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Social Contextual Factors Associated with Entry into Opiate Agonist Treatment Among Injection Drug Users

Jacqueline J. Lloyd, Ph.D., M.S.W.¹, Erin P. Ricketts, M.S.P.H.², Steffanie A. Strathdee, Ph.D.⁴, Llewellyn J. Cornelius, Ph.D., M.A.^{2,3}, David Bishai, M.D., Ph.D.², Steven Huettner, B.S.², Jennifer R. Havens, Ph.D., M.P.H.⁵, and Carl Latkin, Ph.D.²

¹ Temple University School of Social Administration, Philadelphia, Pennsylvania, USA

² Johns Hopkins University Bloomberg School of Public Health, Baltimore, Maryland, USA

³ University of California San Diego School of Medicine, San Diego, California, USA

⁴ University of Maryland School of Social Work, Baltimore, Maryland, USA

⁵ University of Kentucky College of Medicine, Lexington, Kentucky, USA

Abstract

We tested hypotheses that social living arrangement and drug use in one's network are independently associated with entry into opiate agonist treatment modalities. Injection drug users (IDUs) attending the Baltimore Needle Exchange Program who received a referral for drug abuse treatment were studied. Baseline interviews, HIV testing, and the Addiction Severity Index (ASI) were administered. Agency records were used to confirm entry into a treatment program offering opiate agonist maintenance therapy within 30 days of the baseline interview. Logistic regression was used to identify predictors of treatment entry. To date, of 245 IDUs, 39% entered such a program. Multivariate logistic regression models controlling for age and intervention status revealed that compared to individuals who lived alone, in a controlled, or nonstable environment (e.g., streets, abandoned house, transitional housing program, or boarding house), individuals who lived with a sexual partner were 3 times more likely to enter treatment (adjusted Odds Ratio [aOR]=3.04; p=0.013) and those who lived with family or friends were almost 3 times more likely to enter treatment (aOR=2.72; p=0.016). In the bivariate analyses, a marginal association was observed between being responsible for children or others and entry into treatment (p=0.066); however, this association was not significant in the multivariate model. Findings from this study suggest that supportive living environments may facilitate entry into treatment and may be helpful in devising appropriate and targeted interventions to encourage drug treatment entry.

Keywords

Social network; living arrangement; treatment; injection drug users

INTRODUCTION

Injection drug users (IDUs) represent the second largest risk group for HIV infection in the United States, accounting for approximately one-third of AIDS cases in the U.S. (1,2). In addition, IDUs are at increased risk for contracting other blood-borne pathogens such as

Address correspondence to Jacqueline J. Lloyd, Temple University School of Social Administration, 1301 Cecil B. Moore Ave., Ritter Annex, Room 599, Philadelphia, PA 19112–6091, USA; E-mail: jlloyd@temple.edu.

hepatitis B and C viruses (3) and are at increased risk of endocarditis, cellulitis, and abscesses compared to noninjectors (4).

Drug abuse treatment, in particular methadone maintenance, has been associated with decreased drug use and reductions in other HIV-related risk behaviors such injection frequency, needle sharing (5–8), and in some cases reduced sexual risk behaviors (9,10). Methadone maintenance treatment (MMT) has been associated with decreases in HIV incidence (5,11, 12) and has been found to reduce the spread of hepatitis B and C, tuberculosis, and sexually transmitted infections (13). However, a sizeable gap exists between the need for drug abuse treatment and the number of individuals who enter treatment in the United States. Of an estimated 810,000 opiate addicts in the U.S., about 20% are enrolled in MMT (14,15). Among IDUs, approximately 15–20% are enrolled in a drug treatment program at any given time in the U.S. (16). Given this gap and the adverse public health consequences associated with injecting drug use, engaging greater numbers of IDUs in drug treatment is an important public health priority.

The importance of drug treatment for IDUs calls for increased understanding of factors associated with entry into treatment. Variables found to be associated with entry into treatment in this population are being female (17), having health insurance (18,19), recent heroin use (20,21), a lengthy duration of drug use (>10 years) (21), HIV-risk injecting behavior (20,21), a desire for treatment (20,21), and prior treatment experience (17,20,21).

A limited number of studies have focused on social contextual factors that may be amenable to change that may influence treatment behaviors and experience. Studies have found drug use in one's network (21,22), having a substance using live-in partner and drug using social relationships (23) to be associated with continued drug use among individuals in treatment. With respect to retention, studies have found homelessness, perceived weak social support from one's family (24), and having a drug-free partner to be predictors of remaining in treatment (25).

Few studies have examined social factors in relation to treatment entry. Existing studies have found the following factors to be associated with entry into treatment: being married, living with a partner, associating with fewer drug-using friends, and mothers residing with their children (17,21,26). Studies provide evidence that the following factors are barriers and associated with not entering treatment: homelessness, problems in family/social relationships and other family related matters (i.e., wanting to conceal addiction from spouse or having to care for ill family members) (18,27).

This study attempts to fill a gap in knowledge and add to a limited body of knowledge with respect to the role of social network and social contextual factors on treatment entry among IDUs. Specifically, we attempted to identify and evaluate the role of social factors that might be associated with entering opiate agonist therapy in this population. We tested two hypotheses: 1) drug use in one's social network is associated with entry into opiate agonist therapy, and 2) one's social living situation is associated with entry into opiate agonist therapy. The findings from this study may have important implications with respect to identifying individuals who may be more or less likely to enter treatment based on characteristics of their social network and environment and may also influence planning of outreach strategies and interventions to encourage earlier treatment entry.

METHODS

The Baltimore Needle Exchange Program

This study builds from the Baltimore Needle Exchange Program (BNEP) Treatment Research Intervention (TRI) evaluation study. The TRI study was designed to evaluate the impact of case management services on drug treatment entry, retention, and outcomes (i.e., HIV seroincidence, injection drug use, and injection-related health seeking behaviors) among IDUs in the BNEP. The BNEP provides referrals into subsidized drug treatment programs, ranging from detoxification to methadone maintenance. Details on the BNEP have been published elsewhere (28).

The TRI was a prospective study based on data collected at a baseline assessment and at multiple follow-up periods. Participants were attenders at one of 13 mobile van sites of the BNEP who requested a referral for substance abuse treatment. They received a referral for MMT or levo-alpha-acetyl-methadol (LAAM) and were randomized to receive either strengths-based case management (intervention condition) or a standard referral (control condition). The study protocol for this investigation was reviewed and approved by the Institutional Review Board (IRB) for protection of human subjects in research at Johns Hopkins University Bloomberg School of Public Health.

Data Collection

Baseline data were obtained and recorded by study staff during face-to-face interviews. During the baseline interview, participants completed a questionnaire consisting of demographic, social network, social environment, and other questions; they also completed the Addiction Severity Index (ASI), a semistructured interview designed to assess problem areas in substance abusing patients (29).

Measures

Response Variable—The response variable of interest in this study was entry into opiate agonist drug treatment (therapy). Entry into treatment was defined as entry into a MMT or LAAM program within the first 30 days after the baseline interview (date enrolled in the study). Only entry into MMT and LAAM were selected as the outcomes in this analysis because they were the focus in the TRI evaluation study and because MMT and LAAM treatment slots were designated for NEP study participants; hence, financial ability was not a criterion for enrollment. Clients who entered MMT or LAAM received regular doses of methadone, in addition to scheduled psychosocial/behavioral counseling sessions from one of 6 treatment programs that maintain subsidized treatment slots for NEP attenders. All 6 treatment programs are generally representative of LAAM and MMT programs available in Baltimore, and all provide methadone maintenance in compliance with federal regulations and the Center for Substance Abuse Treatment Improvement Protocol (30).

Treatment entry data were obtained and verified through linkage with a dataset created and maintained by Baltimore Substance Abuse Systems, Inc (BSAS), the agency that maintains data for all publicly funded drug treatment programs in the city of Baltimore. This dataset contains treatment entry, service, discharge, and other information for clients who received services in a participating Baltimore LAAM or MMT program.

Independent Variables—The covariates of central interest were drug use in one's social network, drug use in one's family, live with someone who uses drugs, know someone in drug treatment/recovery, have a sex partner in drug treatment/recovery, one's living arrangement, and responsible for children or other adults.

“Drug use in one’s social network” was defined as the proportion of individuals in one’s network that currently uses drugs. This measure was assessed based on participants’ responses to a series of social network questions in the baseline questionnaire. Respondents were asked to list up to 10 family members and friends that they grew up with or that raised them. They were also asked to list up to 5 of their closest friends or acquaintances that they hang out with on a daily basis during the last 6 months. For both questions, respondents were asked to provide the initials of each person and were asked whether each person identified ever used drugs, currently uses drugs, was ever in drug treatment, is currently in drug treatment, and type of drug used or using. The current drug use response categories included inject heroin, inject speedball, sniff/snort heroin, sniff/snort cocaine, smoke crack, and other. Based on these questions, study participants provided the initials of up to 15 people that they consider members of their “support” network and the drug use patterns of each person identified. Responses to these questions were used to estimate the proportion of individuals in one’s network that currently uses drugs.

In the Family History section of the ASI, participants were asked if any of their relatives had a significant drug use problem. A relative was defined as a grandparent, parent, aunt, uncle, or sibling. Our study variable “drug use in one’s family” was coded as “yes” if at least one relative had a drug problem, otherwise it was coded as “no.” “Living with someone who uses drugs” was coded as “yes” or “no,” based on responses to the question from the ASI Family/Social Relationships subscale that asked “Do you live with anyone that uses non-prescribed drugs?”

The study variable “know someone in treatment/recovery” was based on the question from the baseline questionnaire that asked “How many people do you know that are currently in recovery or receiving drug treatment?” Responses to this question were coded as “no” if responders answered “none” and “yes” if they answered at least one. The variable “any sex partners in treatment/recovery” was based on a question from the baseline questionnaire that asked “How many of your sex partners are in drug treatment or recovery?” We coded responses as “none” or “one or more.”

“Living Situation” was assessed using the ASI Family/Social Relationships subscale question that asks “What has been your usual living arrangement in the past 3 years?” Responses were coded as “with sexual partner”; “with parents, family, children, or friends”; or “alone, in a controlled environment, or no stable arrangements (e.g., streets, abandoned house, transitional housing program, or boarding house).” Finally, “responsible for children or other adults” was assessed on the baseline questionnaire by two questions: “Do you have any children under 18 years of age that are living with you right now?” and “Do you live with anyone else who you look after, like a parent or grandparent?” The variable was coded as “yes” or “no.”

Other Covariates—The relationship between social network and contextual factors with entry into LAAM or MMT were estimated within the context of a general model for treatment entry. Additional covariates included within this model were sociodemographic characteristics (age, gender, race) obtained from the baseline questionnaire. Also included in the model were additional constructs thought to be important in influencing entry into treatment or constructs that might function as important confounding variables, such as HIV status and intervention group status. “Previous treatment entry” was based on a question from the baseline questionnaire that asked “Have you ever in your life been in a drug treatment program?” Responses to this question were coded as “yes” or “no.”

Blood was drawn from study participants at their baseline visit to test HIV status. The results were assessed by ELISA and, if reactive, confirmed with the Western Blot. The measure for intervention group status was based on recorded randomized intervention group assignments.

Statistical Analysis

The first steps involved frequency estimations, cross tabulations, and other exploratory data analyses to shed light on the underlying distributions of each response variable and covariate of interest. Then bivariate analyses estimated the strength of the association between entry into opiate agonist therapy and each key covariate of interest. In subsequent analyses, the statistical approach involved two steps: 1) fitting terms for multiple logistic regression analyses to control for covariates suspected to distort the associations of interest, and 2) an exploration of subgroup variation in the strength of the observed associations. For example, to test for subgroup variation we tested interaction terms for “living arrangement and responsible for children or other adults,” “living arrangement and sexual partner drug use,” “living arrangement and gender,” and “partner in drug treatment/recovery and partner drug use.”

In this study, odds ratios are presented as estimates of the strength of the associations studied. In addition, we present the 95% confidence intervals and the actual p-values. Statistical significance was set at $p < 0.10$ for the bivariate statistical analyses and $p < 0.05$ for the multivariate analyses. Since this study was a randomized trial of a case management intervention, our analysis adjusted for intervention or control condition.

RESULTS

The study population consists of 245 IDUs attending the BNEP from January 2002 to January 2004. Most (95%) of the sample were residents of Baltimore City. Table 1 presents descriptive statistics for the study sample. The study sample includes 245 IDUs who attended one of 13 mobile van sites of the BNEP and were randomized to receive either the strengths-based case management (intervention condition) or a standard referral (control condition). Of these 245 IDUs, 96 (39%) entered opiate agonist therapy within 30 days of the baseline interview (date enrolled in study). The mean age of the sample was 42.2 years old ($SD = 8.1$). Males comprised about 69% of the study sample, 77% were African American, and approximately 19% were HIV positive. The distribution of the randomization was slightly higher in the intervention condition (52%) than the control condition (48%).

Frequencies for selected study variables of interest stratified by treatment entry as well as estimates for the unadjusted bivariate associations between each covariate and entry into opiate agonist treatment within 30 days of referral are shown in Table 2. We found statistically significant relationships between entry into an opiate agonist treatment with age, responsible for children and other adults, and living arrangement (live with sexual partner; live with parents, family, children, or friends) (all p-values ≤ 0.10).

As depicted in Table 2, the mean age of those that entered opiate agonist therapy was significantly older (44.0 years) than those that did not enter treatment (41.1 years) ($OR = 1.05$; 95% $CI = 1.0, 1.1$; $p = 0.006$). Individuals who were responsible for children or other adults were over one and one-half times more likely to enter treatment compared with those who were not responsible for others ($OR = 1.73$; 95% $CI = 1.0, 3.1$; $p = 0.066$). There was a statistically significant association between living arrangement and entry into treatment, whereas individuals who lived with a sexual partner were almost two and one-half times more likely to enter treatment compared with those in the “alone, controlled, or nonstable environment” living arrangement group ($OR = 2.30$; 95% $CI = 1.0, 5.3$; $p = 0.051$). Additionally, individuals who lived with parents, family, children, or friends were about 2 times more likely to enter treatment compared with those in the “alone, controlled, or nonstable” living arrangement category ($OR = 2.03$; 95% $CI = 0.9, 4.4$; $p = 0.072$).

As shown in Table 2, we did not find statistically significant associations between entry into opiate agonist therapy and gender, race, HIV status, study group randomization status, know

someone in recovery/drug treatment, having a sexual partner in treatment/recovery, living with someone who uses non-prescribed drugs, having family members with drug problems and previous drug treatment (all p -values >0.10). With respect to selected continuous covariates of interest, we did not find statistically significant associations between entry into treatment with proportion in one's network that currently uses drugs, ASI Family/Social Composite score, ASI Drug Composite score, or proportion of sex partners that use drugs (all p -values >0.10).

The results from the multiple logistic regression analyses are presented in Table 3. A multiple logistic regression model controlling for age and study group status revealed that living situation was associated with entry into opiate agonist therapy. In this model, we found that individuals who lived with a sexual partner were about 3 times more likely to enter treatment compared to those who lived alone, in a controlled environment, or those who had no stable living arrangement ("other" living arrangements) (aOR=3.04; 95% CI=1.3, 7.4; $p=0.013$). Those who lived with parents, family, children, or friends were almost 3 times more likely to enter treatment compared to those with "other" living arrangements (aOR=2.72; 95% CI=1.2, 6.2; $p=0.016$). Additionally, age was associated with entry into treatment. For every one year increase in age, individuals were 6% more likely to enter treatment (aOR=1.06; 95% CI=1.0, 1.1; $p=0.001$). In the multivariate model, we did not find any of the other variables tested in the bivariate analyses to be associated with entry into opiate agonist therapy (all p -values >0.05).

In exploratory analyses, we tested for subgroup variation in the strength of the association between living arrangement and entry into opiate agonist therapy by introducing into the final model selected interaction terms. The results from these analyses did not provide evidence of subgroup variation by "living arrangement and responsible for children or other adults," "living arrangement and sexual partner drug use," "living arrangement and gender" or "partner in drug treatment/recovery and partner drug use."

DISCUSSION

The findings from this study extend prior research on the relationship between social factors and entry into opiate agonist therapy. As hypothesized, we found an association between one's living arrangement and entry into treatment, even after controlling for age and study group status. Consistent with prior research, these findings provide evidence of the importance of specific social contextual factors, one's home living situation, and entry into treatment (17). In our study, individuals who lived with a sexual partner were more likely to enter treatment compared with those who lived alone, in a controlled, or a nonstable living arrangement. In addition, those who lived with parents, family, children, or friends were also more likely to enter treatment than those who lived alone, in a controlled, or in a nonstable environment. Also, older age was associated with entry into treatment. Contrary to our hypothesis and findings from prior studies, we did not find an association between drug use in one's social network and entry into opiate agonist therapy (21). In addition, we did not find associations for relationships between entry into treatment and other social contextual factors of interest, such as drug use in one's family, living with someone who uses drugs, or knowing someone in recovery. Though negative, these findings are important given limited research in this area.

On the other hand, the association we observed between living arrangement and entry into opiate agonist therapy suggests that having social connections in one's environment promote or encourage substance abusers to enter treatment. The fact that this relationship persisted even when we controlled for several alternative predictors of treatment entry is an important finding that may speak to the importance of one's living situation on treatment entry despite individual factors. Specifically, the finding that individuals who lived alone, in a controlled, or in a

nonstable living situation were less likely to enter treatment compared with those who lived with parents, family, children, or friends as well as a sexual partner might speak to the importance of social and emotional connections. This notion is supported by findings from prior studies in which emotional support has been found to be related to treatment retention (31). It is plausible that living arrangement might be an index of social support and social connectedness in this sample, which is an area for future research. However, it is important to note that research findings in this area have not been consistent. For example, in a study of patients in an inpatient treatment program, Westreich and colleagues (24) found that patients who reported stronger perceived social support from family were less likely to complete treatment.

Although not a focus of this study, it is noteworthy that older individuals were more likely to enter treatment, independent of the relationships described above; this finding is consistent with evidence from prior research (18). We also observed a marginal association between previous treatment and treatment entry in the unadjusted model. This relationship has been reported in prior studies (17,20,21). However, this relationship did not persist after adjusting for other predictors of treatment entry. Consistent with findings from previous studies, we observed a marginal association between being responsible for children or others and treatment entry in the crude model (26,32); however, this relationship was not observed in the multivariate model.

Also noteworthy is the fact that the results from the exploratory analyses did not provide evidence of subgroup variation in the relationship between living arrangement and entry into opiate agonist therapy. While we thought it possible that entry into treatment might be more strongly linked with living arrangement for individuals who were responsible for children or other adults, our findings did not support this. Also, we found that the relationship between entry into treatment and living arrangement did not vary by whether or not one's partner used drugs. Nor did the findings reveal any difference in the strength of this relationship by whether or not one's partner used drugs and whether or not one's partner was in drug treatment or recovery. These findings merit additional investigation.

Several of the more important study limitations merit attention. Since the majority of the study participants were African American (approximately 77%), mean age of 42.2 years and living in an urban area, generalizability to other populations is unknown. Also, the study enrolled treatment-seeking IDUs who used the BNEP, therefore, the results may not be generalizable to IDUs who do not use NEPs. In future research, it might be important to replicate this study in diverse geographic areas and in non-NEP, nontreatment seeking samples.

This study only provides evidence of entry into treatment for individuals who presented for treatment at one of the study facilities within 30 days of enrolling in the study and receiving a referral. We chose to restrict our sample to a short period, during which time we expected that their self-reported living situation would stand to be a valid predictor. In addition, one might question the measure of social network used in this study given that it is based on participants' self-report of individuals within their own network and the drug use and treatment experience of these network members.

This study possesses a number of strengths. Given that most of the research in this area has focused on the role of social network and contextual factors on treatment retention and outcomes, this research adds to a limited knowledge base on how these factors influence entry into treatment. In addition, data for the study outcome, treatment entry, are validated by data ascertained from linkage with the BSAS treatment admissions database.

CONCLUSION

The results from this study suggest that one's living situation is associated with entry into treatment. These results extend findings from prior studies which provide evidence that social contextual factors are predictors of substance abuse treatment retention and treatment outcomes. In addition, these findings add to evidence from a limited number of prior studies that have focused on the role of specific social contextual factors on entry into treatment.

The findings from this study may have important implications as we seek to account for social contextual factors associated with entry into treatment. Increased understanding of the link between one's living situation with entry into methadone opiate agonist treatment may be helpful in planning outreach strategies to encourage earlier drug treatment entry. For example, it may be important to tailor treatment outreach and recruitment strategies based on clients' living situation. The evidence from this study may suggest the need to assess and stabilize the home living arrangement of drug users in an attempt to promote entry into treatment. In addition, couples or family interventions may be useful strategies for strengthening the support networks of drug users in order to prompt treatment entry. In future analyses, it might be important to focus on whether and how entry into treatment influences characteristics of one's social support network and social environment and how stability or changes in these social factors might influence treatment retention and treatment outcomes.

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Table 1

Sample characteristics of the Baltimore needle exchange program treatment retention intervention study, 2004

Variable	n	%
Age (mean±SD)	245	42.2±8.1
Gender		
Male	169	69.0
Female	76	31.0
Race		
Other	57	23.4
African American	187	76.6
HIV Status		
Negative	198	80.8
Positive	47	19.2
Study group randomization		
Case management intervention	128	52.2
Standard referral group	117	47.8
Entered opiate agonist treatment within 30 days of referral date		
No	149	60.8
Yes	96	39.2

Table 2

Sample characteristics and estimated odds ratios and confidence intervals for associations between selected covariates and entry into opiate agonist treatment

	Did not enter treatment (n=149)		Entered treatment (n=96)		Total sample (n=245)		Unadjusted OR	95% CI	p-value
	n	%	n	%	n	%			
Age (mean±SD)	149	41.1±8.5	96	44.0±7.0	245	42.2±8.1	1.05	1.0–1.1	0.006
Gender									
Male	102	68.5	67	69.8	169	69.0	Referent		
Female	47	31.5	29	30.2	76	31.0	0.94	0.5–1.6	0.825
Race									
Other	34	23.0	23	24.0	57	23.4	Referent		
African American	114	77.0	73	76.0	187	76.6	0.95	0.5–1.7	0.859
HIV Status									
Negative	125	83.9	73	76.0	198	80.8	Referent		
Positive	24	16.1	23	24.0	47	19.2	1.64	0.9–3.1	0.130
Study group randomization									
Standard referral group	67	45.0	50	52.1	117	47.8	Referent		
Case management intervention	82	55.0	46	47.9	128	52.2	0.75	0.5–1.3	0.277
Responsible for children or others									
No	118	79.2	66	68.8	184	75.1	Referent		
Yes	31	20.8	30	31.3	61	24.9	1.73	1.0–3.1	0.066
Know someone in recovery/drug treatment									
No	62	41.9	33	34.4	95	38.9	Referent		
Yes	86	58.1	63	65.6	149	61.1	1.38	0.8–2.3	0.240
Any sex partners in recovery/drug treatment									
No	128	85.9	86	89.6	214	87.3	Referent		
Yes	21	14.1	10	10.4	31	12.7	0.71	0.3–1.6	0.400
Living arrangement									
Alone, controlled, or nonstable environment	32	21.9	11	11.7	43	17.9	Referent		
With sexual partner	38	26.0	30	31.9	68	28.3	2.30	1.0–5.3	0.051
With parents, family, children, or friends	76	52.1	53	56.4	129	53.8	2.03	0.9–4.4	0.072
Live with someone who uses nonprescribed drugs									
No	120	83.9	73	79.3	193	82.1	Referent		
Yes	23	16.1	19	20.7	42	17.9	1.36	0.7–2.7	0.373
Any people in family with drug problems									
No	64	43.0	39	40.6	103	42.0	Referent		
Yes	85	57.0	57	59.4	142	58.0	1.10	0.7–1.9	0.719
Previous drug treatment entry									
No	40	26.8	17	17.7	57	23.3	Referent		
Yes	109	73.2	79	82.3	188	76.7	1.71	0.9–3.2	0.101
Proportion in network that currently uses drugs (mean±SD)	149	0.25±0.2	95	0.22±0.2	244	0.24±0.2	0.56	0.2–1.8	0.331
ASI-Family/Social Composite score (mean±SD)	145	0.22±0.2	94	0.19±0.2	239	0.21±0.2	0.47	0.1–1.6	0.235
ASI-Drug Composite score (mean±SD)	143	0.39±0.1	93	0.38±0.1	236	0.39±0.1	0.18	0.0–3.9	0.276
Proportion of sex partners that use drugs (mean±SD)	55	0.52±0.5	34	0.58±0.5	89	0.55±0.5	1.26	0.5–2.9	0.594

Table 3

Results from multivariate logistic regression analysis to estimate relationships between study variables and entry into opiate agonist treatment

	Adjusted OR	95% CI	p-value
Study group randomization			
Standard referral group	Referent		
Case management intervention	0.80	0.5–1.4	0.414
Increasing age (years)	1.06	1.0–1.1	0.001
Living arrangement			
Alone, controlled, or nonstable environment	Referent		
With sexual partner	3.04	1.3–7.4	0.013
With parents, family, children, or friends	2.72	1.2–6.2	0.016