G., & Wang, J. (1995). Reducing HIV needle risk behaviors among injection-drug users in the Midwest: An evaluation of the efficacy

- of standard and enhanced interventions. *AIDS Education and Prevention*, 7(4), 308-319.
- Simmonds, L., & Coomber, R. (2009). Injecting drug users: A stigmatised and stigmatising population. *International Journal of Drug Policy*, 20(2), 121-130.
- Simpson, R. K., Jr., Fischer, D. K., Narayan, R. K., Cech, D. A., & Robertson, C. S. (1990). Intravenous cocaine abuse and subarachnoid haemorrhage: Effect on outcome. *British Journal of Neurosurgery*, 4(1), 27-30.
- Singer, M. (1994). AIDS and the health crisis of the U.S. urban poor; the perspective of critical medical anthropology. *Social Science and Medicine*, 39(7), 931-948.
- Singer, M., Stopka, T., Siano, C., Springer, K., Barton, G., Khoshnood, K., et al. (2000). The social geography of AIDS and hepatitis risk: Qualitative approaches for assessing local differences in sterile-syringe access among injection drug users. *American Journal of Public Health*, 90(7), 1049-1056.
- Small, D., Palepu, A., & Tyndall, M. W. (2006). The establishment of North America's first state sanctioned supervised injection facility: A case study in culture change. *International Journal of Drug Policy*, 17(2), 73-82.
- Small, W., Ainsworth, L., Wood, E., & Kerr, T. (2011). IDU perspectives on the design and operation of North America's first medically supervised injection facility. *Substance Use and Misuse*, 46(5), 561-568.
- Small, W., Kain, S., Laliberte, N., Schechter, M. T., O'Shaughnessy, M. V., & Spittal, P. M. (2005). Incarceration, addiction and harm reduction: Inmates experience injecting drugs in prison. *Substance Use and Misuse*, 40(6), 831-843.

- Small, W., Kerr, T., Charette, J., Schechter, M., & Spittal, P. (2006). Impacts of intensified police activity on injection drug users: Evidence from an ethnographic investigation. *International Journal of Drug Policy*, *17*(2), 85-95.
- Small, W., Rhodes, T., Wood, E., & Kerr, T. (2007). Public injection settings in Vancouver: Physical environment, social context and risk. *International Journal of Drug Policy*, *18*(1), 27-36.
- Small, W., Shoveller, J., Moore, D., Tyndall, M., Wood, E., & Kerr, T. (2011). Injection drug users' access to a supervised injection facility in Vancouver, Canada: The influence of operating policies and local drug culture. *Qualitative Health Research*, *21*(6), 743-756.
- Small, W., Wood, E., Jurgens, R., & Kerr, T. (2005). Injection drug use, HIV/AIDS and incarceration: Evidence from the Vancouver Injection Drug Users Study. *HIV/AIDS Policy and Law Review*, *10*(3), 5-10.
- Smith, K. C., Lillie Tle, L., & Latkin, C. (2007). Injection drug users' strategies to manage perceptions of personal risk: How do IDUs see HIV as having affected them? *AIDS Education and Prevention*, *19*(3), 245-257.
- Smith, M. J., Thirthalli, J., Abdallah, A. B., Murray, R. M., & Cottler, L. B. (2009). Prevalence of psychotic symptoms in substance users: a comparison across substances. *Comprehensive Psychiatry*, *50*(3), 245-250.
- Smyth, B. P., Barry, J., & Keenan, E. (2001). Syringe borrowing persists in Dublin despite harm reduction interventions. *Addiction*, *96*(5), 717-727.
- Spittal, P., Small, W., Wood, E., Johnston, C., Charette, J., Laliberte, N., et al. (2004). How otherwise dedicated AIDS prevention workers come to support state-sponsored

- shortage of clean syringes in Vancouver, Canada. *International Journal of Drug Policy*, 15(1), 36-45.
- Spittal, P. M., Craib, K. J., Teegee, M., Baylis, C., Christian, W. M., Moniruzzaman, A. K., et al. (2007). The Cedar project: prevalence and correlates of HIV infection among young Aboriginal people who use drugs in two Canadian cities. *International Journal of Circumpolar Health*, 66(3), 226-240.
- Spittal, P. M., Craib, K. J., Wood, E., Laliberte, N., Li, K., Tyndall, M. W., et al. (2002). Risk factors for elevated HIV incidence rates among female injection drug users in Vancouver. *Canadian Medical Association Journal*, 166(7), 894-899.
- Spittal, P. M., Hogg, R. S., Li, K., Craib, K. J., Recsky, M., Johnston, C., et al. (2006). Drastic elevations in mortality among female injection drug users in a Canadian setting. *AIDS and Care*, 18(2), 101-108.
- Stajduhar, K., Poffenroth, L., Wong, E., Archibald, C. P., Sutherland, D., & Rekart, M. (2004). Missed opportunities: Injection drug use and HIV/AIDS in Victoria, Canada. *International Journal of Drug Policy*, 15(3), 171-181.
- Staley, J. K., Hearn, W. L., Rutenber, A. J., Wetli, C. V., & Mash, D. C. (1994). High affinity cocaine recognition sites on the dopamine transporter are elevated in fatal cocaine overdose victims. *Journal of Pharmacology and Experimental Therapeutics*, 271(3), 1678-1685.
- Stein, M. D., Charuvastra, A., & Anderson, B. J. (2002). Social support and zero sharing risk among hazardously drinking injection drug users. *Journal of Substance Abuse Treatment*, 23(3), 225-230.

- Stein, M. D., Maksad, J., & Clarke, J. (2001). Hepatitis C disease among injection drug users: Knowledge, perceived risk and willingness to receive treatment. *Drug and Alcohol Dependence*, 61(3), 211-215.
- Stein, M. D., Solomon, D. A., Herman, D. S., Anderson, B. J., & Miller, I. (2003). Depression severity and drug injection HIV risk behaviors. *American Journal of Psychiatry*, 160(9), 1659-1662.
- Stephens, R. C., Feucht, T. E., & Roman, S. W. (1991). Effects of an intervention program on AIDS-related drug and needle behavior among intravenous drug users. *American Journal of Public Health*, 81(5), 568-571.
- Stoltz, J. A., Wood, E., Small, W., Li, K., Tyndall, M., Montaner, J., et al. (2007). Changes in injecting practices associated with the use of a medically supervised safer injection facility. *Journal of Public Health*, 29(1), 35-39.
- Strathdee, S. A., Galai, N., Safaiean, M., Celentano, D. D., Vlahov, D., Johnson, L., et al. (2001). Sex differences in risk factors for hiv seroconversion among injection drug users: A 10-year perspective. *Archives of Internal Medicine*, 161(10), 1281-1288.
- Strathdee, S. A., Hallett, T. B., Bobrova, N., Rhodes, T., Booth, R., Abdool, R., et al. (2010). HIV and risk environment for injecting drug users: The past, present, and future. *The Lancet*, 376(9737), 268-284.
- Strathdee, S. A., Lozada, R., Pollini, R. A., Brouwer, K. C., Mantsios, A., Abramovitz, D. A., et al. (2008). Individual, social, and environmental influences associated with HIV infection among injection drug users in Tijuana, Mexico. *Journal of Acquired Immune Deficiency Syndromes*, 47(3), 369-376.

- Strathdee, S. A., Patrick, D. M., Archibald, C. P., Ofner, M., Cornelisse, P. G., Rekart, M., et al. (1997). Social determinants predict needle-sharing behaviour among injection drug users in Vancouver, Canada. *Addiction*, *92*(10), 1339-1347.
- Strathdee, S. A., Patrick, D. M., Currie, S. L., Cornelisse, P. G., Rekart, M. L., Montaner, J. S., et al. (1997). Needle exchange is not enough: lessons from the Vancouver injecting drug use study. *AIDS*, *11*(8), F59-65.
- Strike, C. J., Myers, T., & Millson, M. (2004). Finding a place for needle exchange programs. *Critical Public Health*, *14*(3), 261-275.
- Sufian, M., Friedman, S. R., Curtis, R., Neaigus, A., & Stepherson, B. (1991). Organizing as a new approach to AIDS risk reduction for intravenous drug users. *Journal of Addictive Diseases*, *10*(4), 89-98.
- Suh, T., Mandell, W., Latkin, C., & Kim, J. (1997). Social network characteristics and injecting HIV-risk behaviors among street injection drug users. *Drug and Alcohol Dependence*, *47*(2), 137-143.
- Sullivan, L. E., Metzger, D. S., Fudala, P. J., & Fiellin, D. A. (2005). Decreasing international HIV transmission: the role of expanding access to opioid agonist therapies for injection drug users. *Addiction*, *100*(2), 150-158.
- Sumartojo, E. (2000). Structural factors in HIV prevention: Concepts, examples, and implications for research. *AIDS*, *14*(Suppl 1), S3-10.
- Susser, E., Miller, M., Valencia, E., Colson, P., Roche, B., & Conover, S. (1996). Injection drug use and risk of HIV transmission among homeless men with mental illness. *American Journal of Psychiatry*, *153*(6), 794-798.

- Takahashi, T. A., Merrill, J. O., Boyko, E. J., & Bradley, K. A. (2003). Type and location of injection drug use-related soft tissue infections predict hospitalization. *Journal of Urban Health, 80*(1), 127-136.
- Taussig, J. A., Weinstein, B., Burris, S., & Jones, T. S. (2000). Syringe laws and pharmacy regulations are structural constraints on HIV prevention in the US. *AIDS, 14*(Suppl 1), S47-51.
- Taylor, A. (1994). Outbreak of HIV infection in a Scottish prison. *British Medical Journal, 310*(6975), 289-292.
- Teesson, M., Mills, K., Ross, J., Darke, S., Williamson, A., & Havard, A. (2008). The impact of treatment on 3 years' outcome for heroin dependence: Findings from the Australian Treatment Outcome Study (ATOS). *Addiction, 103*(1), 80-88.
- Tempalski, B., Friedman, R., Keem, M., Cooper, H., & Friedman, S. R. (2007). NIMBY localism and national inequitable exclusion alliances: The case of syringe exchange programs in the United States. *Geoforum, 38*(6), 1250-1263.
- The Chicago Recovery Alliance. (2011). Better vein care/safer injection. Retrieved from <http://www.anypositivechange.org/bvcsi.html>.
- Thiede, H., Hagan, H., Campbell, J. V., Strathdee, S. A., Bailey, S. L., Hudson, S. M., et al. (2007). Prevalence and correlates of indirect sharing practices among young adult injection drug users in five U.S. cities. *Drug and Alcohol Dependence, 91*(Suppl 1), S39-47.
- Thorpe, L. E., Bailey, S. L., Huo, D. Z., Monterroso, E. R., & Ouellet, L. J. (2001). Injection-related risk behaviors in young urban and suburban injection drug users in Chicago (1997-1999). *Journal of Acquired Immune Deficiency Syndromes, 27*(1), 71-78.

- Thorpe, L. E., Ouellet, L. J., Hershov, R., Bailey, S. L., Williams, I. T., Williamson, J., et al. (2002). Risk of hepatitis C virus infection among young adult injection drug users who share injection equipment. *American Journal of Epidemiology*, *155*(7), 645-653.
- Tobin, K. E., Davey-Rothwell, M., & Latkin, C. A. (2010). Social-level correlates of shooting gallery attendance: A focus on networks and norms. *AIDS and Behavior*, *14*(5), 1142-1148.
- Tobin, K. E., & Latkin, C. A. (2008). An examination of social network characteristics of men who have sex with men who use drugs. *Sexually Transmitted Infections*, *84*(6), 420-424.
- Topp, L., Iversen, J., Conroy, A., Salmon, A. M., & Maher, L. (2008). Prevalence and predictors of injecting-related injury and disease among clients of Australia's needle and syringe programs. *Australian and New Zealand Journal of Public Health*, *32*(1), 34-37.
- Trautmann, F. (1995). Peer support as a method of risk reduction in injecting drug-user communities: Experiences in Dutch projects and the "European Peer Support Project". *Journal of Drug Issues*, *25*(3), 617-628.
- Treloar, C., Laybutt, B., Jauncey, M., van Beek, I., Lodge, M., Malpas, G., et al. (2008). Broadening discussions of "safe" in hepatitis C prevention: A close-up of swabbing in an analysis of video recordings of injecting practice. *International Journal of Drug Policy*, *19*(1), 59-65.
- Treloar, C., & Wen, C. (2005). Barriers to use of needle and syringe programmes in a high drug use area of Sydney New South Wales. *International Journal of Drug Policy*, *16*(5), 308-315.

- Tucker, T., Fry, C. L., Lintzeris, N., Baldwin, S., Ritter, A., Donath, S., et al. (2004). Randomized controlled trial of a brief behavioural intervention for reducing hepatitis C virus risk practices among injecting drug users. *Addiction*, *99*(9), 1157-1166.
- Tyndall, M. W., Craib, K. J., Currie, S., Li, K., O'Shaughnessy, M. V., & Schechter, M. T. (2001). Impact of HIV infection on mortality in a cohort of injection drug users. *Journal of Acquired Immune Deficiency Syndromes*, *28*(4), 351-357.
- Tyndall, M. W., Currie, S., Spittal, P., Li, K., Wood, E., O'Shaughnessy, M. V., et al. (2003). Intensive injection cocaine use as the primary risk factor in the Vancouver HIV-1 epidemic. *AIDS*, *17*(6), 887-893.
- Tyndall, M. W., Wood, E., Zhang, R., Lai, C., Montaner, J. S., & Kerr, T. (2006). HIV seroprevalence among participants at a Supervised Injection Facility in Vancouver, Canada: implications for prevention, care and treatment. *Harm Reduction Journal*, *3*, 36.
- UNAIDS. (2007). Affected communities: People who inject drugs. Retrieved from http://www.unaids.org/en/Policies/Affected_communities/idu.asp.
- Unger, J. B., Kipke, M. D., De Rosa, C. J., Hyde, J., Ritt-Olson, A., & Montgomery, S. (2006). Needle-sharing among young IV drug users and their social network members: The influence of the injection partner's characteristics on HIV risk behavior. *Addictive Behaviors*, *31*(9), 1607-1618.
- Valente, T. W., & Vlahov, D. (2001). Selective risk taking among needle exchange participants: Implications for supplemental interventions. *American Journal of Public Health*, *91*(3), 406-411.

- van Beek, I., Kimber, J., Dakin, A., & Gilmour, S. (2004). The Sydney medically supervised injecting centre: Reducing harm associated with heroin overdose. *Critical Public Health, 14*(4), 391-406.
- Van Den Berg, C., Smit, C., Van Brussel, G., Coutinho, R., & Prins, M. (2007). Full participation in harm reduction programmes is associated with decreased risk for human immunodeficiency virus and hepatitis C virus: Evidence from the Amsterdam Cohort Studies among drug users. *Addiction, 102*(9), 1454-1462.
- van der Poel, A., Barendregt, C., & van de Mheen, D. (2003). Drug consumption rooms in Rotterdam: An explorative description. *European Addiction Research, 9*(2), 94-100.
- Van Griensvan, F., Pitisuttithum, P., Vanichseni, S., Wichienkuer, P., Tappero, J. W., Udomsak, S., et al. (2005). Trends in the injection of midazolam and other drugs and needle sharing among injection drug users enrolled in the AIDSVAX B/E HIV-1 vaccine trial in Bangkok, Thailand. *International Journal of Drug Policy, 16*(3), 171-175.
- Vega, J. M., & Lucas, C. E. (1979). Rapidly spreading subcutaneous inflammation after skin popping in drug addicts. *American Surgeon, 45*(6), 392-393.
- Vlahov, D., Robertson, A. M., & Strathdee, S. A. (2010). Prevention of HIV infection among injection drug users in resource-limited settings. *Clinical Infectious Diseases, 50* (Suppl 3), S114-121.
- Wagner, K. D., Unger, J. B., Bluthenthal, R. N., Andreeva, V. A., & Pentz, M. A. (2010). Cognitive behavioral theories used to explain injection risk behavior among injection drug users: A review and suggestions for the integration of cognitive and environmental models. *Health Education and Behavior, 37*(4), 504-532.

- Waldorf, D., Reinerman, C., & Murphy, S. (1990). Needle sharing, shooting galleries, and AIDS risks among intravenous drug users in San Francisco: Criminal justice and public health policy. *Criminal Justice Policy Review*, 3(4), 321-343.
- Wallerstein, N., & Bernstein, E. (1988). Empowerment education: Freire's ideas adapted to health education. *Health Education and Behaviour*, 15(4), 379-394.
- Wallerstein, N., & Sanchez-Merki, V. (1994). Freirian praxis in health education: Research results from an adolescent prevention program. *Health Education Research*, 9(1), 105-118.
- Warner-Smith, M., Darke, S., & Day, C. (2002). Morbidity associated with non-fatal heroin overdose. *Addiction*, 97(8), 963-967.
- Watters, J. (1987). A street-based outreach model of AIDS prevention for intravenous drug users: Preliminary evaluation. *Contemporary Drug Problems*, Fall, 411-423.
- Webb, L., Oyefeso, A., Schifano, F., Cheeta, S., Pollard, M., & Ghodse, A. H. (2003). Cause and manner of death in drug-related fatality: An analysis of drug-related deaths recorded by coroners in England and Wales in 2000. *Drug and Alcohol Dependence*, 72(1), 67-74.
- Wechsberg, W., Cavanaugh, E. R., Duntzman, G. H., & Smith, F. J. (1994). Changing needle practices in community outreach and methadone treatment. *Evaluation and Program Planning*, 17(4), 371-379.
- Weeks, M., Himmelgreen, D. A., Singer, M., Woolley, S., Romero-Daza, N., & Grier, M. (1996). Community-based AIDS prevention: Preliminary outcomes of a program for African American and Latino injection drug users. *Journal of Drug Issues*, 26(3), 561-590.

- Weeks, M. R., Clair, S., Singer, M., Radda, K., Schensul, J. J., Wilson, D. S., et al. (2001). High risk drug use sites, meaning and practice: Implications for AIDS prevention. *Journal of Drug Issues, 31*(3), 781-808.
- Weeks, M. R., Li, J., Dickson-Gomez, J., Convey, M., Martinez, M., Radda, K., et al. (2009). Outcomes of a peer HIV prevention program with injection drug and crack users: The Risk Avoidance Partnership. *Substance Use and Misuse, 44*(2), 253-281.
- Werb, D., Hayashi, K., Fairbairn, N., Kaplan, K., Suwannawong, P., Lai, C., et al. (2009). Drug use patterns among Thai illicit drug injectors amidst increased police presence. *Substance Abuse Treatment, Prevention, and Policy, 4*(1), 16.
- Werb, D., Wood, E., Small, W., Strathdee, S., Li, K., Montaner, J., et al. (2008). Effects of police confiscation of illicit drugs and syringes among injection drug users in Vancouver. *International Journal of Drug Policy, 19*(4), 332-338.
- WHO, UNODC, & UNAIDS. (2009). *WHO, UNODC, UNAIDS technical guide for countries to set targets for universal access to HIV prevention, treatment and care for injecting drug users*. Retrieved from http://www.unodc.org/documents/hiv-aids/idu_target_setting_guide.pdf
- Wiebel, W. (1996). Ethnographic contributions to AIDS intervention strategies. In T. Rhodes & R. Hartnoll (Eds.), *AIDS, drugs and prevention: Perspectives on individual and community action*. London: Psychology Press.
- Wiebel, W. W., Jimenez, A., Johnson, W., Ouellet, L., Jovanovic, B., Lampinen, T., et al. (1996). Risk behavior and HIV seroincidence among out-of-treatment injection drug users: A four-year prospective study. *Journal of Acquired Immune Deficiency Syndromes, 12*(3), 282-289.

- Wilkins, L., Bissell, P., & Meier, P. S. (2010). Risky injecting practices associated with snowballing: A qualitative study. *Drug and Alcohol Review, 29*(3), 256-262.
- Wodak, A., & Cooney, A. (2006). Do needle syringe programs reduce HIV infection among injecting drug users: A comprehensive review of the international evidence. *Substance Use and Misuse, 41*(6-7), 777-813.
- Wood, E., & Kerr, T. (2006). What do you do when you hit rock bottom: Responding to drugs in the city of Vancouver. *International Journal of Drug Policy, 17*(2), 55-60.
- Wood, E., Kerr, T., Lloyd-Smith, E., Buchner, C., Marsh, D. C., Montaner, J. S., et al. (2004). Methodology for evaluating Insite: Canada's first medically supervised safer injection facility for injection drug users. *Harm Reduction Journal, 1*(1), 9.
- Wood, E., Kerr, T., Small, W., Jones, J., Schechter, M. T., & Tyndall, M. W. (2003). The impact of a police presence on access to needle exchange programs. *Journal of Acquired Immune Deficiency Syndromes, 34*(1), 116-118.
- Wood, E., Kerr, T., Small, W., Li, K., Marsh, D. C., Montaner, J. S., et al. (2004). Changes in public order after the opening of a medically supervised safer injecting facility for illicit injection drug users. *Canadian Medical Association Journal, 171*(7), 731-734.
- Wood, E., Kerr, T., Spittal, P. M., Small, W., Tyndall, M. W., O'Shaughnessy, M. V., et al. (2003). An external evaluation of a peer-run "unsanctioned" syringe exchange program. *Journal of Urban Health, 80*(3), 455-464.
- Wood, E., Kerr, T., Spittal, P. M., Tyndall, M. W., O'Shaughnessy, M. V., & Schechter, M. T. (2003). The healthcare and fiscal costs of the illicit drug use epidemic: The impact of conventional drug control strategies and the impact of a comprehensive approach. *BC Medical Journal, 45*(3), 128-134.

- Wood, E., Kerr, T., Stoltz, J., Qui, Z., Zhang, R., Montaner, J. S., et al. (2005). Prevalence and correlates of hepatitis C infection among users of North America's first medically supervised safer injection facility. *Public Health, 119*(12), 1111-1115.
- Wood, E., Li, K., Small, W., Montaner, J. S., Schechter, M. T., & Kerr, T. (2005). Recent incarceration independently associated with syringe sharing by injection drug users. *Public Health Reports, 120*(2), 150-156.
- Wood, E., Lloyd-Smith, E., Li, K., Strathdee, S. A., Small, W., Tyndall, M. W., et al. (2007). Frequent needle exchange use and HIV incidence in Vancouver, Canada. *American Journal of Medicine, 120*(2), 172-179.
- Wood, E., Montaner, J., & Kerr, T. (2005). HIV risks in incarcerated injection-drug users. *The Lancet, 366*(9500), 1834-1835.
- Wood, E., Spittal, P., Li, K., Kerr, T., Miller, C. L., Hogg, R. S., et al. (2004). Inability to access addiction treatment and risk of HIV infection among injection drug users. *Journal of Acquired Immune Deficiency Syndromes, 36*(2), 750-754.
- Wood, E., Spittal, P. M., Kerr, T., Small, W., Tyndall, M. W., O'Shaughnessy, M. V., et al. (2003). Requiring help injecting as a risk factor for HIV infection in the Vancouver epidemic: implications for HIV prevention. *Canadian Journal of Public Health, 94*(5), 355-359.
- Wood, E., Spittal, P. M., Small, W., Kerr, T., Li, K., Hogg, R. S., et al. (2004). Displacement of Canada's largest public illicit drug market in response to a police crackdown. *Canadian Medical Association Journal, 170*(10), 1551-1556.

- Wood, E., Tyndall, M., Stoltz, J., Small, D., Zhang, R., O'Connell, J., et al. (2005). Safer injecting education for HIV prevention within a medically supervised safer injecting facility. *International Journal of Drug Policy*, 16(4), 281-284.
- Wood, E., Tyndall, M. W., Montaner, J. S., & Kerr, T. (2006). Summary of findings from the evaluation of a pilot medically supervised safer injecting facility. *Canadian Medical Association Journal*, 175(11), 1399-1404.
- Wood, E., Tyndall, M. W., Spittal, P., Li, K., Hogg, R.S., O'Shaughnessy, M., et al. (2002). Needle exchange and difficulty with needle access during an ongoing HIV epidemic. *International Journal of Drug Policy*, 13(2), 95-102.
- Wood, E., Tyndall, M. W., Spittal, P. M., Li, K., Hogg, R. S., Montaner, J. S., et al. (2002). Factors associated with persistent high-risk syringe sharing in the presence of an established needle exchange programme. *AIDS*, 16(6), 941-943.
- Wood, E., Tyndall, M. W., Spittal, P. M., Li, K., Kerr, T., Hogg, R. S., et al. (2001). Unsafe injection practices in a cohort of injection drug users in Vancouver: Could safer injecting rooms help? *Canadian Medical Association Journal*, 165(4), 405-410.
- Wood, E., Tyndall, M. W., Zhang, R., Montaner, J. S., & Kerr, T. (2007). Rate of detoxification service use and its impact among a cohort of supervised injecting facility users. *Addiction*, 102(6), 916-919.
- Wood, E., Tyndall, M. W., Zhang, R., Stoltz, J. A., Lai, C., Montaner, J. S., et al. (2006). Attendance at supervised injecting facilities and use of detoxification services. *New England Journal of Medicine*, 354(23), 2512-2514.
- Wood, R. A., Wood, E., Lai, C., Tyndall, M. W., Montaner, J. S., & Kerr, T. (2008). Nurse-delivered safer injection education among a cohort of injection drug users: Evidence

- from the evaluation of Vancouver's supervised injection facility. *International Journal of Drug Policy*, 19(3), 183-188.
- Woodburn, K. R., & Murie, J. A. (1996). Vascular complications of injecting drug misuse. *British Journal of Surgery*, 83(10), 1329-1334.
- Wu, Z., Luo, W., Sullivan, S. G., Rou, K., Lin, P., Liu, W., et al. (2007). Evaluation of a needle social marketing strategy to control HIV among injecting drug users in China. *AIDS*, 2(Suppl 8), S115-122.
- Wylie, J. L., Shah, L., & Jolly, A. (2007). Incorporating geographic settings into a social network analysis of injection drug use and bloodborne pathogen prevalence. *Health and Place*, 13(3), 617-628.
- Wylie, J. L., Shah, L., & Jolly, A. M. (2006). Demographic, risk behaviour and personal network variables associated with prevalent hepatitis C, hepatitis B, and HIV infection in injection drug users in Winnipeg, Canada. *BMC Public Health*, 6, 229.
- Zador, D., Lintzeris, N., van der Waal, R., Miller, P., Metrebian, N., & Strang, J. (2008). The fine line between harm reduction and harm production--development of a clinical policy on femoral (groin) injecting. *European Addiction Research*, 14(4), 213-218.
- Zamani, S., Kihara, M., Gouya, M. M., Vazirian, M., Ono-Kihara, M., Razzaghi, E. M., et al. (2005). Prevalence of and factors associated with HIV-1 infection among drug users visiting treatment centers in Tehran, Iran. *AIDS*, 19(7), 709-716.
- Zapka, J. G., Stoddard, A. M., & McCusker, J. (1993). Social network, support and influence: Relationships with drug use and protective AIDS behavior. *AIDS Education and Prevention*, 5(4), 352-366.

- Zhang, L., Zhu, J., Rui, B., Zhang, Y., Yin, L., Ruan, Y., et al. (2008). High HIV risk among Uigur minority ethnic drug users in northwestern China. *Tropical Medicine and International Health*, 13(6), 814-817.
- Zhang, Y., Shan, H., Trizzino, J., Ruan, Y., Beauchamp, G., Masse, B., et al. (2007). Demographic characteristics and risk behaviors associated with HIV positive injecting drug users in Xinjiang, China. *Journal of Infection*, 54(3), 285-290.
- Zierler, S., Krieger, N., Tang, Y., Coady, W., Siegfried, E., DeMaria, A., et al. (2000). Economic deprivation and AIDS incidence in Massachusetts. *American Journal of Public Health*, 90(7), 1064-1073.
- Zule, W. A. (1992). Risk and reciprocity: HIV and the injection drug user. *Journal of Psychoactive Drugs*, 24(3), 243-249.
- Zule, W. A., Costenbader, E. C., Coomes, C. M., & Wechsberg, W. M. (2009). Effects of a hepatitis C virus educational intervention or a motivational intervention on alcohol use, injection drug use, and sexual risk behaviors among injection drug users. *American Journal of Public Health*, 99(Suppl 1), S180-186.