RECOMMENDED BEST PRACTICES FOR EFFECTIVE SYRINGE EXCHANGE PROGRAMS* IN THE UNITED STATES

RESULTS OF A CONSENSUS MEETING

* In this report we use the widely-recognized term "**syringe exchange program" (SEP)** as an abbreviated reference to the vast range of programmatic approaches to the provision of new and sterile syringes to injection drug users (IDUs). Some SEPs operate as an exchange, requiring participants to return used syringes and exchange them for new, sterile ones. Many other SEPs, however, function more as a "syringe distribution" program, providing participants with as many sterile syringes as requested, without condition. In addition, some SEPs are self-contained, freestanding programs, while in other instances the SEP function of a program may be secondary to its primary mission (e.g., a shelter for the homeless whose services include sterile syringe exchange/distribution). Throughout this report, we intend "SEP" to capture the entirety of this programmatic variation. Elsewhere this service carries the name **needle/syringe program (NSP)** or **sterile syringe provision (SSP)**. Although these labels may signify more accurately the substantive function of SEPs, they enjoy more limited usage in the United States.

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EXECUTIVE SUMMARY

Syringe Exchange Programs (SEPs) are central to reducing disease and other health burdens among people who inject illicit drugs. Over two decades of research have demonstrated the effectiveness of SEPs in preventing HIV and other blood-borne infections, as well as connecting injection drug users (IDUs) with a range of vital medical and social services and supports. This document summarizes the consensus among SEP experts of the underlying principles and programmatic elements that enable or constrain SEP effectiveness. Effective SEPs have the support of local governing bodies and match sound operational characteristics with responsiveness to the unique features of their host communities. New or expanding SEPs may benefit from technical assistance from the considerable expertise of those experienced in operating SEPs around the country. The panel highlighted operational characteristics that are critical for effective SEPs, and measures to be avoided because they undermine the primary goal of SEP: to make new, sterile syringes available to IDUs.

Characteristics of effective SEPs

- **Ensure low threshold access to services**
  - *Maximize access by number of locations and available hours*
  - *Ensure anonymity of participants*
  - *Minimize the administrative burden of participation*
- **Promote secondary syringe distribution**
  - *Train and support peer educators*
  - *Do not impose limits on number of syringes*
- **Maximize responsiveness to characteristics of the local IDU population**
  - *Adapt planning activities and service modalities to subgroup needs*
- **Provide or coordinate the provision of other health and social services**
- **Include diverse community stakeholders in creating a social and legal environment supportive of SEPs**

SEP practices to avoid

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

I. INTRODUCTION (OR BACKGROUND)

Providing new, sterile syringes to persons who inject drugs illicitly is one of the most effective means for preventing HIV transmission in the community.[1,2] Many scientific studies—including ecological studies, epidemiological analyses, and social-behavioral inquiries—demonstrate the effectiveness of syringe exchange programs (SEPs) for reducing HIV/AIDS incidence among injection drug users IDUs.[3-10] Multiple factors, including SEPs' operational characteristics and the unique features of their host communities, influence the effectiveness of a given SEP. [11,12]

Anticipating the repeal of the ban on the use of federal funds for syringe exchange programming, the New York City Department of Health and Mental Hygiene (NYC DOHMH) convened a group of SEP experts for a day-long meeting to achieve consensus on the characteristics of SEPs that maximize their likelihood of reducing injection-related morbidity and mortality among IDUs. In this report, we summarize the underlying principles and programmatic elements that enable or constrain SEP effectiveness. Moreover, we translate these characteristics into "best practices" for organizations aspiring to fund, operate, or plan for some form of sterile syringe exchange.

In this report, we present best practice standards for SEP operation, SEP data collection and evaluation, and structural recommendations to improve SEP implementation. We conclude with suggestions for further policy and research approaches that will support and expand the evidence for syringe provision programming in the US.

II. INTEGRAL COMPONENTS OF SEP OPERATION

As a public health intervention, the SEP provides new, sterile syringes to IDUs for the primary purpose of preventing blood-borne disease (principally, HIV) transmission and acquisition among IDUs, and indirectly, among their sexual partners. Secondarily, SEPs can (and often do) serve as the central mechanism by which IDUs access health services, including medical care and treatment for substance use disorders. To maximize the effectiveness of SEPs, services should be planned, implemented, and evaluated as a community-level public health intervention, rather than an individual-level program.

Below we describe the components integral to SEP success. First we specify the basic principles that comprise the recommended approach to establishing and operating an SEP. These should be considered "guiding principles" for the planning and delivery of SEPs. Following, we set forth the operational premises for the actual implementation of an SEP. These are the evidence-based protocols, policies, and procedures that SEPs should follow when providing services.

A. Guiding Principles for Supporting SEPs

To succeed in reducing morbidity and mortality within a community, SEPs must enjoy at least minimal support from their communities' respective governing bodies—the greater the governmental support, the greater the likelihood of SEP effectiveness. The following principles should guide stakeholders' discussions, plans, and actions when supporting or preparing to support programs whose primary, secondary, or tertiary purpose entails the provision of new and sterile syringes to IDUs:

1. **Prioritize meeting IDU needs for sterile syringes by promoting the most effective strategies for syringe provision** (e.g., provide IDUs with as many syringes as they request at each transaction);
2. **Maximize the number and variety of "access points" where IDUs can obtain new and sterile syringes free of** charge (e.g., support the integration of syringe provision into all programs serving IDUs even where IDU service is not the principal activity);
3. **Allow SEP participants to remain anonymous;**
4. **Ensure that IDUs can easily access sterile syringe provision;**
5. **Minimize the data collection burden on SEPs and IDUs.**

B. Operational and Programmatic Elements Critical to SEP Success

The manner in which an SEP delivers its services is a central determinant in the success of those services. [13,14] To succeed in reducing HIV/AIDS incidence in the community, SEPs should maximize the responsiveness of the service delivery environment to the particular life circumstances of participants and deliver services in a supportive, non-condemning and non-

punitive manner. More specifically, SEPs should abide by the following best practice standards in developing and delivering sterile syringe provision/service programming.

1. **Ensure "Low-Threshold" Service Access**

Injection drug use is a highly stigmatized behavior which underpins multiple forms of discrimination and barriers to services. Historically, SEPs have predicated their work on the recognition that stigmatization of IDUs[15-17] is, in itself, associated with poor health outcomes among IDUs.[17-20] SEPs therefore must contend with the effects of stigma on IDUs (e.g., distrust of health care providers) by making services simple and easy to access. In the context of public health service, the term 'low-threshold' refers to the program's expectations of the individual in order to qualify for services (i.e., the higher the threshold, the greater these expectations to qualify for services).

A low-threshold approach to services includes:

- Anonymous participation (no oral or written identification of name/identity required);
- Confidentiality of involvement;
- No requirement for participation in other services;
- Hours and location(s) of service delivery responsive to IDU population characteristics.

2. **Promote and Encourage "Secondary Syringe Distribution"**

Secondary (or satellite) distribution occurs when an SEP participant visits an SEP, obtains injection supplies (namely syringes), and then distributes some portion of these new and sterile syringes to other IDUs who do not or cannot visit the SEP themselves.

In some jurisdictions where SEPs are already authorized, secondary syringe exchange (i.e., peer-to-peer transfer of new and sterile syringes) is discouraged or prohibited by law. This approach appears to reflect liability concerns on the part of jurisdictional authorities.

However, discouraging secondary exchange greatly limits access to sterile syringes by IDUs who, for various reasons, do not access the SEP directly. Secondary syringe exchange can also be a conduit for peer education, and many programs have found that IDUs who carry out secondary exchange can provide safe injection information to those who are not accessing SEPs.[21-23]

Secondary syringe exchange and distribution should be actively *encouraged* among SEP participants, rather than simply *allowed*. To promote this activity, SEPs should abide by the following tenets of service delivery:

- Provide training to primary SEP participants as peer educators, teaching appropriate syringe disposal and injection hygiene practices and advising on SEP access and availability, for dissemination to the broader IDU community;
- Do not limit the number of syringes distributed to each individual;
- Do not restrict the number of syringes distributed at any given visit based upon the number of syringes received (i.e., programs should provide syringes beyond a 'one-for-one' ratio. [24]

3. Maximize SEP Service Responsiveness to Local IDU Population Characteristics

Numerous individual and social-environmental factors,[25-28] affect the ability of IDUs to access and utilize SEP services. Planning activities and service implementation for SEPs should be responsive to the individual-level characteristics of local IDUs, and to the environment in which services will be delivered.

IDUs are not a homogeneous population, but rather tend to form subgroups around some of their distinguishing individual characteristics. In turn, these subgroups may benefit from specialized or customized services and/or existing services adapted to meet their particular needs (e.g., spoken for non-English speakers, etc.). The most effective SEPs have developed service modalities responsive to the particular subgroups of IDUs in the communities where they operate. The following distinguishing characteristics are not mutually exclusive, yet reflect particular subgroups for whom customized services should be considered:

Demographic and Work Status	**Drug Use Characteristics**
• Youth • Homeless • Women with children • Undocumented people • Sex workers, including exotic dancers (“strippers”)	• Type of drug used (e.g., heroin, pharmaceutical opioids, cocaine, amphetamine and other stimulants, benzodiazepines, etc.) • Hormone/steroid users • Recently initiated IDUs
Cultural Factors	**Gender and Sexuality**
• Race/ethnicity • Non-English-speaking • Native Americans	• Transgender individuals • Men who have sex with men • Women who have sex with women

4. Providing and/or Coordinating the Provision of Other Services

To succeed in engaging IDUs and directing them to medical, mental health and/or drug treatment, where possible SEPs should consider providing or coordinating the provision of the following other services:

- Food and clothing distribution;
- As many concrete services as feasible, including
    1. Ancillary medical (screening and vaccinations, as well as primary care),[29-31]
    2. Social services (i.e., housing, legal aid, drug abuse treatment),[32]
    3. Counseling (i.e., safer sex, overdose prevention).[33]

5. Minimize Data Collection

Since the science on SEP effectiveness is well established, excessive data collection is wasteful and inefficient. SEPs' collection of data from participants should be minimal and should not detract from their primary mission: the provision of sterile syringes to IDUs. Just as governing bodies should minimize the data collection burden on SEPs, the SEP should minimize its data collection to capture only essential information recording service delivery (see III. below).

Imposing extensive reporting requirements on SEPs will result in the expectation for considerable data collected from participants at SEPs. In turn, this expectation will create barriers to SEP participation among IDUs because the threshold for services is necessarily raised. SEP resources, and personnel time and effort, are diverted to activities not directly related to the delivery of SEPs, and IDU participation is reduced by these activities. In effect, collecting extensive reports from SEPs does not support or promote the prevention of injection-related morbidity and mortality among IDUs.

> **Program registration.** The provision of "registration cards" at program enrollment should be considered a legal tool, not a data collection tool. "Registration cards" should only be used as a tool to assist SEP participants where state-level paraphernalia laws and/or local law enforcement practices may otherwise prevent or interfere with individual syringe possession. Moreover, not requiring "program registration" is an acceptable option and may significantly reduce barriers to first visits by IDUs who have never attended a SEP. For these reasons, the decision to provide "registration cards" should be a local/jurisdictional decision for SEPs, and should be accompanied by an explicit justification for this decision.

C. Counterproductive SEP practices

Over more than two decades of development and expansion in the US, SEPs have promoted and/or implemented a wide variety of practices. While some have reflected true program quality improvement intentions, others derived from an attempt to assuage certain stakeholders' concerns. Unfortunately, a number of these practices undermined progress toward achieving SEPs' central objective: reducing incidence of injection-related morbidity and mortality, including the reduction of HIV transmission.

The common denominator to all of these inadvisable practices is their restrictive effect on syringe access in their respective communities. The following table identifies particular program and service delivery protocols, procedures, and practices that undermine effective SEPs.

Protocol, procedure, or practice	Rationale
Distributing single-use syringes only	In a single injection episode, many IDUs repeatedly plunge and adjust the volume of substance in the syringe more than once, which titrates the dose being injected and thus can be protective against overdose. [34] Single-use syringes prevent this practice because a 'locking' mechanism activates and retracts the needle after its initial insertion.
Limiting the number of syringes per visit and/or per transaction	The frequency of SEP visits made by IDUs varies widely among IDUs, and for an individual IDU over time. [24,25,35] Limiting the number of syringes distributed per IDU visit does not ensure an increased frequency of SEP visits per IDU, and may prevent the intended effect of the SEP, because IDUs will not possess sufficient numbers of sterile syringes to meet their injecting needs.
Enforcing a mandated exchange ratio, such as "one for one," providing new syringes only to those who return used syringes	IDUs may experience any number of circumstances that result in syringe confiscation or disposal in a location other than the SEP. [13,24,36] Refusing to provide any syringes without syringes returned will prevent IDU access to sterile syringes, and represents an unethical and punitive public health practice.
Restricting the number of transactions allowed daily, per unique IDU	More than one daily visit to the SEP may be necessary for particular IDUs, because their social, contextual, or other environmental circumstances prevent carriage of an adequate volume of sterile syringes to meet their ongoing injecting needs.[37]
Requiring research and/or behavior surveillance data collection as a threshold for syringe access	Requiring IDUs to participate in research or behavior surveillance activities such as interviews/surveys (concerning, for example, their drug use or sexual activity) in order to obtain sterile syringes imposes an unnecessary burden on this group that may discourage utilization of SEP services. Any research data collection program involving IDUs at an SEP should be restricted to a limited sample of participants and captured for periodic SEP evaluation efforts only.
Limiting program access to individuals who live within specified boundaries	Unfortunately, SEPs often remain unavailable in the geographic area where IDUs reside. For those who are able and willing to travel to an SEP in the region, syringe access and availability should be encouraged. Syringe access for IDUs should not be limited by geographic boundaries.

Requiring presentation of identifying documents	The anonymity of SEPs ensures the broad reach of services [38]. IDUs will be discouraged from SEP utilization if they believe that association will increase the likelihood they are identified as an illicit drug user by any authorities.

III. PROGRAM DATA COLLECTION AND EVALUATION

A. Variables for SEP Data Collection

The data collection burden on both SEPs and IDUs should be minimized to capture only essential information regarding the services provided/received and oriented strictly to SEP program evaluation. Moreover, data collection should never interfere with IDU participation or SEP operation. Below we enumerate and describe the types of data that SEPs should collect for the purpose of program evaluation.

1. Transaction-level. SEPs should collect only essential data concerning each interaction with participants. SEPs and/or their respective jurisdictions may elect to ask IDUs for additional, optional *individual*-level information at each SEP transaction. Such additional, optional individual-level data collection may occur either at periodic intervals or on a continuous basis, and should position the SEP to understand better its participant population and the manner in which they utilize services. The decision for whether and how to collect this information should be made locally and explicitly justified.

i. Essential information at each SEP transaction

- Number of syringes distributed
- Number of syringes received

ii. Optional individual-level information at each SEP transaction

- Gender, age, race/ethnicity, current zip code/geographic area residing
- Last visit to SEP
- Number of people for whom IDU is obtaining syringes (i.e., numeric indicator regarding secondary syringe exchange)
- Site/service location of transaction
- Date, time

2. Program-level. SEPs usually provide a range of supplies, services, referrals, and even structured education and training, beyond the distribution of new and sterile syringes. Aggregate data capturing these activities can be compiled at the program level, and reported at regular intervals.

- Number of new and sterile syringes distributed
- Number of used/contaminated syringes received
- Number of other supplies delivered (e.g., alcohol pads/wipes, condoms, etc.) (where relevant)
- Characteristics of other services provided (e.g., vaccination, infectious disease testing, DOT, wound care, overdose prevention training and response, etc.) (where relevant)

- Number of referrals to drug treatment, medical care, mental health services, etc. (where relevant)
- Number of participants in peer education and training sessions promoting secondary SEP, including related needs such as injection hygiene, safe syringe disposal, etc.

B. Evaluating SEPs

SEP evaluation should be reasonable and rigorous in its approach, design, and methodology, and may be utilized to assess the effectiveness of SEPs at the local/jurisdictional level. Evaluation should focus on assessing the volume, adequacy, and public health impact of services.

Program evaluation should be periodic and involve randomly drawn samples of IDUs rather than requiring the continuous involvement of all IDUs who access SEP services. Evaluation should include survey administration and, where appropriate, testing for exposure to blood-borne infection. Surveys should be brief and targeted to capture information on injecting and other health risk behaviors, health problems, social-contextual characteristics, and other relevant information to guide program development and improvement.

IV. STRUCTURAL RECOMMENDATIONS

Numerous factors impact the availability, accessibility and sustainability of services by a given SEP.[39] These include access to competent technical assistance and the influence of the political and legal environment in which a given SEP may operate.

A. Technical Assistance to Improve SEP Access and Availability

Jurisdictions without SEPs or with minimal experience supporting SEPs should be offered capacity-building technical assistance from expert providers, including experienced harm reduction technical assistance providers, existing and former leadership from SEPs, and expert SEP researchers. Particular areas requiring assistance may include:

- Understanding IDU practices and associated HIV and hepatitis transmission risks;
- Understanding and working with specific subgroups;
- Dispelling common myths about SEPs and IDUs among community and institutional stakeholders;
- Rapid assessment, focused on community stakeholders;
- Capacity-building for community mobilization, e.g., maximizing the role of CDC-supported HIV Prevention Community Planning Groups in guidance, recommendations, and dissemination;
- Evaluation support (e.g., epidemiologic methods, random sample surveys of IDUs);
- SEP operations planning, development, and implementation;
- Legal considerations (i.e., paraphernalia, pharmacy, and public health laws, including amendments and repeals to improve syringe access for IDU);
- Law enforcement education and training (including occupational health issues).

B. Reducing the Influence of State-level Paraphernalia Laws on SEPs

To support and promote the success of SEPs at the jurisdictional level, local authorities should work to improve the legal environment for IDU syringe possession. Ideally, state-level syringe paraphernalia laws would be repealed to prevent the need for distinctions between legal and illegal syringe possession. In some states, however, it may be easier to initiate legislative change by amending syringe possession laws to exempt IDUs from arrest and/or prosecution for the possession of syringes.

The overwhelming majority of US court cases considering SEP have affirmed its legality as a public health imperative for reducing the incidence of HIV/AIDS. These cases should be acknowledged and adapted as legal guidance for establishing and supporting SEPs in jurisdictions where state-level syringe paraphernalia laws remain. In addition, the state-level criminal code should be amended to allow the possession of used syringes, which may contain particulate residue from illicit drugs, for return to SEPs and other safe syringe disposal options.[40]

Building support to enact these legislative changes may require the commitment and participation of a diverse group of community stakeholders, including public health and law enforcement officials, independent public health and legal experts (e.g., research/academic institutions, policy groups), ‘grass-roots’ community groups, and formal and informal community leadership. Capacity-building technical assistance and support should prioritize these organizing efforts.

V. ADDITIONAL RECOMMENDATIONS

The group articulated several further policy and research approaches to support and expand the evidence for SEP in the US.

A. Civil Society

1. CDC should establish a group of expert providers and researchers to serve as continued technical advisors on syringe exchange, for consultation to respond to new issues as they arise.

B. Policy

1. States should improve syringe access via pharmacy sales and physician prescribing to complement – but not replace – SEPs, recognizing the differential benefits of such access for diverse IDU populations.
2. CDC should assign the status of Evidence-Based Intervention (EBI) to SEP, given scientific evidence relating the provision of SEPs to population-level reductions in HIV infection among IDUs.

C. Research

1. NIH should convene a consensus panel to identify research gaps (e.g., effective program combinations, dynamics within programs, etc.).
2. The Institute of Medicine should conduct a study of SEP best practices.

VI. WORKS CITED

1. Wodak A, Cooney A. Effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injecting drug users. (Evidence for action technical papers). Geneva, 2004.
2. (US) PSTF. Guide to clinical preventive services. 2 ed. Baltimore, MD: Williams & Wilkins, 1996.
3. Ljungberg B, Christensson B, Tunving K, et al. HIV prevention among injecting drug users: three years of experience from a syringe exchange program in Sweden. J Acquir Immune Defic Syndr. 1991;4(9):890-5.
4. 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 Aug;95(2):214-20.
5. Des Jarlais DC, Marmor M, Paone D, et al. HIV incidence among injecting drug users in New York City syringe-exchange programmes. Lancet. 1996 Oct 12;348(9033):987-91.
6. Hurley SF, Jolley DJ, Kaldor JM. Effectiveness of needle-exchange programmes for prevention of HIV infection. Lancet. 1997 Jun 21;349(9068):1797-800.
7. Monterroso ER, Hamburger ME, Vlahov D, et al. Prevention of HIV infection in street-recruited injection drug users. The Collaborative Injection Drug User Study (CIDUS). J Acquir Immune Defic Syndr. 2000 Sep 1;25(1):63-70.
8. 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 Aug;95(8):1439-44.
9. Bluthenthal R, Kral AH, Erringer EA, Edlin BR. Use of an illegal syringe exchange and injection-related risk behaviors among street-recruited injection drug users in Oakland, California, 1992 to 1995. J Acquir Immune Defic Syndr. 1998;18:505-11.
10. Neaigus A, Zhao M, Gvarmathy VA, Cisek L, Friedman SR, Baxter RC. Greater drug injecting risk for HIV, HBV, and HCV infection in a city where syringe exchange and pharmacy syringe distribution are illegal. J Urban Health. 2008;85:309-22.
11. Kral AH, Bluthenthal R. What is it about needle and syringe programmes that make them effective for preventing HIV transmission? Int J Drug Policy. 2003;14:3.
12. Des Jarlais DC, McKnight C, Goldblatt C, Purchase D. Doing harm reduction better: syringe exchange in the United States. Addiction. 2009 Sep;104(9):1441-6.
13. 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 Apr;102(4):638-46.
14. Kral A, Bluthenthal R. What is it about needle and syringe programmes that make them effective for preventing HIV transmission? Int J Drug Policy. 2003;14(3).
15. Weiss L, Kluger M, McCoy K. Health care accessibility and acceptability among people that inject drugs or use crack cocaine. New York, NY: The New York Academy of Medicine, 2000.
16. McGrory BJ, McDowell DM, Muskin PR. Medical students' attitudes toward AIDS, homosexual, and intravenous drug-abusing patients: a re-evaluation in New York City. Psychosomatics. 1990 Fall;31(4):426-33.
17. Finkelstein R, Ramos SE (eds). Manual for Primary Care Providers: Effectively Caring for Active Substance Users. New York, NY: The New York Academy of Medicine; 2002.
18. Bartelt J, Gallant JE (eds). The Medical Management of HIV Infection, 2000-2001. Volume 74. Baltimore, MD: Johns Hopkins University; 2000.
19. Holmberg SD. The estimated prevalence and incidence of HIV in 96 large US metropolitan areas. Am J Public Health. 1996;86:642.

20. Molitor F, Kuenneth C, Waltermeyer J, et al. Linking HIV-infected persons of color and injection drug users to HIV medical and other services: the California Bridge Project. AIDS Patient Care STDS. 2005 Jun;19(6):406-12.
21. Lorvick J, Bluthenthal RN, Scott A, et al. Secondary syringe exchange among users of 23 California syringe exchange programs. Subst Use Misuse. 2006;41(6-7):865-82.
22. Grau LE, Bluthenthal RN, Marshall P, Singer M, Heimer R. Psychosocial and behavioral differences among drug injectors who use and do not use syringe exchange programs. AIDS Behav. 2005 Dec;9(4):495-504.
23. De P, Cox J, Boivin JF, Platt RW, Jolly AM. Social network-related risk factors for bloodborne virus infections among injection drug users receiving syringes through secondary exchange. J Urban Health. 2008 Jan;85(1):77-89.
24. 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 Jul 10;89(2-3):214-22.
25. Heller DI, Paone D, Siegler A, Karpati A. The syringe gap: an assessment of sterile syringe need and acquisition among syringe exchange program participants in New York City. Harm Reduct J. 2009;6:1.
26. Case P, Meehan T, Jones TS. Arrests and incarceration of injection drug users for syringe possession in Massachusetts: implications for HIV prevention. J Acquir Immune Defic Syndr Hum Retrovirol. 1998;18 Suppl 1:S71-5.
27. Rich JD, Strong L, Towe CW, McKenzie M. Obstacles to needle exchange participation in Rhode Island. J Acquir Immune Defic Syndr. 1999 Aug 15;21(5):396-400.
28. Bluthenthal RN, Malik MR, Grau LE, Singer M, Marshall P, Heimer R. Sterile syringe access conditions and variations in HIV risk among drug injectors in three cities. Addiction. 2004 Sep;99(9):1136-46.
29. 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 Feb 1;81(2):167-78.
30. Heinzerling KG, Kral AH, Flynn NM, et al. Human immunodeficiency virus and hepatitis C virus testing services at syringe exchange programs: availability and outcomes. J Subst Abuse Treat. 2007 Jun;32(4):423-9.
31. Grau LE, Arevalo S, Catchpool C, Heimer R. Expanding harm reduction services through a wound and abscess clinic. Am J Public Health. 2002 Dec;92(12):1915-7.
32. Brooner R, Kidorf M, King V, Beilenson P, Svikis D, Vlahov D. Drug abuse treatment success among needle exchange participants. Public Health Rep. 1998 Jun;113 Suppl 1:129-39.
33. Piper T, Rudenstine S, Stancliff S, et al. Overdose prevention for injection drug users: lessons learned from naloxone training and distribution programs in New York City. Int J Drug Policy. 2009;20.
34. Des Jarlais DC. "Single-use" needles and syringes for the prevention of HIV infection among injection drug users. J Acquir Immune Defic Syndr Hum Retrovirol. 1998;18 Suppl 1:S52-6.
35. Kral AH, Anderson R, Flynn NM, Bluthenthal RN. Injection risk behaviors among clients of syringe exchange programs with different syringe dispensation policies. J Acquir Immune Defic Syndr. 2004 Oct 1;37(2):1307-12.
36. Heimer R, Clair S, Teng W, Grau LE, Khoshnood K, Singer M. Effects of increasing syringe availability on syringe-exchange use and HIV risk: Connecticut, 1990-2001. J Urban Health. 2002 Dec;79(4):556-70.
37. Rhodes T, Kimber J, Small W, et al. Public injecting and the need for 'safer environment interventions' in the reduction of drug-related harm. Addiction. 2006 Oct;101(10):1384-93.
38. Tucker JA, Foushee HR, Simpson CA. Increasing the appeal and utilization of services for alcohol and drug problems: what consumers and their social networks prefer. Int J Drug Policy. 2009 Jan;20(1):76-84.

39. Burris S, Blankenship KM, Donoghoe M, et al. Addressing the "risk environment" for injection drug users: the mysterious case of the missing cop. Milbank Q. 2004;82(1).
40. Burris S, Welsh J, Ng M, Li M, Ditzler A. State syringe and drug possession laws potentially influencing safe syringe disposal by injection drug users. J Am Pharm Assoc (Wash). 2002 Nov-Dec;42(6 Suppl 2):S94-8.