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Age of First Arrest, Sex, and Drug Use as Correlates of Adult Risk Behaviors Among Rural Women in Jails

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Abstract

Incarcerated women frequently report initiation of substance use and sexual encounters at an early age, and often engage in high-risk drug use and sexual behaviors as adults. This study examined the timing of first sex, drug use, and arrest, as well as their unique influences on specific risky behaviors in adulthood, among a high-risk population of rural women recruited from jails. Ages of initiation were all positively and significantly correlated, and each independently increased the likelihood of several risky behaviors in adulthood. Implications are discussed for screening, intervention, and treatment targeting high-risk women and girls in rural areas, particularly within criminal justice settings.

Keywords

risk behaviors; rural; incarcerated; women; initiation

BACKGROUND

The number and proportion of female inmates in the United States continues to grow across all age groups, from adolescence to adulthood. The Bureau of Justice Statistics (Minton, 2015) reports that between 1999 and 2013, the total population of incarcerated women increased 48%, and the proportion of women increased from 11% to 14% of all inmates. In adolescent populations, the Office of Juvenile Justice and Delinquency Prevention (OJJDP, 2014) has reported that juvenile girls currently make up 14% of youth incarcerated in residential facilities. However, juvenile girls also comprised 28% of all delinquency cases in 2010, a 69% increase from the number of cases in 1985 (Puzzanchera & Hockenberry,

2013). As women and girls represent an increasingly large proportion of individuals involved in the justice system, attention must continue to be given to gender-specific issues within this high-risk population.

The high occurrence of substance use and abuse among incarcerated females has been well documented over time and across different geographic areas. Although this prevalence may be explained in part by the fact that such a high number of justice-involved women are arrested for drug abuse violations—313, 980 women and girls arrested in 2010, or approximately 1 out of every 10 female arrests in any age group (Snyder, 2012)—substance use is even more ubiquitous than this would suggest. In a systematic review, rates of drug abuse in adult female prisoners ranged from 30–60% (Fazel, Bains, & Doll, 2006). Compared to detained juvenile boys, a greater proportion of girls also report lifetime use of a majority of illicit substances, as well as polysubstance use and negative substance-related consequences (Sedlak & McPherson, 2010).

High proportions of incarcerated women also engage in many high-risk sexual behaviors. Studies have demonstrated that women involved in the criminal justice system are often involved in sexual relationships with high-risk partners, and at times perform sex in exchange for money, drugs, or favors (Clarke et al., 2006; Knudsen et al., 2008). Similarly, incarcerated juvenile girls also self-report a higher number of lifetime sexual partners than their non-incarcerated peers, possibly due to younger average age of sexual initiation (Guthrie, Hoey, Ravoira, & Kintner, 2002; Kelly, Owen, Peralez-Dieckmann, & Martinez, 2007). Such behaviors can place women in danger of unplanned pregnancies and emotional or physical harm, or may expose them to HIV and sexually transmitted infections (STIs), both of which are common among populations of incarcerated women (Javanbakht et al., 2014; Maruschak, 2012; Spaulding et al., 2002).

Involvement in the criminal justice system may provide low-income women and girls the opportunity to receive reproductive health care and substance abuse treatment services, but research has also noted several possible negative consequences of early arrest. Juveniles with a history of offending are more likely to drop out of high school and less likely to attend a 4-year college (Hirschfield, 2009; Kirk & Sampson, 2013), may experience barriers to employment (Banys, 2016), and, according to labeling theory, may adopt or accept a deviant identity that increases their odds of recidivism (Asencio & Burke, 2011; Liberman, Kirk, & Kim, 2014). Earlier justice system involvement is also associated with increased risk of continued offending as a juvenile (Cottle, Lee, & Heilbrun, 2001), and repeat offending in adolescence is further associated with adult justice system involvement (Colman, Kim, Mitchell-Herzfeld, & Shady, 2009).

Early involvement with substance use and early sexual initiation are important risk factors that are frequently associated with justice system involvement in adolescent girls, and the literature supports relationships between these factors that reinforce further trajectories of risk and disadvantage. Earlier initiation of substance use is a strong predictor of later dependence (King & Chassin, 2007; Walters & Urban, 2014) and substance-using risk behaviors (Baldwin, Shrestha, Potrepka, & Copenhaver, 2013), and girls with a history of drug use are twice as likely to recidivate in adolescence than those who do not report

substance use (Barrett, Ju, Katsiyannis, & Zhang, 2015). Furthermore, adolescent girls that engage in more frequent substance use are also more likely to have a high number of sexual partners (Cavazos-Rehg et al., 2011) and engage in frequent HIV risk behaviors (Teplin et al., 2005). Similarly, earlier age of sexual debut is associated with higher incidence of risky sexual behaviors in adolescence and young adulthood (Baldwin et al., 2013; Epstein, Bailey, Manhart, Hill, & Hawkins, 2014), as well as more frequent use of drugs and alcohol (Staton et al., 1999).

Substance use and risky sexual behaviors are prevalent among populations of women and girls in the criminal justice system, yet the correlates of early justice system involvement regarding behavioral outcomes later in adulthood are less understood. Jessor and colleagues (Donovan & Jessor, 1985; Jessor, 1987) have proposed that early adolescent engagement in illegal or dangerous activities is driven by a common set of personal and perceived environmental factors, resulting in correlated timing of initiation for multiple risk behaviors. This theory supports that earlier age of first arrest would be associated with earlier engagement in sexual and substance-using behaviors, and therefore also with more frequent and severe risk behaviors in adulthood, but this relationship has yet to be thoroughly explored, particularly for women.

The current study addresses these questions, as well as exploring developmental patterns of risky behaviors among women from rural areas. Although it has been demonstrated that adolescents from rural areas are distinct in patterns of substance use (Martino, Ellickson, & McCaffrey, 2008; Scaramella & Keyes, 2001) and sexual behaviors (as suggested by teen birth rates; see Shoff & Yang, 2012) from those raised in urban environments, high-risk groups of rural women and girls are often overlooked in research contexts. In describing rural women's initiation of risky behaviors and involvement with the justice system and exploring how those events are associated with differences in adult trajectories, this study will help to illustrate the development of these at-risk women and provide targeted guidance for gender-sensitive services in rural criminal justice settings.

To that end, the objectives of this study were as follows: (a) to profile age of first arrest, age of first illicit drug use, and age of first sex in a sample of rural women drug users; (b) to examine the relationships among ages of first arrest, illicit drug use, and sex; and (c) to examine the unique contributions of age of first arrest, age of initiation of sex, and age of first drug use to adult high-risk behaviors, specifically high-risk drug use and high-risk sexual practices.

METHODS

Participants

As part of a larger parent grant (NIH/NIDA, 1R01-DA033866), participants in this study were screened for eligibility from a randomly selected sample of adult incarcerated women. All participants were housed in three rural jails located in the Appalachian region of eastern Kentucky. Women included in the final sample ($N = 400$) were selected for study participation based on: (a) anticipated release date between 2 weeks and 3 months from screening; (b) score of 4 or greater for any drug on the NIDA-Modified Alcohol, Smoking,

and Substance Involvement Screening Test (NM-ASSIST; NIDA, 2009), indicating at least moderate risk of substance abuse; (c) self-reported sexual risk behaviors in 3 months before arrest, based on five questions from the Risk Behavioral Assessment (Wechsberg, 1998); (d) residence in a designated Appalachian county prior to incarceration; and (e) willingness to participate.

Procedures

In order to recruit a generalizable sample of incarcerated, drug-using women, a random selection process was utilized at all three rural jail sites (see Staton-Tindall et al., 2015). Women selected for screening were offered informed consent by research staff and encouraged to ask questions about the study. Using the aforementioned criteria, consented women were screened for eligibility in a group session conducted in a private room with no jail staff or representatives present. Of 900 randomly selected women, 688 chose to participate in screening sessions, and 440 were eligible for participation. Forty additional women were released before baseline interviews could be scheduled, resulting in a final sample of 400 women. Within two days of screening, eligible women were interviewed at the jail by trained female assistants local to the area. As during screening, no jail staff were present for the interview process, and all data collection procedures were protected under a federal Certificate of Confidentiality and approved by the university IRB. Participants were compensated \$25 for the initial interview.

Measures

Demographics—Women were asked to provide current age, race, county of residence prior to incarceration, years of education completed, marital status (either currently married/living as married or not), and employment status before arrest.

Ages of Onset Variables—Participants were asked to self-report age at which they were first arrested, age at which they first used any illicit drug, and age of first sexual encounter (either oral, anal, or vaginal).

High-Risk Drug Use—Risky patterns of drug use in adulthood were reported as: (a) ever having injected any drug; (b) having injected any drug during 6 months prior to arrest; (c) age of first injection drug use (IDU), if applicable; and (d) ever having overdosed.

High-Risk Sexual Practices—Self-reported risky sexual behaviors included were: (a) number of male oral/anal/vaginal sex partners in past year before arrest; (b) use of drugs before last sexual encounter; (c) last male partner's high-risk behaviors (history of IDU or incarceration); and (d) exchange of sex for money, drugs, shelter, or transportation in year prior to incarceration.

Data Analysis

Complete age of onset data were available from a majority of enrolled participants (90%); women not providing responses to all age of onset variables were excluded from analysis for a final $N = 358$. Demographic, age of onset, and adult risk behavior variables were first examined using descriptive statistics. Bivariate correlations were then used to evaluate the

relationship among age of onset variables as well as the relationship between age of onset variables and adult risk behaviors. Finally, multivariable regression models were used to determine the unique contribution of age of onset variables to adult risk behaviors. Logistic and multiple linear regression analyses were used for categorical and continuous outcomes, respectively. Age of onset variables that were statistically significant at the bivariate analyses were included in the corresponding model. Relevant sociodemographic characteristics (i.e., age, sampling site, marital status, years of education, and employment status) were also entered as covariates in all models. Statistical significance was set at $p < .05$ in all tests and all analyses were conducted using SPSS Statistics, Version 22 (IBM Corporation, Armonk, NY).

RESULTS

Sample Profile

Sociodemographic, drug use, and sexual history variables are presented in Table 1 for all participants providing complete age of onset data ($N = 358$). Women were an average of 32.5 years old, mostly White (98.9%), and had approximately 11.1 years of education. At the time of interview, 39.1% were married or living as married and 71.5% were unemployed during the 6 months prior to incarceration.

For risky drug use, about a third (36%) reported a lifetime drug overdose, three-quarters (76.8%) reported lifetime drug injection (60.6% in the past 6 months), and the average age of first IDU was 24.6 years old. Adult sexual behaviors included multiple male sexual partners in the past year (mean = 4 partners), using drugs prior to the last sexual encounter (84.4%), and reporting a recent sexual partner who had been incarcerated (80.4%) or ever injected drugs (60.6%). About a quarter (26.5%) indicated having traded sex for money or goods in the past year.

Age of First Arrest, Drug Use, and Sexual Encounter

When examining the mean age of onset for arrest, drug use, and sexual encounter, average age of first sexual encounter was earliest (14.7 years old), followed by age of first drug use (16.3 years old) and age of first arrest (23.3 years old) (Table 1). The correlation between these age of onset variables was positive and significant in all cases, as depicted in Table 2. The relationship between age of first drug use and arrest was strongest ($r = .31$) followed by age of first drug use and sex ($r = .28$) and age of first arrest and sex ($r = .16$).

Bivariate Relationship Between Age of Onset Variables and Adult Risk Behaviors

A series of correlations were computed to examine bivariate relationships between adult risk behaviors and the age of first arrest, drug use, and sexual encounter. The results of these analyses are presented in Table 2.

Participants arrested at a younger age were significantly more likely to report ever overdosing, ever injecting drugs, injecting drugs in the past 6 months, and injecting drugs at a younger age (p values $< .05$). These participants were also significantly more likely to have

a recent sexual partner with a history of IDU and to have used drugs before their last sexual encounter (p values $< .05$).

Participants who reported earlier drug use were also more likely to report high-risk drug use as an adult, including ever overdosing, ever injecting drugs, injecting drugs in the past 6 months, and injecting drugs at a younger age (p values $< .05$). Earlier drug use was also associated with having a recent sexual partner that had been incarcerated or that had a history of IDU, trading sex for drugs or money in the past year, and using drugs before the last sexual encounter (p values $< .05$).

Finally, participants with a sexual encounter at an earlier age reported significantly more male sexual partners in the past year and earlier IDU (p values $< .05$). These participants were also significantly more likely to have ever overdosed, ever injected drugs, injected drugs in the past 6 months, traded sex for drugs or money in the past year, and had a recent sexual partner who had ever injected drugs (p values $< .05$).

Unique Contribution of Age of Onset Variables to Adult Risk Behaviors

Logistic and linear regression models were used to examine the unique contribution of age of first arrest, drug use, and sexual encounter to adult high-risk behaviors. Relevant sociodemo-graphic characteristics (i.e., age, sampling site, marital status, years of education, and employment status) were entered as covariates in all models. Significant effects of age of onset variables therefore represent unique contributions after adjustment for relevant covariates and other onset variables included in each model.

High-Risk Drug Use Model—Effect size estimates and 95% confidence intervals from logistic and linear regression models examining high-risk drug use are presented in Table 3. One or more age of onset variables were uniquely associated with the following: ever overdosing, lifetime IDU, and the age of first IDU.

Age of first arrest and drug use were significant and unique predictors of ever injecting drugs and the age of first IDU. For each additional year before first arrest and drug use, the odds of ever injecting drugs declined by 5% and 6%, respectively. Among injection drug users ($n = 275$), later onset of arrest and drug use were also associated with a later reported age of first IDU. All three onset variables were significant and unique predictors of a lifetime overdose. For each additional year before first arrest, drug use, and sexual encounter, the odds of having ever overdosed decreased by 7%, 6%, and 13%, respectively.

Significant and unique covariate predictors were also observed after controlling for other covariates and age of onset variables. Older age was associated with increased odds of ever overdosing, decreased odds of recent IDU (i.e., past 6 months), and first IDU at a later age. Participants unemployed in the past 6 months were also twice as likely to report a history of IDU and were more than 60% more likely to report recent IDU.

High-Risk Sexual Practices Model—Effect size estimates and 95% confidence intervals from logistic and linear regression models evaluating high-risk sexual practices are

presented in Table 4. Findings from these models indicated that only the drug use and sexual encounter onset variables were uniquely associated with high-risk sexual practices.

Age of first drug use was uniquely associated with having a recent sexual partner who had previously injected drugs as well as using drugs before the last sexual encounter. Each additional year before first drug use was associated with a 6% decrease in the odds of the most recent sexual partner previously injecting drugs and a 7% decrease in the odds of using drugs prior to the last sexual encounter. In addition to age of drug use initiation, age of first sexual encounter was also uniquely associated with the number of male sexual partners in the past year, such that a later age of first sexual encounter was associated with fewer past year partners.

Significant and unique covariate predictors were also observed after controlling for other covariates and age of onset variables. Older participants were less likely to report a recent sexual partner who had been incarcerated or had ever injected drugs. Additionally, participants that were unemployed during the past 6 months were more than twice as likely to report using drugs prior to their last sexual encounter.

DISCUSSION

The prevalence of high-risk substance use and sexual behaviors among incarcerated women of all ages has been well-documented, emphasizing the importance of criminal justice venues in identifying and providing services to this vulnerable population. Although research has shown that women's earlier engagement with drug use and sex is often associated with higher-risk adult behaviors, few studies have also included age of first arrest as an onset variable of interest. In exploring these relationships, this study fills an important gap in the literature by providing insight into the development of risk factors within a sample of rural women, and identifying specific behaviors that would be valuable to address through targeted education and interventions.

The first objective of this study was to profile age of first sex, drug use, and arrest in a sample of incarcerated rural women. Findings showed that women in this sample reported initiation of both substance use and sexual behaviors earlier than national averages (Haydon, Herring, Prinstein, & Halpern, 2012; SAMHSA, 2014). Age of initiation of sex or drug use is less often assessed in samples of incarcerated adult women, but among detained juveniles, research has demonstrated that early involvement is also common among girls (Guthrie et al., 2002; Kelly et al., 2007). Similarly, age of first arrest is rarely reported in adult populations, but Pelissier (2004) found an average of 24.2 years of age among a sample of women in prison-based drug treatment programs, similar to the 23.3 years of age observed in the current study. Overall, results from the present study suggest that rural women in this sample are similar to other samples of substance-using, incarcerated women in reporting early onset of sex or drug use and comparable age of first arrest.

Second, this study examined the relationship between age of first arrest, age of first illicit drug use, and first sexual encounter. The significant and positive correlations found between all three age of onset variables indicate that initiation of these events is related among high-

risk rural women, such that earlier initiation of each would rarely not be accompanied by earlier initiation of the other two. This finding is consistent with theory provided by Jessor and colleagues (Donovan & Jessor, 1985; Jessor, 1987), which has suggested that timing of onset for behaviors such as drug use and sex is predicted by a common set of factors, providing impetus for a trajectory of early or later initiation among a variety of novel behaviors and explaining the correlation of timing observed in this sample. Although first arrest does not signify a voluntary initiation in the manner of first drug use or sex, its inclusion in this study is warranted as a common result of early risky or delinquent behaviors, particularly given the criminal justice setting from which the current sample of women was recruited.

The final objective of this study was to examine the unique contribution of the ages of onset variables to adult high-risk drug use and sexual practices. All three age of initiation variables were found to uniquely affect risk of engaging in at least one high-risk drug-using behavior. Earlier age of first drug use uniquely increased women's likelihood of ever having overdosed and injected drugs, and having injected drugs at an earlier age. Given results of previous studies that have shown earlier age of drug use onset to increase likelihood of later dependence (King & Chassin, 2007; Walters & Urban, 2014) and engagement in risky substance-using behaviors (Baldwin et al., 2013), these findings are not particularly surprising.

Younger age of first sex was also found to independently increase the risk for ever having overdosed, which was unexpected. Epstein and colleagues (2014) have suggested that early sexual initiation and sexual risk behaviors in early adulthood are both driven by behavioral disinhibition and involvement with negative peer groups, factors that could also result in high-risk drug use and increased odds of overdose. Future research should examine further the nature of this relationship.

Finally, women with earlier criminal justice system involvement were more likely to have ever overdosed or used drugs intravenously, and to have begun injecting drugs at a younger age, even when other demographic and onset variables were held constant. In a related study, Herbst et al. (2016) found that women with a history of incarceration, compared to those arrested for the first time, engage in a greater number of substance-using and sexual risk behaviors, and are more likely to have ever injected drugs. These results and the findings of the present study emphasize the need to further examine the relationship between justice system involvement and high-risk behaviors.

Although age of first arrest was not found to have a unique influence on the likelihood of engaging in later sexual risk behaviors, women's ages of onset for drug use and sex significantly affected the risk of several behaviors specifically. Women reporting earlier sexual encounters were more likely to report a greater number of recent male sexual partners, a pattern that has been observed in previous studies (Adimora, Schoenbach, Taylor, Khan, & Schwartz, 2011). Additionally, earlier age of first illicit drug use was found to uniquely increase women's risk of sexual involvement with men that had ever been incarcerated or engaged in IDU behaviors. In this case, the increased likelihood of engaging in sex with risky partners may have resulted from earlier and more prolonged involvement in

drug-using networks, narrowing women's perceived options for sexual partnerships. In a previous study, Pilowsky and colleagues (2007) demonstrated that drug-using individuals are more likely to report high-risk sexual partnerships if they also report a large drug-using social network, suggesting that the relationship between early drug use and later involvement with high-risk partners observed in the present study should be an important area of focus for future research.

Overall, all three age of onset variables examined were independently associated with differences in risk behaviors in adulthood, such that earlier involvement—with sex, illicit drug use, or the criminal justice system—increased women's odds of engaging in higher-risk practices associated with drug use and sex as adults. Claims of causality would be spurious given the cross-sectional nature of this data, but these results nonetheless indicate that important differences exist between women who have earlier or later ages of onset, and that these differences are uniquely and adversely associated with their behaviors as adults.

In addition, the findings related to age and employment status in the multivariate models were unexpected. Women in this sample who were unemployed prior to arrest had significantly higher odds of having used drugs intravenously, by lifetime and 6-month estimates, and were more than twice as likely to have used drugs prior to their last sexual encounter. Older women, although more likely to have ever overdosed, were less likely to report recent high-risk male sex partners (had been incarcerated or injected drugs) or recent IDU (past 6 months), and were more likely to have initiated IDU at a later age. Regarding employment status, although drug dependence can create barriers to seeking or obtaining work, research has also shown that unemployment can increase the risk of initiating IDU, suggesting a supportive relationship between these variables (Richardson, DeBeck, Feng, Kerr, & Wood, 2014). The finding related to age, however, is more challenging, and has been given less attention in research contexts. A previous study (Staton, Walker, & Leukefeld, 2003) has shown that incarcerated female substance abusers show no difference in sexual or substance-using risk behavior by age group, but variables related specifically to IDU and partners' risky behaviors were not included at that time. Furthermore, it should be noted that IDU has been documented in Appalachian counties only recently (Havens, Walker, & Leukefeld, 2007; Staton-Tindall et al., 2015), and perhaps the effect of age noted in this study resulted from older women's limited previous exposure to drug injection.

Prior to this study, adolescent onsets of sex, drug use, or criminal justice involvement have rarely been explored as possible predictors of later risk behaviors in adulthood. The fact that earlier ages of engagement were individually associated with higher odds of various risky drug-using and sexual activities, even when holding other variables constant, is noteworthy. Identifying women who begin engaging early in drug use or sexual activity, or who are arrested at relatively younger ages, may allow for early intervention to target these women specifically and interrupt a trajectory of behavioral development that can create escalating patterns of risky engagement. This has important clinical implications for services to girls in adolescence and young adulthood. For populations of adult women, these factors can still indicate greater or lesser degrees of risk for certain behaviors, and the findings related to age and employment status further suggest that younger, unemployed women may benefit from resources specifically addressing risky relationships and IDU. The criminal justice system

remains an important venue to identify such high-risk women across the lifespan and provide them with education, prevention, intervention, and treatment.

Findings from this study are subject to limitations. Regional differences exist in adolescent development between urban and rural areas, demonstrated by variable pregnancy rates (Shoff & Yang, 2012) and patterns of adolescent substance use (Martino et al., 2008; Scaramella & Keyes, 2001), therefore onset experiences of these women may be unique based on their rural backgrounds. Additionally, it is possible that high rates of regional unemployment—9.4% in Appalachian Kentucky between 2010–2014 (Pollard & Jacobsen, 2016)—may have amplified the effect of unemployment on later risk behaviors. Furthermore, the racial homogeneity of the sample, although representative of Appalachian Kentucky (Pollard & Jacobsen, 2016), may limit generalizability to other ethnicities of women, even within rural settings. Previous research has also identified other variables that are implicated in risky behaviors among women from adolescence to adulthood, such as trauma (Ullman, Relyea, Peter-Hagene, & Vasquez, 2013), environmental factors (Stevens, Gilliard-Matthews, Nilsen, Malven, & Dunaev, 2014), psychological distress (Elkington, Bauermeister, & Zimmerman, 2010), and personal characteristics like behavioral disinhibition (Epstein et al., 2014). Consideration of such variables was unfortunately beyond the scope of this study and should be considered for future research. Finally, the use of self-report data raises the possibility that women's recollections of initiatory events may be inaccurate. The criminal justice setting may also have resulted in inaccurate responding due to salient concerns for confidentiality, in spite of all measures taken to increase privacy and trust.

Despite these limitations, this study makes a contribution to the literature with a focus on high-risk rural women. The results have clearly indicated that onsets of engagement with illicit drug use, the criminal justice system, and sex are related events, and that each initiation can serve as a marker for potential involvement with specific risky behaviors later in adulthood.

For juvenile girls, these findings emphasize the importance of identifying individuals with earlier engagement and offering strong preventive programs that may preclude the developmental trajectory of risky behaviors, particularly within criminal justice settings. Furthermore, for justice system-involved adult women, these results provide insight into variables—early age of first arrest, sex, or drug use, as well as younger current age and unemployment—that may signal need for intervention or treatment. Results of this study have provided new insight regarding the relationships between onset and later risk, particularly between early arrest and IDU behaviors, and have indicated valuable areas of focus for programs targeting juvenile girls and adult women in rural areas.

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References

- Adimora AA, Schoenbach VJ, Taylor EM, Khan MR, Schwartz RJ. Concurrent partnerships, nonmonogamous partners, and substance use among women in the United States. *American Journal of Public Health*. 2011; 101(1):128–136. [PubMed: 20724694]
- Asencio EK, Burke PJ. Does incarceration change the criminal identity? A synthesis of labeling and identity theory perspectives on identity change. *Sociological Perspectives*. 2011; 54(2):163–182.
- Baldwin P, Shrestha R, Potrepka J, Copenhaver M. The age of initiation of drug use and sexual behavior may influence subsequent HIV risk behavior: A systematic review. *ISRN AIDS*. 2013; 2013:1–17. DOI: 10.1155/2013/976035
- Banys P. Mitigation of marijuana-related legal harms to youth in California. *Journal of Psychoactive Drugs*. 2016; 48(1):11–20. [PubMed: 26891110]
- Barrett DE, Ju S, Katsiyannis A, Zhang D. Females in the juvenile justice system: Influences on delinquency and recidivism. *Journal of Child and Family Studies*. 2015; 24(2):427–433.
- Cavazos-Rehg PA, Krauss MJ, Spitznagel EL, Schootman M, Cottler LB, Bierut LJ. Number of sexual partners and associations with initiation and intensity of substance use. *AIDS and Behavior*. 2011; 15(4):869–874. [PubMed: 20107887]
- Clarke JG, Hebert MR, Rosengard C, Rose JS, DaSilva KM, Stein MD. Reproductive health care and family planning needs among incarcerated women. *American Journal of Public Health*. 2006; 96(5): 834–839. [PubMed: 16571701]
- Colman RA, Kim DH, Mitchell-Herzfeld S, Shady TA. Delinquent girls grown up: Young adult offending patterns and their relation to early legal, individual, and family risk. *Journal of Youth and Adolescence*. 2009; 38:355–366. [PubMed: 19636750]
- Cottle CC, Lee RJ, Heilbrun K. The prediction of criminal recidivism in juveniles: A meta-analysis. *Criminal Justice and Behavior*. 2001; 28(3):367–394.
- Donovan JE, Jessor R. Structure of problem behavior in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology*. 1985; 53(6):890–904. [PubMed: 4086689]
- Elkington KS, Bauermeister JA, Zimmerman MA. Psychological distress, substance use, and HIV/STI risk behaviors among youth. *Journal of Youth and Adolescence*. 2010; 39:514–527. [PubMed: 20229264]
- Epstein M, Bailey JA, Manhart LE, Hill KG, Hawkins JD. Sexual risk behavior in young adulthood: Broadening the scope beyond early sexual initiation. *Journal of Sex Research*. 2014; 51(7):721–730. [PubMed: 24423058]
- Fazel S, Bains P, Doll H. Substance abuse and dependence in prisoners: A systematic review. *Addiction*. 2006; 101:181–191. [PubMed: 16445547]
- Guthrie BJ, Hoey E, Ravoir L, Kintner E. Girls in the juvenile justice system: Leave no girl's health un-addressed. *Journal of Pediatric Nursing*. 2002; 17(6):414–423. [PubMed: 12518282]
- Havens JR, Walker R, Leukefeld CG. Prevalence of opioid analgesic injection among rural nonmedical opioid analgesic users. *Drug and Alcohol Dependence*. 2007; 87:98–102. [PubMed: 16959437]
- Haydon AA, Herring AH, Prinstein MJ, Halpern CT. Beyond age at first sex: Patterns of emerging sexual behavior in adolescence and young adulthood. *Journal of Adolescent Health*. 2012; 50:456–463. [PubMed: 22525108]
- Herbst JH, Branscomb-Burgess O, Gelaude DJ, Seth P, Parker S, Fogel CI. Risk profiles of women experiencing initial and repeat incarcerations: Implications for prevention programs. *AIDS Education and Prevention*. 2016; 28(4):299–311. [PubMed: 27427925]
- Hirschfield P. Another way out: The impact of juvenile arrests on high school dropout. *Sociology of Education*. 2009; 82:368–393.
- Javanbakht M, Boudov M, Anderson LJ, Malek M, Smith LV, Chien M, Guerry S. Sexually transmitted infections among incarcerated women: Findings from a decade of screening in a Los

Angeles County Jail, 2002–2012. *American Journal of Public Health*. 2014; 104(11):e103–e109. [PubMed: 25211762]

- Jessor R. Problem-Behavior Theory, psychosocial development, and adolescent problem drinking. *British Journal of Addiction*. 1987; 82:331–342. [PubMed: 3472582]
- Kelly PJ, Owen SV, Peralez-Dieckmann E, Martinez E. Health interventions with girls in the juvenile justice system. *Women's Health Issues*. 2007; 17:227–236. [PubMed: 17602967]
- King KM, Chassin L. A prospective study of the effects of age of initiation of alcohol and drug use on young adult substance dependence. *Journal of Studies on Alcohol and Drugs*. 2007; 68(2):256–265. [PubMed: 17286344]
- Kirk DS, Sampson RJ. Juvenile arrest and collateral educational damage in the transition to adulthood. *Sociology of Education*. 2013; 86(1):36–62.
- Knudsen HK, Leukefeld C, Havens JR, Duvall JL, Oser CB, Staton-Tindall M, ... Inciardi JA. Partner relationships and HIV risk behaviors among women offenders. *Journal of Psychoactive Drugs*. 2008; 40(4):471–481. [PubMed: 19283951]
- Lieberman AM, Kirk DS, Kim K. Labeling effects of first juvenile arrests: Secondary deviance and secondary sanctioning. *Criminology*. 2014; 52(3):345–370.
- Martino SC, Ellickson PL, McCaffrey DF. Developmental trajectories of substance use from early to late adolescence: A comparison of rural and urban youth. *Journal of Studies on Alcohol and Drugs*. 2008; 69(3):430–440. [PubMed: 18432386]
- Maruschak LM. HIV in prisons, 2001–2010 [Bulletin]. U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2012. Retrieved from <http://www.bjs.gov/content/pub/pdf/hivp10.pdf>
- Minton TD. Census of jails: Population changes, 1999–2013 [NCJ 248627]. Department of Justice, Bureau of Justice Statistics; 2015. Retrieved from <http://www.bjs.gov/content/pub/pdf/cjpc9913.pdf>
- National Institute on Drug Abuse (NIDA). NIDA Modified-ASSIST. 2009. Retrieved from <http://www.drugabuse.gov/nidamed/screening/>
- Office of Juvenile Justice and Delinquency Prevention. Juveniles in residential placement, 2011 [Bulletin]. Juvenile Offenders and Victims: National Report Series. 2014. Retrieved from <http://www.ojjdp.gov/pubs/246826.pdf>
- Pelissier B. Gender differences in substance use treatment entry and retention among prisoners with substance use histories. *American Journal of Public Health*. 2004; 94(8):1418–1424. [PubMed: 15284053]
- Pilowsky DJ, Hoover D, Hadden B, Fuller C, Ompad DC, Andrews HF, ... Latkin C. Impact of social network characteristics on high-risk sexual behaviors among non-injection drug users. *Substance Use & Misuse*. 2007; 42:1629–1649. [PubMed: 17934988]
- Pollard K, Jacobsen LA. The Appalachian region: A data overview from the 2010–2014 American Community Survey [Chartbook]. 2016. Retrieved from http://www.arc.gov/assets/research_reports/DataOverviewfrom2010to2014ACS.pdf
- Puzzanchera C, Hockenberry S. Juvenile Court Statistics 2010. Pittsburgh, PA: National Center for Juvenile Justice; 2013.
- Richardson L, DeBeck K, Feng C, Kerr T, Wood E. Employment and risk of injection drug use initiation among street involved youth in a Canadian setting. *Preventive Medicine*. 2014; 66:56–59. [PubMed: 24989355]
- Scaramella LV, Keyes AW. The social contextual approach and rural adolescent substance use: Implications for prevention in rural settings. *Clinical Child and Family Psychology Review*. 2001; 4(3):231–251. [PubMed: 11783740]
- Sedlak AJ, McPherson K. Survey of Youth in Residential Placement, Office of Juvenile Justice and Delinquency Prevention. Rockville, MD: Westat; 2010. Survey of youth in residential placement: Youth's needs and services.
- Shoff C, Yang T. Spatially varying predictors of teenage birth rates among counties in the United States. *Demographic Research*. 2012; 27:377–417. [PubMed: 23144587]
- Snyder HN. Arrest in the United States, 1990–2010 [NCJ 239423]. Department of Justice, Bureau of Justice Statistics; 2012. Retrieved from <http://www.bjs.gov/content/pub/pdf/aus9010.pdf>

- Spaulding A, Stephenson B, Macalino G, Ruby W, Clarke JG, Flanigan TP. Human immunodeficiency virus in correctional facilities: A review. *HIV/AIDS*. 2002; 35:305–312.
- Staton M, Leukefeld C, Logan TK, Zimmerman R, Lynam D, Milich R, ... Clayton R. Risky sex behavior and substance use among young adults. *Health & Social Work*. 1999; 24(2):147–154. [PubMed: 10340165]
- Staton M, Walker R, Leukefeld C. Age differences in risk behavior among incarcerated substance-abusing women. *Journal of Addictions Nursing*. 2003; 14:3–9.
- Staton-Tindall M, Harp KLH, Minieri A, Oser C, Webster JM, Havens J, Leukefeld C. An exploratory study of mental health and HIV risk behavior among drug-using rural women in jail. *Psychiatric Rehabilitation Journal*. 2015; 38(1):45–54. [PubMed: 25799305]
- Stevens R, Gilliard-Matthews S, Nilsen M, Malven E, Dunaev J. Socioecological factors in sexual decision making among urban girls and young women. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*. 2014; 43:644–654.
- Substance Abuse and Mental Health Services Administration (SAMHSA). Results from the 2013 National Survey on Drug Use and Health: Summary of national findings. Rockville, MD: SAMHSA, Center for Behavioral Health Statistics and Quality; 2014.
- Teplin LA, Elkington KS, McClelland GM, Abram KM, Mericle AA, Washburn JJ. Major mental disorders, substance use disorders, comorbidity, and HIV-AIDS risk behaviors in juvenile detainees. *Psychiatric Services*. 2005; 56(7):823–828. [PubMed: 16020814]
- Ullman SE, Relyea M, Peter-Hagene L, Vasquez AL. Trauma histories, substance use coping, PTSD, and problem substance use among sexual assault victims. *Addictive Behaviors*. 2013; 38:2219–2223. [PubMed: 23501138]
- Walters GD, Urban H. Age of substance use onset as a predictor of early adult substance dependence and offending in male and female delinquents: Simple and mediated moderation. *Journal of Drug Issues*. 2014; 44(4):442–456.
- Wechsberg WM. The revised risk behavior assessment. Research Triangle Park, NC: Research Triangle Institute; 1998.

TABLE 1Descriptive Profile of Sociodemographics, Drug Use, and Sexual History ($N = 358$)

	Mean/%	SD	IQR
Age of onset			
Age of first arrest	23.3	6.4	19–26
Age of first drug use	16.3	5.0	13–18
Age of first sexual encounter	14.7	2.0	13–16
Sociodemographics			
Age	32.5	7.96	27–37
Race (White)	98.9%	—	—
Laurel County	30.2%	—	—
Leslie County	39.1%	—	—
Perry County	30.7%	—	—
Years of education	11.1	2.29	10–12
Currently married or living as married	39.1%	—	—
Unemployed in the past 6 months	71.5%	—	—
High-risk drug use			
Ever overdosed	36.3%	—	—
Ever injected drugs	76.8%	—	—
Injected drugs in past 6 months	60.6%	—	—
Age first injected drugs	24.6	6.8	19–28
High-risk sexual practices			
Last sexual partner been incarcerated	80.4%	—	—
Last sexual partner injected drugs	60.6%	—	—
Used drugs before last sexual encounter	84.4%	—	—
Traded sex for money or goods in past year	26.5%	—	—
# male sexual partners in past year	4.1	12.8	1–3

Note. SD = standard deviation; IQR = interquartile range. $n = 275$ for age first injected drugs.

TABLE 2

Correlations Between Age of First Arrest, Drug Use, and Sexual Encounter and Adult High-Risk Drug Use and Sexual Practices ($N = 358$)

	Age of First		
	Arrest	Drug use	Sex
<i>Intercorrelations</i>			
Age of first arrest	—	—	—
Age of first drug use	.31**	—	—
Age of first sex	.16**	.28**	—
<i>High-risk drug use</i>			
Ever overdosed ^a	-.16**	-.18**	-.16**
Ever injected drugs ^a	-.26**	-.24**	-.13*
Injected drugs in past 6 months ^a	-.23**	-.19**	-.13*
Age first injected drugs	.62**	.36**	.13*
<i>High-risk sexual practices</i>			
Last sexual partner been incarcerated ^a	-.10	.15**	-.10
Last sexual partner injected drugs ^a	-.16**	-.22**	-.11*
Used drugs before last sexual encounter ^a	-.16**	-.20**	-.10
Traded sex for money or goods in past year ^a	-.07	-.11*	-.11*
# Male sexual partners in past year	-.03	-.07	-.12*

Note.

^aDesignates dichotomous variables; $n = 275$ for age first injected drugs.

* $p < .05$

** $p < .01$.

TABLE 3

Unique Contribution of Age of First Arrest, Drug Use, and Sexual Encounter to Adult High-Risk Drug Use ($N = 358$)

	Ever Overdosed	Ever IDU	IDU Past 6 Months	Age of First IDU
	OR (95% CI)	OR (95% CI)	OR (95% CI)	β (95% CI)
<i>Age of first</i>				
Arrest	0.93 (0.89, 0.98)*	0.95 (0.91, 0.99)*	0.97 (0.93, 1.01)	0.36 (0.26, 0.46)*
Drug Use	0.94 (0.89, 0.99)*	0.94 (0.89, 0.99)*	0.97 (0.92, 1.02)	0.13 (0.04, 0.22)*
Sex	0.87 (0.77, 0.98)*	0.91 (0.80, 1.05)	0.91 (0.81, 1.03)	0.00 (0.09, 0.09)
<i>Covariates</i>				
Perry County ^a	1.02 (0.57, 1.81)	1.11 (0.55, 2.24)	0.83 (0.46, 1.50)	-0.05 (-0.15, 0.05)
Laurel County ^a	1.00 (0.58, 1.71)	0.84 (0.44, 1.59)	0.63 (0.36, 1.09)	0.01 (-0.09, 0.11)
Married ^b	0.86 (0.54, 1.38)	0.85 (0.50, 1.45)	1.02 (0.64, 1.63)	-0.03 (-0.11, 0.05)
Unemployed ^c	1.00 (0.60, 1.67)	2.04 (1.16, 3.58)*	1.68 (1.01, 2.77)*	-0.07 (-0.15, 0.02)
Education	1.04 (0.94, 1.16)	1.10 (0.98, 1.24)	1.07 (0.97, 1.19)	0.04 (-0.04, 0.13)
Current Age	1.04 (1.01, 1.08)*	0.97 (0.93, 1.01)	0.95 (0.91, 0.98)*	0.42 (0.32, 0.51)*
R^2	.10	.18	.16	.54

Note.

^aPerry and Laurel County reference group = Leslie County;

^bMarried reference group = not currently married or living as married;

^cUnemployed reference group = employed in the past 6 months. IDU = injection drug use; OR = logistic regression odds ratio; β = linear regression beta coefficient; $n = 275$ for age first injected drugs. R^2 for logistic models represents Nagelkerke pseudo- R^2 .

* $p < .05$.

TABLE 4
 Unique Contribution of Age of First Arrest, Drug Use, and Sexual Encounter to Adult High-Risk Sexual Practices

	Last Sexual Partner Had Been to Prison	Last Sexual Partner Had Injected Drugs	Used Drugs Before Last Sexual Encounter	Traded Sex for Goods or Money in Past Year	Number of Male Sexual Partners in Past Year
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	β (95% CI)
<i>Age of first</i>					
Arrest	—	1.00 (0.96, 1.05)	0.96 (0.91, 1.02)	0.99 (0.94, 1.04)	—
Drug use	0.96 (0.91, 1.01)	0.94 (0.89, 0.98)*	0.93 (0.88, 0.99)*	0.97 (0.91, 1.03)	—
Sex	—	0.96 (0.85, 1.08)	—	0.89 (0.78, 1.01)	-0.12 (-0.22, -0.01)*
<i>Covariates</i>					
Perry County ^a	0.83 (0.41, 1.68)	0.79 (0.45, 1.42)	0.97 (0.44, 2.14)	1.73 (0.96, 3.13)	0.02 (-0.10, 0.14)
Laurel County ^a	0.81 (0.42, 1.58)	0.68 (0.40, 1.18)	0.79 (0.38, 1.64)	0.66 (0.35, 1.22)	0.08 (-0.04, 0.21)
Married ^b	1.13 (0.65, 1.97)	1.13 (0.71, 1.78)	1.02 (0.56, 1.88)	1.10 (0.66, 1.81)	0.03 (-0.07, 0.13)
Unemployed ^c	0.90 (0.49, 1.65)	1.15 (0.70, 1.89)	2.35 (1.27, 4.35)*	1.38 (0.78, 2.45)	0.08 (-0.03, 0.18)
Education	0.95 (0.85, 1.07)	0.95 (0.86, 1.05)	1.03 (0.91, 1.17)	1.11 (0.99, 1.25)	0.04 (-0.07, 0.14)
Current Age	0.95 (0.92, 0.98)*	0.95 (0.92, 0.98)*	0.99 (0.95, 1.04)	0.99 (0.95, 1.03)	-0.04 (-0.15, 0.06)
R^2	.07	.12	.12	.09	.03

Note.

^aPerry and Laurel County reference group = Leslie County;

^bMarried reference group = not currently married or living as married;

^cUnemployed reference group = employed in the past 6 months. OR = logistic regression odds ratio; β = linear regression beta coefficient. R^2 for logistic models represents Nagelkerke pseudo- R^2 .

* $p < .05$.