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## A community based approach to linking injection drug users with needed services through pharmacies: An evaluation of a pilot intervention in New York City

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### Abstract

Studies suggest that community-based approaches could help pharmacies expand their public health role, particularly pertaining to HIV prevention. Thirteen pharmacies participating in New York's Expanded Syringe Access Program, which permits non-prescription syringe sales to reduce syringe-sharing among injection drug users (IDUs), were enrolled in an intervention to link IDU syringe customers to medical/social services. Sociodemographics, injection practices, beliefs about and experiences with pharmacy use, and medical/social service utilization were compared among 29 IDUs purchasing syringes from intervention pharmacies and 66 IDUs purchasing syringes from control pharmacies using chi-square tests. Intervention IDUs reported more positive experiences in pharmacies than controls; both groups were receptive to a greater public health pharmacist role. These data provide evidence that CBPR aided in the implementation of a pilot structural intervention to promote understanding of drug use and HIV prevention among pharmacy staff, and facilitated expansion of pharmacy services beyond syringe sales in marginalized, drug-using communities.

## Keywords

Community Based Participatory Research; Structural Intervention; Harm Reduction; Pharmacies; HIV Prevention; Injection Drug Use

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## INTRODUCTION

Injection drug use contributes significantly to the HIV burden in the United States (CDC, 2009) and most successful HIV prevention strategies targeting this population have taken a harm reduction approach. For example, syringe exchange programs and the expansion of syringe access via pharmacies have both proven to be very effective interventions. Through a comprehensive approach to harm reduction, syringe exchange programs have successfully increased access to sterile syringes, decreased high-risk injection behaviors, (Des Jarlais and Marmor, 1996; Groseclose and Weinstein, 1995) provided a means for safe disposal, reduced the incidence and prevalence of HIV (Des Jarlais and Marmor, 2000; MacDonald and Law, 2003) and improved access to HIV prevention programs. Much of their success can be attributed to the additional services that many syringe exchange programs provide, such as (1) health education, (2) alcohol swabs to prevent abscesses and other bacterial infections, (3) condoms to prevent the transmission of HIV and other sexually transmitted infections, (4) on-site medical services, (5) counseling and screening for tuberculosis, Hepatitis B, Hepatitis C, HIV and other infections, and (6) referrals to substance abuse treatment and other medical and social services. Because many drug users do not have health insurance (Standcliff, Salomon, Perlman and Russell, 2000) or fear being mistreated in the healthcare system because of their drug use, (Miller, Sheppard, Colenda and Magen, 2001) syringe exchange programs can serve to link IDUs with health and social services that they might not otherwise have access to.

Alternatively, IDUs can access sterile syringes through pharmacies, which have the potential to provide a similarly comprehensive set of harm reduction services. Pharmacists are health care professionals who can potentially provide discrete and confidential information regarding disease prevention and safe disposal of syringes to all syringe customers. Pharmacies have access to syringes, are already established in urban centers, have longer and more convenient hours of operation than syringe exchange programs, and may attract those uncomfortable with syringe exchange programs or those who require syringes when exchange is either inconvenient or impossible.

Several states have passed legislation to permit pharmacy sales of syringes. In 2000, the New York State Expanded Syringe Access Demonstration Program (ESAP) was enacted by the legislature and implemented in January 2001 to (1) prevent reusing or sharing of needles and (2) reduce the transmission of blood-borne diseases, including HIV and Hepatitis C virus among IDUs. This law stipulates that pharmacies who have registered with the NYSDOH to participate in ESAP may sell up to 10 syringes per transaction to persons 18 years of age and older and that the ESAP safe injection and disposal insert be provided with each transaction. The ESAP legislation required an independent evaluation to be conducted to determine its continuance beyond the authorized period through March 31, 2003. Our research group led this evaluation and found that ESAP was not associated with increases in substance use, criminal activity, accidental needle sticks or improper disposal of syringes. It also found a slight decline in syringe sharing after ESAP's inception. (NYAM 2003) On the strength of these findings, the ESAP law was renewed through 2007 and subsequently renewed through 2011.

Over-the-counter syringe sales in pharmacies present a unique opportunity for IDUs to interact with a health care professional. Pharmacies outside of the United States have been able to incorporate some of the various harm reduction strategies that have been successful in syringe

exchange programs. In the UK, Australia and the Netherlands, pharmacies have expanded their services and play an integral role in providing HIV prevention services to IDUs. For example, many pharmacies currently (1) counsel IDUs on safer sex and injection practices, (2) furnish both syringes and injection equipment, (3) provide a means for the disposal of used syringes, and (4) dispense methadone for treating opiate dependence. Pharmacies in the United States may be able to incorporate some of the successful strategies from syringe exchange programs and from pharmacies in other settings. Although conversations between IDUs and pharmacists/pharmacy clerks are infrequent in the United States, discussions about drug treatment and safe syringe disposal sometimes occur. (Caceres et al., 2005) For these reasons, pharmacy personnel at ESAP-participating pharmacies have the potential to evolve into frontline public health educators for IDUs who purchase syringes from them.

Recognizing this gap between evidence and practice, researchers at the New York Academy of Medicine partnered with community leaders and public health advocates in the Harlem community to form the Harlem Community and Academic Partnership (HCAP) in 1999. This community and academic partnership focused on (1) fostering a trusting relationship with the community, (2) strengthening credibility in the community, (3) demonstrating its commitment to improve the health of Harlem residents through research and practice, and (4) creating a platform that could be used to address local urban health issues. This was largely accomplished by making community and national presentations about the partnership and its research activities, reporting data from its various CBPR projects, and having 2-hour monthly meetings to share information, strategize, and accomplish the partnership's goals and objectives. These meetings were also used as a forum to identify and address new public health concerns in the community and to form intervention working groups to address these issues using a community based participatory research approach. Similar to other academic and community partnerships, ongoing education of all parties was required to successfully merge the specific goals of each partner (Galea et al 2001) and a collaborative approach to public health research was utilized (Isreal BA, Schulz AJ, Parker EA; Leung MW, Yen IH and Minkler M, 2004; Becker AB, 1998). HCAP allowed community members, community representatives and researchers to contribute equally to all aspects of the research process. By combining the unique strengths of all community partners, interventions were developed that integrated epidemiologic findings and that most appropriately addressed the social and cultural dynamics within the community. However, unlike traditional epidemiologic research, the HCAP partnership was committed to action as part of the research process.

When HCAP initially formed, the partnership reviewed published and unpublished research findings, conducted focus group discussions with community residents, and gathered input from other local community organizations before identifying substance abuse and infectious diseases as two of the top public health priorities in their community. As others have also noted, community-established research priorities are the foundation for community based participatory research because they ensure that the research is context-specific and that community partners will be engaged in the research (Isreal et al., 1998; Leung MW, Yen IH and Minkler M, 2004). In 2001, HCAP developed a multi-component, multilevel intervention to increase IDU participation in ESAP (Harlem ESAP Intervention Study). Because of the complex social and social-contextual factors that influence individual behaviors, a multi-level approach was decided upon by the partnership which involved targeting three population levels: community members, pharmacists and IDUs. (Fuller et al. 2002) Not only did this intervention provide strong evidence of effectiveness, but during the implementation and the examination of final study findings, our research partnership noted that pharmacists were interested in assuming a more frontline, public health role. As a result, four community partners from HCAP (originally involved in the Harlem ESAP Intervention Study) joined with four new community partners (from Brooklyn, Queens, South Bronx and the Lower East Side of Manhattan) to design and implement a pilot structural intervention targeting IDUs and

pharmacy staff in five New York City neighborhoods (Harlem, Brooklyn, Queens, South Bronx, the Lower East Side of Manhattan) to create a multi-community intervention working group. At this time two independent pharmacy owners who had expressed an interest in working with our partnership during the Harlem ESAP Intervention Study joined our intervention working group as well. Together, the intervention working group strived to increase the capacity of pharmacists and their staff to play a more proactive role in connecting their syringe purchasing clients with health, social, and medical services during and after the completion of the intervention. With pharmacies becoming increasingly popular as a source of sterile syringes for IDUs in New York City, this was an opportune time to implement a citywide community-based structural intervention in pharmacies to target IDUs. Thus, the intervention working group set forth to launch an intervention using the syringe exchange program model to (1) create a stronger public health role for pharmacists and (2) provide referrals and information about medical care, social services and drug treatment during the syringe sale transaction using CBPR. The intervention work group proposed to develop an intervention to (1) sensitize pharmacists and technicians to issues of substance use, (2) facilitate interactions between the pharmacist/technician and IDUs during the syringe sale, and (3) encourage pharmacists and technicians to promote safer injection and disposal practices as well as provide information on health care services and drug treatment options. In addition to the conception, design and implementation of the intervention (including pharmacy staff training in HIV prevention, drug dependence, and harm reduction), the intervention working group was integral in various phases of data collection, interpretation and dissemination of pilot study findings. This equal participation in all phases of the research is described by others as one of the guiding principles of community based participatory research (Isreal et al., 1998; Schwab M and Syme SL, 1997). This paper will discuss the role of our community partners and will evaluate the feasibility and effectiveness of this pilot structural intervention with respect to changes in risk behaviors, attitudes about pharmacies and their staff and service utilization among control and intervention IDU syringe customers.

## METHODS

### Population & Study Design

**Pharmacists/Technicians**—Pharmacies were selected from neighborhoods in Brooklyn, Queens, the Lower East Side, Harlem, and the Bronx that had previously been identified through ethnographic mapping as areas with high drug activity. A list of ESAP-registered pharmacies in New York City was obtained from the New York State Department of Health and randomly ordered. Research staff called each pharmacy and asked to speak with the managing pharmacist to obtain permission for the pharmacy to participate in the pilot project. If the managing pharmacist agreed to participate, research staff from NYAM approached each member of the pharmacy staff involved in syringe sales at that pharmacy to obtain written informed consent to participate in the Pharmacies As The Link to Community Services (PAT-LINK) project. In addition to obtaining informed consent from the managing pharmacists and pharmacy technicians involved in syringe sales, informed consent was also required from district managers for chain pharmacies. Based on the recommendations from members of the PAT-LINK intervention working group, pharmacies were eligible if they (1) were registered as an ESAP pharmacy, (2) reported selling to at least 3 new IDU customers per month *or* at least 10 regular customers per month and had at least 1 new customer per month, (3) reported at least 2 new IDUs becoming regular customers per month, (4) reported having previously engaged in conversations about treatment, disposal, or safe injection practices with approximately 25% of customers and (5) sold non-prescription syringes with no additional requirements (e.g., request diabetic ID). In order for pharmacies to participate in ESAP, pharmacies had to be registered with the New York State Department of Health. Of the 1237 pharmacies in the geographic range of the study, 931 were registered with ESAP. Both chain

and independent pharmacies were eligible to participate in the pilot intervention. The first 25 eligible pharmacies that had sufficient time, space, and interest in participating in the intervention (i.e., space for private conversations; pharmacists, technicians and clerks equally willing to engage in conversations with syringe customers; and time to collect data and converse with syringe customers without disrupting patient/customer flow) were screened and consented to participate. These 25 pharmacies went through additional screening and monitoring to ensure all criteria were met which resulted in a final sample of 13 pharmacies enrolled in the pilot study (2 from Brooklyn, 5 from South Bronx, 1 from the Lower East Side, 1 from Queens, and 4 from Harlem). The most common reason for non-participation included too few syringe customers, however, two pharmacies had insufficient time to collect required data, and one pharmacy lacked interest from all pharmacy staff.

**IDUs**—IDUs were recruited through two different strategies. IDUs using PAT-LINK intervention pharmacies were referred to our study site by the pharmacy staff at PAT-LINK pharmacies. IDUs who presented at the research site with a referral coupon from a PAT-LINK pharmacy were screened to verify that they (1) injected drugs in the past 6 months, (2) purchased syringes from the pharmacy indicated on the referral coupon, and (3) had visible track marks. The IDU control group was comprised of IDUs using non-intervention pharmacies identified through their participation in the IMPACT study, a separately funded community-based study to determine the association between features of the urban environment and several health outcomes. IMPACT participants were recruited using random street-intercept sampling in 36 socioeconomically disadvantaged neighborhoods (as described elsewhere) which were included in the same five communities where the pilot pharmacies were located. (Ompad et al, 2008) Individuals who reported injecting drugs and using non-intervention pharmacies to purchase syringes were then asked to participate in the PAT-LINK study. All individuals who agreed to take part in PAT-LINK provided written informed consent, completed a survey (described below) and were compensated with \$20 and a \$4 Metrocard if they had been referred by a PAT-LINK pharmacy and \$10 if they were referred through IMPACT (which included separate additional compensation). To verify that control IDUs had not purchased syringes from PAT-LINK pharmacies, participants were shown photographs of each PAT-LINK pharmacy to jog their memory and asked if they had ever purchased syringes at one of the pharmacies pictured. Had an individual indicated that he/she purchased syringes from at least one of the PAT-LINK pharmacies, he/she would have been enrolled in the intervention group.

**Intervention**—The PAT-LINK pilot intervention was designed to expand pharmacy services and the public health role of pharmacists. New York City pharmacies were enrolled in the pilot project and were asked to provide IDU customers with information on harm reduction and referrals to medical/social services including drug treatment programs. All pharmacists and technicians were also invited to attend two workshops led by members of the intervention working group and research staff. Pharmacy staff training workshops were designed to (1) provide information about the pilot project, (2) describe the potential for pharmacies and pharmacy staff to serve as frontline public health providers in the HIV prevention arena, (3) discuss the infectious disease burden among IDUs, namely HIV and HCV, (4) humanize IDUs through education on addiction and dependence and (5) provide tips on how to engage in conversation with IDU syringe customers and to provide information and referrals to services.

All PAT-LINK pilot pharmacies were visited monthly by project staff, provided with PAT-LINK posters to display in their pharmacy, log sheets to record syringe transactions, and materials to distribute to IDUs during the syringe sale transaction (e.g. ESAP safety inserts, safe syringe-disposal containers (Fitpacks), safe injection kits, pamphlets from the health department, referral guides to local health and drug treatment services, and referral coupons to participate in a survey at our research site). All materials were developed in both English

and Spanish and were designed and/or approved by the intervention working group and the institutional review board at NYAM. Finally, there was no contact with the control pharmacies.

**Forming the PAT-LINK Intervention Working Group**—Members of this intervention working group included representatives from Columbia University Mailman School of Public Health, Center for Family and Community Medicine at Columbia University College of Physicians and Surgeons, New York State Department of Health AIDS Institute, Mount Sinai Medical Center, DeFranco Pharmacy, Zive Pharmacy, VIP Community Services, Brooklyn AIDS Task Force, East Harlem HIV CARE Network, Bronx District Public Health Office, Lehman College, City University of New York and AIDS Center of Queens County. Throughout the duration of this pilot research project, the PAT-Link intervention working group met monthly to discuss the implementation and progress of the pilot intervention.

**CBPR partners**—All PAT-LINK pilot intervention activities were fully designed and implemented by the PAT-LINK intervention working group. To allow for full and equal participation in this research collaboration by all members, monthly meetings were held before, during and after implementation of this pilot intervention to permit ongoing feedback, input and refinement. Members of the PAT-LINK intervention working group also designed and led workshops and focus group discussions with pharmacy staff and participated in the development of all pharmacy resource materials (e.g. posters, safe injection guide, pharmacy staff training manual, safe injection kits, resource referral guides). For example, our intervention working group worked closely with HCAP and an independent pharmacy owner to develop the PATLINK Pharmacy Staff Training Manual. Together they developed effective and appropriate strategies on how to engage IDUs in conversation in a non-judgmental manner using a harm-reduction approach. The training manual included sections describing 1) the role of pharmacy staff as public health providers, 2) HIV and drug abuse in the community, 3) ESAP and the need for extended pharmacy services, 4) chemical dependency and addiction, 5) how to provide services to ESAP customers, 6) various treatment modalities and 7) relevant research articles. The intervention working group and HCAP were also actively engaged in creating the pharmacy staff training workshop which aimed to equip pharmacy staff who were participating in the pilot intervention with the skills needed to best serve their IDU syringe customers (e.g. provide information on safe injection and disposal of syringes and referrals to drug treatment programs, HIV testing centers, drug detoxification centers and medical services). This pharmacy staff training workshop was developed in partnership with the Pharmacists Society of the State of New York and was accredited for 2 continuing education credits for pharmacists by the New York State Department of Education. It was designed to 1) familiarize pharmacy staff with the characteristics and needs of the local IDU population, 2) to present strategies for engaging customers in conversations and for creating a comfortable and non-judgmental environment, and 3) to provide pharmacy staff with information about HIV services, medical and mental health services and drug treatment programs in the community. In addition, 32 community health centers and drug treatment programs from the neighborhoods surrounding our intervention pharmacies were contacted by research staff and asked to assist us in this project by agreeing to have their contact information distributed to IDUs through pharmacists and technicians in their community.

## Data Collection

**Intervention IDUs**—After providing written informed consent to participate in the PAT-LINK study, IDUs completed a 25-minute interviewer-administered questionnaire at enrollment to assess sociodemographic characteristics, injection risk behaviors, syringe acquisition and disposal, experiences purchasing syringes in pharmacies, sexual risk behaviors, health care/drug treatment utilization, and experiences with the police. This visit served to enroll participants, to establish a rapport with research staff and to increase the likelihood of

participants returning to the study site two months after the intervention for the intervention effect assessment. This two-month survey was administered between May 16, 2006 and October 1, 2007 and assessed the following for IDUs in the intervention arm: syringe acquisition and disposal, syringe purchasing experiences in pharmacies, beliefs about pharmacies and syringe exchange programs, utilization of drug treatment, medical and social services and experiences with discrimination.

**Control IDUs**—Of 73 IDUs enrolled in the IMPACT study between May 21, 2006 and August 6, 2007, 66 were eligible to participate as PAT-LINK controls. Control IDUs participated in an interviewer-administered cross-sectional survey that collected similar information to the 2-month intervention survey, allowing for comparison between control and intervention IDUs with respect to the intervention effect.

## RESULTS

Of the 95 IDUs enrolled, the median age was 37, 81% were male, 21% were African American/black, 62% were Hispanic, 9% were white, 61% had at least a high school education, 53% had been homeless in the past 6 months and 26% had traded sex for money in the past 6 months (Table 1).

As presented in Table 1, compared with the control IDUs, intervention IDUs were significantly older ( $p<0.001$ ), more likely to be African American/black ( $p<0.001$ ), and less likely to report high risk sexual activity ( $p<0.001$ ). Homelessness and education status did not differ by intervention and control status.

In terms of injection risk, intervention IDUs were less likely to share syringes ( $p<0.04$ ) and more likely to report pharmacy use in the past 2 months compared with IDUs in the control group ( $p<0.02$ ). No other injection risk behaviors differed by intervention and control status, including disposal practices.

In terms of service utilization, intervention IDUs were somewhat more likely to report seeing a clinician in a private medical office compared with control IDUs ( $p<0.08$ ). Use of any type of drug treatment, visit to a community health clinic, emergency room, or use of any type of case management, social work and/or counseling services did not differ by intervention and control status.

In terms of pharmacy experiences, such as level of comfort, additional requirements for syringe sales, receipt of information, and likelihood of returning to and using pharmacy services in the future, there were no significant differences by intervention and control status. With respect to beliefs about pharmacies, IDUs in the intervention group were more likely to feel that their pharmacists cared about their health and well being ( $p=0.02$ ) and to feel comfortable trying to buy a syringe in a pharmacy even if he/she did not know whether the pharmacy would sell one to him/her ( $p<0.01$ ). Intervention IDUs surveyed were also somewhat less likely to feel like it was difficult to get a clean syringe when he/she needed one ( $p=0.10$ ). There were no differences with respect to beliefs about the staff and services at syringe exchange programs.

Other results suggest that IDUs in both groups would like their pharmacies to take a more active role in their health. For example, 87.5% of all IDUs reported that they felt comfortable/very comfortable receiving information from a pharmacist. Of note, no one reported feeling uncomfortable receiving information from pharmacies. Most IDUs sampled reported that the staff at syringe exchange programs cared about their health and well-being (81.7%) and felt that getting other services at syringe exchange programs was important to them (84.5%).

Among both intervention and control IDUs, a majority had used syringe exchange programs and pharmacies for syringe purchases/exchange in the past two months, but other, potentially unsafe syringe sources (e.g. shooting galleries, friends, needle dealers) were also minimally used among this population.

## DISCUSSION

These results support the use of a community-based approach to promote expanding pharmacy services to include risk and harm reduction services targeting IDU syringe customers. Our community partners were instrumental in the pharmacy staff training workshops and helped pharmacy staff to become more tolerant of their IDU customers and more willing and capable of performing intervention activities. Pilot data suggesting evidence of an intervention effect include intervention IDUs reporting that pharmacists cared more about their health and well-being, feeling more comfortable purchasing syringes in pharmacies, and having more positive feelings about pharmacies. Additionally, as noted in many of the training evaluations completed by pharmacists and technicians, most felt that they had learned a great deal about HIV prevention and drug use from our community partners and felt better equipped and inspired to interact with their IDU customers and to serve their community through HIV prevention. Although this was an unintended benefit of our pilot intervention, many pharmacists anecdotally reported continued contact with a few of the community providers they were introduced to during the intervention, even after the pilot had ended. This evidence of sustainability (e.g. community relationships established and fostered between CBOs and pharmacy staff) could potentially be further explored in a larger, more robust trial. Finally, these findings also suggest that IDUs valued the services provided at syringe exchange programs and those IDUs who use pharmacies as a syringe source would be receptive to pharmacists who assumed an expanded public health role. The merger between epidemiology and community based participatory research that is described above is projected by some to transform the field from one that isolates risk factors to one that improves the community's health and well-being (Leung MW, Yen IH and Minkler M, 2004).

Several limitations of this analysis must be acknowledged. One of the major limitations is the small sample size which may have limited our ability to detect significant differences between intervention and control measures and limits our ability to generalize our findings to other IDU populations. Larger samples are needed to validate these findings and to make inferences about IDUs more generally. Also, due to the limited number of IDUs referred through our PAT-LINK pharmacies, regression analysis to identify independent effects and control for potential confounders was not possible. As described above, IDUs recruited through IMPACT and PAT-LINK differed significantly with respect to age, race/ethnicity and history of trading sex for money in the past 6 months, which could have been independently associated with injection practices. For example, the control group included more Hispanic IDUs, who have been shown elsewhere (Estrada, 2005) to have higher risk injection practices than African American/black IDUs. There were also differences in attitudes towards pharmacy staff and frequency of pharmacy use. However, there is no data to suggest that selection bias would influence attitudes on pharmacy utilization. In fact, Hispanics have typically reported more frequent use of pharmacies for syringes in New York City (NYAM, 2003, Fuller et al. 2007). Because this is counter to what we observed, it is possible that the effect observed reflects an intervention effect, rather than selection bias. As evidenced by their decreased likelihood of trading sex for money in the past 6 months, IDUs in the intervention group may be a more risk-adverse population and may consequently be more likely to seek other health/social services for reasons not related to where they purchase syringes.

It was also difficult to measure an intervention effect on a few of the injection risk behaviors because the questions in the control survey referred to behaviors in the past 6 months, while



those in the intervention survey corresponded with behaviors in the last 2 months. The questions were asked in this way to be consistent with those asked in IMPACT which began prior to the pilot study and was the source of our control IDUs. This could have biased our results because the control group may have reported either more or less risk if asked about behaviors occurring during a shorter time frame. While confirmation of these findings in a larger sample using a more robust design is warranted, the beliefs and attitudes toward pharmacy staff were asked over a similar time frame and provide some evidence of a potential intervention effect.

It is important to note, however, that our study may be limited in its ability to detect an intervention effect specifically with respect to service utilization after only two months of exposure to the intervention. It is possible that this is too short a period to detect an intervention effect particularly with respect to utilization of health, social, and drug treatment services which may require more time to access. For example, before these types of referrals take place in the pharmacy, there must be a level of trust between the pharmacist and IDU customer. Therefore, it is unlikely that all or even the majority of IDUs were referred to such services by pharmacy staff in this short period of time. This was also evidenced by an additional analysis that compared the enrollment data to the 2-month follow-up data among the intervention IDUs (data not shown) which found no significant differences or changes in risk behavior or service utilization over the 2-month period. Even though two months may be a sufficient amount of time to shape attitudes and beliefs (which we observed here), future studies should allow IDUs a longer period of exposure to the intervention to increase the opportunity to observe an intervention effect on the use of referral information and possibly on risk behavior as well.

Finally, our intervention sought to support and foster relationships between community members to improve the health of the IDU community, which is one of the key principles of community based research outlined by Isreal and colleagues (1998). While the project had intended for the affiliations between PAT-LINK pharmacies and referral services to become more concrete partnerships, the short period of time inhibited the formation of these close relationships in all but a few instances. As noted above, some pharmacists did maintain contact with members from the PAT-LINK intervention working group outside of the study, but few formed long-lasting relationships with the health and service organizations that we had hoped they would. In future interventions that attempt to link pharmacists and pharmacy staff with community service organizations, additional time should be spent on fostering a trusting and mutually beneficial relationship between both groups so that the link can be sustained beyond the intervention period. Other partnerships have also noted time as an obstacle to achieving intervention effects (Metzler et al., 2003).

With limitations acknowledged, these pilot data are sufficient to support the implementation of a large-scale intervention trial to confirm these findings and to demonstrate the benefit of using community based participatory research methods. A partnership with community members was essential for the researchers to comprehensively address the social and cultural context of the problem so that an appropriate, effective and potentially sustainable intervention could be tested. Based on lessons learned and partnerships built during this pilot project, our intervention working group has begun the design of a similar scaled-up, pharmacy-randomized community based trial in New York City. While the successful implementation of this pilot project was largely due to our collaborations with local community based organizations, it must be acknowledged that building trusting and productive relationships between academic centers and community based organizations takes time (Israel et al., 1998; Hatch et al., 1993; Isreal et al., 1992; Maguire, 1987; Mittelmark et al., 1993; Weiss and Greene, 1992; Metzler et al., 2003). Thus in order for this approach to work with urgent health problems, a viable partnership must already be in place.

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## References

1. Caceres, W.; Fuller, CM.; Blaney, S.; Shah, N.; Pendleton, LR.; Standish, K.; Vlahov, D. Pharmacists as treatment linkages; Expanding service referrals to injection drug users through the Expanded Syringe Access Program, New York City, 2001–2004. [Oral Presentation] 4th International Society for Urban Health Conference; Toronto, Ontario Canada. 2005 Oct.
2. CDC. HIV Prevalence Estimates - United States, 2006. *JAMA* 2009;301(1):27–29.
3. Des Jarlais DC, Marmor M. HIV incidence among injecting drug users in NYC syringe-exchange programmes. *Lancet* 1996;348:987–991. [PubMed: 8855855]
4. Des Jarlais DC, Marmor M. HIV incidence among injection drug users in New York City, 1992–1997: evidence for a declining epidemic. *Am J Public Health* 2000;90(3):352–359. [PubMed: 10705851]
5. Estrada AL. Health disparities among African-American and Hispanic drug injectors--HIV, AIDS, hepatitis B virus and hepatitis C virus: a review. *AIDS* 2005;19:S47–S52. [PubMed: 16251828]
6. Fuller CM, Galea S, Caceres W, Blaney S, Sisco S, Vlahov D. Multilevel community-based intervention to increase access to sterile syringes among injection drug users through pharmacy sales in New York City. *Am J Public Health* 2007;97(1):117–124. [PubMed: 17138929]
7. Fuller CM, Ahern J, Vadnai L, Coffin PO, Galea S, Factor SH, Vlahov D. Impact of increased syringe access: preliminary findings on injection drug user syringe source, disposal, and pharmacy sales in Harlem, New York. *Journal of the American Pharmaceutical Association* 2002;42:S77–S82. [PubMed: 12489621]
8. Galea S, Factor SH, Bonner S, Foley M, Freudenberg N, Latka M, Palermo A, Vlahov D. Collaboration among community members, local health service providers, and researchers in an urban research center in Harlem, NY. 2001;116:530–539.
9. Groseclose SL, Weinstein B. Impact of increased legal access to needles and syringes on practices of injecting-drug users and police officers—Connecticut, 1992–1993. *J Acquir Immune Defic Syndr Hum Retrovirol* 1995;10(1):71–72. [PubMed: 7648287]
10. Hatch J, Moss N, Saran A, Presley-Cantrell L, Mallory C. Community research: partnership in Black communities. *Am J Prev Med* 1993;9:27–31. [PubMed: 8123284]
11. Israel BA, Schulz AJ, Parker EA, Becker AB. Review of community-based research: assessing partnership approaches to improve public health. *Annu Rev Public Health* 1998;19:173–202. [PubMed: 9611617]
12. Isreal BA, Schurman SJ, Hugentobler MK. Conducting action research: relationships between organization members and researchers. *J Appl Behav Sci* 1992;28:74–101.
13. Leung MW, Yen IH, Minkler M. Community based participatory research: a promising approach for increasing epidemiology's relevance in the 21st century. *Int J Epidemiol* 2004;33:499–506. [PubMed: 15155709]
14. MacDonald M, Law M. Effectiveness of needle and syringe programmes for preventing HIV transmission. *Int J Drug Policy* 2003;14:353–357.
15. Maguire, P. *Doing Participatory Research: A Feminist Approach*. Sch Educ., Amherst, MA: University of Massachusetts; 1987. p. 253
16. Metzler MM, Higgins DI, Beeker CG, Freudenberg N, Latnz PM, Senturia KD, Eisinger AA, Viruell-Fuentes EA, Gheisar B, Palermo A, Softley D. Addressing urban health in Detroit, New York City, and Seattle through community-based participatory research partnerships. *Am J Public Health* 2003;93(5):803–811. [PubMed: 12721148]

17. Miller NS, Sheppard LM, Colenda CC, Magen J. Why physicians are unprepared to treat patients who have alcohol- and drug-related disorders. *Academy of Medicine* 2001;76(5):410–418.
18. Mittelmark MB, Hunt MK, Heath GW, Schmid TL. Realistic outcomes: lessons from community-based research and demonstration programs for the prevention of cardiovascular disease. *J Public Health Policy* 1993;14:437–462. [PubMed: 8163634]
19. The New York Academy of Medicine. New York State Expanded Syringe Access Demonstration Program Evaluation. Evaluation Report to the Governor and the New York State Legislatures. 2003
20. Ompad DC, Galea S, Marshall G, Fuller CM, Weiss L, Beard JR, Chan C, Edwards V, Vlahov D. Sampling and recruitment in multilevel studies among marginalized urban populations: The IMPACT studies. *Journal of Urban Health* 2008;85(2):268–280. [PubMed: 18214686]
21. Schwab M, Syme SL. On paradigms, community participation and the future of public health. *Am J Public Health* 1997;87:2049–2052. [PubMed: 9431303]
22. Stancliff S, Salomon N, Perlman DC, Russell PC. Provision of influenza and pneumococcal vaccines to injection drug users at syringe exchange. *Journal of Substance Abuse and Treatment* 2000;18(3): 263–265.
23. Weiss HB, Greene JC. An empowerment partnership for family support and education programs and evaluations. *Fam Sci Rev* 1992;5:131–149.

**Table 1**

Sociodemographic characteristics, injection practices, syringe acquisition and disposal, service utilization, experiences at pharmacies and beliefs about pharmacies and syringe exchange programs for control and intervention IDUs in New York City, 2006–2007 (N=95)

<i>Variables, No. (%)</i>	<b>Number and Percentage (%) with each Syringe Source</b>			<i>P-value</i>
	<b>All IDUs (n=95)</b>	<b>Control IDUs (n=66)</b>	<b>Intervention IDUs (n=29)</b>	
<b><i>Sociodemographic Variables</i></b>				
Age				<0.0001
18 to 29	16 (17.6)	13 (19.7)	3 (12.0)	
30 to 39	40 (44.0)	36 (54.5)	4 (16.0)	
40 to 49	25 (27.5)	12 (18.2)	13 (52.0)	
50 and older	10 (11.0)	5 (7.6)	5 (20.0)	
Age (Median)	37	35.5	45	<0.0001
Sex (Male)	74 (81.3)	53 (80.3)	21 (84.0)	0.77
Race				0.04
African American / Black	19 (21.1)	9 (13.6)	10 (41.7)	
Hispanic	56 (62.2)	45 (68.2)	11 (45.8)	
White	8 (8.9)	6 (9.1)	2 (8.3)	
Other	7 (7.8)	6 (9.1)	1 (4.2)	
Education ( $\geq$ HS diploma/GED)	55 (61.1)	37 (56.1)	18 (75.0)	0.21
Homeless in the past 6 months	48 (53.3)	38 (57.6)	10 (41.7)	0.18
Traded sex for money in the past 6 months	23 (25.6)	23 (34.8)	0 (0.0)	<0.001
<b><i>Injection practices</i></b>				
Used a needle used by someone else before you in the past 6 months	22 (25.29)	17 (28.8)	5 (17.9)	0.27
Used only new needles in the past 6m	60 (67.4)	41 (67.2)	19 (67.9)	0.95
Passed a needle along after using it in the past 6m	33 (37.1)	27 (44.3)	6 (21.4)	0.04
Average number of times injecting with a syringe before disposing of it, mean (standard deviation)	3.1 (3.0)	3.4 (3.4)	2.5 (1.8)	0.14
Injected $\geq$ 5 years	78 (86.7)	55 (83.3)	23 (95.8)	0.17
<b><i>Syringe acquisition in the past 2 months</i></b>				
Pharmacy	65 (69.2)	41 (62.1)	24 (85.7)	0.02
Needle Exchange Program	20 (21.7)	13 (20.3)	7 (25.0)	0.50
MD, PA, or nurse	1 (1.1)	0 (0.0)	1 (3.6)	0.30
Shooting gallery	2 (2.1)	1 (1.5)	1 (3.6)	0.51
Diabetic	10 (10.6)	7 (10.6)	3 (19.7)	1.00
Non-Diabetic friend	11 (11.8)	5 (7.7)	6 (21.4)	0.08
Non-Diabetic relative	2 (2.1)	2 (3.0)	0 (0.0)	0.10
Drug or needle dealer	7 (7.5)	4 (6.1)	3 (10.7)	0.42
Other source	3 (3.2)	2 (3.0)	1 (3.6)	1.00

<i>Variables, No. (%)</i>	<b>Number and Percentage (%) with each Syringe Source</b>			<i>P-value</i>
	<b>All IDUs (n=95)</b>	<b>Control IDUs (n=66)</b>	<b>Intervention IDUs (n=29)</b>	
<b><i>Syringe disposal in the past 2 months</i></b>				
Brought it to a needle exchange program	10 (10.6)	7 (10.6)	3 (10.7)	0.69
Brought it to a free-standing clinic/health department	1 (1.1)	1 (1.5)	0 (0.0)	
Threw it away	70 (74.5)	47 (71.2)	23 (82.1)	
Put it in a sharps container, Fitpack or soda/laundry bottle and then threw it away	10 (10.6)	9 (13.6)	1 (3.6)	
Other	3 (3.2)	2 (3.0)	1 (3.6)	
<b><i>Service utilization in the past 2 months</i></b>				
Any drug treatment	36 (38.3)	28 (42.2)	8 (28.6)	0.21
Community health clinic	12 (13.0)	6 (9.4)	6 (21.4)	0.18
Private medical office	16 (17.6)	8 (12.7)	8 (28.6)	0.08
ER	22 (25.0)	17 (27.0)	5 (20.0)	0.50
Any use of case management, social work and/or counseling services	52 (54.7)	38 (57.6)	14 (48.3)	0.40
<b><i>Experiences at a pharmacy in the past 2 months</i></b>				
Asked to sign a log book or to provide personal information	7 (9.5)	3 (6.3)	4 (15.4)	0.23
Asked what syringes will be used for	3 (4.1)	2 (4.2)	1 (3.8)	1.00
Pharmacist declined to sell syringes	9 (12.2)	5 (10.4)	4 (15.4)	0.71
Pharmacist refused to sell a single syringe	9 (12.2)	5 (10.4)	4 (15.4)	0.71
Pharmacist gave information	8 (25.0)	0 (0.0)	8 (28.6)	0.55
Felt comfortable/very comfortable receiving information from the pharmacist	14 (87.5)	2 (100.0)	12 (85.7)	1.0
Would go to this or any other pharmacist in order to get any needed referral services	10 (33.3)	0 (0.0)	10 (38.5)	0.27
Would return to this pharmacy in order to purchase syringes in the future	29 (93.6)	4 (100.0)	25 (92.6)	1.00
Would return to this pharmacy in order to purchase household/health/beauty products	20 (64.5)	2 (50.0)	18 (66.7)	0.60
Would return to this pharmacy in order to refill medication prescriptions	24 (77.4)	2 (50.0)	22 (81.5)	0.21
<b><i>Beliefs about pharmacies and syringe exchange programs</i></b>				
Feel that pharmacists care about my health and well being	34 (44.7)	17 (34.7)	17 (63.0)	0.02
Feel comfortable trying to buy a syringe at any pharmacy even if I don't know if they will sell one to me before I go into the store	48 (65.8)	25 (54.3)	23 (85.2)	<0.01
Feel that the staff at syringe exchange programs care about my health and well being	58 (81.7)	34 (75.6)	24 (92.3)	0.11
Feel that syringe exchange programs are sometimes too far away to get to	36 (49.3)	25 (54.3)	11 (40.7)	0.26
Feel that it is hard to make syringe exchange program hours	34 (46.6)	24 (52.2)	10 (37.0)	0.21
Feel that it is difficult to get a clean syringe when he/she needs one	16 (20.8)	13 (26.5)	3 (10.7)	0.10

<i>Variables, No. (%)</i>	<b>Number and Percentage (%) with each Syringe Source</b>			<i>P</i> -value
	<b>All IDUs (n=95)</b>	<b>Control IDUs (n=66)</b>	<b>Intervention IDUs (n=29)</b>	
Feel that getting other services at syringe exchange programs is important	60 (84.5)	37 (84.1)	23 (85.2)	1.00
Fell that he/she knows which pharmacies to go to for syringes	72 (94.7)	44 (91.7)	28 (100.0)	0.29