



Center for
Interdisciplinary
Research on
AIDS

RESEARCH INTO SYRINGE AVAILABILITY, HIV RISK, AIDS, AND HEPATITIS

Primary Investigator, Robert Heimer,
Ph.D.

*These findings come from studies
conducted in conjunction with other
CIRA scientists including Edward H.
Kaplan, Kaveh Khoshnood, Merrill
Singer, Laretta E. Grau, Scott Clair,
and Susan Shaw.*



Center for
Interdisciplinary
Research on
AIDS

Research into Syringe Availability, HIV Risk, AIDS, Drug Treatment and Hepatitis

1. Syringe exchange programs (SEPs) are associated with lower risk for HIV
2. SEPs are associated with lower levels of AIDS
3. SEPs are associated with large financial savings
4. Injectors who are most at risk for HIV/AIDS and hepatitis C can be reached by SEPs
5. SEPs are a conduit to substance abuse treatment for the entire community
6. Hepatitis knowledge is low and hepatitis risks are high, even among HIV savvy injectors
7. Hispanic communities have reduced access to clean syringes



SEPs ARE ASSOCIATED WITH LOWER RISK FOR HIV

- The first—the Diffusion of Benefit through Syringe Exchange Study— used network-based sampling starting by recruiting customers who, in turn, referred non-customer injection associates to participate, who, in turn, referred more non-customers.
- More than 600 participants were recruited in Hartford CT, Chicago IL, and Oakland CA.
- About 20% of the participants were customers at enrollment into this longitudinal study (subjects assessed over time).



SEPs ARE ASSOCIATED WITH LOWER RISK FOR HIV

- The second study—Syringe Access, Use, and Discard—used neighborhood-based targeted sampling to recruit 40 injectors in each of 8 neighborhoods in New Haven and Hartford, CT and Springfield, MA.
- The three cities were chosen because injectors in New Haven and Hartford have legal access to syringes but those in Springfield do not.
- More than 960 participants were enrolled into this cross-sectional study (subjects assessed at a single time).



SEPs ARE ASSOCIATED WITH LOWER RISK FOR HIV

In both of these studies, the use of SEPs is linked to less syringe & injection paraphernalia sharing. In the first study, customers were

- 2 to 3 times less likely to inject with someone else's used syringe,
- to share a syringe to dissolve drugs,
- to share water for dissolving drugs or rinsing syringes,
- or to reuse previously used syringes.



SEPs ARE ASSOCIATED WITH LOWER RISK FOR HIV

In the second study, injectors residing in neighborhoods with either a SEP or a pharmacy that sold syringes to injectors were two to three times less likely to

- share and reuse syringes,
- to acquire syringes from unsafe sources,
- and to discard their used syringes improperly than those without neighborhoods without an exchange site.

The studies demonstrate that the availability of an SEP in a community is linked to safer routes of syringe acquisition, lower injection risk, and safer syringe discard.



SEPs ARE ASSOCIATED WITH LOWER LEVELS OF AIDS

- In conjunction with the start of the New Haven SEP, a study was done from November 1990 to August 1993 to the use and exchange of syringes.
- The study used a syringe tracking & testing system to uniquely label each syringe distributed by the SEP and determine whether or not returned syringes had the potential to transmit HIV-1 or hepatitis B virus should that syringe have been reused instead of exchanged.
- The study collected data from approximately 1500 different people who visited the SEP at least once and from about 20,000 exchanges and 80,000 returned needles of which over 6000 were tested.



SEPs ARE ASSOCIATED WITH LOWER LEVELS OF AIDS

- The tracking data revealed that program syringes were being used less often than syringes in circulation before the program started and that as the program gained momentum the average circulation time of syringes decreased from nearly two weeks to less than three days.
- The implication of this finding, supported by the results of syringe testing, is that syringes would have less chance to be shared.
- At the program's outset, two thirds of syringes were contaminated with traces of blood from HIV-1 infected individuals.



SEPs ARE ASSOCIATED WITH LOWER LEVELS OF AIDS

- Within five months, the prevalence of such potentially infectious syringes was decreased to two-fifths and the prevalence remained at this level or lower for the remaining 35 months of the study.
- Mathematical models suggest that the lower prevalence of potentially infectious syringes should have resulted in a minimum one-third reduction in the rate of new HIV-1 infections.



SEPs ARE ASSOCIATED WITH LOWER LEVELS OF AIDS

- The existence of the SEP in New Haven is linked a decrease in the number and percentage of AIDS cases beginning eight years after the start of the program, as would be expected based on the time lag between infection and AIDS.
- In contrast, no parallel decrease has been seen in Springfield, MA, which has neither syringe exchange nor legal pharmacy access to syringes.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

- There are several ways to estimate the financial consequences of opening the New Haven SEP.
- The first is to use mathematical models that use syringe tracking and testing data to estimate the change in the incidence rate.
- These are conservative estimates, relying only on changes in syringe circulation times and not accounting for behavioral changes that might occur if increased access to syringes decreased the need to share syringes.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

Center for
Interdisciplinary
Research on
AIDS

- The incidence rate prior to the program's establishment was estimated at 6.4 new infections per 100 person years.
- The overall estimate after 36 months of program operations was 3.6 new infections per 100 person years, a decrease of 44%.
- Given that the program served about 200 people per month, the number of infections averted was about 17 for the period between November 1990 and October 1993.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

Center for
Interdisciplinary
Research on
AIDS

- If the lifetime cost of treating someone who got infected in the early 1990s was about \$125,000, by the time their illness had progressed enough to require treatment then the gross savings were \$2.125 million. During the first three years, the SEP cost the city and state about \$225,000.
- Therefore, the net savings were \$1.9 million.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

Center for
Interdisciplinary
Research on
AIDS

- The incidence rate of 3.6 new infections per 100 person years excludes benefits from behavior change of injectors using the SEP.
- However, work by Kaveh Khoshnood has revealed that risky behaviors like syringe sharing and shooting gallery use were reduced significantly.
- Syringe testing data have been looked at another way to estimate incidence.
- Syringes returned by the same person over the many months of testing are similar to HIV tests but are imperfect because the syringe tested may not have last been used by the person returning the syringe and the test give false negative results.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

Center for
Interdisciplinary
Research on
AIDS

- Nevertheless, Ed Kaplan developed a model to identify real signals of new infection despite the noise. This “changepoint model” estimated incidence at 1.6 new infections per 100 person years, a decrease in incidence of 75% from the estimate prior to the start of the program.
- By this estimate, 29 cases were averted at a net savings of \$3.4 million.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

- Furthermore, the benefits may have extended beyond the direct customers of the SEP.
- Increases in syringe availability may have decreased the extent of risky injection behaviors citywide.
- To investigate this possibility, we compared New Haven and Springfield, MA.
- New Haven provided legal access to clean syringes through the SEP beginning in 1990 and through over-the counter pharmacy access in 1992.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

In Springfield, injectors have no legal access to syringes. The two cities were very similar in terms of population, poverty, percentage of minority residents, percentage with substance abuse problems, and per capita dollars spent on AIDS care.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

- Both cities had similar AIDS case rates and percentages of cases attributed to injection drug use until the mid 1990's.
- Since then, an analysis of AIDS cases has revealed that the rate of AIDS cases among injectors has dropped dramatically in New Haven.
- For the 2 year period between 1999 and 2000, the rate was 54.7 cases/100,000 inhabitants.
- The rate in Springfield has remained much higher at 96.7 cases per 100,000 inhabitants.



SEPs ARE ASSOCIATED WITH LARGE FINANCIAL SAVINGS

- The difference in rate can be used to estimate the number of cases averted in New Haven by estimating how many cases would have occurred citywide if New Haven remained on the same level as Springfield.
- We have estimated that 55 cases were averted in New Haven.
- Again, using the conservative figure of \$125,000 for the lifetime cost of treating a case of AIDS, the net savings in New Haven was calculated at \$6.65 million—and this is just for infections averted in the early 1990s.
- Further savings are anticipated as those who might have been infected with HIV after 1993 only now would require treatment for AIDS.



Center for
Interdisciplinary
Research on
AIDS

INJECTORS WHO ARE MOST AT RISK FOR HIV/AIDS AND HEPATITIS CAN BE REACHED BY SEPs

Nearly 600 participants in the Diffusion of Benefit through Syringe Exchange Study were recruited from among SEP customers by referral of non-customers by customers, by a second wave of referral of non-customers by recruited non-customers, and by street outreach from contacted non-customers.



INJECTORS WHO ARE MOST AT RISK FOR HIV/AIDS AND HEPATITIS CAN BE REACHED BY SEPs

The recruitment strategy allowed us to divide the sample of injectors into four levels:

1. SEP customers,
2. non-customers who got syringes from customers,
3. non-customers who injected with but did not get syringes from customers, and
4. non-customers neither injected with nor got syringes from customers.

The interview data about their HIV-related knowledge and risk revealed, not surprisingly, that SEP customers as a group were best informed and safest.



INJECTORS WHO ARE MOST AT RISK FOR HIV/AIDS AND HEPATITIS CAN BE REACHED BY SEPs

- Surprisingly, the group that engaged in the most risk was the non-customers who injected with customers, even if they got syringes from these people.
- This group of non-customers is more likely than either customers or non-customers who do not interact with SEP customers to share syringes and other injection paraphernalia, to reuse their syringes more frequently before acquiring new ones, to be injected by someone else, and share water both for rinsing syringes and dissolving their drugs.



INJECTORS WHO ARE MOST AT RISK FOR HIV/AIDS AND HEPATITIS CAN BE REACHED BY SEPs

- The significance of this finding is its implication for prevention.
- SEPs have the biggest impact by using their current customers to recruit the riskiest group of injector: those non-customers with whom they are already injecting.
- It also means that SEPs can, with only modest additional resources, make the biggest difference.
- This argument should be used to advocate for expanding SEP programs and providing incentives to train current customers as recruiters.



Center for
Interdisciplinary
Research on
AIDS

HEPATITIS KNOWLEDGE IS LOW AND HEPATITIS RISKS ARE HIGH, EVEN AMONG HIV-SAVVY INJECTORS

- Injection drug use is a major risk factor for HIV and hepatitis infections.
- Syringe exchange programs have focused on HIV while generally neglecting hepatitis B and C.
- We examined the interrelationships among HIV and hepatitis knowledge, risky drug preparation and injection practices, and participation in SEPs.



Center for
Interdisciplinary
Research on
AIDS

HEPATITIS KNOWLEDGE IS LOW AND HEPATITIS RISKS ARE HIGH, EVEN AMONG HIV-SAVVY INJECTORS

The nearly 600 participants in this study were Recruited:

1. from among SEP customers,
2. by referral of non-customers by customers,
3. by a second wave of referral of non-customers by recruited non-customers, and
4. by street outreach from contacted non-customers.

Slightly more than 20% of those recruited into the study were SEP customers.



Center for
Interdisciplinary
Research on
AIDS

HEPATITIS KNOWLEDGE IS LOW AND HEPATITIS RISKS ARE HIGH, EVEN AMONG HIV-SAVVY INJECTORS

- Data were collected on sociodemographics, medical history, drug use and injection practices, and HIV- and hepatitis-related knowledge. Our primary analyses concentrated on identifying the associations among HIV and hepatitis knowledge, injection-related risks for virus transmission, SEP use, medical history, and demographic status.
- SEP customers were consistently less likely than non-customers to engage in a range of risk behaviors, with the notable exception of safely stanching blood post-injection—a behavior that is more likely to transmit hepatitis than HIV.



Center for
Interdisciplinary
Research on
AIDS

HEPATITIS KNOWLEDGE IS LOW AND HEPATITIS RISKS ARE HIGH, EVEN AMONG HIV-SAVVY INJECTORS

- HIV knowledge was significantly higher than hepatitis knowledge among SEP customers and non-customers alike.
- Elevated hepatitis knowledge was associated with a history of substance abuse treatment, hepatitis infection, hepatitis B vaccination, and injection practices that reduced contact with contaminated blood or water.



Center for
Interdisciplinary
Research on
AIDS

HEPATITIS KNOWLEDGE IS LOW AND HEPATITIS RISKS ARE HIGH, EVEN AMONG HIV-SAVVY INJECTORS

- These findings demonstrate the need to increase hepatitis awareness among injection drug users.
- The associations between knowledge and continued risk demonstrate that education is a necessary activity to reduce hepatitis transmissions.
- On the positive side, SEPs continue to effectively disseminate HIV prevention messages, but they must do more to prevent hepatitis transmissions.



HISPANIC COMMUNITIES HAVE REDUCED ACCESS TO CLEAN SYRINGES

- The Syringe Access, Use, and Discard study was designed to investigate HIV risk at the level of neighborhoods in the three cities Hartford, New Haven, and Springfield, MA.
- The neighborhoods were divided into categories based on whether they had a SEP van site, a pharmacy that sold syringes without a prescription, both forms of access, or neither.
- Neighborhoods without local access to clean syringes through SEPs or over-the-counter pharmacy sales were more likely to have large Latino populations and be poor.



HISPANIC COMMUNITIES HAVE REDUCED ACCESS TO CLEAN SYRINGES

- Acquisition of syringes from unsafe sources predominated in the neighborhoods without SEP or pharmacy access; only 14% of injectors obtained syringes from a pharmacy and 16% obtained them from an SEP.
- Syringe sharing frequencies were 1.25 to 2.25 times higher in the neighborhoods without access compared to those with SEP and/or pharmacy access.
- Syringe reuse frequencies were 1.5-2 times higher in the neighborhoods without access compared to those with SEP and/or pharmacy access.



HISPANIC COMMUNITIES HAVE REDUCED ACCESS TO CLEAN SYRINGES

- Injection drug users (IDUs) in neighborhoods with neither SEPs nor pharmacies were 2.5 times as likely to stash syringes for later use than were IDUs from neighborhoods with SEP and/or pharmacy access (26% vs. 10%).
- IDUs in neighborhoods with neither SEPs nor pharmacies were twice as likely to publicly discard their syringes than were IDUs from neighborhoods with SEP and/or pharmacy access.



HISPANIC COMMUNITIES HAVE REDUCED ACCESS TO CLEAN SYRINGES

- Thus, by multiple measures, syringe acquisition, use, and discard practices were less safe in the neighborhoods without safe and legal access to clean syringes.
- This means that the problem of HIV and hepatitis must be considered at a level lower than that of a city as a whole. Risk is a neighborhood phenomenon that can be reduced by neighborhood measures.
- Excluding services from a neighborhood will not cause the problems of drug abuse and its avoidable medical consequences to go away. It will only make the negative consequences more likely.