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Drug Abuse Treatment Success among Needle Exchange Participants

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SYNOPSIS

Objective. Although lowering incidence rates of human immunodeficiency virus (HIV) transmission is the primary goal of needle exchange programs (NEPs), other desirable outcomes are possible. Referring exchange participants to more comprehensive drug abuse treatment programs has the potential to reduce or eliminate the use of drugs. This possibility was evaluated by comparing the treatment responses of new admissions with an outpatient opioid agonist treatment program in Baltimore, Maryland.

Methods. New admissions (1994–1997) to an opioid agonist treatment program were first grouped by referral source (needle exchange, $n = 82$ *vs.* standard referrals, $n = 243$) and then compared on admission demographic and clinical variables and response to treatment during the first three months. Outcome measures included retention rates, self-reported drug use and injecting frequencies, self-reported illegal activities for profit, and results from weekly urinalysis testing for opioids and cocaine.

Results. Patients from the NEP were significantly older and more likely to be male, African American, and unemployed than standard referral patients. Needle exchange patients also had a greater baseline severity of drug use than patients in the standard referral group. Despite these baseline differences, both groups achieved comparably good short-term treatment outcomes (including reduced drug use and criminal activity for profit); treatment

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retention was also good, although slightly better in the standard referral group (88% *vs.* 76%).

Conclusion. These data demonstrate the feasibility and merits of creating strong linkages between NEPs and more comprehensive drug abuse treatment clinics.

A total of 117 needle exchange programs (NEPs) have been established in the United States.[1] These programs were designed to provide injecting drug users (IDUs) with ready access to sterile needles and syringes to reduce the frequency of sharing contaminated equipment, thereby lowering the risk of parenteral transmission of human immunodeficiency virus (HIV) infection.[2] A review of recent studies suggests that participation in NEPs is associated with lower rates of HIV seroconversion, although a few exceptions have been reported and are discussed in the Vlahov and Junge chapter appearing in this Supplement.[3]

Although reducing the risk of transmitting HIV and other blood-borne diseases is the primary goal of needle exchange,[1-3] other desirable outcomes should be considered. For example, it may be possible to achieve meaningful reductions in drug use by integrating NEPs with more traditional drug abuse treatment programs. Creating this linkage would make NEPs important conduits into more traditional drug abuse rehabilitation programs for individuals interested in reducing or stopping their use of drugs. A review of work conducted across several sites has already evaluated the success of referring needle exchange participants into other drug abuse rehabilitation programs.[4] The results show that such linkages are possible and that a substantial number of patients will accept referrals to other treatment programs.

Greater linkage between NEPs and other drug abuse treatment programs is a critical first step toward expanding the effectiveness of the national approach for reducing the public health risks and human suffering from drug abuse. The creation of these links, however, raises equally important questions about the effectiveness of more traditional drug abuse treatment when initiated through referral by NEPs. At least two factors illustrate the importance of this issue. First, recent comparisons of IDUs either using or not using NEPs have found that exchange participants have higher injection frequencies and risk behavior profiles than other IDUs.[5-7] These baseline differences may have important prognostic implications for drug abuse treatment response; careful study of this issue is necessary. For example, a large number of drug abuse treatment outcome studies have shown that greater severity of drug use at treatment entry is associated with poorer outcomes.[8] This would suggest that patients referred into traditional drug abuse treatment settings by NEPs would have disproportionately poorer outcomes than other patients.

The second major factor illustrating the critical importance of this topic is the paucity of available data on the treatment response of IDUs successfully referred by NEPs into more traditional treatment programs.[4] Effective public policy is most assured when decisions about allocation of limited health care resources are data driven. While a general consensus has been reached that meaningful reductions in drug use would enhance the effectiveness of NEPs in reducing HIV transmission,[3] it is not clear if some of the limited drug abuse treatment services should be allocated to needle exchange participants. Obtaining answers to the following questions will help resolve that issue:

- What is the severity of HIV risk behavior profiles in needle exchange participants versus other IDUs?
- What proportion of needle exchange referrals enter other drug abuse treatment programs?
- How effective is opioid against treatment for patients referred by NEPs?

The present report helps inform the field on this critical topic by presenting data that evaluate the clinical response of IDUs referred into outpatient opioid substitution treatment by an NEP. The early treatment responses of these patients are compared with those of other IDUs entering the same treatment program via standard referral sources (SRS) (for example, self-referral, family referral, and other health care providers). On admission, the two groups (needle exchange referrals *vs.* standard referrals) are compared on demographic and clinical variables and on several treatment outcome variables including retention, drug use, and illegal behaviors. All patients were admitted to routine treatment rather than to a controlled study evaluating the clinical response of needle exchange *vs.* standard referral patients; the data shown here were collected as part of that treatment.

METHODS

Study participants. Participants included 82 new admissions referred by the NEP and a comparison group of 243 admissions entering treatment via SRS. All patients entered the treatment program during the same three-year period, August 1994 to September 1997. The mean age of the combined samples was 38.4 years (SD = 7.3 years); the mean education level of the samples was 11.3 years (SD = 2.05 years); 50% were female; 41% were white; 77% were unemployed.

Treatment referral conditions.

Needle exchange program. Patients in the needle exchange group were referred by the Baltimore Needle Exchange Program. A total of 160 out-of-treatment opioid abusers enrolled in the NEP were offered a referral that guaranteed admission to the Southeast Baltimore (SEB) Drug Abuse Treatment Program. During the time period covered in this report, 51% (82 out of 160) presented to the treatment program for admission. There were no significant demographic differences between the 82 referrals who entered the treatment program and the 78 referrals who did not seek admission (data not shown).

Standard referral sources. Patients (n = 243) in this group entered treatment via traditional referral sources. The four major referral categories were patient initiated (self-referred), family members and friends, other health care workers, and social service agencies. These patients constitute 100% of all new admissions during the same time period as the needle exchange referrals.

Drug abuse treatment program services. Patients in both referral groups received routine opioid agonist treatment in the SEB Treatment Program, a community-based treatment program operated on the campus of the Johns Hopkins Bayview Medical Center in Baltimore, Maryland. All patients received clinical services routinely offered by the SEB Treatment Program. These services include daily ingestion of methadone (about 70 milligrams daily), to suppress opioid withdrawal and reduce craving for heroin and other opioids, and weekly individual and group counseling. Individual counseling sessions were 30 to 40 minutes in duration and focused on reducing drug use and resolving co-occurring medical, occupational, and other psychosocial problems. Counselors were supervised by the senior clinical staff and helped patients develop a functional analysis of drug use, identify and avoid high risk drug use situations, cope with urges to use drugs, examine acute and long-term consequences of drug use, pursue employment and volunteer opportunities, and improve the structure of daily activity. Group counseling was used to intensify the weekly counseling schedule of patients. Counseling groups were manual guided and run by the senior clinical staff. The content of groups included social and cognitive skills training designed to initiate abstinence, to reduce the number and

duration of returns to use, and to improve social support for abstinence.

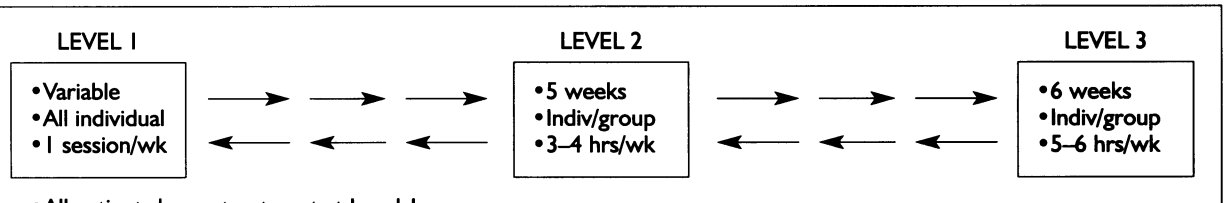
The overall counseling component of the program used a highly structured progression of services in which the quantity of individual and group sessions each week increased for patients with drug-positive urine results and decreased for patients who became drug negative. This is a highly individualized treatment matching procedure in which the intensity and scope of weekly counseling increases or decreases based on patient behavior. Counseling services are divided into three discrete levels: Level 1, Level 2, and Level 3 (see Figure 1). A simple incentive procedure was used to enhance participation in weekly counseling: patients were informed that failure to attend all weekly sessions in Level 3 would result in discharge from the treatment program. Changes from one level to another were contingent on objective behaviors: rates of drug-positive urine specimens and counseling attendance. A completed randomized evaluation of this treatment approach has produced good results that include excellent counseling attendance and reduced drug use without sacrificing retention rates.[9–11]

Treatment outcome measures. Current psychiatric and substance use diagnoses were made using the Structured Clinical Interview for DSM III-R (SCID).[12,13] It was administered after a brief period of treatment stabilization (two to three weeks) to control partially for the effects of acute situational crises and drug intoxication and withdrawal on psychiatric symptom reporting.[14] Dimensional data on severity of drug use and psychosocial impairment were obtained using the Addiction Severity Index–Fifth Edition (ASI).[15] The ASI provides a reliable index of problems for the 30 days prior to administration and is useful for measuring change in problem severity over time.[16] All new admissions to the Treatment Program routinely complete the ASI on the day of admission and one month later. The self-report data on drug use was supplemented by weekly urine collection and testing for all patients. All urine specimens were collected via direct observation by same-sex laboratory assistants or licensed medical staff regardless of gender. Retention in treatment for the first 13 weeks was determined for all patients in each of the referral groups.

RESULTS

Demographic, substance use, and other psychiatric disorders. T-tests or chi-square tests were used to make between-group comparisons of NEP and SRS referrals on demographic characteristics and on rates of current substance dependence and other psychiatric disorders. A P value of <0.05 was considered significant in all comparisons; Bonferroni adjustments were made within

Figure 1. Structural levels of weekly counseling in the Southeast Baltimore Drug Abuse Treatment Program



- All patients began treatment at Level 1.
- Patients are referred to higher levels based on drug use and/or missed counseling sessions.
- Patients return to lower levels based on drug abstinence and full counseling attendance.

Level 1. One individual counseling session scheduled per week (30 minutes). Patients with drug-positive urine specimens or missed counseling sessions during any two out of three weeks following a four-week stabilization period were referred to Level 2.

Level 2. One individual counseling session and three to four hours of weekly group counseling scheduled per week for five weeks. Patients returned to Level 1 if they have drug-negative urine specimens and attended all counseling sessions in weeks four and five. Patients with drug-positive urine specimens or who missed scheduled counseling in either of the final two weeks were referred to Level 3.

Level 3. Two individual counseling sessions and six to seven hours of group counseling scheduled per week for six weeks. Patients returned to Level 1 if urine specimens were drug negative and they attended all counseling sessions in the fifth and sixth weeks.

Table 1. Demographic and psychiatric characteristics of patients in NEP *vs.* SRS groups at admission

Variable	*NEP (n = 82)*	*SRS (n = 243)*	*Overall P-value*
Demographic			
Age (yrs)	40.6	37.6	<0.001
Education (yrs)	11.4	11.3	*NS*
Male (%)	69.5	43.6	<0.001
Minority (%)	85.4	49.8	<0.001
Married (%)	6.1	13.2	*NS*
Unemployed (%)	93.9	71.2	<0.001
Drug dependence disorders (%)[a]			
Opioid	100	100	—
Cocaine	71.4	41.1	<0.001
Alcohol	18.6	11.8	*NS*
Sedative	4.3	14.9	0.022
Cannabis	5.7	3.3	*NS*
Other psychiatric disorders (%)[a]			
Any axis I	28.6	23.0	*NS*
Any axis II	47.8	41.0	*NS*
Antisocial personality	43.7	33.3	*NS*
Any axis I or II	60.9	50.0	*NS*

[a]Rates are for current disorders according to DSM III-R or DSM IV.

each set of analyses to control for inflation of *alpha* due to multiple testing of correlated data.

Demographic characteristics at admission. As shown in Table 1, patients in the NEP group were older than patients in the SRS group (40.6 years *vs.* 37.6 years, $P = 0.001$), and more were African American (85.4% *vs.* 49.8%, $P < 0.001$). There were also more males in the NEP group (69.5% *vs.* 43.6%, $P < 0.001$) and higher rates of unemployment (93.9% *vs.* 71.2%, $P < 0.001$).

Current substance dependence and other psychiatric disorders at admission. Table 1 also shows that significantly more of the NEP patients had cocaine dependence (74.1% *vs.* 41.1%, $P < 0.001$); there was also a trend (following Bonferroni adjustment) for lower rates of sedative dependence (4.3% *vs.* 14.9%, $P = 0.022$). No significant between-group differences were found for rates of current psychiatric disorder in any of the categories evaluated, which included those most common among IDUs (mood disorders and personality disorders).

Self-reported drug use and psychosocial problems at admission. T-tests were used to compare the NEP patients and SRS patients on self-reported drug use, frequencies of drug injection and needle sharing, and severity of other psychosocial problems. All data are from the ASI and cover the 30 days prior to admission; questions on the frequencies of drug injection and needle sharing were added to the ASI.

Self-reported drug use. Table 2 shows that NEP patients reported remarkably higher rates of heroin and cocaine use than SRS patients (heroin: 28.8 days *vs.* 17.2 days, $P < 0.001$; cocaine: 15.4 days *vs.* 5.2 days, $P < 0.001$). The NEP group also reported significantly more days of injecting drugs (26 days *vs.* 14 days, $P < 0.001$) and sharing of injection equipment (5.1 days *vs.* 1.8 days, $P = 0.010$) than patients in the SRS group.

Self-reported problem severity. Consistent with the above data, NEP patients reported higher ASI severity scores for drug use, alcohol use, and legal difficulties than SRS patients (P values all <0.001; see Table 2). NEP patients also reported spending more days in the past month engaged in illegal activity (12.2 days *vs.* 3.2 days, $P < 0.001$) and earning more illegal income during this period than SRS patients ($637 *vs.* $181, $P = 0.001$).

Prior opioid substitution treatment. All patients were asked if they had any prior episodes of opioid agonist treatment, including short-term methadone detoxification and longer-term methadone maintenance. A smaller proportion of the NEP referrals reported any history of opioid agonist treatment compared with SRS patients

(58% *vs.* 74%), although this difference failed to reach statistical significance.

Comparisons on treatment outcome measures.

Retention in treatment. A survival analysis comparing between-group differences in treatment retention over time was calculated using the Cox Proportional Hazards Model that controlled for baseline and admission demographic differences (Figure 2). Significantly more of the patients in the SRS group than NEP group completed the first 13 weeks of treatment (88% *vs.* 76%; Wald = 8.13, $df = 1$, $P = 0.004$); none of the demographic variables were significant covariates.

Comparison of admission vs. *month one self-reported outcomes.* A series of 2×2 repeated measures analyses, with "study group" as the between-subjects variable and "time" as the within-subjects variable, were performed to evaluate changes in self-reported drug use and HIV risk behavior. These analyses were restricted to comparing the 30-day pretreatment data (baseline) with the month one data covering the first 30 days of treatment. Only patients who completed the ASI at each of these time points were included in these analyses ($n = 66$ NEP patients; $n = 203$ SRS patients). Tukey's Test was used to evaluate the source of significant main effects and interactions. As shown in Table 3, both NEP and SRS patients reported significant reductions in opioid and cocaine use, number of days engaged in illegal activity, and number of days injecting drugs (all P values <0.01). Patients in the NEP group also had significant reductions in amount of illegal income and number of days sharing injection equipment.

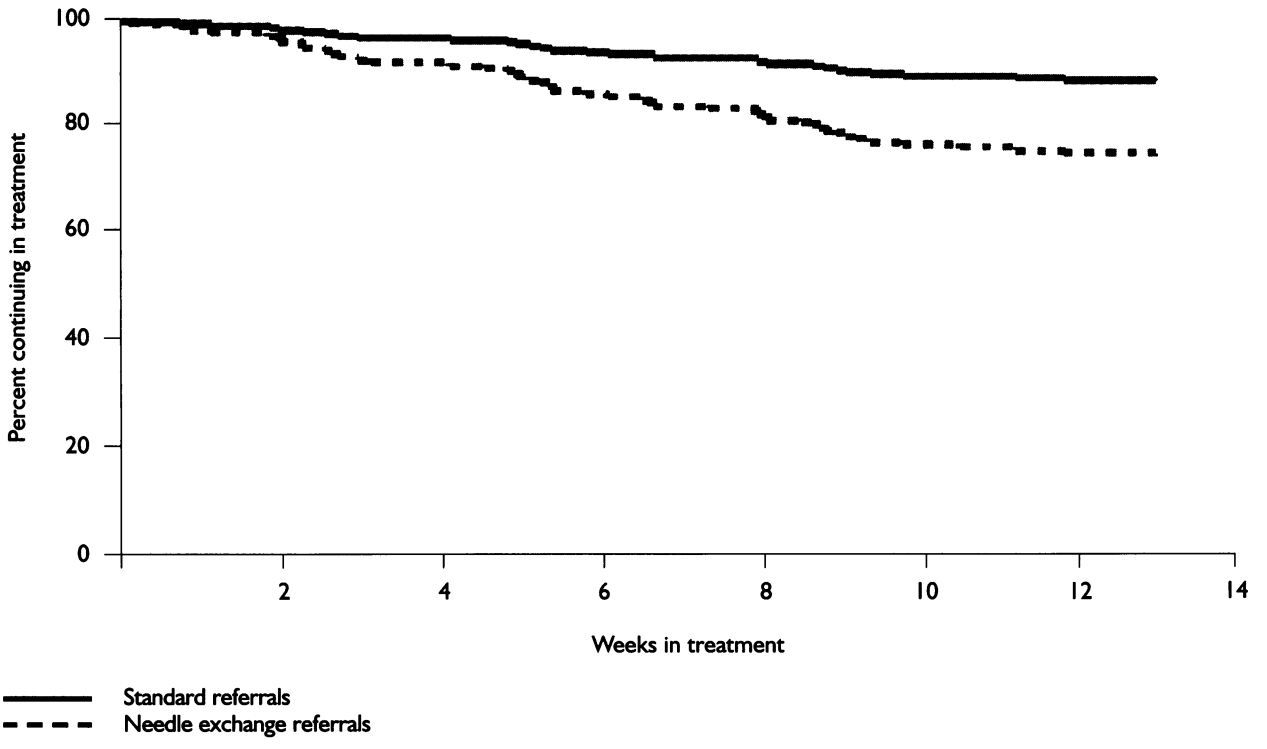
Urinalysis results. The urinalysis results of NEP and SRS patients were compared using several analytic approaches. Groups were first compared on the proportion of opioid and cocaine-positive urine specimens submitted by patients using all available data (no replacement of missing data). These analyses showed that NEP patients submitted a higher proportion of opioid-positive (M = 49% *vs.* 29%; t = 5.0; $P < 0.001$) and cocaine-positive (M = 54% *vs.* 32%; t = 4.90; $P < 0.001$) urine specimens than SRS patients during the first three months of treatment. A separate set of analyses were then performed that were more sensitive to differences in treatment retention. Groups were compared on the average number of opioid-negative and cocaine-negative urine specimens submitted by patients during their treatment participation. NEP patients submitted a lower mean number of opioid-negative (M = 5.5 *vs.* 8.3; t = 5.19; $P < 0.001$) and cocaine-negative (M = 5.5 *vs.* 7.9; t = 4.90; $P < 0.001$) urine specimens during treatment participation.

The third set of analyses compared changes in percent of opioid-positive and cocaine-positive urine

Table 2. Self-reported drug use, illegal behavior, risk behavior, and problem severity of patients in NEPs *vs.* SRSs during the 30 days prior to admission

Variable	*NEP (n = 82)*	*SRS (n = 243)*	*Overall P-value*
Demographic			
Heroin (days)	28.8	17.2	<0.001
Cocaine (days)	15.4	5.2	<0.001
Criminal behavior			
Illegal activity (days)	12.2	3.2	<0.001
Illegal income ($)	637.4	180.5	0.001
HIV high risk drug use behavior			
Injecting drugs (days)	25.2	14.1	<0.001
Sharing needles (days)	5.1	1.8	0.010
ASI composite scores			
Medical	.30	.30	*NS*
Employment	.90	.70	<0.001
Alcohol use	.10	0.0	0.057
Drug use	.40	.30	<0.001
Legal status	.20	.10	<0.001
Family/social	.20	.20	*NS*
Psychiatric	.10	.10	*NS*

Figure 2. Treatment survival in needle exchange and standard referral admissions using Cox Proportional Hazards Modeling controlling for baseline demographic differences. Standard referrals had better retention than needle exchange referrals (88% *vs.* 76%; Wald = 8.13; *df* = 1; *P* = 0.004).



specimens over time. Urinalysis results were compared during the first three months of treatment using repeated measures analysis of variance with simple effects tests conducted across time within each group. Percent of urine specimens positive for each drug class were summarized in one-month blocks. For subjects who left treatment during this time period, the average of their last two urine results for each drug class was substituted for missing data.

Significant effects of both group and month in treatment were observed for opioids and for cocaine, but no significant interactions were seen. The NEP group had significant decreases in percent of opioid-positive urine specimens over time (means = 61%, 54%, and 52% across months; F = 3.78; *df* = 2642; *P* = 0.025); the SRS group also achieved significant decreases in percents of opioid-positive urine specimens (means = 37%, 30%, 26%; F = 16.87; *df* = 2642; *P* < 0.001). Viewed differently, there were comparable reductions in opioid-positive urine specimens between months one and three (NEP: 9%, SRS: 11%). Both groups had more modest changes in percent of cocaine-positive urine specimens over time, and the observed decreases were significant only in the SRS group (NEP: means = 63%, 60%, 59%; F = .94; *df* = 2642; *P* = 0.385; SRS: means = 39%, 35%, 32%; F = 7.41; *df* = 2642; *P* = 0.001).

DISCUSSION

There is considerable debate in this country on the merits of offering IDUs the opportunity to exchange used injection equipment for sterile injection equipment. The debate currently centers on the benefits of lowering the incidence of HIV transmission versus the possible risk of "endorsing" continued use of drugs.[3] The extreme perspectives often engendered by this debate can compromise discussions on how needle exchange interventions might be used to enhance reductions in drug use. One possible approach for accomplishing that goal would be to establish strong linkages between NEPs and other effective drug abuse treatment programs. This report contains several findings that are relevant to that discussion:

Table 3. Self-reported drug use, illegal behavior, and risk behavior for needle exchange (NEP) *vs.* standard referrals (SRS) at admission and one month

Variable	*Group*[a]	*Admission*[b]	*Month one*[b]	*Tukey's HSD Test*
Drug use				
Heroin (days)	NEP	28.59	16.46	.01
	SRS	7.06	4.43	.01
Cocaine (days)	NEP	15.29	4.84	.01
	SRS	5.97	3.02	.05
Illegal Behavior				
Illegal income ($)	NEP	608.79	185.62	.01
	SRS	41.59	49.98	*NS*
Illegal activity (days)	NEP	11.92	3.08	.01
	SRS	2.74	.64	.01
Risk behavior				
Injecting drugs (days)	NEP	24.08	13.70	.01
	SRS	6.68	3.82	.01
Sharing needles (days)	NEP	4.63	1.93	.01
	SRS	.69	.72	*NS*

[a]Analysis restricted to subset of patients with ASI data at each time-point (NEP: $n = 66$; SRS: $n = 203$).
[b]Admission and month one data reflect 30 days prior to assessment point.

- Fifty-one percent of needle exchange referrals were admitted to the opioid agonist treatment program.
- Patients referred by NEPs used more drugs in the 30 days prior to entering treatment and reported more days of injecting drugs and sharing equipment than other new admissions.
- Despite having greater baseline drug use severity, NEP referrals had good response during the first few months of opioid agonist treatment.
- With few exceptions, the extent of improvement in the needle exchange group was comparable to that achieved by other new admissions.

Several aspects of these findings warrant further discussion.

Drug abuse treatment enrollment. The 51% rate of treatment enrollment among individuals referred by NEPs was closer than expected to admission rates observed for other referral sources (about 65%). The fact that 49% of needle exchange referrals never presented for admission also reveals ample room for improvement. It is likely that even modest changes in the referral process, such as transportation vouchers and other behavioral incentives and motivational interviewing strategies, would increase the rate of admissions. Several studies have already shown that behavioral incentives and brief motivational interventions enhance both treatment-seeking behavior and response to drug abuse treatment.[17–19] There is no compelling reason to believe these strategies would fail to enhance treatment entry and response among patients referred by NEPs.

A related finding is that 42% of the needle exchange referrals had no history of opioid agonist therapy. Although this percentage was not statistically different from the standard referrals (42% *vs.* 26%), it shows clearly that the Baltimore Needle Exchange Program is reaching large segments of IDUs naive to methadone treatment.

Severity of baseline or admission drug use and HIV risk behavior profile. The greater pretreatment severity of drug use and HIV transmission risk among patients referred by NEPs relative to other new admissions is impressive from several perspectives. The data support earlier studies reporting greater HIV risk behavior profiles of needle exchange participants compared to other IDUs[5–7] and suggests that NEPs are enrolling subgroups most likely to transmit HIV and other blood-borne diseases. Additional confirmation of this finding in larger and more geographically diverse samples may have critical public policy implications for expansion of opioid substitution treatment resources or possible reallocation of

existing resources. Ideally, both strategies would be strongly considered.

It also is worth highlighting the similarity between groups on rates of current nonsubstance use psychiatric disorders. The interview used to collect these data (SCID) covers a wide range of disorders including those (mood disorder, antisocial personality) most common among treatment-seeking opioid abusers.[20,21] At least in this highly self-selected sample of patients, between-group clinical baseline differences were restricted to indexes of drug use severity rather than psychiatric comorbidity. This has potentially meaningful drug abuse treatment implications since comorbidity is associated with poorer outcomes, particularly when it involves diagnosis of antisocial personality.[21–23] It will be important in future work to see if similar results are found using larger samples of needle exchange participants.

Clinical response to opioid substitution treatment. Retaining patients in treatment is a critical predictor of outcome in many drug abuse treatment programs.[24,25] Simply put, good retention in treatment is strongly associated with good outcomes across a variety of clinical indicators. The early retention rates in the present study were good in both groups (SRS: 88%; NEP: 76%), particularly among needle exchange referrals who had greater severity of drug use and psychosocial problems at admission. The retention rates shown here also compare favorably to published data on retention rates among new admissions to a large proportion of the opioid substitution programs in the greater Baltimore area.[26] That study reported an average median retention among new admissions of four months, which is disappointingly low for a long-term treatment modality.

The generally positive and rapid response to treatment observed in both the needle exchange and standard referral groups was somewhat expected; previous research has shown that opioid agonist therapy is often associated with clinical improvement.[24,27] What makes these outcome data impressive is that within a population of IDUs referred from needle exchange—a setting where free distribution of sterile syringes might have been expected to attract individuals interested in continuation of use—the magnitude of their improvement was often similar to the standard referral patients.

While this pattern of treatment outcome is best observed when comparing the baseline to month one self-report data, urinalysis results point in a similar direction even when conservative intent-to-treat analyses are used to replace missing data. Both groups had significant and similar reductions in opioid-positive urines, which support the veracity of self-reported reductions in opioid use. The urine data for cocaine were more worrisome: although modest reductions in cocaine-positive urines were observed in both groups, these changes were statistically significant only in the standard referral group. There are several possible explanations for both of these findings. The only treatment provided for cocaine abuse was weekly counseling, while heroin abuse was treated with both medication (methadone) and weekly counseling. The combination of treatments for heroin use is the most likely explanation for bigger reductions in heroin *vs.* cocaine use early in the course of treatment. An effective medication treatment for cocaine abuse also might produce bigger reduction in cocaine use in the early phase of treatment. The fact that only the SRS group had a significant reduction in cocaine-positive urine results during the first three months of treatment is probably related to lower baseline severity of cocaine use; significantly more of the NEP group had cocaine dependence and they reported more frequent use in the 30 days prior to admission.

It would have been more impressive to see larger reductions over time in both opioid and cocaine-positive urine specimens, particularly in view of the magnitude of self-reported reductions in the use of these drugs. However, there are a number of reasons why this should not necessarily be expected. Heroin and cocaine are often detectable in urine several days after last use. This means that randomly obtained weekly urine specimens will often remain positive even when patients reduce the frequency of use from daily to once per week. It should also be remembered that these results were achieved during a relatively brief period of treatment; longer durations of treatment should produce even greater reductions in drug use.[24,25,27]

Limitations. There are several important limitations to this set of data. This was a naturalistic evaluation of a self-selected sample of needle exchange participants receiving routine treatment in a single opioid substitution program in Baltimore. A more scientifically rigorous study is necessary to determine whether these results can be replicated in other populations and settings. Several factors will likely influence these studies, including the demographic and clinical characteristics of the patients being evaluated (needle exchange and standard referrals), and the scope of services being offered by the needle exchange and the other drug abuse treatment programs linked to them. For example, the outcomes obtained in

our program may differ in another sample of needle exchange participants or in patients receiving opioid agonist therapy in programs offering less intensive counseling and no incentives for counseling attendance. Other major limitations include the relatively small sample of needle exchange patients and the three-month evaluation period. These problems raise important questions about the external validity of our data and point to the need for larger samples evaluated over longer periods of time (for example, six and 12 months).

Another limitation of this study is the absence of self-report data for the second and third months of treatment. Data for this report were collected from routine treatment records in a program that administers the ASI on the day of admission and one month later. This restricted our within-subject comparisons on self-reported problems to two time-points (baseline versus one month). Finally, it would have been useful to link these treatment outcome data with information from the NEP on indexes of continued participation, including frequency of visits and frequency of needle exchanges. We are in the process of linking these data sets; results will be reported in a separate publication.

Implications. The single most important implication of this work is the need to conduct controlled studies that evaluate the effectiveness of linking needle exchanges with other drug abuse treatment programs. While this report shows that needle exchange referrals significantly reduced drug use and criminal behaviors, the data are preliminary and cannot be used to reach conclusions on the overall merits of linking these programs. The data do suggest that such linkages are possible and that the therapeutic goals of needle exchanges and more conventional drug abuse programs can be complementary rather than contradictory. Both treatment settings encourage use of sterile injection equipment, reduced needle sharing, and reduced drug use. The fact that they emphasize each of these goals differently does not mean they are in opposition. Stronger linkages between these drug abuse programs should be pursued and will provide a rich context for evaluating other important research questions, such as whether referral to needle exchange would reduce the incidence of HIV among active drug injectors dropping out of more conventional treatment programs and whether community-based needle exchange participation by these patients would promote more rapid return to more comprehensive drug rehabilitation programs. These possibilities have major potential for enhancing public health by improving the substance abuse service delivery system for severely impaired IDUs.

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