HHS Public Access

Author manuscript

Am J Prev Med. Author manuscript; available in PMC 2024 August 20.

Published in final edited form as:

Am J Prev Med. 2021 November ; 61(5 Suppl 1): S118–S129. doi:10.1016/j.amepre.2021.05.044.

Syringe Services Programs' Role in Ending the HIV Epidemic in the U.S.: Why We Cannot Do It Without Them

Dita Broz, PhD, MPH[1], **Neal Carnes, PhD**[1], **Johanna Chapin-Bardales, PhD, MPH**[1], **Don C. Des Jarlais, PhD**[2], **Senad Handanagic, MD, MPH**[1], **Christopher M. Jones, PhD, MSW**[3,4], **R. Paul McClung, MD**[1,4], **Alice K. Asher, RN, PhD**[5]

[1]Division of HIV Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention, Atlanta, Georgia;

[2]Department of Epidemiology, School of Global Health, New York University, New York, New York;

[3]National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Georgia;

[4]U.S. Public Health Service Commissioned Corps, Rockville, Maryland;

[5]Office of Policy, Planning and Partnerships, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia

Abstract

Diagnoses of HIV among people who inject drugs have increased in the U.S. during 2014–2018 for the first time in 2 decades, and multiple HIV outbreaks have been detected among people who inject drugs since 2015. These epidemiologic trends pose a significant concern for achieving goals of the federal initiative for Ending the HIV Epidemic in the U.S. Syringe services programs are cost effective, safe, and highly effective in reducing HIV transmission and are an essential component of a comprehensive, integrated approach to addressing these concerns. Yet, geographic coverage of these programs remains limited in the U.S., and many jurisdictions continue to have laws and policies that limit or disallow syringe services programs. An in-depth literature review was conducted on the role of syringe services programs in the Ending the HIV Epidemic initiative. Empirical and model-based evidence consistently shows that syringe services programs have the highest impact in HIV prevention when combined with access to medications for substance use disorder and antiretroviral therapy. Their effectiveness is further maximized when they provide services without restrictions and include proven and innovative strategies to expand access to harm-reduction and clinical services (e.g., peer outreach, telehealth). Increasing geographic and service coverage of syringe services programs requires strong and sustainable policy, funding, and

Address correspondence to: Dita Broz, PhD, MPH, Division of HIV Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention, 1600 Clifton Road Northeast, MS-E46, Atlanta GA 30333. dbroz@cdc.gov.

SUPPLEMENT NOTE

This article is part of a supplement entitled The Evidence Base for Initial Intervention Strategies for Ending the HIV Epidemic in the U.S., which is sponsored by the U.S. Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS). The findings and conclusions in this article are those of the author(s) and do not necessarily represent the official position of CDC or HHS.

community support and will need to address new challenges related to the COVID-19 pandemic. Syringe services programs have a key role in all 4 Ending the HIV Epidemic initiative strategies —Prevent, Diagnose, Treat, and Respond—and thus are instrumental to its success in preventing disease and saving lives.

CONTEXT

Sharing syringes and other injection equipment during injection drug use (IDU) continues to be an important route of HIV transmission in the U.S. and worldwide.[1–3] In the U.S., diagnoses of HIV infection attributed to IDU were steadily declining for decades,[3,4] owing in large part to effective HIV prevention interventions for people who inject drugs (PWID), including syringe services programs (SSPs) that provide access to sterile injection equipment and other health and social services.[5] HIV diagnoses among PWID increased, however, during 2014–2018, and multiple HIV outbreaks have been detected since 2015.[3,6,7] These epidemiologic trends suggest increases in HIV transmission related to IDU that pose a significant concern for achieving goals of the federal initiative Ending the HIV Epidemic (EHE) in the U.S.[8]

Over the past 2 decades, unprecedented increases in opioid use in the U.S. have led to increased prevalence of IDU[9–12] and injection-related health and social consequences that may further complicate HIV prevention.[13] For instance, the rates of acute hepatitis C virus (HCV) cases increased 71% between 2014 and 2018, indicating increases in unsafe injection practices that could also lead to HIV transmission.[14] The 2015 HIV outbreak among PWID in a nonurban area of Indiana was predated by widespread HCV transmission[15] and highlighted the devastating impact of IDU in communities that have previously lacked effective, evidence-based public health interventions, including SSPs.[16–18] The multiple HIV outbreaks across the U.S. among PWID since then further demonstrate the challenges in HIV prevention and care in the context of ongoing syndemics of drug use, overdose, and infectious diseases.[7]

Research over the past 3 decades has provided compelling evidence on the effectiveness, safety, and cost effectiveness of SSPs in preventing HIV infection among PWID.[19–23] SSPs also play a key role in reducing additional health sequelae of IDU, such as viral hepatitis, life-threatening bacterial and fungal infections, and overdose deaths,[24,25] and provide other public health benefits, including safe disposal of used syringes[26] and linkage to substance use disorder (SUD) treatment.[27,28] SSPs also can contribute to interventions for preventing drug injection initiation.[29] Importantly, SSPs have not been shown to increase drug use or crime.[30–32] Despite this overwhelming evidence, coverage of SSPs remains limited in the U.S.[33,34] and many jurisdictions continue to have laws and policies that limit or disallow SSP services.[35,36] The coronavirus disease 2019 (COVID-19) crisis has further exacerbated challenges in obtaining these lifesaving services,[37,38] compromising efforts to end HIV among PWID if not successfully addressed.

The EHE initiative aims to reduce new HIV infections in the U.S. by 90% by 2030.[8,39] EHE leverages critical scientific advances in HIV prevention and treatment and provides new resources to jurisdictions most heavily impacted. The initiative scales up 4 science-based

strategies: Prevent, Diagnose, Treat, and Respond. This special article summarizes findings from an in-depth review of available evidence on the role of SSPs in EHE.

EVIDENCE ACQUISITION

The in-depth literature review occurred in 2 stages. First, a search was conducted on December 8, 2020 in PubMed, Embase, Scopus, Cochrane, and CINAHL databases and included keywords to describe SSPs and their effectiveness, SSPs in the context of each of the 4 EHE strategies (i.e., Prevent, Diagnose, Treat, and Respond), and SSPs' operational successes and challenges. Results were limited to articles in English, published in peer-reviewed, professional publications. Given the breadth of scientific evidence, this review focused on studies published since the 2004 WHO comprehensive literature review.[40] Publications before 2004 were included for historical reference or if more recent publications were not available. Second, additional reviews of documents not identified in the first search were conducted, which included materials disseminated through the Centers for Disease Control and Prevention (CDC) website (e.g., factsheets), additional papers referenced by publications identified in the first review, and papers published during the writing of this manuscript after December 8, 2020.

EVIDENCE SYNTHESIS

The first SSPs were established in the U.S. in the late 1980s in response to the HIV epidemic. Since then, many studies in the U.S. and internationally have demonstrated SSP safety and effectiveness in reducing HIV transmission, and in 2004, WHO declared the provision of sterile injection equipment to PWID an essential component for HIV prevention programs.[41] In December 2020, the North American Syringe Exchange Network directory listed 494 SSPs operating in 44 states and Puerto Rico.[42]

Provision of sterile syringes and safe disposal of used syringes are fundamental services of all SSPs. Many SSPs offer additional services for preventing HIV transmission and other health and social sequelae of drug use.[43,44] Programs are located in all regions of the country,[42,45] and although most are fixed sites, some operate mobile sites, on-demand/on-call services, street outreach, and delivery to increase access.[46,47] To further expand syringe distribution to areas where SSP implementation is limited or not feasible, pharmacies, hospitals, mail delivery, and vending machines can provide important complementary services to SSPs (Box 1[48–56]).[57] The philosophical underpinning of all SSPs is harm reduction and creating a safe space for people who use drugs to receive needed, targeted services without fear of judgment or punishment.

Effectiveness of Syringe Services Programs to Prevent HIV

The effectiveness of SSPs in reducing injection risk behaviors and HIV transmission has been well studied, with research dating back to 1989.[20,40] Early studies found that if SSPs are implemented when HIV prevalence is <5% among PWID, on a large scale, and with trust-building communication with PWID, SSPs can reduce and maintain HIV transmission at low levels.[58] An HIV incidence study in New York City in 1992–2002 found that, if implemented on a large scale during ongoing high HIV prevalence (>40%) among PWID,

SSPs can lead to large reductions in HIV incidence and eventual public health control of HIV transmission among PWID.[59] A recent meta-analysis of SSP effectiveness that included studies from North America and Europe estimated a 58% reduction in HIV among PWID attending SSPs compared with PWID who did not.[20]

The effectiveness of SSPs in preventing HIV depends, in part, on their ability to follow evidence-based best practices for services delivery.[44] A key best practice is ensuring needs-based syringe distribution; that is, providing access to sterile syringes based on client needs and without restrictions as part of low-threshold service provision. Difficulty in accessing sterile injection equipment is associated with increased syringe sharing and reuse,[60,61] whereas sufficient access can significantly decrease syringe sharing.[62,63] When PWID are able to use a sterile syringe for each injection, HIV transmission can be reduced by almost 60%.[20] A survey of clients from 24 SSPs found that 61% of PWID who attended SSPs with needs-based syringe distribution policies obtained a sterile syringe for each reported injection compared with 26% of PWID accessing SSPs with a limited 1-for-1 syringe distribution policy (i.e., 1 sterile syringe is exchanged for 1 used syringe).[64] Concerns that increasing access to syringes may increase the number of improperly discarded syringes in a community have not been substantiated by available evidence.[65] Although any sharp litter that can cause injury is a concern, HIV transmission following community-acquired needlestick injury is extremely unlikely and no cases have been reported to date.[66] Building on decades of research, CDC recommends needs-based syringe distribution for SSPs to ensure a new, sterile syringe for each injection.[67] A needs-based syringe distribution model also recognizes the essential role of peers, including current clients of SSPs, as syringe distributors and risk reduction educators.[68] Peer distributors have been found to reach more diverse networks of PWID and those facing barriers to accessing SSPs (e.g., houselessness, lack of transportation).[69] Despite this, majority of the SSPs operate under policies that restrict the number of syringes provided, which often also impacts the capacity to support peer distribution.[45]

Additional best practices focus on ensuring low-threshold access to all other SSP services, strong community partnerships, and program sustainability. Table 1 summarizes recommendations from a 2009 expert consultation meeting for maximizing SSP effectiveness[70] and a 2020 CDC technical package for SSPs.[71]

Although SSPs are effective in reducing HIV risk among PWID through sterile syringe access without ancillary services readily available,[72,73] empirical evidence and model-based projections consistently show that SSPs have the highest impact in HIV prevention when a comprehensive, integrated approach is implemented.[44,57] This holistic prevention and care approach addresses the myriad health and social sequelae of IDU that also impact HIV prevention. The combination of services, in addition to needs-based syringe access, includes at minimum: access to HIV and HCV testing and linkage to care; SUD treatment, including medications for opioid use disorder (MOUD); and naloxone distribution.[71]

Role of Syringe Services Programs in HIV Testing

Diagnosing people with HIV as early as possible is key to rapid initiation of treatment and viral suppression; nevertheless, only 55% of PWID received HIV testing in the past year per

CDC recommendations.[74] Because SSPs often reach PWID who may not otherwise engage with the healthcare system, SSPs are an important source of regular HIV testing. In a survey of PWID conducted across 23 SSPs, 44% reported a primary care visit in the past 6 months, but 78% had ≥2 SSP visits in the past 30 days.[75] In a study of administrators from 127 SSPs, 87% reported providing on-site HIV testing.[76] This is in contrast to other settings frequented by PWID, including SUD treatment facilities, of which only 23%–40% report offering any testing,[77] and emergency departments, where <1% of visits overall include HIV testing.[78]

When HIV testing is offered at SSPs, uptake can be high. One SSP in Miami found a 42% increase in HIV and HCV testing when they offered both tests to all clients at intake and monthly thereafter.[79] A meta-analysis found that PWID accessing SSPs were 1.6 times more likely to have had an HIV test in the past year.[80] Nevertheless, key barriers to HIV testing exist and may impact uptake at SSPs. A study of 127 SSPs found that although a large proportion of SSPs offered HIV testing, an average of 15%–17% of clients tested on-site.[76] The authors noted potential financial and organizational capacity barriers, in addition to client-related barriers, to testing. The EHE scale-up efforts coupled with new resources provide an important opportunity to expand HIV testing for PWID through increasing the geographic coverage of SSPs and by supporting improvements in SSPs' capacity to provide regular HIV testing services and linkage to care. Such efforts need to include strategies to address barriers previously found to be associated with low uptake of HIV testing, including housing instability, stigma around drug use, social isolation, and inadequate transportation.[81,82]

Role of Syringe Services Programs in Biomedical Interventions

Improving access and use of HIV pre-exposure prophylaxis (PrEP) by people without HIV and antiretroviral therapy (ART) for people with HIV to achieve viral suppression is key to HIV prevention. These biomedical interventions also address sexual transmission among PWID. Other interventions, such as SUD treatment, can reduce IDU and thereby lower injection transmission risk and improve adherence of both PrEP and ART medications.

SSPs can have an important role in connecting PWID with these interventions. PWID face significant individual and structural barriers to accessing clinical HIV prevention and care services, including out-of-pocket medical costs, lack of health insurance, lack of transportation, housing instability, negative healthcare experiences, and low provider willingness to prescribe HIV medications amidst concerns about adherence, in addition to the many competing priorities related to drug use.[83–89] However, because SSPs can offer a comprehensive, integrated approach for harm reduction, they are well situated to assist PWID in overcoming these barriers and provide or facilitate linkage to client-centered prevention and care services to achieve EHE goals. Implementation research is critical to addressing how to effectively and efficiently integrate these services in SSPs.[90]

Pre-exposure prophylaxis.—Daily oral emtricitabine and tenofovir as PrEP can reduce the risk of HIV infection among PWID by 49%, with even higher efficacy (74%) given sufficient adherence.[91] Nevertheless, awareness and use of PrEP among PWID remain low.[74,92–94] Among those aware, interest in using oral daily PrEP has been around 60%

in studies of urban and rural PWID,[92–96] but only 1%–4% of PWID have reported using PrEP.[74,92,93,97] PWID attending SSPs report greater awareness of PrEP, suggesting that SSPs provide an effective avenue for increasing PrEP awareness and utilization.[83–85,98] Several studies have found that PWID prefer accessing PrEP at SSPs where there may be less stigma and greater comfort, and colocation could reduce the burden of additional clinical visits.[83–86,89] Providers also prefer service colocation, which could include placing PrEP providers within an SSP or allowing standing PrEP orders for PWID at SSPs.[73,99]

Evidence-based program models for successful PrEP implementation within SSPs remain sorely needed. Two studies found that although most PWID accessing SSPs expressed interest in using PrEP, none initiated PrEP.[96,100] In a study of women who inject drugs, more than two thirds initiated PrEP, although of these, only about a third remained on PrEP at Week 24 and daily adherence was low.[101] These findings suggest that SSPs offering PrEP need support to help identify and address barriers to PrEP uptake and adherence among their clients. Further, SSPs may need to develop options for direct provision or facilitating direct provision of PrEP, possibly via telehealth providers, to support low-barrier access and timely PrEP initiation.

Antiretroviral therapy.—SSPs serve an important role in diagnosing, linking, and navigating PWID to HIV care, supporting them along the continuum of care to achieve viral suppression, and thus contribute to preventing ongoing HIV transmission and improving health outcomes.[87,102–104] In 2015, approximately a quarter of the 127 surveyed SSP administrators indicated that their programs offered HIV viral load testing or HIV treatment.[76] In Kentucky, North Carolina, and West Virginia, a region hard hit by the opioid crisis and of particular concern for HIV outbreaks, a recent study found that most SSPs in these states linked their clients to HIV care services, thus suggesting feasibility of these clinical services in both urban and rural SSPs.[105] Modeling studies demonstrate a significant impact of SSPs when combined with ART,[44] and SSPs can provide strategies, such as telehealth, directly administered ART, and on-site medical lockers to store ART for SSP clients, to further support ART use and adherence.[87,106] HIV care and navigation services at SSPs can be tailored to meet the unique needs of PWID subpopulations, such as pregnant women, women who engage in sex work, young PWID, and trans PWID, within a trusted, judgment-free setting.[88,107]

Substance use disorder treatment.—Treatment for SUD, including MOUD, is a key health service that can reduce or stop IDU, thus lowering HIV transmission risk.[108–111] Modeling studies demonstrate strong, cumulative effects when SSPs and access to MOUD are offered, reducing the risk of HIV transmission by nearly 50%.[44] Furthermore, research has consistently shown that comprehensive SSPs with MOUD and ART assist PWID to increase ART adherence, and this may also have implications for PrEP use and adherence.[44,88] When referrals and patient navigation for SUD are offered, SSP clients are more likely to enter and remain in SUD treatment and stop injecting drugs than PWID who do not use SSPs.[27,112] MOUD without additional interventions (e.g., psychosocial or behavioral therapy) has been found to be an effective treatment for SUD[113]; thus, access to MOUD that is low-threshold, client-centered, and affordable is essential. COVID-19–related

temporary policy changes to federal guidance for MOUD treatment providers that allow telehealth to substitute in-person visits and increased number of doses patients bring home are positive improvements and should become permanent.[114] Telehealth capacity in SSPs could greatly improve access to health services; an SSP in Miami recently implemented a free telehealth system to help clients initiate MOUD,[115] which could provide a framework for expanding access to other clinical services, including PrEP and ART.

Role of Syringe Services Programs in Outbreak Response

Effective HIV outbreak response requires health departments and their communities to establish partnerships and processes to identify rapid HIV transmission and respond swiftly by delivering HIV prevention and care services.[116] In recent years, multiple HIV outbreaks in the U.S. have affected PWID.[7,16] Without exception, SSPs have been crucial to the success of these outbreak responses. SSPs can support early detection of HIV transmission through routine HIV testing and retesting. By developing trusting relationships with PWID, SSP staff are also well positioned to identify shifts in drug use or injection behaviors that might signal increased concern for HIV risk.

When an outbreak is detected, SSPs provide valuable infrastructure for rapid delivery of essential prevention and care services, including expanded HIV testing, increased delivery of sterile injection equipment, linkage to care for HIV and SUD, PrEP, and delivery of health messages via peer networks or peer-education interventions.[117,118] To rapidly identify service needs and barriers, SSPs can also facilitate qualitative interviews, quantitative surveys, or other rapid assessments; these investigation activities have been essential in identifying drivers of transmission in prior responses.[119,120] Mobile SSPs can provide flexibility for directing services to new areas affected by an outbreak and for reaching community members unable to access fixed sites. Integration of SUD treatment, ART, and PrEP into SSP operations can be especially valuable during an outbreak, and close collaboration among SSPs, healthcare facilities, and health department staff (including disease intervention specialists) can promote a timely, well-coordinated, and culturally competent response.

Proactive implementation of an SSP before an outbreak occurs is vital for reducing an outbreak's size and scope when compared with reactive implementation or the absence of SSPs.[17] SSP implementation during an outbreak among PWID is possible, however, and should be prioritized early in the response. Of note, many recent U.S. outbreaks occurred in communities with an established SSP,[7] indicating the importance of ongoing monitoring of changes in drug use patterns that may increase HIV transmission risk and identifying potential gaps in SSP services that can limit SSP effectiveness. Such gaps must be addressed with urgency during a response to interrupt HIV transmission. In prior outbreaks, identification of these gaps has led to new investments in services for PWID during and after the outbreak, including expansion or establishment of new SSPs, expansion of HIV testing, and hiring new staff to support future response efforts.[16,120–122]

Challenges to Syringe Services Program Implementation

Despite strong evidence demonstrating their public health benefits, SSPs remain limited in number, scale, scope, and reach in the U.S. owing to persistent legal, sociopolitical, and funding challenges.[5,35,123–126] These issues, in particular longstanding federal funding prohibitions or restrictions, have led to an inefficient and uneven patchwork of laws, regulations, and policies related to SSPs. Moreover, some states maintain laws that criminalize possession of syringes, needles, and other injection equipment as well as directly prohibit the implementation of SSPs.[123,124,127] Although increasing rates of overdose and infectious disease transmission among PWID have caused some states to enact SSP-supportive laws or policies,[128–130] SSP implementation has not been commensurate with need[131,132]; some SSPs implemented after the 2015 HIV outbreak in Indiana were closed,[126,133] and challenges related to laws and policies, funding, and community acceptance remain.

Laws and policy.—As of August 2019, a total of 32 states had laws that explicitly authorized SSPs and 39 states had taken steps to address legal concerns related to SSPs. However, in many of these states, inconsistencies and limitations among the laws persist, such as having laws that authorize distribution of syringes and others making possession of syringes illegal, or laws that required local governments or public safety to approve or be consulted before an SSP could be implemented. Furthermore, 12 states still provide no legal basis for SSP operation; these include 4 of the 7 EHE states designated as having a substantial number of HIV diagnoses in rural areas, and many are located in the U.S. South where HIV burden is high.[129,134,135] Recent research found that among a geographically diverse sample of urban and rural SSPs, program administrators depicted many legal and policy challenges that limit SSPs. Many described operating in an ambiguous legal environment, and some underground or without explicit legal protection at the state or local level. Even in states with laws explicitly authorizing SSPs, they faced a complex and challenging process to receive local approval or attain community buy-in to implement or expand SSPs.[35]

Funding.—Funding for SSPs has improved in recent years owing to the partial lifting of the ban on use of federal funds to support SSP services through the Consolidated Appropriations Act of 2016[136]; however, the ban on using these funds to purchase syringes has been a key challenge for SSPs.[35] In addition, before these federal funds can be used, jurisdictions must provide evidence to CDC and receive a Determination of Need (DON) that they are experiencing or are at risk for significant increases in viral hepatitis or HIV infections owing to IDU.[136] Currently, 6 states have not requested a DON.[137] Importantly, after receiving a DON, jurisdictions and SSPs are still faced with having limited dedicated federal funding programs for SSPs. Emblematic of SSP funding challenges are the limited number of locations, days, and hours SSPs are able to operate.[138] In 1 study, nearly 45% of SSPs were open 1 day per week and 41% were open ≤3 hours on the days they were open.[35] The American Rescue Plan Act of 2021, which became law during the writing of the manuscript, directed resources to the Substance Abuse and Mental Health Services Administration that allows for support of SSPs and other harm-reduction services in the U.S.[139] Guidance for implementing these funds is still in development.

Community acceptance.—Community acceptance and stigma are chronic problems facing SSPs and are inextricably linked to the persistent legal, policy, and funding challenges.[35,126,140] A recent survey of U.S. adults found that 39% supported legalization of SSPs in their communities, and this varied significantly across political and socio-demographic characteristics. In addition, individuals who held greater stigma toward people who use opioids were 51% less likely to support legalization of SSPs, underscoring the import role stigma plays in support for SSPs.[141]

COVID-19.—The COVID-19 pandemic significantly disrupted provision of SSP services and may compromise EHE efforts. As of April 2020, of 173 surveyed SSPs, 43% surveyed reported decreased availability of services, including in-person provision of injecting equipment or naloxone, HIV or HCV testing, and referrals to SUD treatment, and 25% closed ≥1 location.[37] In another study of 65 SSPs, 15% discontinued all their services, and 25% have switched fully to mobile provision.[142] Only 26% of SSPs continued to provide HIV or HCV testing, and most discontinued the provision of other medical services for clients.

The legal, sociopolitical, and funding challenges SSPs face result in missed opportunities to implement or expand comprehensive SSPs and limit their public health impact. The COVID-19 pandemic is further exacerbating existing barriers to SSP services and expanding inequity. If not addressed, these challenges stand to limit progress of the EHE initiative. Actions that can be taken to address these challenges are listed in Table 2.

CONCLUSIONS

Ending the HIV epidemic among PWID is achievable. We understand how HIV is transmitted among PWID and we have highly effective behavioral and biomedical interventions to substantially reduce risk and get close to 0 new HIV infections. SSPs are highly effective, cost effective, and safe in reducing HIV transmission in the communities where they operate. Their impact is maximized when they can follow best practices (e.g., needs-based access to sterile syringes) and are combined with access to MOUD, PrEP, and ART. SSPs have a key role in all 4 EHE strategies—Prevent, Diagnose, Treat, and Respond—and thus are instrumental to the success of EHE efforts. Nevertheless, coverage of these programs remains low in the U.S., and the COVID-19 crisis is further exacerbating existing challenges SSPs face. Increasing geographic and service coverage of SSPs will require strong and sustainable policy, funding, and community support to build on the successes of these programs and to drive innovation to prevent disease and save lives. Implementation research will be critical to informing these expansion efforts. With the EHE initiative, we have an opportunity of a lifetime to eliminate HIV among PWID and we have an ethical obligation to deliver the necessary programs at the scale required.

ACKNOWLEDGMENTS

The authors would like to thank Jack F. Colbert, Librarian from the Stephen B. Thacker Centers for Disease Control and Prevention Library, for his assistance with generating the initial literature review and reference library. The authors also thank Dawn Smith and Andrew Margolis for reviewing an early version of the manuscript and providing valuable input.

All authors, other than DCDJ, were employees of the Centers of Disease Control and Prevention.

The authors alone made decisions about the scientific review design and interpretation of findings, writing the report, and the decision to submit the report for publication.

No financial disclosures were reported by the authors of this paper.

REFERENCES

1. Des Jarlais DC, Sypsa V, Feelemyer J, et al. HIV outbreaks among people who inject drugs in Europe, North America, and Israel. Lancet HIV. 2020;7(6):e434–e442. 10.1016/S2352-3018(20)30082-5. [PubMed: 32504576]
2. The Joint United Nations Programme on HIV/AIDS (UNAIDS). 2020 global AIDS update Seizing the moment—tackling entrenched inequalities to end epidemics. Geneva, Switzerland: The Joint United Nations Programme on HIV/AIDS (UNAIDS). https://www.unaids.org/en/resources/documents/2020/global-aids-report. Published July 6, 2020. Accessed December 28, 2020.
3. Centers for Disease Control and Prevention. HIV surveillance report, 2018 (updated), 31. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-2018-updated-vol-31.pdf. Published May 2020. Accessed December 28, 2020.
4. Centers for Disease Control and Prevention. HIV/AIDS surveillance report, 1994;6(no. 2). Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-report-1994-vol-6-2.pdf. Accessed December 28, 2020.
5. Des Jarlais DC, Kerr T, Carrieri P, Feelemyer J, Arasteh K. HIV infection among persons who inject drugs: ending old epidemics and addressing new outbreaks. AIDS. 2016;30(6):815–826. 10.1097/QAD.0000000000001039. [PubMed: 26836787]
6. HIV and people who inject drugs. Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/group/hiv-idu.html. Accessed December 8, 2010.
7. Lyss SB, Buchacz K, McClung RP, Asher A, Oster AM. Responding to outbreaks of human immunodeficiency virus among persons who inject drugs-United States, 2016–2019: perspectives on recent experience and lessons learned. J Infect Dis. 2020;222(suppl 5):S239–S249. 10.1093/infdis/jiaa112. [PubMed: 32877545]
8. Fauci AS, Redfield RR, Sigounas G, Weahkee MD, Giroir BP. Ending the HIV epidemic: a plan for the United States. JAMA. 2019;321(9):844–845. 10.1001/jama.2019.1343. [PubMed: 30730529]
9. Maxwell JC. The prescription drug epidemic in the United States: a perfect storm. Drug Alcohol Rev. 2011;30(3):264–270. 10.1111/j.1465-3362.2011.00291.x. [PubMed: 21545556]
10. Jones CM, Logan J, Gladden RM, Bohm MK. Vital signs: demographic and substance use trends among heroin users - United States, 2002–2013. MMWR Morb Mortal Wkly Rep. 2015;64(26):719–725. [PubMed: 26158353]
11. Rudd RA, Aleshire N, Zibbell JE, Gladden RM. Increases in drug and opioid overdose deaths–United States, 2000–2014. MMWR Morb Mortal Wkly Rep. 2016;64(50–51):1378–1382. 10.15585/mmwr.mm6450a3. [PubMed: 26720857]
12. Hedegaard H, Miniño AM, Warner M. Drug overdose deaths in the United States, 1999–2018. Hyattsville, MD: National Center for Health Statistics. https://www.cdc.gov/nchs/data/databriefs/db356-h.pdf. Published January 2020. Accessed December 28, 2020.
13. Levitt A, Mermin J, Jones CM, See I, Butler JC. Infectious diseases and injection drug use: public health burden and response. J Infect Dis. 2020;222(suppl 5):S213–S217. 10.1093/infdis/jiaa432. [PubMed: 32877539]
14. People coinfected with HIV and viral hepatitis. Centers for Disease Control and Prevention. https://www.cdc.gov/hepatitis/populations/hiv.htm#ref11. Updated September 21, 2020. Accessed December 28, 2020.
15. Ramachandran S, Thai H, Forbi JC, et al. A large HCV transmission network enabled a fast-growing HIV outbreak in rural Indiana, 2015. EBioMedicine. 2018;37:374–381. 10.1016/j.ebiom.2018.10.007. [PubMed: 30448155]

16. Peters PJ, Pontones P, Hoover KW, et al. HIV infection linked to injection use of oxymorphone in Indiana, 2014–2015. N Engl J Med. 2016;375(3):229–239. 10.1056/NEJMoa1515195. [PubMed: 27468059]

17. Goedel WC, King MRF, Lurie MN, et al. Implementation of syringe services programs to prevent rapid human immunodeficiency virus transmission in rural counties in the United States: a modeling study. Clin Infect Dis. 2020;70(6):1096–1102. 10.1093/cid/ciz321. [PubMed: 31143944]

18. Gonsalves GS, Crawford FW. Dynamics of the HIV outbreak and response in Scott County, IN, USA, 2011–15: a modelling study. Lancet HIV. 2018;5(10):e569–e577. 10.1016/S2352-3018(18)30176-0. [PubMed: 30220531]

19. Wodak A, Cooney A. Do needle syringe programs reduce HIV infection among injecting drug users: a comprehensive review of the international evidence. Subst Use Misuse. 2006;41(6–7):777–813. 10.1080/10826080600669579. [PubMed: 16809167]

20. Aspinall EJ, Nambiar D, Goldberg DJ, et al. Are needle and syringe programmes associated with a reduction in HIV transmission among people who inject drugs: a systematic review and meta-analysis. Int J Epidemiol. 2014;43(1):235–248. 10.1093/ije/dyt243. [PubMed: 24374889]

21. Determination that a demonstration needle exchange program would be effective in reducing drug abuse and the risk of acquired immune deficiency syndrome infection among intravenous drug users. Fed Regist. 2011;76(36):10038.. To be codified at 76 FR 10038 https://www.federalregister.gov/documents/2011/02/23/2011-3990/determination-that-a-demonstration-needle-exchange-program-would-be-effective-in-reducing-drug-abuse. Accessed December 28, 2020.

22. Ruiz MS, O'Rourke A, Allen ST. Impact evaluation of a policy intervention for HIV prevention in Washington, DC. AIDS Behav. 2016;20(1):22–28. 10.1007/s10461-015-1143-6. [PubMed: 26336945]

23. Ruiz MS, O'Rourke A, Allen ST, et al. Using interrupted time series analysis to measure the impact of legalized syringe exchange on HIV diagnoses in Baltimore and Philadelphia [published correction appears in J Acquir Immune Defic Syndr. 2020;83(2):e12] J Acquir Immune Defic Syndr. 2019;82(2):S148–S154 (suppl 2). 10.1097/QAI.0000000000002176. [PubMed: 31658203]

24. Platt L, Minozzi S, Reed J, et al. Needle and syringe programmes and opioid substitution therapy for preventing HCV transmission among people who inject drugs: findings from a Cochrane Review and meta-analysis. Addiction. 2018;113(3):545–563. 10.1111/add.14012. [PubMed: 28891267]

25. Macarthur GJ, van Velzen E, Palmateer N, et al. Interventions to prevent HIV and hepatitis C in people who inject drugs: a review of reviews to assess evidence of effectiveness. Int J Drug Policy. 2014;25(1):34–52. 10.1016/j.drugpo.2013.07.001. [PubMed: 23973009]

26. Levine H, Bartholomew TS, Rea-Wilson V, et al. Syringe disposal among people who inject drugs before and after the implementation of a syringe services program. Drug Alcohol Depend. 2019;202:13–17. 10.1016/j.drugalcdep.2019.04.025. [PubMed: 31280002]

27. Hagan H, McGough JP, Thiede H, Hopkins S, Duchin J, Alexander ER. Reduced injection frequency and increased entry and retention in drug treatment associated with needle-exchange participation in Seattle drug injectors. J Subst Abuse Treat. 2000;19(3):247–252. 10.1016/s0740-5472(00)00104-5. [PubMed: 11027894]

28. Strathdee SA, Ricketts EP, Huettner S, et al. Facilitating entry into drug treatment among injection drug users referred from a needle exchange program: results from a community-based behavioral intervention trial. Drug Alcohol Depend. 2006;83(3):225–232. 10.1016/j.drugalcdep.2005.11.015. [PubMed: 16364566]

29. Des Jarlais D, Uuskula A, Talu A, et al. Implementing an updated "Break the Cycle" intervention to reduce initiating persons into injecting drug use in an Eastern European and a U.S. "opioid epidemic" setting. AIDS Behav. 2019;23(9):2304–2314. 10.1007/s10461-019-02467-y. [PubMed: 30879209]

30. Marx MA, Crape B, Brookmeyer RS, et al. Trends in crime and the introduction of a needle exchange program. Am J Public Health. 2000;90(12):1933–1936. 10.2105/ajph.90.12.1933. [PubMed: 11111271]

31. Galea S, Ahern J, Fuller C, Freudenberg N, Vlahov D. Needle exchange programs and experience of violence in an inner city neighborhood. J Acquir Immune Defic Syndr. 2001;28(3):282–288. 10.1097/00042560-200111010-00014. [PubMed: 11694838]
32. Fisher DG, Fenaughty AM, Cagle HH, Wells RS. Needle exchange and injection drug use frequency: a randomized clinical trial. J Acquir Immune Defic Syndr. 2003;33(2):199–205. 10.1097/00126334-200306010-00014. [PubMed: 12794555]
33. Tempalski B, Cooper HL, Friedman SR, Des Jarlais DC, Brady J, Gostnell K. Correlates of syringe coverage for heroin injection in 35 large metropolitan areas in the U.S. in which heroin is the dominant injected drug. Int J Drug Policy. 2008;19(suppl 1):S47–S58. 10.1016/j.drugpo.2007.11.011. [PubMed: 18295468]
34. Canary L, Hariri S, Campbell C, et al. Geographic disparities in access to syringe services programs among young persons with hepatitis C virus infection in the United States. Clin Infect Dis. 2017;65(3):514–517. 10.1093/cid/cix333. [PubMed: 28402431]
35. Jones CM. Syringe services programs: an examination of legal, policy, and funding barriers in the midst of the evolving opioid crisis in the U.S. Int J Drug Policy. 2019;70:22–32. 10.1016/j.drugpo.2019.04.006. [PubMed: 31059965]
36. Davis CS, Carr DH, Samuels EA. Paraphernalia laws, criminalizing possession and distribution of items used to consume illicit drugs, and injection-related harm. Am J Public Health. 2019;109(11):1564–1567. 10.2105/AJPH.2019.305268. [PubMed: 31536408]
37. Glick SN, Prohaska SM, LaKosky PA, Juarez AM, Corcorran MA, Des Jarlais DC. The impact of COVID-19 on syringe services programs in the United States. AIDS Behav. 2020;24(9):2466–2468. 10.1007/s10461-020-02886-2. [PubMed: 32333209]
38. Vasylyeva TI, Smyrnov P, Strathdee S, Friedman SR. Challenges posed by COVID-19 to people who inject drugs and lessons from other outbreaks. J Int AIDS Soc. 2020;23(7):e25583. 10.1002/jia2.25583. [PubMed: 32697423]
39. Ending the HIV epidemic in the U.S. (EHE). Centers for Disease Control and Prevention. https://www.cdc.gov/endhiv/index.html. Accessed January 21, 2021.
40. WHO. Evidence for action technical papers: effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injecting drug users. Geneva, Switzerland: WHO. https://www.who.int/hiv/pub/prev_care/effectivenesssterileneedle.pdf. Published 2004. Accessed December 28, 2020.
41. WHO. Policy brief: provision of sterile injecting equipment to reduce HIV transmission. Geneva, Switzerland: WHO. https://applications.emro.who.int/aiecf/web32.pdf. Published March 2004. Accessed December 28, 2020.
42. A Dave Purchase initiative. North American Syringe Exchange Network. https://nasen.org/. Accessed December 28, 2020.
43. Centers for Disease Control and Prevention. Syringe services programs (SSPs): developing, implementing and monitoring programs. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/risk/cdc-hiv-developing-ssp.pdf. Published February 2016. Accessed December 28, 2020.
44. Degenhardt L, Mathers B, Vickerman P, Rhodes T, Latkin C, Hickman M. Prevention of HIV infection for people who inject drugs: why individual, structural, and combination approaches are needed. Lancet. 2010;376(9737):285–301. 10.1016/S0140-6736(10)60742-8. [PubMed: 20650522]
45. Des Jarlais DC, Nugent A, Solberg A, Feelemyer J, Mermin J, Holtzman D. Syringe service programs for persons who inject drugs in urban, suburban, and rural areas - United States, 2013. MMWR Morb Mortal Wkly Rep. 2015;64(48):1337–1341. 10.15585/mmwr.mm6448a3. [PubMed: 26655918]
46. Strike C, Miskovic M. Scoping out the literature on mobile needle and syringe programs-review of service delivery and client characteristics, operation, utilization, referrals, and impact. Harm Reduct J. 2018;15(1):6. 10.1186/s12954-018-0212-3. [PubMed: 29422042]
47. Jones L, Pickering L, Sumnall H, McVeigh J, Bellis MA. Optimal provision of needle and syringe programmes for injecting drug users: a systematic review. Int J Drug Policy. 2010;21(5):335–342. 10.1016/j.drugpo.2010.02.001. [PubMed: 20189375]

48. McCree DH, Byrd KK, Johnston M, Gaines M, Weidle PJ. Roles for pharmacists in the “Ending the HIV Epidemic: A Plan for America” initiative. Public Health Rep. 2020;135(5):547–554. 10.1177/0033354920941184. [PubMed: 32780671]

49. Sawangjit R, Khan TM, Chaiyakunapruk N. Effectiveness of pharmacy-based needle/syringe exchange programme for people who inject drugs: a systematic review and meta-analysis. Addiction. 2017;112(2):236–247. 10.1111/add.13593. [PubMed: 27566970]

50. Meyerson BE, Davis A, Agley JD, et al. Predicting pharmacy syringe sales to people who inject drugs: policy, practice and perceptions. Int J Drug Policy. 2018;56:46–53. 10.1016/j.drugpo.2018.02.024. [PubMed: 29558701]

51. Masson CL, Sorensen JL, Perlman DC, et al. Hospital- versus community-based syringe exchange: a randomized controlled trial. AIDS Educ Prev. 2007;19(2):97–110. 10.1521/aeap.2007.19.2.97. [PubMed: 17411413]

52. Masson CL, Sorensen JL, Grossman N, Sporer KA, Des Jarlais DC, Perlman DC. Organizational issues in the implementation of a hospital-based syringe exchange program. Subst Use Misuse. 2010;45(6):901–915. 10.3109/10826080903080631. [PubMed: 20397875]

53. Torres-Leguizamon M, Reynaud EG, Néfau T, Duplessy C. HaRePo (harm reduction by post): an innovative and effective harm reduction programme for people who use drugs using email, telephone, and post service. Harm Reduct J. 2020;17(1):59. 10.1186/s12954-020-00403-1. [PubMed: 32831094]

54. Islam M, Wodak A, Conigrave KM. The effectiveness and safety of syringe vending machines as a component of needle syringe programmes in community settings. Int J Drug Policy. 2008;19(6):436–441. 10.1016/j.drugpo.2007.07.006. [PubMed: 17766100]

55. Philbin MM, Mantsios A, Lozada R, et al. Exploring stakeholder perceptions of acceptability and feasibility of needle exchange programmes, syringe vending machines and safer injection facilities in Tijuana, Mexico. Int J Drug Policy. 2009;20(4):329–335. 10.1016/j.drugpo.2008.09.002. [PubMed: 18963906]

56. Otiashvili D, Kirtadze I, Vardanashvili I, Tabatadze M, Ober AJ. Perceived acceptability of and willingness to use syringe vending machines: results of a cross-sectional survey of out-of-service people who inject drugs in Tbilisi, Georgia. Harm Reduct J. 2019;16(1):21. 10.1186/s12954-019-0292-8. [PubMed: 30898120]

57. Reddon H, Marshall BDL, Milloy MJ. Elimination of HIV transmission through novel and established prevention strategies among people who inject drugs. Lancet HIV. 2019;6(2):e128–e136. 10.1016/S2352-3018(18)30292-3. [PubMed: 30558843]

58. Des Jarlais DC, Hagan H, Friedman SR, et al. Maintaining low HIV seroprevalence in populations of injecting drug users. JAMA. 1995;274(15):1226–1231. https://jamanetwork.com/journals/jama/article-abstract/389827. [PubMed: 7563513]

59. Des Jarlais DC, Perlis T, Arasteh K, et al. HIV incidence among injection drug users in New York City, 1990 to 2002: use of serologic test algorithm to assess expansion of HIV prevention services. Am J Public Health. 2005;95(8):1439–1444. 10.2105/AJPH.2003.036517. [PubMed: 15985649]

60. Bozinoff N, Wood E, Dong H, Richardson L, Kerr T, DeBeck K. Syringe sharing among a prospective cohort of street-involved youth: implications for needle distribution programs. AIDS Behav. 2017;21(9):2717–2725. 10.1007/s10461-017-1762-1. [PubMed: 28409267]

61. Bartholomew TS, Tookes HE, Bullock C, Onugha J, Forrest DW, Feaster DJ. Examining risk behavior and syringe coverage among people who inject drugs accessing a syringe services program: a latent class analysis. Int J Drug Policy. 2020;78:102716. 10.1016/j.drugpo.2020.102716. [PubMed: 32146348]

62. Kerr T, Small W, Buchner C, et al. Syringe sharing and HIV incidence among injection drug users and increased access to sterile syringes. Am J Public Health. 2010;100(8):1449–1453. 10.2105/AJPH.2009.178467. [PubMed: 20558797]

63. Patel MR, Foote C, Duwve J, et al. Reduction of injection-related risk behaviors after emergency implementation of a syringe services program during an HIV outbreak. J Acquir Immune Defic Syndr. 2018;77(4):373–382. 10.1097/QAI.0000000000001615. [PubMed: 29271829]

64. Bluthenthal RN, Ridgeway G, Schell T, Anderson R, Flynn NM, Kral AH. Examination of the association between syringe exchange program (SEP) dispensation policy and SEP client-

level syringe coverage among injection drug users. Addiction. 2007;102(4):638–646. 10.1111/j.1360-0443.2006.01741.x. [PubMed: 17286637]

65. Bluthenthal RN, Anderson R, Flynn NM, Kral AH. Higher syringe coverage is associated with lower odds of HIV risk and does not increase unsafe syringe disposal among syringe exchange program clients. Drug Alcohol Depend. 2007;89(2–3):214–222. 10.1016/j.drugalcdep.2006.12.035. [PubMed: 17280802]
66. Moore DL. Needle stick injuries in the community. Paediatr Child Health. 2018;23(8):532–546. 10.1093/pch/pxy129. [PubMed: 30894792]
67. Centers for Disease Control and Prevention. Needs-based distribution at syringe services programs. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/ssp/docs/CDC-SSP-Fact-Sheet-508.pdf. Published December 2020. Accessed December 18, 2020.
68. Marshall Z, Dechman MK, Minichiello A, Alcock L, Harris GE. Peering into the literature: a systematic review of the roles of people who inject drugs in harm reduction initiatives. Drug Alcohol Depend. 2015;151:1–14. 10.1016/j.drugalcdep.2015.03.002. [PubMed: 25891234]
69. Snead J, Downing M, Lorvick J, et al. Secondary syringe exchange among injection drug users. J Urban Health. 2003;80(2):330–348. 10.1093/jurban/jtg035. [PubMed: 12791808]
70. New York City Department of Health and Mental Hygiene. Recommended best practices for effective syringe exchange programs in the United States: results of a consensus meeting. New York, NY: New York City Department of Health and Mental Hygiene. http://www.santa-cruzhealth.com/Portals/7/Pdfs/SEP%20Recs%20-%20Consensus%20Meeting.pdf. Published 2009. Accessed December 28, 2020.
71. Javed Z, Burk K, Facente S, Pegram L, Ali A, Asher A. Syringe services programs: a technical package of effective strategies and approaches for planning, design, and implementation. Atlanta, GA: HHS, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, Centers for Disease Control and Prevention. https://www.cdc.gov/ssp/docs/SSP-Technical-Package.pdf. Published 2020. Accessed January 5, 2021.
72. Des Jarlais DC, Marmor M, Paone D, et al. HIV incidence among injecting drug users in New York City syringe-exchange programmes. Lancet. 1996;348(9033):987–991. 10.1016/s0140-6736(96)02536-6. [PubMed: 8855855]
73. Heimer R, Kaplan EH, Khoshnood K, Jariwala B, Cadman EC. Needle exchange decreases the prevalence of HIV-1 proviral DNA in returned syringes in New Haven, Connecticut. Am J Med. 1993;95(2):214–220. 10.1016/0002-9343(93)90263-o. [PubMed: 8356986]
74. Centers for Disease Control and Prevention. HIV infection risk, prevention, and testing behaviors among persons who inject drugs—national HIV Behavioral Surveillance: injection Drug Use, 23 U.S. cities, 2018. HIV Surveillance Special Report 24. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/library/reports/surveillance/cdc-hiv-surveillance-special-report-number-24.pdf. Published February 2020. Accessed December 28, 2020.
75. Heinzerling KG, Kral AH, Flynn NM, et al. Unmet need for recommended preventive health services among clients of California syringe exchange programs: implications for quality improvement. Drug Alcohol Depend. 2006;81(2):167–178. 10.1016/j.drugalcdep.2005.06.008. [PubMed: 16043308]
76. Behrends CN, Nugent AV, Des Jarlais DC, Frimpong JA, Perlman DC, Schackman BR. Availability of HIV and HCV on-site testing and treatment at syringe service programs in the United States. J Acquir Immune Defic Syndr. 2018;79(2):e76–e78. 10.1097/QAI.0000000000001792. [PubMed: 29985266]
77. Substance Abuse and Mental Health Services Administration. National survey of substance abuse treatment services (N-SSATS): 2018. Data on substance abuse treatment facilities. Rockville, MD: Substance Abuse and Mental Health Services Administration. https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSSATS-2018.pdf. Published September 2019. Accessed December 28, 2020.
78. Hoover KW, Huang YA, Tanner ML, et al. HIV testing trends at visits to physician offices, community health centers, and emergency departments - United States, 2009–2017. MMWR Morb Mortal Wkly Rep. 2020;69(25):776–780. 10.15585/mmwr.mm6925a2. [PubMed: 32584800]

79. Bartholomew TS, Tookes HE, Serota DP, Behrends CN, Forrest DW, Feaster DJ. Impact of routine opt-out HIV/HCV screening on testing uptake at a syringe services program: an interrupted time series analysis. Int J Drug Policy. 2020;84:102875. 10.1016/j.drugpo.2020.102875. [PubMed: 32731112]
80. Bayani A, Ghiasvand H, Rezaei O, et al. Factors associated with HIV testing among people who inject drugs: a meta-analysis. J Addict Dis. 2020;38(3):361–374. 10.1080/10550887.2020.1771235. [PubMed: 32552504]
81. Neale J, Tompkins C, Sheard L. Barriers to accessing generic health and social care services: a qualitative study of injecting drug users. Health Soc Care Community. 2008;16(2):147–154. 10.1111/j.1365-2524.2007.00739.x. [PubMed: 18290980]
82. Chitwood DD, McBride DC, Metsch LR, Comerford M, McCoy CB. A comparison of the need for health care and use of health care by injection-drug users, other chronic drug users, and nondrug users. Am Behav Sci. 1998;41(8):1107–1122. 10.1177/0002764298041008007.
83. Biello KB, Bazzi AR, Mimiaga MJ, et al. Perspectives on HIV pre-exposure prophylaxis (PrEP) utilization and related intervention needs among people who inject drugs. Harm Reduct J. 2018;15(1):55. 10.1186/s12954-018-0263-5. [PubMed: 30419926]
84. Felsher M, Szep Z, Krakower D, Martinez-Donate A, Tran N, Roth AM. I don't need PrEP right now": a qualitative exploration of the barriers to PrEP care engagement through the application of the health belief model. AIDS Educ Prev. 2018;30(5):369–381. 10.1521/aeap.2018.30.5.369. [PubMed: 30332306]
85. Allen ST, O'Rourke A, White RH, et al. Barriers and facilitators to PrEP use among people who inject drugs in rural Appalachia: a qualitative study. AIDS Behav. 2020;24(6):1942–1950. 10.1007/s10461-019-02767-3. [PubMed: 31853771]
86. Adams LM, Balderson BH. HIV providers' likelihood to prescribe pre-exposure prophylaxis (PrEP) for HIV prevention differs by patient type: a short report. AIDS Care. 2016;28(9):1154–1158. 10.1080/09540121.2016.1153595. [PubMed: 26915281]
87. Tookes H, Bartholomew TS, Geary S, et al. Rapid identification and investigation of an HIV risk network among people who inject drugs–Miami, FL, 2018. AIDS Behav. 2020;24(1):246–256. 10.1007/s10461-019-02680-9. [PubMed: 31555932]
88. Bazzi AR, Drainoni ML, Biancarelli DL, et al. Systematic review of HIV treatment adherence research among people who inject drugs in the United States and Canada: evidence to inform pre-exposure prophylaxis (PrEP) adherence interventions. BMC Public Health. 2019;19(1):31. 10.1186/s12889-018-6314-8. [PubMed: 30621657]
89. Edelman EJ, Moore BA, Calabrese SK, et al. Primary care physicians' willingness to prescribe HIV pre-exposure prophylaxis for people who inject drugs. AIDS Behav. 2017;21(4):1025–1033. 10.1007/s10461-016-1612-6. [PubMed: 27896552]
90. Des Jarlais DC. Harm reduction in the USA: the research perspective and an archive to David Purchase. Harm Reduct J. 2017;14(1):51. 10.1186/s12954-017-0178-6. [PubMed: 28747189]
91. Choopanya K, Martin M, Suntharasamai P, et al. Antiretroviral prophylaxis for HIV infection in injecting drug users in Bangkok, Thailand (the Bangkok Tenofovir Study): a randomised, double-blind, placebo-controlled phase 3 trial. Lancet. 2013;381(9883):2083–2090. 10.1016/S0140-6736(13)61127-7. [PubMed: 23769234]
92. Schneider KE, White RH, O'Rourke A, et al. Awareness of and interest in oral pre-exposure prophylaxis (PrEP) for HIV prevention and interest in hypothetical forms of PrEP among people who inject drugs in rural West Virginia. AIDS Care. 2021;33(6):721–728. 10.1080/09540121.2020.1822506. [PubMed: 32951438]
93. Walters SM, Kral AH, Simpson KA, Wenger L, Bluthenthal RN. HIV pre-exposure prophylaxis prevention awareness, willingness, and perceived barriers among people who inject drugs in Los Angeles and San Francisco, CA, 2016–2018. Subst Use Misuse. 2020;55(14):2409–2419. 10.1080/10826084.2020.1823419. [PubMed: 32962490]
94. Sherman SG, Schneider KE, Park JN, et al. PrEP awareness, eligibility, and interest among people who inject drugs in Baltimore, Maryland. Drug Alcohol Depend. 2019;195:148–155. 10.1016/j.drugalcdep.2018.08.014. [PubMed: 30639794]

95. Kuo I, Olsen H, Patrick R, et al. Willingness to use HIV pre-exposure prophylaxis among community-recruited, older people who inject drugs in Washington, DC. Drug Alcohol Depend. 2016;164:8–13. 10.1016/j.drugalcdep.2016.02.044. [PubMed: 27177804]

96. Jo Y, Bartholomew TS, Doblecki-Lewis S, et al. Interest in linkage to PrEP among people who inject drugs accessing syringe services; Miami, Florida. PLoS One. 2020;15(4):e0231424. 10.1371/journal.pone.0231424. [PubMed: 32298320]

97. Mistler CB, Copenhaver MM, Shrestha R. The pre-exposure prophylaxis (PrEP) care cascade in people who inject drugs: a systematic review. AIDS Behav. 2021;25(5):1490–1506. 10.1007/s10461-020-02988-x. [PubMed: 32749627]

98. Roth AM, Aumaier BL, Felsher MA, et al. An exploration of factors impacting preexposure prophylaxis eligibility and access among syringe exchange users. Sex Transm Dis. 2018;45(4):217–221. 10.1097/OLQ.0000000000000728. [PubMed: 29465703]

99. Hershow RB, Gonzalez M, Costenbader E, Zule W, Golin C, Brinkley-Rubinstein L. Medical providers and harm reduction views on pre-exposure prophylaxis for HIV prevention among people who inject drugs. AIDS Educ Prev. 2019;31(4):363–379. 10.1521/aeap.2019.31.4.363. [PubMed: 31361517]

100. Blackstock OJ, Platt J, Golub SA, et al. A pilot study to evaluate a novel pre-exposure prophylaxis peer outreach and navigation intervention for women at high risk for HIV infection. AIDS Behav. 2021;25(5):1411–1422. 10.1007/s10461-020-02979-y. [PubMed: 32748159]

101. Roth AM, Tran NK, Felsher M, et al. Integrating HIV preexposure prophylaxis with community-based syringe services for women who inject drugs: results from the Project SHE Demonstration Study. J Acquir Immune Defic Syndr. 2021;86(3):e61–e70. 10.1097/QAI.0000000000002558. [PubMed: 33148998]

102. Summary of information on the safety and effectiveness of syringe services programs (SSPs). Centers for Disease Control and Prevention. Updated May 23, 2019 https://www.cdc.gov/ssp/syringe-services-programs-summary.html. Accessed December 9, 2020.

103. Centers for Disease Control and Prevention. CDC HIV prevention progress report, 2019. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/policies/progressreports/cdc-hiv-preventionprogressreport.pdf. Published March 2019. Accessed December 28, 2020.

104. Rich KM, Bia J, Altice FL, Feinberg J. Integrated models of care for individuals with opioid use disorder: how do we prevent HIV and HCV? Curr HIV/AIDS Rep. 2018;15(3):266–275. 10.1007/s11904-018-0396-x. [PubMed: 29774442]

105. Bixler D, Corby-Lee G, Proescholdbell S, et al. Access to syringe services programs - Kentucky, North Carolina, and West Virginia, 2013–2017 [published correction appears in MMWR Morb Mortal Wkly Rep. 2018;67(24):695] MMWR Morb Mortal Wkly Rep. 2018;67(18):529–532. 10.15585/mmwr.mm6718a5. [PubMed: 29746453]

106. Altice FL, Maru DS, Bruce RD, Springer SA, Friedland GH. Superiority of directly administered antiretroviral therapy over self-administered therapy among HIV-infected drug users: a prospective, randomized, controlled trial. Clin Infect Dis. 2007;45(6):770–778. 10.1086/521166. [PubMed: 17712763]

107. Burr CK, Storm DS, Hoyt MJ, et al. Integrating health and prevention services in syringe access programs: a strategy to address unmet needs in a high-risk population. Public Health Rep. 2014;129(suppl 1):26–32. 10.1177/00333549141291S105. [PubMed: 24385646]

108. Mattick RP, Breen C, Kimber J, Davoli M. Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. Cochrane Database Syst Rev. 2009;2009(3):CD002209. 10.1002/14651858.CD002209.pub2.

109. Mattick RP, Breen C, Kimber J, Davoli M. Buprenorphine maintenance versus placebo or methadone maintenance for opioid dependence. Cochrane Database Syst Rev. 2014(2):CD002207. 10.1002/14651858.CD002207.pub4.

110. Metzger DS, Navaline H. Human immunodeficiency virus prevention and the potential of drug abuse treatment. Clin Infect Dis. 2003;37(suppl 5):S451–S456. 10.1086/377548. [PubMed: 14648463]

111. Latkin CA, Davey MA, Hua W. Needle exchange program utilization and entry into drug user treatment: is there a long-term connection in Baltimore, Maryland? Subst Use Misuse. 2006;41(14):1991–2001. 10.1080/10826080601026027. [PubMed: 17162601]

112. Havens JR, Latkin CA, Pu M, et al. Predictors of opiate agonist treatment retention among injection drug users referred from a needle exchange program. J Subst Abuse Treat. 2009;36(3):306–312. 10.1016/j.jsat.2008.07.002. [PubMed: 18835681]

113. Carroll KM, Weiss RD. The role of behavioral interventions in buprenorphine maintenance treatment: a review. Am J Psychiatry. 2017;174(8):738–747. 10.1176/appi.ajp.2016.16070792. [PubMed: 27978771]

114. FAQs: provision of methadone and buprenorphine for the treatment of Opioid Use Disorder in the COVID-19 emergency. Substance Abuse and Mental Health Services Administration. Updated April 21, 2020 https://www.samhsa.gov/sites/default/files/faqs-for-oud-prescribing-and-dispensing.pdf. Accessed January 21, 2021.

115. Castillo M, Conte B, Hinkes S, et al. Implementation of a medical student-run telemedicine program for medications for opioid use disorder during the COVID-19 pandemic. Harm Reduct J. 2020;17(1):88. 10.1186/s12954-020-00438-4. [PubMed: 33203460]

116. Centers for Disease Control and Prevention. Managing HIV and hepatitis C outbreaks among people who inject drugs: a guide for state and local health departments. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/programre-sources/guidance/cluster-outbreak/cdc-hiv-hcv-pwid-guide.pdf. Published March 2018. Accessed May 1, 2021.

117. Golden MR, Lechtenberg R, Glick SN, et al. Outbreak of human immunodeficiency virus infection among heterosexual persons who are living homeless and inject drugs - Seattle, Washington, 2018. MMWR Morb Mortal Wkly Rep. 2019;68(15):344–349. 10.15585/mmwr.mm6815a2. [PubMed: 30998671]

118. McClung RP, Atkins AD, Kilkenny M, et al. Response to a large HIV outbreak, Cabell County, West Virginia, 2018–2019. Am J Prev Med. 2021;61(5S1):S143–S150. [PubMed: 34686283]

119. Broz D, Zibbell J, Foote C, et al. Multiple injections per injection episode: high-risk injection practice among people who injected pills during the 2015 HIV outbreak in Indiana. Int J Drug Policy. 2018;52:97–101. 10.1016/j.drugpo.2017.12.003. [PubMed: 29278838]

120. Alpren C, Dawson EL, John B, et al. Opioid use fueling HIV transmission in an urban setting: an outbreak of HIV infection among people who inject drugs-Massachusetts, 2015–2018. Am J Public Health. 2020;110(1):37–44. 10.2105/AJPH.2019.305366. [PubMed: 31725317]

121. Atkins A, McClung RP, Kilkenny M, et al. Notes from the field: outbreak of human immunodeficiency virus infection among persons who inject drugs - Cabell County, West Virginia, 2018–2019. MMWR Morb Mortal Wkly Rep. 2020;69(16):499–500. 10.15585/mmwr.mm6916a2. [PubMed: 32324723]

122. Kim MM, Conyngham SC, Smith C, et al. Understanding the intersection of behavioral risk and social determinants of health and the impact on an outbreak of human immunodeficiency virus among persons who inject drugs in Philadelphia. J Infect Dis. 2020;222(suppl 5):S250–S258. 10.1093/infdis/jiaa128. [PubMed: 32877552]

123. Lurie P, Drucker E. An opportunity lost: HIV infections associated with lack of a national needle-exchange programme in the USA. Lancet. 1997;349(9052):604–608. 10.1016/S0140-6736(96)05439-6. [PubMed: 9057732]

124. Bramson H, Des Jarlais DC, Arasteh K, et al. State laws, syringe exchange, and HIV among persons who inject drugs in the United States: history and effectiveness. J Public Health Policy. 2015;36(2):212–230. 10.1057/jphp.2014.54. [PubMed: 25590514]

125. Weinmeyer R Needle exchange programs' status in U.S. politics. AMA J Ethics. 2016;18(3):252–257. 10.1001/journalofethics.2016.18.3.hlaw1-1603. [PubMed: 27002996]

126. Allen ST, Grieb SM, O'Rourke A, et al. Understanding the public health consequences of suspending a rural syringe services program: a qualitative study of the experiences of people who inject drugs. Harm Reduct J. 2019;16(1):33. 10.1186/s12954-019-0305-7. [PubMed: 31109339]

127. Clarke K, Harris D, Zweifler JA, Lasher M, Mortimer RB, Hughes S. The significance of harm reduction as a social and healthcare intervention for injecting drug users: an exploratory study of

a needle exchange program in Fresno, California. Soc Work Public Health. 2016;31(5):398–407. 10.1080/19371918.2015.1137522. [PubMed: 27167664]

128. Tookes H, Bartholomew TS, St Onge JE, Ford H. The University of Miami Infectious Disease Elimination Act Syringe Services Program: a blueprint for student advocacy, education, and innovation. Acad Med. 2021;96(2):213–217. 10.1097/ACM.0000000000003557. [PubMed: 32590466]
129. Fernández-Viña MH, Prood NE, Herpolsheimer A, Waimberg J, Burris S. State laws governing syringe services programs and participant syringe possession, 2014–2019. Public Health Rep. 2020;135(1_suppl):128S–137S. 10.1177/0033354920921817. [PubMed: 32735195]
130. Cloud DH, Castillo T, Brinkley-Rubinstein L, Dubey M, Childs R. Syringe decriminalization advocacy in red states: lessons from the North Carolina Harm Reduction Coalition. Curr HIV/AIDS Rep. 2018;15(3):276–282. 10.1007/s11904-018-0397-9. [PubMed: 29740734]
131. Kishore S, Hayden M, Rich J. Lessons from Scott County - progress or paralysis on harm reduction? N Engl J Med. 2019;380(21):1988–1990. 10.1056/NEJMp1901276. [PubMed: 31042821]
132. amfAR, The Foundation for AIDS Research. Preventing HIV and hepatitis C among people who inject drugs: public funding for syringe services programs makes the difference. Washington, DC: amfAR, The Foundation for AIDS Research. https://www.amfar.org/uploadedFiles/_amfarorg/On_the_Hill/amfAR_SSP_Issue_Brief_April_2017-update.pdf. Published April 2017. Accessed December 28, 2020.
133. Rudavsky S Why Marion County doesn't have a needle exchange. IndyStar. December 17, 2017 https://www.indystar.com/story/news/2017/12/17/why-marion-county-doesnt-have-needle-exchange/949707001/. Accessed June 29, 2021.
134. Reif S, Safley D, McAllaster C, Wilson E, Whetten K. State of HIV in the U.S. deep south. J Community Health. 2017;42(5):844–853. 10.1007/s10900-017-0325-8. [PubMed: 28247067]
135. Centers for Disease Control and Prevention. HIV in the Southern United States. Atlanta, GA: Centers for Disease Control and Prevention. https://www.cdc.gov/hiv/pdf/policies/cdc-hiv-in-the-south-issue-brief.pdf. Published September 2019. Accessed May 1, 2021.
136. Consolidated Appropriations Act, H.R. 2029, S. 114–57, 114th Cong. (2015–2016).
137. Determination of need for syringe services programs. Centers for Disease Control and Prevention. Updated February 7, 2020 https://www.cdc.gov/ssp/determination-of-need-for-ssp.html. Accessed January 7, 2021.
138. Davis SM, Davidov D, Kristjansson AL, Zullig K, Baus A, Fisher M. Qualitative case study of needle exchange programs in the Central Appalachian region of the United States. PLoS One. 2018;13(10):e0205466. 10.1371/journal.pone.0205466. [PubMed: 30312333]
139. American Rescue Plan Act of 2021, H.R. 1319, 117th Cong. (2021).
140. Carico RR Jr, Hussain N, Sheppard J, Thomas CB, Fenerty J. Syringe services programs and real world research: an overview for pharmacists. J Am Pharm Assoc (2003). 2020;60(5):e29–e33. 10.1016/j.japh.2020.02.029. [PubMed: 32278515]
141. McGinty EE, Barry CL, Stone EM, et al. Public support for safe consumption sites and syringe services programs to combat the opioid epidemic. Prev Med. 2018;111:73–77. 10.1016/j.ypmed.2018.02.026. [PubMed: 29481827]
142. Bartholomew TS, Nakamura N, Metsch LR, Tookes HE. Syringe services program (SSP) operational changes during the COVID-19 global outbreak. Int J Drug Policy. 2020;83:102821. 10.1016/j.drugpo.2020.102821. [PubMed: 32591222]

Box 1.

Strategies Complementary to SSPs to Increase Access to Harm-Reduction Services

MINIMIZE DISTANCE, MAXIMIZE ACCESS

- ***Pharmacy syringe sales without a prescription*** can complement the access SSPs offer and play an important role in the EHE initiative.[48] Pharmacies have much larger geographic coverage and longer hours of operation than SSPs alone could provide[49] and could have a role in providing clinical services, such as dispensing ART and providing HIV screening, adherence counseling, and PrEP. However, there is great variation in state laws regulating pharmacy sales of syringes, and even when state laws permit sales, perceived pharmacists' stigmatizing attitudes toward PWID and concerns over privacy can greatly restrict pharmacy sales and use by PWID.[50] Support to empower pharmacies and pharmacists in partnering to end the HIV epidemic among PWID and considerable public advocacy are needed to reach their full potential.
- Integrating syringe access for PWID within ***hospital systems*** has been found to be a valuable strategy for engaging hard-to-reach PWID in HIV prevention and care[51]; however more studies are needed to understand the operational and legal challenges.[52]
- ***Home and mail delivery*** have been adopted by more SSPs because of the COVID-19 pandemic and could be important strategies to expanding SSP access and in reducing HIV transmission risk. In 1 recent study, 20% of the 173 SSPs surveyed provided syringe delivery services and 6% reported using mail-based delivery.[37] A mail syringe program in France found that between 2011 and 2018, <3% of clients reported ever sharing needles/syringes and only 29% reported ever reusing their needles/syringes.[53] The most commonly reported reasons for using the mail program were distance from the fixed-site SSP, fear of stigma, and need for anonymity. A similar mail program (https://nextdistro.org) began operations in the U.S. in 2017.
- ***Syringe vending machines*** (SVM) have been implemented in the U.S. and worldwide. They provide sterile injection equipment, other prevention supplies (e.g., condoms, naloxone kits), and the ability to return used injecting equipment.[54–56] Although sufficient evidence to assess the effectiveness of SVM in reducing HIV transmission among PWID is lacking,[25] SVM have been shown to be safe and improve access to harm-reduction services for remote and underserved populations.[47]

ART, antiretroviral therapy; EHE, Ending the HIV Epidemic; PrEP, pre-exposure prophylaxis; PWID, people who inject drugs; SSP, syringe services program.

Table 1.

Practices to Maximize Effectiveness of SSPs

Ensure low-threshold access to sterile syringes

- Provide needs-based access to syringes and other injection equipment
- Maximize access by increasing the number of locations and available hours
- Ensure anonymity of participants
- Minimize the administrative burden of participation (i.e., no lengthy intake processes)

Promote secondary syringe distribution

- Train and support peer educators
- Do not impose limits on the number of syringes distributed

Maximize responsiveness to characteristics of local PWID population

- Adapt planning activities and service modalities to subgroup needs
- Collect the minimum set of data necessary for program evaluation
- Engage PWID in the design and implementation of the program
- Ensure people with lived experience are represented among program staff and volunteers

As part of a comprehensive approach, provide or coordinate the provision of other health and social services
At minimum:

- HIV and HCV testing and linkage to care
- Substance use disorder treatment, including medication for opioid use disorder
- Naloxone distribution

Include diverse community stakeholders in creating a social and legal environment supportive of SSPs
For example:

- Law enforcement
- Health departments
- Local businesses
- Faith-based organizations

Avoidthe following practices:

- Supplying single-use, retractable syringes
- One-for-one exchange
- Limiting frequency of visits and number of syringes
- Imposing geographic limits
- Restricting syringe volume with unnecessary maximums
- Requiring identifying documents
- Requiring unnecessary data collection

Sources: New York City Department of Health and Mental Hygiene (2009)[70] and Javed (2020)[71].

HCV, hepatitis C virus; PWID, people who inject drugs; SSP, syringe services program.

Table 2.

Key Considerations for Successful Scale-Up of SSPs in the U.S.

Key considerations
Policy and funding
• Ensure state and local laws and regulations explicitly authorize the establishment of SSPs
• Enact or revise laws and policies that authorize broad syringe and needle possession and exempt both sterile injection equipment distributed from and used injection equipment returned to SSPs from drug paraphernalia laws
• Repeal funding bans or restrictions, including prohibition on use of funds to purchase syringes/needles
• Create dedicated funding programs for SSPs
• Ensure timely and adequate logistical and financial support for SSPs to assist them in using innovative approaches to deliver harm-reduction services to PWID during the COVID-19 pandemic
• Establish SSPs to prevent HIV outbreaks; SSPs should be implemented before an HIV outbreak occurs and should remain in the community as long as people need SSP services
• Include SSPs in public health emergency response planning
Community support
• Implement awareness campaigns that provide accurate scientific information about the public health and social benefits of SSPs and counter stigma related to PWID and SSPs
• Develop strong community partnerships to ensure that SSPs are supported; partners include law enforcement, local health and social services providers, faith-based organizations
Program operations
• Implement best practices to maximize effectiveness of SSPs (Table 1)
• Consider diverse methods for maximizing SSP services' reach, including mobile SSPs, home and mail delivery, syringe vending machines, and partnering with pharmacies, hospitals, and other healthcare providers in providing injecting equipment
• Consider telehealth as a feasible option to providing low-barrier access to SUD treatment, PrEP, and HIV care and treatment for SSP clients
• Support and conduct implementation science research to inform SSP implementation, integration of comprehensive services (e.g., ART, PrEP, SUD treatment), and program sustainment

ART, antiretroviral therapy; PrEP, pre-exposure prophylaxis; PWID, people who inject drugs; SSP, syringe services program; SUD, substance use disorder.