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Harm Reduction Services to Prevent and Treat Infectious Diseases in People Who Use Drugs

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SYRINGE SERVICE PROGRAMS

The term “syringe service program” (SSP), also referred to as “needle exchanges” or “needle and syringe programs,” is inclusive of any setting that provides needles, syringes, and other supplies intended for injection of drugs.[2] SSPs were first established in Europe in the 1980s during the human immunodeficiency virus (HIV)/AIDS epidemic.[3] Since then, as evidence has mounted supporting their value, SSPs have been implemented worldwide.[4]

Most SSPs offer free or low-cost harm reduction services such naloxone rescue kits, education, infectious disease screening and vaccination, wound care, and recovery resources.[5–7] Identifying and screening for infectious diseases at SSPs or through SSP outreach work has resulted in successful linkage to care.[8] Onsite clinical care for HIV and hepatitis C (HCV) is less common, but can exist.[9] Since many people who inject drugs (PWID) avoid health care settings, but may be willing to engage with SSPs, integrated testing and outreach has strong potential to identify otherwise undiagnosed infectious diseases.[7] Mobile SSP units, based out of vehicles that can travel to several locations, are also poised to further geographically expand screening.[2]

In the United States, the political and funding environment for SSPs has been largely unfavorable, although recent high-profile HIV outbreaks have spurred some policy changes.[10,11] Services vary significantly in scope and scale and are often limited by regulations and

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funding.[12–15] Policy needs to evolve to allow for expansion, innovation, and research on SSP delivery models such as mobile delivery models and peer sharing networks.[6]

Evidence of Syringe Service Programs Benefit in Infectious Disease Prevention

A critical component of SSPs is the promotion of safe injection practices through supply distribution and education. An understanding of these supplies, their proper use, and risk reduction is important for communicating effectively with PWID. Items that may be available at SSPs are shown in Fig. 1 and are summarized in Table 1.

Although it can be challenging to study the effect of SSPs in the real-world setting, SSPs have clearly reduced high-risk injection behaviors such as equipment sharing, reuse, and high injection frequency.[15] This risk reduction can extend beyond SSP users to their peer network.

In terms of injection drug use (IDU)-associated infections, there is strong evidence that SSPs decrease HIV and its associated costs.[15,16] Implementation of SSPs in conjunction with other harm reduction measures in the midst of HIV outbreaks have proven effective measures to curb ongoing transmission.[17] Although pre-exposure prophylaxis (PrEP) for HIV prevention uptake has been low among PWID, SSPs can be a channel for increasing PrEP awareness and use[18]

The quality of evidence is more limited than for HIV, but SSPs can also potentially play a role in decreasing other IDU-associated infections. HCV can remain on drug equipment surfaces for several days; not surprisingly, because they distribute clean equipment, SSPs can decrease HCV risk.[19,20] Distance from SSP can increase HCV risk, whereas frequent SSP use decreases HCV risk.[21,22] Although not well-studied, infrequent SSP use has been linked to HBV.[16,23] Additionally, decreasing injection risk behaviors among SSP users suggests promise in reducing skin and soft tissue infections (SSTI), which are prevalent among PWID.[7]

Regulations Surrounding Syringe Service Programs in the United States

Despite the proven and potential benefits, SSPs remain somewhat controversial in the United States owing to the “war on drugs” ideology and the misconception that substance use disorders (SUD) represent a moral failing, as well as the fear that SSPs might lead to drug use initiation.[10,24] At the time of inaugural SSP development in the 1980s, one notable barrier was the 1988 ban on the use of federal funding for SSP programs until they could be proven safe and effective.[10,24]

As evidence on the benefits of SSPs mounted, over the decades there were several attempts to lift the funding ban.[24] After the HIV outbreak in Scott County, Indiana, brought national attention to the event and SSPs were included in the public health response, the federal ban was removed again in 2015 to allow for the use of federal funds to support SSP operations in areas or jurisdictions deemed at risk for outbreaks, excepting the actual purchase of needles and syringes.[10] This change has facilitated SSP expansion.[25] However, SSPs have been slow to spread to vulnerable areas, reflecting continuing stigma as well as hurdles posed by state and local drug paraphernalia laws.[26] By 2015, many states had updated policies to allow for

licensed SSPs, but today there are still several states that prohibit them.[11] Other regulations also affect the number of syringes that can be distributed or exchanged, for example, requiring a used syringe to be collected for each clean syringe dispensed (ie, 1-for-1 syringe exchange).[27] Overall, in the United States there continues to be a complicated regulatory landscape that hinders adequate access to sterile injection supplies.

In contrast, other countries including Canada, Australia, and many European Union nations are permissive and supportive of SSPs, with costs shared by national and local governments and even international organizations.[4,28] Many countries have also explored the use of safe injection facilities, which is discussed further in the next section.

Summary

- SSPs can decrease IDU-associated infections
- SSPs vary in availability of preventative services, such as vaccinations and PrEP, however PWID have shown interest in these important services.
- Despite evidence showing the benefits of SSPs, in the United States several regulatory barriers exist that prevent SSP expansion

SUPERVISED INJECTION FACILITIES

Individuals can bring preowned drugs to supervised injection facilities (SIFs), which are safe environments to inject drugs. SIFs are also sometimes referred to as medically supervised injection centers, safe injection facilities, supervised consumption facilities, drug consumption rooms, or overdose prevention sites. Facility staff members do not directly assist in injecting or handling any drugs preowned by the individual, but they are present to provide sterile injection equipment, answer questions on safe injection techniques, administer first aid when needed, and monitor for overdose.

SIFs were first started in the 1970s and have been operating in Europe, Australia, and Canada for decades,[29] but no legally authorized facilities exist in the United States to date. Insite, the first SIF in North America, was opened in Vancouver, Canada in 2003, as a response to the devastating epidemics of HIV and drug overdose deaths and was legally sanctioned in 2011. Mobile and in-hospital SIFs also exist in some countries.[30,31] In the United States, SIFs have faced opposition; however, SIFs in Canada and Australia have undergone numerous evaluations showing that they have multiple health and community benefits.[32,33] SIF benefits and barriers are discussed further in this section.[33–38]

Benefits of Supervised Injection Facilities

Reduce morbidity and mortality—A cohort study that compared mortality before and after Insite was opened in Vancouver, British Columbia, showed a decrease in overdose death by 35%.[34] Another study found that the number of deaths averted by Insite ranged from 1.9 to 11.7 deaths per year.[35] SIFs have reported thousands of witnessed overdoses; however, no deaths have been reported thus far.[37,39] Notably, a study from Sydney, Australia, also reported a 67% decrease in the number of ambulance calls for overdose reversal in a SIF neighborhood.[36,39]

Reduce infections—In addition to monitoring for overdoses, SIFs provide clients education on safe injection techniques, provide vaccinations, and conduct screening and treatment for sexually transmitted infections.[40] PWID who use SIFs frequently practice safer injection, and there have been significant decreases in prolonged hospitalizations for IDUassociated infections.[41,42] Modeling studies have shown that SIFs can decrease incident HIV and HCV infections[43] and the costs incurred to provide lifelong HIV care and expensive HCV treatment.[37,38,41,42,44–46]

Reduce cost—Studies have shown that SIFs are cost effective. One cost-effectiveness analysis showed that a SIF was associated with an incremental net savings of almost $14 million and 920 life-years gained over a 10-year period.[43] There are expected cost savings from averted HIV and HCV, decreased skin and soft tissue infections, averted overdose deaths, and increased uptake of medications for opioid use disorder (MOUD).[43,45–48]

Reduce drug use and increase treatment uptake—Studies in Vancouver have shown that SIF users reported less frequent reuse of syringes, and in 1 study, 57% of clients entered MOUD treatment programs.[49,50] SIFs can also facilitate referrals to the hospital for earlier intervention.[41,42]

Decrease public injecting and increase public safety—Observational studies have reported beneficial effects of SIFs for PWID and neighborhoods. PWID who used SIFs are less likely to report needle sharing (71%), to dispose of syringes unsafely (56%), and to inject in public places. By decreasing fatal drug overdoses in the streets and reducing public drug use, public safety is maintained.[37,50–52]

Barriers to Safe Injection Facilities

The barriers to opening SIFs in the United States arise from the public and legal issues that are presented in Table 2. SIF opponents report concerns that SIFs are morally or legally wrong and will promote drug use and increase crime rates; however, these fears are unsubstantiated.[33,53] In October 2019, a federal judge ruled that the bid of a nonprofit group, Safehouse, to open a SIF in Philadelphia did not violate federal law. Its opening, however, was halted in the setting of opposition.[54]

Summary

- SIFs are safe indoor spaces where PWID can inject their preowned drugs in the presence of trained staff
- SIFs decrease morbidity and mortality, while increasing treatment uptake and public safety
- The status of SIFs in the United States remains uncertain, although in 2019 a federal judge ruled that opening a SIF in Philadelphia would not violate federal law

INTEGRATING HARM REDUCTION INTO CLINICAL PRACTICE

Particularly in the setting of increasing stimulant use, harm reduction is an essential component to preventing IDU-associated infections. In addition to reviewing evidence-based harm reduction strategies to integrate into clinical practice, this section reviews the concept of low barrier programs and opportunities for providers to advocate for harm reduction policies.

Overdose Prevention

Naloxone is a cost-effective, rapidly acting opioid antagonist to reverse drug overdoses, and it is particularly effective when distributed directly to PWID.[55,56] In some states, standing orders for naloxone exist; that is, the ability for a person at risk of overdose and/or a potential bystander to purchase naloxone without a prescription.[57] Although anyone with prescribing authority is able to prescribe naloxone to patients at risk for overdose, state laws vary in terms of prescriptions for third parties (ie, potential bystanders).[58]

Barriers to obtaining naloxone, such as stigma, inconvenience, cost, and lack of syringe service or community programs, have been reported.[58,59] Given these barriers, providers should prescribe naloxone. Despite its effectiveness, the uptake of prescribing naloxone has been suboptimal, often owing to a lack of provider training, lack of time, and/or concerns for "enabling" drug use.[60,61] Strategies to improve naloxone prescribing include partnering with community organizations who can deliver naloxone education to providers,[62,63] obtaining political and institutional support to streamline naloxone education and prescribing,[64,65] and the use of existing online resources (ie, naloxone training videos).[58,66] These strategies can help providers to improve their prescribing self-efficacy and to integrate naloxone prescribing into practice. In addition, providers should counsel patients on how to recognize the signs and symptoms of an overdose.

Counseling strategies to prevent overdoses are summarized in Table 4. In addition, fentanyl test strip technology, initially developed as a tool for detecting fentanyl in the urine, has been used by many PWID to detect fentanyl in their street drugs.[67] Although use of fentanyl test strips has been associated with overdose safety,[68] there are still some fentanyl test strip limitations, including an inability to quantify fentanyl and difficulty interpreting results.[67]

Safe Injection Techniques

Safe injection techniques can reduce complications from IDU-associated infections. Provider strategies to begin these discussions include: (1) an awareness of safe injection techniques, (2) a nonjudgmental manner, (3) an awareness of local resources and regulations (SSPs, mobile units, and local policies like pharmacist dispensing), and (4) the willingness to explore the patient barriers to accessing harm reduction services.

There are multiple steps in the drug preparation process, and specific counseling points for each step are summarized in Table 3.[69,70] Asking open-ended questions (eg, "Can you walk me through how you usually inject?") can help to begin these conversations. By understanding specific injection practices, providers can then make individualized suggestions to minimize infection risk.[71] Other factors, such as stigma and a lack of access

to housing and/or SSPs or pharmacies may influence injection practices, so these issues should also be addressed.[72]

In Canada, providers have been successful in providing clean drug equipment for their patients; however, in the United States, state laws vary in terms of (1) possession of drug equipment, such as the number of needles/syringes an individual can carry and (2) provider ability to prescribe needles, syringes, and other supplies. Providers should also seek guidance from institutional or practice legal counsel to understand their scopes or practice. Provision of supplies can not only help to ensure access to clean supplies, but also help to develop a therapeutic relationship with patients.[73]

Other Preventative Measures: Vaccinations and Pre-exposure Prophylaxis for Human Immunodeficiency Virus Infection

Vaccinations—Hepatitis A, B, Td, and Tdap vaccines are indicated for PWID. Viral hepatitis vaccines may be given without serologic confirmation. PCV13 and PPSV23 vaccines should also be offered to PWID who report tobacco or alcohol use. Other age-appropriate vaccines should be given per national guidelines.[74,75]

Pre-exposure prophylaxis—PWID are at risk for acquiring HIV infection; however, PrEP uptake for PWID has been relatively low.[76] Oral tenofovir disoproxil fumarate/emtricitabine and oral tenofovir alafenamide fumarate/emtricitabine taken once daily are both approved by the US Food and Drug Administration for PrEP, although oral tenofovir alafenamide fumarate/emtricitabine has not been studied in people at risk for HIV through receptive vaginal sex and there are cost concerns.[77] Although not yet approved by the US Food and Drug Administration, long-acting injectable formulations of PrEP may be future options.[78]

In addition to increasing provider knowledge and training around PrEP prescribing,[79] strategies such as developing electronic medical record-based algorithms to alert providers of potential PrEP candidates, colocating PrEP and other services, and creating pharmacist-led PrEP programs through collaborative practice agreements are feasible and acceptable approaches to integrating PrEP prescribing into clinical practice.[80–82]

Low barrier programs—Low barrier programs incorporate a harm reduction approach of meeting patients with SUD “where they are at.” They can increase engagement in care, as well as improve patient–provider relationships and patient outcomes. These programs are flexible and meet the needs of individual patients, for example, maintaining SUD program participation even in the setting of continued drug use.[83] Although they may offer counseling services, low barrier programs do not require counseling. This harm reduction, patient-centered approach could also minimize infectious complications of IDU.[84] A lack of confidence has been cited as a provider barrier to providers offering SUD treatment[85]; however, there are several resources such as warmlines[86] and telemedicine programs for provider-to-provider consultation to help providers integrate SUD treatment into their practices.[87]

Prescribing heroin or fentanyl—In the United States, heroin cannot be prescribed. However, in other countries, prescribing heroin (also known as “supervised injectable heroin” or “heroin-assisted treatment”) with optional oral methadone had benefits for people “refractory” to MOUD. Because the heroin is quality controlled (ie, of a known potency) and dosed at intervals based on patient response, this approach has been adopted to minimize overdose risk and engage PWID in care.[88]

In Canada, in PWID who are also refractory to MOUD, there is also some evidence on treating OUD with prescribed transdermal fentanyl, which creates stable, long-acting drug levels.[89] Although diversion and safety are valid concerns, transdermal fentanyl could prove to be another harm reduction approach to mitigate the downstream infectious complications of injecting fentanyl.[89]

Advocacy and partnering with the community—Medicaid expansion has been associated with increased naloxone availability and improved health outcomes.[90,91] In addition, Good Samaritan laws can protect people from prosecution if they help to reverse an overdose.[92] Providers can play an important role in advocating for Medicaid expansion and Good Samaritan laws in states where these policies have not yet been adopted. In addition, partnering with the community is key to help promoting best practices around harm reduction.[93,94] Finally, especially in areas where harm reduction services are scarce or prohibited, providers can partner with community organizations to advocate for SSPs, SIFs, and other policies like eliminating 1-for-1syringe exchange and decriminalization of drug paraphernalia and syringe possession.

Summary

- Naloxone prescribing can be integrated into clinical practice
- Discussing safe injection techniques, offering vaccinations, and PrEP for HIV prevention are some evidence based-strategies for preventing IDU-associated infections
- Low barrier programs can improve engagement in care and patient outcomes
- Advocacy is crucial for promoting harm reduction

DISCUSSION

Harm reduction is grounded in social justice and aimed at meeting people where they are at. By integrating a harm reduction approach into practice, providers can help to mitigate the infectious complications of drug use. In addition to interacting with patients in a nonjudgmental manner and with compassion, providers should work with patients to develop practical strategies to minimize infectious consequences associated with drug use. By openly discussing safe injection techniques and access to harm reduction services such as SSPs, naloxone, and other drug equipment, providers can empower PWID to use more safely. Moreover, advocating for policies that increase access to harm reduction services, such as SIFs and elimination of 1for-1 syringe exchanges, can help to ensure that PWID are able to access lifesaving prevention and treatment services.

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KEY POINTS

- Harm reduction is a social justice movement and encompasses nonjudgmental strategies to mitigate negative consequences from ongoing drug use.
- Syringe service programs and supervised infection facilities are evidence-based strategies to prevent injection drug use-associated infections and overdoses.
- Clinicians can integrate harm reduction strategies into their practice and work with community partners to advocate for the health and safety of people who inject drugs.

WHAT IS HARM REDUCTION?

Harm reduction encompasses practical strategies, programs, and policies to help mitigate the negative consequences of drug use. Grounded in social justice, harm reduction is based on several principles and includes treating people who use drugs with respect and compassion. Harm reduction is a pragmatic approach where providers can offer people a range of options to reduce harm and individualize care plans to protect their health, while respecting the autonomy of people who use drugs.[1]

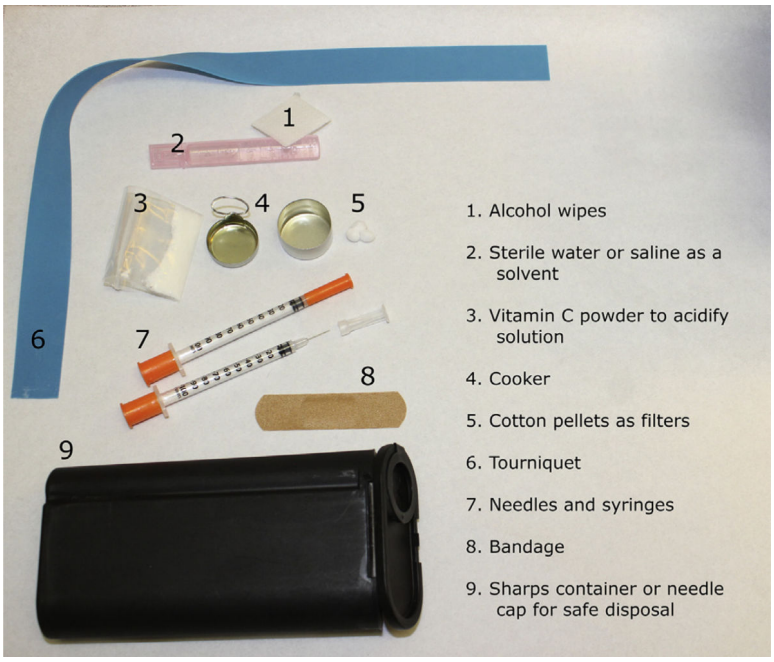

Fig. 1.
Drug preparation equipment.

Table 1

Summary of equipment for drug preparation process

Street Examples[95]	**Recommended Supplies**	**Purpose**[96–104]
No skin cleanser, tap water, soap and water, hand sanitizer, cloth/tissue, alcoholic beverage	Alcohol wipes	Clean hands and skin at injection site before injection
Spoons, bottle caps	Cookers	Sterile metal cup in which to heat up/dissolve drug powder into solvent
Tap or bottle water, pond or puddle water, spit, toilet water	Sterile water or saline	Solvent for drug solution
Lemon juice, vinegar, kettle descaler	Vitamin C	Acidify solution to help dissolve crack cocaine and “black tar” heroin
Cigarettes, cotton balls, cotton tipped swabs, tampons, lint	Dental/cotton pellets	Catch particulates as the drug solution is drawn up into the syringe; can decrease bacterial loads
Reused needles	New needles	Injecting into vein
Socks, belts, gloves, condoms	Tourniquets	Prepare vein for injection
Reused syringes	Syringes	Injecting into vein
Reused needles/syringes, trash, street	Sharps containers	Safe storage, return syringes and needles to SSP for exchange if available
No wound care	Wound care supplies: band- aids, gauze, gloves, bandage wraps, tape, ointments	Protect open wounds
No preventive services	Fentanyl test strips, condoms, naloxone kits, PrEP	Reduce overdoses, reduce sexually transmitted infections

Abbreviation: PrEP, pre-exposure prophylaxis for HIV prevention.

Table 2

Supervised injection facilities in the United States

Barriers	Arguments and Evidence to Support SIFs
Legal: Legality complicated owing to federal and state government involvement. The US forbids: Possession of controlled substances Making places available for unlawful distribution or use of a controlled substance.[27]	CSA* meant to address drug purchasing and consumption (colloquially known as the "Crack House Statute")[27] CSA not meant to influence public health interventions/infringe on state public health authority[27]
Public opinion: Although evidence support SIFs, establishing SIFs can be challenging in the setting of public opposition	PWID need public support[98] SIFs are public health interventions that can reduce mortality, morbidity, and IDU-associated infections[37,44,48,99] SIFs reduce public injecting, crime and increase public safety[50–52]
Funding: SIFs may require significant startup and operating costs. Obtaining federal, state and local funding, in addition to outside donations, can be difficult owing to the legal controversies.	Cost saving[100,101] Life saving, lead to early medical interventions, and should be publicly funded[42]

Abbreviation: CSA, Controlled Substance Act.

Table 3

Summary of drug preparation steps and safe injection counseling points

Drug Preparation Step	Counseling Points[69,70,102–106]
Injection site preparation	Wash hands before and after injection Use alcohol pads, gauze pads, and bandages at injection site Clean other surfaces blood may have touched (ie, tourniquets) To minimize SSTIs, avoid “skip popping” (injecting subcutaneously) or “muscle popping” (injecting intramuscularly) if unable to find veins Avoid major arteries and small veins Rotate injection sites
N/S	Avoid reusing N/S Although often done to recover residual drug, avoid licking needles If no clean N/S available, wash with full-strength bleach for >2 min
Filters	Cigarette or other filters that require manual manipulation increase infection risk Consider small, preformed pellets Use new filters with each injection
Cookers	Cooking drugs can decrease bacterial burden. Avoid reusing or sharing cookers
Dissolving drug	Use sterile water when possible
Acidifiers (used if injecting solids such as base heroin or crack cocaine)	Use vitamin C packets to minimize risk of fungal infections and vein damage Avoid excessive use (ie, entire vitamin C packet) owing to risk of vein damage Consider adding small amount of sodium bicarbonate to buffer solution at the end of drug preparation process[105]
Environment	Take your time; find a clean, safe space Avoid injecting alone To decrease overdose risk, inject yourself, rather than having someone else do it

Abbreviations: N/S, sterile needles and syringes; SSTIs, skin and soft tissue infections.

Table 4

Counseling points for overdose prevention

Mixing drugs	Use 1 drug at a time Minimize use of each drug Avoid mixing drugs with alcohol
Quality of drug	Test a small amount of drug first (“test shot”) Purchase from same distributor Be cautious when switching between pills, know what you are using
Overdose plan	Do not use alone Keep door unlocked and/or slightly open Call a friend to check in Have naloxone ready
Mode of administration	Injecting and smoking increase overdose risk If using alone or concerns for decreased tolerance, snort if possible

From National Harm Reduction Coalition. Overdose Prevention Tips. Available at: https://harmreduction.org/wp-content/uploads/2012/11/HRC_ODprevention_worksheet9.pdf. Accessed March 2 2020; with permission[106].