

The Role of Safer Injection Facilities in the Response to HIV/AIDS Among Injection Drug Users

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Many cities throughout the globe are experiencing ongoing infectious disease and overdose epidemics among injection drug users (IDUs). In particular, HIV has become endemic among IDUs in many settings. In an effort to reduce this and related public health concerns, medically supervised safer injecting facilities (SIFs), where IDUs can inject pre-obtained illicit drugs under the supervision of medical staff, have been established in several countries. The following review assesses the role that SIFs can play in reducing the harms associated with HIV infection among IDUs and points to ways in which SIFs can be further developed to better respond to the challenges associated with HIV/AIDS among this population.

Introduction

Injection drug use continues to be a driving factor in the global HIV/AIDS epidemic. Close to one third of all new HIV infections outside of sub-Saharan Africa are attributed to injection drug use, and in Eastern Europe and Central Asia, the sharing of contaminated injecting equipment accounts for more than 80% of all new HIV infections [1]. Other costly infectious diseases that can be easily acquired from nonsterile injection practices, such as hepatitis C, and endocarditis and cellulitis are also common [2]. The health and care of IDUs is further compromised by avoidance and erratic use of primary care services and over-reliance on emergency departments [3]. In addition, illicit drug overdose deaths and community concerns, such as public drug use, continue to plague many cities throughout the world [4].

The dominant policy response, particularly in North America, to the harms associated with injection drug use has been law enforcement and incarceration [5]. In public health circles, it is increasingly well recognized that conventional enforcement-based drug control strategies have not limited the spread of infectious diseases, the incidence of overdoses, or the prevalence of other community harms of injection drug use [7–11]. In light of these ongoing challenges, there is need for the development of innovative, health-focused approaches to reducing drug-related harms.

Medically Supervised Safer Injection Facilities

In response to ongoing harms associated with injection drug use, several municipalities throughout the world have established medically supervised safer injecting facilities (SIFs) where IDUs can inject pre-obtained illicit drugs under medical supervision [12]. SIFs have also been referred to as “drug consumption rooms,” “safe injection sites,” and “consumer rooms” [12]. Although there are considerable operational differences across SIFs, within such facilities, IDUs can typically obtain information on safer injecting techniques, onsite overdose management, primary health care, counseling, and referrals to health and social services [12]. SIFs now exist in eight countries (Germany, Switzerland, the Netherlands, Luxembourg, Norway, Australia, Spain, and Canada), and it is estimated that there are approximately 76 SIFs in operation [13••].

Although SIFs have existed in Europe since the 1980s, there has only been limited information available concerning their effectiveness until recently [14]. However, rigorous evaluations of SIFs in Sydney, Australia, and Vancouver, Canada, have recently been completed [15••,16]. As well, the European Monitoring Centre for Drugs and Drug Addiction recently completed an extensive review of the international SIF literature, including the non-English literature [13••]. Although the body of scientific evidence pertaining to SIFs has grown considerably, there are no reviews to date of SIFs that specifically consider their role in stemming the harms

associated with HIV/AIDS. The purpose of this review is to consider the evidence specific to SIFs and to identify the potential of SIFs to complement existing efforts to address HIV/AIDS among IDUs. As well, the review will consider underexplored opportunities to employ SIFs as HIV/AIDS-focused interventions.

Search Strategy and Selection Criteria

PubMed databases were searched for published reports on the health impacts of SIFs (under their various names: drug consumption rooms, alley rooms, etc.) with no language or date specified and by examining references from relevant articles. In addition, key abstracts presented at international meetings were reviewed as long as the findings provided novel insights into issues not covered in peer-reviewed papers. As well, reviews of the SIF literature that considered “gray” and non-English literature were also considered.

The Impact of SIFs on the Prevention of HIV Infection

SIFs are often implemented in settings with defined epidemics of HIV among IDUs (eg, Vancouver, Switzerland, Spain) [13••]. A growing body of evidence suggests that SIFs can complement other mainstream HIV-prevention strategies. In particular, as described below, SIFs have been shown to attract individuals at heightened risk for HIV infection, act as locations for the provision of safer injecting education, reduce syringe sharing, and promote enrollment into abstinence-based withdrawal management and addiction treatment programs.

Reaching IDUs at High Risk for HIV Infection

Preventing health-related harm among IDUs has been complicated by the fact that those IDUs most at risk for adverse outcomes are often hard to reach with traditional public health programs and services. As a result, IDUs are known to rely on emergency departments for primary care. Furthermore, many IDUs present late in the course of illness and often require hospitalization upon arrival in emergency departments [3].

A growing body of evidence indicates that SIFs, by providing a space for injection of illicit drugs, attract a subset of IDUs who possess markers for heightened risk for HIV infection. For example, evaluations from Vancouver indicate that those most likely to initiate use of the local SIF were higher-intensity drug users who reported injecting heroin and/or cocaine at least daily [17,18]. Other studies undertaken in Sydney, Hannover and Frankfurt in Germany, and Biel and Geneva in Switzerland have also found that a substantial proportion of those using SIFs are individuals who inject at least daily [16,19–22]. Furthermore, several studies from a range of settings have found

that SIFs attract individuals who possess other known risk factors for HIV infection, including engagement in sex work and homelessness [17,21–25]. By attracting IDUs who are at risk for HIV infection, SIFs afford considerable opportunity to deliver HIV prevention services and education to this high-risk population.

Providing Safer Injecting Education and Addressing High-risk Injecting Practices

Although several existing HIV-focused programs, such as syringe exchanges, make regular contact with high-risk IDUs, often the duration of contact between IDUs and service providers is brief [12]. As a result, these services have limited opportunity to provide safer injecting education to IDUs. However, SIFs have a longer window in which to engage IDUs in safer injecting education and referrals. For example, in Sydney, clients were found to spend an average of just under 30 minutes on the premises [16].

Evidence from several settings has pointed to the substantial risks associated with assisted injection, and evaluations undertaken in North America have found the practice of assisted injection to be associated with syringe sharing and HIV incidence [26]. In light of these risks, it is encouraging that SIFs afford considerable opportunity to provide safer injecting education. A recent evaluation from Vancouver found that one third of SIF users received safer injecting education in the previous 6 months and that those most likely to receive this type of education were those who frequently require assistance with injections [27]. Therefore, by increasing capacity for self-administration of injections, SIFs can help offset the risks associated with the dangerous practice of assisted injection.

Reducing Syringe Sharing

Although it is recognized that substitution therapies—such as methadone, syringe exchange, and other public health services for IDUs—may reduce the incidence of viral-associated risk behaviors [28], it is clear that additional measures are often required to prevent syringe sharing that arises due to intoxication, binge use of drugs, or other factors [4].

A growing body of quantitative data point to the impact of SIF use on syringe sharing. For example, early studies from Biel report declines in syringe sharing among IDUs following the establishment of SIFs [21,29,30], and similar effects have been noted elsewhere [31–34]. Other European studies have found low rates of high-risk injecting among SIF users [32,35], and a recent evaluation from Vancouver found that more frequent use of a SIF was associated with reduced syringe borrowing among IDUs who were HIV negative and reduced lending among IDUs who were HIV positive [36]. Some of the most compelling evidence of the positive impact of SIF use on syringe sharing came from a longitudinal

evaluation of syringe sharing among IDUs participating in a prospective, cohort study in Vancouver [37]. In this analysis, IDUs using the local SIF frequently were 70% less likely to report syringe sharing when compared with those IDUs who used the SIF infrequently or not at all. Although this initial result could be perceived to reflect a selection effect (ie, those using the SIF frequently were less likely to share syringes irrespective of their SIF use), a retrospective analysis showed that individuals who used the SIF frequently shared syringes at the same rate as those who did not prior to the opening of the SIF.

There are other mechanisms through which SIFs may indirectly help to reduce syringe sharing. For example, SIFs may serve to reduce the need for alternative, unsafe injecting environments such as shooting galleries, which have been found to exacerbate risk for HIV infection [38]. Evidence for such an effect comes from an evaluation from Sydney which found that the number of used syringes collected from local shooting galleries decreased by 69% during a period when SIF use increased [39]. SIFs may also indirectly address high rates of syringe sharing associated with incarceration by reducing contact between police and IDUs within public injecting scenes. Indeed, preliminary evidence from the evaluation of the Vancouver SIF has indicated that police are commonly directing IDUs found injecting in public to SIFs as an alternative to arrest [40].

Finally, although independent evaluations of syringe exchange have led to endorsements by the US National Institutes of Health Consensus Panel, US National Research Counsel, and the American Medical Association among others [4], challenges related to coverage of these programs have been documented in several settings [41]. Although the primary purpose of SIFs is to provide an environment for injecting, once established, they often become a key source of sterile syringes, thereby increasing coverage of syringe distribution efforts and contributing to the positive effects of these programs on rates of syringe sharing [12].

Promoting Cessation of Injecting

Among IDUs, the intensity of injecting is among the most reliable predictors of HIV infection [10]. Therefore, programs which serve to promote reductions in and/or cessation of injecting are a critical part of larger efforts to reduce HIV infection among IDUs. Such programs include withdrawal management (eg, detoxification programs), substitution therapies (eg, methadone), and abstinence-based addiction treatment programs. However, even though these programs are of unquestionable importance, challenges related to access remain [42••]. For example, there is evidence to suggest that individuals possessing markers of heightened risk for HIV infection often face barriers to addiction treatment access [42••], and difficulty accessing addiction treatment has been associated with elevated rates of syringe sharing [43].

There is a growing body of evidence to suggest that SIFs serve to increase use of programs that reduce injecting [13••,44,45]. For example, in Sydney, 15% of SIF users received a referral to an external service within the first 18 months of operation, and 43% of these referrals were for addiction treatment [16]. Among treatment-naïve SIF users, one in five referrals resulted in confirmed contact with a treatment service. Similar benefits in terms of referrals to addiction treatment have been found in several European settings [13••].

A recent evaluation involving a randomly selected cohort of SIF users in Vancouver found that frequent use of the SIF was associated with an elevated rate of entry into detoxification in multivariate Cox regression analyses [46]. Furthermore, this same analysis revealed an independent and positive effect of contact with the SIF's addiction counselor on time to detoxification program enrollment. In a recent follow-up study, the Vancouver evaluators found that the incidence of detoxification program use among the cohort of SIF users increased by 33% in comparison to the year prior to the SIF's opening [47]. In this study, enrollment in a detox program was found to be associated with subsequent enrollment in methadone maintenance therapy, other forms of addiction treatment, and reduced rates of injecting at the local SIF.

A small number of studies have investigated the impacts of SIFs on frequency of injecting. In Sydney, 31% of SIF users reported changes in the frequency of injecting, with 22% reporting a decrease in the frequency of injecting and 9% reporting an increase in the frequency of injecting [16]. Similarly, a small proportion of SIF users (5%) in Germany reported reductions in injection frequency and attributed the reduction to use of a SIF [48]. Other evaluations undertaken with small samples in Switzerland have also found some reductions in injecting frequency among SIF users, although the results have been somewhat mixed with some settings reporting some levels of increased injecting [21,49].

Reducing Morbidity

Despite the implementation of various programs to reduce injection-related illness, high rates of morbidity persist among IDU populations. For example, in some settings, bacterial infections associated with unsafe injecting are the primary cause of emergency department visits among IDUs [3,50]. Several studies have reported higher rates of emergency room use for injection-related bacterial infections among IDUs who are HIV positive when compared with HIV-negative IDUs [50], and it has been suggested that this trend reflects heightened biologic susceptibility to bacterial infections resulting from compromised immunity [2,50].

Previous research has found that individuals who inject in public spaces often skip important steps in the injection practice that reduce risks for bacterial infections,

such as using sterile water, “cooking” (ie, heating drugs in a spoon to sterilize), filtering drugs prior to injection, and cleaning injection sites with alcohol swabs prior to injection [51]. Ethnographic research suggests that individuals injecting in public commonly skip these steps in an effort to inject quickly and thus avoid the risk of confrontation with police and street predators [12,51].

The available evidence indicates that SIFs afford additional opportunities to provide safer injecting education to active IDUs, and this “in situ” education has been observed to promote behavioral changes toward lower-risk drug use [16,21,49,52]. However, by providing a secure alternative space for injection (ie, an alternative to public injection settings) and all the equipment needed for sterile injecting, SIFs also have potential to reduce rates of public injecting and the associated unsafe injecting practices that lead to bacterial infections. Furthermore, in addition to the provision of sterile syringes for each injection, SIF rules preventing the sharing of drugs and injecting equipment also serve to obviate indirect sharing (ie, the sharing of cookers/spoons, filters).

The impact of SIFs on public injecting has now been documented in several studies. For example, there are several reports of public drug use declining after the implementation of SIFs in several European cities [19,23,34,48,53] and in Sydney [54,55]. In Vancouver, in multivariate analyses, the establishment of a SIF was independently and positively associated with declines in the number of IDUs injecting in public, as well as the number of discarded syringes on city streets [14].

Several SIF evaluations have also revealed positive impacts of SIFs on unsafe injecting practices that are associated with morbidity among IDUs. For example, two studies undertaken in the Netherlands observed increases in safer injecting practice among SIF users over time [35,56]. Likewise, 41% of a sample of SIF users in Sydney reported improvements in injecting technique since they started using the SIF, and commonly cited benefits included less vein damage and blood loss during injections (ie, reduced capacity for environmental contamination and exposure) [16]. Other cross-sectional studies of SIF users in European cities have consistently cited reported improvement in injecting hygiene associated with SIF use [23,32,34]. In a recent cohort study, IDUs who used a SIF in Vancouver frequently were more likely to report a range of safer injecting practices (eg, use of sterile water, cooking and filtering drugs) than IDUs who used the SIF infrequently or not at all after adjustment for a range of potential confounders [57].

Process evaluations of SIFs have also found that these sites can help increase access to assessment, care, treatment of soft-tissue infections, and other illnesses common among IDUs. For example, during 26 months of operation, a SIF in Madrid provided wound care and dressing changes for skin infections on 3841 occasions [58]. A qualitative study undertaken in Vancouver indicated that the SIF was likely the only

source for assessment and care for abscesses and other injection-related infections for many local high-risk IDUs [59].

Reducing Mortality

Overdose has been a leading cause of death in many North American cities [4,6], and recent evidence suggests that overdose continues to be a primary cause of death among IDUs who are HIV positive [60]. Although the provision of methadone maintenance therapy and needle exchange attendance has been associated with a reduction in overdose incidence [61,62], ongoing high overdose rates in settings where these interventions are available demonstrate that additional public health measures are needed [4,6].

As a primary function of SIFs is to supervise injectors and respond in the event of overdose, they have the potential to fill this gap in services for IDUs [12]. Indeed, several cities have witnessed substantial reductions in overdose deaths following the establishment of SIFs. For example, in Frankfurt, the number of overdose deaths has declined from 147 in 1991 to 22 in 1997 [63]. Although this improvement can be attributed in part to an array of harm reduction services, the data show a substantial decline in the overdose rate in the year following the establishment of SIFs, and these reductions occurred while overdose rates remained stable in other parts of Germany [63]. Furthermore, during the first 18 months of Sydney’s SIF evaluation a total of 419 drug overdoses that may have otherwise occurred in an unsupervised setting were reportedly managed without brain injuries or fatalities [16,64]. Likewise, a recent evaluation from Vancouver reported 366 overdose events during an 18-month period, with no fatalities reported [65]. Some of the most compelling evidence of the impact of SIFs on overdose rates comes from a recent ecologic study that employed a time-series analysis involving data from four German cities and found a positive effect of SIFs on the rate of drug-related deaths [66].

Underexplored Opportunities to Address HIV/AIDS among IDUs

Although the available evidence suggests that SIFs can help reduce the harms associated with HIV/AIDS among IDUs through various mechanisms, there are still some opportunities that have been underexplored. For example, given that SIFs are known to attract high-risk IDUs who may have limited contact with other public health programs [17], SIFs may have potential as sites for HIV testing, especially given the growing use of rapid testing methods [67]. By increasing testing rates among high-risk IDUs, SIFs could assist in prevention efforts by ensuring that newly infected IDUs are identified and informed of their serostatus. Furthermore, recent evidence has shown that access to testing services can also serve to increase access to HIV treatment among IDUs [50]. Likewise, given the ongoing problem of poor uptake of HIV disease monitoring and HIV treatment

among IDUs [68], SIFs could expand the set of services currently offered by providing regular HIV disease monitoring (eg, monitoring of CD4 cell counts) to IDUs who are HIV positive. Such services would help to identify when IDUs should seek HIV treatment [68]. Also, although at least one SIF in Madrid has reported experience providing directly observed therapy for tuberculosis [58], SIFs could potentially assist in HIV treatment efforts by offering assisted therapy for antiretroviral as well as tuberculosis medications. Likewise, although some SIFs are embedded within larger facilities that provide access to substitution therapies such as methadone [12], many stand-alone SIFs do not provide these services. Therefore, the incorporation of substitution therapies within stand-alone SIFs would further increase the utility of this type of program.

Remaining Limitations and Challenges

Although SIFs can complement the commonly available set of services that address HIV/AIDS among IDUs, there remain several challenges and limitations associated with the delivery of SIF services and the related evaluations that should be noted.

Among the more obvious limitations associated with SIF evaluations is their limited ability to demonstrate impacts of SIF use on the incidence of HIV infection [13••]. The accurate measurement of the impact of any program or service on HIV incidence is not easy and presents a number of methodologic challenges. This is due, in part, to the fact that it would be unethical to conduct randomized, controlled trials of SIFs given the established benefits of SIFs. As well, low rates of HIV infection in some settings, such as Sydney [16], would make the assessment of the impact of a single SIF on HIV incidence a long-term project, requiring ongoing follow-up and testing of a large number of SIF users. Finally, because harm reduction programs are known to attract high-risk injectors, observational, epidemiologic studies may have significant challenges appropriately accounting for differences between SIF users and nonusers [69]. Although similar challenges pertain to the assessment of the impact of SIFs on hepatitis C incidence and abscesses and other soft-tissue infections, the higher event rate for these types of outcomes makes the related evaluations somewhat more feasible.

A further area of evaluation that has not received appropriate attention is the impact of SIFs on hospital use. Although this type of assessment may be feasible in some settings, most settings do not have the appropriate resources needed for such evaluation work [13••]. Furthermore, a thorough evaluation of the impact of a SIF on hospital use would require an assessment of both emergency department and acute bed use due to the fact that emergency department use may initially increase among SIF users as a result of appropriate early assessment and referral [3]. Similar effects have been found for other HIV-focused programs serving IDUs [70].

A further outstanding challenge for SIF evaluators involves accurately assessing the impact of SIFs on changes in patterns of drug use. Although there is now substantial evidence indicating that SIFs can play an important role in increasing uptake of detoxification and abstinence-based therapies [46,47], there are, to date, no known studies that have reported on the impact of a SIF on changes in patterns of drug use. However, a recent study from Vancouver demonstrated that SIF-facilitated referral to medical detoxification resulted in reduced subsequent use of SIF, suggesting that these programs may reduce rates of injecting [47].

A final challenge that also relates to the assessment of the impact of SIFs on the incidence of HIV infection and soft-tissue infections is the low coverage rate of most SIFs [13••]. As indicated elsewhere, many IDUs use SIFs for only a small proportion of their injections [13••]. In some settings, this is due in part to the fact that there are a limited number of SIFs running at capacity, and evaluations undertaken in several settings have found that long wait times and limited hours of operation are among the greatest barriers to access of SIF services [23,24,71]. Estimates from Vancouver and Sydney suggest that these SIFs are covering approximately 5% to 10% of all injections occurring in the local neighborhood despite the fact that the SIFs are running at capacity [72,73]. With such low coverage rates, SIFs, although capable of producing positive outcomes at the individual level, may have limited discernible impact at the population level. However, it should be noted that a population effect on overdose was found for cities with SIFs in Germany [66]. Still, in most settings, a much expanded program of supervised injection would be needed before certain impacts could be measured at the population level.

Conclusions

In summary, the available evidence suggests that medically supervised SIFs can complement the existing set of services that seek to address HIV/AIDS-related harms among IDUs. By attracting high-risk IDUs, providing safer injecting education, reducing syringe sharing, and promoting enrollment into abstinence-based withdrawal management and addiction treatment programs, SIFs can help to prevent HIV transmission and promote greater stability among active IDUs. As well, by providing an alternative space for injection, SIFs can reduce rates of public injecting and the associated unsafe injection practices that increase risk for bacterial infections and other forms of morbidity common among IDUs who are HIV positive. Finally, by providing emergency response in the event of overdose, SIFs have been shown to reduce mortality associated with injection drug use.

Although SIFs have potential to be important components of the larger set of HIV-focused services offered to

IDUs, the full potential of these programs to address issues specific to HIV/AIDS has not been realized. By expanding the existing set of services within SIFs to include HIV testing, HIV disease monitoring, directly observed therapy, and substitution therapies, SIFs could potentially have a greater impact on HIV/AIDS among IDUs.

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