Published in final edited form as:

Crim Justice Behav. 2008 ; 35(1): 34–47.

A Study of Methadone Maintenance For Male Prisoners:

3-Month Postrelease Outcomes

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Abstract

This study examined benefits of methadone maintenance among prerelease prison inmates. Incarcerated males with preincarceration heroin dependence ($n = 197$) were randomly assigned to (a) group educational counseling (counseling only); (b) counseling, with opportunity to begin methadone maintenance on release (counseling + transfer); or (c) counseling and methadone maintenance in prison, with opportunity to continue methadone maintenance on release (counseling + methadone). At 90-day follow-up, counseling + methadone participants were significantly more likely than counseling-only and counseling + transfer participants to attend drug treatment ($p = .0001$) and less likely to be reincarcerated ($p = .019$). Counseling + methadone and counseling + transfer participants were significantly less likely (all $ps < .05$) to report heroin use, cocaine use, and criminal involvement than counseling-only participants. Follow-up is needed to determine whether these findings hold over a longer period.

Keywords

heroin addiction; prisoners; methadone maintenance

Of the more than 2 million adults incarcerated in the United States (Harrison & Beck, 2005), an estimated 12% to 15% have preincarceration histories of heroin addiction (Chaiken, 2000; Karberg & James, 2005). Longitudinal studies have consistently found that rapid relapse to opioid (principally, heroin) addiction following incarceration is a continuing problem. Several reports indicate that readdiction is typically well established within 90 days of release (Office of National Drug Control Policy, 1999; Stewart, 1995; Wexler, Lipton, & Johnson, 1988), whereas other reports have found that most incarceration episodes are followed by relapse as early as 1 month after release (Kinlock, Battjes, & Schwartz, 2002; Maddux & Desmond, 1981; Nurco, Hanlon, & Kinlock, 1991).

In addition to its high prevalence, readdiction to heroin is accompanied by increased criminal activity (Chaiken & Chaiken, 1990; Kinlock, O'Grady, & Hanlon, 2003; Nurco, 1998), disproportionately high risk of HIV infection (Chitwood, Comerford, & Weatherby, 1998;

Inciardi, McBride, & Surratt, 1998), Hepatitis B and C infections (Edlin, 2002; Fuller, Vlahov, Safeian, Ompad, & Strathdee, 1999; Hagan et al., 2002), overdose death (Mark, Woody, Juday, & Kleber, 2001; Weatherburn & Lind, 1999), reincarceration (Hanlon, Nurco, Bateman, & O'Grady, 1998; Substance Abuse and Mental Health Services Administration [SAMHSA], 2000), unemployment (Inciardi et al., 1998; Mark et al., 2001), and impaired parenting (Keller, Catalano, Haggerty, & Fleming, 2002). Thus, the development and implementation of effective drug abuse treatment strategies for incarcerated offenders with heroin-addiction histories is urgently needed, not only for such individuals' rehabilitation but also for their survival and for the safety and welfare of the public (Kinlock et al., 2002; Rich, Boutwell, et al., 2005; Smith-Rohrberg, Bruce, & Altice, 2004).

Furthermore, researchers, practitioners, and policy makers have emphasized that the first 3 months after release to the community is a crucial period for newly released prisoners. If successful reintegration is not achieved during this period, it is not likely to occur (Council of State Governments [CSG], 2003; Gaes, Flanigan, Montiuk, & Stewart, 1999; Visher & Farrell, 2005). With regard to substance abuse treatment, in addition to having a continuum of care spanning prison and the community, offenders need to remain in community treatment for a minimum of 3 months to achieve longer-term behavioral change concerning drug use and criminal behavior (CSG, 2003; Gaes et al., 1999). Therefore, prisons provide an important opportunity to engage individuals with heroin-addiction histories in drug abuse treatment, as many heroin-dependent persons do not receive such treatment while incarcerated or on release (Inciardi et al., 1998; Smith-Rohrberg et al., 2004).

Forty years of experience and research evidence in community-based settings has shown that opioid-agonist therapy, primarily involving methadone maintenance, is highly effective in reducing heroin addiction, crime, and HIV transmission (Johnson et al., 2000; Joseph, Stancliff, & Langrod, 2000; Platt, Widman, Lidz, & Marlowe, 1998; Smith-Rohrberg et al., 2004). Furthermore, and of particular significance, methadone maintenance has been found superior to other treatment modalities with regard to retaining clients in treatment (Nurco, Kinlock, & Hanlon, 1994; Platt et al., 1998). However, opioid-agonist programs have rarely been implemented in jail and prison settings in the United States. The first such experimental program, which began in 1968, involved 12 prerelease jail inmates in New York City (Dole et al., 1969). At 7 to 10 months postrelease, the 12 had lower read addiction and reincarceration rates than 16 untreated controls. Subsequently, a New York City methadone-maintenance program for jail inmates, titled the Key Extended Entry Program (KEEP) has been operating continuously since 1987. KEEP provides heroin detoxification with methadone, initiates methadone maintenance for inmates who were heroin-dependent at jail admission, and continued methadone treatment for individuals who were on methadone at the time of their arrest. An 11-year analysis of KEEP suggested that jail-based methadone-maintenance treatment not only facilitates postrelease treatment entry but also reduces reincarceration (Tomasino, Swanson, Nolan, & Shuman, 2001). Other effective programs involving prison-initiated opioid-agonist maintenance include a methadone-maintenance program in Australia (Dolan et al., 2005) and a buprenorphine-naloxone intervention in Puerto Rico (Albizu-Garcia et al., in press).

The positive experiences with KEEP and the pressing need to reduce the adverse health and criminogenic consequences associated with Baltimore's serious and persistent heroin-addiction problem (Fuller et al., 1999; Gray & Wish, 1997; Kinlock et al., 2002; Wish & Yacoubian, 2001) led to a pilot study of prison-initiated opioid-maintenance treatment for male prerelease inmates with histories of heroin dependence by the present investigators (Kinlock et al., 2002; Kinlock, Battjes, & Schwartz, 2005). In contrast to KEEP, which involved short-term jail inmates, this pilot project was, to our knowledge, the first that focused on prison inmates who had longer periods of incarceration and who were previously, but not currently, heroin

dependent. In our pilot study, consenting prisoners initiated maintenance treatment, which was delivered by the staff of a Baltimore community-based opioid-maintenance treatment program, shortly before release from incarceration, with opportunity to continue maintenance treatment with the same provider in the community. At 9 months postrelease, treated prisoners (experimental group) were compared regarding treatment participation and community adjustment with controls who received community-treatment referral information only and prisoners who withdrew from treatment prior to medication. Nineteen of 20 (95%) prisoners who began maintenance in prison entered community treatment, compared to 3 of 31 (10%) controls and 1 of 13 (8%) who withdrew. Furthermore, 53% of experimental participants remained in community treatment for at least 6 months, whereas none of the other participants did so. Despite study limitations (the relatively small sample size, urine drug screening was not conducted at 9-month follow-up, and efforts to assure comparability of experimental and control groups was compromised by participant attrition), findings regarding postrelease treatment participation were sufficiently robust to suggest that this intervention was quite promising (Kinlock, Battjes, et al., 2005).

The Present Study

Imprisoned males with preincarceration heroin dependence who were nearing release and meet criteria for opioid-agonist treatment were randomly assigned to one of three conditions (Kinlock, Schwartz, & Gordon, 2005). These conditions were (a) *counseling only*: counseling in prison without methadone with passive treatment referral on release; (b) *counseling + transfer*: counseling in prison without methadone and with transfer to methadone maintenance in the community on release; or (c) *counseling + methadone*: counseling and methadone in prison with transfer to methadone maintenance in the community on release. In-prison counseling and methadone treatment are delivered by the same community treatment provider, which continues to offer treatment on release to participants in the counseling + transfer and counseling + methadone conditions.

Method

Participants

Males incarcerated in a Baltimore prerelease facility who met study eligibility criteria (see below) and consented to participate were randomly assigned to one of the three treatment conditions. All participants received an individual intake and were subsequently scheduled to receive, within treatment condition, 12 weekly sessions of group psycho-education on relapse and overdose prevention, cocaine and alcohol abuse, and other reentry issues. Immediately prior to scheduled release, all participants were scheduled to meet with the study's counselor individually to discuss plans for release, including housing and employment concerns.

Eligibility/exclusion criteria—To be eligible for entry into the study, inmates must have met the following criteria: (a) 3 to 6 months remaining to serve before anticipated release from prison, (b) history of heroin dependence meeting *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; American Psychiatric Association, 1994) criteria of dependence at time of incarceration and being physiologically dependent during the year prior to incarceration, (c) suitability for methadone maintenance as determined by medical evaluation, (d) willingness to enroll in a prison-based methadone-maintenance treatment program, and (e) residing in Baltimore following release. Furthermore, individuals who did not meet the heroin-dependence criterion were eligible if they were enrolled in opioid-agonist maintenance treatment in the year before incarceration. Inmates with one or more of the following conditions were excluded from study participation: (a) evidence of kidney failure, (b) evidence of liver failure, (c) pending/unadjudicated charges that might result in transfer to another correctional facility and/or additional prison time, and (d) having a pending parole hearing. Research and correctional

staff made initial determination of eligibility, with the study's medical personnel making a final determination following the physical examination.

Participant screening and recruitment—From September 22, 2003, to June 9, 2006, 1,521 male inmates were identified by Maryland Department of Public Safety and Correctional Services' (DPSCS) management information and case management staff as meeting study eligibility criteria regarding (a) time remaining to serve, (b) no pending parole hearings, (c) no unadjudicated charges, and (d) Baltimore address. On initial screening by research staff at project orientation sessions, 564 (37.1%) of these 1,521 inmates reported being heroin dependent or receiving methadone-maintenance treatment in the year before incarceration. Of these 564, 248 (44.0%) reported that they were not interested in receiving methadone-maintenance treatment. The 316 remaining inmates underwent individual screening by research staff; 43 (13.6%) were either medically ineligible or had insufficient heroin use in the year before incarceration and 19 (6.0%) were no longer interested in receiving methadone. The remaining 254 met with the study's research assistant to review the informed consent form; 253 (99.6%) consented and completed a baseline assessment. Forty-two (16.6%) of these 253 were found unsuitable for treatment prior to or during the physical examination for the following reasons: no longer interested in receiving methadone-maintenance treatment ($n = 13$), placed in punitive segregation or transferred to another facility ($n = 17$), or found to have medical or psychological conditions that, in the judgment of the study physician, precluded admission to methadone-maintenance treatment ($n = 12$). Following the completion of the medical examination, the remaining 211 were randomized to either counseling only ($n = 70$), counseling + transfer ($n = 70$), or counseling + methadone ($n = 71$). Of these 211, 1 participant was removed from the study because he threatened to physically harm his counselor, 2 died of non-study-related circumstances, 1 was not released from prison, and 2 were not yet due for their 3-month assessment, leaving 205 participants eligible for their 3-month postrelease assessment.

The present study is based on data from the 197 (96.1% follow-up rate) participants who completed their 3-month postrelease assessment. It focuses on comparing the three study groups on the outcomes described below at a crucial point in time—3 months after participants were released from prison. Results of these analyses provide valuable information on short-term postinstitutional outcomes. Our emphasis on this particular postrelease period is consistent with the previously noted observations that relapse to heroin addiction and to crime occur rapidly following release from incarceration.

Interventions—Counseling-only participants were informed at release by treatment staff to seek drug abuse treatment in the community in any of the publicly funded programs in Baltimore according to their admission procedures (including waiting list placement for all modalities except drug-free outpatient programs). Counseling + transfer participants were informed at release by treatment staff to report to the community-based methadone program within 10 days to begin methadone at 5 mg, with dose increases of 5 mg every eighth day to a target minimum of 60 mg. Participants randomized to the counseling + methadone condition began at 5 mg of methadone and increased 5 mg every eighth day during incarceration to a target dose of 60 mg. At release, they were advised by treatment staff to report to the program's community-based methadone program within 10 days for continuing care. Once they arrived at this facility, dosage could be increased based on clinical need. These slow induction rates were followed because participants were not physiologically tolerant to opioids at the time the medication was initiated.

Assessments/Procedures

Assessments included demographic information and histories of drug abuse, drug abuse treatment, criminal activity, and criminal-justice-system involvement. Measures administered at baseline (study entry) included the Addiction Severity Index (ASI; McLellan et al., 1992) and a supplemental self-report questionnaire based on previous research on heroin-dependent offenders (Nurco, 1998). The ASI is a standardized instrument that assesses problem severity in seven life-functioning areas: alcohol use, drug use, medical, psychiatric, family/social, employment, and legal. The ASI has excellent interrater and test-retest reliability as well as discriminant and concurrent validity (McLellan et al., 1992). In addition, more detailed historical information about criminality, criminal-justice-system sanctions, drug abuse, and drug abuse treatment than provided by the ASI were obtained from the supplemental self-report questionnaire. Follow-up assessments scheduled 3 months after release from prison consisted of treatment record review; urine drug testing for opioids, cocaine, and other illicit drugs; and a confidential interview addressing heroin use, cocaine use, and criminal activity.

Outcome measures—The primary outcome measures examined during the 90-day follow-up period were (a) entered treatment in the community, (b) reincarceration, (c) urine drug test results for opioids and cocaine, and (d) self-reported heroin or cocaine use or other illegal activity (excluding illicit drug use and/or possession). Because of the relatively large number of participants who reported zero days of drug use, self-reported heroin, cocaine, and crime days were collapsed into dichotomous variables (any versus none) for the purpose of analysis.

Data on drug-abuse-treatment status were obtained from treatment program records and participant self-report. Urine drug-test results were obtained for the presence of opioids and cocaine metabolites using the enzyme multiplied immune test (EMIT). Data on reincarceration status and the number of days incarcerated were obtained from the ASI. Furthermore, in the process of locating study participants for follow-up assessments, research interviewers routinely consulted the rosters of the Baltimore City Detention Center and searched public-record information databases to determine whether participants were incarcerated. Self-reported heroin use, cocaine use, and illegal activity (excluding illicit drug use or possession) were obtained from the ASI.

Statistical analysis—The 197 participants were compared by treatment condition with regard to each outcome variable listed above using logistic regression analysis (Agresti, 1990; Hosmer & Lemeshow, 1989). A relatively small set of control variables was chosen for the regression analyses because of the relatively small sample size. Behavioral variables that had predicted responsiveness to drug abuse treatment in previous research with offender populations were included, such as age at first crime (Hanlon et al., 1998; Hiller, Knight, & Simpson, 1999; Kinlock, Schwartz, et al., 2005), a history of prior cocaine use (Magura, Nwakeze, & Demsky, 1998; Rowan-Szal, Chatham, & Simpson, 2000), and completed prison treatment (Butzin, Martin, & Inciardi, 2002; Prendergast & Wexler, 2004). Control variables in all regression analyses included age, age at first crime, prior cocaine use (measured as the number of self-reported days of cocaine use in the 30 days in the community before the current incarceration), and completed prison treatment. For the analysis of each outcome variable, the predictor variable, treatment condition, and the control variables were entered simultaneously in the relevant regression analysis (i.e., logistic regression) for each dependent variable. Therefore, the tests of the treatment condition effect assessed the unique ability of this variable to predict the respective outcome variable after adjusting for the control variables. An alpha level of .05 was chosen to determine statistical significance.

Results

Participant Characteristics

As shown in Table 1, most participants in each of the three study conditions were African American, between 35 and 45 years of age, had not completed high school, and had at least six prior incarcerations. All 197 participants had been incarcerated, whereas at least two thirds in each study condition had one or more previous drug-abuse-treatment episodes, with fewer than one third reporting having been in methadone-maintenance treatment. Participants in each condition, on average, began heroin use in their late teens, generally 4 to 5 years after the onset of criminal activity. In the 30 days prior to their current incarceration, participants in each condition reported, on average, using heroin and committing crime nearly every day. The only significant baseline variable that differed by treatment condition was age first incarcerated ($p = .041$); however, post hoc simple mean comparisons did not reveal any differences in age between any two of the three groups.

Treatment participation in prison—The respective proportions, by condition, of participants who began their respective treatment in prison were: counseling only (71.4%), counseling + transfer (83.3%), and counseling + methadone (92.7%). Counseling + methadone participants were more likely than counseling-only participants to initiate treatment in prison ($p = .001$). Furthermore, there was a tendency for groups to differ with regard to those remaining in treatment until release, as slightly more than half of counseling-only participants (50.8%) remained in treatment on release, compared with 77.2% of counseling + transfer and 72.1% of counseling + methadone participants. Both counseling + transfer ($p = .001$) and counseling + methadone ($p = .01$) groups had a greater proportion of members in treatment on release than did the counseling-only group.

Logistic Regression Analyses

Tables 2 and 3 present results for all outcome measures. Although nearly 70% of counseling + methadone and 50% of counseling + transfer participants entered community treatment within 90 days of release from incarceration, only about 8% of counseling-only participants did so. Of the three study groups, counseling-only participants were most likely to use heroin and to use cocaine, according to both urine testing and self-report, and to report involvement in criminal activities. However, with regard to reincarceration in the first 90 days following release, both counseling + transfer (33%) and counseling-only (29%) participants had rates that were more than twice as high as the comparable rate for counseling + methadone participants (13%).

Table 2 also shows results for the logistic regression analyses predicting each of the six dichotomous outcome variables. Table 3 presents 95% confidence intervals and odds ratios for each of the predictor variables in the logistic regression analyses.

Community treatment retention—Community treatment entry was significantly predicted by the set of five predictor variables, $\chi^2 (df = 6) = 118.7, p = .0001$. As shown in Table 3, treatment condition was significantly associated with treatment entry ($p = .0001$). Counseling + methadone participants were more likely to enter treatment compared to counseling-only ($p = .0001$) and counseling + transfer ($p = .001$) participants. In addition, counseling + transfer participants were more likely to enter treatment compared to counseling-only participants ($p = .0001$). Furthermore, as expected, those participants completing prison treatment were more likely to enter community-based treatment ($p = .0001$). The only other significant predictor was age ($p = .02$), with increasing age being related to greater likelihood of treatment entry.

Urine drug screening for opioids—Urine screening for opioids was not significantly predicted by the set of five predictor variables (see Table 2). Although not statistically significant, there was a tendency for counseling-only (47.8%) participants to test positive compared to counseling + methadone (38.6%) and counseling + transfer (39.0%) participants.

Urine drug testing for cocaine—Urine testing results for cocaine was not significantly predicted by the set of five predictor variables (see Table 2). Moreover, there were no differences in rates of cocaine-positive results by treatment condition. There was only one significant predictor of having a positive urine test for cocaine. As might be expected (see Table 3), higher levels of self-reported cocaine use in the 30 days prior to the current incarceration was related to being cocaine-positive at 1-month postrelease ($p = .019$).

Reincarceration—The overall model was significant, $\chi^2 (df = 6) = 15.2, p = .019$. Treatment condition ($p = .018$) and age ($p = .04$) were the only significant predictors. Participants in the counseling + methadone condition were less likely to be reincarcerated compared to both counseling-only ($p = .03$) and counseling + transfer ($p = .006$) participants. Furthermore, those individuals who were younger were more likely to be reincarcerated within the past 90 days.

Heroin use—Self-reported heroin use was significantly predicted by the set of five predictor variables, $\chi^2 (df = 6) = 16.068, p = .013$. As shown in Table 3, treatment condition was the only significant predictor variable ($p = .048$). Those inmates in the counseling + methadone condition were less likely to report using heroin compared to counseling-only participants ($p = .014$).

Cocaine use—Self-reported cocaine use was significantly predicted by the set of five predictor variables, $\chi^2 (df = 6) = 19.168, p = .004$. As might be expected (see Table 3), higher levels of self-reported cocaine use in the 30 days prior to the current incarceration was related to reporting having used cocaine at 90 days postrelease ($p = .001$).

Self-reported criminal activity—Self-reported criminal activity in the past 90 days postrelease was significantly predicted by the set of five predictor variables, $\chi^2 (df = 6) = 16.6, p = .011$. As shown in Table 3, treatment condition was the only significant predictor variable ($p = .008$). Those in the counseling + methadone ($p = .005$) and counseling + transfer ($p = .009$) condition were less likely to engage in criminal activity compared to the counseling-only participants.

Discussion

The 197 participants resembled previous samples of incarcerated offenders from large American cities with histories of heroin addiction regarding the following characteristics: disproportionately African American (Inciardi et al., 1998; Inciardi, Martin, Butzin, Hooper, & Harrison, 1997; Kinlock et al., 2002; Kinlock et al., 2003); low educational attainment compared to the general population (Inciardi et al., 1997; Kinlock et al., 2002); early onset of both drug use and crime during the teenage years, with marijuana use preceding use of heroin and cocaine (Chaiken & Chaiken, 1990; Kinlock et al., 2002; Nurco, 1998); more involvement with incarceration than with drug abuse treatment (Inciardi et al., 1998; Kinlock et al., 2002); and rapid relapse to heroin addiction following prior incarcerations (Maddux & Desmond, 1981; Kinlock et al., 2002; Nurco et al., 1991). However, the sample was approximately 10 to 15 years older than the above-mentioned previous samples of incarcerated offenders and generally about 2 to 3 years older at first heroin use than other samples of heroin-dependent males (Chaiken & Chaiken, 1990; Kinlock et al., 2003), although similar in age of heroin onset to participants in the investigators' previous study of opioid-agonist maintenance (Kinlock et al., 2002). It is difficult to precisely determine the implications of the age difference between

the present sample and previous samples of heroin-dependent males. The older age indicates, in general, that fewer years are remaining in one's addiction and criminal careers. However, the present sample is similar to other samples with regard to the age at first addiction and crime; furthermore, the earlier the onset of addiction and crime, the greater the persistence of deviant careers throughout adulthood.

This study suggests that opioid-agonist maintenance treatment, provided to prisoners with preincarceration histories of heroin addiction, is an effective intervention for interrupting the cycle of relapse, recidivism, and reincarceration typically experienced by individuals with heroin-addiction histories who are released from American prisons. The present results confirm and extend the conclusions of a smaller-scale study on the effectiveness of such treatment (Kinlock et al., 2002; Kinlock, Battjes, et al., 2005). The current investigation, which involves 197 participants in a rigorously conducted randomized clinical trial, indicates that in-prison opioid-maintenance facilitates community treatment and reduces self-reported heroin use (although not opioid-positive urine drug test results) at a crucial point in time when relapse disproportionately occurs—3 months postrelease. In addition, in-prison methadone maintenance was found to be associated with lower levels of criminal recidivism (both reincarceration and self-reported crime) during this same time period.

The findings with regard to treatment condition were remarkably similar to those reported in our pilot study of opioid-agonist maintenance (Kinlock et al., 2002; Kinlock, Battjes, et al., 2005). In both the small-scale study and the current report, participants who received prison-initiated maintenance treatment were significantly more likely to enter community-based treatment than were inmates who received either information on how to access drug abuse treatment after release or counseling only. Furthermore, in both investigations, more than 70% of participants who initiated maintenance treatment in prison continued treatment until their release, and more than 90% of these individuals continued this treatment within 10 days of release from incarceration.

Methadone maintenance initiated in prison was superior to the counseling-only condition with regard to postrelease treatment status, reincarceration, and self-reported heroin use and criminal activity. Compared to counseling-only participants, those who received counseling + methadone were more than 8 times more likely to enter drug abuse treatment in the 3 months following release and were almost 3 times less likely to spend time in jail or prison during that same period. Furthermore, counseling-only participants' rate of participation in self-reported criminal activity (excluding illicit drug use or possession) was twice as high as rates reported by counseling + methadone participants. However, there were no significant differences between these two conditions with regard to urine tests for opioids, although this finding may have been attributed to the relatively small number of cases available for analysis. Urine specimens were obtained on 144 of the 197 participants. Examination of the relationship between self-report and urine screening results for opioids and cocaine reveals that drug-positive individuals reported substantially more days of use in the 3-month postrelease reporting period than did individuals testing negative. For example, the mean number of days of heroin use for opiate-positive participants was nearly 4 times greater than those testing negative (43.5 versus 11.3). Similarly, the mean number of days of cocaine use for cocaine-positive participants was 8 times greater than that of cocaine-negative participants (25.6 versus 3.1).

Counseling + transfer participants, who were intended to begin maintenance treatment in the community, generally showed postrelease outcomes that were superior to those of counseling only, although not as pronounced as the contrast between counseling only and counseling + methadone. Counseling + transfer respondents were significantly more likely than counseling-only individuals to enter drug abuse treatment by 3-month postrelease and to report

significantly lower rates of criminal activity. However, they tended to have less favorable outcomes than participants in counseling + methadone, with treatment status and reincarceration being the only ones to reach statistical significance.

Although longer-term follow-up is needed to draw more definite conclusions, these short-term results of the first controlled clinical trial of in-prison methadone-maintenance treatment in an American prison build on those obtained in our initial study (Kinlock et al., 2002; Kinlock, Battjes, et al., 2005; Kinlock, Schwartz, et al., 2005). Experiences in both studies indicate that corrections, treatment, and research agencies can collaborate to implement effective interventions for prison inmates with heroin-addiction histories. Results suggest that the current intervention may be able to meet an urgent need in ensuring a continuum of drug abuse treatment spanning the institution and the community, an objective recently emphasized by the Office of National Drug Control Policy (2001) and the American Association for the Treatment of Opioid Dependence (2004). Furthermore, the findings are in line with the recommendations of Rich and his colleagues (Rich, Boutwell, et al., 2005; Rich, McKenzie, et al., 2005) that far more prison and jail inmates with heroin-addiction histories need to have access to methadone-maintenance treatment that continues in the community to interrupt the cycle of readdiction, related risk behavior, and crime among this population. Finally, the present intervention appears consistent with Field's (1998) observation that the most promising programs for reducing addiction and its adverse health and criminogenic consequences involve corrections-treatment partnerships in which a single treatment team takes primary responsibility for rehabilitation efforts.

Implications for Methadone-Maintenance Treatment of American Prisoners

In contrast to jail and prison inmates in other countries, incarcerated individuals in the United States are less likely to have access to heroin on a regular basis (Dolan et al., 2005). As a result, despite their histories of heroin dependence prior to incarceration, while in prerelease facilities (Dole et al., 1969; Kinlock et al., 2002) or on release to the community, most such individuals are not tolerant to opioids. Therefore, it is necessary to begin opioid-maintenance treatment at a low dose and increase the dose slowly and gradually. The dosing schedule used in the present study has been generally well tolerated, except for some reports of tiredness and frequent reports of constipation. Careful, regular assessment of potential side effects during dose induction and treatment of constipation is necessary.

Limitations

There are a number of limitations in this study. First, it was not feasible to obtain urine samples on 53 of the 197 participants because those 53 participants were interviewed more than 2 months after their due date, interviewed by telephone, or incarcerated or hospitalized. Understandably, the availability of urine drug screening on all 197 participants would have allowed a more precise comparison of the effects of treatment condition on heroin use and cocaine use. Second, the sample only involved male prisoners from Baltimore. Therefore, the findings cannot be generalized to female prisoners or to prison inmates from other geographic locations. Third, because of the relatively large number of participants reporting no days of involvement in one or more of the self-reported variables (heroin use, cocaine use, crime), a less precise measure of involvement (*any* or *none*) was used. Finally, objective arrest data on study participants were not available. It would be useful to compare such data to participants' self-reports.

Policy Implications

Although the present study was designed to evaluate the effectiveness of methadone maintenance provided to soon-to-be released prisoners with preincarceration heroin-addiction histories, its implementation has contributed to expanding the services available to methadone

clients in Baltimore. First, the study prompted the DPSCS's Home Detention Unit to change its policy by allowing offenders on home monitoring to receive methadone-maintenance treatment (Kinlock, Schwartz, et al., 2005). Second, at the start of the study, the staff of a Baltimore work-release transitional house for drug-involved offenders had not allowed their clients to receive methadone maintenance. As a result of the study, the policy was changed so that individuals leaving prison were able to continue or initiate methadone-maintenance treatment and reside at their facility. Third, a considerable number of study participants have experienced difficulty finding stable housing on their release from prison. This particular problem has not only been found here in Baltimore (Visser, Kachnowski, LaVigne, & Travis, 2004) but also in other American cities (Inciardi et al., 1998; Lynch & Sabol, 2001). In confronting this circumstance, we became aware that several facilities providing shelter for homeless individuals did not allow their residents to receive methadone-maintenance treatment. Following meetings with the operators of these facilities, some of these operators have begun to accept methadone clients, whereas others remain open to discussion on this issue.

Acknowledgements

This study was funded by the National Institute on Drug Abuse (Grant R01 DA 16237) awarded to the first author. The authors would like to thank the Maryland Department of Public Safety and Correctional Services, the Metropolitan Transition Center, and the staff of Man Alive, Inc.

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Table 1
Selected Background Characteristics by Treatment Condition

<i>Categorical Variable</i>	<i>Counseling Only (n = 63)</i>		<i>Counseling + Transfer (n = 66)</i>		<i>Counseling + Methadone (n = 68)</i>	
	n	%	n	%	n	%
<i>Race</i>						
African American	41/63	65.1	48/66	72.7	48/68	70.6
Caucasian	20/63	31.7	13/66	19.7	14/68	20.6
Other	2/63	3.2	5/66	7.6	6/68	8.8
Prior drug treatment	43/63	68.3	48/66	72.7	50/68	73.5
Prior methadone treatment	14/63	22.2	17/66	25.8	14/68	20.6
<i>Continuous Variable</i>	M	SD	M	SD	M	SD
Age	40.81	7.69	40.28	7.00	39.79	7.11
Education	10.87	2.08	11.12	1.61	10.01	1.69
Age at first marijuana use	13.80	4.43	14.0	3.08	14.20	3.75
Age at first cocaine use	21.69	8.34	22.45	7.06	21.14	7.07
Age at first heroin use	19.06	5.31	18.74	4.79	18.07	4.87
Age at first crime	13.53	5.09	13.77	4.95	13.25	3.75
Age when first arrested	15.81	4.98	17.26	5.51	16.71	5.97
Age when first incarcerated	19.71	6.81	22.56	8.54	19.56	7.37
Lifetime incarcerated	7.62	5.31	6.03	4.30	7.51	5.49
Heroin-use days ^a	27.49	7.07	27.95	6.05	26.53	9.02
Cocaine-use days ^a	20.15	12.74	16.92	13.10	17.74	13.94
Crime days ^a	23.57	11.28	26.38	8.81	24.0	10.23

^aPast 30 days in the community prior to the current incarceration.

Table 2
Treatment Outcomes and Results of Logistic Regression Analyses

Outcome	Counseling Only (CO)		Counseling + Transfer (C + T)		Counseling + Methadone (C + M)		χ^2	p
	n	%	n	%	n	%		
Entered community treatment	5/63	7.94	33/66	50.0	47/68	69.12	118.73	.0001
Opioid-positive urine	22/46	47.83	16/41	39.02	22/57	38.60	5.77	.449
Cocaine-positive urine	30/46	65.22	22/41	53.66	31/57	54.39	8.90	.179
Reincarcerated	18/63	28.57	22/66	33.33	9/68	13.24	15.17	.019
Heroin use ^a	48/62	77.42	39/65	60.0	36/66	54.5	16.07	.013
Cocaine use ^b	36/62	58.1	25/65	38.5	28/66	42.42	19.17	.004
Criminal activity ^c	35/62	56.45	19/65	29.23	19/66	28.78	16.65	.011

Note. The logistic regression analyses included age, age at first crime, prior cocaine use, and completed prison treatment as covariates. $df = 6$ for all logistic regression models. Descriptive statistics for continuous measures before they were collapsed

^aCO: $M = 47.4$, $SD = 39.5$; C + T: $M = 20.8$, $SD = 31.9$; C + M: $M = 31.3$, $SD = 28.3$.

^bCO: $M = 29.6$, $SD = 35.4$; C + T: $M = 13.1$, $SD = 25.9$; C + M: $M = 12.3$, $SD = 25.9$.

^cCO: $M = 26.7$, $SD = 33.8$; C + T: $M = 10.4$, $SD = 22.9$; C + M: $M = 16.6$, $SD = 28.8$.

Table 3
Results of Logistic Regression Analyses With Predictor Variables Examining Postrelease Outcomes

Condition	Entered Community Treatment		Opioid-Positive Urine		Cocaine-Positive Urine		Reincarcerated	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
CO	Referent	—	Referent	—	Referent	—	Referent	—
C + T	11.09	3.49-35.13 ^{a***}	0.48	0.19-1.21	0.64	0.25-1.65	1.26	0.57-2.82
C + M	61.71	16.02-237.76 ^{a***}	0.47	0.20-1.11	0.62	0.26-1.49	0.36	0.14-0.91 ^{a*,b**}
Age	1.08	1.02-1.15 [*]	1.01	0.96-1.06	1.01	0.96-1.06	0.95	0.90-0.99 [*]
Age at first crime	0.96	0.88-1.05	1.04	0.96-1.11	1.02	0.95-1.09	0.99	0.92-1.07
Cocaine 30	0.99	0.96-1.02	1.01	0.98-1.03	1.03	1.01-1.06	0.99	0.97-1.02
Prison treatment	0.32	0.01-0.11	0.97	0.42-2.21	0.97	0.42-2.25	1.35	0.65-2.83

Condition	Heroin Use		Cocaine Use		Criminal Activity	
	OR	95% CI	OR	95% CI	OR	95% CI
CO	Referent	—	Referent	—	Referent	—
C + T	0.50	0.22-1.14	0.50	0.23-1.08	0.36	0.17-0.78 ^{a**}
C + M	0.36	0.16-0.81 ^{a*}	0.57	0.27-1.21	0.34	0.16-0.73 ^{a**}
Age	0.97	0.93-1.01	.99	0.95-1.04	1.02	0.97-1.06
Age at first crime	1.03	0.96-1.11	0.96	0.89-1.02	0.96	0.89-1.03
Cocaine 30	1.02	0.99-1.04	1.04	1.02-1.06 ^{***}	1.01	0.99-1.03
Prison treatment	1.75	0.86-3.58	1.0	0.51-1.97	1.50	0.76-2.95

Note. OR = odds ratio; CO = counseling only; C + T = counseling + transfer; C + M = counseling + methadone.

^a Statistical comparison with CO.

^b Statistical comparison with C + T.

* $p < .05$.

** $p < .01$.

*** $p < .001$.