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Maternal substance use and HIV status: Adolescent risk and resilience

Noelle R. Leonard^{a,b}, Marya Viorst Gwadz^a, Charles M. Cleland^a, Pooja C. Vekaria^b, and Bill Ferns^c

Noelle R. Leonard: Leonard@ndri.org; Marya Viorst Gwadz: gwadz@ndri.org; Charles M. Cleland: cleland@ndri.org; Pooja C. Vekaria: pcv2101@columbia.edu; Bill Ferns: bill_ferns@baruch.cuny.edu

^a The Center for Drug Use and HIV Research, Institute for AIDS Research, National Development and Research Institutes, Inc., 71 West 23rd Street, 8th Floor, New York, NY, USA, 10010

^b Program in Applied Educational Psychology, Teachers College, Columbia University, 525 West 120th Street, New York, NY, USA, 10027

^c Department of Statistics/Computer Information Systems, Zicklin School of Business, Baruch College, City University of New York., One Bernard Baruch Way, New York, NY, USA, 10010

Introduction

Mothers with problem drinking place their adolescent and younger children at elevated risk for their own emotional and behavioral problems, including alcohol and drug use and internalizing and externalizing disorders (Chassin, Pillow, Curran, Molina, & Barrera, 1993; Johnson & Leff, 1999; Windle, 1997). Complicating both mothers' and youths' abilities to adapt to this challenge, most women with problem drinking (over 75%) also have co-morbid drug and/or mental health problems (Kessler et al., 1997; Ohannessian et al., 2004).

Problem alcohol and/or drug use interfere with parenting practices. Mothers with substance use problems tend to be lacking in warmth and emotionally rejecting, and at the same time overprotective, coercive, and in general, insufficiently adaptive and responsive to their children's needs (Dutra et al., 2000; Eiden, Peterson, & Coleman, 1999; Mayes & Truman, 2002; Reyland, McMahon, Higgins-Delessandro, & Luthar 2002). In addition, their children are more likely to be exposed to familial and community violence (Walsh, MacMillian, & Jamieson, 2003) and to experience childhood maltreatment, which places these youth at increased risk for later substance abuse and mental health problems (Widom, 2000). These youth are also at elevated risk for removal from the home, typically because a mother's substance abuse severely limits her ability to care for children appropriately (Herrenkohl, Herrenkohl, & Egolf, 2003; VanDeMark et al., 2005). Poor parenting practices are linked to other contextual influences, particularly poverty; however, even when socioeconomic status is controlled for, mothers with alcohol and/or drug problems demonstrate less effective parenting (Bauman & Levine, 1986; Ondersma, 2002).

Correspondence concerning this article should be addressed to: Noelle R. Leonard, Institute for AIDS Research, National Development and Research Institutes, Inc. 71 West 23 Street, 8th Floor, New York, NY, USA, 10010. Email: E-mail: Leonard@ndri.org. Tel: 1-212-845-4656. Fax: 1-917-438-0894.

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The vast majority of studies that have examined the effects of maternal substance abuse on the adjustment of their offspring have focused on infants and preschoolers (e.g., Nair, Schuler, Black, Kettinger, & Harrington, 2003), school-aged or pre-adolescents (e.g., Hussong, Curran, & Chassin, 1998; VanDeMark et al., 2005) or adult children of substance abusers (e.g., Flora & Chassin, 2005); fewer studies have focused on adolescents (Ohannessian et al., 2004). However, adolescence is a critical developmental period. The powerful impact that families have on youths' health-related behaviors, including sexual and substance use behavior, is particularly salient during adolescence when these behaviors typically emerge (Kotchick, Shaffer, Miller & Forehand, 2001; Pequegnat & Bray, 1997; Tinsley, Markey, Ericksen, Kwasman, & Ortiz, 2002). Moreover, psychological disorders such as depression and anxiety, and problem behaviors such as delinquency are also emerging during this period, indicating adolescents' need for parental guidance, support and monitoring (Dryfoos, 1990; Chassin, Pitts, DeLucia, & Todd, 1999; Wills, Schreibman, Benson, & Vaccaro, 1994). Thus more research is needed to assess how maternal substance use during the this period of development affects current functioning.

The additional burden of maternal HIV-infection

Substance abuse and HIV infection are considered “twin epidemics;” women with HIV commonly have historical or on-going alcohol and/or drug problems (Coyle, 1998; Lee, Lester, & Rotheram-Borus, 2002; Petry, 1999). HIV/AIDS disproportionately affects urban African-American and Latina women (CDC, 2006) many of whom are single parents of minor children (Schable et al., 1995; Schuster et al., 2000). These families typically experience persistent poverty, unemployment, homelessness, and live in disenfranchised communities (Quinn & Overbaugh, 2005; Marcenko, Kemp, & Larson, 2000). Mothers with HIV/AIDS experience complex treatment regimes, frequent medical appointments, and periods of poor physical and mental health (Sowell, Seals, Phillips, & Julious, 2003). Moreover, despite significant advances in the medical management of HIV and reductions in mortality, women with HIV, particularly those of color, continue to live with uncertainty about their future (Kylman, Vehvilainen-Julkunen, & Lahdevirta, 2001; Tiamson, 2002). Furthermore, those from lower socioeconomic status backgrounds have benefited the least from these medical advances (Cunningham et al., 2005; Cargill & Stone, 2005).

Children of parents with serious, life-threatening illness generally demonstrate higher levels of mental health symptoms although the specific theoretical mechanisms by which parental illness impacts youth outcomes have not been sufficiently articulated (Romer, Barkmann, Schulte-Markwort, Thomalla, & Riedesser, 2002; Worsham, Compas, & Sydney, 1997). Adolescents may report a higher level of maladjustment than younger children because they have a greater understanding of the risks and may be saddled with additional familial responsibilities (Romer et al., 2002; Stein, Riedel, & Rotheram-Borus, 1999). A socially stigmatized illness such as HIV/AIDS may present a heightened level of familial stress that negatively impacts youths' adjustment, particularly when coupled with maternal substance abuse and persistent poverty (Pequegnat & Bray, 1997).

Maternal HIV infection however may not confer unique risk to adolescents

Reports that have compared young adolescents of HIV-infected mothers with their demographically similar controls (Mellins, Brackis-Cott, Dolezal, & Meyer-Bahlburg, 2005), or older adolescents with published norms (Rotheram-Borus & Stein, 1999), have indicated that maternal HIV infection may not confer broad-based additional psychosocial or behavioral risk to adolescents. This may be because HIV-infected mothers successfully adapt to their serostatus over time (Mosack, Abbott, Singer, Weeks, & Rohena, 2005), and may also be partially due to the fact that HIV-infection co-occurs with a number of other adverse parental behaviors and social contexts that have a strong relationship with adverse youth outcomes,

including persistent poverty (Forehand et al., 2002). Among mothers living with HIV, their substance use, rather than health status, may be more strongly related to adolescents' risk behaviors, particularly externalizing behaviors (Rotheram-Borus & Stein, 1999; Mellins et al., 2005). However, research on the combined effects of maternal HIV infection and alcohol and/or drug problems on adolescents is in its early stages.

The present paper focuses on the adolescent children of urban mothers with problem drinking and drug use, both HIV-infected and uninfected, from low socioeconomic backgrounds. First, we describe the sample, specifically, demographic and background characteristics, risk and protective factors (e.g. education, caregiving history, childhood maltreatment, foster care placement), behavioral functioning (i.e., sexual behavior, substance use) and mental health problems (i.e., internalizing and externalizing problems) of these adolescents. Our main aim is to explore whether there are differences between the two subgroups of youth (youth of HIV-infected and uninfected mothers) on risk-taking behaviors, specifically substance use and sexual behavior and mental health functioning. Because the adolescents in the present study had experienced risk factors over their lifetime known to be associated with problem behavior and mental health symptoms; namely, long-standing maternal substance use problems and its attendant risks, including poverty, we hypothesized that both groups of adolescents would exhibit elevated rates of childhood maltreatment, mental health symptoms, and risk behavior in comparison to their peers in the general population. However, based on the literature reviewed above, we expected that maternal HIV-infection would confer little unique risk, and that there would be few, if any, differences between the two subgroups. Regarding gender differences, we hypothesized that patterns would reflect those in the general population of adolescents; i.e., males will be more likely to exhibit sexual behavior, externalizing symptoms, and to be involved in the criminal justice system than females, and females will be more likely to have experienced sexual abuse and to exhibit internalizing symptoms than boys (Keenan & Shaw, 1997; Nolen-Hoeksema & Girgus, 1994; Olson, Bates, Sandy, & Lanthier, 2000).

Method

Participants

We used data from the baseline interviews of adolescents who agreed to take part in three waves of assessment as part of a longitudinal randomized controlled trial which examined the effectiveness of a behavioral intervention for these adolescents' mothers. The intervention targeted mothers' problem drinking/drug use and parenting issues. Mothers were both HIV-infected and uninfected, and recruited from New York City based community based organizations, hospital clinics (HIV specialty clinics and others), media ads, and snowball sampling. Between February 2002 and August 2003, 118 women met the study eligibility criteria: (a) were the biological or adoptive mother of at least one adolescent child between the ages of 11 and 18; (b) resided with at least one of these adolescent children at least half the time over the past month; (c) met criteria for problem drinking on the Alcohol Use Disorders Identification Test (AUDIT; Bohn, Babor, & Kranzler, 1995) a widely used screening instrument (d) and had not injected drugs during the past three months. There were few differences between HIV-infected and uninfected mothers in demographic characteristics and in the areas of substance use, risk history, health and mental health. Table 1 describes these key differences. Mothers (*M* age = 40.4 years, *SD* = 6.16 years) were primarily from racial and ethnic minority backgrounds (56.8% African-American; 28% Latina; 5.9% White; 9.3% bi or multi-racial or other). A total of 55% were HIV-infected. Most mothers were from low socioeconomic status backgrounds: 84.5% were in the two lowest socioeconomic strata (Hollingshead, 1975). Half (56.8%) were receiving public assistance, with HIV-infected mothers significantly more likely to be doing so than uninfected mothers (73.3% versus 39.5%; $p < .01$). Both groups reported significant historical risk factors: approximately two-thirds had

a history of homelessness and approximately 68% had been arrested more than once. In the 6 month period before the baseline interview, mothers averaged 6.56 ($SD = 7.85$) drinks per day. Most mothers (69.5%) also used other drugs (primarily marijuana and/or cocaine) in addition to alcohol. The majority of mothers in both groups fell well below the normative mean on standardized self-report measures of general physical and mental health. Among HIV-infected mothers, the mean time since HIV diagnosis was 9 years ($SD = 4.4$; range: 1-20 years). HIV-infected mothers were more likely to be infected with Hepatitis C which is often comorbid with HIV (Rockstroh & Spengler, 2005; see Leonard, Gwadz, Cleland, Rotko, & Gostnell 2007 for a complete description of the mothers).

At the time of the baseline interview, mothers were asked to provide consent for project staff to recruit all of their adolescent children who met inclusion criteria for a baseline and two follow up interviews. Inclusion criteria for adolescents included being between the ages of 11 and 18 and having lived with the mother at least half the time over the past month. Mothers were informed that disclosure of their HIV status or problem drinking to their adolescents was not a requirement for participation because youth were not interviewed about mothers' health or substance use. Mothers were informed they could decline to enroll adolescents and continue in the study. If the mother provided signed informed consent to allow her adolescent children to participate, these youth were asked by their mothers or research interviewers if they would agree to join a "family health study." Adolescents provided their own signed informed consent or assent for participation. A total of 105 adolescents (55.2% offspring of HIV-infected mothers) of 83 mothers (54.2% HIV-infected) enrolled into the study. Thus 70% of mothers enrolled at least one adolescent (83/118). Of the 35 mothers who did not have at least one participating adolescent, 5.7% (2/35) declined to allow their eligible adolescents to participate, 40% (14/35) of these adolescents declined participation, and 19/35 (54.3%) of eligible adolescents were unavailable or untraceable (e.g., were not living with mother any longer, moved out of state, went into foster care). Adolescents were considered "declined" if they indicated as such to the study recruiter (typically citing a lack of time or interest) or if the adolescent did not return the study recruiter's multiple calls or respond to recruitment letters or flyers, despite signed consent by mothers' to youths' participation. Sixty-four mothers had one participating adolescent, 16 mothers had two adolescents and three mothers had three participating adolescents.

Procedures

Adolescents completed a structured interview using the Questionnaire Development System software (QDS; Nova Research Company, 2003). Interviews took place at the participant's home or at the project's field site. Interviewers administered most items to participants verbally; sensitive sections (sexual behavior and substance use) were administered using the audio-computer assisted self-interviewing methods (A-CASI). The interviews lasted approximately 1.5 hours and adolescents received a stipend for their participation (\$25). All youth completed the interviews and missing data were rare. Procedures were approved by the Joint Institutional Review Board of the National Development and Research Institutes, Inc. and the performance sites, where appropriate.

Measures

Demographic and background characteristics were collected, including age; educational history (in school/GED/HS graduate; highest grade attained); gender; caregiving history [raised primarily by mother (yes/no), mother current primary caregiver (yes/no)]; history of foster care placement [ever in foster care (yes/no); years and ages in foster care]; criminal justice involvement [ever arrested (yes/no)]; pregnancy and parenting status, and runaway history. Maternal HIV status was drawn from the mother's interview.

Maltreatment history was assessed using the Childhood Trauma Questionnaire (CTQ; Bernstein and Fink, 1998). This 28-item inventory provides reliable and valid screening for histories of abuse and neglect for adolescents and adults. Responses are coded on a five-point scale and, after reverse coding appropriate items, responses are summed to produce scale scores that quantify the severity of maltreatment in five areas (physical abuse, physical neglect, emotional abuse, emotional neglect and sexual abuse). Scales other than physical neglect ($\alpha = .38$) showed satisfactory internal consistency (Cronbach's α range .70 - .83).

Lifetime and recent alcohol and drug use were assessed using the National Alcohol Survey (Graves, 1995) a multistage area probability sampling of adults and adolescents in the United States which is conducted bi-annually by the National Alcohol Research Center. Lifetime prevalence, age of initiation, and frequency of use in the past 6 months for alcohol and ten classes of illicit drug use (marijuana, crack, cocaine, heroin, hallucinogens, amphetamines, inhalants, club drugs, prescription drugs, and other drugs) were assessed. Recent frequency of alcohol and marijuana use were each based on single Likert-type items which asked, "how often did you get drunk?" and "how often did you use marijuana?". Responses ranged from never in the past 6 months to 3 or more times a day (range 0-9). Recent frequency of harder drug use was based on nine Likert-type items which asks how often each of nine types of substances were used. Frequency was determined by the frequency of the mostly frequently used substance, across these nine harder drugs. Responses ranged from never in the past 6 months to 3 or more times a day (range 0-9). Reliability for this measure has not been reported.

Sexual behavior was also assessed using the National Alcohol Survey (Graves, 1995). We selected a number of items regarding sexual behavior which included type and age of initiation of any sexual activity with members of the opposite and same sex (e.g., touching, oral sex) and the number of sexual partners; lifetime occurrence of penile/vaginal sex, including the frequency of condom use. Reliability for this measure has not been reported. Participants were also asked about rates of HIV testing (we did not assess youths' own serostatus).

Mental health functioning was assessed using the Youth Self Report (YSR; Achenbach, 1991). The YSR is a widely used, standardized measure of problem behaviors completed by the adolescent. Youth rate themselves for how true each item is now or was within the past 6 months. Items were scored on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, 2 = very or often true) and then summed to create a total score, internalizing and externalizing scores, and eight mental health syndromes. *T* scores were calculated using Achenbach's (1991) norms for the YSR. Internal consistency was high for the internalizing ($\alpha = .84$), externalizing ($\alpha = .86$), and total ($\alpha = .92$) scales. Using scores provided for the measures, data were also coded to reflect the percentage of participants whose scores exceeded the clinical cut-off scores for each of the sub-scales and the internalizing, externalizing, and total domains.

Data Analysis

When data are collected on several adolescent children in a family, these siblings form a cluster. In the specific case of a sibling group, cluster members are likely to be similar to each other due to assortive mating, shared genes, shared environments, and mutual influence (Kenny, Mannetti, Pierro, Livi, & Kashy, 2002). To take into account this clustering of adolescents, the main effects of gender and maternal HIV status and the interaction between these two variables were assessed using either linear mixed effects (Pinheiro & Bates, 2000; Raudenbush & Bryk, 2002) or, for dichotomous characteristics, generalized estimating equation analysis (GEE; Hardin & Hilbe, 2003).

Results

As we hypothesized, there were no significant differences between youth of HIV-infected mothers and those of HIV-uninfected mothers on any of the risk behavior indices we examined. In contrast to our hypotheses regarding gender differences in sexual risk behaviors and mental health symptoms, we found few, if any significant differences on these indices. We discuss details of these findings below.

Sample description

Table 2 presents the demographic characteristics of adolescents by HIV serostatus of mothers, gender, and for the sample as a whole. Analyses were conducted on 105 adolescents; missing data were rare with two exceptions; 4% of the data was missing for the question concerning who the adolescents considered “raised” them and 1% of the data was missing for sexual abuse items of the CTQ. Sample sizes are also reduced for variables which do not apply to all adolescents; these reduced sample sizes are noted in Tables 2 and 3.

In general, there were few differences between youth of HIV-infected mothers and those of HIV-uninfected. Adolescents were, on average, 14.83 years old ($SD=2.35$ years, range 11-18) and the majority were from racial and ethnic minorities including those whose ethnicity was reported as bi- or multi- racial. White youths were more likely to be from uninfected than HIV-infected mothers. There were no differences between adolescents of HIV-infected and uninfected mothers in their caregiving histories. Most youth (73%) had been raised primarily by their mothers alone; that is, not also by fathers or other relatives. Further, 18% of youth had spent an average of 4.43 years in foster care ($SD=3.25$). Almost all (91%) were currently enrolled in school or received a high school diploma or equivalent. Rates of pregnancy were comparable in the two groups (11%). The prevalence of criminal justice system involvement was substantial for both groups (31% arrested), and boys were more likely than girls to have ever been arrested or detained by the police. Almost a quarter of youth had run away from home in the past (19%). A substantial minority experienced childhood maltreatment at moderate to extreme levels however as predicted, there were no differences between the groups by maternal serostatus nor were there gender differences.

Alcohol and drug use

As presented in Table 3, 46% of youth had used alcohol in their lifetimes (age of initiation $M=13.4$, $SD=2.50$), rates slightly lower than their same age, gender and racial/ethnic peers in New York City from the Youth Risk Behavior Survey (YRBS), where 69.2% had used alcohol (CDC, 2004). A total of 35% had used marijuana, (age of initiation $M=13.2$, $SD=1.61$); these rates are somewhat higher than those among their local demographically similar peers (30.4% of peers had used marijuana; CDC, 2004). There were no differences between the youth cohorts or between genders in either alcohol or marijuana use or ages of initiation. The prevalence of use of other drugs (cocaine, crack, heroin, hallucinogens, speed, inhalants, prescription drugs and other) was low, ranging from 0-7%, thus we collapsed these drugs into one category by creating a composite of the average of the reported use of these drugs (Table 3). Adolescents of HIV-uninfected mothers appeared to be somewhat more likely to have ever tried one or more harder drugs, but this difference was not statistically significant. There were no gender differences in rates of alcohol or drug use. Alcohol and marijuana were the most frequently used substances in the preceding six month period, with no group or gender differences.

Sexual behavior

Approximately half of adolescents (51%) had ever engaged in penile/vaginal intercourse with an opposite sex partner and/or sexual activity with a same sex partner with no differences between groups or genders (Table 3). The mean age of sexual initiation (penile-vaginal or

same-sex activity) was 13.3 years ($SD=2.42$; median age = 14 years). In contrast to the vast majority of studies that have found males reporting a greater number of lifetime sexual partners, we found no such gender differences. Youth had an average of 6.1 sexual partners ($SD=8.76$; range: 1-45), with a median of 3. Thus about half of those who had been sexually active had three or fewer partners, but the other half (25% of the total sample) had 4 or more lifetime sexual partners. For females, this number of partners is higher when compared to their same-aged, demographically similar peers on the YRBS (7.3% had 4 or more partners; 95% CI = ± 2.0), but for males, the proportion who had 4 or more partners in our sample is roughly comparable to their peers (28.0% had 4 or more partners; 95% CI = ± 6.9 ; CDC, 2004). We did not find statistically significant differences in the number of lifetime sexual partners between youth of HIV-infected mothers and uninfected mothers. Among adolescents who had penile/vaginal intercourse in the past month ($N=25$), youth reported that they used condoms more often than not; the average proportion of vaginal/anal sexual acts protected by a condom was .82 ($SD=.28$). Condoms were reportedly used consistently (that is, at every vaginal/anal encounter) by 60% of youth (data not shown). Consistent condom use was particularly low among females with uninfected mothers (17%; data not shown). While females were more likely than males to have ever been tested for HIV (41.3% versus 18.6%; $z = 2.51, p < .05$) there were no differences between youth of HIV-infected (31.9% tested) and uninfected mothers (25.9% tested; data not shown). Although HIV status of youth was not assessed directly, there was no indication from mothers in structured or qualitative interviews or intervention sessions that any of the youth were HIV-infected.

Mental health functioning

While the majority of youth did not exhibit symptoms at clinically significant levels, the scores of a notable minority exceeded the clinical cut-off for the externalizing (17%), internalizing (5%), and total (5%) dimensions (Table 4). There were no significant group differences and unexpectedly, there were no gender differences on these three domains.

Discussion

We described a number of critical risk and protective factors among urban adolescents whose mothers experience problem drinking and/or drug use, both HIV-infected and uninfected. We also documented patterns of emerging sexual and substance use risk behavior and mental health problems among these youth and explored potential differences between the adolescents of HIV-infected and uninfected mothers. As hypothesized, such differences were few. Of concern, we found that youth in both groups experienced elevated rates of childhood abuse and neglect, foster care placement, and unstable or changing caregiving relationships, all of which significantly challenge a young person's ability to manage developmental milestones and transitions, particularly as they age into young adulthood (Herrenkohl et al., 2003; VanDeMark et al., 2005). Unexpectedly, and contrary to our hypotheses, we did not find significant gender differences in sexual risk behavior or mental health symptoms.

Despite the numerous risk factors many experienced, adolescents in the present study exhibited signs of resilience, for example, over 90% reported either being in school, completing high school, or receiving a high school equivalency diploma. This is critical, as education is an essential aspect of adolescent development.

We also compared the reports of sexual and substance use risk behaviors between youth in our sample and those reported in national surveys. While youth reported lower rates of alcohol use than among their demographically similar peers in New York City (CDC, 2004), the prevalence of marijuana use was slightly elevated (CDC, 2004). Regarding use of hard drugs, the prevalence of use was low (0-7%), consistent with other national reports (SAMHSA, 2004). While youth of uninfected mothers were somewhat more likely to report use of hard drugs,

this difference was small and not significant. We view this finding as consistent with the expectation that mother's HIV status does not confer any unique risk or benefit for the adolescent with respect to drug use.

Regarding sexual behavior, the overall proportion of youth who had engaged in sexual intercourse was similar to their demographically comparable peers (CDC, 2004) but for girls in our sample, a greater proportion had participated in sexual activity with 4 or more sexual partners over their lifetimes than their peers. The rates of sexual activity, ages of initiation, and number of sexual partners in the present sample were roughly equivalent between males and females, in contrast to patterns in the general population where boys exhibit earlier ages of initiation and a greater number of partners (CDC, 2004; O'Donnell, O'Donnell, & Steuve, 2001). This lack of gender difference resulted from a lower proportion of males in our sample reporting ever engaging in sexual intercourse when compared to their New York City peers (CDC, 2004). The proportion of condom use among those who were sexually active was roughly similar to local and national reports (CDC, 2004). These data suggest that overall, and contrary to hypotheses, youth whose mothers are currently abusing substances, both HIV-infected and uninfected, do not exhibit significantly heightened rates of risky sexual behavior in comparison to their peers, signaling their abilities to maintain a level of health-protective behavior in light of their significant trauma history and current stressful life circumstances. However, the high number of sexual partners reported by females in the study does raise concerns about their risk for sexually transmitted infections, premature pregnancy, and other problem behaviors (Howard & Wang, 2004). Further, as with adolescents generally, condoms are not used consistently by these youth, indicating the urgent need to step-up HIV and other sexually transmitted disease infection (STI) prevention efforts for this population.

Although most adolescents in the present study did not suffer from clinically-significant levels of mental health distress, indicating that most are successfully adapting to their complex life circumstances, the number of youth exhibiting clinically significant symptoms of externalizing (17%) and internalizing (5%) disorders is noteworthy and consistent with other reports that have examined youth of substance abusing parents (Hussong et al., 1998; VanDeMark et al., 2005). In particular, behaviors associated with externalizing disorders such as delinquency have been associated with poor parental monitoring of adolescents (Dishion, Patterson, Stoolmiller, & Skinner, 1991) and parents with alcohol and drug problems are less likely to monitor their adolescents' activities and behaviors (Chassin et al., 1993; Dorius, Bahr, Hoffmann, & Harmon, 2004). In contrast to a number of reports that have found higher rates of delinquency among males (Dishion et al., 1991; Mellins et al., 2005; Rotheram-Borus & Stein, 1999) we found no significant gender differences. This is consistent with Luthar and colleagues' (1998) study of adolescents of opioid and cocaine-abusing mothers, which found no gender differences across major psychiatric disorders. The impact of externalizing disorders can be serious, and include contact with the criminal justice system, school expulsion, increased risk for alcohol and drug abuse and psychiatric disorders in adulthood (Caspi, Elder, & Bem, 1987; Kim-Cohen et al., 2003). In the present study both girls and boys are at elevated risk for the adverse effects of externalizing behaviors.

The present study adds and extends the current body of research findings that maternal HIV status does not significantly add to the psychosocial and behavioral effects of maternal substance abuse for adolescent children living in urban poverty. Several limitations should be noted. First, the sample size was small, thus the differences between the groups (or lack of differences) should be viewed with caution. We note some demographic differences between the two groups that may impact youth outcomes, for example, there was a greater proportion of females among the youth of HIV-infected mothers, youth of HIV-infected mothers were slightly younger, and there was a small percentage of white youth in the uninfected group but none among the youth of HIV-infected mothers. There were also some differences in the social

histories of the two groups, for example, while there was very little difference in the percentage of youth who were ever in foster care, youth of HIV-infected mothers were placed, on average, at a slightly younger age and remained in care slightly longer. However, while adolescents of HIV-infected and HIV-uninfected mothers may be different in more ways than just their mother's HIV status, HIV/AIDS remains a serious, unremitting, life-threatening, and highly stigmatized disease (Siegel, Karus, & Dean, 2004) that has broad implications for family members (Pequegnat & Bray, 1997; Rotheram-Borus, Flannery, Rice, & Lester, 2005; Tinsley, Lees, & Sumartojo, 2004). Although our sample size precludes us from examining these pathways, we speculate that maternal HIV-infection may operate as a more distal factor in adolescent adjustment (Bronfenbrenner & Morris, 2006; Cicchetti & Toth, 1998). For example, HIV-infected individuals in service-rich areas such as New York City receive significantly enhanced public assistance benefits which typically result in a stable residence and a higher level and longer duration of financial assistance (NYCHRA, 2005; Siegel et al., 2004). As a result, HIV-infected mothers in our sample were more likely to be on public assistance. Thus, despite continued maternal substance abuse, this financial and residential *stability* may have indirect (as well as direct) benefits for adolescent children (Aneshensel & Sucoff, 1996; Herrenkohl et al., 2003) that mitigate the additional challenges of dealing with mothers' HIV infection. Future research with this population will be needed as the youth age into young adulthood and are no longer benefiting from the enhanced assistance their mothers currently receive. On the other hand, for several of the sociodemographic differences between the groups of youth we note above, maternal HIV infection may have played a more negative, albeit distal, influence on youth adjustment. For example, women are often diagnosed with HIV when they seek medical care for symptoms (which are typically a sign of progression of the disease to AIDS) (CDC, 2003), thus, it is possible that for these youth, maternal illness played a factor in the average younger age of placement and duration of time in foster care, given the average number of years since HIV diagnosis reported by the mothers in this sample (see Leonard et al., 2007 for more information). Similarly, maternal illness may have been a factor in the greater number of youth of HIV-infected mothers who did not consider their mother to be their primary caregiver in childhood (Schable et al., 1995). Placement outside of the mother's care however, may have also served as a protective factor for these youth as they may have benefited from an environment where their caregivers were not abusing drugs or alcohol. In light of the fact that the HIV epidemic increasingly affects women, particularly African-American and Latinas (CDC, 2006), future research with larger samples will be needed that can test these potential pathways and mechanisms.

A second limitation includes the veracity of youths' self-report of their risk behaviors (e.g., underreporting). Unlike the national surveys (e.g., YRBS) we cite where youth are interviewed anonymously, youth in the present study were interviewed in person, although separate from their mothers. We did however institute procedures to improve the veracity of these reports by using well-validated measures and A-CASI which has been shown to enhance the validity of self-reported data (Des Jarlais et al., 1999; Macalino, Celentano, Latkin, Strathdee, & Vlahov, 2002). Moreover, we note that reports of risk behaviors by youth in the present study varied when compared to national studies that are typically administered anonymously; that is, for some variables, risk behavior reports were higher, some were lower, and some were similar to those reported in national samples.

A third limitation concerns the fact that because mothers' health was not a focus of the adolescents' interview, we do not know if the adolescents of the HIV-infected mothers were disclosed to regarding their mothers' HIV status. However, past research has indicated that adolescents are likely to have been informed of mothers' serostatus (Rotheram-Borus, DRAININ, Reid, & Murphy, 1997). Finally, the data reported here are cross-sectional which limits our ability to make inferences about the causal processes involved.

Conclusion

As hypothesized, maternal HIV status did not confer additional substance use or sexual risk behaviors or adjustment factors on urban adolescent children of mothers with problem drinking and drug use living in an HIV/AIDS epicenter. Despite the small sample size, these results are consistent with the literature on the effects of maternal substance abuse on adolescent offspring. Youth exhibited patterns of emerging sexual and substance use risk behaviors and mental health problems as well as signs of resiliency. Intervention efforts continue to be needed for these youth of substance abusing mothers, both HIV-infected and HIV-uninfected.

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Table 1
Key differences between HIV-infected and uninfected mothers

	HIV-infected (n=45)	HIV-uninfected (n=38)	<i>p-Value</i>	ϕ
HS Diploma or GED	57.8	78.9	†	-.23
Major source of financial support – past 6 months			**	
Job	13.3	36.8	*	-.27
Partner or spouse	8.9	7.9		.02
Family or friends	0.0	7.9	†	-.21
Unemployment compensation	0.0	0.0		.00
Welfare, public assistance	73.3	39.5	**	.34
Other	4.4	7.9		-.07
Hepatitis C Infected	24.4	7.9	†	.22

Note: † $p < .10$; * $p < .05$; ** $p < .01$.

ϕ = phi coefficient for categorical variables.

Table 2
Adolescent Demographics, Background Characteristics and Risk Factors

	<i>HIV-infected mothers</i>			<i>HIV-uninfected mothers</i>		
	Female (n=29)	Male (n=29)	Total (n=58)	Female (n=17)	Male (n=30)	Total (n=47)
Age [†]	14.36 (2.28)	14.87 (2.57)	14.62 (2.42)	15.12 (2.13)	15.07 (2.35)	14.83 (2.35)
<i>Ethnicity</i>	--	--	--	--	--	--
African-American [†]	62	52	57	47	47	52
Hispanic [†]	28	41	34	12	23	28
White [†]	0	0	0	18	13	7
Bi-racial/Other [†]	10	7	9	24	17	13
Mother Current Prim. Caregiver [†]	83	86	84	82	87	85
Raised by Mother ^{† a}	62	72	67	76	83	73
Ever Foster/Group Home Care [†]	17	21	19	12	20	18
Yrs in Foster/Group Home Care ^{† b}	4.5 (1.92)	5.2 (3.35)	4.9 (2.67)	6.0 (7.07)	2.0 (1.73)	4.43 (3.25)
Age First Foster/Group Home Care ^{† b}	8.4 (6.73)	7.2 (5.67)	7.7 (5.88)	7.0 (9.90)	9.0 (2.55)	8.0 (5.30)
School/GED/HS Graduate [†]	93	86	90	100	90	91
Highest School Grade [†]	7 (2.23)	8 (2.31)	8 (2.25)	8 (2.00)	8 (2.52)	8 (2.29)
Ever Pregnant/Partner Pregnant [†]	3	10	7	24	13	11
Number of Children ^{† c}	2 (--)	--	2 (--)	1 (--)	1 (0.00)	1 (0.45)
Ever Arrested [†]	14	45	29	24	37	31
Ever Ran Away from Home [†]	17	14	16	24	23	19
<i>Childhood trauma – moderate to extreme (%)</i>						
Physical Abuse [†]	17	3	10	6	7	9
Physical Neglect [†]	14	10	12	12	17	13
Emotional Abuse [†]	14	3	9	24	7	11
Emotional Neglect [†]	24	7	16	18	13	15
Sexual Abuse ^{† d}	7	7	7	25	13	12

H = HIV Status Main Effect, $p < .05$; G = Child Gender Main Effect, $p < .05$.

^a indicates the cell content is a percentage

[#] indicates the cell contents are means with standard deviations in parentheses

^a N= 101

^b N= 18

^c N= 12

^d N= 104

Table 3
Adolescents Behavioral Functioning: Substance Use and Sexual Behavior Histories

	<i>HIV-infected mothers</i>			<i>HIV-uninfected mothers</i>		
	Female (n=29)	Male (n=29)	Total (n=58)	Female (n=17)	Male (n=30)	Total (n=47)
<i>Lifetime substance use (%)</i>						
Alcohol [†]	52	31	41	53	50	51
Marijuana [†]	34	28	31	35	43	40
Any Other Drugs [†]	20.7	0	10.3	17.6	16.7	17.0
<i>Age of Initiation - substances</i>						
Alcohol ^{‡ a}	13.9 (1.46)	14.3 (2.24)	14.0 (1.76)	12.3 (3.32)	12.9 (2.84)	12.7 (2.98)
Marijuana ^{‡ b}	12.7 (1.70)	13.8 (1.39)	13.2 (1.62)	13.2 (0.98)	13.2 (1.95)	13.2 (1.61)
<i>Frequency sub. use - recent</i>						
Alcohol Past 6 Mos. [‡]	0.86 (1.81)	0.62 (1.21)	0.74 (1.53)	1.88 (2.55)	0.87 (1.66)	1.23 (2.06)
Marijuana Past 6 Mos. [‡]	0.97 (2.20)	0.52 (1.18)	0.74 (1.76)	1.00 (1.87)	1.00 (2.13)	1.00 (2.02)
Harder Drugs Past 6 Mos. [‡]	0.10 (0.56)	0.00 (0.00)	0.05 (0.39)	0.00 (0.00)	0.10 (0.31)	0.06 (0.33)
<i>Sexual behavior</i>						
Sexually Active – Lifetime [†]	45	55	50	59	50	53
Age of Initiation ^{‡ c}	13.1 (3.99)	12.9 (1.96)	13.0 (3.01)	14.0 (1.33)	13.3 (1.54)	13.6 (1.47)
Median Age of Initiation	14.0	13.0	13.5	14.0	13.0	14.0
No. of Partners – Lifetime ^{‡ d}	3.5 (2.94)	5.5 (5.03)	4.6 (4.28)	7.1 (12.34)	8.2 (11.95)	7.8 (11.86)
Median No. of Partners – Lifetime	2.5	3.0	3.0	2.0	4.0	3.0
Proportion Condom Use ^{‡ e}	0.81 (0.42)	0.87 (0.20)	0.85 (0.29)	0.63 (0.28)	0.93 (0.19)	0.79 (0.27)

[†] indicates the cell content is a percentage

[‡] indicates the cell contents are means with standard deviations in parentheses

^a N=47

$b_N=36$
 $c_N=29$
 $d_N=51$
 $e_N=14$

Table 4
Adolescent Mental Health Functioning

	HIV-infected mothers			HIV-uninfected mothers		
	Female (n=29)	Male (n=29)	Total (n=58)	Female (n=17)	Male (n=30)	Total (n=47)
<i>T-Scores</i>						
Externalizing [†]	54.5 (10.8)	52.8 (8.5)	53.6 (9.7)	56.9 (9.4)	50.3 (13.5)	52.7 (12.6)
Internalizing [‡]	47.4 (8.1)	46.8 (8.1)	47.1 (8.0)	48.7 (6.2)	50.4 (13.1)	49.7 (11.0)
Total [‡]	48.7 (8.3)	46.7 (8.1)	47.7 (8.2)	49.6 (7.3)	48.6 (12.7)	49.0 (11.0)
<i>Percent Exceeding Clinical Cutoff</i>						
Externalizing [†]	21	14	17	18	17	17
Internalizing [†]	3	0	2	0	13	9
Total [†]	0	3	2	6	10	9

[†]Indicates the cell content is a percentage

[‡]Indicates the cell contents are means with standard deviations in parentheses.