Published in final edited form as:

Pediatrics. 2007 May ; 119(5): e1126. doi:10.1542/peds.2006-0128.

A Longitudinal Study of the Prevalence, Development, and Persistence of HIV/STI Risk Behaviors in Delinquent Youth: Implications for Health Care in the Community

Erin Gregory Romero, B.S.^a, Linda A. Teplin, Ph.D.^a, Gary M. McClelland, Ph.D.^a, Karen M. Abram, Ph.D.^a, Leah J. Welty, Ph.D.^b, and Jason J. Washburn, Ph.D., ABPP^a

^a Department of Psychiatry and Behavioral Sciences, Feinberg School of Medicine, Northwestern University Chicago, IL

^b Department of Preventive Medicine, Feinberg School of Medicine, Northwestern University Chicago, IL

Abstract

Objective—To examine the prevalence, development, and persistence of sex and drug behaviors that place delinquent youth at risk for human immunodeficiency virus and other sexually transmitted infections (HIV/STI).

Methods—At the baseline interview, HIV/STI drug and sex risk behaviors were assessed in a stratified random sample of 800 juvenile detainees, aged 10 to 18 years. Participants were re-interviewed approximately 3 years later (mean [SD] follow-up, 3.2 [0.3] years; median follow-up, 3.1 years). The final sample in these analyses ($n = 724$) includes 316 females and 408 males, 393 African Americans, 198 Hispanics, 131 non-Hispanic whites, and 2 participants who self-identified as “other.”

Results—Nearly three quarters of youth engaged in one or more unprotected sexual risk behaviors at follow-up. Over 60% had engaged in 10 or more risk behaviors at their baseline interview, and nearly two thirds of them persisted in 10 or more risk behaviors at follow-up. Among youth living in the community, many behaviors were more prevalent at follow-up than at baseline. Among incarcerated youth, the opposite pattern prevailed. Development and persistence of HIV/STI risk behaviors differed by gender, race/ethnicity, and age, even after adjusting for incarceration status. Compared with females, males had higher prevalence rates of many HIV/STI risk behaviors and were more likely to persist in some behaviors and develop new ones. Yet, injection risk behaviors were more prevalent among females than males and were also more likely to develop and persist. Compared with persons younger than 18, persons 18 and older had higher prevalence rates of many HIV/STI risk behaviors at follow-up. Overall, there were few racial and ethnic differences in patterns of HIV/STI risk behaviors; most involved the initiation and persistence of substance use among non-Hispanic whites and Hispanics.

Conclusions—Because detained youth have a median stay of only 2 weeks, HIV/STI risk behaviors in delinquent youth are a community public health problem, not just a problem for the juvenile justice system. Improving the coordination among systems that provide HIV/STI interventions to youth – primary care, education, mental health, and juvenile justice – can reduce the prevalence of risk behaviors and substantially reduce the spread of HIV/STI in young people.

Keywords

Adolescent sexual behavior; HIV/AIDS; Juvenile delinquents; Longitudinal study; Incarceration; Corrections; Drug use

Adolescents and young adults are disproportionately affected by human immunodeficiency virus and other sexually transmitted infections (HIV/STI). Youth aged 15 to 24 represent approximately 25% of sexual active persons in the United States but accounted for nearly 50% of new STI cases (9.1 million) in 2000.¹ Between 2001 and 2005, HIV/AIDS diagnoses increased more than 20% in persons aged 13 to 24 years.² Advances for treating AIDS have slowed mortality.^{3, 4} Still, among persons aged 25 to 34 years, HIV is the sixth leading cause of death among non-Hispanic whites and Hispanics, the third leading cause of death in African Americans, and the leading cause of death in African American women.⁵

HIV/AIDS and other STIs are increasingly diseases of racial/ethnic minorities and youth.^{3, 6} The National Longitudinal Study of Adolescent Health, which sampled over 13,000 young adults, found that the rate of HIV infection in African Americans was 4.9 cases per 1000 persons, compared with 0.22 cases per 1000 in other racial/ethnic groups.^{7, 8} The most recent statistics compiled by the Centers for Disease Control and Prevention indicate that more than three quarters of persons younger than 25 years diagnosed with HIV/AIDS are African American or Hispanic.⁹ Young minority females are at particular risk. African American and Hispanic females account for approximately 80% of HIV/AIDS diagnoses in females aged 13 to 24 years.⁹ Minorities have greater exposure to risk factors than do other groups, including low socioeconomic status, urban living, substance abuse, and limited access to health care.^{10–14}

Minorities are also overrepresented in the juvenile justice system, where HIV/STI risk behaviors are prevalent.^{15–20} Detained youth report more risk behaviors and initiate them at younger ages than do youth in the community.²¹ Detained youth are likely to be at continued risk for HIV infection as they age. Adults in prison have higher rates of HIV/STI risk behaviors^{22–26} and HIV infection (1.8%) than the general population (0.2%).²⁷ Sound public policy and effective interventions require data on the developmental course of HIV/STI risk behaviors. Because youth are detained for an average of only 2 weeks,¹⁵ their behaviors place persons in the community at risk.

There are, however, few comprehensive studies of HIV/STI risk behaviors in delinquent youth,^{17, 18, 21, 28–34} and, to our knowledge, no longitudinal studies. Even after expanding our literature review to include “high-risk” youth -- such as inner city youth and other impoverished populations -- we found only 4 epidemiologic studies with follow-up periods longer than 6 months.^{35–38} Only 1 of these studies collected comprehensive information on HIV/STI sex and drug risk behaviors.³⁶ None of these studies investigated how the development and persistence of HIV/STI risk behaviors differ by gender, race/ethnicity, and age.^{35–38}

To our knowledge, this is the first large-scale longitudinal study of HIV/STI risk behaviors in delinquent youth. Our study has two methodological strengths: (1) a stratified random sample, large enough ($n = 724$) to generate reliable rates of HIV/STI risk behaviors for key demographic subgroups (e.g., females and Hispanics); and (2) comprehensive measures of HIV/STI drug and sex risk behaviors.

In this article, we address three questions: (1) **Prevalence:** among youth in the sample, what proportion reported each HIV/STI behavior? (2) **Development:** among youth who did *not* report a specific HIV/STI behavior at baseline, what proportion reported that behavior at follow-up? (3) **Persistence:** among youth who *did* report a specific HIV/STI behavior at

baseline, what proportion persisted in that behavior at follow-up? We examine differences by incarceration status and demographic variables (gender, race/ethnicity, and age).

METHODS

Sampling Procedures

Our data are from the Northwestern Juvenile Project, a longitudinal study of health needs and outcomes of delinquent youth.^{20, 21, 39} We recruited a stratified random sample of 1829 detained youth initially arrested and detained awaiting the adjudication and/or disposition of their case between November 20, 1995, and June 14, 1998, at the Cook County Juvenile Temporary Detention Center (CCJTDC) in Chicago, IL. To ensure adequate representation of key subgroups, we stratified our sample by age (10–13 years or ≥ 14 years), gender, race/ethnicity (African American, non-Hispanic white, and Hispanic), and legal status (processed as a juvenile or an adult). The CCJTDC is used for pretrial detention and for offenders sentenced for fewer than 30 days. Consistent with juvenile detainees nationwide,¹⁵ nearly 90% of detainees at CCJTDC were male and most were racial/ethnic minorities. Additional information on our methods has been published elsewhere.^{20, 21, 39}

Procedures to Obtain Assent and Consent

At the baseline and follow-up interviews, participants signed either an assent form (if they were < 18 years) or a consent form (if they were ≥ 18 years). The Northwestern University Institutional Review Board and the Centers for Disease Control and Prevention Institutional Review Board waived parental consent, consistent with federal regulations regarding research with minimal risk (45 CFR [Code of Federal Regulations] 46.116[c], 45 CFR 46.116[d], and 45 CFR 46.408[c]).⁴⁰ We nevertheless tried to contact parents to provide them information and offer an opportunity to decline participation. Despite repeated attempts to contact the parent or guardian, for 43.8% of the participants, none could be found. In lieu of parental consent, an independent participant advocate representing the interests of the participants oversaw youth assent. Federal regulations allow for a participant advocate if parental consent is not feasible (45 CFR 46.116[d]).⁴⁰

Participants

Collection of the baseline HIV/STI data began when funding became available, from February 1997 through June 1998. Among the 1052 youth sampled during this period, 3.9% ($n = 41$) refused to participate.^{21, 41} There were no significant differences in refusal rates by gender, race/ethnicity, or age. Fourteen participants did not complete the HIV/STI questions because of the interviewer's error. One participant was released from detention before finishing the interview; 196 participants left the detention center while we were locating their caretakers to obtain consent or before we could schedule an interview. The final number of youth who received the HIV/STI interview was 800; of these, 769 (96.1%) were interviewed at follow-up; 12 (1.5%) died before the follow-up; 3 (0.4%) withdrew from the study; and 16 (2.0%) were lost to follow-up. Time to follow-up was between 2.9 and 7.9 years (mean [SD] follow-up, 3.3 [0.6] years; median follow-up, 3.1 years).

Forty-five participants of the 769 participants were excluded from our analyses: 5 (0.7%) did not receive the HIV/STI risk behavior assessment at follow-up (because of time constraints or the interviewer's error); and 40 (5.2%) received their follow-up interview more than 4.5 years after their baseline interview. We chose 4.5 years for the cutoff because, in this high-risk and highly mobile sample, participants can be difficult to track; using a stricter cutoff would restrict the generalizability of the sample. To ensure that our cutoff did not bias the findings, we compared the demographic characteristics (gender, race/ethnicity, and age) of participants who were interviewed between 3.5 and 4.5 years ($n = 81$, 11% of the sample) after baseline with

those interviewed within 3.5 years after baseline; there were no significant differences. In addition, we examined whether our findings were affected by including these participants. We repeated all analyses using only participants interviewed within 3.5 years; the findings were substantially the same.

The final sample in these analyses ($n = 724$) includes 316 females and 408 males, 393 African Americans, 198 Hispanics, 131 non-Hispanic whites, and 2 participants who self-identified as “other.” At baseline, 113 youth were processed as adults and 611 were processed as juveniles. The median length of stay at CCJTDC was 15 days (range, 1 to 686 days; mean [SD] days, 40.7 [75.3]). At baseline, participants were aged 10 to 18 years (mean [SD] age, 14.8 [1.4]; median age, 15). At follow-up, participants were aged 13 to 22 years (mean [SD] age, 18.1 [1.4]; median age, 18). Time to follow-up was 2.9 to 4.5 years (mean [SD] time to follow-up, 3.2 [0.3] years; median, 3.1 years).

Procedures for Data Collection

At the baseline interview, face-to-face, structured interviews were conducted at the detention center in a private area; most interviews took place within 2 days of intake.^{20–21, 39} At the follow-up, the same participants were interviewed, irrespective of where they lived. Participants were interviewed in the community (66.2%), at correctional facilities (26.2%), at residential placement facilities (2.5%), or by telephone if they lived in a community more than two hours away (5.1%). Baseline and follow-up interviews took 2 to 4 hours to complete.^{20–21, 39} We used both male and female interviewers; female participants were interviewed only by female interviewers. Most interviewers had advanced degrees in psychology or an associated field and had experience interviewing at-risk youth. All interviewers were trained for at least 1 month by one of the authors (KMA) and other supervisory staff. One third of the interviewers were fluent in Spanish.^{20–21, 39}

Measures

We examined behaviors associated with increased risk for HIV/STI, including sex risk behaviors and injection risk behaviors (sharing needles or “works” for drug injection, piercings, or tattoos).^{42–46} We also examined antecedents to HIV/STI risk behaviors, such as alcohol and other drug use, because they may indirectly lead to HIV/STIs by increasing high-risk sexual behaviors.

HIV/STI risk behaviors were assessed using the National Institute on Drug Abuse (NIDA) Risk Behavior Assessment (RBA).⁴⁷ Although designed for adults, we chose the RBA because instruments designed for adolescents and young adults did not assess the breadth, frequency, and severity of HIV/AIDS risk behaviors common in our sample. A report issued by the Substance Abuse and Mental Health Services Administration recommends the RBA for the comprehensive assessment of HIV/AIDS among drug-using adolescents.⁴⁸ The RBA is a reliable and valid measure of drug and sex risk behaviors.^{47, 49, 50} We supplemented the RBA with items from the Adolescent Health Survey from NIDA’s Study of Street Youth at Risk for AIDS⁵¹ and Yale’s AIDS Risk Inventory.⁵² Experts reviewed our measure at baseline, and we pilot-tested 58 participants. At baseline, *lifetime* drug use was assessed using screen items (one for each substance) from the Diagnostic Interview Schedule, Version 2.3.⁵³ At baseline and follow-up, *recency* and *frequency* of drug use were assessed using NIDA’s RBA.

Missing Data

Missing cases—To assess the effect of attrition on generalizability, we compared participants who provided follow-up data with those who did not on the following variables: (1) demographic characteristics (gender, race/ethnicity, age); and (2) HIV/STI risk behaviors reported at baseline. There were no significant differences except: (1) those who died were

more likely to be male ($P < .05$); and (2) those lost to follow-up were more likely to be non-Hispanic white or Hispanic ($P < .05$) and were less likely to have had sex with more than one partner ($P < .05$). Potential bias from demographic differences in attrition was adjusted by weighting the statistical analyses by sampling strata (see the “Statistical Analysis” subsection of the “Methods” section).

Missing data from interviews conducted by telephone (n=37, 5.1%)—Because telephone interviews needed to be shorter than face-to-face interviews, they are missing the following variables at follow-up: use of specific drugs, types of sex with a high-risk partner, sex and unprotected sex while drunk or high, and trading sex and drugs. Comparing participants interviewed by telephone with those interviewed face-to-face revealed (1) no significant demographic differences (gender, race/ethnicity, or age); (2) no significant differences in the prevalence of HIV/STI risk behaviors reported at baseline; and (3) no significant differences in the prevalence of other HIV/STI risk behaviors reported at follow-up.

Independent Variables

We compared HIV/STI risk behaviors by gender, race/ethnicity, and age. We also examined incarceration status since baseline. For behaviors assessed “since the last interview,” participants were considered incarcerated if they self-reported that they had been “mostly in correctional facilities” since the baseline interview (21.4% of sample [$n = 126$ males; $n = 29$ females]). For behaviors assessed “in the past three months” or less, participants were considered incarcerated if they self-reported that they had been “mostly in correctional facilities in the past three months” (23.1% of sample [$n = 138$ males; $n = 29$ females]).

Statistical Analysis

All data were weighted to reflect the population at the CCJTDC. Because selected strata were oversampled, we used sample weights, based on CCJTDC’s population, to estimate descriptive statistics and model parameters that reflect CCJTDC’s population. Taylor series linearization was used to estimate standard errors.^{54, 55} Only statistically significant findings with an alpha of $P < .05$ are noted in the text.

Changes in the prevalence of behaviors between the baseline and follow-up interviews were assessed using paired differences with an adjusted Wald F statistic.⁵⁶ Logistic regression was used to assess demographic differences in the prevalence (Tables 1 and 2), development (Tables 3 and 4), and persistence (Tables 5 and 6) of individual risk behaviors.⁵⁷ The independent variables in the regression models were incarceration status only (Tables 1 and 2), incarceration status and gender (Tables 2, 3 and 5), incarceration status and race/ethnicity (Tables 4 and 6), and incarceration status and age. We tested for differences between specific groups (e.g., African American versus Hispanic) only when the overall model was significant at the $P < .05$ level. We controlled for incarceration status in all analyses by either (1) computing separate prevalence rates for those incarcerated and those in the community, or (2) including incarceration status in logistic regression models.

RESULTS

1. Prevalence of HIV/STI Risk Behaviors

Comparing the Baseline and Follow-up Interviews

Males: Table 1 shows that prevalence of the following behaviors increased at follow-up: oral sex, anal sex (receptive and/or insertive), sex while drunk or high, and unprotected sex while drunk or high. In contrast, multiple sex partners (>1 and >3 in the past 3 months), recent use of marijuana, and frequent use of marijuana decreased at follow-up.

Table 1 also shows differences by **incarceration status**. Among males in the community, most behaviors were more prevalent at follow-up. Only two behaviors, recent and frequent use of marijuana, were significantly less prevalent. Among incarcerated males, the opposite pattern prevailed; many behaviors were less prevalent at follow-up. Only one behavior, oral sex with a high-risk partner, was significantly more prevalent.

Females: Table 2 shows that the prevalence of the following behaviors increased at follow-up: sexual activity, vaginal sex, recent unprotected vaginal sex, oral sex, recent unprotected oral sex, unprotected sex while drunk or high, and trading sex and drugs. In contrast, multiple sex partners (>1 in the past 3 months), use of alcohol, use of marijuana, and recent use of marijuana were less prevalent at follow-up.

Table 2 also reports differences by **incarceration status**. Among females in the community, many behaviors were more prevalent at follow-up. Only four behaviors, multiple sex partners (> 1 and >3 in the past 3 months); use of marijuana; and recent use of marijuana, were significantly less prevalent. Among incarcerated females, the opposite pattern prevailed; only one behavior, oral sex, was significantly more prevalent.

Prevalence at Follow-up

Males: Table 1 shows that at follow-up, nearly all males were sexually active, had vaginal sex, and used alcohol and marijuana. The prevalence of unprotected sex in the past three months was also notable: nearly half had recent unprotected vaginal sex, over one third had recent unprotected oral sex, 7% had recent unprotected anal sex, and over half had unprotected sex while drunk or high.

Table 1 also shows that at follow-up, more males in the community than incarcerated males reported the following behaviors: sexually active, multiple sex partners (>1 and >3 in the past 3 months), vaginal sex, recent unprotected vaginal sex, recent unprotected oral sex, recent unprotected anal sex, traded sex and drugs, recent use of alcohol, frequent use of alcohol, use of marijuana, recent use of marijuana, and frequent use of marijuana. In contrast, more incarcerated males engaged in anal sex with a high-risk partner than those in the community.

Females: Table 2 shows that at follow-up, nearly all females were sexually active and had vaginal sex; over four fifths used alcohol and marijuana. The prevalence of unprotected sex in the past three months was also notable: nearly two thirds had recent unprotected vaginal sex, over one third had recent unprotected oral sex, nearly 4% had recent unprotected anal sex, and nearly half had unprotected sex while drunk or high.

Table 2 also shows that at follow-up, more females in the community than incarcerated females reported the following behaviors: sexually active, vaginal sex, recent unprotected vaginal sex, recent use of alcohol, frequent use of alcohol, recent use of marijuana, and frequent use of marijuana.

Gender differences: There were many gender differences, which are reported in Table 2. More males than females reported the following behaviors: multiple sex partners (>1 and >3 in the past 3 months), vaginal sex, oral sex with a high-risk partner, anal sex (receptive and/or insertive), anal sex with a high-risk partner, sex while drunk or high, frequent use of alcohol, and use of marijuana. In contrast, more females than males reported the following behaviors: receptive anal sex, and injection drugs.

Age differences (data not shown): More youth 18 and older (n = 502) than youth younger than 18 (n = 222) reported the following behaviors: recent unprotected anal sex (prevalence

rate [PR]: 2.0% vs. 7.9%; $P < .05$), recent use of alcohol (PR: 28.9% vs. 52.9%; $P < .05$), and tattooing (PR: 19.8% vs. 50.1%; $P < .001$).

2. Development of HIV/STI Risk Behaviors

Table 3 shows that many participants who had not reported risk behaviors at baseline had developed them by follow-up. For example, among those who had not previously reported unprotected vaginal sex, nearly 40% of males and over half of females reported such behavior at follow-up. More than 40% of males and nearly 40% of females began engaging in unprotected sex while drunk or high at follow-up.

Gender differences—Table 3 shows that at follow-up, more males than females had begun engaging in the following behaviors: multiple sex partners (>1 and >3 in the past 3 months), vaginal sex with a high-risk partner, anal sex (receptive and/or insertive), anal sex with a high-risk partner, use of alcohol, and frequent use of alcohol. In contrast, at follow-up more females than males had begun engaging in receptive anal sex, use of substances other than alcohol and marijuana, and injection drugs.

Racial/ethnic differences—Table 4 shows that there were few racial and ethnic differences in the development of risk behaviors; most involved the initiation of substance use among non-Hispanic whites and Hispanics. More non-Hispanic whites and Hispanics than African Americans had begun engaging in recent use of alcohol, use of substances other than alcohol or marijuana, recent use of substances other than alcohol or marijuana, and frequent use of substances other than alcohol or marijuana. More non-Hispanic whites than African Americans had begun having recent unprotected oral sex. More Hispanics than non-Hispanic whites had begun having recent unprotected anal sex.

3. Persistence of HIV/STI Risk Behaviors

Table 5 shows that persistence of sex and drug risk behaviors was common for both males and females. For example, among youth who had engaged in unprotected vaginal sex at baseline, more than half of males and nearly 70% of females persisted in this behavior at follow-up. Over three quarters of males and nearly 60% of females persisted in unprotected sex while drunk or high at follow-up. More than 70% of males and nearly 70% of females persisted in using substances other than alcohol and marijuana at follow-up.

Gender differences—There were few gender differences in the tendency for risk behaviors to persist. At follow-up, more males than females had persisted in the following sex risk behaviors: multiple sex partners (>1 in the past 3 months), sex while drunk or high, and use of marijuana.

Racial/ethnic differences—Table 6 shows that there were few racial or ethnic differences in the tendency for behaviors to persist. More non-Hispanic whites and Hispanics than African Americans persisted in the following behaviors: oral sex and use of substances other than alcohol and marijuana. More Hispanics than African Americans persisted in recent use of alcohol and tattooing.

DISCUSSION

Our findings show that youth involved in the juvenile justice system continue to be at great risk for HIV/STIs as they age. Nearly three quarters of youth engaged in one or more unprotected sexual risk behaviors at follow-up. Over 60% had engaged in 10 or more risk behaviors at their baseline interview,²¹ and nearly two thirds of them persisted in 10 or more risk behaviors at follow-up.

Irrespective of gender, race/ethnicity, or age, sex risk behaviors were prevalent and likely to persist and develop. At follow-up, more than one third of males and one fourth of females reported engaging in vaginal sex with a high-risk partner. At baseline, more than one third of males and over half of females reported engaging in recent unprotected vaginal sex. At follow-up, more than half of youth persisted in this behavior and more than one third developed this behavior. These findings underscore the importance of providing early HIV/STI interventions, continued outreach, and long-term interventions that focus on sex risk behaviors.

Injection risk behaviors were uncommon at baseline and at follow-up. However, our findings on risk behaviors related to *non-injection* drug use are of great concern. One half of our participants had a substance use disorder at baseline,²⁰ and over 80% of youth reported using alcohol and marijuana at follow-up. At baseline, more than one third of participants engaged in unprotected sex while drunk or high. At follow-up, approximately three fifths of youth persisted in this behavior and two fifths of youth developed this behavior. Substance abuse can lead to high-risk sexual behaviors by affecting decision making, compromising judgment, decreasing the likelihood of condom use, and increasing the likelihood of sex-for-drug exchanges and injection drug use.^{58–72} Yet, research on non-injection drug use and HIV/STIs has lagged considering its importance in the current HIV/STI epidemic.

Taken together, these findings mirror changing patterns of transmission of HIV/STIs in the general population. In the early stages of the HIV/STI epidemic, the most common patterns of transmission were injection drug use (approximately one quarter of AIDS cases) and male-to-male sex (two thirds of AIDS cases).⁷³ Male-to-female sexual contact at that time accounted for only 4% of AIDS cases;⁷³ it now accounts for one third of reported HIV/AIDS cases.⁷⁴

We found a number of gender differences, even after adjusting for incarceration status. Compared with females, males had higher prevalence rates of many HIV/STI risk behaviors and were more likely to persist in some behaviors and develop new ones. Yet, injection risk behaviors were more prevalent among females than males and were also more likely to develop and persist. Our findings emphasize the need to develop interventions tailored to specific patterns of risk and transmission.⁷⁴ For example, nearly 80% of females contract HIV/AIDS from vaginal sex compared with only 16% of males.⁷⁴ Gender-specific interventions are especially important now that females comprise nearly 20% of juvenile detainees¹⁵ and 26% of AIDS cases² (compared with 7% during the early years of the epidemic⁷³).

Incarceration status was an important variable. Among youth in the community, many behaviors were more prevalent at follow-up than at baseline. Among incarcerated youth, the opposite pattern prevailed. Our findings add to the growing debate on the role of incarceration in the HIV/STI epidemic. One view is that correctional facilities are “breeding grounds”⁷⁵ for HIV/AIDS. Others suggest that the disproportionately high prevalence of HIV/AIDS in correctional facilities occurs because behaviors that put persons at risk for HIV/AIDS (e.g., drug use, prostitution) *also* put them at risk for incarceration.⁷⁵

Although risk behaviors may be less common in correctional facilities than in the community, they may carry substantially greater risk. For example, to prevent HIV/STI transmission, prisoners may use plastic gloves and hand lotion instead of lubricated condoms.^{24, 76} Similarly, to inject drugs, inmates may share needles or “works” or use dirty equipment if sterilization is unavailable.^{24, 76–78} Moreover, the *probability* of infection is also higher, since more persons in prisons than in the community are infected with HIV.²⁷

Overall, there were few racial and ethnic differences in patterns of HIV/STI risk behaviors; most involved the initiation and persistence of substance use among non-Hispanic whites and Hispanics. There were surprisingly few racial/ethnic differences in sex risk behaviors. Yet, because of the disproportionate numbers of African Americans who cycle through correctional

facilities,^{79, 80} the pediatrics community must focus on implementing culturally appropriate interventions for African American youth and young adults. More than any other racial/ethnic group, African Americans are disproportionately incarcerated and affected by HIV/AIDS.⁸¹ Although African Americans comprise only 13% of the general population,⁸² and juvenile crime rates are relatively similar across race/ethnicity,⁸³ African Americans comprise about 40% of incarcerated youth and adults^{15, 80, 84} and 49% of new cases of HIV/AIDS (42% among men and 66% among women).²

The prevalence of HIV/STI risk behaviors in our sample is similar to that of other high-risk youth -- those living on the street, drug users, and those living in the inner city.^{85–90} Primary risk reduction interventions may not reach these youth. Although most schools now provide HIV/STI education,^{91, 92} youth who are frequently truant, such as delinquent and homeless youth, are unlikely to receive school-based interventions.⁹³ Moreover, delinquent youth are over-represented in groups that are uninsured -- including the poor,⁹⁴ youth living in central cities,⁹⁵ and older adolescents^{95–98} -- reducing the likelihood that they will have a primary care physician from whom they could receive primary interventions.^{99–101} Public clinics and emergency services are often the primary source of health care for high-risk youth.^{102, 103} As recently recommended by the American Academy of Pediatrics,¹⁰⁴ public clinics should integrate HIV prevention, especially sex education and substance abuse treatment, into primary medical care. HIV/STI interventions should also be provided in detention centers and in juvenile courts that, based on recent statistics, could reach as many as 1.6 million youth annually.¹⁵

Limitations

It was not possible to assess actual HIV/STI risk behaviors, such as having unprotected sex with an infected partner and sharing injection/piercing equipment with an infected partner. Moreover, it was not feasible to obtain biological outcome measures such as HIV or STI tests. Thus, our measures of HIV/STI risk are proximal. Findings might have been slightly different had follow-up data been available for participants who died, withdrew from the study, or were lost to follow-up. We examined HIV/STI risk behaviors during 2 periods of our subjects' lives. Our analyses do not address causal mechanisms underlying HIV/STI risk. Our findings, drawn from 1 site, may pertain only to youth who were detained during adolescence in urban detention centers of similar demographic composition. Our sample (though larger than most prior investigations) limited our analyses of demographic subgroups that are less common in detention centers, such as young, non-Hispanic white females. Finally, the data are subject to the limitations of self-reporting. Participants may have under-reported some behaviors and exaggerated others.

CONCLUSIONS

HIV infection and disproportionate minority confinement are among the most critical racial/ethnic disparities in our nation. Future studies must explore the causes and correlates of the increased risk of HIV/STIs faced by minority youth. To develop appropriate public policy initiatives, future studies must also disentangle the role of incarceration in the transmission of HIV/STIs. Because most detained youth return to their communities, HIV/STI risk behaviors in delinquent youth are a *community* public health problem, not just a problem for the juvenile justice system. Improving the coordination among systems that provide HIV/STI interventions to youth -- primary care, education, mental health, and juvenile justice -- can reduce the prevalence of risk behaviors and substantially reduce the spread of HIV/STIs in young people. The Surgeon General will soon issue a *Call to Action on Correctional Health*. By targeting HIV/STI risk behaviors in delinquent youth, we have the opportunity to redress significant health disparities and threats to public health.

Acknowledgments

This work was supported by National Institute of Mental Health grants R01MH54197 and R01MH59463 (Division of Services & Intervention Research and Center for Mental Health Research on AIDS) and grants 1999-JE-FX-1001 and 2005-JL-FX-0288 from the Office of Juvenile Justice and Delinquency Prevention. Major funding was also provided by the National Institute on Drug Abuse, the Substance Abuse and Mental Health Services Administration (Center for Mental Health Services, Center for Substance Abuse Prevention, Center for Substance Abuse Treatment), the NIH Center on Minority Health and Health Disparities, the Centers for Disease Control and Prevention (National Center on Injury Prevention & Control and National Center for HIV, STD & TB Prevention), the National Institute on Alcohol Abuse and Alcoholism, the NIH Office of Research on Women's Health, the NIH Office on Rare Diseases, Department of Labor, The William T. Grant Foundation, and The Robert Wood Johnson Foundation. Additional funds were provided by The John D. and Catherine T. MacArthur Foundation, The Open Society Institute, and The Chicago Community Trust. We thank all our agencies for their collaborative spirit and steadfast support.

Many more people than the authors contributed to this project. This study could not have been accomplished without the advice of Ann Hohmann, Ph.D., Kimberly Hoagwood, Ph.D., Heather Ringeisen, Ph.D., and Eugene Griffin, Ph.D. Jacques Normand, Ph.D., Helen Cesari, M.S., Richard Needle, Ph.D., Robert Booth, Ph.D., David Huizinga, Ph.D., and David Ostrow, M.D., Ph.D., generously offered their expertise in developing our instruments. David Stoff, Ph.D., Grayson Norquist, M.D., and Delores Parron, Ph.D., provided support and encouragement. Celia Fisher, Ph.D., guided our human subject procedures. We thank Frank Palella, Jr., M.D., and the anonymous reviewers for their many helpful comments.

This research was approved by the Institutional Review Boards of Northwestern University, the Centers for Disease Control and Prevention, and US Office of Protection from Research Risks. We obtained informed consent from all participants 18 years and older. For participants younger than 18, we obtained assent from the youth and consent from a parent or guardian, wherever possible; when this was not possible, youth assent was overseen by a participant advocate representing the interests of the youth.

We thank all project staff, especially Amy Mericle, Ph.D., for instrumentation development and project leadership and Lynda Carey, M.A., for her superb data management. We thank Kate Elkington, Ph.D., for her literature review. We also greatly appreciate the cooperation of everyone working in the Cook County and State of Illinois systems. Without their cooperation, this study would not have been possible. Finally, we thank the participants for their time and willingness to participate and our field interviewers for their commitment to excellence.

List of abbreviations

HIV	human immunodeficiency virus
STI	sexually transmitted infections
CCJTDC	Cook County Juvenile Temporary Detention Center
NIDA	National Institute on Drug Abuse
RBA	Risk Behavior Assessment, SD, standard deviation
PR	prevalence rate

References

1. Weinstock H, Berman S, Cates W. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. *Perspect Sex Reprod Health* 2004;36:6–10. [PubMed: 14982671]
2. Centers for Disease Control and Prevention. Cases of HIV Infection and AIDS in the United States, 2005. *HIV/AIDS Surveillance Report* 2006;17:1–54.
3. Centers for Disease Control and Prevention Web site. A glance at the HIV epidemic. Atlanta, Ga: Centers for Disease Control and Prevention; 2006.
4. Kochanek KD, Sherry M, Anderson R, Scott C. Division of Vital Statistics. Deaths: final data for 2002. *Natl Vital Stat Rep* 2004;53:1–116. [PubMed: 15587328]
5. Anderson R, Smith BL. Division of Vital Statistics. Deaths: Leading causes 2002. *Natl Vital Stat Rep* 2005;53:1–92. [PubMed: 15786629]
6. Centers for Disease Control and Prevention Web site. HIV/AIDS among African Americans. Atlanta, Ga: Center for Disease Control and Prevention; 2006.

7. Morris M, Handcock MS, Miller WC, Ford CA, Schmitz JL, Hobbs MM, et al. Prevalence of HIV infection among young adults in the United States: results from the Add Health Study. *Am J Public Health* 2006;96:1091–1097. [PubMed: 16670236]
8. Centers for Disease Control and Prevention. Cases of HIV Infection and AIDS in the United States, 2004. *HIV/AIDS Surveillance Report* 2005;16:1–46.
9. Centers for Disease Control and Prevention. Cases of HIV infection and AIDS in the United States, by race/ethnicity, 2000–2004. *HIV/AIDS Surveillance Supplemental Report* 2006;12:1–36.
10. Kaiser Family Foundation Web site. HIV/AIDS Policy Fact Sheet: Latinos and HIV/AIDS. Menlo Park, Calif: The Henry J. Kaiser Family Foundation; Feb. 2006
11. Kaiser Family Foundation Web site. HIV/AIDS Policy Fact Sheet: African Americans and HIV/AIDS. Menlo Park, Calif: The Henry J. Kaiser Family Foundation; 2006.
12. Fisher JD, Fisher WA, Bryan AD, Misovich SJ. Information-motivation-behavioral skills model-based HIV risk behavior change intervention for inner-city high school youth. *Health Psychol* 2002;21:177–186. [PubMed: 11950108]
13. Jemmott JB, Jemmott LS, Fong GT. Reductions in HIV risk-associated sexual behaviors among black male adolescents: effects of an AIDS prevention intervention. *Am J Public Health* 1992;82:372–377. [PubMed: 1536352]
14. 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]
15. Snyder, HN.; Sickmund, M. Juvenile Offenders and Victims: 2006 National Report. Washington, DC: US Department of Justice, Office of Juvenile Justice Programs, Office of Juvenile Justice and Delinquency Prevention; 2006.
16. DiClemente RJ, Lanier MM, Horan PF, Lodico M. Comparison of AIDS knowledge, attitudes, and behaviors among incarcerated adolescents and a public school sample in San Francisco. *Am J Public Health* 1991;81:628–630. [PubMed: 2014866]
17. Canterbury RJ, McGarvey EL, Sheldon-Keller AE, Waite D, Reams P, Koopman C. Prevalence of HIV-related risk behaviors and STDs among incarcerated adolescents. *J Adolesc Health* 1995;17:173–177. [PubMed: 8519785]
18. Magura S, Kang SY, Shapiro JL. Outcomes of intensive AIDS education for male adolescent drug users in jail. *J Adolesc Health* 1994;15:457–463. [PubMed: 7811677]
19. Morris RE, Harrison EA, Knox GW, Tromanhauser E, Marquis DK, Watts LL. Health risk behavioral survey from 39 juvenile correctional facilities in the United States. *J Adolesc Health* 1995;17:334–344. [PubMed: 8924439]
20. Teplin LA, Abram KM, McClelland GM, Dulcan MK, Mericle AA. Psychiatric disorders in youth in juvenile detention. *Arch Gen Psychiatry* 2002;59:1133–1143. [PubMed: 12470130]
21. Teplin LA, Mericle AA, McClelland GM, Abram KM. HIV and AIDS risk behaviors in juvenile detainees: implications for public health policy. *Am J Public Health* 2003;93:906–912. [PubMed: 12773351]
22. McClelland G, Teplin LA, Abram KM, Jacobs N. HIV and AIDS risk behaviors among female jail detainees: implications for public health policy. *Am J Public Health* 2002;92:818–825. [PubMed: 11988453]
23. Magura S, Kang SY, Shapiro J, O'Day J. HIV risk among women injecting drug users who are in jail. *Addiction* 1993;88:1351–1360. [PubMed: 8251872]
24. Mahon N. New York inmates' HIV risk behaviors: the implications for prevention policy and programs. *Am J Public Health* 1996;86:1211–1215. [PubMed: 8806370]
25. Horsburgh C, Jarvis JQ, McArthur T, Ignacio T, Stock P. Seroconversion to human immunodeficiency virus in prison inmates. *Am J Public Health* 1990;80:209–210. [PubMed: 2297070]
26. Hammett, T.; Daugherty, A. Epidemiology of HIV disease in correctional facilities and the population at large. In: Hammett, T.; Daugherty, A., editors. 1990 Update: AIDS in Correctional Facilities. Washington, DC: US Department of Justice, National Institute of Justice; 1991. p. 9-24.
27. Maruschak, LM. Bureau of Justice Statistics Bulletin. Washington DC: US Department of Justice; 2006. HIV in prisons, 2004. NCJ No. 213897
28. Rolf J, Nanda J, Baldwin J, Chandra A, Thompson L. Substance misuse and HIV/AIDS risks among delinquents: a prevention challenge. *Int J Addict* 1990;25:533–559. [PubMed: 2093093]

29. Kingree JB, Phan DL. Marijuana use and HIV risk among adolescent offenders: the moderating effect of age. *J Subst Abuse* 2001;13:59–71. [PubMed: 11547625]
30. Canterbury RJ, Clavet GJ, McGarvey EL, Koopman C. HIV risk-related attitudes and behaviors of incarcerated adolescents: implications for public school students. *High Sch J* 1998;82:1–10.
31. Otto-Salaj L, Gore-Felton C, McGarvey E, Canterbury R. Psychiatric functioning and substance use: factors associated with HIV risk among incarcerated adolescents. *Child Psychiatry Hum Dev* 2002;22:91–106. [PubMed: 12462349]
32. Devieux J, Malow R, Stein JA, Jennings TE, Lucenko BA, Averhart C, et al. Impulsivity and HIV risk among adjudicated alcohol- and other drug-abusing adolescent offenders. *AIDS Educ Prev* 2002;14:24–35. [PubMed: 12413190]
33. Lucenko BA, Malow RM, Sanchez-Martinez M, Jennings T, Devieux JG. Negative affect and HIV risk in alcohol and other drug (AOD) abusing adolescent offenders. *Journal of Child & Adolescent Substance Abuse* 2003;13:1–17. [PubMed: 19112523]
34. Catania JA, Gibson DR, Marin BV, Coates TJ, Greenblatt RM. Response bias in assessing sexual behaviors relevant to HIV transmission. *Eval Program Plann* 1990;13:19–29.
35. Katz BP, Fortenberry JD, Tu W, Harezlak J, Orr DP. Sexual behavior among adolescent women at high risk for sexually transmitted infections. *Sex Transm Dis* 2001;28:247–251. [PubMed: 11354261]
36. Stiffman AR, Dore P, Cunningham RM, Earls F. Person and environment in HIV risk behavior change between adolescence and young adulthood. *Health Educ Q* 1995;22:211–226. [PubMed: 7622389]
37. Capaldi DM, Stoolmiller M, Clark S, Owen LD. Heterosexual risk behaviors in at-risk young men from early adolescence to young adulthood: prevalence, prediction, and association with STD contraction. *Dev Psychol* 2002;38:394–406. [PubMed: 12005382]
38. Brook JS, Adams RE, Balka EB, Whiteman M, Zhang C, Sugerman R. Illicit drug use and risky sexual behavior among African American and Puerto Rican urban adolescents: the longitudinal links. *J Genet Psychol* 2004;165:203–220. [PubMed: 15259877]
39. Abram KM, Teplin LA, McClelland GM, Dulcan MK. Comorbid psychiatric disorders in youth in juvenile detention. *Arch Gen Psychiatry* 2003;60:1097–1108. [PubMed: 14609885]
40. Federal Policy for the Protection of Human Subjects: Notices and Rules. Part 2. *Federal Register* June 18;1991 56(117):28002–32. 56 FR 28002.
41. 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. *Psychiatr Serv* 2005;56:823–828. [PubMed: 16020814]
42. Kipke MD, Unger JB, Palmer RF, Edgington R. Drug use, needle sharing, and HIV risk among injection drug-using street youth. *Subst Use Misuse* 1996;31:1167–1187. [PubMed: 8853236]
43. D'Angelo, L.; DiClemente, R. Sexually transmitted diseases including human immunodeficiency virus infection. In: DiClemente, R.; Hansen, W.; Ponton, L., editors. *Handbook of Adolescent Health Risk Behavior*. New York, NY: Plenum Press; 1996. p. 333–367.
44. Long GE, Rickman LS. Infectious complications of tattoos. *Clin Infect Dis* 1994;18:610–619. [PubMed: 8038318]
45. Valois RF, Oeltmann JE, Waller J, Hussey JR. Relationship between number of sexual intercourse partners and selected health risk behaviors among public high school adolescents. *J Adolesc Health* 1999;25:328–335. [PubMed: 10551663]
46. Carroll ST, Riffenburgh RH, Roberts TA, Myhre EB. Tattoos and body piercings as indicators of adolescent risk-taking behaviors. *Pediatrics* 2002;109:1021–1027. [PubMed: 12042538]
47. Needle R, Fisher D, Weatherby N, Chitwood D, Brown D, Cesari H, et al. Reliability of self-reported HIV risk behaviors of drug users. *Psychol Addict Behav* 1995;9:242–250.
48. Winters, KC. TIP 31: Screening and Assessing Adolescents for Substance Use Disorders. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Treatment; 1999. DHHS Publication No. (SMA) 99-3282
49. Weatherby NL, Needle R, Cesari H. Validity of self-reported drug use among injection drug users and crack cocaine users recruited through street outreach. *Eval Program Plann* 1994;17:347–355.

50. Dowling S, Johnson ME, Fisher DG. Reliability of drug users' self-reported recent drug use. *Assess* 1994;1:382–392.
51. Watters, J. Final Report 1994. Rockville, MD: National Institute on Drug Abuse; 1994. Street youth at risk for AIDS.
52. Chawarski, MC.; Schottenfeld, RS.; Pakes, J.; Avants, K. Problems of Drug Dependence 1996. Proceedings of the 58th Annual Scientific Meeting NIDA Research Monograph 174. Washington, DC: US Department of Health and Human Services; 1996. AIDS Risk Inventory (ARI): a structured interview for assessing risk of HIV infection in a population of drug abusers.
53. Shaffer D, Fisher P, Dulcan MK, Davies M, Piacentini J, Schwab-Stone ME, et al. The NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC-2.3): description, acceptability, prevalence rates, and performance in the MECA Study: methods for the Epidemiology of Child and Adolescent Mental Disorders Study. *J Am Acad Child Adolesc Psychiatry* 1996;35:865–877. [PubMed: 8768346]
54. Cochran, W. Sampling Techniques. 3. New York, NY: Wiley; 1977.
55. Levy, P.; Lemeshow, S. Sampling of Populations: Methods and Applications. 3. New York, NY: John Wiley & Sons; 1999.
56. Korn EL, Graubard BI. Simultaneous testing of regression coefficients with complex survey data: use of Bonferroni t statistics. *American Statistician* 1990;44:270–276.
57. Hosmer, DW.; Lemeshow, S. Applied Logistic Regression. 2. New York: John Wiley & Sons; 2000.
58. Shafer M, Hilton JF, Ekstrand M, Keogh J, Gee L, Digorgio-Haag, et al. Relationship between drug use and sexual behaviors and the occurrence of sexually transmitted diseases among high-risk male youth. *Sex Transm Dis* 1993;20:307–313. [PubMed: 8108752]
59. Williams M. HIV infection among a national sample of adolescent intravenous drug abusers. *Alcohol Treatment Quarterly* 1993;10:107–121.
60. Chaisson RE, Bacchetti P, Osmond D, Brodie B, Sande MA, Moss AR. Cocaine use and HIV infection in intravenous drug users in San Francisco. *JAMA* 1989;261:561–565. [PubMed: 2909798]
61. Chitwood DD, Griffin DK, Comerford M, Page JB, Trapido EJ, Lai S, et al. Risk factors for HIV-1 seroconversion among injection drug users: a case-control study. *Am J Public Health* 1995;85:1538–1542. [PubMed: 7485667]
62. Cooper ML, Peirce RS, Huselid RF. Substance use and sexual risk taking among black adolescents and white adolescents. *Health Psychol* 1994;13:251–262. [PubMed: 8055860]
63. Edlin BR, Irwin KL, Faruque S, McCoy CB, Word C, Serrano Y, et al. Intersecting epidemics--crack cocaine use and HIV infection among inner-city young adults. *N Engl J Med* 1994;331:1422–1427. [PubMed: 7969281]
64. Edlin BR, Irwin KL, Ludwig DD, McCoy HV, Serrano Y, Word C, et al. High-risk sex behavior among young street-recruited crack cocaine smokers in three American cities: an interim report. *J Psychoactive Drugs* 1992;24:363–371. [PubMed: 1491285]
65. Fullilove RE, Fullilove MT, Bowser BP, Gross SA. Risk of sexually transmitted disease among black adolescent crack users in Oakland and San Francisco, Calif. *JAMA* 1990;263:851–855. [PubMed: 2296147]
66. Inciardi J, Pottieger A, Forney M, Chitwood D, McBride D. Prostitution, IV drug use, and sex-for-crack exchanges among serious delinquents: risks for HIV infection. *Criminology* 1991;29:221–235.
67. Keller SE, Bartlett JA, Schleifer SJ, Johnson RL, Pinner E, Delaney B. HIV-relevant sexual behavior among a healthy inner-city heterosexual adolescent population in an endemic area of HIV. *J Adolesc Health* 1991;12:44–48. [PubMed: 2007154]
68. McBride DC, Inciardi JA, Chitwood DD, McCoy CB, Consortium TNAR. Crack use and correlates of use in a national population of street heroin users. *J Psychoactive Drugs* 1992;24:411–416. [PubMed: 1491290]
69. Schoenbaum EE, Hartel D, Selwyn PA, Klein RS, Davenney K, Rogers M, et al. Risk factors for human immunodeficiency virus infection in intravenous drug users. *N Engl J Med* 1989;321:874–879. [PubMed: 2770823]
70. Weatherby NL, Shultz JM, Chitwood DD, McCoy HV, McCoy CB, Ludwig DD, et al. Crack cocaine use and sexual activity in Miami, Florida. *J Psychoactive Drugs* 1992;24:373–380. [PubMed: 1491286]

71. Zule WA. Risk and reciprocity: HIV and the injection drug user. *J Psychoactive Drugs* 1992;24:243–249. [PubMed: 1432402]
72. Shrier LA, Emans SJ, Woods ER, DuRant RH. The association of sexual risk behaviors and problem drug behaviors in high school students. *J Adolesc Health* 1997;20:377–383. [PubMed: 9168385]
73. Centers for Disease Control and Prevention Web site. Surveillance Report. Atlanta, Ga: Centers for Disease Control and Prevention; Dec 29. 1986 AIDS Weekly Surveillance Report-United States AIDS Program, Center for Infectious Diseases. 1987
74. Centers for Disease Control and Prevention Web site. HIV/AIDS surveillance - general epidemiology (through 2004), Slide series. Atlanta, Ga: Centers for Disease Control and Prevention; 2005.
75. Hammett TM. HIV/AIDS and other infectious diseases among correctional inmates: transmission, burden, and an appropriate response. *Am J Public Health* 2006;96:974–978. [PubMed: 16449578]
76. Centers for Disease Control and Prevention. HIV Transmission among male inmates in a state prison system- Georgia 1992–2005. *MMWR Morb Mortal Wkly Rep* 2006;55:421–426. [PubMed: 16628181]
77. Kantor, E. HIV InSite Knowledge Base Chapter [online text]. San Francisco: University of California - San Francisco General Hospital; Feb. 2003 HIV transmission and prevention in prisons.
78. Hammett, TM.; Widom, R.; Epstein, J.; Gross, M.; Sifre, S.; Enos, T. 1994 Update: HIV/AIDS and STDs in Correctional Facilities. Washington, DC: US Department of Justice; 1995.
79. Reynolds AJ, Temple JA, Robertson DL, Mann EA. Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: a 15-year follow-up of low-income children. *JAMA* 2001;285:2339–2346. [PubMed: 11343481]
80. Harrison, PM.; Beck, AJ. Prison and Jail Inmates at Midyear 2005. Washington, DC: US Department of Justice; 2006. NCJ No. 213133
81. Belenko SR, Shedlin M, Chaple M. HIV risk behaviors, knowledge, and prevention service experiences among African American and other offenders. *J Health Care Poor Underserved* 2005;16:108–129. [PubMed: 16327111]
82. US Census Bureau Web site. The 2007 Statistical Abstract. Washington DC: Census Bureau; 2006. Table 14. Resident Population, by Race, Hispanic Origin, and Age: 2000 to 2005.
83. Huizinga D, Elliott DS. Juvenile offenders: prevalence, offender incidence, and arrest rates by race. *Crime Delinq* 1987;33:206–223.
84. Harrison, PM.; Beck, AJ. Prison and Jail Inmates at Midyear 2004. Washington, DC: US Department of Justice; 2005. NCJ No. 208801
85. Clements K, Gleghorn A, Garcia D, Katz M, Marx R. A risk profile of street youth in northern California: implications for gender-specific human immunodeficiency virus prevention. *J Adolesc Health* 1997;20:343–353. [PubMed: 9168381]
86. Brook JS, Cohen P, Brook DW. Longitudinal study of co-occurring psychiatric disorders and substance use. *J Am Acad Child Adolesc Psychiatry* 1998;37:322–330. [PubMed: 9519638]
87. Stiffman AR, Dore P, Cunningham RM. Inner-city youths and condom use: health beliefs, clinic care, welfare, and the HIV epidemic. *Adolescence* 1994;29:805–820. [PubMed: 7892792]
88. Deas-Nesmith D, Brady KT, White R, Campbell S. HIV-risk behaviors in adolescent substance abusers. *J Subst Abuse Treat* 1999;16:169–172. [PubMed: 10023616]
89. Stanton B, Li X, Black M, Ricardo I, Galbraith J, Kaljee L, et al. Sexual practices and intentions among preadolescent and early adolescent low-income urban African-Americans. *Pediatrics* 1994;93:966–973. [PubMed: 8190585]
90. DiClemente RJ, Lodico M, Grinstead OA, Harper G, Rickman RL, Evans PE, et al. African-American adolescents residing in high-risk urban environments do use condoms: correlates and predictors of condom use among adolescents in public housing developments. *Pediatrics* 1996;98:269–278. [PubMed: 8692629]
91. Centers for Disease Control and Prevention. Guidelines for effective school health education to prevent the spread of AIDS. *MMWR Morb Mortal Wkly Rep* 1988;2005:1–14.
92. Centers for Disease Control and Prevention. School-based HIV-prevention education United States, 1994. *MMWR Morb Mortal Wkly Rep* 1996;45:760–765. [PubMed: 8815397]

93. Dembo R. Problems among youths entering the juvenile justice system, their service needs and innovative approaches to address them. *Subst Use Misuse* 1996;31:81–94. [PubMed: 8838394]
94. Brindis C, Morreale M, English A. The unique health care needs of adolescents. *The Future of Children* 2003;13:117–135. [PubMed: 14503457]
95. Holahan J, Dubay L, Kenney G. Which children are still uninsured and why. *The Future of Children* 2003;13:55–79. [PubMed: 14503454]
96. Newacheck PW, Brindis CD, Cart CU, Marchi K, Irwin CE. Adolescent health insurance coverage: recent changes and access to care. *Pediatrics* 1999;104:195–202. [PubMed: 10428994]
97. Short PF, Graefe DR. Battery-powered health insurance? stability in coverage of the uninsured. *Health Aff (Millwood)* 2003;22:244–255. [PubMed: 14649453]
98. Collins SR, Schoen C, Tenney K, Doty MM, Ho A. Rite of passage? why young adults become uninsured and how new policies can help. *Issue Brief (Commonw Fund)* 2004;649:1–8. [PubMed: 15154408]
99. Hughes DC, Ng S. Reducing health disparities among children. *The Future of Children* 2003;13:153–167. [PubMed: 14503459]
100. Feinstein RA, Lampkin A, Lorish CD, Klerman LV, Maisiak R, Oh MK. Medical status of adolescents at time of admission to a juvenile detention center. *J Adolesc Health* 1998;22:190–196. [PubMed: 9502005]
101. Zuvekas SH, Weinick RM. Changes in access to care, 1977–1996: the role of health insurance. *Health Serv Res* 1999;34:271–279. [PubMed: 10199674]
102. Hedberg VA, Byrd RS, Klein JD, Auinger P, Weitzman M. The role of community health centers in providing preventive care to adolescents. *Arch Pediatr Adolesc Med* 1996;150:603–608. [PubMed: 8646310]
103. Christakis DA, Mell L, Koepsell TD, Zimmerman FJ, Connell FA. Association of lower continuity of care with greater risk of emergency department use and hospitalization in children. *Pediatrics* 2001;107:524–529. [PubMed: 11230593]
104. American Academy of Pediatrics Committee on Pediatric Aids. Reducing the risk of HIV infection associated with illicit drug use. *Pediatrics* 2006;117:566–571. [PubMed: 16452382]

Table 1

Drug Risk Behaviors in Male Juvenile Detainees at the Baseline and Follow-up Interviews (n=408)^{*,†}

Total Males (n=408)		Living Situation at Follow-up [‡]								Significant Difference Between Incarcerated and Community at Follow-up	p-value
		Community				Incarcerated					
		Follow-up Prevalence	Significant Change	Baseline Prevalence	Follow-up Prevalence	Significant Change	Baseline Prevalence	Follow-up Prevalence	Significant Change		
%	%	%	p-value	%	%	p-value	%	%	%		
90.6	92.9	90.1	ns	99.0	91.7	p < .001	80.3	ns	p < .001		
61.7	36.8	63.7	p < .001	53.4	57.7	ns	3.2	p < .001	p < .001		
35.2	15.5	33.5	p < .01	22.2	38.8	ns	2.1	p < .001	p < .001		
90.3	92.3	89.6	ns	98.6	91.7	p < .01	79.9	ns	p < .001		
36.4	44.4	35.1	ns	62.2	38.9	p < .01	8.9	p < .001	p < .001		
25.1	37.9	21.7	ns	36.6	31.3	ns	40.4	ns	ns		
43.1	58.8	39.5	p < .05	63.2	50.0	p < .01	50.4	ns	ns		
32.9	35.1	32.1	ns	47.9	34.6	p < .01	8.1	p < .05	p < .01		
8.1	16.3	11.4	ns	13.1	1.7	ns	22.4	p < .05	ns		
9.7	22.3	9.8	p < .05	17.3	9.6	ns	31.9	ns	ns		
1.6	0.5	2.3	ns	0.7	0.0	ns	0.1	ns	ns		
9.7	22.1	9.8	ns	17.0	9.6	ns	31.9	ns	ns		
3.2	7.1	4.1	ns	10.5	1.4	ns	0.1	p < .05	p < .001		
2.5	6.3	3.5	ns	1.6	0.7	ns	14.9	ns	p < .001		
65.8	80.2	64.6	p < .05	85.0	67.8	p < .01	71.8	ns	ns		

Pediatrics. Author manuscript; available in PMC 2010 January 29.

Living Situation at Follow-up [‡]													
Total Males (n=408)				Community				Incarcerated				Significant Difference Between Incarcerated and Community at Follow-up	
Prevalence	Follow-up Prevalence	Significant Change	Baseline Prevalence	Follow-up Prevalence	Significant Change	Baseline Prevalence	Follow-up Prevalence	Significant Change	Follow-up Prevalence	Significant Change	Significant Change	Significant Change	p-value
%	%	p-value	%	%	p-value	%	%	p-value	%	%	%	%	p-value
36.0	54.9	p < .01	33.6	53.8	p < .05	40.0	56.9	ns	ns	ns	ns	ns	ns
2.8	6.8	ns	1.2	9.9	ns	5.9	1.1	ns	ns	ns	ns	p < .01	ns
89.2	89.1	ns	88.0	91.5	ns	91.5	84.5	ns	ns	ns	ns	ns	ns
56.7	47.8	ns	62.0	64.7	ns	45.9	13.6	ns	p < .01	p < .01	p < .001	p < .001	p < .001
30.8	29.1	ns	31.5	38.4	ns	29.4	10.1	ns	ns	ns	ns	p < .05	p < .05
93.4	88.5	ns	93.8	96.1	ns	92.8	74.4	ns	p < .05	p < .05	p < .001	p < .001	p < .001
77.5	46.1	p < .001	84.9	62.7	p < .01	62.9	13.1	p < .01	p < .001	p < .001	p < .001	p < .001	p < .001
60.4	37.4	p < .001	67.0	50.0	p < .05	47.2	12.2	p < .05	p < .01	p < .01	p < .01	p < .01	p < .01
14.2	15.1	ns	17.2	17.9	ns	8.8	9.9	ns	ns	ns	ns	ns	ns
7.0	3.7	ns	8.8	4.7	ns	3.4	1.8	ns	ns	ns	ns	ns	ns
1.4	1.2	ns	1.7	1.2	ns	1.0	1.1	ns	ns	ns	ns	ns	ns
0.1	0.1	ns	0.2	0.1	ns	0.0	0.0	ns	ns	ns	ns	ns	ns
43.8	43.8	ns	39.5	41.8	ns	52.5	48.1	ns	ns	ns	ns	ns	ns
3.5	0.3	ns	4.9	0.4	ns	0.4	0.1	ns	ns	ns	ns	ns	ns
1.6	0.0	ns	2.3	0.0	ns	0.0	0.0	ns	ns	ns	ns	ns	ns

Pediatrics. Author manuscript; available in PMC 2010 January 29.

Living Situation at Follow-up [‡]											
Total Males (n=408)						Community			Incarcerated		
	Follow-up Prevalence	Significant Change	Baseline Prevalence	Follow-up Prevalence	Significant Change	Follow-up Prevalence	Significant Change	Baseline Prevalence	Follow-up Prevalence	Significant Change	Significant Difference Between Incarcerated and Community at Follow-up
	%	p-value	%	%	p-value	%	%	%	%	%	p-value
1.6	0.0	ns	2.3	0.0	ns	0.0	0.0	0.0	0.1	ns	ns

[‡]ns (HIV), not significant (ns), sexually transmitted infections (STI), month (mo).
and follow-up data for each variable. Follow-up data are measured “since the last interview,” unless noted.
tion of the Cook County Juvenile Temporary Detention Center.
view,” the number of “incarcerated participants” are those who self-reported they had “been mostly in correctional facilities” since the baseline interview (126 males,
st three months” or less available in the number of incarcerated participants are those that self reported they had been “mostly in correctional facilities in the past three
ve ever worked as a prostitute, persons with HIV/AIDS, persons who inject drugs, and persons whose sexual history is not well known.
than alcohol or marijuana.
because baseline and follow-up prevalence rates were zero.
because one or more cell sizes were zero.
y, abandoned building, car, public bathroom, and crack house/shooting gallery.

Table 2

Behaviors in Female Juvenile Detainees at the Baseline and Follow-up Interviews (n=316)^{*,†}

Females (n=316)	Living Situation at Follow-up [‡]										Odds Ratios (95% Confidence Intervals) for follow-up prevalence, Males to Females (Adjusted for Incarceration Status) [‡]
	Community					Incarcerated					
	Significant Change		Baseline Prevalence	Follow-up Prevalence	Significant Change	Significant Change		Baseline Prevalence	Follow-up Prevalence	Significant Change	
	p-value	%	%	%		p-value	%	%	p-value		
Follow-up Prevalence	%										
	94.6		p < .001	86.4		p < .001	93.3		73.6	p < .001	2.2 (1.0 – 5.0)
	13.3		p < .001	26.2		p < .01	33.9		23.2	ns	6.7 (3.6 – 12.3) ^b
	2.3		ns	4.8		p < .05	7.6		7.6	ns	11.1 (4.1 – 30.0) ^b
	94.0		p < .001	83.1		p < .001	90.3		72.0	p < .001	2.4 (1.1 – 5.2) ^c
	61.9		p < .01	50.9		p < .001	49.1		23.4	p < .05	0.8 (0.5 – 1.5)
	25.4		ns	19.5		ns	16.1		38.5	ns	1.7 (0.9 – 3.2)
	48.4		p < .001	33.1		p < .001	14.8		56.0	ns	1.7 (1.0 – 3.2)
	35.9		p < .001	24.3		p < .01	17.3		34.6	ns	1.4 (0.8 – 2.7)
	6.3		ns	3.7		ns	0.0		5.1	ns	2.4 (1.0 – 5.8) ^c
	9.8		ns	8.4		ns	0.0		11.0	ns	2.1 (1.1 – 4.1) ^c
	9.8		ns	8.4		ns	0.0		11.0	ns	0.1 (0.02 – 0.2) ^b
	3.6		ns	1.9		ns	0.0		5.4	ns	2.8 (0.9 – 8.8)
	0.3		ns	3.8		ns	0.0		0.0	--//	10.7 (1.3 – 86.7) ^c

Pediatrics. Author manuscript; available in PMC 2010 January 29.

Females (n=316)	Living Situation at Follow-up [‡]										Odds Ratios (95% Confidence Intervals) for follow-up prevalence, Males to Females (Adjusted for Incarceration Status) ^{‡,b}
	Community					Incarcerated					
	Follow-up Prevalence	Baseline Prevalence	Significant Change	p-value	%	Follow-up Prevalence	Baseline Prevalence	Significant Change	p-value	%	
Follow-up Prevalence	%										
	<i>Pediatrics</i> . Author manuscript; available in PMC 2010 January 29.										
	58.7	52.2	ns	p < .05	60.5	48.8	ns	ns	ns	3.7 (1.8 – 7.6) _b	
	45.7	34.1	p < .01	p < .01	39.4	39.4	ns	ns	ns	1.4 (0.8 – 2.5)	
	8.0	3.0	p < .01	p < .01	3.7	7.5	ns	ns	ns	1.1 (0.4 – 3.4)	
	85.6	90.8	p < .05	ns	92.2	74.3	ns	ns	ns	1.7 (0.7 – 4.1)	
	48.8	52.0	ns	ns	72.1	14.0	p < .001	p < .001	p < .001	1.6 (0.9 – 3.0)	
	23.1	24.6	ns	ns	44.5	3.8	p < .001	p < .05	p < .05	1.9 (1.1 – 3.4) _c	
	81.9	89.8	p < .001	p < .01	96.3	79.8	ns	ns	ns	3.7 (2.2 – 6.2) _b	
	52.3	66.0	p < .001	p < .01	82.2	6.3	p < .001	p < .001	p < .001	1.3 (0.7 – 2.3)	
	38.0	43.3	ns	ns	53.5	3.8	p < .001	p < .01	p < .01	1.5 (0.8 – 2.6)	
	24.6	20.4	ns	ns	32.3	38.8	ns	ns	ns	0.6 (0.4 – 1.1)	
	5.1	7.8	ns	ns	14.8	2.5	ns	ns	ns	0.9 (0.5 – 1.6)	
	1.9	1.7	ns	ns	12.3	0.0	p < .05	– [¶]	– [¶]	0.6 (0.2 – 1.9)	
	0.9	0.7	ns	ns	3.8	0.0	ns	ns	– [¶]	0.1 (0.01 – 0.9) _c	
	42.0	45.4	ns	ns	54.0	43.5	ns	ns	ns	1.0 (0.6 – 1.7)	
	1.0	1.1	ns	ns	3.0	3.0	ns	ns	ns	0.3 (0.05 – 2.3)	

Pediatrics. Author manuscript; available in PMC 2010 January 29.

Females (n=316)	Living Situation at Follow-up [‡]												Odds Ratios (95% Confidence Intervals) for follow-up prevalence, Males to Females (Adjusted for Incarceration Status) [‡]	
	Community						Incarcerated							
	Significant Change		Baseline Prevalence		Follow-up Prevalence		Significant Change		Baseline Prevalence		Follow-up Prevalence			Significant Difference Between Incarcerated and Community at Follow-up
	%	p-value	%	p-value	%	p-value	%	p-value	%	p-value	%	p-value		
Follow-up Prevalence	0.2	ns	0.0	ns	0.2	0.0	0.0	ns	0.0	0.0	0.0	--//	--//	
	0.4	ns	0.0	ns	0.5	0.0	3.1	ns	0.0	0.0	0.0	ns	--//	

Pediatrics. Author manuscript; available in PMC 2010 January 29.

ant (ns), sexually transmitted infections (STI), month (mo.)

each variable. Follow-up data are measured "since the last interview" unless noted.

unity Juvenile Temporary Detention Center.

ncarcerated participants are those who self-reported they had "been mostly in correctional facilities" since the baseline interview (126 males,
ess, the number of incarcerated participants are those who self-reported they had been "mostly in correctional facilities in the past three

prostitute, persons with HIV/AIDS, persons who inject drugs, and persons whose sexual history is not well known.

follow-up prevalence rates were zero.

cell sizes were zero.

tuana.

ng, car, public bathroom, and crack house/shooting gallery.

Table 3

Development of HIV/STI Sex and Drug Risk Behaviors in Juvenile Detainees Between the Baseline and Follow-up Interviews by Gender (n=724)^{*,†}

Variable	Males (n=408)		Females (n=316)		Odds Ratios (95% Confidence Intervals) for Developing, [‡] Males to Females (Adjusted for Incarceration Status [§]
	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	
Sex risk behaviors					
Sexually active					
Multiple partners: >1 in past 3 mo	9.4	92.9	13.0	80.7	2.8 (0.8 – 9.7)
Multiple partners: >3 in past 3 mo	38.3	28.9	73.1	10.8	5.7 (2.3 – 13.7) ^{//}
Vaginal sex	64.8	11.2	94.9	2.1	8.0 (2.4 – 26.5) ^{//}
Recent (past 3 mo) unprotected vaginal sex	9.7	91.0	16.3	80.7	2.1 (0.6 – 6.9)
	63.6	38.7	49.2	54.9	0.8 (0.4 – 1.8)
Vaginal sex with high-risk partner [¶]	74.9	36.5	80.8	18.8	2.3 (1.1 – 4.6) ^{**}
Oral sex	56.9	52.5	68.4	39.6	1.8 (0.9 – 3.7)
Recent (past 3 mo) unprotected oral sex	67.1	23.3	76.3	29.9	0.9 (0.4 – 1.8)
Oral sex with high-risk partner [¶]	91.9	14.7	96.6	5.1	2.4 (1.0 – 6.0)
Anal sex (receptive and/or insertive)	90.3	22.6	92.3	9.6	2.1 (1.0 – 4.4) ^{**}
Receptive anal sex	98.4	0.5	92.3	9.6	0.1 (0.02 – 0.2) ^{//}
Insertive anal sex (males only)	90.3	22.6	n/a	n/a	n/a
Recent (past 3 mos) unprotected anal sex	96.8	7.2	98.2	3.7	2.9 (0.9 – 9.0)
Anal sex with high-risk partner [¶]	97.5	6.4	96.5	0.3	10.6 (1.3 – 86.2) ^{**}
Sex while drunk or high	34.2	65.5	47.0	43.7	2.8 (1.1 – 7.0)
Unprotected sex while drunk or high	64.0	43.6	65.4	39.1	1.2 (0.6 – 2.4)
Traded sex and drugs	97.2	6.8	96.9	7.1	1.3 (0.4 – 3.9)
Drug and injection risk behaviors					
Used alcohol	10.8	76.3	9.1	54.6	8.0 (2.0 – 32.0) ^{††}
Recent (past mo) use of alcohol	43.3	32.7	46.3	34.9	1.5 (0.6 – 3.6)
Frequent use of alcohol (>3 times past mo)	69.2	26.3	73.7	18.0	2.1 (1.0 – 4.3) ^{**}
Used marijuana	6.6	51.9	9.6	42.5	4.5 (1.0 – 21.0)
Recent (past mo) use of marijuana	22.5	24.7	32.6	37.6	0.9 (0.3 – 2.9)

Variable	Males (n=408)		Females (n=316)		Odds Ratios (95% Confidence Intervals) for Developing, [‡] Males to Females (Adjusted for Incarceration Status [§])
	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	
Frequent use of marijuana (>3 times past mo)	39.6	27.2	55.8	26.4	1.3 (0.5 – 3.7)
Used other substance ^{††}	85.8	5.3	78.5	12.3	0.4 (0.3 – 0.8) ^{††}
Recent (past mo) use of other substance ^{††}	93.0	2.3	91.6	4.8	0.5 (0.3 – 1.1)
Frequent use of other substance ^{§§} (>3 times past mo)	98.6	1.1	97.3	1.7	0.6 (0.2 – 2.1)
Injected drugs	99.9	0.1	99.0	0.9	0.1 (0.01 – 0.9) ^{**}
Tattooed	56.2	28.1	53.8	31.6	1.0 (0.5 – 2.3)
Shared needle(s) or equipment (Injection drug use/tattooing)	96.5	0.3	98.7	0.7	0.5 (0.1 – 3.7)
Shared needle(s) in a risky location ^{§§} (Injection drug use/tattooing)	98.4	0.0	100.0	0.2	---/---
Shared needle(s) without cleaning (Injection drug use/tattooing)	98.4	0.0	99.7	0.4	---/---

Abbreviations: human immunodeficiency virus (HIV), not applicable (na), sexually transmitted infections (STD), month (mo).

* This table uses all cases that have baseline and follow-up data for each variable. Follow-up data are measured “since the last interview” unless noted.

[†] Data are weighted to reflect the actual population of the Cook County Juvenile Temporary Detention Center.

[‡] “Development” is defined as follows: Among youth who did not report a specific HIV/STI behavior at baseline, what proportion reported that behavior at follow-up?

[§] Tests of significant are adjusted statistically for incarceration status (yes/no). For variables measured “since the last interview,” participants are considered incarcerated if they self-reported they had “been mostly in correctional facilities” since the baseline interview (126 males, 29 females). For variables measured “in the last three months” or less, participants are considered incarcerated if they self-reported they had been “mostly in correctional facilities in the past three months” (138 males, 29 females).

// p < .001

^{††} “High-risk partners” include persons who have ever worked as a prostitute, persons with HIV/AIDS, persons who inject drugs, and persons whose sexual history is not well known.

** p < .05

^{††} p < .01

^{§§} “Other substance” includes substances other than alcohol or marijuana.

§§. "Risky locations" include a park, street, alley, abandoned building, car, public bathroom, and crack house/shooting gallery.

/// Odds ratios and tests of significance could not be computed because one or more cell sizes were zero.

Table 4

Development of HIV/STI Sex and Drug Risk Behaviors in Juvenile Detainees Between the Baseline and Follow-up Interviews by Race/Ethnicity (n=722)

**†

Variable	African American, % (n=393)				Non-Hispanic White, % (n=131)				Hispanic, % (n=198)		Odds Ratios (95% Confidence Intervals) for Developing [‡] (Adjusted for Incarceration Status ^{//})			
	% Absent at Baseline		% Developing [‡]		% Absent at Baseline		% Developing [‡]		% Absent at Baseline		% Developing [‡]		Overall Test of Racial/ Ethnic Differences [§] (Adjusted for Incarceration Status ^{//})	
	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	African American vs Non-Hispanic White	African American vs Hispanic	Non-Hispanic White vs Hispanic			
Sex risk behaviors														
Sexually active	7.9	91.3	21.1	86.9	14.0	95.0	ns							
Multiple partners: >1 in past 3 mo	37.0	29.4	64.3	29.0	49.9	14.2	ns							
Multiple partners: >3 in past 3 mo	62.5	12.0	85.2	3.8	79.8	6.9	ns							
Vaginal sex	8.5	88.3	21.1	86.9	14.2	94.9	ns							
Recent (past 3 mo) unprotected vaginal sex	64.1	41.8	62.6	44.8	58.1	28.3	ns							
Vaginal sex with high-risk partner [†]	74.5	33.6	84.6	43.0	76.6	38.9	ns							
Oral sex	57.4	48.2	47.2	64.5	64.1	59.8	ns							
Recent (past 3 mo) unprotected oral sex	66.8	23.1	60.1	43.2	75.9	21.8	p < .05		0.4 (0.2–1.0)**	0.9 (0.3– 2.3)	2.1 (1.0–4.5)			
Oral sex with high- risk partner [†]	90.7	12.5	93.6	24.6	98.4	16.9	ns							
Anal sex (receptive and/or insertive)	91.0	19.2	89.6	16.9	89.5	33.4	ns							
Receptive anal sex	97.8	0.8	98.7	2.9	99.9	1.9	ns							
Insertive anal sex (males only)	90.7	20.0	89.6	16.5	88.8	35.5	ns							
Recent (past 3 mos) unprotected anal sex	97.0	5.0	94.1	4.4	97.5	16.1	p < .05		1.4 (0.3–7.0)	0.2 (0.04–1.2)	0.2 (0.03– 0.7)**			
Anal sex with high- risk partner [†]	97.4	5.8	97.0	4.0	98.9	7.2	ns							
Sex while drunk or high	33.3	65.0	38.0	65.6	42.6	57.5	ns							

Variable	African American, % (n=393)			Non-Hispanic White, % (n=131)			Hispanic, % (n=198)		Odds Ratios (95% Confidence Intervals) for Developing [‡] (Adjusted for Incarceration Status ^{//})			
	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	% Absent at Baseline	% Developing [‡]	African American vs Non-Hispanic White	African American vs Hispanic	Non-Hispanic White vs Hispanic	Overall Test of Racial/ Ethnic Differences [§] (Adjusted for Incarceration Status ^{//})
Unprotected sex while drunk or high	66.3	43.7	62.0	42.7	58.0	41.1	ns					
Traded sex and drugs	96.9	8.2	98.5	4.5	98.0	2.3	ns					
Drug and injection risk behaviors												
Used alcohol	13.2	75.5	5.2	65.9	2.3	66.9	ns					
Recent (past mo) use of alcohol	44.9	24.8	37.4	66.9	39.0	64.0	p < .001	0.2 (0.1–0.5) ^{‡‡}	0.1 (0.03–0.5) ^{‡‡}	0.6 (0.1–2.8)		
Frequent use of alcohol (>3 times past mo)	69.8	21.2	73.4	38.9	67.7	41.6	ns					
Used marijuana	5.9	70.6	6.5	27.4	10.8	11.0	ns					
Recent (past mo) use of marijuana	23.4	25.8	22.9	38.0	23.5	23.4	ns					
Frequent use of marijuana (>3 times past mo)	39.1	25.7	38.3	38.3	48.9	27.0	ns					
Used other substance ^{##}	97.2	1.6	41.4	52.2	50.4	24.7	p < .001	0.02 (0.01–0.04) ^{§§}	0.04 (0.02–0.10) ^{§§}	2.5 (1.0–6.4)		
Recent (past mo) use of other substance ^{##}	97.8	0.4	67.9	14.5	79.9	8.5	p < .001	0.02 (0.01–0.07) ^{§§}	0.04 (0.01–0.13) ^{§§}	1.6 (0.6–4.4)		
Frequent use of other substance ^{##} (>3 times past mo)	99.9	0.3	87.5	4.3	95.7	2.4	p < .001	0.1 (0.01–0.25) ^{§§}	0.1 (0.02–0.7) ^{**}	2.0 (0.4–10.2)		
Injected drugs	100.0	0.0	97.6	2.3	99.8	0.0	—//					
Tattooed	59.9	27.4	61.7	35.8	37.9	31.6	ns					
Shared needle(s) or equipment (Injection drug use/tattooing)	96.0	0.0	99.7	1.7	98.4	1.1	—//					
Shared needle(s) in a risky location ^{¶¶} (Injection drug use/tattooing)	98.1	0.0	100.0	0.3	100.0	0.0	—//					
Shared needle(s) without cleaning	98.1	0.0	100.0	0.6	99.9	0.1	—//					

Variable (Injection drug use/ tattooing)	African American, % (n=393)		Non-Hispanic White, % (n=131)		Hispanic, % (n=198)		Odds Ratios (95% Confidence Intervals) for Developing [‡] (Adjusted for Incarceration Status ^{//})			
	% Absent at Baseline	% Developing [‡] at Baseline	% Absent at Baseline	% Developing [‡] at Baseline	% Absent at Baseline	% Developing [‡] at Baseline	Overall Test of Racial/ Ethnic Differences [§] (Adjusted for Incarceration Status ^{//})	African American vs Non-Hispanic White	African American vs Hispanic	Non-Hispanic White vs Hispanic

Abbreviations: human immunodeficiency virus (HIV), not significant (ns), sexually transmitted infections (STI), month (mo).

* One male and one female who self-identified as “other” race/ethnicity were not included in this analysis. This table uses all cases that have baseline and follow-up data for each variable. Follow-up data are measured “since the last interview” unless noted.

[†] Data are weighted to reflect the actual population of the Cook County Juvenile Temporary Detention Center.

[‡] “Development” is defined as follows: Among youth who did not report a specific HIV/STI behavior at baseline, what proportion reported that behavior at follow-up?

[§] We tested for differences between specific groups (e.g., African Americans versus Hispanics) only when the categorical predictor (in this case, race/ethnicity) was significant at the p<.05 level.

^{//} Tests of significance are adjusted statistically for incarceration status (yes/no). For variables measured “since the last interview,” participants are considered incarcerated if they self-reported they had “been mostly in correctional facilities” since the baseline interview (126 males, 29 females). For variables measured “in the last three months” or less, participants are considered incarcerated if they self-reported they had been “mostly in correctional facilities in the past three months” (138 males, 29 females).

[¶] “High-risk partners” include persons who have ever worked as a prostitute, persons with HIV/AIDS, persons who inject drugs, and persons whose sexual history is not well known.

**

p<.05

^{††}

p<.01

^{‡‡} “Other substances” includes substances other than alcohol or marijuana.

^{§§}

p<.001

^{////} Odds ratios and tests of significance could not be computed because one or more cell sizes were zero.

^{¶¶} “Risky locations” include a park, street, alley, abandoned building, car, public bathroom and crack house/shooting gallery.

Table 5

Persistence of HIV/STI Sex and Drug Risk Behaviors in Juvenile Detainees Between the Baseline and Follow-up Interviews by Gender (n=724) ^{*†}

Variable	Males, % (n=408)		Females, % (n=316)		Odds Ratios (95% Confidence Intervals) for Persisting, [‡] Males to Females (Adjusted for Incarceration Status) [§]
	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Persisting [‡]	
Sex risk behaviors					
Sexually active	90.6	92.9	87.0	96.6	1.6 (0.5 – 5.1)
Multiple partners: >1 in past 3 mo	61.7	41.7	26.9	20.0	5.0 (1.9 – 12.9)//
Multiple partners: >3 in past 3 mo	35.2	23.6	5.1	6.7	6.6 (0.6 – 73.4)
Vaginal sex	90.3	92.4	83.7	96.6	1.9 (0.6 – 6.3)
Recent (past 3 mo) unprotected vaginal sex	36.4	54.2	50.8	68.7	1.1 (0.4 – 3.2)
Vaginal sex with high-risk partner [¶]	25.1	42.1	19.2	53.3	0.8 (0.2 – 3.8)
Oral sex	43.1	67.1	31.6	67.4	1.4 (0.4 – 4.4)
Recent (past 3 mos) unprotected oral sex	32.9	59.2	23.7	55.3	5.0 (1.0 – 25.6)
Oral sex with high-risk partner [¶]	8.1	35.2	3.4	40.3	0.9 (0.1 – 10.2)
Anal sex (receptive and/or insertive)	9.7	19.4	7.7	11.8	2.3 (0.3 – 16.1)
Receptive anal sex	1.6	0.0	7.7	11.8	—
Insertive anal sex (males only)	9.7	17.4	n/a		n/a
Recent (past 3 mo) unprotected anal sex	3.2	2.8	1.8	0.0	—
Anal sex with high-risk partner [¶]	2.5	3.6	3.5	0.0	—
Sex while drunk or high	65.8	87.8	53.0	72.0	4.7 (1.3 – 17.3) ^{††}
Unprotected sex while drunk or high	36.0	75.2	34.6	58.2	2.0 (0.7 – 6.4)
Traded sex and drugs	2.8	6.2	3.1	34.6	0.2 (0.01 – 3.2)
Drug and injection risk behaviors					
Used alcohol	89.2	90.7	90.9	88.7	1.3 (0.5 – 3.7)
Recent (past mo) use of alcohol	56.7	59.4	53.7	60.8	1.5 (0.7 – 3.4)
Frequent use of alcohol (>3 times past mo)	30.8	35.3	26.3	37.2	1.4 (0.5 – 4.0)
Used marijuana	93.4	91.1	90.4	86.1	3.6 (1.9 – 6.7)//
Recent (past mo) use of marijuana	77.5	52.3	67.4	59.4	1.1 (0.6 – 2.2)

Variable	Males, % (n=408)		Females, % (n=316)		Odds Ratios (95% Confidence Intervals) for Persisting, [‡] Males to Females (Adjusted for Incarceration Status [§])
	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Persisting [‡]	
Frequent use of marijuana (>3 times past mo)	60.4	44.1	44.2	52.8	1.0 (0.5 – 2.1)
Used other substance ^{‡‡}	14.2	73.9	21.5	69.5	1.2 (0.3 – 4.7)
Recent (past mo) use of other substance ^{‡‡}	7.0	23.2	8.4	8.4	3.4 (0.7 – 15.3)
Frequent use of other substance ^{‡‡} (>3 times past mo)	1.4	8.9	2.7	10.0	0.6 (0.04 – 9.2)
Injected drugs	0.1	0.0	1.0	0.0	---
Tattooed	43.8	64.1	46.2	54.2	1.1 (0.5 – 2.6)
Shared needle(s) or equipment (Injection drug use/tattooing)	3.5	0.7	1.3	20.5	0.04 (0.0004 – 4.8)
Shared needle(s) in a risky location ^{§§} (Injection drug use/tattooing)	1.6	0.0	0.0	--	---
Shared needle(s) without cleaning (Injection drug use/tattooing)	1.6	0.0	0.3	0.0	---

Abbreviations: human immunodeficiency virus (HIV), not applicable (na), sexually transmitted infections (STD), month (mo).

* This table uses all cases that have baseline and follow-up data for each variable. Follow-up data are measured “since the last interview” unless noted.

[‡] Data are weighted to reflect the actual population of the Cook County Juvenile Temporary Detention Center.

^{‡‡} “Persistence” is defined as follows: Among youth who engaged in a behavior at the baseline interview, what proportion persisted in that behavior at the follow-up interview?

[§] Tests of significant are adjusted statistically for incarceration status (yes/no). For variables measured “since the last interview,” participants are considered incarcerated if they self-reported they had “been mostly in correctional facilities” since the baseline interview (126 males, 29 females). For variables measured “in the last three months” or less, participants are considered incarcerated if they self-reported they had been “mostly in correctional facilities in the past three months” (138 males, 29 females).

// p < .001

[¶] “High-risk partners” include persons who have ever worked as a prostitute, persons with HIV/AIDS, persons who inject drugs, and persons whose sexual history is not well known.

** Odds ratios and tests of significance could not be computed because one or more cell sizes were zero.

^{‡‡} p < .05

^{‡‡‡} “Other substance” includes substances other than alcohol or marijuana.

^{§§} “Risky locations” include a park, street, alley, abandoned building, car, public bathroom, and crack house/shooting gallery.

Table 6

Persistence of HIV/STI Sex and Drug Risk Behaviors in Juvenile Detainees Between the Baseline and Follow-up Interviews by Race/Ethnicity (n=722) ^{*,†}

Variable	African American, %(n=393)		Non-Hispanic White, %(n=131)		Hispanic, %(n=198)		Odds Ratios (95% Confidence Intervals) for Persisting* (Adjusted for Incarceration Status [§])		
	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Persisting [‡]	African American vs Non-Hispanic White	African American vs Hispanic	Non-Hispanic White vs Hispanic
Sex risk behaviors									
Sexually active	92.1	94.2	78.9	96.0	86.0	87.5	ns	0.2 (0.1–0.8) **	0.8 (0.2–4.0)
Multiple partners: >1 in past 3 mo	63.0	41.9	35.7	34.2	50.1	38.7			
Multiple partners: >3 in past 3 mo	37.5	24.6	14.8	14.5	20.2	16.0			
Vaginal sex	91.5	93.8	78.9	93.9	85.8	87.0			
Recent (past 3 mo) unprotected vaginal sex	35.9	52.4	37.4	64.1	41.9	61.9			
Vaginal sex with high-risk partner [¶]	25.5	40.8	15.4	72.6	23.4	47.8	p < .05	0.2 (0.1–0.8) **	0.8 (0.2–4.0)
Oral sex	42.6	60.4	52.8	89.0	35.9	88.1			
Recent (past 3 mo) unprotected oral sex	33.2	51.8	39.9	84.6	24.1	81.9	ns		
Oral sex with high-risk partner [¶]	9.3	35.1	6.4	57.9	1.6	12.4	ns		
Anal sex (receptive and/or insertive)	9.0	13.6	10.4	36.7	10.5	35.4	ns		
Receptive anal sex	2.2	1.9	1.3	50.0	0.1	0.0	-- ^{††}		
Insertive anal sex (males only)	9.3	13.5	10.4	34.9	11.2	26.2			
Recent (past 3 mo) unprotected anal sex	3.0	0.0	5.9	17.9	2.5	5.0	-- ^{††}		
Anal sex with high-risk partner [¶]	2.6	4.2	3.0	0.0	1.1	0.0	-- ^{††}		
Sex while drunk or high	66.7	85.0	62.0	89.3	57.4	94.1	ns		

Peer review status: This manuscript is available in PMC at 2010 January 1.

Variable	African American, %(n=393)			Non-Hispanic White, %(n=131)			Hispanic, %(n=198)			Odds Ratios (95% Confidence Intervals) for Persisting [‡] (Adjusted for Incarceration Status ^{//})		
	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Present at Baseline	% Persisting [‡]	Overall Test of Racial/ Ethnic Differences [§] (Adjusted for Incarceration Status ^{//})	African American vs Non-Hispanic White	African American vs Hispanic	Non- Hispanic White vs Hispanic
Unprotected sex while drunk or high	33.7	70.9	38.0	68.2	83.5	42.0	83.5	ns				
Traded sex and drugs	3.1	10.2	1.5	0.0	0.0	2.0	0.0	-- ^{††}				
Drug and injection risk behaviors												
Used alcohol	86.8	88.9	94.8	95.8	94.7	97.7	94.7	ns				
Recent (past mo) use of alcohol	55.1	55.2	62.6	74.5	70.2	61.0	70.2	p < .05		0.44 (0.2–1.1)	0.20 (0.04–0.9) **	0.4 (0.1–2.0)
Frequent use of alcohol (>3 times past mo)	30.2	29.6	26.6	52.5	51.7	32.3	51.7	ns				
Used marijuana	94.1	89.8	93.5	92.1	93.7	89.2	93.7	ns				
Recent (past mo) use of marijuana	76.6	49.9	77.1	69.0	58.2	76.5	58.2	ns				
Frequent use of marijuana (>3 times past mo)	60.9	42.4	61.7	61.7	47.2	51.1	47.2	ns				
Used other substance ^{††}	2.8	11.4	58.6	86.4	82.7	49.6	82.7	p < .01		0.02 (0.002–0.2) §§	0.02 (0.002–0.2) ///	1.2 (0.4–3.5)
Recent (past mo) use of other substance ^{††}	2.2	5.5	32.1	44.7	18.2	20.1	18.2	ns				
Frequent use of other substance ^{††} (>3 times past mo)	0.1	0.0	12.5	16.9	2.5	4.3	2.5	-- ^{††}				
Injected drugs	0.0		2.4	0.0	0.0	0.2	0.0	-- ^{††}				
Tattooed	40.1	56.4	38.3	63.4	83.8	62.1	83.8	p < .05		0.57 (0.2–1.7)	0.25 (0.08–0.8) **	0.4 (0.1–1.2)
Shared needle(s) or equipment (Injection drug use/tattooing)	4.0	0.0	0.3	0.0	14.9	1.6	14.9	-- ^{††}				
Shared needle(s) in a risky location ^{¶¶} (Injection drug use/tattooing)	1.9	0.0	0.0			0.0		-- ^{††}				
Shared needle(s) without cleaning	1.9	0.0	0.0		0.0	0.1	0.0	-- ^{††}				

Variable (Injection drug use/ tattooing)	Odds Ratios (95% Confidence Intervals) for Persisting [‡] (Adjusted for Incarceration Status ^{//})			
	African American, %(n=393)		Non-Hispanic White, %(n=131)	
	% Present at Baseline	% Persisting [‡]	% Present at Baseline	% Persisting [‡]
Overall Test of Racial/ Ethnic Differences [§] (Adjusted for Incarceration Status ^{//})				
African American vs Non-Hispanic White				
Non-Hispanic White vs Hispanic				

Abbreviations: human immunodeficiency virus (HIV), not significant (ns), sexually transmitted infections (STI), month (mo).

* One male and one female who self-identified as “other” race/ethnicity were not included in this analysis. This table uses all cases that have baseline and follow-up data for each variable. Follow-up data are measured “since the last interview” unless noted.

[†] Data are weighted to reflect the actual population of the Cook County Juvenile Temporary Detention Center.

[‡] “Persistence” is defined as follows: Among youth who engaged in a behavior at the baseline interview, what proportion persisted in that behavior at the follow-up interview?

[§] We tested for differences between specific groups (e.g., African Americans versus Hispanics) only when the categorical predictor (in this case, race/ethnicity) was significant at the p<.05 level.

// Tests of significance are adjusted statistically for incarceration status (yes/no). For variables measured “since the last interview,” participants are considered incarcerated if they self-reported they had “been mostly in correctional facilities” since the baseline interview (126 males, 29 females). For variables measured “in the last three months” or less, participants are considered incarcerated if they self-reported they had been “mostly in correctional facilities in the past three months” (138 males, 29 females).

[¶] “High-risk partners” include persons who have ever worked as a prostitute, persons with HIV/AIDS, persons who inject drugs, and persons whose sexual history is not well known.

**

p<.05

^{††} Odds ratios and tests of significance could not be computed because one or more cell sizes were zero.

^{‡‡} “Other substance” includes substances other than alcohol or marijuana.

^{§§} p<.001

////

p<.01

^{¶¶} “Risky locations” include a park, street, alley, abandoned building, car, public bathroom and crack house/shooting gallery.