

A Review of State Laws, Syringe Exchange and HIV among Persons Who Inject Drugs in the United States: History and Effectiveness

Short Title: Syringe Exchange Law in the United States

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Abstract

Background: Providing safe and unimpeded access to sterile injecting equipment is a primary method for preventing HIV transmission among people who inject drugs (PWID). We examined legal changes related to possession of needles and syringes for injecting drugs over time in the US.

Methods: A systematic review was conducted to document state laws focused on syringe and drug paraphernalia possession, drug possession, and syringe pharmacy sales between 1980 and 2012 in 30 states, the District of Columbia and Puerto Rico in conjunction with syringe exchange data through the National Survey of Syringe Exchange Programs, and estimated state-level HIV incidence data for PWID. States were categorized into three HIV incidence trend groups: high-remaining-high, changing from high-to-low, and low-remaining-low. Public funding of SEPs was examined in relation to: 1) state-level trends in estimated HIV incidence, 2) current very high numbers of newly diagnosed cases of HIV among PWID, 3) the numbers of needles and syringes distributed by SEPs, and 4) the provision of multiple services at SEPs.

Results: All 15 states with public funding of syringe exchange were in the high-to-low or low-to-low HIV incidence categories. None of the four states in the high-remaining-high category provided public funding for syringe exchange. OTC sales were also present in 11 of the 22 states in the high-to-low or low-to-low HIV incidence trend groups; only one state in the high-remaining-high category had OTC sales. Lack of public funding for syringe exchange was also associated with high absolute numbers of newly diagnosed cases of HIV among PWID. There was a strong positive association between a syringe exchange program's receipt of public funding and the number of syringes distributed ($R^2=0.42$), the number of on-site services provided ($R^2=0.52$), and whether SEPs provided HIV counseling and testing ($R^2=0.45$).

Conclusions: There are positive associations between publicly funded syringe exchange and low HIV incidence and low absolute numbers of new cases of HIV, as well as with greater service provision. Distribution of large numbers of needles and syringes is a potential causal mechanism linking public funding of SEPs to low HIV incidence. Public funding of SEPs is possible only when such programs are legal. SEPs and OTC sales of syringes will be most successful in reducing HIV transmission when legal barriers limiting their expansion, including the ban on federal funding of syringe exchange, are eliminated.

Keywords: HIV, PWID, drugs, laws, syringe exchange, pharmacy sales

Background

The first cases of AIDS among people who inject drugs (PWID) were reported in 1981. By the mid-1980s, HIV (the virus that causes AIDS) had been discovered, an antibody test to detect HIV infection had been developed, and it was clear HIV was being transmitted through the sharing of needles and syringes for the injection of illicit drugs. Providing safe and legal access to sterile needles and syringes for PWID was seen as an important method for reducing HIV transmission in this population. Syringe exchange programs (SEPs), in which drug injectors are given new sterile needles and syringes in exchange for returning used ones, would prove to have major advantages. SEPs provided large numbers of sterile needles and syringes to drug users while removing HIV-contaminated needles and syringes from the community. They also facilitated positive contacts between drug injectors and health workers. Syringe exchange had actually begun in Amsterdam in 1984 as a method for reducing blood-borne transmission of the hepatitis B virus prior to the discovery of HIV infection among injectors in that city. Between 1985 and 1990, several more countries, including the Netherlands, Australia and the United Kingdom, developed national programs for syringe exchange.

At that time, the situation in the US was quite complicated. With over one million PWID, the US had the potential for an enormous wave of HIV infection among drug injectors. In the Northeast, HIV infection among PWID was already well established, with HIV prevalence approximately 50% in New York City.¹ At the same time, the US was experiencing increases in the use of crack cocaine and large increases in violent crime associated with the illicit market distribution of the drug.² This led to an intensification of the US “War on Drugs,” and any public health efforts that appeared to “condone” or “encourage” illicit drug use were extremely controversial.³

In 1988, US federal legislation initiated a ban on the use of federal funds to support syringe exchange. With the exception of a one-year period in 2009, this ban continues to be retained in the annual appropriations legislation for the federal government.⁴ While the challenges of the federal ban have received considerable attention, it is also important to understand the activities that provide access to sterile injection equipment at the state and local levels. In the US federal system, both public health and drug law enforcement are primarily state responsibilities. Even if the federal ban had never been enacted and federal funds for syringe exchange had been made available in 1988, it was still illegal in most states to operate SEPs. In order to implement SEPs, changes in state laws regarding the distribution and possession of needles and syringes would still be required.^{5,6}

There are a variety of state laws that can affect whether PWID have safe and ready access to sterile needles and syringes. Drug paraphernalia laws that criminalize the sale, distribution, and possession of syringes for the purposes of injecting illicit drugs have been used to arrest persons operating or frequenting SEPs, and can prevent the implementation and utilization of over-the-counter (OTC) sales of syringes at pharmacies. Laws requiring prescriptions for the sale of syringes, and other pharmacy restrictions such as identification requirements, can also greatly restrict a drug user's ability to obtain sterile syringes. Finally, drug possession laws can be applied to the drug residue in a used syringe, creating another barrier to drug users possessing and using sterile syringes.

Interventions such as SEPs and OTC sales of syringes can be enacted either through explicit legal authorization, with the law clearly instituting SEPs or OTC sales, or via law that implicitly allows for the intervention. Generally, SEPs and OTC sales are implicitly permitted when 1) even in the absence of a law authorizing syringe exchange or OTC sales, there exist no laws prohibiting syringe exchange or OTC sales, 2) the criminal law decriminalizes syringes by

either explicitly excluding syringes from the definition of drug paraphernalia, or purposely omits reference to injection equipment, barring the application of drug paraphernalia laws to syringes, and/or 3) where laws restricting syringe sale, delivery, or possession are only limited to minors, or where these laws are interpreted by the state's legal authorities to provide special exemptions for syringe exchange or OTC sales. An example of such an exception occurred in Illinois where syringe exchange programs participating in research are exempt from violating the law governing the sale of drug paraphernalia.⁷ In states with explicit authorization of SEPs and OTC sales, generally via the public health code, states often provide an exception to the drug paraphernalia law for SEP participants and operators, or for others who legally purchased syringes, including from pharmacies or for disease prevention purposes (see Table 1).

In this report we provide information on: 1) the changes in various state laws that permitted the legal operation of syringe exchange and OTC sales of sterile injection equipment, 2) the relationship between public funding of SEPs and trends in estimated state level HIV incidence among PWID and in the current absolute numbers of newly diagnosed cases of HIV among PWID, 3) the relationship between public funding of syringe exchange and the numbers of syringes exchanged, and 4) the provision of other SEP-based health services to PWID in the US. An understanding of state and local government activities with respect to syringe exchange is critical to understanding the overall strengths and limitations of HIV prevention for PWID in the US.

Methods

Four datasets were used for this research project: 1) syringe exchange survey data gathered from the Beth Israel Medical Center (BIMC)/amfAR's Dave Purchase Memorial Syringe Exchange Survey (see methods below), 2) the numbers of newly reported cases of HIV

among PWID at the state level, 3) the estimated numbers of PWID in the different states, and 4) legal data on state laws that affect syringe access for PWID.

Syringe exchange survey data collection

The syringe exchange survey data was collected through surveys of directors of SEPs located in the US. The survey has been conducted since 1994 by staff from BIMC and the North American Syringe Exchange Network (NASEN). In the spring of each year, a survey form is mailed to the directors of all US SEPs known to NASEN. NASEN is knowledgeable of most of the SEP programs that exist in the US, as it provides multiple services to its member programs, including technical assistance, ‘start-up kits’ and large volume–low price purchasing of sterile syringes. The survey includes questions on syringes exchanged, services provided, program characteristics, community relationships, and budgets and funding for the previous calendar year. Follow-up telephone interviews are conducted to obtain missing data and to clarify responses.

HIV data collection for newly diagnosed cases of HIV among PWID

Research assistants gathered publicly available data from state department of health websites to obtain the annual numbers of newly diagnosed cases of HIV among PWID. We used these as the numerators for calculating state HIV incidence among PWID annually over time. Note there is a lag time between the time of actual HIV infection and the time when a new case of HIV is reported to a state health department. While this lag time may vary across states and over time, newly reported cases of HIV are still the best numerator estimator to use when calculating state trends in HIV incidence.

Among all states combined, we collected new case data for a span of 28 years, from 1985 to 2012. However, states varied in the extent of annual HIV case data they made available to the public, with many states not publishing new case data for many years. This led to gaps in our state-level annual HIV incidence data, with some states having more, less, or different years of

annual HIV case data available than others. For instance, Maryland published new case data that consisted of 26 consecutive years of data from 1985 to 2010, while Mississippi had only three years of data available from 2009 to 2012. Overall, however, the data were more complete for recent years.

We also used the state level cases of newly diagnosed HIV among PWID to classify states according to having very high absolute numbers of newly diagnosed cases of HIV among PWID. Examination of the data showed four states with 140 or more cases of HIV among PWID in the most recent reporting year. All other state had 100 or fewer cases. The four states with 140 or more cases were classified as having very high absolute numbers of newly diagnosed cases of HIV among PWID.

Numbers of PWID in each state

Estimates of PWID populations were derived using PWID estimates from Metropolitan Statistical Areas (MSAs) obtained from the dataset of Tempalski et al. (2009).⁸ We assumed that the numbers of PWID in each MSA did not change, as the PWID population in these MSAs has been shown to be stable over time.⁹ PWID MSA population estimates were aggregated together if the MSAs were located in the same state. However, some MSAs are comprised of geographic areas shared by more than one state. In such instances, the population was allocated to the state where the majority of the MSA population resided. We made this allocation based on the assumption that PWID are likely to be concentrated in inner city areas, which are likely to be in the state where the majority of the MSA population resides.

Trends in estimated HIV incidence

Annual HIV incidence among PWID was calculated by dividing the number of newly diagnosed cases of HIV for each year by the estimated state-level PWID population. For our analyses, we classified each state's annual estimated incidence into high (>2/1000 person-years)

versus low ($\leq 2/1000$ person-years). This was derived using the national incidence estimate. There are an estimated 4000 new HIV infections per year among PWID in the US¹⁰ and an estimated 1.3 million persons who inject drugs in the US.¹¹ This gives an estimated incidence of 3/1000 person-years at risk among PWID in the US. We classified low incidence lower than the national estimate for two reasons. First, we wanted to be sure we were not classifying states as low incidence if they were truly not low incidence, and second, we have higher aspirations than the current national incidence estimate. We hope to see a reduction in the national incidence estimate, providing conditions for an “AIDS-free generation” of PWID in the US.

We then looked for trends within each state by reviewing each state’s estimated HIV incidence over time, using the often-limited annual data states made public. States were categorized into three categories: 1) states with historically high rates of HIV infection among PWID that are currently still high, 2) states with historically high rates of HIV infection that transitioned to low rates of infection, and 3) states with historically low rates of HIV infection that remain low. We did not find any examples of states that had historically low rates of infection that transitioned to currently high rates.

Inclusion/exclusion criteria for states

Given the large number of laws relevant to accessing injection equipment and the large number of states, it soon became clear it would be necessary to limit the number of states for which we would search and categorize the legal data. As the primary purpose of the research was to examine associations between state laws and HIV infection among PWID, limitations in the data on HIV among PWID data provided a rationale for excluding a number of states from the analyses. We excluded states from the analyses if:

1. We did not have MSA data in the state for estimating the PWID population.

2. We had evidence of substantial numbers of PWID in the state who did not reside in the MSAs for which we had estimates of the PWID population size. The presence of substantial numbers of PWID living outside of MSAs would lead to overestimation of HIV incidence among PWID in the state.
3. States with very few recently identified cases of HIV among PWID (≤ 10 per year). These states typically had very small estimated numbers of PWID. This combination of small HIV case numbers and small PWID estimates made assessing trends in HIV incidence very difficult—small variations in year to year cases of newly diagnosed cases of HIV among PWID would appear to create large changes in incidence.

These criteria led to excluding 23 states from our analyses of estimated HIV incidence among PWID in each state. We did, however, conduct a supplementary analysis of the public health aspects of HIV among PWID for these states.

Legal data collection

Legal data were collected from laws related to four topics: 1) SEPs, 2) drug paraphernalia laws, 3) drug possession laws, and 4) pharmacy laws related to syringe distribution/sales. Formal data collection began February 2012. Data was collected for laws in existence in 1980, or passed between 1980 and 2012.

Legal data was sourced from statutes, session laws, regulations, and case law by using two legal databases, LexisNexis and HeinOnline. LexisNexis was searched systematically for cases, statutes, and regulations using search strings piloted and refined before use. Regulations were searched using the LexisNexis Administrative Code Archive. The amount of regulation content differed for each state, with many states only having regulations dating back to the mid-1990s or early 2000s, limiting our investigative reach.

LexisNexis has a well-populated “History” section for most current statutes where it notes when statutes became law, as well as when amendments occurred. We utilized this history to acquire source information for older versions of a statute. For those versions of the statute not available via LexisNexis, we turned to session laws obtained through the Session Law Library in HeinOnline.

Quality assurance was conducted during data collection and data entry. There was a first round of document searching with very broad inclusionary parameters completed by research assistants; a second review by a legal professional refined the results to ensure all laws were relevant. Data entry was conducted by the research assistants, with the Project Director conducting a second check for accuracy and consensus on all records entered into the database.

Data Analysis

Relationships were assessed between state laws and estimated HIV incidence trends. Survey data were aggregated by state. The relationship between public funding of SEPs and estimated HIV incidence was assessed for 26 states for which there were 1) SEPs that reported public funding data in any survey year (this includes state, county, or local funding, and is inclusive of reports of not receiving any public funding) and 2) a PWID population estimate and estimated HIV incidence data over time, so as to establish a HIV trend in the state. We were using the entire population of states that met our inclusion/exclusion criteria, and thus had no sampling error. Therefore, standard statistical testing based on sampling from a population was not appropriate for assessing this relationship.

The relationship between public funding of SEPs and the absolute number of newly reported cases of HIV PWID was examined by simple inspection of the data. Again, as we were not sampling from the states, standard statistical testing would not be appropriate.

The relationship between public funding and the provision of SEP services was also assessed for 25 states in which there were SEPs that reported 1) program-level public funding data in any survey year¹ and 2) any service delivery data in any survey year. Relationships were assessed at the program level using simple regression, with the strength of the relationship expressed by the coefficient of determination (R^2). Again, probability testing was not appropriate because we were using the entire population of SEPs in the US that met our criteria, rather than a sample. The use of the coefficient of determination as a measure of effect size is still appropriate.

Results

Of the 32 states reviewed, laws either explicitly or implicitly authorizing SEPs and OTC sales of syringes (See Table 1) were first instituted in the late 1980s. While states began to increasingly authorize both types of interventions during the 1990s, SEP laws were passed more often. State laws permitting OTC sales increased in the early 2000s, and the trend for passage of both laws is now increasing in parallel. (See Figure 1) Of the laws reviewed in 32 states: three states have laws authorizing SEPs only; two states have laws authorizing OTC sales only; 14 states permit both interventions; and 13 states allow neither intervention. (See Table 2) In the 14 states with both interventions, SEP laws were passed first in eight states, OTC sales were passed first in only one state (California), and both laws were passed simultaneously in five states.

Although only 17 of the 32 states have state-level legal authorization of SEPs, there are states that have SEPs that are either not legally authorized, or are only authorized via local or city law. In our analysis of 26 states where SEP directors answered survey questions related to receipt

¹SEPs in New Mexico are operated by state health departments, who report only one budget figure for all programs in their respective states. As such, New Mexico was excluded from program-level funding analysis. *****JOURNAL DOES NOT ALLOW FOOTNOTES; NEED TO REMOVE*****

of public funding, and where HIV incidence estimates among PWID were available, at least one SEP in each of 15 states reported receipt of public funding. Of those 15, 12 states had state laws explicitly authorizing SEPs, the other three did not (See Table 3).

All 15 states with at least one SEP reporting public funding fell into the high-to-low or low-to-low HIV incidence trend groups. Additionally, of the 22 states in the high-to-low or low-to-low HIV incidence categories, 11 authorized OTC sales. The four states in the high-remaining-high group had only one state with legalized OTC sales, and no SEPs that received public funding (see Table 4).

The analysis of trends in estimated HIV incidence among PWID in the different states focuses on changes in the HIV among PWID problem over time and utilizes estimates of the numbers of PWID in each state. We also examined what can be considered as the absolute size of the current problem of HIV among PWID in each state. Even if a state has a declining estimated incidence, a large number of newly identified cases of HIV among PWID in the state suggests a need for a continued emphasis on HIV prevention for PWID. There were four states that reported 100 or more newly diagnosed cases of HIV among PWID in the most recent year of reporting:

1. Texas, with 307 cases reported in 2011.
2. Florida, with 195 cases reported in 2012.
3. New York, with 159 cases reported in 2010.
4. Louisiana, with 140 cases reported in 2011.

New York almost certainly has the largest number of PWID of any state in the country⁹ and experienced the earliest and largest epidemic of HIV among PWID of any state in the country.¹² New York also has public funding of syringe exchange, estimated HIV incidence among PWID has declined sharply by approximately 80% after public funding began,¹³ but considerable

problems still exists. The other three states (Texas, Florida, and Louisiana) did not show declines in our incidence trend analysis, and, according to their own state data, clearly have very large numbers new cases of HIV among PWID. (South Carolina, the other state in the high remaining high incidence trend category/no public funding of syringe exchange category, reported 17 cases in 2012).

Our analyses also demonstrated a strong positive relationship between receipt of public funding and the number of syringes distributed, whether SEPs provided voluntary HIV counseling and testing, and the range and quantity of on-site services provided. There was a positive correlation between public funding and the number of syringes distributed by SEPs ($R^2=0.42$). The provision of public funding was also associated with SEPs offering a greater number of other services to PWID ($R^2=0.52$). In particular, public funding was positively correlated with SEPs offering: HIV counseling and testing ($R^2=0.45$), HCV testing ($R^2=0.28$), condom distribution ($R^2=0.47$), hepatitis prevention services ($R^2=0.46$), overdose prevention services with naloxone ($R^2=0.28$), overdose prevention services without naloxone ($R^2=0.38$), and STD and HIV prevention services other than condom distribution ($R^2=0.46$).

Supplementary analysis

As noted in the methods section, we excluded 23 states from our primary analyses because of limited resources and limitations of the HIV and PWID population data. We did, however, conduct a basic descriptive analysis of the public health problems of HIV among PWID in these states. The results of this descriptive analysis are presented by the reasons for exclusion:

1. States without MSA data to estimate the number of PWID. There were 12 states excluded from the primary analysis for this reason, including Alaska, Idaho, Iowa, Maine, Mississippi, Montana, New Hampshire, North Dakota, South Dakota, Vermont, West Virginia, and Wyoming. Without an estimate of the numbers of PWID in these states we

could not estimate HIV incidence among PWID in the state nor examine possible associations between state law and estimated HIV incidence. However, nine of these states (Alaska, Idaho, Iowa, Maine, Montana, North Dakota, Vermont, West Virginia, and Wyoming) had ≤ 10 cases of newly diagnosed HIV among PWID in their most recent reporting year. Such low numbers of newly diagnosed cases indicate these nine states are not experiencing a major epidemic of HIV transmission among PWID. Two of these states (Maine and Vermont) also had publicly funded SEPs.

2. States with low numbers of recently identified cases of HIV among PWID. In addition to the nine states listed above, there were eleven more states (Alabama, Arkansas, Delaware, Georgia, Hawaii, Indiana, Kansas, Kentucky, Minnesota, Nebraska, and Rhode Island) that reported ≤ 10 newly diagnosed cases of HIV among PWID in their most recent reporting year. We did have MSA data for these states so as to derive an estimated PWID population size; eight states (Alabama, Arkansas, Delaware, Hawaii, Kansas, Kentucky, Nebraska, and Rhode Island) had an estimated PWID population of $< 10,000$. The low absolute numbers of newly diagnosed cases of HIV among PWID in these states would indicate they are not experiencing large epidemics of HIV among PWID. Of the 20 states reporting ≤ 10 newly diagnosed cases of HIV among PWID in their most recent reporting year, seven (Delaware, Georgia, Hawaii, Maine, Minnesota, Rhode Island, and Vermont) reported having publicly funded SEPs.

While the limitations of the PWID population and HIV data kept us from estimating HIV incidence in these 23 states, the presence of publicly funded syringe exchange programs in 8 of them is consistent with the findings of the primary analysis showing the association between publicly funded syringe exchange and current low estimated HIV incidence among PWID.

Discussion

In this report, we examined the legal frameworks through which large amounts of sterile injecting equipment have been (or have not been) provided to PWID in the US. For SEPs, this legal process has involved two stages: creating laws that permit legal operations of SEPs, and the provision of public funding to SEPs. For OTC sales, providing access to sterile injecting equipment has involved removing prescription requirements and other pharmacy and drug paraphernalia restrictions for selling and purchasing needles and syringes. Both interventions have been facilitated by allowing drug users to legally possess injecting equipment by ensuring drug paraphernalia laws are not applicable to needles and syringes.

As noted in the introduction, when AIDS was first observed among PWID, almost all states had laws that made it very difficult for PWID to obtain and use sterile injecting equipment, notably laws that criminalized distribution and possession of needles and syringes for injecting illicit drugs. These laws were the product of multiple social factors: the long history of a large narcotic addiction problem in the country (narcotic addiction was known as the “American disease” for much of the twentieth century,¹⁴ the stigmatization of addiction as a moral failing,¹⁵ the association of illicit drug use with stigmatized racial/ethnic minorities,^{16,17} and the urban violence associated with crack cocaine distribution during the 1980s.² Changing the existing laws required at least neutralizing these social factors, and the time needed to change the laws created important delays in the US response to HIV among PWID.

We found that provision of public funding for SEPs was associated with states either remaining in the low estimated HIV incidence category, or moving from high to low estimated HIV incidence, as opposed to remaining in the high estimated incidence category. Among the states that remained in the high estimated HIV incidence category, none provided public funding

for SEPs. Additionally, lack of public funding was associated with high absolute numbers of newly identified cases of HIV among PWID. Three of the four states with very high absolute numbers of newly diagnosed cases of HIV among PWID did not have public funding of SEPs. Public funding of syringe exchange is critically important because public funding is strongly tied to the numbers of syringes exchanged, and large numbers of syringes per injector are needed to control HIV transmission.¹⁸ Providing large numbers of syringes per injector may be considered as a causal mechanism through which public funding leads to reduced HIV transmission among PWID.

OTC syringe sales are a second method of providing access to sterile injection equipment. Many of the states that implemented syringe exchange also implemented OTC sales. Studies from CT and NY indicate that when both are implemented in the same area, both contribute to reductions in injecting risk behavior, but that syringe exchange makes the larger contribution.^{19,20} Because of the limitations of the data, we were not, however, able to assess the size of any independent contribution of OTC sales to trends in estimated HIV incidence in the states.

Limitations

There are a number of limitations to this study that need to be considered. The HIV incidence estimates for PWID have limitations. The denominator is based upon aggregated MSA population estimates of PWID, rather than an estimate of the state-wide PWID population. This has a high probability of missing the PWID population in rural areas and in small cities, and thereby over-estimating HIV incidence. We excluded one state, Illinois, for which we had evidence of relatively large numbers of small city/rural PWID (based on large numbers of syringes being distributed outside of MSAs in the state). Given the hidden nature of the PWID population, MSA population estimates of PWID are currently the best PWID estimates that exist. For MSAs that encompassed more than one state, we assigned the PWID population to the state

in which the majority of the MSA population resided. This would tend to underestimate HIV incidence in these MSAs, but we did not have the data needed to allocate the PWID population across the different states in a single MSA.

A number of states did not have any MSAs for estimating the size of the PWID population. Other states had very low numbers of newly reported cases of HIV among PWID and relatively low estimated PWID populations. We were not able to assess trends in estimated HIV incidence in these states. However, the states with low numbers of cases of HIV among PWID clearly were not experiencing large scale HIV epidemics among PWID. That a substantial number of these states did have publicly funded syringe exchange is consistent with the findings of the primary analysis.

Another limitation is that we may have missed applicable laws that expired and for which there is no documentation. In LexisNexis, regulations very rarely identified when or if they were amended. We responded to this obstacle by searching the regulation archive for each year the archive had data, comparing the regulation texts year by year for any changes. However, it is unknown if changes were made to regulations in the years for which we have no copy of the text. As for statutes, it is common that laws are amended, rather than permanently removed from the legislative code. Since this project focuses on relatively recent law (i.e., laws implemented in the past 33 years), we are confident not much was permanently removed from the code for which we would have no copy.

Our legal data covered a long time period (from 1980 to 2013), we had only an estimate of the numbers of PWID only a single time period (2002), and we counted numbers of newly identified cases of HIV over a long time period (1985-2012). The HIV case data came from the states, and there undoubtedly is variation in the completeness of identifying new cases of HIV across states and over time.

Finally, there are a number of factors in addition to legal access to sterile injecting equipment that may influence the course of HIV epidemics in injecting drug use populations. These would include the size of the PWID population, density and turnover rates in injecting networks, the types of drugs injected, the availability of substance use treatment programs, and sexual transmission of HIV. We could not measure and control for such factors in our analysis of the relationship between publicly funded SEPs and trends in estimated HIV incidence.

We believe the overall effect of these limitations was probably to reduce our ability to find relationships between public funding of SEPs with trends in estimated HIV incidence. The number of states was clearly reduced, and excluding states with low numbers of newly identified cases of HIV among PWID would have excluded states likely to be in the low to low or high to low estimated HIV trend groups. A number of these states do have publicly funded SEPs.

It would seem very unlikely that the patterns we observed were the result of systematic bias in the data. This would have required that states such as Florida, Texas and Louisiana were either misclassifying large numbers of recent cases of HIV as occurring among PWID when the cases should have been assigned to other transmission groups or these three states were much better than others in identifying cases of HIV among PWID. Neither of these seems plausible.

Conclusions

HIV is not the only health problem faced by PWID in the US. HCV, overdose, sexually transmitted infections, soft tissue infections, tuberculosis, and the primary need for treatment for substance use disorders are among the many health problems facing PWID. We found that public funding of SEPs was strongly related to providing services for many of these other health problems. The value of SEPs for protecting the health of PWID, and of the larger community, goes beyond addressing the problem of HIV.

SEPs often struggle to find sufficient funding for providing syringes to PWID, as well as to fund additional services. State and local public funding can only be possible in jurisdictions that have favorable syringe access laws, particularly those governing SEPs. Repealing the ban on the use of federal funds for SEPs could also bolster the budgets and therefore the effectiveness of SEP programs.

The HIV/AIDS epidemic was the public health crisis of the late twentieth century and continues to this day. Injecting drug use has been a major driver of HIV transmission in the US. State and local government funding of SEPs is strongly associated with both reducing HIV transmission among PWID in states that experienced high HIV incidence, and with keeping HIV incidence low in other states. There are still approximately 4000 new HIV infections among PWID per year in the US.² Increased state and local public funding of syringe exchange—particularly in states with high numbers of newly identified cases of HIV among PWID—as well as the federal funding of SEPs—would be major steps towards achieving an “AIDS free generation” in the US.

Acknowledgements

The study was funded by the American Foundation for AIDS Research (amfAR) 108290-51-PGSA

Authors' contributions

HB contributed to project management, data collection, data analysis, and writing and editing of the manuscript. DCDJ contributed to project conception, data analysis, and writing and editing of the manuscript. KA contributed to data analysis and writing and editing of the manuscript. AN contributed to data analysis and editing of the manuscript. VG contributed to data collection, and editing of the manuscript. DH contributed to the writing and editing of the manuscript.

Competing interests

The authors declare that they have no competing interests.

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Table 1: States with Explicit or Implicit Authorization of SEPs or OTC Sales

SEPs (N=17/32)									OTC Sales (N=16/32)					
Explicit Authorization (N=12)				Implicit Authorization (N=5)					Explicit Authorization (N=110)				Implicit Authorization (N=5)	
CA	CO	CT	DC	IL	NH	OR	UT	WI	CA	CT	IL	LA	NH	OR
MA	MD	NJ	NM						MA	NJ	NM	NV	PR	UT
NV	NY	PR	WA						NY	PA	WA	.	WI	.

Table 2: States With and Without Legal Authorization of SEPs and OTC Sales

	SEPs Legally Authorized (N=17/32)			SEPs Not Legally Authorized (N=15/32)		
OTC Sales Legally Authorized (N=16/32)	CA	CT	MA	LA	PA	
	NV	NH	NJ			
	NM	NY	OR			
	PR	UT	WA			
	WI	IL	.			
OTC Sales Not Legally Authorized (N=16/32)	CO	DC	MD	AZ	FL	MI
				MS	MO	NC
				OH	OK	SC
				SD	TN	TX
				VA	.	.

Table 3: Public Funding In States With and Without State Laws Authorizing SEPs

	SEPs Legally Authorized (N=13/26)			SEPs Not Legally Authorized(N=13/26)		
Public Funding for SEPs (N=15/26)	CA	CO	CT	AZ	MI	PA
	DC	MD	MA			
	NJ	NM	NY			
	OR	WA	WI			
No Public Funding for SEPs (N=11/26)	UT			FL	LA	MO
				NC	OH	OK
				SC	TN	TX
				VA	.	.

Table 4: Estimated HIV Incidence Trend Group and Public Funding

High-remaining-High (N=4)				High-to-Low (N=13)					Low-to-Low (N=9)		
FL	LA [°]	SC	TX	CT** [°]	DC*	MD*	MA* [°]	MI*	AZ*	CA* [°]	CO*
				NC	NJ** [°]	NY** [°]	OK	PA* [°]	MO	NM** [°]	OH
				TN	VA	WI** [°]	.	.	OR** [°]	UT [°]	WA** [°]
<p>*At least one SEP in the state reported receipt of public funding [°]OTC Sales permitted</p>											

Figure 1 Cumulative Trends in the Passage of Laws Authorizing Syringe Exchange Programs and Over-the-Counter Sales of Syringes Over Time

