

PREDICTORS OF POSITIVE OUTCOMES FOR OUT-OF-TREATMENT OPIATE INJECTORS RECRUITED INTO METHADONE MAINTENANCE THROUGH STREET OUTREACH

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This study was conducted to assess behavior change in the areas of drug use, productivity, criminal activity, and HIV risk among street-recruited injection drug users who entered methadone maintenance treatment. In addition, the study examined a number of variables that could account for these changes, including demographics, intervention effects, and treatment-related measures. A total of 168 participants were interviewed at baseline, received outreach interventions, entered methadone maintenance treatment, and were reinterviewed 5-9 months later. Significant ($p < .001$) improvements were seen in the areas of drug use, productivity, criminality, and HIV risk behaviors. The only variables significantly associated with behavior change were related to drug treatment. In particular, being in treatment at the time of the follow-up assessment had the strongest relationship to positive outcomes, including length of treatment. Having no prior treatment experience was associated with fewer injections at follow-up. These findings emphasize the importance of retaining clients, given the likelihood that positive change is likely to be evidenced while they remain in treatment.

INTRODUCTION

Drug use in general, and opiate addiction in particular, are significant problems in the United States. In 2000, the Substance Abuse Mental Health Services Administration (SAMHSA) reported that 14 million Americans were current illicit drug users, representing approximately 6.3% of the population 12 years of age and

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older. This figure includes 130,000 heroin users (SAMHSA, 2001). Since methadone maintenance treatment was first tested on opiate-addicted IDUs by Dole and Nyswander (1965) in the 1960s, its role as an effective therapeutic modality for opiate addiction treatment has been repeatedly studied (Dole, Nyswander, & Warner, 1968; Ball & Ross, 1991; Ward, Hall, & Mattlick, 1999; Glass, 1993). Aspects of methadone maintenance that have been examined include dose, length of time in treatment and the number of treatment episodes. Studies have shown that a higher methadone dose predicts better outcomes and retention in treatment (Rhoades, Creson, Elk, Schmitz, & Grabowski, 1998; D'Ippoliti, Davoli, Perucci, & Pasqualini, 1998; Strain, Stitzer, Liebson, & Bigelow, 1993). Length of time in treatment has been studied to determine what treatment duration predicts optimal outcomes for drug users. Simpson (1981) and others have shown that greater time in treatment (90 days or more) predicts better outcomes (Ball, Lange, Myers, & Friedman, 1988; McLellan, Luborsky, & O'Brien, 1986; Gottheil, Sterling, & Weinstein, 1993; Sees et al., 2000). It has also been found that prior treatment experience can have a negative effect on treatment outcome and retention (McLellan et al., 1986), indicating that first-time treatment clients have a higher success rate than repeat clients. Further research is needed to clarify what factors may account for behavior change among drug users in treatment.

Although not all IDUs who enter methadone treatment programs quit drug use altogether, they are likely to reduce their drug use (Sorenson & Copeland, 2000; Metzger, Navaline, & Woody, 1998; Booth, Crowley, & Zhang, 1996; Simpson, 1981; McLellan et al., 1986), as well as improve other areas of their lives, including health, employment, personal relationships, and criminal behavior (Kidorf, Hollander, King, & Brooner, 1998; Farrell et al., 1994; Murray, 1998; Ball, Corty, Bond, Myers, & Tommasello, 1981; Rounsaville, Kosten, & Kleber, 1987; Strain, Stitzer, & Bigelow, 1991; Weiss, Griffin, & Mirin, 1989). By reducing drug use, drug users also reduce their risk of contracting blood-borne diseases, including HIV and hepatitis (Sorenson & Copeland, 2000; Metzger et al., 1998; Longshore, Hsieh, Danila, & Anglin, 1993; Ball et al., 1988; Comacho, Bartholomew, & Simpson, 1997). Getting opiate-addicted clients engaged in methadone programs and retaining them is an important means of decreasing the spread of HIV and other diseases, as well as reducing costs to society. Research has shown that incentives, such as decreasing delays at intake and reduced or no-cost treatment fees, can dramatically increase retention (Woody, O'Hare, Mintz, & O'Brien, 1975; Dennis, Ingram, Burks, & Rachal, 1994; Maddux, Prihoda, & Desmond, 1994; Kwiatkowski, Booth, & Lloyd, 2000).

HIV infection persists as a significant public health threat, in particular within populations that engage in high-risk behaviors, including needle sharing and

unprotected sex. Moreover, injection drug use ranks as the second highest risk factor for contracting HIV, after homosexual contact among males (Centers for Disease Control and Prevention, 2000). Despite the success of prevention projects that raise awareness through outreach and intervention to drug users (Booth & Weibel, 1992; Watters, 1996), some marginalized groups continue to engage in risky injection and sex practices. In the United States, through June 2000, injection drug users (IDUs) accounted for 25% of all adult/adolescent AIDS cases. An additional 6% of AIDS cases were found among men who had sex with men and also injected drugs, and more than half of pediatric AIDS cases (57%) occurred among mothers using drugs or having an IDU sex partner (Centers for Disease Control and Prevention, 2000). Sharing drug injection paraphernalia, such as needles, cotton, cooker, and rinse water, has been found to be a significant factor in the transmission of HIV (Chitwood et al., 1995). IDUs who share paraphernalia are not only at risk of contracting HIV, but also hepatitis, a debilitating liver disease that is reaching epidemic proportions in this population due to its virulence and ease of spread (Hagan et al., 2001). Since the HIV epidemic began, researchers and public health authorities have called for prevention strategies targeting the IDU population that include increasing safe injection practices and stopping or reducing injection drug use (Schuster, 1988). Research has shown that methadone maintenance treatment for opiate-addicted IDUs is effective in decreasing risks for contracting HIV and in improving both quality of life and health (Sorenson & Copeland, 2000; Metzger et al., 1993). Further, both researchers and treatment providers have recommended methadone maintenance as a modality that reduces needle sharing and other risk behaviors, in addition to promoting drug use cessation (Brickner et al., 1989; Sorenson & Copeland, 2000).

In the current study, we hypothesized that out-of-treatment IDUs who were induced to enter methadone maintenance treatment through a variety of incentives would show improved behaviors in the areas of drug use, productivity, criminal activity, and HIV risk behaviors. Several factors that might account for these improvements were assessed in multiple analyses, including background characteristics of users and treatment-related variables. By testing some of these factors, treatment centers may be able to better tailor their programs to foster greater success for clients who are less likely to benefit from treatment.

METHODS

RECRUITMENT

Subjects included in the present study were part of a larger investigation designed to test the effectiveness of outreach interventions, as well as free treatment, in increasing treatment entry and retention among out-of-treatment IDUs. Participants

were recruited through street outreach in Denver, Colorado from 1996-2000 using targeted sampling methods (Watters & Biernacki, 1989). Indicators of drug use (e.g., drug-related arrests, treatment admissions, HIV/AIDS cases among IDUs) were used to estimate the number of drug users residing within census tracts in the city and surrounding areas. Recruitment quotas were developed for each census tract representing the estimated distribution of drug users within each area. Outreach workers familiar with the drug-using community recruited subjects, conducted an initial street eligibility assessment, and scheduled and transported clients to interviews. Outreach workers also conducted behavioral interventions, as described below.

Eligibility criteria included: 1) injection drug use in the 30 days prior to the baseline interview; 2) at least 18 years of age; and 3) not enrolled in substance abuse treatment in the 30 days prior to the baseline interview. Eligibility was verified through urinalysis and visual inspection for signs of recent venipuncture. Those testing negative for opiates, cocaine and methamphetamines were not eligible to participate in the study. Subjects were also ineligible if they were in treatment at the time of eligibility screening, as verified by a methadone urinalysis test. Participants had to be competent to provide informed consent. Eligible subjects were compensated \$20 and \$25 for their baseline and follow-up interviews, respectively, for their time as research participants. The current research focuses on those participants who chose to enter treatment between baseline and the 6-month follow-up. Study procedures were approved by the Institutional Review Board of the University of Colorado Health Sciences Center and affiliated institutions.

PROCEDURES

Interviews were conducted by trained interviewers using a modified version of the Risk Behavior Assessment (RBA). The RBA is a structured interview developed by a grantee consortium of the National Institute on Drug Abuse (1991). It assesses demographics, drug use, sexual behaviors, medical histories, and HIV risk behaviors. Reliability and validity studies of the RBA support its adequacy as a research tool with this population (Weatherby et al., 1994; Needle et al., 1995).

All participants were offered free HIV testing and counseling and were randomly assigned to receive either a Risk Reduction (RR) or a Motivational Interviewing (MI) intervention. The RR intervention focused on reducing the participant's risk for HIV and included assessing individual risk behaviors, offering viable alternatives to high-risk behaviors, and reinforcing risk reduction efforts (Weibel, 1993). The MI intervention focused on more sweeping lifestyle changes, particularly by encouraging individuals to enter drug treatment (Miller & Rollnick, 1991).

PREDICTORS OF POSITIVE OUTCOMES FOR OPIATE INJECTORS

Techniques such as providing feedback on drug use, discussing the perceived pros and cons of drug use, and encouraging drug use cessation and/or treatment entry were used to promote behavior change. Prevention materials, including bleach kits and condoms, were also made available to participants. In addition, half of the sample was randomly assigned to receive a coupon for 90 days of free substance abuse treatment. In order to receive free treatment, subjects had to enter treatment at the clinic associated with the University of Colorado Health Sciences Center (Addiction Research and Treatment Services) within 2 months of their baseline interview. The clinic provides outpatient drug-free treatment, methadone maintenance, and methadone detox. Subjects who wished to enter treatment, regardless of their intervention assignment or whether or not they received a coupon, were assisted by outreach staff: they scheduled the intake appointment, provided rapid intake (i.e., within 24-72 hours), transported the client to the clinic, and waived the intake fee (\$40). Transportation to subsequent appointments for all study participants in treatment was provided via bus tokens. For the present study, only participants who entered methadone maintenance treatment were included in the analyses.

ANALYSIS

Seven outcome variables were assessed at baseline and again 5-9 months later at the follow-up interview. They included two drug use variables (morphine urinalysis results and self-reported frequency of heroin injections in the prior month), two indicators of productivity (employment and legal income earned), one measure of criminal behavior (illegal income) and two indicators of HIV risk behaviors (using needles that had been previously used without bleaching [dirty needles], and sharing other drug paraphernalia [cookers, cotton filters or rinse water]).

Variables tested for their association with each of the outcomes included demographics (gender, ethnicity, age), treatment variables (whether they had ever been in drug treatment before, days in treatment in the 6 months prior to the follow up interview, in treatment in the 30 days before the follow-up interview, number of treatment counselor contacts, maximum methadone dose), and three intervention variables (type of intervention, number of intervention contacts, free treatment). In addition, in multiple variable models, baseline levels of the respective outcome variables were controlled for in each model. All data were self-reported except urinalysis results and the treatment variables, which were verified through the treatment agency. Univariate tests were run using chi-square, correlations, and one-way ANOVA. Significant variables ($p < .10$) were included in statistical models using multiple logistic regression and ANCOVA.

RESULTS

A total of 586 subjects were enrolled in the larger study. Of these, 218 (37%) entered methadone maintenance drug treatment, constituting the basis for the present study. We were able to obtain follow-up interviews approximately 5-9 months after the baseline interview on 180 (83%) of this sample. Baseline and treatment differences were minimal between those who were followed and those not followed, as described below. Twelve subjects from this pool were dropped from further analyses because they had been in jail for more than 15 days in the month prior to their follow-up interview (the time period queried for most outcome variables). The decision to eliminate these subjects was based on comparison analyses that indicated that participants who were in jail for more than 15 of the prior 30 days at follow-up were substantially different on the outcome variables than the rest of the sample (e.g., none were employed). Attrition analyses were run to compare the remaining 168 subjects with the 38 subjects who received a baseline interview and entered treatment, but who did not return for their follow-up interview. Those who were not reinterviewed differed from those who were on only one variable: their maximum methadone dose was lower, on average, than those who were successfully followed (58 mg vs. 71 mg; $F(1,181)=5.7, p<.05$). None of the other variables (including demographics, background variables, treatment and intervention related variables) demonstrated statistically significant differences.

Descriptive variables for the 168 study participants who were interviewed at follow-up are shown in Table 1. The sample was primarily male, White, or Hispanic, and averaged 39 years old. They injected drugs nearly 3 times a day on average and had been injecting for over 18 years. A little over two thirds had been in drug treatment previously, including methadone maintenance, outpatient, and residential treatment.

Following the baseline interview, subjects were randomly assigned to an intervention condition; 49.4% were assigned to the more intensive, treatment-focused MI group. A total of 61.9% had received coupons for free treatment (random assignment in the larger study was 50%, however, a larger percentage of those who received free treatment coupons are represented in this subset of those who entered treatment). Project interventionists conducted an average of 3.5 intervention sessions with each participant between their baseline and follow-up interviews ($sd=2.0$). While in treatment, participants also received an average of 1.2 counseling sessions per month from the treatment clinic ($sd=0.6$). The average treatment stay was 100.4 days ($sd=58.1$), and 38.7% were still in drug treatment during the month prior to their follow-up interview. The average maximum methadone dose while in treatment was 71.0 mg ($sd=28.7$).

TABLE 1
BASELINE DESCRIPTIVE VARIABLES FOR 168 PARTICIPANTS

Baseline descriptive variables	% or mean (sd)
Male gender (%)	63.7
Ethnicity (%)	
White	43.7
Hispanic	34.7
African American	10.8
Native American	4.8
Other	6.0
Mean age	38.5 (9.5)
Mean times injected drugs in prior month	85.6 (54.6)
Mean number of years injecting	
Ever been in drug treatment before (%)	18.1 (11.4)
	67.3

Pre/post change figures on the seven outcome variables are shown on Table 2. At baseline, all but one participant had a positive morphine urinalysis result, and the average number of heroin injections in the prior month for the sample was 70. About one third reported being employed, and, overall, subjects reported making nearly \$800 a month in legal income. Nearly 60% also reported making illegal income in the prior month. Approximately one third of participants reported using a dirty needle, and over two thirds shared other drug paraphernalia. Changes from baseline to follow-up on these outcome variables were substantial and significant for all variables except legal income. That is, the percentage of positive morphine tests declined, monthly heroin injections decreased, the percentage of participants who were employed increased, the percentage who acquired illegal income decreased, and the percentage engaging in HIV risk behaviors decreased.

In order to determine what accounted for the positive changes seen at follow-up, models were developed for each of the six outcome variables demonstrating significant change from baseline to follow-up. The first step in building the models was to test the independent variables (demographics, treatment and intervention variables) in univariate analyses (chi-square, one-way ANOVA, and correlations). Independent variables that were significant in univariate tests at $p < .10$ were entered into logistic regression models and ANCOVA in order to determine the most significant variables contributing to each of the outcomes. For the dichotomous

TABLE 2
CHANGES IN OUTCOME VARIABLES BETWEEN BASELINE AND FOLLOW-UP INTERVIEWS

Variables (current or past month behavior)	Baseline	Follow-up	P-value
Drug use			
Morphine UA (%)	99.4	66.0	.000
Times injected heroin	70.1 (41.2)	26.2 (35.9)	.000
Productivity			
Employed (%)	32.7	45.2	.006
Legal income ¹	\$791.2 (790.5)	\$912.3(840.8)	.177
Criminal Behavior			
Illegal income (%)	58.7	26.9	.000
HIV risk behaviors			
Used dirty needle (%)	32.9	10.6	.000
Shared paraphernalia (%)	70.8	37.5	.000

¹Log transformation was used in the analyses because of high standard deviations.

outcome variables, baseline levels of the outcome variables were controlled for in logistic regression models (note that these are reported in the text but omitted from the table for clarity). Percentages, odds ratios (OR) and 95% confidence intervals (CI) are reported for significant independent variables in the logistic regression models. For the one continuous outcome variable, ANCOVA was run on the difference between the number of heroin injections at baseline and the number at follow-up. Results, shown in Table 3, are presented in terms of positive outcomes: reduced drug use, increased productivity, decreased criminal behavior, and decreased HIV risk behaviors.

DRUG USE

With regards to having a negative morphine urinalysis result at the follow-up interview, variables that were significant in the univariate tests included being in treatment in the month prior to the follow-up interview and receiving the RR intervention. When these variables were entered simultaneously into a logistic regression model, only the treatment variable was significant. Those who had a negative UA result, 59.6% were in treatment in the prior month, compared to 30.5% of those who had a positive result (OR=3.2).

The decrease, between baseline and follow-up, in the number of times that participants injected heroin was associated with not having ever previously been in treatment, longer retention (in days) in treatment, having more contact with the treatment counselor, having a higher maximum methadone dose and being in treatment during the month prior to the follow-up interview. The two variables that were significant in the final model were not having ever been in treatment before

TABLE 3
MULTIVARIATE MODELS OF ASSOCIATIONS WITH POSITIVE OUTCOMES

Outcome Variables <i>Significant associations</i>	Odds Ratio or F value	95% Confidence Interval	P-value
Negative Morphine UA <i>In treatment in month prior to follow-up</i>	OR = 3.22	1.60-6.48	.001
Decreased # times injected heroin <i>No previous treatment experience</i>			
<i>More days in treatment</i>	F = 4.91		.028
	F = 10.53		.001
Employed at follow-up <i>Fewer counseling contacts</i>	OR = 2.28	1.17-4.44	.022
<i>In treatment in month prior to follow-up</i>			
No illegal income at follow-up <i>In treatment in month prior to follow-up</i>	OR = 2.02	0.98-4.16	.058
	OR = 2.74	1.16-6.49	.022
Not sharing paraphernalia at follow-up* <i>More days in treatment</i>			
<i>In treatment in month prior to follow-up</i>	OR = 1.01	1.00-1.02	.005
	OR = 3.72	1.77-7.80	.001

* Results are for two separate models due to the high correlation between the two treatment variables tested.

and greater treatment retention. That is, those who had not ever been in treatment prior to enrolling in this study showed greater reductions in heroin injections (60.4 times fewer at follow-up) than those who had been in treatment before (33.3 times fewer at follow-up), $F(1,144)=4.9$, $p<.05$, and the more days spent in treatment, the greater the decrease in heroin injections, $F(1,144)=10.5$, $p<.001$.

PRODUCTIVITY

Five variables, including baseline employment, were significantly associated with being employed at the follow-up interview. Men were more likely to be employed at follow-up, as were participants who received the RR intervention and those who were in treatment in the month prior to the follow-up interview. Those who were employed at follow-up also received fewer counseling contacts while in treatment. When these variables were entered into a logistic regression, baseline employment and counseling contacts were significant, and being in treatment in the month prior to follow-up was marginally significant ($p=.058$). Findings showed that 33.6% of those who were not employed at baseline were employed at follow-

up, compared to 69.1% of those who were employed at baseline and were also employed at follow-up (OR=4.2). Those who were employed at follow-up received an average of 1.1 counseling contacts while they were in treatment, while those who were not employed received an average of 1.3 contacts (OR=2.3). Fifty-two percent of those who were in treatment in the month prior to follow-up were employed, compared to only 41% of those who were not in treatment (OR=2.0).

CRIMINAL BEHAVIOR

Reporting no illegal income in the month prior to the follow-up interview was significantly related to three variables in univariate tests: no illegal income at baseline, being in treatment during the month prior to follow-up and not having previously been in treatment. When these variables were entered simultaneously into the logistic regression model, only the former two remained significant predictors. As would be expected, those reporting no illegal income at baseline were more likely to report no illegal income at follow-up (95.7%) than those who reported illegal income at baseline but not at follow-up (57.1%; OR=15.7). In addition, participants who were in treatment in the month prior to their follow-up interview were more likely not to report illegal income (84.6%) than those who were not in treatment (66.0%; OR=2.7).

HIV RISK BEHAVIORS

In univariate tests, the only variable significantly associated with not using dirty needles at follow-up was not using dirty needles at baseline. Those who did not use dirty needles at baseline were less likely to use them at follow-up (98.1%) compared to those who did use dirty needles at baseline (71.7%; OR= 20.9).

With regards to reduced sharing of drug paraphernalia, not sharing at follow-up was associated with not sharing at baseline, more days in treatment, being in treatment in the month prior to follow-up and having fewer intervention contacts. Two separate logistic regression models were developed to assess and compare the separate contributions of the highly correlated variables of being in treatment and having more days in treatment. Sharing paraphernalia at baseline was significant in both models (those who did not share at baseline were less likely to share at follow-up [79.6%] than those who did share at baseline [55.5%; OR=1.1] in both models). The number of intervention contacts was not significant in either model. Because both models were equally strong, logistic regression results are presented for each. Those who did not share paraphernalia at follow-up spent more days in treatment (110.3 days) than those who did share (83.9; OR=1.0) and those who were in treatment during the month prior to follow-up were more likely not to share

paraphernalia (80.0%) compared to those who were not in treatment at follow-up (51.5%; OR=3.7).

DISCUSSION

This study was conducted with 168 opiate-addicted IDUs located for a follow-up interview 5-9 months after receiving an initial assessment interview, HIV testing and counseling and HIV prevention interventions. All research subjects also entered methadone maintenance treatment during the time between baseline and follow up. The results of this investigation showed significant improvements in this population of drug injectors between baseline and follow-up on several important social and behavioral measures. This included reduced drug use, increased productivity (as measured by employment), decreased criminal behavior (as measured by illegal income), and decreased HIV risk behaviors (as measured by dirty needle use and sharing of drug paraphernalia). Two treatment-related variables (time in treatment and being in treatment at the time of the follow-up assessment) were strongly associated with positive outcomes.

One of the most consistent predictors of positive outcomes was being in treatment in the month prior to follow up, which nearly tripled the likelihood that subjects would have a negative morphine urinalysis, be employed, not make illegal income and not share drug paraphernalia. While many studies have reported that greater treatment retention predicts more positive outcomes, few studies have directly compared retention in treatment to being in treatment at the time of the outcome assessment. This study found that being in treatment during the 30 days prior to follow-up was more strongly associated with positive behavior change than the amount of time spent in treatment. This is an area of research that deserves more attention, particularly since our research also found that time spent in treatment was predictive of two positive outcomes: reporting fewer injections, and not sharing drug paraphernalia. These outcomes are particularly important for HIV prevention, suggesting that spending some time in treatment, although the duration is uncertain, is effective in reducing HIV risk behaviors, as well as being in treatment at follow-up.

Another variable that was associated with reduced injections was having no prior treatment experience. In the present study, participants who had never been in treatment reported significantly fewer injections at follow-up than those who had previously been in drug treatment. Claus and colleagues (1999) found that previous treatment clients were more likely to have more severe substance abuse problems, co-morbid psychiatric problems, and greater problems in other life areas than those with no prior treatment experience. This indicates that treatment programs may need to use different approaches for clients who have been in treatment

previously, since they may be less likely to change their problem behavior. It also suggests that strategies to entice treatment-naïve IDUs into drug treatment may be worthwhile, as such individuals typically have more positive outcomes. One such strategy for recruiting injectors into drug treatment is the provision of free treatment. In previous studies we reported that offering free treatment leads to better treatment entry rates and longer retention in treatment (Booth et al., 1998a; Kwiatkowski et al., 2000), and that for first-time treatment clients, free treatment is a particularly strong motivator (Kwiatkowski et al., 2000). Although in the present study offering free treatment did not have a direct effect on behavior change, the effectiveness of free treatment for recruiting treatment-naïve clients, combined with the finding that such clients are likely to have more positive outcomes, suggests that this could be an important strategy for intervening in the lives of drug users.

Prior research has demonstrated that methadone treatment is effective in improving many life outcomes for drug users (Sorenson & Copeland, 2000). However, most studies have been conducted with drug users already in treatment and otherwise motivated or required to be there, such as self-referred or court-ordered clients. This study, on the other hand, recruited IDUs who were not seeking treatment at the time that they entered the study. Data reported elsewhere from this same population of out-of-treatment drug users demonstrated that they had more severe substance use issues than drug users recruited in more traditional ways, (i.e. through treatment centers). Their increased chronic drug use was demonstrated in that they injected more drugs, injected more frequently and were more likely to have used dirty needles in the thirty days prior to admission than traditional treatment clients. Furthermore, they had more social and productivity problems, in that they were more likely to be homeless, unemployed and recipients of public assistance than those who entered treatment through other referral sources (Kwiatkowski & Booth, 2001). The present study demonstrates that street-recruited out-of-treatment drug users, induced to enter treatment through a variety of incentives, can significantly change their behaviors.

The following limitations should be considered when drawing conclusions from this study. The recruitment of this population of opiate injectors used a targeted sampling plan, an approach that is less rigorous than a random sample. However, it is more feasible than random sampling, more experimentally rigorous than a convenience sample, and has been shown to be an appropriate method for recruiting hidden or hard-to-reach populations (Watters & Biernacki, 1989). Another limitation is that all risk-related behaviors and background information collected were based on self-report, which is subject to social desirability and inaccurate memory. Since respondents were asked to comment on a relatively short period of time (in the last 30 days) recall problems may have been minimized. Furthermore, drug use was

confirmed by urinalysis and all treatment information was obtained and verified from the treatment provider. Additionally, prior research has shown that self-report generates sufficiently valid data for this type of research (Magura et al., 1987; Booth et al., 1996).

Loss to follow-up and sample attrition is an issue with this typically transient population. We were unable to follow 17% of the respondents for whom we had baseline data. There were no baseline differences between those who were followed and those who were not, and the only treatment difference that was significant was in dosing, as described in the results section. Nonetheless, this limits the generalizability of the findings to a population of opiate IDUs that can be successfully located, in that those who were available for follow-up interviews may represent a different cross-section of the population than those who were not available. Follow-up eligibility was not an issue since all subjects who were able to be located were eligible for a follow-up interview.

The relatively brief period from baseline to follow-up (6 months) should also be considered in the interpretation of this research. Although this “at risk” period is common in these types of investigations (Booth et al., 1998b), lengthier follow-up periods may produce differing results. Another limitation is in the study design, with only a single group lacking a comparison. However, the project was designed to facilitate treatment entry and retention among out-of-treatment IDUs. Additional efforts are currently underway comparing differences in those who entered vs. not entered treatment for their substance abuse problem.

This study supports previous research on the effectiveness of methadone maintenance treatment in contributing to decreased drug use and HIV risk behaviors and improved life and social behaviors. In particular, the study isolated several treatment-related factors that contributed to these positive changes. Being in treatment at follow-up suggests that continued contact with the treatment agency affects positive behavior change and decreases risk factors for blood-borne diseases, underscoring the need to continue to facilitate treatment entry to affect myriad improved outcomes. Treatment centers can find support from these findings to design programs that induce treatment-naïve IDUs to enter treatment and to remain as long as possible. Keeping clients in treatment is critical, given the positive outcomes, including decreased HIV risk behaviors.

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PREDICTORS OF POSITIVE OUTCOMES FOR OPIATE INJECTORS

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