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Reducing risky relationships: A multi-site randomized trial of a prison-based intervention for reducing HIV sexual risk behaviors among women with a history of drug use

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Abstract

Women involved in the criminal justice system, particularly those with a history of drug use, are at elevated risk of HIV infection, yet few HIV prevention interventions have been tailored for delivery to incarcerated women. Drawing on the Relational Model (Miller, 1976; Covington, 1998), the *Reducing Risky Relationships for HIV (RRR-HIV)* intervention was developed and evaluated in a multi-site randomized clinical trial. Women with weekly drug use prior to incarceration (n=444) who were incarcerated within correctional institutions in four states were randomized to: (1) the *RRR-HIV* intervention consisting of an HIV educational video, five group sessions and one post-release booster session, or (2) a control condition consisting of the HIV educational video. The *RRR-HIV* intervention combined didactic and interactive content regarding seven “thinking myths” about intimate relationships that may result in decisions to engage in risky sexual behaviors. Data were collected while women were still incarcerated and approximately 90 days following release from prison by trained interviewers. A negative binomial regression model of unprotected sexual behaviors at the 90-day follow-up indicated that *RRR-HIV* participants reported fewer unprotected sexual behaviors than women in the control condition once the analysis was adjusted for study site. Future studies should examine the sustainability of the *RRR-*

HIV intervention's effect on risk reduction. Implementation research is needed to determine whether delivery of this intervention by correctional staff or peers, rather than research staff, yields similar reductions in unprotected sexual behaviors.

Keywords

HIV prevention intervention; HIV sexual risk behaviors; women; criminal justice; drug use

Introduction

Women who use illicit drugs and are involved in the criminal justice system are at elevated risk of contracting HIV. The rate of HIV infection for incarcerated women is 15 times greater than women in the general US population (De Groot & Cu Uvin, 2005). Furthermore, the rate of HIV infection is greater for female inmates than male inmates (Harrison & Beck, 2006). Much of this risk is associated with injection drug use (Altice et al., 2005; Tortu, Beardsley, Deren, & Davis, 1994) and unprotected sexual encounters (Quinn & Overbaugh, 2005).

These heightened risks among incarcerated women prompted the development and testing of the intervention, *Reducing Risky Relationships for HIV (RRR-HIV)*. *RRR-HIV* was informed by the Relational Model (Covington & Surrey, 1997; Covington, 1998; Finkelstein, 1996; Finkelstein & Piedade, 1993; Miller, 1976), which posits that relationships are highly significant for women. While positive relationships can support healthy choices, women may engage in risky behaviors if they perceive that such behaviors are necessary to maintain their relationships (Wingood & DiClemente, 1998).

Women offenders often have complex histories of abusive relationships, including physical, sexual, and emotional abuse in childhood and adulthood (Carlson, Shafer, & Duffee, 2010; Grella, Stein, & Greenwell, 2005; McLellan, Farabee, & Crouch, 1997; Peters, Strozier, Murrin, & Kearns, 1997; Salisbury & Van Voorhis, 2009). Their histories frequently reveal intersections between unhealthy relationships, psychological problems, and substance abuse (Salisbury & Van Voorhis, 2009). Patterns of sexual risk behaviors often resume after women offenders re-enter their communities (Khan et al., 2008), making this a critical time for intervention efforts.

When *RRR-HIV* was developed, scholars noted that few interventions targeted the needs of drug-using women offenders and the role of relationships in women's sexual decision-making (Gomez, 2011; Kramer & Comfort, 2011; Logan, Cole, & Leukefeld, 2002; Staton Tindall et al., 2007). *RRR-HIV* drew upon focus groups with 36 incarcerated women which generated seven "thinking myths," or cognitions about relationship experiences linked to sexual risk behaviors (Staton Tindall, et al., 2007). The "thinking myths" addressed beliefs that 1) unprotected sex strengthened relationships; 2) being in a relationship was central to self-worth; 3) drug use did not preclude healthy sexual choices; 4) a partner's presentation of self could indicate "safety" (i.e., lack of HIV risk); 5) perceived invincibility regarding contracting HIV; 6) long-term relationships no longer required safe sexual practices; and 7) the strategic value of sex in achieving relationship goals (Havens et al., 2009).

These “thinking myths,” combined with information about HIV transmission, were the basis for a manualized group-based intervention for the prison setting with a post-release booster session (Leukefeld et al., 2009). In addition to its relationship focus, *RRR-HIV* sought to increase knowledge, attitudes, and behaviors regarding the male latex condom because consistent condom use is the most effective method for preventing heterosexual HIV transmission (Harvey et al., 2006).

The outcomes of *RRR-HIV* were evaluated in a multi-site randomized clinical trial. Women in *RRR-HIV* reported significantly greater HIV knowledge and lower endorsement of the “thinking myths” at follow-up than women in the control condition (Leukefeld et al., 2012). The present paper examines the impact of *RRR-HIV* on past-month unprotected sexual behaviors at follow-up, while considering other variables that may be associated with these behaviors.

Methods

Study Design

This two-arm randomized clinical trial, *Reducing Risky Relationships for HIV (RRR-HIV)*, was conducted between March 2007 and December 2008 as part of the National Institute on Drug Abuse's (NIDA) Criminal Justice Drug Abuse Treatment Studies (CJ-DATS) cooperative agreement (Havens, et al., 2009; Leukefeld, et al., 2012; Staton Tindall, et al., 2007; Wexler & Fletcher, 2007). Women in both study conditions viewed the 17-minute video, *Drug Abuse and HIV: Reaching Those at Risk* (National Clearinghouse for Alcohol and Drug Information, NCADI Stock #VHS-74) during a pre-randomization screening session. The *RRR-HIV* condition consisted of five prison-based group sessions and a single booster delivered by telephone or face-to-face approximately 30 days post-release. Fidelity to the intervention was high (Havens, et al., 2009). In the control condition, women watched the HIV video, but received no further intervention. Institutional review boards at University of Connecticut, University of Delaware, University of Kentucky, and Memorial Hospital of Rhode Island and the CJ-DATS Research Management Subcommittee approved this protocol.

Recruitment occurred within four state correctional facilities in Connecticut, Delaware, Kentucky, and Rhode Island. Women nearing release received invitations to attend screening sessions in which trained research staff described the study, invited participation, and obtained informed consent. Women were assured their decision regarding participation would not affect their criminal justice status. Women completed an eligibility screening form and watched the HIV awareness video. Inclusion criteria were: (1) being scheduled to appear before the parole board or complete one's sentence within six weeks of recruitment; (2) at least weekly substance use prior to entering prison; (3) aged 18 or older; and (4) willingness to be randomized. Exclusion criteria were: (1) reporting past-month psychotic features and (2) having specific parole/probation conditions that would prohibit participation. Of 599 women screened, 124 women were ineligible, largely due to insufficient pre-incarceration drug use (n=59) and release-related reasons (n=56). Among the 475 eligible women, 444 women were randomized using *Research Randomizer*

(Urbaniak & Plous, 2010), 26 declined to participate, and 5 were discharged prior to receiving *RRR-HIV* (n=4 due to prison transfers; n=1 for mental health reasons).

Data were collected via structured questionnaires administered by trained interviewers. Baseline interviews lasting about 2 hours generally occurred during the week following the screening session in the prison's visitation room. Participants received a US\$20 honorarium. Follow-up interviews were conducted approximately 90 days after release. Women who were not released prior to study's conclusion (n=66) were ineligible for follow-up. Telephone or face-to-face interviews were attempted with all women who were released, even if they were reincarcerated. Follow-up data were obtained from 346 of 378 women (91.5%) released from prison. Rates of follow-up did not differ by site or by study condition. At follow-up, participants received a US\$20 honorarium.

Measures

The dependent variable of past-month number of unprotected sexual behaviors was measured using NIDA's (1995) Risk Behavior Assessment instrument. Unprotected sexual behaviors were defined as vaginal, anal, and/or oral sexual behaviors without protection (e.g., condom, dental dam) in the 30 days prior to the 90-day follow-up interview.

Independent variables included study assignment (1=*RRR-HIV*, 0=control), baseline unprotected sexual behaviors, study site, and demographic characteristics. Given that past risk behaviors may be associated with the dependent variable (Albarracin, Johnson, Fishbein, & Muellerleile, 2001), we controlled for the number of unprotected sexual behaviors in the 30 days prior to the arrest that resulted in incarceration. Study site differentiated women in Delaware, Rhode Island, and Connecticut from women in Kentucky (reference group) to address socio-demographic heterogeneity as well as state-level variation in how criminal justice systems are managed (Beckett & Western, 2001; Stucky, Heimer, & Lang, 2007).

Socio-demographic variables included age in years, education (1 = at least high school education, 0 = less than high school education), and race (white, African American, or other, with white women as the reference group). As noted by Wingood and DiClemente (2000), these characteristics represent socio-economic "exposures," with being younger, having limited education, and being of a racial/ethnic minority group representing risk factors for HIV acquisition.

Weekly drug use of marijuana, powder cocaine, crack, heroin, and other opiates were included in the analysis. Women were categorized into those who used a given substance at least weekly in the 30 days prior to the arrest that led to incarceration (coded 1) versus those with less than weekly or no use (coded 0).

Finally, re-incarceration at follow-up was controlled. Women with histories of substance use face many challenges upon release (Richie, 2001; Robbins, Martin, & Surratt, 2009), often resulting in recidivism and re-incarceration (Adams, Leukefeld, & Peden, 2008). While not eliminating risky behaviors, incarceration reduces the frequency of sexual risk behaviors (Hogben, Lawrence, & Eldridge, 2001).

Analysis

All analyses were conducted in *Stata 12.1* (StataCorp, College Station, TX). Descriptive statistics were calculated with comparisons by study condition and study site. Multiple imputation by chained equations was implemented using the “mi impute chained” command to avoid the recognized limitations of listwise deletion (Allison, 2002, 2009). Drawing on the work of Royston (2004, 2005a, 2005b), “mi impute chained” estimates a series of iterative imputation models based on the other variables in the model (StataCorp, 2011). A sequence of imputations were estimated, beginning with variables with the least missing data and then progressing to those with greater missing data with the specified link function based on the level of measurement for each variable (e.g., logistic regression when the variable is dichotomous, linear regression for continuous variables, etc.). Our specification of “mi impute chained” included all variables presented in Measures.

Prior to imputation, consideration was given to study features that posed challenges to a traditional intent-to-treat analysis. Baseline data collection, randomization, and most of *RRR-HIV* occurred during incarceration. Based on an *a priori* decision to not collect follow-up data from unreleased women, 66 women were excluded from analysis. However, 32 women were released but lost to follow-up. Consistent with principles of intention-to-treat analysis (Polit & Gillespie, 2010), their missing follow-up data was imputed. Our use of “mi impute chained” produced 20 datasets with each containing 378 participants.

Following imputation, we estimated negative binomial regression (NBR) models of unprotected sexual behaviors because this dependent variable consisted of a count (Beck & Tolnay, 1995; Long & Freese, 2006). NBR is advantageous for skewed distributions in which a sizeable proportion of cases have counts of zero (Long, 1997). Models were estimated using the “mi estimate: nbreg” command, which produces a single set of results that combines the estimates from the 20 imputed datasets (StataCorp, 2011).

Results

Table I presents descriptive statistics as well as comparisons by study site. In the month prior to arrest, the average participant engaged in a substantial number of unprotected sexual behaviors (mean=36.9; SD=67.4); only 19.6% of women reported no unprotected sexual behaviors during this pre-arrest period. At the 90-day follow-up, the average number of unprotected sexual behaviors was much lower (mean=6.5, SD=16.2). About 66.9% of participants reported no past-month unprotected sexual behaviors at follow-up.

Cross-site comparisons indicated the average number of past-month unprotected sexual behaviors at baseline did not vary by site, but a one-way analysis of variance (ANOVA) revealed significant differences at follow-up ($F_{3,340}=4.49, p<.01$). Site-level means with the Bonferroni correction showed a significant difference ($p<.05$) between women from Kentucky and Delaware as well as women from Delaware and Rhode Island. Significant differences between sites were identified for race ($\chi^2=88.33, df=6, p<.001$), age ($F_{3,373}=3.15, p<.05$), re-incarceration ($\chi^2=125.22, df=3, p<.001$), weekly marijuana use ($\chi^2=10.16, df=3, p<.05$), weekly crack use ($\chi^2=13.11, df=3, p<.01$), weekly heroin use ($\chi^2=22.52, df=3, p<.001$), and weekly other opiate use ($\chi^2=29.93, df=3, p<.001$). Women

from Connecticut were significantly older than women from Delaware ($F_{3,374}=3.15, p<.05$). Re-incarceration was significantly greater in Delaware than the other three sites ($\chi^2=125.22, df=3, p<.001$).

Baseline characteristics of the 378 women were compared by study condition (Table II). Women in *RRR-HIV* reported significantly fewer baseline unsafe sexual behaviors than women in the control condition ($t=2.15, df=375, p<.05$). However, women in *RRR-HIV* were significantly more likely than women in the control group to report weekly cocaine use ($\chi^2=7.23, df=1, p<.01$).

To compare *RRR-HIV* to the control condition, we first estimated a negative binomial regression (NBR) model of past-month unprotected sexual behaviors at follow-up where study assignment was the only variable. The two conditions did not differ ($b=-.465, SE=.287, p=.105$). Once study site was added to the model, a significant difference in unprotected sexual behaviors was detected ($b=-.665, SE=.295, p=.02$), with *RRR-HIV* participants reporting fewer past-month unprotected sexual behaviors than women in the control condition.

The final NBR model of unprotected sexual behaviors appears in Table III. Demographic characteristics, study site, baseline unprotected sexual behaviors, re-incarceration, and preincarceration weekly drug use did not mediate the relationship between study assignment and unprotected sexual behaviors. Women in *RRR-HIV* reported significantly fewer past-month unprotected sexual behaviors than women assigned to the control condition. This difference was substantial, with a 55.3% reduction in the expected count of past-month unprotected sexual behaviors for *RRR-HIV* relative to the control condition [$55.3\%=(100)(e^{(-.806)}-1)$].

Three other variables were significantly associated with past-month unprotected sexual behaviors. Women from Rhode Island engaged in more unprotected sexual behaviors at follow-up than women from Kentucky, while women in Connecticut engaged in fewer unprotected sexual behaviors than Kentucky women. Re-incarceration and age were negatively associated with unprotected sexual behaviors. A comparison of the final model to an analysis based on complete cases (not shown) did not substantially alter the key findings.

Discussion

Incarcerated women are disproportionately affected by substance abuse and HIV/AIDS, making the identification of effective risk reduction interventions a significant public health priority. In this study, the frequency of unprotected sexual behaviors at follow-up was significantly lower for women offenders who received a manualized intervention, *Reducing Risky Relationships for HIV (RRR-HIV)*, once study site were controlled. This difference remained significant after other characteristics were added to the model.

Although there is a considerable body of research on HIV risk reduction interventions in other settings (Semaan et al., 2002), few studies have examined interventions for incarcerated women (Epperson et al., 2010). In a recent review, only five interventions for incarcerated women were identified, of which *RRR-HIV* was one (Lichtenstein & Malow,

2010). A four-session educational intervention for incarcerated women demonstrated no significant change in sexual risk behaviors (Magura, Kang, Shapiro, & O'Day, 1995). A 16-session cognitive-behavioral and social support intervention found greater reduction in sexual risk behaviors than six hours of HIV/AIDS education, after controlling for marital status and intervention session attendance (El-Bassel, Ivanoff, Schilling, Borne, & Gilbert, 1997; El-Bassel et al., 1995). Two studies did not collect post-release data to examine risk behaviors (Pomeroy, Kiam, & Abel, 1999; St. Lawrence et al., 1997). When *RRR-HIV* is placed in the context of this literature, it represents an important contribution regarding HIV risk reduction for this population.

Unprotected sexual behaviors varied by state in the final model, with women in Rhode Island reporting more risky behaviors and women in Connecticut reporting fewer risky behaviors than women in Kentucky. These differences are difficult to explain given that pre-incarceration levels of unprotected sexual behaviors did not vary by state. We do not believe that this finding reflects differences in the delivery of *RRR-HIV* because high fidelity was achieved at all sites (Havens, et al., 2009). This finding defies a simple explanation regarding potential rural-urban differences; these two northeastern states are more urban than Kentucky, yet the associations are in opposite directions. Future research should consider whether other site-level differences in post-release risk behaviors (e.g., drug use) or cognitions (e.g., HIV risk perceptions, endorsement of the seven “thinking myths”) may explain these differences.

Re-incarceration was negatively associated with unprotected sexual behaviors, a finding consistent with prior research (Hogben, et al., 2001). This finding may reflect reduced opportunities for unprotected sexual behaviors. Re-incarceration may reduce the likelihood of identifying new sexual partners or reviving previous relationships. In addition, re-incarceration compresses the amount of time that study participants were in the community.

The negative association between age and unprotected sexual behaviors also aligned with previous studies. Decreases in sexual activity over the life course have been previously documented for women in general (Zablotsky & Kennedy, 2003), community-dwelling women receiving substance abuse treatment (Campbell et al., 2009), and women in prison with histories of drug use (Staton, Walker, & Leukefeld, 2003). Future research should consider whether younger and older women have unique needs with regard to HIV risk reduction and whether there is a benefit to greater tailoring of prevention interventions.

Several limitations should be noted. First, sites were located in the Midwest and Northeastern US; it is unknown whether these findings generalize to other regions. Site variability in demographics and unprotected sexual behaviors at follow-up suggests the need for additional research in other correctional settings. All measures were self-reported, raising the possibility of recall and social desirability bias. An additional limitation is the relatively brief follow-up period. HIV risk reduction interventions vary in sustaining short-term effects over time (Koniak-Griffin, Lesser, Takayanagi, & Cumberland, 2011; Tross et al., 2008). It is unknown whether women in *RRR-HIV* maintained their lower levels of unprotected sexual behaviors beyond their first 3 months in the community. Finally, women received an honorarium for the baseline and follow-up data collection; the impact of this honorarium on

participation is unknown. However, 76.8% of women randomized to *RRR-HIV* attended all five prison-based sessions in the absence of any additional incentive for attendance.

While *RRR-HIV*'s focus on risky relationships is novel, other risk factors were not addressed. Women offenders often come from impoverished communities, and economic marginalization through poverty and homelessness are risk factors for HIV infection (Kramer & Comfort, 2011; Scott & Dennis, 2012; Wingood & DiClemente, 2000). Women offenders may face violent home environments in which attempts to negotiate safer sex practices are met with intimate partner violence (Weir et al., 2009). While risk reduction interventions such as *RRR-HIV* may improve the knowledge and skills (Leukefeld, et al., 2012), gender inequalities faced by women may pose formidable barriers to HIV prevention.

This research demonstrated that a prison-based relationship-focused HIV risk reduction intervention delivered prior to community re-entry reduced the frequency of unprotected sexual behaviors among drug-using women. While this finding is promising, future research is needed in several domains. Additional research is needed to determine whether reductions in unprotected sexual behaviors that are sustained over time. Future research should consider whether additional booster sessions have any further benefit in reducing HIV risk behaviors. Finally, implementation research is needed to examine whether similar benefits in HIV risk reduction can be achieved if *RRR-HIV* is led by prison staff or peers rather than research staff and, if so, how to promote routine use of this intervention within prison settings. Such research is vitally important if the *RRR-HIV* intervention is to have a public health impact that extends beyond the women who participated in this study.

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TABLE I

Descriptive statistics of participants in Reducing Risky Relationships for HIV, all participants and by study site.

	All Women % (N) or Mean (SD)	KY % (N) or Mean (SD)	DE % (N) or Mean (SD)	RI % (N) or Mean (SD)	CT % (N) or Mean (SD)	Available N
Assigned to RRR intervention	52.4% (198)	50.7% (114)	49.4% (40)	64.5% (20)	58.5% (24)	378
Number of risky sexual behaviors in the 30 days prior to arrest	36.9 (67.4)	41.3 (70.8)	37.9 (73.7)	20.4 (24.5)	22.9 (53.1)	377
Number of risky sexual behaviors in the past 30 days at 90-day follow- up**	6.5 (16.2)	8.22 (18.9)	2.2 (6.6)	12.0 (17.9)	2.7 (11.1)	344
Incarcerated at time of 90-day follow-up***	27.2% (94)	11.1% (22)	75.3% (61)	21.4% (6)	13.2% (5)	346
Age*	35.2 (9.1)	34.8 (8.9)	33.9 (10.0)	36.6 (9.2)	38.8 (7.3)	378
At least high school education	66.9% (253)	65.3% (147)	70.4% (57)	71.0% (22)	65.9% (27)	378
Race/ethnicity***						378
Caucasian	71.4% (270)	83.6% (188)	58.0% (47)	74.2% (23)	29.3% (12)	
African American	21.7% (82)	14.2% (32)	37.0% (30)	16.1% (5)	36.6% (15)	
Other	6.9% (26)	2.2% (5)	4.9% (4)	9.7% (3)	34.2% (14)	
At least weekly marijuana use in the 30 days prior to arrest*	32.8% (124)	30.2% (68)	45.7% (37)	35.5% (11)	19.5% (8)	378
At least weekly cocaine use in the 30 days prior to arrest**	20.9% (79)	20.4% (46)	23.5% (19)	22.6% (7)	17.1% (7)	378
At least weekly crack use in the 30 days prior to arrest	44.4% (168)	37.8% (85)	49.3% (40)	51.6% (16)	65.9% (27)	378
At least weekly heroin use in the 30 days prior to arrest***	7.9% (30)	3.4% (8)	8.6% (7)	19.4% (6)	22.0% (9)	378
At least weekly other opiate use in the 30 days prior to arrest***	32.0% (121)	42.7% (96)	19.8% (16)	12.9% (4)	12.2% (5)	378

Notes: Baseline data were collected from 378 women, while follow-up data were collected from 346 women. KY = Kentucky (n=225), DE = Delaware (n=81), RI = Rhode Island (n=31), and CT = Connecticut (n=41). Depending on the level of measurement, chi-square tests and one-way analysis of variance (ANOVA) were performed to compare women between the four study sites. Significant differences by study site

Percentages may not sum to 100% due to rounding error.

*
 $p < .05$

**
 $p < .01$

 $p < .001$.

TABLE II

Descriptive statistics of participants in Reducing Risky Relationships for HIV by study condition.

	<i>RRR-HIV condition % (N) or Mean (SD)</i>	<i>Control condition % (N) or Mean (SD)</i>	<i>Available N</i>
Site			378
Kentucky	57.6% (114)	61.7% (111)	
Delaware	20.2% (40)	22.8% (41)	
Rhode Island	10.1% (20)	6.1% (11)	
Connecticut	12.1% (24)	9.4% (17)	
Number of risky sexual behaviors in the 30 days prior to arrest [*]	29.8 (48.9)	44.7 (82.7)	377
Number of risky sexual behaviors in the past 30 days at 90-day follow-up	5.1 (12.9)	8.1 (19.2)	344
Incarcerated at time of 90-day follow-up	23.3% (42)	31.3% (52)	346
Age	35.7 (9.1)	34.7 (9.0)	378
At least high school education	68.7% (136)	65.0% (117)	378
Race/ethnicity			378
Caucasian	68.2% (135)	75.0% (135)	
African American	24.2% (48)	18.9% (34)	
Other	7.6% (15)	6.1% (11)	
At least weekly marijuana use in the 30 days prior to arrest	34.3% (68)	31.1% (56)	378
At least weekly cocaine use in the 30 days prior to arrest ^{**}	26.3% (52)	15.0% (27)	378
At least weekly crack use in the 30 days prior to arrest	45.0% (89)	43.9% (79)	378
At least weekly heroin use in the 30 days prior to arrest	10.1% (20)	5.6% (10)	378
At least weekly other opiate use in the 30 days prior to arrest	31.3% (62)	32.8% (59)	378

Notes: Baseline data were collected from 378 women, while follow-up data were collected from 346 women. Depending on the level of measurement, chi-square tests and t-tests were performed to compare women between the two study conditions. Significant differences by study condition

Percentages may not sum to 100% due to rounding error.

^{*}
 $p < .05$

^{**}
 $p < .01$ (two-tailed).

TABLE III

Negative binomial regression model of risky sexual behaviors in past 30 days at 90-day follow-up (n = 378).

	b (SE)	p-value
Assigned to RRR intervention (vs. control condition)	-.806 (.297)	.007
Site (Kentucky as reference category)		
Delaware	-.560 (.508)	.271
Rhode Island	1.699 (.681)	.013
Connecticut	-1.515 (.652)	.020
Incarcerated at time of 90-day follow-up	-1.217 (.437)	.005
Baseline risky sexual behaviors in the 30 days prior to arrest	.006 (.004)	.077
Age	-.057 (.017)	.001
At least high school education (vs. less than high school)	.028 (.311)	.928
Race/ethnicity (white as reference category)		
African American	-.250 (.430)	.560
Other race/ethnicity	.043 (.769)	.956
At least weekly marijuana use in the 30 days prior to arrest	-.232 (.344)	.499
At least weekly cocaine use in the 30 days prior to arrest	.234 (.395)	.554
At least weekly crack use in the 30 days prior to arrest	-.241 (.307)	.431
At least weekly heroin use in the 30 days prior to arrest	-1.304 (.712)	.067
At least weekly other opiate use in the 30 days prior to arrest	-.466 (.345)	.176
Constant	4.530 (.735)	<.001
LNalpha	1.820 (.103)	
Alpha	6.172 (.636)	

Notes: b = unstandardized coefficient. SE = standard error. Results reflect the pooled results from 20 imputed datasets in which multiple imputation by chained equations was used to impute outcome data for women lost to follow-up and missing data on baseline measures.