Multilevel Community-Based Intervention to Increase Access to Sterile Syringes Among Injection Drug Users Through Pharmacy Sales in New York City

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The many strategies for preventing HIV/AIDS among injection drug users (IDUs) who cannot cease drug use have included syringe exchange programs and the removal of barriers to purchase (primarily through pharmacies) and possess syringes.[1] Syringe exchange programs, which couple syringe exchange with counseling, education, and referrals to care, have been shown to reduce HIV infection. However, obstacles such as fear of being identified as an IDU and police harassment have prevented some IDUs from using these programs.[2–7] Furthermore, inadequate syringe supplies, limited operation hours, and long travel distances have also been identified as barriers to syringe exchange program use.[8,9] As a result, numerous researchers urge the use of pharmacies as safe syringe sources to supplement syringe exchange programs.[1,10]

Recognizing this need, New York State enacted the Expanded Syringe Access Demonstration Program (ESAP), which permits pharmacy syringe sales without a prescription. Since January 1, 2001, individuals aged 18 years or older have been permitted to purchase and legally possess up to 10 syringes without a prescription from pharmacies registered with the New York State Department of Health. Early data revealed that IDUs in East and Central Harlem (referred to as "Harlem" hereafter) and South Bronx minimally participated in ESAP.[11–14] In addition, studies indicated that Black and Hispanic drug users were less likely to use pharmacies as safe and legal syringe sources compared with their White counterparts, irrespective of geographic location.[11,12,14,15]

In the summer of 2001, the Harlem Community and Academic Partnership recognized the disparities in both the use of ESAP and the burden of HIV disease in their community, and organized an intervention work

Objectives. Research has indicated that there is minimal use of pharmacies among injection drug users (IDUs) in specific neighborhoods and among Black and Hispanic IDUs. We developed a community-based participatory research partnership to determine whether a multilevel intervention would increase sterile syringe access through a new policy allowing nonprescription syringe sales in pharmacies.

Methods. We targeted Harlem, NY (using the South Bronx for comparison), and disseminated informational material at community forums, pharmacist training programs, and counseling or outreach programs for IDUs. We compared cross-sectional samples in 3 target populations (pre- and postintervention): community members (attitudes and opinions), pharmacists (opinions and practices), and IDUs (risk behaviors).

Results. Among community members (N = 1496) and pharmacists (N = 131), negative opinions of IDU syringe sales decreased in Harlem whereas there was either no change or an increase in negative opinions in the comparison community. Although pharmacy use by IDUs (N = 728) increased in both communities, pharmacy use increased significantly among Black IDUs in Harlem, but not in the comparison community; syringe reuse significantly decreased in Harlem, but not in the comparison community.

Conclusions. Targeting the individual and the social environment through a multilevel community-based intervention reduced high-risk behavior, particularly among Black IDUs. (*Am J Public Health.* 2007;97:117–124. doi:10.2105/AJPH.2005.069591)

group to address this issue. The partnership had been formed 2 years earlier, as described elsewhere,[16] and currently includes 30 community-based organizations in Harlem, 4 academic institutions, and the local health department. Because of the complex social factors (e.g., police harassment, various types of discrimination) that contribute to injection risk, and previous work that shows how contextual factors (e.g., public policy, cultural norms, illegality of drug use) may influence individual behaviors, a multilevel design was chosen.[17–19] Using a community-based participatory research approach,[20] we targeted 3 populations: community residents, pharmacists, and IDUs. The specific goals for the intervention were (1) to sensitize community residents to drug users and dispel negative myths by providing education on the positive affect that ESAP could

have in their community (e.g., reducing the risk and burden of HIV disease), (2) to provide education to pharmacists about what was and was not required by the law and provide information to help dispel negative perceptions of drug users, and (3) to increase awareness of ESAP among IDUs and provide the location and hours of ESAP-participating pharmacies and information about safe injection and syringe disposal practices. All activities were to be performed in a culturally appropriate manner to specifically reach Black and Hispanic IDUs.

We report the final results of our nonrandomized, multilevel intervention, including pre- and postintervention evaluations in both intervention (Harlem) and comparison (South Bronx) communities. Using a community-based participatory research approach, we obtained data on 3 target

populations: community residents, pharmacists, and IDUs.

METHODS

Study Population

Community residents, pharmacists, and IDUs were sampled at 2 time points: preintervention and postintervention. Community residents were drawn from randomly selected households on the basis of geographic eligibility (identified by the nearest major intersection) in each of 2 locations in New York: Harlem (intervention) and South Bronx (comparison). Further randomization of adults within the household was performed by selecting the individual aged 18 years or older who reported a birth date closest to the call date. The final community sample size was 742 residents preintervention (intervention=494; comparison=248) and 754 residents postintervention (intervention=505; comparison=249).

Pharmacies were selected from a database of listings from the New York State Department of Health combined with listings obtained from Yellowpages.com (http://www.yellowpages.com), an online directory collected from phone books and new business listings. Because of the modest number of pharmacies registered in South Bronx, the Bedford-Stuyvesant community in Brooklyn (with similar demographics) was added to the comparison community, which yielded 106 pharmacies in the comparison community and 45 in the intervention community. Pharmacies were excluded from the study if their phone was disconnected, if they did not provide over-the-counter services, or if the supervising pharmacist was unwilling to participate. Pharmacists were only called when customer volume was expected to be low (on the basis of pilot testing). In the intervention community, 53% (n=24) of the pharmacists participated in the preintervention phone survey and 62% (n=28) participated in the postintervention survey. In the comparison community, 44% (n=47) and 31% (n=33) participated in the pre- and postintervention surveys, respectively. Although it is likely that some pharmacists surveyed preintervention were the same pharmacists surveyed postintervention, confidentiality issues prevented

linking these individuals at these 2 time points.

To enhance feasibility and efficiency of this study, 2 preexisting IDU studies that used similar recruitment techniques provided the samples for pre- and postintervention periods. IDUs for both studies were recruited at community research sites within each target community using targeted and respondent-driven sampling methods. The first study was an observational cohort study that targeted IDUs between 18 and 35 years of age and the second was an observational cross-sectional study (Urban Resource Center Cross-Sectional Survey) conducted among IDUs aged 18 years and older. The final sample (combined across each study) included 278 IDUs in the preintervention period (intervention=134; comparison=144) and 450 IDUs in the postintervention period (intervention=239; comparison=211). Because these studies ran concurrently and were conducted by the same research staff, participants were allowed to participate in only 1 of the 2 studies.

Data Collection

Surveys were conducted pre- and postintervention for each population in the intervention and the comparison communities. An anonymous random-digit-dial telephone survey was conducted among community residents preintervention (February 2002) and postintervention (July 2003). In addition to demographics, respondents were asked about approval or disapproval of drug use, and the effect of ESAP on street-discarded syringes, crime, drug use, and the spread of HIV. Surveys lasted approximately 25 minutes and were administered in English and Spanish. Spanish-language surveys had previously been back-translated for verification of consistency.

Pharmacists also participated in anonymous, cross-sectional surveys regarding their opinions and attitudes about ESAP both preintervention (April 2002) and postintervention (August 2003). In addition to individual pharmacist demographics, pharmacists were asked about their support for ESAP and their opinions of ESAP's effect on street-discarded syringes, drug abuse, and HIV transmission.

Data collected among IDUs from both observational studies focused on social and

behavioral risk factors for HIV, hepatitis C virus, and hepatitis B virus infections. In addition to existing sociodemographic data, new ESAP-related variables were added to both surveys and included knowledge about ESAP, source of pharmacy syringes, syringe sharing, and syringe reuse. IDUs surveyed from January 1, 2001, to June 31, 2002, comprised the preintervention sample and those surveyed from July 1, 2002, to September 1, 2004, comprised the postintervention sample.

Intervention Activities

The Harlem ESAP Intervention Project spanned between July 1, 2002, and June 30, 2003, and was fully designed and implemented by the Intervention Work Group. Activities targeting community members included visits to IDU-servicing community-based organizations and training programs conducted at these organizations, presentations to Harlem community boards, participation in health fairs and harm reduction meetings, and an ESAP community forum at a local church. Pamphlets were distributed and posters were hung in community centers, hair salons, barbershops, and bodegas.

All ESAP-registered and non-ESAP-registered pharmacists in the intervention community were visited and provided with ESAP information and registration assistance. They were also invited to a pharmacist and pharmacy clerk training workshop. Each registered pharmacy received pharmacy-tailored ESAP posters, pamphlets, ESAP guides, free safe syringe-disposal containers (Fitpacks), and regular program progress updates.

Intervention activities for IDUs included education about ESAP during HIV pre- and posttest counseling, small group training sessions regarding ESAP and safe syringe-disposal practices, and ESAP stickers and posters posted in communities where there was high drug use. The New York Academy of Medicine and other IDU-servicing community-based organizations conducted 1-on-1 and small group outreach to IDUs by disseminating ESAP pamphlets, which included a list and map of all registered pharmacies in Harlem. All ESAP educational materials included a toll-free telephone number (1-866-SAFE-SHOT) for a service that provided 24-hour information about ESAP, safe injection, syringe

TABLE 1—Intervention Outreach Activities, by Target Population: Harlem, New York City, NY, 2002–2003

Activity Category	Community[a]	Pharmacy[b]	IDU
1-on-1 education	90 visits to IDU-servicing CBOs	128 visits	60 counseling sessions
Workshops/small groups/ trainings	1 community forum 3 CBO trainings	2 pharmacist forums/ trainings[c]	16 groups attended 3 sessions
Presentations and community events	5 health fairs 2 community board meetings 2 harm/risk reduction meetings		3 ESAP stickering campaigns[d] 84 outreach events[e]
Materials disseminated	1485 posters 11 400 pamphlets 510 stickers 60 Fitpacks[f]	95 pharmacy guides 94 posters 586 Fitpacks[f]	2000 Fitpacks[f] 5350 pamphlets 750 stickers

Note. IDU = injection drug user; CBO = community-based organization; ESAP = Expanded Syringe Access Demonstration Program.
[a]Ninety CBOs involved in the East/Central Harlem area community.
[b]Unless otherwise noted, 45 pharmacies were involved.
[c]Attended by 10 pharmacists.
[d]Outreach teams posted ESAP infomation stickers on community billboards across Harlem.
[e]ESAP information tables set up in high-traffic areas staffed by 2 outreach workers.
[f]Small black syringe-disposal containers that were preassembled and included instructions for use and harm reduction information. Outreach workers distributed them at pharmacies, syringe exchange programs, community-based organizations.

disposal, and legal matters to IDUs and pharmacists and staffed during regular business hours and voice-prompted after business hours.

Data Analysis

Intervention activity materials were tabulated by population and activity category. Chi-square tests were used to compare pre- and postintervention periods for community resident, pharmacist, and IDU cross-sectional samples. In addition, pharmacy use reported by IDUs during the pre- and postintervention periods was stratified by race/ethnicity to determine the effect of the intervention on Black and Hispanic IDUs. P values $<.05$ were used to help determine significant differences for all group comparisons.

RESULTS

Intervention Activities

Table 1 presents the intervention activities implemented at each targeted population level. At the community level, there were 90 contacts with community-based organizations, which included 4 community-based organization training sessions or forums, 9 health fairs or community meetings, and 50 1-on-1 visits (3 visits or contacts with each community-based organization on average). This resulted in the distribution of 11 400 ESAP pamphlets, 1485 ESAP posters, 510 ESAP stickers, and 60 Fitpacks. With regard to pharmacies, there were 128 1-on-1 visits (3 visits to each pharmacy on average), and 2 pharmacist training sessions or forums that resulted in the distribution of 95 ESAP pharmacy guides, 94 ESAP posters, and 586 Fitpacks. Finally, 60 1-on-1 counseling sessions, 16 focus groups, and 87 IDU-targeted outreach events were conducted. A total of 5350 ESAP pamphlets, 750 ESAP stickers (posted on billboards, construction scaffolding, and vacant buildings) and 2000 Fitpacks were distributed.

Community Members

Table 2 shows pre- and postintervention awareness and perceptions of ESAP among Harlem (intervention) and South Bronx (comparison) community residents. There were no sociodemographic differences in pre- and postintervention samples in the intervention community or the comparison community with respect to age, gender, and education. Black and Hispanic residents were the majority in both communities. However, there were fewer Black (48%) and more Hispanic residents (44%) in the postintervention sample than in the preintervention sample (54% and 36%, respectively; $P<.03$). Most residents from both communities were unaware of nonprescription syringe sales at pharmacies. However, there was a significant increase in ESAP awareness postintervention (14%) compared with preintervention (6%; $P<.01$) in the intervention community with no change in the comparison community.

In the intervention community, a significantly smaller proportion of the residents postintervention felt that street-discarded syringes would increase (57%), and a larger proportion felt there would be no effect (20%) compared with preintervention perceptions (68% and 15%, respectively; $P<.01$). In the comparison community, those who felt ESAP would have no effect on street-discarded syringes decreased during the postintervention period (8%) compared with the preintervention period (16%; $P<.02$). Within the intervention community, there were no differences in the opinions of ESAP's effect on illegal drug use when comparing pre- and poststudy samples. However, there was a slightly larger proportion of residents in the comparison community who felt illegal drug use would increase (74%), and a smaller proportion who felt there would be a decrease (2%) postintervention compared with preintervention (72% and 7%, respectively; $P<.04$). Finally, there was no difference in opinion about ESAP's effect on the spread of HIV in the intervention community. However, in the comparison community there was a significantly larger proportion of residents who felt HIV would increase (63%), and a smaller proportion who felt HIV would decrease (22%) postintervention compared with preintervention (43% and 40%, respectively; $P<.01$).

Pharmacists

Attitudes and perceptions of ESAP-registered pharmacists about nonprescription syringe sales to IDUs, both pre- and postintervention, are reported in Table 3. There

TABLE 2—Pre- and Postintervention Comparison of Demographic Characteristics and Perceptions of ESAP among Community Residents of Harlem (n = 999) and South Bronx (n = 497): New York City, NY, 2002–2003

	Harlem (Intervention)			South Bronx (Comparison)		
	Preintervention (n = 494)	Postintervention (n = 505)	P	Preintervention (n = 248)	Postintervention (n = 249)	P
Mean age, y	42.1, 16.4	40.8, 15.9	<.21	39.3, 16.4	40.1, 15.4	<.60
Gender			<.58			<.35
Men no. (%)	217 (47)	221 (45)		108 (46)	108 (50)	
Women, no. (%)	277 (53)	284 (55)		140 (54)	141 (50)	
Race/ethnicity			<.03			<.11
Black, no. (%)	267 (54)	254 (48)		74 (27)	73 (26)	
White, no. (%)	37 (7)	21 (4)		5 (1)	9 (3)	
Hispanic, no. (%)	159 (36)	186 (44)		154 (67)	158 (70)	
Asian, no. (%)	6 (1)	8 (2)		4 (2)	1 (0)	
Other, no. (%)	10 (2)	16 (3)		7 (3)	3 (1)	
Education			<.46			<.21
Less than high school degree, no. (%)	93 (21)	98 (23)		80 (33)	78 (33)	
High school graduate, no. (%)	137 (29)	134 (27)		74 (28)	71 (30)	
Some college, no. (%)	106 (22)	119 (25)		56 (31)	45 (18)	
College graduate or more, no. (%)	144 (29)	142 (26)		35 (14)	51 (19)	
Aware of ESAP			<.01*			<.18
Yes, no. (%)	36 (6)	74 (14)		16 (6)	26 (9)	
No, no. (%)	457 (94)	420 (84)		231 (94)	220 (90)	
Not sure, no. (%)	1 (0)	11 (2)		1 (0)	3 (1)	
Effect of ESAP on street-discarded syringes			<.01			<.02
Increase, no. (%)	324 (68)	289 (57)		170 (71)	179 (74)	
Decrease, no. (%)	48 (10)	53 (12)		21 (8)	20 (7)	
No effect, no. (%)	80 (15)	101 (20)		39 (16)	23 (8)	
Not sure, no. (%)	38 (7)	60 (12)		17 (5)	27 (10)	
Effect of ESAP on illegal drug use			<.51			<.04
Increase, no. (%)	277 (61)	280 (57)		175 (72)	177 (74)	
Decrease, no. (%)	35 (7)	26 (6)		16 (7)	7 (2)	
No effect, no. (%)	151 (27)	166 (31)		45 (18)	52 (18)	
Not sure, no. (%)	26 (4)	31 (6)		11 (3)	13 (6)	
Effect of ESAP on spread of HIV/AIDS			<.60			<.01*
Increase, no. (%)	178 (40)	198 (43)		100 (43)	149 (63)	
Decrease, no. (%)	202 (38)	189 (35)		100 (40)	57 (22)	
No effect, no. (%)	78 (16)	75 (15)		31 (12)	20 (9)	
Not sure, no. (%)	32 (6)	42 (8)		16 (6)	23 (6)	

Note. ESAP = Expanded Syringe Access Demonstration Program. We used t tests for continuous variables and χ^2 tests for categorical variables. Preintervention data were collected February 2002; postintervention data were collected July 2003.
*$P < .001$.

were no differences in the pre- and post-intervention pharmacist samples with respect to gender and pharmacy type (chain vs independent). However, there were significantly more Black (26%), and fewer White pharmacists (17%) sampled postintervention than preintervention (14% and 32%, respectively; $P<.01$) in the intervention community. There were significantly more Whites (26%) and fewer Middle Eastern pharmacists (3%) sampled postintervention than preintervention (20% and 38%, respectively; $P<.02$) in the comparison community. A smaller proportion did not support ESAP (27%), and a larger proportion reported they were undecided (23%) postintervention than preintervention (41% and 0%, respectively; $P<.06$) in the intervention community. This difference was only marginally significant. In the comparison community, there was a significantly larger proportion that did not support ESAP (63%) and fewer who supported ESAP (34%) postintervention than preintervention (39% and 61%, respectively; $P<.05$). The majority of registered pharmacists surveyed reported selling syringes during both time periods for each community.

In the intervention community, significantly fewer pharmacists felt there would be an increase in street-discarded syringes (17%) and more were undecided about the effect of ESAP on street-discarded syringes (26%) postintervention compared with preintervention (43% and 4%, respectively; $P<.05$); there were no differences in the comparison community. There were no significant differences in pharmacists' opinions on whether ESAP would increase drug use in either community pre- and postintervention. Most pharmacists agreed that ESAP would reduce HIV transmission in both communities; however, fewer pharmacists agreed postintervention (75%) than preintervention (91%; $P<.08$) in the comparison community.

Injection Drug Users

Table 4 illustrates injection practices pre- and postintervention among IDUs in the intervention and comparison communities. In the intervention community, the mean age of IDUs was significantly younger during the postintervention period (36 years) compared with preintervention (39 years; $P<.01$). However, in the comparison community, mean age did not differ by period. In both communities, there was a significant increase in the proportion of men surveyed when comparing pre- and postintervention periods. There tended to be more Hispanic (66%) and White (18%) and fewer Black IDUs (16%) in the intervention community postintervention than preintervention (49%, 8%, and 43%, respectively; $P<.01$). A similar trend was observed in the comparison

TABLE 3—Pre- and Postintervention Comparison of Demographic Characteristics and Perceptions of ESAP among ESAP-Registered Pharmacists in Harlem (n = 51) and South Bronx and Brooklyn (n = 80): New York City, NY, 2002–2003

| | Harlem (Intervention) | | | Brooklyn and S. Bronx (Comparison) | | |
	Preintervention (n = 24)	Postintervention (n = 27)	P	Preintervention (n = 47)	Postintervention (n = 33)	P
Gender			<.58			>.99
Men, no. (%)	17 (71)	21 (78)		41 (87)	29 (88)	
Women, no. (%)	7 (29)	6 (22)		6 (13)	4 (12)	
Race/ethnicity			<.01			<.02
Black, no. (%)	3 (14)	6 (26)		3 (7)	2 (6)	
White, no. (%)	7 (32)	4 (17)		9 (20)	8 (26)	
Hispanic, no. (%)	7 (32)	0 (0)		2 (4)	3 (10)	
Asian, no. (%)	2 (9)	9 (39)		14 (31)	17 (55)	
Middle Eastern, no. (%)	3 (14)	4 (17)		17 (38)	1 (3)	
Pharmacy type			<.64			<.90
Independent, no. (%)	15 (65)	20 (71)		39 (83)	27 (82)	
Chain or franchise, no. (%)	8 (35)	8 (29)		8 (17)	6 (18)	
Have sold nonprescription syringes (ESAP-registered only)			<.13			<.25
No, no. (%)	3 (23)	1 (5)		5 (24)	2 (20)	
Yes, no. (%)	10 (77)	19 (95)		16 (76)	8 (80)	
Support nonprescription syringe sales to IDUs			<.06			<.05
Not Support, no. (%)	9 (41)	7 (27)		18 (39)	20 (63)	
Support, no. (%)	13 (59)	13 (50)		28 (61)	11 (34)	
Don't know or undecided, no. (%)	0 (0)	6 (23)		0 (0)	1 (3)	
Selling syringes to IDUs will increase street-discarded syringes			<.05			<.40
Disagree, no. (%)	12 (52)	13 (57)		29 (64)	19 (79)	
Agree, no. (%)	10 (43)	4 (17)		15 (33)	5 (21)	
Don't know or undecided, no. (%)	1 (4)	6 (26)		1 (2)	0 (0)	
Selling syringes to IDUs will increase drug use			<.31			<.64
Disagree, no. (%)	14 (67)	16 (62)		30 (64)	17 (53)	
Agree, no. (%)	6 (29)	5 (19)		15 (32)	13 (41)	
Don't know or undecided, no. (%)	1 (5)	5 (19)		2 (4)	2 (6)	
Selling syringes to IDUs will decrease HIV transmission			<.51			<.08
Disagree, no. (%)	2 (8)	1 (4)		3 (7)	3 (9)	
Agree, no. (%)	22 (92)	25 (93)		42 (91)	24 (75)	
Don't know or undecided, no. (%)	0 (0)	1 (4)		1 (2)	5 (16)	

Note. ESAP = Expanded Syringe Access Demonstration Program. We used *t* tests for continuous variables and χ^2 tests for categorical variables. Preintervention data were collected April 2002; postintervention data were collected August 2003.

community except that there were fewer White IDUs in the postintervention than the preintervention period, and fewer Black IDUs overall.

More IDUs were aware of the legality of buying syringes in pharmacies without a prescription in both the intervention community (58%) and the comparison community (45%) postintervention than preintervention (42%, $P<.01$; 21%, $P<.01$, respectively). In the intervention community, only about half of IDUs during these periods knew it was legal to carry syringes, and significantly fewer in the comparison community had knowledge of legal syringe possession postintervention (37%) compared with preintervention (52%, $P<.01$). Even though there were significantly more IDUs who reported using a pharmacy as a syringe source in both the intervention and comparison communities post- versus preintervention (32% vs 13%, $P<.02$; and 27% vs 12%, $P<.04$; respectively), in the intervention community a smaller proportion of IDUs reported injecting with a previously used syringe (16%) postintervention compared with preintervention (26%; $P<.03$; whereas there was no significant difference in the comparison community when comparing over the same time period (26% vs 20%; $P<.37$).

To further examine the effect of the intervention on IDUs by race/ethnicity, stratified analysis revealed that Black IDUs in the intervention community were significantly more likely to use pharmacies postintervention (22%) than preintervention (5%; $P<.02$), although there was no significant difference in pharmacy use among Black IDUs in the comparison community postintervention (11%) than preintervention (8%; $P>.99$). There was also a significant increase among Hispanic IDUs in both intervention and comparison communities when comparing postintervention and preintervention periods (34% vs 15%, $P<.005$; and 29% vs 13%, $P<.001$, respectively).

DISCUSSION

A multilevel intervention that was implemented by a community and academic partnership to create a more socially receptive environment appears to have contributed to positive behavior change in the intervention community, and either no change of opinions or increased negative opinions in the comparison community. Specifically, there was an increase in positive opinions and a decrease in negative opinions and attitudes toward pharmacy syringe sales to IDUs among community residents and pharmacists in the intervention community. Also, negative attitudes shifted to an "undecided" viewpoint in the intervention community only. Thus, in

TABLE 4—Pre- and Postintervention Comparison of Demographic Characteristics and Injection Practices Among IDUs in Harlem (n = 509) and South Bronx (n = 444): New York City, NY, 2001–2004

	Harlem (Intervention)			South Bronx (Comparison)		
	Preintervention (n = 134)	Postintervention (n = 239)	P	Preintervention (n = 144)	Postintervention (n = 211)	P
Mean age, y (SD)	39.1 (8.9)	36.2 (8.3)	<.01	37.2 (9.2)	36.3 (7.8)	<.33
Gender			<.05			<.01
Men, no. (%)	88 (67)	184 (78)		98 (69)	167 (80)	
Women, no. (%)	44 (33)	53 (22)		44 (31)	43 (20)	
Race/ethnicity			<.01*			<.01*
Hispanic, no. (%)	65 (49)	158 (66)		110 (76)	191 (91)	
Black, no. (%)	58 (43)	37 (16)		25 (17)	18 (9)	
White/other, no. (%)	11 (8)	43 (18)		9 (6)	2 (1)	
Knew it was legal to buy syringes at pharmacies without a prescription			<.01			<.01*
Yes, no. (%)	55 (42)	138 (58)		29 (21)	95 (45)	
No, no. (%)	77 (58)	101 (42)		111 (79)	115 (55)	
Knew it was legal to carry syringes			<.72			<.01
Yes, no. (%)	74 (47)	78 (50)		83 (52)	78 (37)	
No, no. (%)	66 (53)	132 (50)		78 (48)	132 (63)	
New or previously used syringe at last injection			<.03			<.37
New, no. (%)	198 (74)	195 (84)		106 (80)	157 (75)	
Used, no. (%)	34 (26)	38 (16)		27 (20)	51 (26)	
Pharmacy use in past 6 months			<.01**			<.01*
Yes, no. (%)	18 (13)	77 (32)		17 (12)	57 (27)	
No, no. (%)	116 (87)	162 (68)		127 (88)	154 (73)	

Note: We used *t* tests for continuous variables and χ^2 tests for categorical variables. Preintervention data were collected January 2001–June 2002; postintervention data were collected July 2002–September 2004.
*$P < .001$.

some cases negative perceptions might not have been completely dispelled, but pharmacists' previous negative opinions might have been shifted toward a more positive opinion of ESAP. Finally, although there was an increase in pharmacy use among IDUs in both communities, there was a significant decrease in syringe reuse, as well as a significant increase in pharmacy use among Black IDUs in the intervention community when pre- and postintervention periods were compared.

Elements of multilevel community interventions (or structural interventions) with multilevel pre- and postintervention evaluation and comparison communities have been described in the literature.[21] Community and academic partnerships have also been described[22,23] and used in community-based participatory research to address a variety of health-related problems,[20,24] but to date most partnerships have been evaluated on process rather than outcome. Although multilevel interventions (individual, provider, community) have been considered important to the research community,[25–28] they have been designed and led by research professionals.[25,26] Examples include nonrandomized pre- and postintervention designs for disease prevention projects, which in general have the closest similarity to the results reported here. For instance, HIV intervention programs for drug users have used community outreach to achieve reductions in individual-level risk behaviors,[29] but generally the evaluations have been conducted using individual pre- and postintervention questionnaires. Drug abuse treatment has been evaluated at the individual level by comparing in-treatment with out-of-treatment populations,[30] but follow-up typically has been limited to in-treatment modalities. Using community ecological designs, injection risk behaviors of syringe exchange program participants and nonparticipants have been evaluated before the start of the syringe program rather than after.[1,31] More recently, Connecticut policy makers changed a law to allow nonprescription syringe sales in pharmacies, and separate evaluations of drug users and pharmacists show that program use and changes in risk behavior occurred after the law was changed.[32,33] Data from Connecticut have also been compared with data from other states that had more restricted syringe access.[34] These latter studies are what stimulated the law change in New York State as well as the multilevel intervention program we described.

Limitations

Although our findings provide solid evidence of an intervention effect, there were a few limitations in the analytic approach. The use of cross-sectional data to evaluate the effect of a community-based multilevel intervention on individual behavior may be subject to some sources of bias and may be less sensitive to the effect of recent behavior change than prospective studies. However, the pre- and postintervention cross-sectional analytic method chosen here is a prudent and more cost-efficient first approach to determine the effect of a multilevel design. Separate cross-sectional evaluations of each level may also be limited in that they do not provide estimates of the independent effects of each factor examined (i.e., community-level and pharmacy-level factors) on IDU behavior. If the sample size permitted, such information would be significant from a public health and research perspective by identifying the role of the social environment, which in turn lends further support for a multilevel intervention design. However, separate analyses have merit and provide firm evidence of the intervention effect.

As with any community intervention, there was the potential for a contamination effect; our finding of increased pharmacy use in both communities may be an example of this effect. However, in the comparison community there was a decrease in IDU knowledge of the legality of syringe possession despite an increase in pharmacy use. A possible explanation for these contradictory findings in

the comparison community is that some ESAP information may have spread more efficiently among drug-use networks, such as which pharmacists are selling syringes, as opposed to more detailed information, such as when syringes are legal and illegal to possess.

We must also note the possibility of selection bias which may partially explain the changes that we have observed. Specifically, pre- and postintervention IDU samples differed with respect to age, race, and gender, which could have been independently associated with pharmacy use. There have been no differences observed in pharmacy use by gender, although older IDUs and minorities have been significantly less likely to use pharmacies in previous reports.[12–14,35] The fact that the postintervention sample tended to be younger and that there was a larger proportion of White IDUs in the intervention community may partially explain the increase in pharmacy use. Yet some of the demographic differences provide notable evidence of an intervention effect. For example, the increased proportion of Hispanic and Latino IDUs coupled with the increased pharmacy use among this group in both communities may suggest more of a contamination effect, which in fact is a positive effect from a public health perspective given their minimal use before the start of this project.[11,14,15,35]

The pharmacy participation rates may also indicate the possibility of selection bias; for example, those that participated may have been more likely to support ESAP. To assess this potential bias, we compared the participants to the nonparticipants with regard to pharmacy type (chain vs nonchain) because previous data indicated nonchain pharmacies to be more supportive of ESAP. For pre- and postintervention samples in each community, there were no differences with respect to the proportion of nonchain pharmacies, which provides some evidence of balance with respect to ESAP supporters. We also noted race/ethnicity differences in pre- and postintervention pharmacy samples in both communities. However, previous research has not found an association between pharmacists' race/ethnicity and ESAP support.[36]

Finally, the use of community-based participatory research could also be a drawback for others who want to conduct similar interventions, because it can take a year or more to develop trusting and productive relationships between academic centers and community-based organizations[20]; thus, in order for this approach to work with urgent public heath problems, a viable partnership needs to be in place. The evaluation presented here suggests that establishing this type of partnership can be a worthwhile investment for future programs implemented in this community.

Conclusions

Although structural or multilevel intervention approaches have been suggested for a variety of public health problems—including HIV prevention as early as the year 2000[21]—this is the first community-based multilevel intervention, to our knowledge, that has been evaluated in the HIV-prevention arena with pre- and postintervention measures for community, provider, and individual populations. The findings presented here have important implications for both research and practice. Multilevel interventions, which take into account critical elements of the social environment that may hinder positive behavior change, should be considered a viable disease prevention strategy. Without addressing multiple competing social forces, a public health program such as ESAP will be minimally used, particularly by Black and Hispanic drug users who historically have been mistreated. We have shown here that this intervention strategy may be an efficient and effective strategy to increase the likelihood of individual behavior change and, consequently, a strategy to help reduce racial disparities in a variety of health outcomes. ∎

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Contributors

C.M. Fuller designed the research study, directed all data collection and analysis, and led development of the article. S. Galea designed the research study, codirected all data collection, and assisted with article development. W. Caceres was the primary contributor to the article development. S. Blaney conducted all data analysis. S. Sisco coordinated data collection efforts and provided assistance with article development. D. Vlahov assisted with the research design and provided key input in all data collection efforts.

Human Participant Protection

This study was approved by the institutional review board at New York Academy of Medicine where all research activities were conducted. All study participants underwent informed consent.

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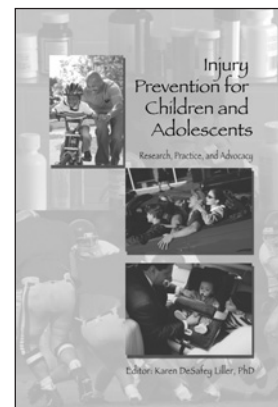
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