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Facilitating entry into drug treatment among injection drug users referred from a needle exchange program: Results from a community-based behavioral intervention trial

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Abstract

We evaluated a case management intervention to increase treatment entry among injecting drug users referred from a needle exchange program (NEP). A randomized trial of a strengths based case management (intervention) versus passive referral (control) was conducted among NEP attenders requesting and receiving referrals to subsidized, publicly funded opiate agonist treatment programs in Baltimore, MD. Logistic regression identified predictors of treatment entry within 7 days, confirmed through treatment program records. Of 247 potential subjects, 245 (99%) participated. HIV prevalence was 19%. Overall, 34% entered treatment within 7 days (intervention: 40% versus control: 26%, $p = 0.03$). In a multivariate "intention to treat' model (i.e., ignoring the amount of case management actually received), those randomized to case management were more likely to enter treatment within 7 days. Additional 'as treated' analyses revealed that participants who received 30 min or more of case management within 7 days were 33% more likely to enter treatment and the active ingredient of case management activities was provision of transportation. These findings demonstrate the combined value of offering dedicated treatment referrals from NEP, case management and transportation in facilitating entry into drug abuse treatment. Such initiatives could be implemented at more than 140 needle exchange programs currently operating in the United States. These data also support the need for more accessible programs such as mobile or office-based drug abuse treatment.

Keywords

Needle exchange programs; Injection drug use; Case management; Drug abuse treatment; Methadone maintenance; HIV/AIDS; Transportation

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1. Introduction

Needle exchange programs (NEPs) have been associated with decreases in HIV prevalence, incidence and needle sharing among injection drug users (IDUs), and can serve as a bridge to drug abuse treatment (Heimer, 1998; Brooner et al., 1998; Strathdee et al., 1999; Shah et al., 2000). Drug abuse treatment, particularly opioid agonist regimens such as methadone maintenance are effective in reducing the frequency of injection drug use, and subsequently, the incidence of HIV infection (Metzger and Navaline, 2003) and tuberculosis (Snyder et al., 1999). Since only 15–20% of IDUs are enrolled in a drug treatment program at any given time in the U.S. (Metzger and Navaline, 2003), increasing the number and proportion of drug users in treatment is an important public health goal.

Although IDUs actively seek out referrals to drug treatment at NEPs (Heimer, 1998; Brooner et al., 1998; Strathdee et al., 1999; Shah et al., 2000), multiple barriers persist such as lack of third party reimbursement, transportation and child care (Brooner et al., 1998). In Baltimore, Maryland, 3400 methadone maintenance slots are available annually to an estimated 35,000 heroin users, 400 of which are subsidized by the city health department and are reserved for IDUs attending the Baltimore NEP. In a previous study of NEP participants, less than one-third of IDUs who received a treatment voucher attended their intake appointment (Riley et al., 2002). We conducted a randomized trial to determine whether the addition of case management services at the Baltimore NEP could increase the proportion of IDUs entering drug abuse treatment, by linking IDUs to available services.

2. Methods

2.1. Study population

The study consisted of clients of the Baltimore NEP who sought drug abuse treatment between January, 2002 and January, 2004 and enrolled in the case management intervention trial. Since the Baltimore NEP opened in 1994, IDUs may exchange potentially contaminated needles for sterile needles and receive a referral to a subsidized drug treatment program provided that they register for NEP services (Vlahov et al., 1997). During the study period, the Baltimore NEP operated two mobile vans serving 10 NEP sites throughout Baltimore City. NEP attenders requesting drug treatment received a referral on a first-come first-served basis which consisted of a voucher that was printed with the date and location of their intake appointment at the drug treatment program that administered an opiate agonist therapy (i.e., methadone maintenance treatment or levo-alpha-acetyl-methadol [LAAM]). Approximately three to five subsidized treatment slots became available each week, with intake dates scheduled within 1 week of referral. Referrals were only given once a treatment slot became available. Due to the limited number of treatment slots available through the NEP, each NEP client could only receive one treatment referral. Since costs were subsidized by the Baltimore Substance Abuse Systems Inc., each client entering drug treatment was required to pay approximately $7 per week, on a sliding scale.

IDUs who requested and were granted a referral to an available drug treatment slot by NEP program staff were invited to participate in the Treatment Retention Intervention (TRI) and were interviewed within 24 h. After providing informed consent, participants underwent a baseline interviewer-administered survey. Baseline HIV antibody testing was conducted using the OraQuick Rapid HIV-1 antibody test (OraSure Technologies, Inc., Bethlehem, Pennsylvania), with pre and post-test HIV counseling.

To limit contamination, participants were randomized by NEP site. Specifically, at the beginning of the study NEP site was randomized to receive the intervention (case management) or control condition (passive referral). Approximately half-way through the recruitment period,

a 1-month washout period was scheduled during which time no participants were recruited. After the washout, sites originally randomized to the case management intervention received the control condition and vice versa until the end of enrollment.

2.2. Intervention and control conditions

Treatment-seeking IDUs randomized at a NEP site which was assigned to the intervention arm were offered free case management services by one of three trained case managers immediately following their baseline interview. The intervention was based on the Strengths-Based Case Management model (SBCM) (Rapp et al., 1992; Rapp, 1998) whereby case managers assist the clients in setting treatment goals and help manage clients' needs to achieve those goals. The foundation of the SBCM model is that the role of the case manager is to build upon the client's strengths; this approach was chosen over other case management models given that NEP participants are already practicing harm reduction, a strength case managers could build upon. SBCM has been associated with improved outcomes in drug abuse treatment for those already engaged in a treatment program (Siegal et al., 1996, 2002). The duration and frequency of case management contacts were client-driven, based on individual desires and needs. Case managers assisted clients in handling problems that arose as potential barriers to treatment, such as transportation to the drug treatment program, child care, social services and referrals to health services. The core of the SBCM activities evolves around the following activities described by Rapp (1998):

1. *Engagement*. Initial meetings served to develop a collaborative partnership between the case manager and the client in a mutually agreed upon location. The purpose of the SBCM activities was discussed. The case manager was instructed to accompany each client to the intake visit for a designated treatment program and to assist with any immediate barriers that might prevent them from attending the intake visit (e.g. drug withdrawal, child care, transportation). The case manager focused on building rapport with the client and developing a plan for follow-up visits.

2. *Strengths assessment.* Starting with the first visit, the case manager used open-ended questions to record specific skills, talents, abilities, behaviors, and "'helping habits" of each client (e.g. client has a high school diploma, client routinely attends NEP to obtain syringes for peers). Strengths assessment consisted of information gathering to "amplify the well part" of the individual. The interests, desires and goals of the client for various life domains are recorded on charts to which both case manager and client contribute. Past and present attempts at entering drug abuse treatment were discussed, including obstacles and choices for overcoming these.

3. *Personal case planning*. During the process of developing a relationship with the client, the case manager helped the client identify short-term and longer-term goals that may or may not be directly related to drug abuse treatment. In addition to focusing on assisting the client with entering into and staying in drug abuse treatment, the case manager also focused on referring the client to community resources and partnerships that address their identified needs and case management goals.

4. *Resource acquisition*. The case manager used information obtained from the baseline needs assessment to identify client goals and helped the client secure services to address these goals (e.g., social support, personal growth and assistance with health, finances, employment, nutrition, housing/shelter, childcare, transportation, etc.). Linkages to other services will be client-driven, based on identified goals. Community partners that may provide subsidized services (e.g. transportation, child care, health care) were sought where appropriate (e.g., Healthcare for the Homeless, Social Security Administration, Maryland Housing Authority). Available transportation in the community included city bus, subway and light rail systems.

As part of their training, all case managers and the Project Director underwent a 3-day training workshop on the SBCM conducted by Dr. Rapp's team at the University of Kansas School of Social Work and Welfare. The training was based on a Case Management Operations and Training Manual adapted by Dr. Rapp for use in this project. Case managers also received training on local resources available to them.

Case managers were supervised by licensed social workers with extensive social work practice experience. Each case manager maintained a reasonable case-load of approximately 20 clients. Multiple methods were used to monitor case management activities, including quality review of Strengths Assessments and Actions Plans, review of case logs and group supervision checklists. On a monthly basis, case managers participated in group supervision sessions led by the Project Director which involved presentation and discussion of difficult cases. These monitoring activities were designed to ensure a high degree of fidelity across the case management team.

NEP participants receiving the control condition were provided only with a voucher printed with the date and time of their intake appointment at the drug treatment program in accordance with standard operating procedures at the Baltimore NEP. All participants were compensated $30 for completing the baseline interview. This study was approved by the Johns Hopkins Bloomberg School of Public Health Committee on Human Research.

2.3. Data collection

The baseline interview ascertained information relating to sociodemographics, location of residence, drug use, drug treatment history, sexual history, the Addiction Severity Index (McLellan et al., 1980), social network information, history of mental illness and psychotropic medication use and alcohol use using the AUDIT (Babor et al., 1989). Participants were also asked about potential barriers to treatment, including access to transportation, child care needs, medical illnesses, and how far they were willing to travel to a drug treatment program (in miles).

To examine motivation for drug treatment, we incorporated a scale based on Prochaska and colleagues' Stages-of-Change model (Prochaska et al., 1992) which was subsequently modified and validated to assess readiness for drug use cessation among opiate-dependent persons (Booth et al., 1998; Henderson, 2000). The five stages include pre-contemplation, contemplation, determination, action, and maintenance. The Centers for Epidemiologic Studies Depression (CES-D) (Radloff, 1997) scale was utilized to measure current depressive symptoms. A cutoff score of 23 was utilized to characterize those with moderate to severe depressive symptoms versus those with mild or no symptoms (Perdue et al., 2003).

Case managers were responsible for maintaining a contact log detailing the number, duration, date and type of contact with each client. We calculated number and duration of case management contacts within 7 days after completing the baseline questionnaire in order to examine "dose" of case management per client as a potential predictor of entry into drug treatment.

Information on the date of treatment entry was ascertained from record linkage with the Baltimore Substance Abuse Systems, Inc., which maintains admission and discharge data for all publicly funded drug treatment programs in Baltimore City. In order to evaluate the direct effect of the case management intervention, treatment entry was defined as having attended the intake appointment for opioid agonist therapy at one of six publicly funded substance abuse programs within 7 days of the baseline interview. Detoxification was not considered as a treatment modality, since it is deemed to have a negligible effect on ongoing substance use (Brooner et al., 1998).

2.4. Analysis

To assess whether randomization succeeded in achieving balance across the study arms in terms of potential confounders, the intervention and control arms were first compared using Chi-square, Wilcoxon rank-sum and *t*-tests, where appropriate. Univariate relative odds estimates and 95% confidence intervals were calculated to compare characteristics of participants who did and did not enter treatment. In an "intent to treat" analysis, logistic regression was utilized to examine the independent predictors of treatment entry, considering all variables significant at the $p < 0.1$ level in univariate analysis as potential covariates. All regression models were adjusted for potential clustering by NEP site and were conducted using STATA, version 8.0 (College Station, TX).

Since not all participants randomized to the intervention condition availed themselves of case management, we also considered the amount of case management time each participant received within the first 7 days after randomization, setting the duration for subjects in the control condition to zero and controlling for randomization assignment ("as treated" analysis). Since distance to travel to drug treatment could be a barrier to treatment entry, we estimated the distance from each participant's residence to the drug treatment program they were assigned, based on zip codes. We also created a variable that indicated whether or not the drug treatment program each participant was referred to was farther away than they stated they were willing to travel. Two-way interactions between covariates were also considered.

3. Results

Of 247 treatment-seeking NEP clients invited to participate, 245 (99%) consented and completed the baseline study visit. Of these 245 participants, 76% were African-American, 69% were male and 91% were unemployed. The median age was 42 (interquartile range: [IQR]: 37–48), and 44% had not finished high school. HIV prevalence was 19%, similar to previous studies of the Baltimore NEP population (Riley et al., 2002). Almost all were already aware of their HIV-serostatus. A comparison between sociodemographic characteristics of the study sample and the overall population of Baltimore NEP attenders during the study period revealed no significant differences (results not shown). There were no seasonal differences between control and intervention conditions, and no observed differences in participant characteristics among the 10 NEP sites.

By design, 128 (52%) were randomized to the intervention and 117 (48%) to the control condition. The number of subjects in each group was not equal since randomization was conducted by NEP site, not by individual, and was based on the number of drug treatment slots available in locations nearest to a NEP site. There were no baseline differences between the intervention and control groups with respect to any sociodemographic or behavioral characteristics, or self-reported barriers to accessing drug treatment (Table 1); however, the median age at first injection was slightly older among controls compared to clients randomized to the intervention arm (23.9 versus 21.5 years, respectively; $p = 0.019$; Table 1). The majority (87%) stated that they required transportation to attend drug treatment, but this proportion did not differ between intervention and control groups.

Overall, 34% entered treatment within 7 days of the referral from NEP (intervention: 40% versus control: 26%, $p = 0.03$). Since the follow-up period was very short, there were no dropouts or post-randomization exclusions.

Among the 128 subjects randomized to the intervention, 104 (81.3%) utilized some degree of case management services. The median duration of case management time received within the 7-day period was 25 min (IQR: 15–80), among a total of 201 contacts (median number of contacts per person: 2; IQR: 1–3). During these contacts, case managers provided primarily

transportation assistance (23%) and counseling (23%) and assistance with social services, medical care, housing and employment.

In univariate analyses (Table 2), factors associated with a greater odds of entering treatment were having been randomized to receive case management (Odds ratio [OR]: 1.84; 95% confidence interval [CI]: 1.07–3.16). Having two or more contacts with a case manager prior to the intake visit at the drug treatment program (OR: 2.47; 95% CI: 1.33–4.59), having received more time with a case manager or being driven to treatment by a case manager (OR: 4.94, 95% CI: 2.19–11.4) were significantly associated with entering treatment. Participants who were older or had access to a car were marginally more likely to enter treatment.

The mean distance participants were required to travel to the treatment program they were referred was 5 miles (±5 miles). Surprisingly, subjects who entered treatment travelled slightly farther than those who did not (mean # of miles: 6.2 versus 4.4; OR = 1.09 per mile, $p = 0.04$). Similarly, subjects who were required to travel farther to the drug treatment program than they had intended were significantly more likely to enter treatment. Treatment entry did not differ according to gender, race, HIV serostatus, marital status, education, employment, living arrangement, alcohol dependence, prior treatment experience, injection history, overdose, age at first injection, barriers to drug treatment, depressive symptoms or treatment readiness score.

In a multivariate “intention to treat” model (i.e., not taking into account the amount of case management clients actually received), those randomized to case management were 87% more likely to enter treatment within 7 days, even after adjustment for farther travel, access to a car, age and clustering by NEP site (AOR: 1.87, 95% CI: 0.91–3.86); however, this association was marginally significant ($p = 0.06$) (Table 3).

We also conducted an ‘as treated’ analysis taking into account the ‘dose’ of case management each client actually received (Table 3). In the final multivariate ‘as treated’ model, after adjusting for age, randomization assignment, and clustering by NEP site, having received more case management time was independently predictive of treatment entry (Table 3). In particular, participants who received 30 min or more of case management within 7 days of the baseline visit were 33% more likely to enter treatment. Additionally, persons with access to a car were almost three times more likely to enter drug treatment. Even after adjusting for these factors, persons who were required to travel farther than intended remained more likely to enter treatment (adjusted odds ratio [AOR]: 2.89; 95% CI: 1.59–5.26). In an effort to explain this association, we examined an interaction term between access to a car and traveling farther than intended. This interaction term was marginally significant in the final model (AOR: 0.17, $p = 0.06$), suggesting that those living farther away without access to a car were 83% less likely to enter treatment (results not shown). A potential interaction between traveling farther than intended and being driven to treatment, however, was not significant ($p = 0.77$). The inclusion of variables related to income, education, employment, treatment clinic site or treatment modality (i.e., methadone or LAAM) did not improve the overall model fit.

In an effort to identify the mechanism through which case management operated to facilitate treatment entry, we also offered the variable that indicated whether or not case managers had driven clients to the treatment program into both the ‘intention to treat’ and ‘as treated’ models in Table 3. Inclusion of this variable did not appreciably change parameter estimates; however, in the ‘intention to treat’ model, being randomized to the case management intervention became insignificant (AOR: 1.13; 95% CI: 0.59–2.16, $p = 0.72$) and the variable indicating whether or not case managers drove clients to treatment was highly significant (AOR: 4.99; 95% CI: 1.98–12.56). Similarly, in the “as treated” model, case management dose became insignificant (AOR: 1.03, $p = 0.58$) and the variable indicating whether or not case managers drove clients to treatment was significant (AOR: 3.89, $p = 0.03$). This suggests that the ‘active ingredient’

of case management was the provision of transportation to the treatment program. Adjustment for age at first injection did not appreciably alter any of the odds ratios presented.

4. Comment

This randomized trial demonstrated that a brief community-based case management intervention offered to treatment-seeking NEP clients significantly increased the proportion that subsequently entered drug treatment, and that the active ingredient of this intervention was provision of transportation. Since all of the subjects were given a treatment voucher prior to their participation in our study, the role of case management was not to secure a treatment slot for the participants, but to facilitate treatment entry among those who had already received a referral. In our analysis, lack of transportation remained a significant barrier that prevented many drug users from entering treatment. These findings have important implications for program planning to engage high-risk drug users in drug abuse treatment.

When offered as an adjunct to substance abuse treatment, case management has been significantly associated with less drug and/or alcohol use (Shwartz et al., 1997; McLellan et al., 1997; Aszalos et al., 1999; Ho et al., 1999), fewer legal and medical problems (Siegal et al., 2002; McLellan et al., 1997; Aszalos et al., 1999; Ho et al., 1999) increased employment (Siegal et al., 1996; McLellan et al., 1997), and improvements in family relations (McLellan et al., 1997) and housing (Aszalos et al., 1999). However, with few exceptions, these studies have been limited to drug users who are already enrolled in drug treatment. In a study of 111 female drug users in New Haven, Connecticut, Thompson et al., (1998) found that women who self-selected to a case management intervention had decreased numbers of unmet service needs, including drug treatment. More recently, Robles and colleagues found that a case management intervention combined with motivational interviewing was associated with increased entry into drug treatment and less injection drug use and needle sharing among drug users in Puerto Rico (Robles et al., 2004).

Our study – which appears to be the first to evaluate a case management intervention aimed specifically at engaging NEP attenders in drug treatment – found that assisting clients with transportation was the most important factor that influenced the rate of treatment entry. One interpretation of these data is that NEP attenders should be provided with some type of transportation assistance such as a bus token or taxi voucher to accompany their referral to treatment. Since 87% of our sample cited transportation as a major barrier to entering treatment, this may be a worthwhile initiative. However, we cannot necessarily conclude that passive assistance with transportation would achieve the same effect as our intervention, since our study was not designed to compare transportation to the array of services provided through SBCM. Additionally, case managers were just as likely to provide counseling as transportation to NEP clients, which may have helped motivate them to follow through with their decision to seek treatment. Although a taxi voucher or bus fare would be cheaper alternative to SBCM, taking into account the start-up costs of case management, a 3-year duration of benefits and a discount rate of 3%, we estimated that the incremental cost of a 30 min encounter with one of our case managers would only be $11, assuming a 2000 h work-year for two full-time case managers. Our findings are also consistent with an earlier assessment by our group, which found that the presence of case management is independently associated with an increased willingness to pay for drug treatment among NEP clients (Bishai et al., 2003).

Despite the positive influence of case management, drug users who lacked access to a car remained much less likely to enter drug treatment. This is not unexpected; in an earlier study of service needs among drug users in drug abuse treatment, transportation was the most important barrier to accessing ancillary services (Friedmann et al., 2000) and provision of transportation to drug users in treatment was associated with increased retention (Friedman et

al., 2001). Surprisingly, however, after controlling for access to a car, drug users who needed to travel farther than they had originally intended were nearly three times more likely to enter drug treatment. This may serve as a proxy measure of motivation for treatment, although treatment readiness per se was not predictive of treatment entry. On the other hand, participants who needed to travel farther than they had intended and who lacked access to a car were significantly less likely to enter drug treatment. These findings support a role for mobile or physician-based programs to offset transportation barriers faced by disadvantaged urban drug users. Indeed, mobile vans offering medically supervised methadone (Langendam et al., 1998) or LAAM (Kuo et al., 2003) have been shown to be feasible and acceptable to drug users in various settings, including Baltimore (Kuo et al., 2003). Efforts to expand drug users' access to methadone and other opiate agonists, such as buprenorphine could also increase the proportion of drug users entering treatment (Fiellin et al., 2004).

Despite our intervention, less than half of case-managed clients entered treatment within 1 week following referral. We limited the period for examining the effect of intervention on treatment entry to 7 days in order to evaluate the extent to which case managers were able to assist NEP attenders in availing themselves of the subsidized drug treatment slot that was offered to them.

Interpretation of our results should take into account some study limitations. Generalizability of our findings may be limited due to specific features of the drug treatment programs which were available to NEP attenders in Baltimore. On the other hand, characteristics of the study sample did not differ significantly from the overall NEP population during the study period, and our participation rate was excellent. Although drug treatment was subsidized by the city, it was not free. Availability of free drug treatment has been found to be an important factor associated with treatment entry (Booth et al., 1998). Although use of LAAM was discontinued by the Federal Drug Administration before our study was completed, consideration of the type of treatment modality to which participants were referred did not alter our study findings. All of the factors that have been found to be associated with treatment outcomes may not have been measured in this study. However, since we employed a randomized controlled design, we can expect that balance would likely have been achieved across study arms in terms of unmeasured confounders.

In summary, we found that a brief, low-cost, community-based case management intervention significantly improved rates of treatment entry among treatment-seeking IDUs referred to subsidized drug treatment from a NEP and that the most important ingredient of this intervention was provision of transportation. IDUs experience a high incidence of HIV, viral hepatitis and tuberculosis; methadone maintenance has been associated with lower incidence of these infections (Brooner et al., 1998; Sullivan et al., 2005). The combination of referrals to dedicated treatment slots, brief case management and transportation are important ancillary services that can be offered to IDUs attending one of the more than 140 NEPs in the United States who remain at high risk of comorbid infectious and chronic diseases. Through such initiatives, it may be possible to significantly increase the proportion of IDUs entering drug abuse treatment, thereby reducing the burden of drug use and disease on this vulnerable population and the communities in which they live. The combined costs of our case management intervention, assistance with transportation and the provision of opiate agonist treatment likely represents a fraction of the costs that would be needed to treat any of these preventable conditions.

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Table 1

Characteristics of IDUs enrolled in the treatment retention intervention study (2002–2004)

	Control arm *n* = 117		Intervention arm *n* = 128		χ^2 *p*-value
	N	%	n	%	
Gender					
Male	78	67	91	71	0.45
Female	39	33	37	29	
Education					
<HS	54	46	53	41	0.45
HS or more	63	54	75	59	
Age (mean ± S.D.)	42.4 ± 8.0		42.1 ± 8.2		0.81
Age at first injection (mean ± S.D.)	23.9 ± 8.4		21.5 ± 7.3		0.02
Individual monthly income (median, IQR)	$1000 ($400–1723)		$800 ($400–1500)		0.55
Employment status					
Employed	9	8	12	9	0.53
Unemployed, not looking for work	52	44	48	38	
Unemployed, looking for work	56	48	68	53	
Prior drug treatment or detox program					
No	88	75	100	78	0.59
Yes	29	25	28	22	
HIV status					
Negative	92	79	106	83	0.41
Positive	25	21	22	17	
Living arrangement					
Own house/apartment	30	26	35	28	0.55
Someone else's house/apartment	79	68	80	63	
Other	7	6	12	9	
Depressive symptoms (CES-D ≥ 23)					
No	50	43	47	37	0.34
Yes	67	57	81	63	
Race					
Other	31	27	26	20	0.24
African-American	85	73	102	80	
Need transportation to get to drug treatment					
No	15	13	15	12	0.79
Yes	102	87	113	88	
Need childcare to get to drug treatment					
No	116	99	124	97	0.21
Yes	1	1	4	3	
Need money to get to drug treatment					
No	33	28	31	24	0.48
Yes	84	72	97	76	
ASI alcohol composite score (mean ± S.D.)	0.09 ± 0.2		0.12 ± 0.2		0.34
ASI drug composite score (mean ± S.D.)	0.38 ± 0.1		0.40 ± 0.1		0.09
ASI family/social composite score (mean ± S.D.)	0.18 ± 0.2		0.23 ± 0.2		0.07
ASI psychiatric composite score (mean ± S.D.)	0.15 ± 0.2		0.17 ± 0.2		0.47
ASI legal composite score (mean ± S.D.)	0.29 ± 0.2		0.33 ± 0.3		0.31
ASI employment composite score (mean ± S.D.)	0.84 ± 0.2		0.83 ± 0.2		0.68
ASI medical composite score (mean ± S.D.)	0.30 ± 0.4		0.30 ± 0.4		0.97
Entered drug treatment within 7 days of referral date					
No	86	74	77	60	0.03
Yes	31	26	51	40	

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Table 2

Correlates of entry into drug treatment: univariate logistic regression

	Entered treatment (*n* = 82)		Did not enter treatment (*n* = 163)		OR	95% CI	*p*-value
	n	%	n	%			
Female	22	27	54	33	0.74	0.41–1.33	0.32
Age (years) (mean ± S.D.)	43.6 ± 7.9		41.5 ± 8.1		1.03	1.00–1.07	0.06
African-American	66	81	121	75	1.40	0.73–2.68	0.31
HIV positive	19	23	28	17	1.45	0.76–2.80	0.26
Never married	47	58	100	61	0.87	0.51–1.50	0.62
High school education	42	51	96	59	0.73	0.43–1.25	0.25
Employed	6	7	15	9	0.78	0.29–2.09	0.62
Randomized to intervention	51	62	77	47	1.84	1.07–3.16	0.03
2 or more contacts with case manager in first 7 days	27	33	27	17	2.47	1.33–4.59	<0.01
Average time of contact >15 minutes or more	25	31	30	18	1.94	1.05–3.60	0.03
Case management time (per 10 min increase) (mean ± S.D.)	32.4 ± 53.0		15.6 ± 33.4		1.10	1.03–1.17	<0.01
Participant was driven to treatment by case manager	20	24	10	6	4.94	2.19–11.14	<0.01
Requiring farther travel to treatment than intended	26	33	22	15	2.90	1.51–5.56	<0.01
Having access to a car	13	16	12	8	2.26	0.98–5.22	0.06
Living with children	18	22	26	16	1.48	0.76–2.90	0.25
Increasing ASI alcohol composite score (mean ± S.D.)	0.1 ± 0.2		0.1 ± 0.2		0.70	0.18–2.78	0.61
Median age at first injection	18.5	IQR (16–27)	21	IQR (17–28)	0.98	0.94–1.01	0.18
Injects drugs at least 2 times a day	151	93	76	93	1.01	0.36–2.79	0.99
Overdosed in last 6 months	3	4	8	5	0.74	0.19–2.85	0.66
Prior history of drug treatment	67	82	121	74	1.55	0.80–3.00	0.19
Depressive symptoms (CES-D ≥ 23)	95	58	53	65	1.31	0.76–2.27	0.34
AUDIT scale (mean ± S.D.)	4.0 ± 6.4		3.9 ± 6.2		1.01	0.96–1.05	0.81
Need transportation to get to drug treatment	72	88	143	88	1.01	0.45–2.27	0.99
Need childcare to get to drug treatment	3	4	2	1	3.06	0.50–18.67	0.23
Need money to get to drug treatment	65	79	116	71	1.55	0.82–2.92	0.18
Treatment readiness stage-determination or higher	67	82	131	80	1.09	0.55–2.15	0.80
Miles to travel to treatment (mean ± S.D.)	6.2 ± 7.6		4.4 ± 3.3		1.09	1.01–1.18	0.04

Table 3

Independent predictors of drug treatment entry within 7 days: "Intention to Treat" and "As treated" models

	Adjusted OR[a]	95% CI
"Intention to Treat" model		
Randomized to case management intervention	1.74	0.97–3.11
Requiring farther travel to treatment than intended	2.71	1.37–5.34
Having access to a car	2.37	0.99–5.68
Age (per year)	1.04	1.00–1.08
"As Treated" model		
Case management time (per 10 min increase)	1.11	1.04–1.20
Requiring farther travel to treatment than intended	2.89	1.59–5.26
Having access to a car	2.88	1.63–5.11
Randomized to case management intervention	1.18	0.60–2.32
Age (per year)	1.04	1.01–1.07

[a]Model also adjusted for clustering by NEP site.