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Post-prison Release HIV-Risk Behaviors in a Randomized Trial of Methadone Treatment for Prisoners

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Abstract

Background—This secondary analysis examined the impact of methadone initiated in prison on post-release HIV risk behaviors. The parent study was a three-group randomized clinical trial in which participants received drug abuse counseling in prison and were randomly assigned to: (1) passive referral to substance abuse treatment upon release; (2) guaranteed methadone treatment admission upon release; and (3) methadone in prison and guaranteed continuation of methadone upon release.

Methods—Participants were 211 adult males with pre-incarceration histories of opiate dependence. The AIDS Risk Assessment was administered at baseline (in prison) and at 1-, 3-, 6-, and 12-months post-release. Data were analyzed for the entire sample (N = 211) as well as the subsamples who reported injecting drugs in the 30 days prior to incarceration (n = 131) and who reported having unprotected sex in that time frame (n = 144) using generalized linear mixed model on an intent-to-treat basis.

Results—There were no significant changes in sex- or drug-risk by Condition over Time. There were significant Time and Condition main effects for the total sample as well as the injector subsample for drug-risk behaviors. There were no significant Condition main effects for HIV sex-risk behaviors, but there were significant Time main effects.

Conclusions—Methadone initiated in prison or immediately post-release is associated with reduced HIV drug-risk compared to counseling in prison without methadone and passive referral to treatment at release. Participation in several drug- and sex-risk behaviors also showed significant declines during the post-release time periods.

Introduction

HIV infection among inmates has been recognized as a world-wide public health concern,¹ as inmates have a rate of HIV infection that is three to five times higher than the rate in the general population.^{2–6} This situation is of considerable concern because there is some evidence that individuals leaving prison may exhibit higher HIV drug use and sex risk behaviors upon release.⁷ In a prospective cohort study, former Canadian inmates who had a history of drug injection were more likely to share needles after release from prison as

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

compared to a matched control group who had not been recently incarcerated.⁸ In Thailand⁹ and Australia,¹⁰ HIV-positive compared to HIV-negative individuals had a significantly greater likelihood of sharing needles after release from prison.⁹ In terms of HIV sex-risk behavior, in North Carolina it was found that men and women who had recently been incarcerated or who were partnered with recently released prisoners, compared to those who were not, showed a greater likelihood of having multiple new partners and transactional sex.¹¹ Thus, there is a need to develop strategies to reduce HIV drug- and sex-risk behaviors post-incarceration.

Methadone maintenance treatment in the community has proven efficacy in reducing illicit opioid use.¹² This treatment approach has been found to be associated with reduced HIV drug-risk behaviors, including injection,¹³ needle sharing,¹⁴ and seroconversion.¹⁵ Condom use does not appear to be impacted by standard methadone treatment,¹⁶ although recent studies have shown that gender-specific HIV risk reduction interventions delivered in the context of methadone treatment can reduce sex-risk behaviors in the population.^{17,18}

Throughout the world, methadone maintenance treatment in jails and prisons is much less available than in community settings.^{19,20} The impact of prison-based methadone treatment on post-prison drug use has been infrequently studied²¹⁻²⁴ and there are few data on the impact of *post-release* methadone treatment on drug and sexual HIV risk behaviors post-prison release. An exception has been a four-year follow-up cohort analysis from a study comparing methadone treatment started in an Australian prison as compared to waiting list assignment which examined mortality, HIV and hepatitis C seroconversion and incarceration.²² It was found that participants with longer lengths of stay in methadone treatment in the community had lower risk of death from any cause, hepatitis C conversion, and re-incarceration. Given the low incidence of HIV infection in Australia, it was not entirely surprising that there were only two cases of HIV seroconversion during the four-year follow-up. No data were collected on post-release HIV drug- and sex-risk behaviors.

To date, there has been one randomized clinical trial of methadone for pre-release prisoners, as opposed to jail inmates.²⁵ This study found that starting methadone in prison or upon release compared to a passive referral to drug treatment was associated with lower rates of heroin use but not arrest at the 12-month post-prison release follow-up.²³ In the present paper, we report the results of the first study in the US of which we are aware that examines the impact of prison-based methadone treatment on HIV drug- and sex-risk behaviors upon release from prison.

Methods

Parent Study

The parent study, involving male inmates with pre-incarceration heroin addiction histories, described in detail elsewhere,^{23, 25-27} was aimed at examining the effectiveness of methadone maintenance initiated prior to or just after release from prison. In brief, all participants met criteria for methadone treatment in the year prior to incarceration and were scheduled to receive, within treatment condition, 12 weekly sessions of drug abuse education in prison. *Counseling Only* in prison was less accepted than *Counseling + Transfer* or *Counseling + Methadone*, in that only 50.8% of participants in *Counseling Only* had remained in treatment at the time of release whereas 77.2% of *Counseling + Transfer* and 72.1% of *Counseling + Methadone* remained in treatment.²⁷ Through research funding, a methadone treatment slot in the participating community-based methadone treatment program was guaranteed for participants in the Counseling + Transfer and Counseling + Methadone conditions for one year. The participating methadone program provided an individual HIV risk assessment upon admission to the program, offered HIV testing on-site

and by referral and provided two HIV informational sessions as part of treatment orientation. As reported elsewhere,²⁵ upon release from prison, 7.8% of the *Counseling Only*, 50% of the *Counseling + Transfer* and 68.6% of the *Counseling + Methadone*, entered community-based methadone treatment. In terms of treatment retention, as reported in Kinlock et al.,²³ none of the *Counseling Only*, 17.3% of the *Counseling + Transfer* and 36.7% of the *Counseling + Methadone* participants were retained in treatment at 12-months post-release.

Participants were assessed at baseline (study entry in prison), and at 1-, 3-, 6-, and 12-months post-release. The study was approved by the Friends Research Institute's Institutional Review Board and all participants provided written informed consent.

Present Project

This secondary analysis was designed to compare HIV drug- and sex-risk behaviors reported in the community by participants, who as part of the study described above, were randomly assigned in prison to either: 1) *Counseling Only*: counseling in prison and passive referral to community-based drug treatment; 2) *Counseling + Transfer*: counseling in prison and transfer to methadone maintenance in the community upon release; or, 3) *Counseling + Methadone*: counseling and methadone in prison with transfer to methadone treatment in the community upon release.

Participants

Participants were 211 male prisoners in a Baltimore pre-release facility. Eligibility criteria were: 1) three to six months before release from prison; 2) meeting Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)³⁴ criteria of heroin dependence at time of incarceration and being physiologically dependent during the year prior to incarceration; and 3) no pending parole hearings and/or unadjudicated charges; 4) having a Baltimore city address post-release; 5) suitability for methadone maintenance as determined by medical evaluation. Inmates were excluded from study participation if they had any unadjudicated charges and/or pending parole hearings. Follow-up data were available from 206 (98%) at 1- and 3-months; 203 (96%) at 6-months; and 194 participants (92%) at 12-months post-release.

The total sample of 211 participants was divided into two overlapping subsamples based on their behaviors in the 30 days preceding their index incarceration (see Table 1). The two subsamples were composed of those participants, during the 30 days prior to incarceration, (1) who reported injecting drugs at least once (injector subsample: $n = 131$ at baseline) and those participants (2) who reported one or more instances of unprotected sex (unprotected sex subsample: $n = 144$ at baseline). The two subsamples were created in order to assess post-release changes over time in the specific HIV risk behaviors in which the participants had a prior history of engaging.

Outcome Measures

The primary outcome measures at each time period were self-reported participation in risky drug- and sex- risk behaviors obtained from the Texas Christian University AIDS Risk Assessment (ARA). The ARA is a brief questionnaire whose items assess HIV drug-risk and HIV sex-risk behaviors over the 30-day period prior to the interview.²⁸ The ARA items inquire regarding the number of times an individual participated in risky behaviors or the number of people with whom they participated in risky activities. The ARA drug- and sex-risk subscales have both been shown to have internal consistency of α s above .70.²⁹ The ARA has been used to assess the effectiveness of interim methadone treatment compared to waiting list,¹³ an HIV risk reduction intervention³⁰ and to relate psychological functioning

to HIV risk-taking.^{31–33} Subscale scores are derived for drug- and sex- risk by summing the items in each scale. The subscale scores as well as the items themselves were included in separate analyses to determine the extent to which the sample was participating in risky behaviors in each domain.

The ARA was administered at baseline (in prison) and 1-, 3-, 6- and at 12-months post-release. The baseline assessment referred to the 30-day period prior to the current incarceration, while the 1-, 3-, 6- and 12-month post-release assessments referenced the 30 days prior to each assessment.

Drug-Risk Behaviors Subscale—The 5 HIV drug-risk items shown in Table 2 assess the frequency of injection, of sharing injection equipment and participating in risky behaviors with others were used to construct the drug-risk subscale. An examination of the 5 items found that the items had an internal consistency $\alpha = .73$. The scores on this scale ranged from 2.90 to 104.1.

Sex-Risk Behaviors Subscale—The 11 HIV sex-risk items (Table 2) assess the number of sexual partners and the frequency of sexual activity and of various types of unprotected sex. These 11 items had an internal consistency $\alpha = .91$. The scores on the resulting scale ranged from 2.3 to 26.4.

Statistical Analysis

The analyses of the ARA HIV drug- and sex-risk behavior subscales and the drug- and sex-risk behavior items were conducted on all available data from the sample of 211 respondents. Analyses of the HIV drug- and sex-risk items were also conducted on the data available on the 131 respondents who indicated at baseline that they had injected drugs in the past 30 days and the 144 who had unprotected sex in the past 30 days. A General Linear Mixed Model (GLMM) was used to test whether there was a change in HIV risk over the four time periods (i.e., Time main effect) and a difference in HIV risk among the three treatment conditions (Counseling Only, Counseling + Transfer; Counseling + Methadone; i.e., Condition main effect). Finally, GLMM was used to determine if there were significant changes in HIV risk over time were by the three Treatment Conditions (i.e., interaction effect).³⁵ Following detection of a significant main effect for Treatment Condition or Time, simple mean difference tests were conducted.

Because the baseline data on HIV risk were collected using a time-line follow back interview technique,³⁶ referenced to the 30 days prior to incarceration, it was possible that participant responses were biased by memory recall problems. Thus, we chose to analyze baseline differences in HIV risk behavior between the three treatment conditions separately from the analysis of change over the post-release period, which analysis examined data over only the 4 follow-up points. The post-release analyses included those 206 of the 211 parent study participants who completed at least at 1-month post-release assessment.

Results

Participant Characteristics

As shown in Table 1, participant baseline characteristics for the total sample as reported elsewhere²⁵ and the two subsamples, including demographics; lifetime drug use and treatment variables; and variables referencing the 30 days prior to the index incarceration, did not differ significantly among the three Treatment Conditions.

Baseline Analyses

As shown in Table 2, there were no significant differences on either the HIV drug- or sex-risk subscales or any drug-risk behavior items among Treatment Conditions for the 30 days prior to the index incarceration (all $ps > .06$). There were significant Treatment Condition effects for frequency of engaging in any kind of sex with someone ($p = .018$) and frequency of engaging in vaginal sex without using a condom ($p = .038$), with the *Counseling + Transfer* condition having the highest mean for both items.

Analysis of Post-Release HIV Risk Behavior: Total Sample

Examination of the post-release data (see *Participants*, above, for sample sizes available at each Time point) found significant Treatment Condition and Time main effects for HIV drug- and sex-risk behaviors. However, there were no significant Treatment Condition X Time interaction effects for these same behaviors (all $ps > .3$).

Drug-Risk—A test of the Time main effect (Table 3) found a significant decline in participation in past 30-day risky behaviors for some, but not all, of the HIV drug-risk items. Findings indicated that for the ARA drug-risk scale score, the frequencies of injecting, injecting with unsterilized needles and of injecting with others who were also injecting did not significantly decrease over Time (all $ps > .15$). However, there were significant decreases over Time in the frequency of participants reporting sharing cookers, cottons and rinse water ($p = .015$), and the number of people with whom the participant reported sharing the same works ($p = .039$), in the total study sample. Simple mean comparisons showed a significant decline ($p = .027$) in the frequency of sharing cookers, cottons or rinse water only between 1- and 12-month post-release. There were no significant differences in the mean number of people with whom the participants reported sharing works with between any of the post-release time periods.

There were also significant Treatment Condition main effect findings for drug risk behaviors (see Table 4). There were significant main effects for the overall ARA drug-risk scale score ($p = .001$), for frequency of injecting ($p = .001$), and frequency of using unsterilized needles ($p = .013$). For the 3 aforementioned items, the *Counseling Only* Condition had significantly higher means compared to the *Counseling + Transfer* ($ps = .028, .026$ and $.009$, respectively) and the *Counseling + Methadone* ($p < .001, < .001$, and $= .011$) Conditions, while the latter Conditions did not significantly differ from each other ($ps > .05$).

Sex-Risk—There were also significant changes in some of the sex-risk behaviors over Time (see Table 3) including scores on the HIV sex-risk scale ($p = .021$), and in some of the sex-risk items, notably, frequency of engaging in unprotected sex with someone who shoots drugs ($p = .001$), frequency of engaging in unprotected anal sex ($p = .001$), number of people engaged in sex with ($p = .009$), frequency of engaging in any kind of sex ($p < .001$), and engaging in unprotected sex with someone who smokes crack/cocaine ($p < .001$). The remaining HIV sex risk items did not significantly change over Time. There were significant differences between the 1- and 12-months post-release ($p = .022$) and 3-month and 6- ($p = .039$) and 12-months post-release ($p = .008$) means for the sex-risk scale score. For the number of people engaged in any kind of sex with, the 1-month significantly differed from 6- ($p = .010$) and 12-months post-release ($p = .007$) means and 3-month and 12-months post-release ($p = .031$) means significantly differed from each other, but no differences were found between the means for other Time periods (all $ps > .05$). For frequency of engaging in any kind of sex, there were significant differences between the 1- and 12-month ($p = .001$), 3- and 12-month ($p < .001$), and 6- and 12-months post-release ($p = .024$) means; no differences were found for the other Time periods (all $ps > .05$). For the frequency of engaging in unprotected sex with someone who shoots drugs, 1-month significantly differed

from 6- ($p = .003$) and 12-months post-release ($p = .001$) means; there were no differences found between the other Time periods (all $ps > .05$). For frequency of engaging in unprotected sex with someone who sometimes smokes crack/cocaine, there were significant differences between the 1- and 6-month ($p = .001$) and 3- and 6-month post-release ($p = .006$) means; no differences were found between the other Time periods (all $ps > .05$). For frequency of engaging in unprotected anal sex, there was a significant difference between 1- and 6-month post-release ($p < .001$) means; no significant differences occurred between the other Time periods (all $ps > .05$). All significant Time main effect simple mean comparisons for sex-risk revealed a decline in engaging in risky sex behaviors at the later point in time relative to the earlier point in time.

In contrast to findings for drug-risk behaviors, none of the Treatment Condition main effect findings for sex-risk behaviors were significant with the sole exception of frequency of engaging in any kind of sex ($p = .019$), with the *Counseling + Transfer* condition having a higher mean compared to the other two conditions. For frequency of engaging in any kind of sex, the *Counseling + Transfer* ($p = .009$) condition mean was significantly different from the *Counseling Only* ($p > .05$) and *Counseling + Methadone* ($p = .027$) condition means.

Analyses of Post-Release HIV Risk Behavior: Injector Subsample

There were no significant Treatment Condition X Time interaction effects in the injector subsample (all $ps > .36$). There were significant Time and Treatment Condition main effects for HIV drug-risk behaviors.

The injector subsample showed some significant Time main effects for drug-risk items. Specifically, as shown in Table 3, there was a significant decrease over time in the frequency of sharing cookers, cottons and rinse water ($p = .020$) and number of people with whom the participant reported sharing works ($p = .041$). There were significant differences between 1- and 12-month post-release means ($p = .033$), but not between the means for any of the other Time periods (all $ps > .05$). For number of people shared works with, there were no significant simple mean comparisons (all $ps > .05$). All significant Time main effect findings for drug-risk revealed a decline in engaging in risky drug-use behaviors.

There were significant Treatment Condition main effect findings for ARA drug-risk scale score ($p = .003$), frequency of injection ($p = .003$) and frequency of using unsterilized needles ($p = .023$), with the *Counseling Only* condition having the highest mean for all 3 items (see Table 3). The ARA drug-risk scale score for *Counseling Only* significantly differed from *Counseling + Methadone* ($p = .001$), but not from *Counseling + Transfer* ($p > .050$) and *Counseling + Transfer* did not significantly differ from *Counseling + Methadone* ($p > .050$). For frequency of injection, *Counseling Only* significantly differed from *Counseling + Methadone* ($p = .001$), but not from *Counseling + Transfer* ($p > .05$). There were no significant differences between *Counseling + Transfer* and *Counseling + Methadone* for frequency of injection ($p > .05$).

Analysis of Post-Release HIV Risk Behavior: Unprotected Sex Subsample

There were no significant Time X Treatment Condition interaction effects in the unprotected sex subsample (all $ps > .5$). There were significant changes in some HIV sex risk items by Time, although as shown in Table 4, there were no significant Treatment Condition main effects (all $ps > .26$).

As shown in Table 3, there were significant changes over Time for ARA sex-risk scale score ($p = .040$), frequency of engaging in any kind of sex ($p = .003$), frequency of engaging in unprotected sex with someone who shoots drugs ($p = .012$), and frequency of engaging in unprotected sex with someone who sometimes smokes crack/cocaine ($p = .013$). There were

significant differences between the 1- and 12-months post-release ($p = .038$) and 3- and 12-months post-release ($p = .011$) means for the ARA sex-risk scale score. No significant differences were found between the ARA sex-risk mean scores for the other Time periods (all $ps > .05$). For frequency of engaging in any kind of sex, there were significant differences between the 1- and 12- ($p = .003$), 3- and 12- ($p = .001$), and 6- and 12-months post-release ($p = .048$) means. There were no significant differences for engaging in any kind of sex between 1- and 3-months post-release or 3- and 6-months post-release (both $ps > .050$) means. For frequency of engaging in unprotected sex with someone who sometimes smokes crack/cocaine, there were significant differences between 1- and 6-months post release ($p = .020$) means and 3- and 6-months post-release ($p = .015$) means, but these were the only significant simple mean differences (all $ps > .05$). All significant Time main effect simple mean comparisons showed a decline in participation in risky sex behaviors at the later point in time relative to the earlier point in time.

Discussion

This is the first report in the literature, of which we are aware, to examine the HIV drug- and sex-risk behaviors over the course of 12-months post-release from a clinical trial of prison-based methadone treatment. In both the total sample and the subsample of injectors, there were significant Treatment Condition main effects. The *Counseling Only* Condition reported injecting drugs more often and using unclean syringes more frequently over the course of the 12 month post-release follow up compared to the *Counseling + Methadone* and the *Counseling + Transfer* Conditions. Thus, having the opportunity to initiate methadone in prison or immediately upon release was associated with reduced HIV drug-risk behaviors.

There were two randomized trials of jail-based methadone treatment conducted in New York City. Both of these studies, a small pilot study of historic interest³⁷ and a larger study conducted more recently²⁴ showed a decrease in self-reported heroin use associated with methadone treatment upon release in the community. However, these trials did not report data on drug injection or needle sharing, so direct comparisons cannot be drawn with the present report.

There were also some significant Time main effects in terms of reductions in HIV drug-risk behaviors over the 12-month post-release period. The frequency of sharing cookers, cottons and rinse water and the number of people with whom participants reported sharing their works both significantly decreased over time. Thus, it would seem that newly-released prisoners are at their greatest HIV drug-risk during the early stages of their release. This conclusion is in keeping with findings from community based cohort studies with formerly incarcerated individuals conducted on several continents.⁸⁻¹⁰ Taken together, these findings, along with those indicating that relapse to heroin addiction,³⁸⁻⁴⁰ overdose death,⁴¹⁻⁴³ and increased criminal activity^{44,45} also are disproportionately most likely to occur within one month of release from incarceration, highlight the importance of making a close connection with drug abuse treatment at release from prison for newly-released prisoners.

We were unable to locate any research on changes in HIV sex-risk behaviors post-incarceration in studies of prison methadone treatment. In the present study, there was little evidence that Treatment Condition was associated with reduction in sexual risk behaviors post-release. This is not entirely surprising, as there were no structured HIV risk interventions incorporated into the study Conditions other than what is routinely supplied as part of community-based drug treatment.

There were a number of significant reductions reported in sex-risk behaviors over the 12 month post-release time frame. For the total sample, significant reductions over time were

found for the overall HIV sex-risk scale score, the number of sexual partners, the frequency of engaging in unprotected anal intercourse and the frequency with which participants reported engaging in unprotected sex with someone who injects drugs. It is not clear if these reductions were due to initial increases in risky sexual behaviors upon release during the first month post-incarceration because of exiting from a restrictive prison environment, because of disengagement from drug-using social networks, or if they was a tendency to provide more socially acceptable answers to the research assistants as time went on.

Limitations

There are a number of limitations to the present study. This was a single site study conducted with males only and therefore findings can not necessarily be generalized to other populations. The post-release HIV risk instrument was administered by unblinded research assistants. The sensitive nature of the HIV risk questions conducted during a face-to-face interview may have resulting in underreported participation in risky behaviors. Baseline data on risky behaviors from the 30 days prior to incarceration may have engendered recall bias. Finally, we conducted a number of tests of significance on the specific items and hence our conclusions may be biased to some unknown extent by Type I errors.

Future Research

More research is need on the impact of pre-release pharmacotherapy for opioid-dependent prisoners. Other medications besides methadone, including buprenorphine and naltrexone, are available and could be studied in comparative effectiveness trials. Research is also warranted on in-prison HIV-risky behaviors to provide public health practitioners and prison officials with a picture of the magnitude of HIV risk among prisoners and to lend further support to the implementation of evidence-based practices in jails and prisons.

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Table 1Sample Characteristics at Baseline ($N = 211$)

	Total Sample ($N = 211$)	Injector Subsample ($n = 131$)	Unprotected Sex Subsample ($n = 144$)
Treatment Condition:			
Counseling Only	70 (33.2)	48 (36.6)	43 (29.9)
Counseling + Transfer	70 (33.2)	40 (30.5)	56 (38.9)
Counseling + Methadone	71 (33.6)	43 (32.8)	45 (31.3)
Demographic Variables			
Age (M/SD)	39.9 (7.1)	40.9 (7.4)	39.1 (7.1)
Education (M/SD)	11.0 (1.8)	10.9 (1.9)	11.0 (1.8)
Race ($N/\%$)			
African-American	147 (69.7)	78 (59.5)	99 (68.8)
White	51 (24.2)	41 (31.3)	36 (25.0)
Other	13 (6.2)	12 (9.2)	9 (6.3)
Criminal Activity Variables (M/SD)			
Age first crime (M/SD)	13.6 (4.6)	13.9 (4.2)	13.4 (4.8)
Current incarceration (months) (M/SD)	1.3 (1.5)	1.2 (1.5)	1.5 (1.7)
Lifetime incarceration (months) (M/SD)	113.5 (92.0)	123.0 (104.7)	115.7 (90.2)
Substance Use Variables			
Age first heroin use (M/SD)	18.4 (4.9)	18 (4.3)	18.4 (4.6)
Past 30 days heroin use* (M/SD)	27.2 (7.6)	28.5 (5.3)	27.1 (7.7)
Past 30 days cocaine use* (M/SD)	18.2 (13.3)	19.8 (12.6)	17.7 (13.3)
Lifetime Route of Heroin Administration ($N/\%$)			
Injector	131 (62.1)	128 (97.7)	94 (65.3)
Non-injector	80 (37.9)	3 (2.3)	50 (34.7)
Lifetime substance abuse treatment (times) (M/SD)	2.0 (3.1)	2.3 (3.1)	1.7 (2.3)

* This information was gathered at baseline interview but referred to the 30 days of behavior prior to the index incarceration.

Table 2

Means and (Standard Errors) for Baseline Drug Use and Sex Risk Behaviors (N= 211)

	Total	Counseling Only (n = 70)	Counseling + Transfer (n = 70)	Counseling + Methadone (n = 71)	p
ARA Drug-Risk Scale Score	60.0 (5.1)	70.0 (8.8)	52.9 (8.8)	57.1 (8.6)	.362
Times injected?	37.2 (2.6)	45.8 (4.5)	33.9 (4.5)	31.9 (4.4)	.064
Times used unsterilized needles?	1.6 (.83)	.97 (1.4)	1.2 (1.4)	2.6 (1.4)	.695
Times used the same cooker, cotton or rinse water that someone else had used?	5.0 (1.1)	5.3 (2.0)	3.1 (2.0)	6.6 (2.0)	.466
Times injected drugs with other people who were also injecting?	15.8 (1.7)	17.8 (3.0)	13.5 (3.0)	16.1 (3.0)	.612
Number of PEOPLE shared the same works with?	.78 (.35)	.34 (.61)	1.4 (.62)	.62 (.60)	.466
ARA Sex-Risk Score	48.1 (2.8)	41.6 (4.9)	56.1 (4.9)	46.7 (4.8)	.108
Number of PEOPLE you had any kind of sex with?	1.3 (.07)	1.4 (.13)	1.3 (.12)	1.2 (.12)	.712
Times you had any kind of sex with someone?	12.1 (.52)	10.5 (.92)	14.2 (.91)	11.7 (.89)	.018
Times had sex without using a latex condom?	8.7 (.51)	7.5 (.90)	10.3 (.90)	8.5 (.86)	.079
<i>When you had sex without using a latex condom, how many times was it...</i>					
...with someone who was not your spouse or primary partner?	1.8 (.29)	2.0 (.51)	1.4 (.51)	2.1 (.49)	.523
...with someone shoots drugs with needles?	1.6 (.32)	1.5 (.56)	1.6 (.56)	1.7 (.54)	.952
...with someone who sometimes smokes crack/cocaine?	1.1 (.17)	1.3 (.30)	1.1 (.30)	.92 (.29)	.596
...while you or your partner was "high" on drugs or alcohol?	5.2 (.41)	4.1 (.72)	6.3 (.72)	5.3 (.70)	.125
...while trading (giving/getting) sex for drugs or alcohol?	.75 (.19)	.62 (.33)	.60 (.33)	1.0 (.32)	.579
Times you had vaginal sex without using a condom?	9.0 (.68)	7.2 (1.2)	11.4 (1.1)	8.4 (1.1)	.038
Times had oral sex without using a condom?	5.6 (.44)	4.4 (.78)	6.9 (.78)	5.3 (.75)	.070
Times had anal sex in those 30 days without using a condom?	.78 (.13)	.87 (.23)	1.0 (.23)	.44 (.22)	.168

Note: Baseline data reported herein retrospectively collected at study entry for the period encompassing the 30 days prior to the index incarceration.

Table 3
Means and (Standard Errors) of Past 30-Day HIV Drug- and Sex-risk Behaviors for Time Main Effect

Question	1 Month (n = 206)	3 Months (n = 206)	6 Months (n = 203)	12 Months (n = 194)	p
Total Sample (N = 206)					
ARA Drug Risk Scale Score	22.3(5.0)	31.8(5.6)	27.7(5.6)	22.4(5.3)	.547
Times injected?	13.8(2.7)	24.2(4.2)	21.7(4.5)	16.0(3.5)	.146
Times used unsterilized needles?	.09 (.04)	.16(.13)	.16(.11)	*	.756
Times used same cooker/cotton/rinse water someone else used?	2.7(1.2)	1.4(.76)	.62(.41)	.01(.01)	.015
Times injected drugs with others who were also injecting?	5.5(1.8)	5.6(1.7)	5.0(1.7)	6.4(2.3)	.976
Number of PEOPLE shared the same works with?	.20(.10)	.44(.25)	.16(.11)	.01(.01)	.039
ARA Sex Risk Scale Score	38.7(3.6)	46.7(6.4)	31.3(3.6)	26.7(3.8)	.021
Number of PEOPLE you had any kind of sex with?	1.4(.13)	1.4(.19)	1.0(.11)	.88(.16)	.009
Times you had any kind of sex with someone?	11.5(.92)	12.1(1.0)	10.0(.89)	7.3(.82)	<.001
Times had sex without using a latex condom?	7.1(.88)	8.7(1.0)	6.6(.87)	5.3(.80)	.079
<i>When you had sex without a condom, how many times was it...</i>					
...with someone who was not your spouse or primary partner?	1.3(.26)	2.0(.89)	.63(.33)	.91(.39)	.314
...with someone who shoots drugs with needles?	.77(.20)	1.2(.64)	.13(.07)	.04(.03)	.001
...with someone who sometimes smokes crack/cocaine?	.73(.18)	.79(.24)	.10(.05)	.44(.24)	<.001
...while you or your partner was "high" on drugs or alcohol?	2.8(.50)	4.1(.79)	2.8(.53)	2.3(.51)	.307
...while trading (giving/getting) sex for drugs or alcohol?	.44(.14)	.54(.52)	.10(.08)	.40(.23)	.125
Times you had vaginal without using a condom?	7.5(.85)	10.3(2.6)	6.5(.86)	5.3(.79)	.109
Times had oral sex without using a condom?	4.3(.73)	4.9(.88)	3.3(.70)	3.5(.69)	.451
Times had anal sex in those 30 days without using a condom?	.79(.19)	.55(.33)	.05(.05)	.37(.25)	.001
Injector Subsample (N = 126)					
ARA Drug Risk Scale Score	33.8(7.6)	48.3(8.5)	39.7(8.4)	36.4(8.4)	.625
Times injected?	20.9(4.0)	36.7(6.3)	30.6(6.8)	25.9(5.5)	.184
Times used unsterilized needles?	.13(.07)	.23(.20)	.22(.18)	*	.805
Times used same cooker/cotton/rinse water someone else used?	4.0(1.9)	2.2(1.2)	1.0(.65)	.02(.02)	.020
Times injected drugs with others who were also injecting?	8.3(2.8)	8.5(2.7)	7.6(2.6)	10.5(3.8)	.943
Number of PEOPLE shared the same works with?	.31(.15)	.69 (.39)	.26(.17)	.02(.02)	.041
Unprotected Sex Sub-Sample (N = 140)					
ARA Sex Risk Scale Score	48.5(4.9)	61.0(9.3)	41.4(5.1)	33.7(5.1)	.040

Question	1 Month (n = 206)	3 Months (n = 206)	6 Months (n = 203)	12 Months (n = 194)	p
Number of PEOPLE you had any kind of sex with?	1.6(.18)	1.5(.26)	1.1(.15)	1.0(.24)	.097
Times you had any kind of sex with someone?	14.0(1.2)	14.9(1.3)	12.3(1.2)	9.0(1.1)	.003
Times had sex without using a latex condom?	9.5(1.2)	11.4(1.4)	9.1(1.2)	6.9(1.1)	.082
<i>When you had sex without a condom, how many times was it...</i>					
...with someone who was not your spouse or primary partner?	1.5(.36)	2.8(1.3)	1.0(.50)	1.2(.56)	.613
...with someone who shoots drugs with needles?	.80(.27)	1.8(.95)	.20(.10)	.06(.05)	.012
...with someone who sometimes smokes crack/cocaine?	.75(.24)	.97(.32)	.15(.08)	.38(.27)	.013
...while you or your partner was "high" on drugs or alcohol?	3.6(.73)	5.8(1.1)	3.9(.77)	2.8(.71)	.174
...while trading (giving/getting) sex for drugs or alcohol?	.35(.16)	.85(.78)	.13(.12)	.37(.23)	.529
Times you had vaginal sex without using a condom?	10.2(1.2)	13.6(3.8)	8.9(1.2)	6.8(1.01)	.095
Times had oral sex without using a condom?	5.3(.98)	6.6(1.2)	4.6(1.0)	4.6(.95)	.565
Times had anal sex in those 30 days without using a condom?	.73(.22)	.63(.49)	**	**	.851

* All responses for this item were "0" at 12 month follow-up

** Majority of responses for 6 and 12 month follow-up were "0"

Table 4

Means and (Standard Errors) on HIV Drug- and Sex-Risk Behaviors for Treatment Condition Main Effect

Question	Counseling Only (n = 65)	Counseling + Transfer (n = 70)	Counseling + Methadone (n = 71)	p
Total Sample (N = 206)				
ARA Drug Risk Scale Score	39.0(4.8)	24.2(4.6)	14.9(4.5)	.001
Times injected?	28.1(3.4)	17.5(3.3)	11.2(3.2)	.001
Times used unsterilized needles?	.38(.10)	.00(.10)	.01 (.10)	.013
Times used same cooker/cotton/rinse water someone else used?	2.1(.66)	.82(.64)	.58(.62)	.180
Times injected drugs with other people who were also injecting?	8.2(1.7)	5.6(1.6)	3.0(1.6)	.083
Number of PEOPLE shared the same works with?	.24(.13)	.31(.12)	.06(.12)	.334
ARA Sex Risk Scale Score	32.1(4.0)	42.5(3.9)	33.1(3.8)	.119
Number of PEOPLE you had any kind of sex with?	1.2(.14)	1.3(.13)	1.0(.13)	.328
Times you had any kind of sex with someone?	9.0(.82)	12.0(.79)	9.6(.77)	.019
Times had sex without using a latex condom?	6.2(.80)	8.0(.77)	6.6(.75)	.235
<i>When you had sex without a condom, how many times was it...</i>				
...with someone who was not your spouse or primary partner?	1.7(.47)	1.0(.46)	.85(.45)	.353
...with someone who shoots drugs with needles?	.50(.30)	.55(.29)	.59(.28)	.976
...with someone who sometimes smokes crack/cocaine?	.46(.18)	.54(.17)	.54(.17)	.929
...while you or your partner was "high" on drugs or alcohol?	2.7(.53)	3.6(.52)	2.7(.50)	.352
...while trading (giving/getting) sex for drugs or alcohol?	.25(.26)	.33(.26)	.52(.25)	.737
Times you had vaginal without using a condom?	6.2(1.3)	9.5(1.3)	6.5(1.2)	.137
Times had oral sex without using a condom?	3.4(.67)	4.9(.65)	3.8(.63)	.230
Times had anal sex in those 30 days without using a condom?	.40(.21)	.67(.20)	.26(.19)	.330
Injector Subsample (n = 126)				
ARA Drug Risk Scale Score	56.6(7.1)	39.7(7.3)	22.4(7.0)	.003
Times injected?	40.7(4.9)	28.2(5.1)	16.6(4.9)	.003
Times used unsterilized needles?	.56(.16)	.00(.17)	.02(.16)	.023
Times used same cooker/cotton/rinse water someone else used?	3.1(.99)	1.3(1.0)	.95(.99)	.256
Times injected drugs with others who were also injecting?	12.0(2.6)	9.6(2.7)	4.7(2.5)	.125
Number of PEOPLE shared the same works with?	.34(.19)	.51(.20)	.10(.19)	.319
Unprotected Sex Sub-Sample (n = 140)				
ARA Sex Risk Scale Score	46.1(5.9)	49.8(5.0)	42.6(5.5)	.629
Number of PEOPLE you had any kind of sex with?	1.5(.20)	1.4(.17)	1.1(.19)	.322
Times you had any kind of sex with someone?	12.0(1.1)	13.7(.98)	12.0(1.1)	.413
Times had sex without using a latex condom?	9.4(1.1)	9.7(.98)	8.6 (1.1)	.746
<i>When you had sex without a condom, how many times was it...</i>				
...with someone who was not your spouse or primary partner?	2.6(.73)	1.2(.63)	1.1(.69)	.271
...with someone who shoots drugs with needles?	.75(.46)	.66(.40)	.77(.43)	.982

Question	Counseling Only (n = 65)	Counseling + Transfer (n = 70)	Counseling + Methadone (n = 71)	p
...with someone who sometimes smokes crack/cocaine?	.69(.23)	.50(.19)	.50(.21)	.777
...while you or your partner was "high" on drugs or alcohol?	4.0(.80)	4.3(.68)	3.7(.75)	.829
...while trading (giving/getting) sex for drugs or alcohol?	.33(.39)	.26(.33)	.69(.37)	.673
Times you had vaginal sex without using a condom?	9.2(2.0)	11.6(1.7)	8.8(1.9)	.489
Times had oral sex without using a condom?	5.1(.99)	5.6(.84)	5.1(.92)	.912
Times had anal sex in those 30 days without using a condom?	.65(.50)	1.1(.43)	.33(.47)	.510