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Antecedents and correlates of methadone treatment entry: A comparison of out-of-treatment and in-treatment cohorts

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Abstract

Background—The majority of opioid-dependent individuals in the US in need of drug treatment are not receiving it. It would be useful to understand the characteristics of individuals entering and failing to enter methadone treatment.

Methods—Participants were opioid-dependent adults in Baltimore Maryland recruited from new admissions to one of six methadone treatment programs ($n=351$) and from the streets from among non-treatment seekers ($n=164$). At study enrollment, participants were administered the Addiction Severity Index, AIDS Risk Assessment, Community Assessment Inventory, Attitudes toward Methadone Scale, Motivation for Treatment Scale and a urine drug test. A series of logistic regression analyses were conducted to determine the best model to predict treatment entry.

Results—The final logistic regression analysis showed that predictors of treatment entry included: being African-American, being on parole or probation, having lower rates of self-reported cocaine use and criminal activity, higher employment functioning, and greater perceptions of support from family and community for behavioral change. In addition, in-treatment participants were more likely to have a more extensive prior history of drug abuse treatment, greater desire to seek help in coping with their drug problem, and more positive view of methadone.

Conclusions—The distinctions between those entering and those not pursuing MTP entry have significance for the structure of outreach programs and reaffirm the need to supplement the current practices of voluntary and coerced treatment entry with one of encouraged treatment entry through outreach.

Keywords

heroin addiction; methadone treatment; outreach; treatment entry

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1. Introduction

The majority of opioid-dependent individuals in the US who need drug abuse treatment are not receiving it (Center for Substance Abuse Treatment, 2004). These individuals are subject to an increased risk of overdose death, HIV and hepatitis infection, and incarceration (Brugal et al., 2005; Celentano et al., 2001; Schwartz et al., 2009). Methadone treatment, in particular, has been repeatedly shown to reduce the likelihood of these and other complications of drug use (Bell et al., 2009; Kleber, 2008; Metzger et al., 1993; Newman et al., 1973; Zanis and Woody, 1998). Because of the risk to self and to public health and safety, it is critical that we understand the characteristics of individuals entering and failing to enter methadone treatment. Armed with that knowledge we can be better equipped to develop approaches designed to increase rates of entry by individuals who stand to derive significant benefit from opioid agonist therapy.

Prior research has found a number of individual and contextual characteristics differentiating between those entering and not entering treatment, such that individuals entering treatment are more likely to be older (Shah et al., 2000); female and married (Schutz et al., 1994); married or living with another (Lloyd et al., 2005; Schutz et al., 1994); have a prior history of drug abuse treatment (Booth et al., 2003; Schutz et al., 1994; Zule and Desmond, 2000); report fewer problems with alcohol but greater problems with drugs (Corsi et al., 2007); injecting or smoking cocaine (Booth et al., 2003); show lower levels of psychological distress and interpersonal problems (Hser et al., 1998); experience greater pressure to enter treatment from friends (Gyarmathy and Latkin, 2008) and family (Kelly et al., 2010) and through the criminal justice system (Hser et al., 1998); as well as report greater HIV risk injection drug use behavior (Zule and Desmond, 2000).

The present study was undertaken to understand how differences between opioid-dependent adults seeking and those not seeking treatment would differ as measured by the Addiction Severity Index (ASI; McLellan et al., 1985) and other measures that would examine issues suggested by the literature as having the capacity to differentiate between groups and appearing to have significance for clinical programming.

Specifically, we hypothesized that, adjusting for the other factors in our model intended to control for demographic and background characteristics, opioid-dependent individuals who are out of treatment compared to those entering methadone treatment will have lower composite scores on the Addiction Severity Index (ASI; McLellan et al., 1985) in the areas of drug use, alcohol use, psychological functioning, legal difficulties, and employment problems, report fewer prior drug abuse treatments, and will see themselves as having lower levels of support for change from family, friends and community, as well as being less subject to legal coercion for treatment entry. In addition, we hypothesized that individuals remaining out of treatment, in comparison with those entering treatment, will show less impetus to achieve change reflected in a lower level of expressed motivation to change, and a more negative attitude towards methadone as an agent of change.

2. Methods

2.1 Participants

Two samples were recruited for study participation. The in-treatment sample consisted of 351 opioid-dependent adults recruited from new admissions to one of six methadone treatment programs in the Baltimore metropolitan area between November 1, 2004 and October 31, 2007. They were recruited by the study's research assistants on the day of their admission and were generally administered study measures within a week of admission to

permit the participants to obtain some relief from their opioid withdrawal and to avoid interference with routine clinic admission procedures.

Inclusion criteria for this sample were: (1) minimum age of 18 years old and (2) meeting the U.S. federal criteria for entry into methadone maintenance (e.g., at least one continuous year of meeting DSM-IV criteria for opioid dependence).

The second sample consisted of 164 opioid-dependent adults recruited from the streets of Baltimore from among out-of-treatment adults who met the criteria for methadone treatment but who were not seeking drug abuse treatment and had not been in treatment during the preceding 12 months. The out-of-treatment sample was recruited between January 2005 and November 2007 through targeted sampling as described in detail elsewhere (Peterson et al., 2008). The study was approved by the Friends Research Institute Institutional Review Board.

2.2 Procedures

All participants provided written informed consent and completed a baseline interview conducted by a trained research assistant. The in-treatment cohort was interviewed at their methadone treatment program, typically within one week of admission. The out-of-treatment cohort was interviewed at our downtown Baltimore offices generally on the day of study recruitment. A urine sample for drug testing was collected at admission by treatment program staff for the in-treatment participants, and by research staff immediately following the baseline interview for out-of-treatment participants.

2.3 Measures

The following measures were administered at baseline:

Addiction Severity Index (ASI)—The ASI is a standardized interview that is widely used in drug abuse research to examine problem severity in seven domains: alcohol use, drug use, employment, family and social, legal, medical, and psychiatric (McLellan et al., 1980; McLellan et al., 1985). Each domain yields a composite score ranging from 0 to 1, inclusive, that is calculated from select items referencing the 30 days prior to the interview. Higher scores indicate greater problem severity. The ASI has been found to have good reliability and validity (Hendriks et al., 1989; Kosten et al., 1983).

For the purposes of the present study, predictor variables from the ASI included all composite scores and selected items regarding the number of days in the 30 days prior to the interview (or prior to the date of the MTP admission for the in-treatment sample) in which participants had: 1) used cocaine; 2) committed crime; and, 3) worked for pay. The items indicating whether the participants had ever injected drugs, were currently on parole or probation, or had experienced depression were included as categorical predictor variables. Finally, the length of their longest full-time job (months) was also examined.

AIDS Risk Assessment—This is a 25-item questionnaire that assesses HIV knowledge and sex and injection-related risk behaviors during the preceding 30-day period. This measure has been used to assess the effectiveness of an AIDS/HIV risk reduction module (Boatler et al., 1994), of interim methadone treatment (Wilson et al., 2010), and to relate psychological functioning to HIV risk taking (Camacho et al., 1996; Joe et al., 1991; Simpson et al., 1993). Injection- and sex-risk scales were created by adding the number of responses (yes/no) of selected items.

FRI Supplemental Questionnaire—This is a structured interview that obtains detailed information about the participants' lifetime and current criminal behavior, legal history of criminal justice system involvement, drug use, self-help meeting attendance, and prior drug abuse treatment. It has been used extensively by FRI's researchers (Nurco, 1998; Nurco et al., 1988). From this Questionnaire, items indicating the age of onset of heroin use and of crime, the number of times participants were enrolled in methadone maintenance treatment lifetime, and the lifetime number of months incarcerated were included as predictor variables.

Attitudes toward Methadone Scale—This is a 28-item scale (internal consistency $\alpha = .75$; Schwartz et al., 2008) that assesses attitudes of opioid-dependent individuals toward the use of methadone as a treatment (Brown et al., 1975), including their perceptions of methadone's potential helpfulness, negative physical and cognitive effects associated with methadone, and the perceived purpose of methadone administration (e.g., patient concern, crime control). The items are rated on a Likert scale with five options, ranging from "strongly disagree (1)" to "strongly agree (5)."

Community Assessment Inventory (CAI)—The CAI measures individuals' perceptions of their level of support on four scales: (1) household members (including spouse or significant others and/or adult relatives); (2) family members with whom the individual does not reside; (3) friends; and (4) community. The responses to the scale items are provided on a 4-point Likert-scale ranging from "strongly agree", "agree", "disagree," to "strongly disagree." Questions in each potential area of support were skipped by the respondent when not relevant, such as those regarding support from individuals in the home for those respondents who lived alone. The four scales scores were calculated by adding the responses in each of the areas of inquiry (Brown et al., 2004). Scale scores that were missing due to the skipped responses were plugged with the total sample mean with percentages of missing data ranging from 18% to 37%. The CAI's scales have been found to be valid and reliable with internal consistency alphas for the Household Member, Family, Friends, and Community Scales ranging from .79 to .88 (Brown et al., 2004).

Texas Christian University Motivation for Treatment—This is a 35-item motivational measure developed by Simpson and colleagues (Knight et al., 1994; Simpson, 1992; Simpson and Joe, 1993). For the purposes of this study, we examined the Problem Recognition (PR) and Desire for Help (DH) Scales. Test-retest reliabilities for these scales have been found to range from .77 and .88, respectively (Simpson and Joe, 1993), and the validity of the measure in predicting treatment engagement, retention, and outcome has been established in a number of studies, including several with methadone maintenance patients (Griffith et al., 1998; Simpson et al., 1997; Simpson et al., 2000). PR, which measures the extent to which the respondent believes behavior problems are associated with his/her drug use, was used to assess extent of recognition of drug use as an issue. DH was used to measure the extent to which the respondent expresses concern about getting help to quit drug use.

Urine drug testing—Urine samples were collected by treatment staff (for those individuals entering treatment) and by research staff (for those individuals out of treatment) and analyzed by enzyme multiplied immune test (EMIT) for opioids and cocaine.

2.4 Statistical analysis

Initial analyses involved simple comparisons of the in- and out-of-treatment groups on all demographic variables shown in Table 1 and predictor variables shown in Table 2 using oneway analysis of variance for continuous variables and χ^2 goodness-of-fit tests for

categorical variables. A series of logistic regression analyses were then conducted to determine the best model to predict treatment entry. The first analysis included all predictor variables, as well as gender, race, and age, to yield a preliminary model predicting group membership. The second analysis included only the variables found to be significant at or below an alpha level of .05 in the first logistic regression analysis, yielding an intermediate model predicting treatment entry. Finally, we then ensured that each predictor variable that was dropped from the model as a result of the first analysis was not significant when added back into the intermediate model.

3. Results

3.1 Participant characteristics

As shown in Table 1, the mean age of the 515 participants was 41.5 years old, 23.5% of the sample was married, 74.8% were Black and 24.3% were White, while 54.4% were men. There were no significant differences between the in-treatment and out-of-treatment sample on these demographic variables (all $ps > .05$).

3.2 Baseline difference for predictor variables between the samples

The baseline differences for the predictor variables between the in- v. out-of-treatment samples are shown in Table 2.

Addiction Severity Index—There were significant differences between the groups on all ASI Composite scores (all $ps < .01$) except for the Family/Social Composite score. The out-of-treatment sample had significantly higher scores on the Alcohol Use, Drug Use, Legal, and Employment Composites and the in-treatment group had higher scores on the Medical and Psychiatric Composites.

In terms of the specific ASI items for behaviors in the 30 days prior to the interview, the out-of-treatment sample, compared to the in-treatment sample, used cocaine ($p < .001$) and committed crime ($p < .001$) on significantly more days, although there was no difference between the groups in the number of days employed ($p=.29$).

Regarding lifetime ASI items, the in-treatment, compared to the out-of-treatment sample, had a significantly greater likelihood of injecting drugs ($p=.006$) and being on parole or probation ($p=.042$). However, there were no significant differences between the groups on history of prior depression or longest full-time job held (both $ps > .05$).

AIDS Risk Assessment—There were no significant differences between the groups on the Sex Risk or Injection Risk Scales (both $ps > .05$).

FRI Supplemental Questionnaire—Neither age of onset of heroin use nor of crime was significantly different between the groups. In contrast, the out-of-treatment as compared to the in-treatment sample spent significantly longer periods of time incarcerated (44.9 v. 28.4 months, respectively; $p = .002$) and had significantly fewer prior episodes of methadone treatment (0.32 v. 1.2; $p < .001$).

Attitudes toward Methadone Scale—The in-treatment sample had a significantly higher score on this scale indicating a more favorable attitude toward methadone than the out-of-treatment sample ($p < .001$).

Community Assessment Inventory—The internal consistency alphas for the household, family member, friends, and community scales were .84, .86, .66 and .80,

respectively. All four scales of the community assessment inventory were significantly higher (all $ps < .001$) for the in-treatment than for the out-of-treatment sample, indicating greater support for involvement in treatment and behavior change.

Motivation for Treatment—There was a significant difference favoring the in-treatment as compared to the out-of-treatment group on the Desire for Help Scale ($p < .001$) but not for the Problem Recognition Scale ($p = .42$).

Drug Testing—The out-of-treatment group, compared to the in-treatment group, was more likely to have a positive cocaine test at enrollment (87.7% v. 64.5%; $p < .001$). This is consistent with the self-report data on cocaine use described above. There was no significant difference in opioid positive tests ($p = .89$).

3.3 Predictors of Treatment Entry

Results of the initial logistic regression analysis are shown in Table 3 and results of the final logistic regression analysis are shown in Table 4. The discussion below focuses on the results for the final model found in Table 4, unless otherwise indicated.

Addiction Severity Index—Only the Employment Composite Score predicted treatment entry and the in-treatment group showed significantly less severe employment problems ($p = .002$). Recent behaviors prior to study enrollment, including the number of days of cocaine use ($p < .001$), work ($p = .006$), and criminal behavior ($p < .001$), also predicted entry, with more disordered behaviors found in the out-of-treatment group. Finally, being on parole or probation, as well as being African American, predicted treatment entry (both $ps < .05$).

AIDS Risk Assessment—Neither the Sex Risk nor Injection Risk Scales predicted group membership (see Table 3).

FRI Supplemental Questionnaire—The greater the number of prior episodes of methadone treatment, the greater the likelihood was of entering treatment ($p < .001$).

Attitudes toward Methadone Scale—More positive attitudes toward methadone predicted treatment entry ($p < .001$).

Community Assessment Inventory—Two of the four CAI scales, namely perceptions of Household and Community Support for treatment involvement and behavior change, predicted greater likelihood of entering treatment ($ps = .001$ and $.004$, respectively).

Motivation for Treatment—Individuals entering treatment were more likely to acknowledge a need for assistance to deal with their drug abuse than were individuals not entering treatment as measured by the Desire for Help Scale ($p < .001$).

Drug Testing—As shown in Table 3, neither opioid nor cocaine positive urine tests predicted treatment entry status.

4. Discussion

This study compared the characteristics of opioid-dependent adults who were entering one of six methadone programs in Baltimore to those individuals who were recruited from the streets and were not seeking treatment. The present study found that treatment was more likely to be accessed by those participants with lower rates of self-reported cocaine use and criminal activity, higher employment functioning, and greater perceptions of support from

members of their household and community for behavioral change. In addition, in-treatment participants were more likely to have a more extensive prior history of methadone treatment, greater desire to seek help in coping with the drug problem they were experiencing, and more positive view of methadone.

These findings have important implications for the treatment of opioid-dependent individuals. Our findings suggest that those individuals who remain outside of treatment perceive less social support from members of their household and of their community. Moreover, findings of greater problem severity in terms of criminal activity, cocaine use, and employment difficulties for those remaining out of treatment suggest that “hitting bottom” is not an effective stimulus to treatment entry or, at a minimum, that “bottom” needs to be carefully defined. The fact that opioid-dependent individuals who remain out of treatment perceive less support from the community and have had less frequent contact with the treatment system in spite of more difficulty underscores the need to modify our view of treatment to embrace outreach efforts to engage individuals in treatment.

In order to have a significant impact on the epidemic of opioid dependence and its associated public health and safety problems, it is necessary to bring treatments for this disorder to scale (Woody and Munoz, 2000). Currently, we have two principal strategies to recruit individuals into treatment. We rely on their own determination to lead them to volunteer for treatment, or they are coerced into treatment through use of the criminal justice system. Those strategies alone have not proven adequate to the task. In part, their inadequacy is highlighted in our findings that indicate that while individuals entering treatment and those not seeking treatment did not differ in scores on the Problem Recognition Scale, the out-of-treatment individuals compared to those individuals entering MTPs did obtain significantly lower Desire for Help scores. Recognizing the problem was insufficient to promote problem resolution. At best, that resolution might occur after the individual enters the criminal justice system, and after creating greater difficulties for the individual and for the community.

Active outreach efforts can be more largely pursued using models such as those originated for street contacts (Booth et al., 1991). Indeed, in the National AIDS Demonstration Research Program, it was found that 25% of opioid-dependent individuals approached in the community for HIV prevention alone, *who had never previously been in treatment in spite of an average of more than 11 years of injecting drugs*, voluntarily entered treatment subsequent to being contacted by an outreach worker (Brown and Needle, 1994).

Other outreach efforts include linking opioid-dependent individuals identified at needle exchange programs to drug treatment (Heimer, 1998; Riley et al., 2002), as well as those offered through Screening Brief Intervention and Referral to Treatment (SBIRT) projects in healthcare settings (Madras et al., 2009). In our study we found that in-treatment as compared to out-of-treatment individuals were more likely to have seen a doctor in the past 30 days and 6 months prior to study enrollment (both $ps < .001$). We are unable from these data to determine whether the participant believed that the index MTP admission was prompted by the medical provider visit, however, referral to treatment through health care providers is a potential means of expanding outreach.

Active outreach may bring into treatment individuals with more severe cocaine problems than those who seek treatment on their own. Individuals referred from syringe exchanges as compared to those who seek treatment through other means have been found to be more impaired (greater cocaine use and likelihood of injection) and had poorer treatment response (Neufeld et al., 2008). Programs engaging in active outreach should be ready to provide tailored clinical services to individuals who are more impaired and more likely to be

cocaine-dependent. In this regard, the increasing availability of contingency management, an effective approach to stimulant dependence, may be of use (Peirce et al., 2006).

Buprenorphine treatment in the US is being increasingly delivered through physician office-based practices, community health centers and outpatient drug treatment programs. Given our finding that individuals with more negative attitudes toward methadone were less likely to enter such treatment, the availability of buprenorphine provides a treatment option which may reach more out-of-treatment opioid-dependent individuals. In addition, the fairly widespread misinformation about methadone, which was found to be more prevalent among our out-of-treatment sample (e.g., methadone rots your bones and teeth) may be amenable to a public health information campaign targeted to opioid dependent individuals. Such a campaign could also provide outcomes and survival data regarding the risk and benefits of opioid agonist treatment as compared to other treatment options (or to no treatment at all) so that individuals could make an informed decision (much like for cancer treatments) about treatment.

Individuals in the present study who were enrolling in methadone treatment were also more likely to be under criminal justice supervision than individuals out of treatment. This is consistent with Baltimore's robust use of referrals by the Maryland Department of Parole and Probation to opioid agonist treatment (Gryczynski, in press). Nonetheless, although criminal justice referrals compose a significant percentage of referrals to the public treatment system in the US, few such referrals are made to opioid agonist treatment in the US (O'Brien and Cornish, 2006). Given the evidence that methadone treatment reduces heroin use (Mattick et al., 2009), criminal behavior (Ball and Ross, 1991), and arrest (Newman et al., 1973; Schwartz et al., 2009), other jurisdictions would be well served by expanding criminal justice referrals to agonist treatments.

The present study has several limitations. Although this was a multi-site study conducted in 6 MTPs and 12 neighborhoods, it was conducted in only one US city that has a long-standing heroin addiction problem (Nurco et al., 1979). Therefore, findings may not generalize to US metropolitan areas in which heroin addiction has not been entrenched over many decades. It should also be noted that contextual issues impacting access to public sector treatment vary by nation, state, and locality. For example, in contrast to the US, in the UK, Australia and France, where public health insurance is the rule, there is wide access to methadone and/or buprenorphine treatment (Gunderson and Fiellin, 2008). In the US, treatment access to public sector programs depends on the availability of Medicaid and block grant funding, referral through parole and probation, and referral to treatment through syringe exchange and other programs (Deck and Carlson, 2002; Peterson et al., 2010; Riley et al., 2002). In this regard, it is possible that Baltimore, despite its history of long-waiting lists (Schwartz et al., 2006), may offer greater access to public sector treatment than some other localities. Hence its out-of-treatment population may be harder to reach.

Clinic policies range from patient-centered care in which staff work with patients who continue to use drugs on a minimal services track (Calysn et al., 2003) to abstinence-based care, in which patients are more likely to be discharged for ongoing drug use (CSAT, 2005), and the extent to which the clinic policies in Baltimore differ from those in other cities is not known with precision. In addition, while MTP admissions in other parts of the US for dependence on prescription opioids have been on the rise (SAMHSA, 2005), the present study's sample was comprised of nearly all heroin-addicted individuals, reflecting the local MTP patient population. The extent to which the study's findings generalize to the prescription opioid population is not known. Furthermore, the participating treatment programs were US-regulated MTPs; hence the extent to which findings generalize to physician office-based practices with methadone (outside the US, where such practice is

common) or to buprenorphine treatment in the US or elsewhere, is not known. More research is needed to determine differences between out-of-treatment populations and those who are entering buprenorphine treatment, to further refine outreach efforts. Finally, we note that the number of for-profit MTPs has grown considerably over the past decade. Our six MTPs were all non-profit agencies and the extent to which these findings generalize to for-profit clinics is an important area for future research.

Nonetheless, this study indicates that the distinctions between those entering and those not pursuing MTP entry have significance for the structure of treatment and outreach programs. Given the relative lack of perceived social support among out-of-treatment individuals and the relatively greater threat they pose to themselves and their communities, a redoubled effort should be made to broaden the view of treatment to embrace the need for outreach to recruit individuals into treatment. There is, in fact, reason for optimism in light of the success associated with earlier outreach efforts. We believe our findings reaffirm the need to supplement the current practices of voluntary and coerced treatment entry with one of encouraged treatment entry through outreach.

References

- Ball, JC.; Ross, A. The effectiveness of methadone maintenance treatment: Patients, programs, services, and outcomes. Springer-Verlag; New York: 1991.
- Bell J, Trinh L, Butler B, Randall D, Rubin G. Comparing retention in treatment and mortality in people after initial entry to methadone and buprenorphine treatment. *Addiction*. 2009; 104(7):1193–1200. [PubMed: 19563562]
- Booth R, Koester S, Brewster JT, Weibel WW, Fritz RB. Intravenous drug users and AIDS: Risk behaviors. *Am J Drug Alcohol Abuse*. 1991; 17(3):337–353. [PubMed: 1928027]
- Booth RE, Corsi KF, Mikulich SK. Improving entry to methadone maintenance among out-of-treatment injection drug users. *J Subst Abuse Treat*. 2003; 24(4):305–311. [PubMed: 12867204]
- Brown BS, Jansen DR, Benn GJ. Changes in attitude toward methadone. *Arch Gen Psychiatry*. 1975; 32(2):214–218. [PubMed: 1115568]
- Brown BS, Needle R. Modifying the process of treatment to meet the threat of AIDS. *Int J Addict*. 1994; 29:1739–1752. [PubMed: 7852000]
- Brown BS, O'Grady KE, Battjes RJ, Katz EC. The Community Assessment Inventory - Client views of supports to drug abuse treatment. *J Subst Abuse Treat*. 2004; 27:241–251. [PubMed: 15501377]
- Brugal MT, Domingo-Salvany A, Puig R, Barrio G, Garcia de Olalla P, de la Fuente L. Evaluating the impact of methadone maintenance programmes on mortality due to overdose and aids in a cohort of heroin users in Spain. *Addiction*. 2005; 100(7):981–989. [PubMed: 15955014]
- Calsyn DA, DeMarco FJ, Saxon AJ, Sloan KL, Gibbon KE. Evaluation of a Minimal Services Treatment Track for Noncompliant Patients in Opioid Substitution Treatment. *AJPH*. 2003; 93(7):1086–1088.
- Camacho LM, Brown BS, Simpson DD. Psychological dysfunction and HIV/AIDS risk behavior. *J Acquir Immune Defic Syndr Hum Retrovirol*. 1996; 11(2):198–202. [PubMed: 8556403]
- Celentano DD, Munoz A, Cohn S, Vlahov D. Dynamics of behavioral risk factors for HIV/AIDS: A 6-year prospective study of injection drug users. *Drug Alcohol Depend*. 2001; 61(3):315–322. [PubMed: 11164696]
- Center for Substance Abuse Treatment (CSAT). Treatment Improvement Protocol (TIP) Series 40. DHHS Publication No. (SMA) 04–3939. Substance Abuse and Mental Health Services Administration; Rockville, MD: 2004. Clinical Guidelines for the Use of Buprenorphine in the Treatment of Opioid Addiction.
- Center for Substance Abuse Treatment (CSAT). Treatment Improvement Protocol (TIP) Series 43. DHHS Publication No. (SMA) 05–4048. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2005. Medication-Assisted Treatment for Opioid Addiction in Opioid Treatment Programs.

- Corsi KF, Kwiatkowski CF, Booth RE. Treatment entry and predictors among opiate-using injection drug users. *Am J Drug Alcohol Abuse*. 2007; 33(1):121–127. [PubMed: 17366252]
- Deck D, Carlson MJ. Retention in publicly funded methadone maintenance treatment in two western states. *J Behav Health Serv Res*. 2005; 32(1):43–60. [PubMed: 15632797]
- Griffith JD, Knight DK, Joe GW, Simpson DD. Implications of family and peer relations for treatment engagement and follow-up outcomes: An integrative model. *Psychol Addict Behav*. 1998; 21(2): 113–126.
- Gryczynski J, Kinlock TW, Kelly SM, O'Grady KE, Gordon MS, Schwartz RP. Methadone maintenance for probationers: Treatment trajectories and predictors of outcome. *Substance Abuse*. (in press).
- Gyarmathy VA, Latkin CA. Individual and social factors associated with participation in treatment programs for drug users. *Subst Use Misuse*. 2008; 43(12–13):1865–1881. [PubMed: 19016169]
- Heimer R. Can syringe exchange serve as a conduit to substance abuse treatment? *J Subst Abuse Treat*. 1998; 15(3):183–191. [PubMed: 9633030]
- Hendriks VM, Kaplan CD, van Limbeek J, Geerlings P. The Addiction Severity Index: Reliability and validity in a Dutch addict population. *J Subst Abuse Treat*. 1989; 6(2):133–141. [PubMed: 2746712]
- Hser YI, Maglione M, Polinsky ML, Anglin MD. Predicting drug treatment entry among treatment-seeking individuals. *J Subst Abuse Treat*. 1998; 15(3):213–220. [PubMed: 9633033]
- Joe GW, Knezek L, Watson D, Simpson DD. Depression and decision-making among intravenous drug users. *Psychol Rep*. 1991; 68(1):339–347. [PubMed: 2034773]
- Kelly SM, O'Grady KE, Schwartz RP, Peterson JA, Wilson ME, Brown BS. The relationship of social support to treatment entry and engagement: The Community Assessment Inventory. *Subst Abuse*. 2010; 31(1):43–52. [PubMed: 20391269]
- Kleber HD. Methadone maintenance 4 decades later: Thousands of lives saved but still controversial. *JAMA*. 2008; 300(19):2303–2305. [PubMed: 19017918]
- Knight, K.; Holcum, M.; Simpson, DD. TCU Psychosocial Functioning and Motivation Scales: Manual on Psychometric Properties. Institute of Behavioral Research, Texas Christian University; Fort Worth, Texas: 1994.
- Kosten TR, Rounsaville BJ, Kleber HD. Concurrent validity of the addiction severity index. *J Nerv Ment Dis*. 1983; 171(10):606–610. [PubMed: 6619823]
- Lloyd JJ, Ricketts EP, Strathdee SA. Social contextual factors associated with entry into opiate agonist treatment among injection drug users. *Am J Drug Alcohol Abuse*. 2005; 31(4):555–570. [PubMed: 16320434]
- Madras BK, Compton WM, Avula D, Stegbauer T, Stein JB, Clark HW. Screening, brief interventions, referral to treatment (SBIRT) for illicit drug and alcohol use at multiple healthcare sites: Comparison at intake and 6 months later. *Drug Alcohol Depend*. 2009; 99(1–3):280–295. [PubMed: 18929451]
- Mattick RP, Breen C, Kimber J, Davoli M. Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. *Cochrane Database Syst Rev*. 2009; (3):CD002209. [PubMed: 19588333]
- McLellan AT, Luborsky L, Cacciola J. New data from the Addiction Severity Index. Reliability and validity in three centers. *J Nerv Ment Dis*. 1985; 173(7):412–423. [PubMed: 4009158]
- McLellan AT, Luborsky L, Woody GE, O'Brien CP. An improved diagnostic evaluation instrument for substance abuse patients: The Addiction Severity Index. *J Nerv Ment Dis*. 1980; 168(1):26–33. [PubMed: 7351540]
- Metzger DS, Woody GE, McLellan AT. Human immunodeficiency virus seroconversion among intravenous drug users in- and out-of-treatment: An 18-month prospective follow-up. *J Acquir Immune Defic Syndr*. 1993; 6(9):1049–1056. [PubMed: 8340896]
- Neufeld K, King V, Peirce J, Kolodner K, Brooner R, Kidorf M. A comparison of 1-year substance abuse treatment outcomes in community syringe exchange participants versus other referrals. *Drug Alcohol Depend*. 2008; 97(1–2):122–9. [PubMed: 18486360]

- Newman, RG.; Bashkow, S.; Cates, M. Contemporary Drug Problems. Federal Legal Publications; New York: 1973. Arrest Histories Before and After Admission to a Methadone Maintenance Treatment Program.
- Nurco, DN.; Wegner, N.; Baum, H.; Makotsky, A. Publication number (ADM) 80–937. National Institute on Drug Abuse Services Research Report, US Department of Health, Education and Welfare, Alcohol, Drug Abuse and Mental Health Administration; 1979. A case study. Narcotic addiction over a quarter of a century in a major American city 1950–1977.
- Nurco DN. A long-term program of research on drug use and crime. *Subst Use Misuse*. 1998; 33(9): 1817–1837. [PubMed: 9718181]
- Nurco DN, Hanlon TE, Kinlock TW, Duszynski KR. Differential criminal patterns of narcotic addicts over an addiction career. *Criminology*. 1988; 26:407–423.
- O'Brien C, Cornish JW. Naltrexone for probationers and parolees. *J Subst Abuse Treat*. 2006; 31(2): 107–111. [PubMed: 16919734]
- Peirce JM, Petry NM, Stitzer ML, Blaine J, Kellogg S, Satterfield F, Schwartz M, Krasnansky J, Pencer E, Silva-Vazquez L, Kirby KC, Royer-Malvestuto C, Roll JM, Cohen A, Copersino ML, Kolodner K, Li R. Effects of lower-cost incentives on stimulant abstinence in methadone maintenance treatment: a National Drug Abuse Treatment Clinical Trials Network study. *Arch Gen Psychiatry*. 2006; 63(2):201–8. [PubMed: 16461864]
- Peterson JA, Reisinger HS, Schwartz RP, Mitchell SG, Kelly SM, Brown BS, Agar MH. Targeted sampling in drug abuse research: A review and case study. *Field Methods*. 2008; 20(2):155–170.
- Riley ED, Safaeian M, Strathdee SA, Brooner RK, Beilenson P, Vlahov D. Drug user treatment referrals and entry among participants of a needle exchange program. *Subst Use Misuse*. 2002; 37(14):1869–1886. [PubMed: 12511056]
- Schütz CG, Rapiti E, Vlahov D, Anthony JC. Suspected determinants of enrollment into detoxification and methadone maintenance treatment among injecting drug users. *Drug Alcohol Depend*. 1994; 36(2):129–138. [PubMed: 7851280]
- Schwartz RP, Jaffe JH, O'Grady KE. Interim methadone treatment: Impact on arrests. *Drug Alcohol Depend*. 2009; 103(3):148–154. [PubMed: 19443133]
- Schwartz RP, Kelly SM, O'Grady KE, Mitchell SG, Peterson JA, Reisinger HS, Agar MH, Brown BS. Attitudes toward buprenorphine and methadone among opioid-dependent individuals. *Am J Addict*. 2008; 17(5):396–401. [PubMed: 18770082]
- Shah NG, Celentano DD, Vlahov D, Stambolis V, Johnson L, Nelson KE, Strathdee SA. Correlates of enrollment in methadone maintenance treatment programs differ by HIV–serostatus. *AIDS*. 2000; 14(13):2035–2043. [PubMed: 10997409]
- Simpson, DD. TCU Forms Manual: Drug Abuse Treatment for AIDS-Risk Reduction (DATAR). Texas Christian University; Forth Worth, Texas: 1992.
- Simpson, DD.; Dansereau, DF.; Joe, GW. The DATAR project: Cognitive and behavioral enhancements to community-based treatments. In: Tims, FM.; Inciardi, JA.; Fletcher, BW.; Horton, JAM., editors. The effectiveness of innovative strategies in the treatment of drug abuse. Greenwood Press; Westport, CT: 1997. p. 182-203.
- Simpson DD, Joe GW. Motivation as a predictor of early dropout from drug abuse treatment. *Psychotherapy*. 1993; 30(2):357–367.
- Simpson DD, Joe GW, Greener JM, Rowan-Szal GA. Modeling year 1 outcomes with treatment process and post treatment social influences. *Substance Use and Misuse*. 2000; 35(12–14):1911–1930. [PubMed: 11138712]
- Simpson DD, Knight K, Ray S. Psychosocial correlates of AIDS-risk drug use and sexual behaviors. *AIDS Educ Prev*. 1993; 5(2):121–130. [PubMed: 8323854]
- Substance Abuse and Mental Health Services Administration. Results from the 2005 National Survey on Drug Use and Health: National Findings (Office of Applied Studies, NSDUH Series H-30, DHHS Publication No. SMA 06-4194). Rockville, MD: 2006.
- Wilson ME, Schwartz RP, O'Grady KE, Jaffe JH. Impact of interim methadone maintenance on HIV risk behaviors. *J Urban Health*. 2010; 87(4):586–591. [PubMed: 20386992]
- Woody GE, Munoz A. Efficacy, individual effectiveness, and population effectiveness in substance abuse treatment. *Curr Psychiatry Rep*. 2000; 2(6):505–507. [PubMed: 11123002]

- Zanis DA, Woody GE. One-year mortality rates following methadone treatment discharge. *Drug Alcohol Depend.* 1998; 52(3):257–260. [PubMed: 9839152]
- Zule WA, Desmond DP. Factors predicting entry of injecting drug users into substance abuse treatment. *Am J Drug Alcohol Abuse.* 2000; 26(2):247–261. [PubMed: 10852359]

Table 1Demographic differences between in- and out-of-treatment samples ($N = 515$)

Variable	Total Sample ($N = 515$)	In-Treatment Sample ($n = 351$)	Out-of-Treatment Sample ($n = 164$)	Test Statistic	p
Male, n (%)	280 (54.4%)	187 (53.3%)	93 (56.7%)	$\chi^2(1) = .53$	.47
Race, n (%)				$\chi^2(1) = .16$	.69
Black	385 (74.8%)	260 (74.1%)	125 (76.2%)		
White	125 (24.3%)	87 (24.8%)	38 (23.2%)		
Other	5 (1.0%)	4 (1.2%)	1 (0.6%)		
Married, n (%)	121 (23.5%)	39 (23.1%)	25 (33.8%)	$\chi^2(1) = .01$	.91
Mean age (SD)	41.5 (8.0)	41.2 (8.2)	41.9 (7.7)	$F(1, 513) = .86$	.35
Mean no. years of education (SD)	11.2 (1.7)	11.2 (1.6)	11.0 (1.7)	$F(1, 513) = 1.23$	.27

Note: Test statistic for Race was obtained by collapsing data into two categories: White ($n = 125$) v. Black/Other ($n = 390$).

Table 2
Baseline differences for predictor variables between in- and out-of-treatment samples ($N=515$)

Variable	Total Sample ($N = 515$)	In- Treatment Sample ($n = 351$)	Out-of- Treatment Sample ($n = 164$)	Test Statistic	p
	<i>Mean (SD)</i>			<i>F</i>	
ASI Medical composite	.13 (.28)	.15 (.29)	.08 (.22)	7.55	.006
ASI Employment composite	.85 (.23)	.82 (.25)	.91 (.18)	18.97	<.001
ASI Alcohol composite	.11 (.16)	.09 (.14)	.15 (.20)	16.77	<.001
ASI Drug composite	.32 (.10)	.32 (.10)	.34 (.10)	7.09	.008
ASI Legal composite	.22 (.21)	.19 (.22)	.28 (.19)	23.63	<.001
ASI Family/Social composite	.06 (.13)	.07 (.14)	.04 (.11)	3.76	.053
ASI Psychiatric composite	.07 (.16)	.08 (.17)	.04 (.13)	6.45	.011
Longest FT job (months)	62.3 (59.0)	62.4 (57.8)	62.3 (61.7)	.00	.989
Age at first crime	17.0 (7.6)	17.1 (7.6)	16.8 (7.7)	.29	.590
Age first used heroin	21.7 (6.5)	22.0 (6.4)	21.0 (6.7)	2.36	.125
Lifetime no. months of incarceration	33.6 (55.3)	28.4 (50.7)	44.9 (62.9)	10.09	.002
No. of prior methadone treatments	.89 (1.2)	1.2 (1.4)	.32 (.67)	56.12	<.001
Attitudes toward methadone	90.7 (13.0)	94.6 (12.1)	82.5 (10.6)	121.58	<.001
Problem recognition	36.0 (6.0)	36.1 (5.8)	35.7 (6.4)	.65	.420
Desire for help	30.0 (3.8)	30.7 (3.4)	28.6 (4.3)	36.13	<.001
Sex risk scale	.82 (1.18)	.76 (1.09)	.94 (1.36)	2.54	.111
Injection risk scale	.72 (.85)	.71 (.81)	.74 (.92)	.15	.697
Household support	17.4 (3.6)	18.1 (3.5)	15.8 (3.3)	48.44	<.001
Family support	22.3 (4.2)	22.8 (4.3)	21.3 (3.7)	13.57	<.001
Friends support	20.5 (2.6)	20.8 (2.6)	19.9 (2.6)	14.72	<.001
Community support	30.5 (6.3)	32.0 (6.3)	27.3 (4.8)	69.60	<.001
No. of days used cocaine past 30 days	12.8 (12.6)	9.4 (11.3)	19.9 (12.4)	91.58	<.001
No. of days worked past 30 days	4.2 (8.6)	4.5 (8.6)	3.6 (8.7)	1.11	.293
No. of days did crime past 30 days	12.6 (13.2)	9.2 (12.0)	19.9 (12.8)	86.21	<.001
	<i>f (%)</i>			χ^2	
On parole or probation	123 (23.9%)	93 (26.5%)	30 (18.3%)	4.14	.042

Variable	Total Sample (N = 515)	In- Treatment Sample (n = 351)	Out-of- Treatment Sample (n = 164)	Test Statistic	p
	Mean (SD)			F	
Ever inject	316 (61.4%)	222 (63.2%)	94 (57.3%)	7.68	.006
Ever experienced depression	145 (28.2%)	112 (31.9%)	33 (20.1%)	1.66	.198
Cocaine positive	362 (72.0%)	220 (64.5%)	142 (87.7%)	29.15	<.001
Opiate positive	438 (86.7%)	297 (86.6%)	141 (87.0%)	.02	.890

Note: The *df* for all *F* tests are (1, 513) except as follows: (1, 503) for Age at first crime due to 10 participants who reported never having committed crime; (1, 512) for Age at first heroin use due to 1 participant who reported never having tried heroin; and (1, 512) for Desire for Help and Problem Recognition due to missing data for 1 participant on each of these scales. The *df* for all χ^2 tests is 1. *N* = 503 for baseline cocaine drug test and *N* = 505 for baseline heroin drug test due to missing urine results.

Table 3Results of initial logistic regression analysis predicting treatment entry ($N = 492$)

Variable	Odds Ratio	95% CI (Lower, Upper)	Wald χ^2	<i>p</i>
ASI Medical composite	1.01	(.28, 3.56)	.00	.992
ASI Employment composite	.02	(.00, .32)	7.79	.005
ASI Alcohol composite	.52	(.09, 3.10)	.53	.469
ASI Drug composite	2.56	(.05, 139.75)	.21	.645
ASI Legal composite	5.95	(.59, 59.78)	2.30	.130
ASI Family/Social composite	3.79	(.18, 78.31)	.74	.388
ASI Psychiatric composite	6.21	(.29, 131.11)	1.38	.240
Longest FT job (months)	1.00	(.99, 1.00)	.48	.487
Age at first crime	.99	(.95, 1.03)	.20	.658
Age first used heroin	1.03	(.98, 1.09)	1.23	.267
Lifetime months of incarceration	1.00	(.99, 1.01)	.04	.851
No. of prior methadone treatments	2.34	(1.60, 3.43)	19.10	<.001
Attitudes toward methadone	1.07	(1.04, 1.10)	20.37	<.001
Problem recognition	.96	(.90, 1.04)	.98	.321
Desire for help	1.19	(1.06, 1.32)	9.60	.002
Sex risk scale	.97	(.75, 1.25)	.06	.806
Injection risk scale	1.05	(.61, 1.81)	.03	.862
Household support	1.16	(1.05, 1.28)	8.27	.004
Family support	1.04	(.95, 1.13)	.76	.383
Friends support	1.06	(.92, 1.22)	.64	.423
Community support	1.08	(1.02, 1.15)	7.31	.007
No. of days used cocaine past 30 days	.94	(.91, .98)	11.10	.001
No. of days worked past 30 days	.94	(.89, 1.00)	4.12	.042
No. of days did crime past 30 days	.93	(.89, .97)	14.35	<.001
On parole or probation	2.42	(1.12, 5.20)	5.09	.024
Ever inject	2.03	(.84, 4.90)	2.47	.116
Ever experienced depression	1.24	(.47, 3.30)	.19	.667
Cocaine positive	.81	(.36, 1.82)	.27	.607
Opiate positive	.79	(.30, 2.09)	.23	.634
Gender	1.00	(.45, 2.23)	.00	.997
Race	4.90	(1.78, 13.52)	9.41	.002
Age	.96	(.91, 1.01)	2.83	.093

Note: The *df* for all χ^2 tests is 1. $N = 492$ due to 23 participants who had missing data (11 were missing baseline urine results; 10 reported never having committed crime; 1 reported never having used heroin; and 1 was missing results for baseline urine tests and both motivation scales).

Table 4Results of final logistic regression analysis predicting treatment entry ($N=492$)

Variable	Odds Ratio	95% CI (Lower, Upper)	Wald χ^2	P
Race	2.20	(1.01, 4.79)	3.97	.046
ASI Employment composite	.02	(.00, .22)	9.81	.002
No. of prior methadone treatments	2.35	(1.67, 3.31)	23.87	<.001
Attitudes toward methadone	1.07	(1.04, 1.11)	24.49	<.001
Desire for help	1.17	(1.08, 1.26)	16.00	<.001
Household support	1.17	(1.07, 1.28)	11.78	.001
Community support	1.08	(1.03, 1.14)	8.37	.004
No. of days used cocaine past 30 days	.95	(.93, .98)	15.63	<.001
No. of days worked past 30 days	.93	(.87, .98)	7.44	.006
No. of days did crime past 30 days	.95	(.93, .97)	21.28	<.001
On parole or probation	2.17	(1.07, 4.43)	4.56	.033

Note: The *df* for all tests is 1.