Published in final edited form as:

AIDS Behav. 2013 October ; 17(8): 2703–2714. doi:10.1007/s10461-013-0421-4.

Incarceration and Sexual Risk: Examining the Relationship Between Men's Involvement in the Criminal Justice System and Risky Sexual Behavior

Andrea K. Knittel,

Department of Health Behavior and Health Education, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor, MI 48109-2029, USA

University of Michigan Medical School, Ann Arbor, MI, USA

Rachel C. Snow,

Department of Health Behavior and Health Education, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor, MI 48109-2029, USA

Derek M. Griffith, and

Center for Medicine, Health and Society, Vanderbilt University, Nashville, TN, USA

Jeffrey Morenoff

Department of Sociology, University of Michigan, Ann Arbor, MI, USA

Andrea K. Knittel: aknittel@umich.edu

Abstract

In this study, we used data from Add Health Waves II and III to compare men who had been incarcerated to those who had not, and examined whether incarceration was associated with increased numbers of sexual partners and increased odds of concurrent partnerships. We used multivariate regression and propensity-score matching to compare sexual behavior of Wave III male respondents who had been incarcerated with those who had not, and compared sexual behavior at Wave II to identify differences in sexual behavior prior to incarceration. Incarceration was associated with an increased rate of lifetime sexual partnership, but this was attenuated by substance use. Criminal justice involvement was associated with increased odds of having partners who report concurrent partnerships, but no further increase was seen with incarceration. There were no significant sexual behavior differences prior to incarceration. These results suggest that the criminal justice system and substance use may interact to shape sexual behavior.

Keywords

Incarceration; Criminal justice system; Sexual behavior; HIV risk

Introduction

In 2010, the United States incarcerated 730 of every 100,000 residents, representing the highest rate of incarceration in the world, with an even larger number of residents on probation or parole [1]. Men accounted for 91 % of prisoners, and the imprisonment rate in 2009 for non-Hispanic Black males (3,119 per 100,000 U.S. residents) was more than six

times higher than for non-Hispanic white males (487 per 100,000) and almost three times higher than for Hispanic males (1,193 per 100,000) [2, 3]. As of mid-year 2009, a majority of individuals in local jails were in facilities that housed more than 1,000 inmates. These large facilities are generally in urban areas. Compared to jails with an average daily census of less than 100, where 90 % or more of inmates are released on a weekly basis, these big jails release just 52.5 % of inmates on a weekly basis, indicating a longer duration of stay in larger urban jails [4]. These data reflect the geographic concentration of incarceration, and given that growing numbers of poor non-Hispanic Black men have histories of incarceration, it is critical to consider the contributions of “mass incarceration” or “hyper incarceration” to health disparities [5, 6]. Two domains likely to be affected by high rates of incarceration are the nature and structure of romantic and sexual relationships. This has potential implications for racial disparities in HIV infection if incarceration and involvement in the criminal justice system change sexual networks in ways that favor HIV transmission [7–9].

One in five HIV-infected Black and Hispanic males passed through the correctional system in 2006, demonstrating the high co-occurrence of incarceration and HIV [10]. It is then not surprising that several studies have shown associations between state and county rates of incarceration and rates of STDs, including HIV [11, 12]. At an individual level, incarceration has not been directly linked to HIV-status. Instead, the literature demonstrates that incarceration is associated with having an increased number of partners and higher rates of unsafe sex and concurrent partnerships [13–18], and that incarceration of a female partner predicts riskier sexual behavior [16, 19]. The continuity of social relationships an inmate is able to maintain contributes to the relationship between incarceration and number of sexual partners [16]. Despite the preponderance of findings that incarceration is associated with sexual risk and may also influence risk to sexual partners, several gaps remain. Few studies measure both incarceration- and sex-related variables outside of high-risk settings (e.g., methadone clinics) sufficiently to control adequately for engagement in criminal activities separate from incarceration history, and only limited research has included a longitudinal component [19]. These gaps limit the generalizability of the findings, as well as the capacity to make causal statements about the effects of incarceration on sexual behavior.

In this study, we use a nationally representative sample of young men to examine associations between incarceration and patterns of sexual behavior. We include control variables for involvement in criminal behavior that have not previously been described, and we also use multiple waves of data, allowing for stronger conclusions about the temporal relationship between incarceration and sexual behavior. We first ask whether, after controlling for demographic variables, men’s involvement in the criminal justice system in general and incarceration in particular are associated with increased numbers of sexual partners and increased odds of having concurrent partnerships. Second, we ask whether the differences we observed exist at an earlier point in time. To answer these questions we examine how adult male incarceration affects young adults’ sexual partnering decisions using individual-level data and two different approaches to statistical control for engagement in criminal activity. We also evaluate whether young men who were later incarcerated display different partnering behaviors prior to adult incarceration.

Methods

Add Health is a school-based longitudinal study of a nationally-representative sample of adolescents who were in grades 7–12 in the United States in 1994–95 [20]. This analysis uses Wave II ($n = 16,706$, response rate = 88.2 %) follow-up interviews conducted in 1996, and Wave III ($n = 15,170$, response rate = 77.4 %) interviews conducted in 2001–2002. Further details about Add Health are available in the survey documentation [20]. Key variables for this paper included:

Number of Sexual Partners

Wave III includes data on the total number of lifetime partners as well as the number of partners in the last 12 months. In Wave II, only the total number of lifetime partners is available.

Concurrency

Respondents were asked to report the calendar month and year of first and last time they had sex within each relationship they had over the preceding 18 months, and relationships were considered ongoing between these two dates [21]. Concurrent partnerships were defined by two or more relationships that included sexual encounters in the same month. A measure of concurrency that required at least two months of overlap was also tested, and the results were not substantially different.

Partners' Concurrency

In Wave III, respondents indicated whether each of their listed partners had other partners at the same time. This was not available in Wave II.

Incarceration History/Future Incarceration

This pattern variable indicated whether the respondent was convicted in an adult court or sentenced to jail or prison as a result of any arrests after the age of 18. For the analysis of Wave II this same measure is used as an indicator of future incarceration. A measure of arrest, rather than conviction, was also tested, but it proved to be a less robust predictor of sexual behavior. Respondents with a history of conviction in an adult court were used as the reference group.

Father's Incarceration

A dichotomous variable indicated whether the respondent's biological father had ever been incarcerated. Examining the effect of father's incarceration may take into account the potential effects of high rates of neighborhood incarceration on sexual behavior, though it is only a weak proxy measure of community rates of incarceration and also includes the direct impact of parental incarceration.

Delinquency

In Wave II, a delinquency scale was created by tallying how many different behaviors in which each respondent had engaged, and then dividing respondents into quintiles of delinquent behaviors.

Demographic Variables

The demographic indicators of age, race, Hispanic ethnicity, and years of education completed were included in the analyses. Preliminary analyses included sex as a demographic variable, but most of the previously incarcerated individuals in our data set are men. This is consistent with incarceration patterns in the USA, and the analysis was subsequently limited to men. We avoided including women in the comparison group because they were far less likely to be incarcerated than men [2].

Drug use Variables

Indicators of any marijuana and any non-marijuana, non-alcohol drug use since 1995 and in the past year were used to capture lifetime and recent drug use. The measure of non-alcohol, non-marijuana drug use included cocaine, methamphetamines, any injection drug use, prescription drug misuse, and any other reported drug use. Alcohol use was represented by a

three category variable indicating the frequency of being drunk in the past year, with subjects responding that they were never drunk, were drunk once a month or less, or were drunk more than monthly; there is not a similar measure for lifetime alcohol abuse. For analyses of lifetime sexual behavior measures, drug use since 1995 was used, and for those of more recent sexual behavior measures, drug use in the past year was used.

Analysis

To test whether incarceration was associated with greater involvement in sexual risk behavior among men, we used regression models and propensity score matching models, each using the Wave III measure of incarceration to predict Wave III measures of sexual risk behaviors. We then constructed another regression model using the Wave III measure of incarceration to predict Wave II (pre-incarceration) measures of sexual risk behaviors to determine whether any observed associations might already have existed prior to incarceration.

Multivariable Analysis

Measures of sexual behavior were the dependent variables: numbers of sexual partners were modeled using negative binomial regression, and the proportion reporting concurrent relationships were modeled using logistic regression. The multivariable analysis was conducted by adding one set of variables at a time and examining the fit of the model and the individual significance tests.

Statistical analyses were conducted using Stata/SE 11.0 and adjusted for the sample design as recommended in the data set using the stratum and cluster codes [22]. The Wave III post-stratification grand sample cross-sectional weight was used for the analysis, which adjusted for non-response and post-stratification by age, race, and sex.

Propensity Score-Based Analysis

A propensity score for incarceration was constructed for respondents of both sexes using: sex, race, age, education level, income, arrest history, and reports of delinquent behaviors in the past 12 months (deliberately damaging property belonging to someone else, stealing something worth more than \$50, selling marijuana or other drugs, carrying a handgun at school or work, and belonging to a named gang). Individuals were matched based on the likelihood of incarceration using stratification and nearest neighbor matching methods. Within levels of likelihood, those individuals who had been incarcerated were compared to those who had not. The propensity score analyses included both male and female respondents, as the matching process ensured that comparisons were only made between individuals with similar likelihood of incarceration. The propensity score was also used as a continuous summary control measure of the likelihood of incarceration in regression analyses.

Wave II Analysis

The pre-incarceration analysis of sexual behavior used a single measure of number of partners (lifetime partners) and of concurrency (calculated based on reported dates of sexual relationships), as further measures were not available.

Results

Wave III Analysis

Descriptive Statistics—Wave III descriptive statistics for the full sample and the subsets of male respondents, respondents with a history of conviction in an adult court, and those

with a history of incarceration are shown in Table 1. The subset of male respondents who have been convicted in an adult court has a higher proportion of Native Americans, and slightly more Black respondents and Hispanic respondents compared to the full male subset. Previously convicted respondents are the same age as other respondents, though they have completed fewer years of formal schooling and more of them are in the highest quintiles of income. Those respondents who have been incarcerated are overrepresented in minority racial and ethnic categories, as well as in the bottom quintiles of income with 34 % earning less than \$2,000 in the year that data were collected. Respondents who have been incarcerated have on average achieved 11.3 years of education, compared to the average of nearly 13 years completed by the population as a whole. Use of alcohol, marijuana, and other drugs is more common in the subsets of men who have been convicted or incarcerated in the past, with a majority of those individuals having ever used marijuana or other drugs.

Bivariate Relationships (data not shown)—The significant predictors of having larger numbers of lifetime partners were Black race, having been stopped by police, arrest as an adult, conviction in an adult court, incarceration, the biological father serving time, being drunk more than monthly in the past year, marijuana use since 1995, other drug use since 1995, being in the highest two quintiles of income, and older age. Only Asian race and increases in education were associated with fewer numbers of partners.

There were few significant relationships between the number of partners in the past 12 months and demographic or criminal justice variables. Predictors of increased numbers of partners in the past 12 months were Black race, being in the highest two quintiles of income, and having been stopped by the police, arrested as an adult, or convicted in an adult court, being drunk more than monthly in the past year, marijuana use in the past year, and other drug use in the past year. Only education predicted slight decreases in numbers of partners per additional year of education.

Black race, experiencing a police stop or conviction in an adult court, being drunk more than monthly in the past year, marijuana use in the past year, and other drug use in the past year all significantly predicted increased odds of engaging in concurrent partnerships. The following variables all increased the odds of reporting having had a partner with concurrent partners: experiencing a police stop, adult arrest, conviction in an adult court, incarceration, the biological father serving time, being drunk more than monthly in the past year, marijuana use in the past year, and other drug use in the past year. Hispanic ethnicity decreased the odds of reporting a partner with concurrent partners.

Multivariate Relationships—After adjusting for demographic variables and biological father's incarceration, individuals who had been incarcerated had 58 % more partners over their lifetime than those who had a history of conviction in an adult court but no incarceration history. Individuals without a conviction or incarceration history had significantly lower rates of partnership than individuals in either of those groups. The addition of drug and alcohol use variables caused the *p* value for this association to rise above the level for statistical significance, although the results continued to trend in the same direction. Significant demographic predictors of higher rates of lifetime partnership in this subset include Black race, age, and being in either of the top two quintiles of income. Years of education completed and Asian race predict lower rates of lifetime partnership. These results are shown in Table 2.

A history of conviction in an adult court predicted an adjusted 43 % increase in the number of partners in the past 12 months (data not shown). Although there was a significant bivariate relationship between incarceration and the number of partners in the past 12

months, this association was completely attenuated by controlling for demographic variables (data not shown).

Using the direct measure of concurrency, calculated using reported sexual relationship dates, conviction in an adult court was associated with 1.93 times higher odds of having concurrent partnerships, but incarceration specifically was not significantly associated with concurrency (data not shown). Black race, being drunk more than monthly in the past year, and marijuana use in the past year were the only additional significant predictors of concurrency. Incarceration of the biological father decreased the odds of concurrency by 33 %.

Male respondents who had been convicted in an adult court had significantly higher odds of reporting partners with concurrent partners compared to men without criminal justice involvement, even when controlling for demographic variables, as shown in Table 3. This relationship was attenuated with the addition of substance use variables into the model. Although incarceration was associated with 1.9 times the odds of reporting partners who had other concurrent partnerships compared with previously convicted respondents, this increase was not statistically significant. Experiencing the incarceration of the biological father was also associated with increased odds of having partners with concurrent partners.

Propensity Score Analysis—When matching individuals by their propensity for incarceration, individuals who had been incarcerated had 4.34 (stratified analysis) to 4.76 (nearest neighbor score matching) more partners over the lifetime compared to individuals who had never been incarcerated, and there was no difference in the number of partners in the past year. Estimates of the differences between ever incarcerated and never incarcerated respondents in terms of the proportion with concurrent partners were -4.5 and -8.5 % by stratified and nearest neighbor matching methods respectively, suggesting that ever incarcerated individuals actually had fewer concurrent partnerships. Between 5.8 and 12.7 % (estimated by nearest neighbor and stratified methods respectively) more previously incarcerated individuals reported partners with concurrent partners.

When used as a single control variable in regression analyses of the effect of incarceration on sexual behavior variables, having been incarcerated still significantly predicted an increased rate of partnership over the lifetime ($OR = 1.90$, $p = 0.00$) as well as increased odds of reporting partners with concurrent partners ($OR = 2.03$, $p = 0.05$). Within the convicted subset, when controlling for the propensity for incarceration, incarceration predicted an increased rate of partnership over the lifetime ($IRR = 1.45$), though the effect was just above the cutoff for significance ($p = 0.07$).

Wave II Analysis

Descriptive statistics for the respondents at Wave II are shown in Table 4. The basic demographic composition of the sample was the same at both time points. At Wave II, respondents were on average 16 years old and were finishing the 9th grade. All but the top 21 % of male respondents made less than \$6,000 in the year of the survey. The convicted subset was similar, but with approximately 30 % of the subset falling into the highest quintile of yearly income. More than half of the male subset had committed either zero or one delinquent behavior in the past 12 months (none: 32 %, one: 20 %), with less than one percent of the subset in each of the categories above eight (out of 14 behaviors). For the convicted subset, a larger proportion of respondents had been involved in more different delinquent behaviors, and the average number of delinquency events in this group was higher (7.6 versus 4.2). At Wave II, only 40 % of the male subset had ever been sexually active, with just under 4 % having concurrent partners. A substantially larger proportion of the convicted subset reported having been sexually active (70 %), and nearly 7 % had concurrent partners.

Unadjusted differences in the mean number of lifetime partners and rates of concurrency at Wave II between individuals who would or would not be incarcerated in future were generally not significant.

As shown in Table 5, multivariate models showed that future incarceration was not a significant predictor of the total number of sexual partners at Wave II. The only significant predictors of increased numbers of partners at this time point were incarceration of the biological father and having engaged in a higher average number of delinquent activities. Some income categories also showed higher numbers of partners, but the pattern was not consistent. Although being in the group that would be convicted in an adult court (but not incarcerated) was associated with higher odds of reporting concurrent partners at this time point compared to individuals with no involvement in the criminal justice system, incarceration did not predict additional higher odds. The number of delinquent behaviors reported in the past 12 months was the only other significant predictor of increased odds of concurrency. Decreased odds of concurrency were associated with Asian race and being in the lower two quintiles of income.

Discussion

In this study, we compared men who had been incarcerated to those who had not, and we examined whether being incarcerated was associated with increased numbers of sexual partners and increased odds of having concurrent partnerships. We found a significant relationship between involvement in the criminal justice system and patterns of sexual behavior, and this relationship was complicated by drug and alcohol use. Although the propensity score analysis was suggestive of a significant increase in numbers of lifetime partnership and the number of partners who report concurrent partnerships, the significant relationships in the multivariate analyses were attenuated by the inclusion of substance use variables. This raises additional questions about the relationship between involvement in the criminal justice system and drug and alcohol use, and the mechanisms that mediate these relationships. In the broader context of involvement in the criminal justice system, incarceration may contribute to increased rates of partnership dissolution. Involvement in the criminal justice system that does not result in incarceration does not result in the same physical and institutional barriers to and may not produce the same level of perceived need to “make up for lost time” by having multiple sexual partners after release, as some qualitative work has suggested with regard to incarceration, but may influence sexual behavior in other ways [23].

It was particularly notable that those who had been convicted previously but not incarcerated also had higher numbers of partners than those without any previous involvement in the criminal justice system. This, along with the results using other sexual behavior outcomes, implies that the effects of incarceration identified in this analysis may represent only the furthest end of a continuum of criminal justice involvement. These findings suggest that in addition to the effects of the physical removal and return of an incarcerated individual, factors such as stigma, constructions of masculinity and femininity, and individual preferences may vary across the range of experiences with the criminal justice system, not just with incarceration.

In our study, incarceration also was associated with a substantial increase in the odds of reporting a partner with other partners, but this was not significant above and beyond the effect of conviction in an adult court, which also increased the odds of reporting a partner with other partners. This may reflect that the social milieu resulting from involvement in any level of criminal activity has a greater impact on the patterns of relationships than the specific experience of incarceration. This measure of a partner’s concurrency should be

interpreted only cautiously, however, because it may be prone to an underreporting bias due to social desirability as well as the possibility that respondents were unaware of their partners' other concurrent partnerships [24, 25].

These results are consistent with prior work suggesting that men who had been incarcerated have higher numbers of partners, although our more detailed data on different degrees of criminal justice involvement are suggestive of a spectrum of experiences rather than an absolute increase in risk with incarceration [14–16]. The finding that the number of partners in the past year is unaffected by incarceration while the number of lifetime partners is increased suggests that a longer-term mechanism may be at work here, but further work is needed to examine potential underlying mechanisms.

Incarceration was not associated with having concurrent partners in this analysis, and the propensity score analysis even suggested that men who had been incarcerated actually had fewer concurrent partnerships, which conflicts with earlier work [17]. One possible explanation is that Add Health represents a relatively young population with overall high rates of concurrency compared to older, nationally representative samples [17]. Adimora and colleagues also find that for men incarcerated more than a year ago, the odds ratio for having concurrent partners drops from 2.1 (for men incarcerated in the past 12 months) to 1.08 [17], suggesting that the effect of incarceration on concurrency lasts only 12 months; our data set may not have sufficient power to detect this brief difference.

In our analysis, having a father who had been incarcerated decreased the odds of having concurrent partners, but increased the odds of having partners with concurrent partners. If this measure can truly be interpreted as indicating an effect of high community rates of incarceration, it may suggest that in terms of concurrent partnerships, high rates of incarceration differentially affect the behaviors of their partners rather than those of incarcerated men themselves.

Our results also are consistent with previous work documenting that the effects of involvement in the criminal justice system and of substance use on sexual decision-making are closely intertwined [14, 15, 18, 19]. Based on the available data, it is difficult to definitively determine whether our results demonstrate that substance use is a confounder or a mediator between criminal justice involvement and sexual decision-making. If individuals who use alcohol and other drugs are more likely to be involved in the criminal justice system, and to have more partners, both as a result of substance use, then substance use may represent a confounder. Alternately, if the substance use decisions of individuals who have been involved with the criminal justice system are affected by those experiences with the criminal justice system, then substance use mediates the relationship between criminal justice involvement and sexual decision-making. Further research may be necessary to better understand the relationship between substance use, involvement in the criminal justice system, and sexual decision-making.

Individuals who would later be incarcerated did not differ significantly from those who would not be incarcerated in terms of number of sexual partners and rate of concurrency. This suggests that these groups of men—those who would never encounter the criminal justice system, those who would later be convicted in an adult court but would not be incarcerated, and those who would eventually experience incarceration—were initially similar with respect to sexual behavior, but that involvement in the criminal justice system and incarceration altered the trajectory of sexual behavior that might otherwise be observed. This is a particularly important finding because it suggests that it is the range of experiences with the criminal justice system, up to and including incarceration, that may increase men's sexual risk.

This study addresses several important gaps in the literature. We use more appropriate comparison groups and more extensively control for criminal justice involvement than has been possible in previous studies. As a result, the current findings are more likely to demonstrate the true effects of involvement in the criminal justice system, including incarceration, on future sexual risk and behavior. The opportunity to track individuals through time to demonstrate that effects of incarceration are not exclusively the result of earlier experiences provides an additional opportunity to check for confounding relationships.

This study is not without weaknesses. Even in this large, nationally representative data set there are relatively few individuals who have been incarcerated. Limiting the analysis to the most relevant comparison group within this sample means that the power of the data set is decreased significantly. In order to improve our understanding of the unintended consequences of incarceration, future national data collection projects should consider enriching their samples with both individuals who are currently incarcerated and individuals who have previously been in jail or prison. In addition, in order to better understand how the full range of experiences with the criminal justice system shapes patterns of sexual behavior, data about duration of incarceration would be useful; this data set does not include this level of detail.

That the sample began as a school-based sample also raises conceptual questions and offers additional directions for future studies. While the study started before participants could legally stop attending school, those who have dropped out of school over time are likely under-represented in the initial waves of the survey and later waves. Some of the most vulnerable youth may, therefore, be underrepresented. More representative data may show even greater consequences of incarceration, which is strong motivation for future research to include data collection around issues of incarceration. Given the growing proportion of the US population with a history of incarceration, further studies in this area are definitely needed.

Acknowledgments

This work was supported by the University of Michigan Medical Scientist Training Program (NIGMS T32GM07863); a Point Foundation Scholarship; the University of Michigan School of Public Health Department of Health Behavior and Health Education, and a King Parks Chavez Future Faculty Fellowship. The authors have no conflicts of interest to report. This research uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01 HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining Data Files from Add Health should contact Add Health, The University of North Carolina at Chapel Hill, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516 2524 (addhealth@unc.edu). No direct support was received from grant P01 HD31921 for this analysis.

References

1. World Prison Brief. [Accessed 1 August 2012] International Centre for Prison Studies: Available from. 2011. http://www.prisonstudies.org/info/worldbrief/wpb_country.php?country=190
2. West, HC. Prison Inmates at Midyear 2009—Statistical Tables. Washington DC: 2010. Contract No.: NCJ 230113
3. Western, B. Punishment and Inequality in America. New York: Russell Sage Foundation; 2006.
4. Minton, TD. Jail Inmates at Midyear 2009—Statistical Tables. Washington DC: 2010. Contract No.: NCJ 230122
5. Mauer, M.; Chesney-Lind, M. Invisible Punishment: the collateral consequences of mass incarceration. New York: New Press; 2002.

6. Waquant, L. Racial Stigma in the Making of America's Punitive State. In: Loury, GC., editor. Race, incarceration, and American values : based on the 2007 Tanner lectures on human values at Stanford. Cambridge: MIT Press; 2008.
7. Hall HI, Song R, Rhodes P. Estimation of HIV Incidence in the United States. *J Am Med Assoc.* 2008; 300(5):520–529.
8. Karon JM, Fleming PL, Steketee RW, De Cock KM. HIV in the United States at the turn of the century: an epidemic in transition. *Am J Public Health.* 2001; 91:1060–1068. [PubMed: 11441732]
9. Comfort, M. Doing time together: love and family in the shadow of the prison. Chicago: The University of Chicago Press; 2008.
10. Spaulding AC, Seals RM, Page MJ, Brzozowski AK, Rhodes W, Hammett TM. HIV/AIDS among inmates of and releasees from US correctional facilities, 2006: declining share of epidemic but persistent public health opportunity. *PLoS One.* 2009; 4(11):e7558. [PubMed: 19907649]
11. Johnson, RC.; Raphael, S. The effects of male incarceration dynamics on AIDS infection rates among African-American women and men. Berkeley: University of California; 2005.
12. Thomas JC, Levandowski BA, Isler MR, Torrone E, Wilson G. Incarceration and sexually transmitted infections: a neighborhood perspective. *J Urban Health.* 2007; 85(1):90–99. [PubMed: 18046653]
13. Laumann, EO.; Gagnon, JH.; Michael, RT.; Michaels, S. The social organization of sexuality. Chicago: The University of Chicago Press; 1994.
14. Epperson MW, El-Bassel N, Chang M, Gilbert L. Examining the temporal relationship between criminal justice involvement and sexual risk behaviors among drug-involved men. *J Urban Health.* 2010; 87(2):324–336. [PubMed: 20143270]
15. Epperson MW, El-Bassel N, Gilbert L, Orellana ER, Chang M. Increased HIV Risk Associated with Criminal Justice Involvement among Men on Methadone. *AIDS Behav.* 2008; 12:51–57. [PubMed: 17705034]
16. Seal DW, Eldrige GD, Kacanek E, Binson D, MacGowan RF. Group TPSS. A longitudinal, qualitative analysis of the context of substance use and sexual behavior among 18- to 29-year-old men after their release from prison. *Soc Sci Med.* 2007; 65:2394–2406. [PubMed: 17683839]
17. Adimora AA, Schoenbach VJ, Doherty IA. Concurrent sexual partnerships among men in the United States. *Am J Public Health.* 2007; 97(12):2230–2237. [PubMed: 17971556]
18. Khan MR, Doherty IA, Schoenbach VJ, Taylor EM, Epperson MW, Adimora AA. Incarceration and high-risk sex partnerships among men in the United States. *J Urban Health.* 2009; 86(4):584–601. [PubMed: 19459050]
19. Epperson MW, Khan MR, El-Bassel N, Wu E, Gilbert L. A longitudinal study of incarceration and HIV risk among methadone maintained men and their primary female partners. *AIDS Behav.* 2011; 15(2):347–355. [PubMed: 20063053]
20. Harris, KM.; Udry, JR. National longitudinal study of adolescent health (Add Health). Ann Arbor: 1994–2002.
21. Ford K, Sohn W, Lepkowski J. American adolescents: sexual mixing patterns, bridge partners, and concurrency. *Sex Transm Dis.* 2002; 29(1):13–19. [PubMed: 11773873]
22. StataCorp. TStata statistical software. College Station. 2009
23. Thomas JC, Sampson LA. High rates of incarceration as a social force associated with community rates of sexually transmitted infection. *J Infect Dis.* 2005; 191(Suppl 1):S55–S60. [PubMed: 15627231]
24. Drumright LN, Gorbach PM, Holmes KK. Do people really know their sex partners? Concurrency, knowledge of partner behavior, and sexually transmitted infections within partnerships. *Sex Transm Dis.* 2004; 31(7):437–442. [PubMed: 15215701]
25. Lenoir CD, Adler NE, Borzekowski DLG, Tschann JM, Ellen JM. What you don't know can hurt you: perceptions of sex-partner concurrency and partner-reported behavior. *J Adolesc Health.* 2006; 38:179–185. [PubMed: 16488813]

Table 1

Descriptive statistics for the Wave III analytical subsets

	Full sample		Male subset		Convicted male subset		Incarcerated male subset	
	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency
Demographic variables								
Sex								
Male	50.14	5,092	100	5,092	100	423	100	87
Female	49.86	5,736	0	0	0	0	0	0
Race								
White	76.75	7,157	76.72	3,408	75.46	300	69.95	52
Black	16.36	2,349	15.94	1,010	16.64	75	17.87	17
Native American	2.62	340	2.85	171	5.71	25	10.46	10
Asian	4.27	831	4.49	431	2.19	16	1.72	2
Hispanic								
No	88.05	9,069	87.78	4,226	88.54	357	75.54	61
Yes	11.95	1,741	12.22	855	11.46	65	24.46	25
Income (quintiles)								
\$0–\$1,999	22.83	1,932	19.47	789	16.61	67	30.48	22
\$2,000–\$7,999	20.5	1,764	18.25	773	17.18	56	13.32	8
\$8,000–\$14,999	24.96	2,021	24.37	926	24.42	83	19.78	13
\$15,000–\$22,999	16.22	1,471	17.59	761	19.63	68	19.63	11
\$23,000–\$500,909	15.48	1,441	20.32	910	22.17	80	16.8	11
			Mean	N	Mean	N		
Age	21.4	10,828	21.49	5,092	21.71	423	21.68	65
Education	13.08	10,827	12.88	5,092	12.61	423	11.3	65
Criminal justice variables								
Ever been stopped by the police								
No	78.81	8,657	68.75	3,533	0.73	1	0	0
Yes	21.19	2,060	31.25	1,488	99.27	414	100	78
History of adult arrest								
No	97.28	10,494	95	4,885	66.1	289	51.18	43

	Full sample		Male subset		Convicted male subset		Incarcerated male subset	
	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency
Yes	2.72	223	5	202	33.9	133	48.82	39
History of conviction in an adult court								
No	94.54	10,213	90.74	4,658	0	0	0	0
Yes	5.46	504	9.26	423	100	423	100	81
History of incarceration in an adult facility								
No	99.16	10,631	98.46	5,005	83.2	342	0	0
Yes	0.84	86	1.54	79	16.8	79	100	87
Biologic father ever served time								
No	85.98	8,692	86.09	4,091	72.27	270	71.43	48
Yes	14.02	1,498	13.91	691	27.73	114	28.57	23
Sexual experience variables								
Ever had sex								
No	13.74	1,497	14.5	764	3.05	16	2.38	3
Yes	86.26	9,225	85.5	4,279	96.95	404	97.62	84
Concurrent partnerships								
No	73.35	6,546	75.88	3,143	66.35	229	71.68	53
Yes	26.65	2,325	24.12	942	33.65	116	28.32	21
Report partners with concurrent partners								
No	70.25	6,229	72.45	3,011	58.36	203	46.36	41
Yes	29.75	2,642	27.55	1,074	41.64	142	53.64	33
	Mean	N	Mean	N	Mean	N		
Total number of lifetime partners	5.53	10,533	6.2	4,991	11.56	410	15.3	85
Partners in the last 12 months	1.56	10,533	1.78	4,974	2.57	415	2.70	85
Drug use variables								
Alcohol use (past year)								
Never drunk	26.68	2,323	21.36	906	11.07	50	13.72	10
Once a month or less	44.11	3,379	40.21	1,518	34.41	127	39.74	23
Drunk monthly or more	29.21	1,994	38.43	1,287	54.53	186	46.53	26
Marijuana use								
Since 1995	47.73	4,796	53.57	2,564	85.29	347	83.48	61

	Full sample		Male subset		Convicted male subset		Incarcerated male subset	
	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency
In the past year	34.72	3,424	40.04	1,872	70.18	283	74.7	50
Other drug use								
Since 1995	34.75	3,502	37.77	1,792	63.26	264	55.79	46
In the past year	14.04	1,320	17.33	774	41.9	156	43.23	28

Table 2

Multivariate models of number of lifetime sexual partners

<i>(n = 4,961)</i>									
Covariates	(1)		(2)		(3)		(4)		t (p-value)
	IRR	t (p-value)	IRR	t (p-value)	IRR	t (p-value)	IRR	t (p-value)	
Criminal justice involvement (ref = Ever convicted in an adult court)									
Never convicted or incarcerated	0.53	-7.16 (0.00)	0.57	-5.48 (0.00)	0.61	-5.30 (0.00)	0.79	-2.29 (0.02)	
Ever been incarcerated	1.45	1.99 (0.05)	1.39	1.52 (0.13)	1.58	1.99 (0.05)	1.35	1.11 (0.27)	
Race/ethnicity (ref = White)									
Black			1.55	6.02 (0.00)	1.62	6.55 (0.00)	2.09	9.06 (0.00)	
Native American			1.09	0.59 (0.55)	1.15	0.86 (0.39)	1.31	1.85 (0.07)	
Asian			0.55	-4.27 (0.00)	0.55	-4.24 (0.00)	0.52	-5.26 (0.00)	
Hispanic			0.91	-1.02 (0.31)	0.95	-0.58 (0.57)	0.93	-0.88 (0.38)	
Age (years)			1.12	6.79 (0.00)	1.13	6.71 (0.00)	1.14	6.45 (0.00)	
Education (years completed)			0.94	-4.32 (0.00)	0.95	-3.50 (0.00)	0.93	-4.54 (0.00)	
Income (ref = 3rd quintile)									
1st Quintile (lowest)			0.97	-0.43 (0.67)	0.99	-0.08 (0.94)	1.10	1.13 (0.26)	
2nd Quintile			0.93	-0.70 (0.48)	0.94	-0.68 (0.50)	1.00	0.03 (0.98)	
4th Quintile			1.21	2.17 (0.03)	1.25	2.48 (0.01)	1.30	2.87 (0.01)	
5th Quintile			1.35	3.61 (0.00)	1.36	3.55 (0.00)	1.46	3.39 (0.00)	
Biological father ever incarcerated									
Alcohol use in the past year (ref = none)					1.09	0.91 (0.36)	1.08	0.78 (0.44)	
Drunk monthly or less									
Drunk more than monthly							0.87	-1.77 (0.08)	
Marijuana use since 1995 (ref = no)									
Marijuana use since 1995 (ref = no)							1.31	3.78 (0.00)	
Other drug use since 1995 (ref = no)									
Other drug use since 1995 (ref = no)							1.45	5.44 (0.00)	
							1.11	1.84 (0.07)	

Values in bold are statistically significant

Table 3

Multivariate models of proportion reporting partners with concurrent partners

(n = 4,961)								
Covariates	(1)		(2)		(3)		(4)	
	IRR	t (p-value)	IRR	t (p-value)	IRR	t (p-value)	IRR	t (p-value)
Criminal justice involvement (ref = Ever convicted in an adult court)								
Never convicted or incarcerated	0.54	-3.66 (0.00)	0.57	-2.99 (0.00)	0.60	-2.66 (0.01)	0.84	20.80 (0.42)
Ever been incarcerated	1.62	1.35 (0.18)	1.65	1.21 (0.23)	1.90	1.45 (0.15)	1.95	1.26 (0.21)
Race/ethnicity (ref = White)								
Black			1.09	0.52 (0.60)	1.13	0.67 (0.51)	1.32	1.32 (0.19)
Native American			0.83	-0.46 (0.65)	0.87	-0.35 (0.72)	1.01	0.03 (0.98)
Asian			0.79	-0.96 (0.34)	0.80	-0.86 (0.39)	0.87	-0.55 (0.58)
Hispanic			0.75	-1.56 (0.12)	0.74	-1.56 (0.12)	0.83	-0.90 (0.38)
Age (years)			1.01	0.39 (0.70)	1.02	0.38 (0.71)	1.03	0.66 (0.51)
Education (years completed)			0.99	-0.18 (0.86)	1.01	0.23 (0.82)	0.98	-0.41 (0.68)
Income (ref = 3rd quintile)								
1st Quintile (lowest)			0.97	-0.15 (0.88)	0.96	-0.21 (0.83)	0.95	-0.25 (0.80)
2nd Quintile			1.14	0.71 (0.48)	1.27	1.24 (0.22)	1.32	1.35 (0.18)
4th Quintile			1.14	0.76 (0.45)	1.15	0.78 (0.44)	1.28	1.36 (0.18)
5th Quintile			0.90	-0.68 (0.50)	0.88	-0.75 (0.46)	0.95	-0.25 (0.80)
Biological father ever incarcerated					1.80	3.90 (0.00)	1.48	2.24 (0.03)
Alcohol use in the past year (ref =none)								
Drunk monthly or less							1.24	1.32 (0.19)
Drunk more than monthly							1.81	4.17 (0.00)
Marijuana use since 1995 (ref = no)							1.23	1.73 (0.09)
Other drug use since 1995 (ref = no)							1.50	2.67 (0.01)

Values in bold are statistically significant

Table 4

Descriptive statistics for the Wave II analytical subsets

	<u>Male Subset</u>		<u>Convicted Male Subset</u>	
	Weighted proportion	Unweighted frequency	Weighted proportion	Unweighted frequency
Demographic variables				
Income (quintiles)				
\$0–\$1,465	19.41	507	19.67	17
\$1,466–\$2,795	21.34	573	22.38	24
\$2,796–\$4,420	18.67	588	18.46	24
\$4,421–\$6,616	19.2	665	8.77	18
\$6,617–\$38,229	21.37	717	30.72	39
Age	16.02	5,092	15.95	207
Current grade level	9.93	4,619	9.73	174
Criminal justice variables				
Number of different delinquent behaviors in the past 12 months				
0	31.72	1,627	18.52	88
1	20.19	1,033	17.03	60
2	14.84	779	10.95	52
3	11.07	533	13.29	52
4	7.11	348	8.99	37
5	5.62	266	8.51	40
6	2.99	184	5.06	29
7	2.2	98	5.68	16
8	1.52	78	3.5	13
9	0.78	42	1.6	7
10	0.84	40	3.2	10
11	0.55	30	1.62	9
12	0.18	15	0.84	5
13	0.21	10	1.03	3
14	0.19	9	0.19	2
	Mean	<i>N</i>	Mean	<i>N</i>
Number of Events of Delinquent Behavior in the past 12 months	4.2	5,092	7.61	423
Sexual experience variables				
Ever had sex				
No	59.13	2,875	29.67	62
Yes	40.87	2,190	70.33	144
Concurrent partnerships				
No	96.45	4,889	93.11	395
Yes	3.55	203	6.98	28
	Mean	<i>N</i>	Mean	<i>N</i>
Total Lifetime Partners	5.2	1,225	5.65	84

Table 5

Multivariate models of number of lifetime partners and concurrency at Wave II

Covariates	Number of lifetime partners (<i>n</i> = 650)				Any Concurrent Partnerships (<i>n</i> = 2,556)							
	(1)		(2)		(3)		(4)		(5)		(6)	
	IRR	t	IRR	t	IRR	t	IRR	t	OR	t	OR	t
Criminal justice involvement (ref = Ever convicted in an adult court)												
Never convicted or incarcerated	1.05	0.23	0.79	-1.37	0.96	-0.21	1.02	0.11	0.39	-3.41	0.39	-2.39
Ever been incarcerated	1.32	1.05	0.65	-1.18	0.68	-0.98	0.56	-1.53	0.24	-1.78	0.17	-1.58
Race/ethnicity (ref = White)												
Black			1.03	0.20	1.08	0.53	1.07	0.50			1.72	1.79
Native American			1.79	0.79	1.52	0.66	1.05	0.09			1.00	0.00
Asian			0.92	-0.32	0.84	-0.96	0.76	-1.55			0.01	-4.96
Hispanic			1.19	0.55	1.01	0.03	1.09	0.45			1.21	0.43
Age (years)			1.02	0.18	1.06	0.98	1.11	1.44			1.35	2.17
Education (years completed)			0.96	-0.61	0.93	-1.05	0.90	-1.52			1.06	0.37
Income (ref = 3rd quintile)												
1st Quintile (lowest)			0.83	-1.05	0.84	-1.01	0.92	-0.41			0.09	-2.63
2nd Quintile			2.08	2.90	2.08	3.01	2.03	2.96			0.36	-2.82
4th Quintile			1.35	1.97	1.28	1.97	1.39	2.23			1.07	0.22
5th Quintile			2.32	1.74	2.32	1.80	2.05	2.43			1.39	0.94
# of delinquent behaviors (12 mo)												
Biological father ever incarcerated					1.12	3.50	1.11	3.24			1.15	3.18
							1.97	2.12			0.87	-0.35

Values in bold are statistically significant