Published in final edited form as:

Am J Orthopsychiatry. 2009 January ; 79(1): 51–59. doi:10.1037/a0015427.

The Longitudinal Impact of HIV+ Parents' Drug Use on their Adolescent Children

Patricia Lester, Robert Weiss, Eric Rice, W. Scott Comulada, Lynwood Lord, Susan Alber, and Mary Jane Rotheram-Borus

Center for Community Health, University of California, Los Angeles

Abstract

The impact of parental substance use on the emotional and behavioral adjustment of their adolescent children was examined over five years. A representative sample of 220 parents with HIV (PWH) and 330 adolescent children in New York City were repeatedly assessed. Some parents never used marijuana or hard drugs over the 5 years (*nonusers*). Among those who were users, substance use varied over time. PWH who used substances during a specific 3-month period were classified as *active users* and those who abstained from substance use were classified as *inactive users*. Longitudinal regression analyses were used to analyze the impact of variations in patterns of substance use over time on their adolescent children's emotional adjustment and behavioral problems. PWH relapse exacerbated adolescent substance use, trouble with peers, and adolescent emotional distress. Even time-limited reductions in parents' substance abuse can have a significant positive impact on their adolescent children's emotional and behavioral adjustment. Interventions which address parental substance use among PWH should be developed to ameliorate the impact of substance use relapse on their adolescents.

Keywords

Addiction; HIV; problem behavior; adolescent development; relapse

More than one million persons are living with HIV in the United States (Glynn & Rhodes, 2005). Increasing numbers of HIV-positive adults are parents (Schuster et al., 2000), and many of these parents acquire HIV from drug use (Centers for Disease Control and Prevention [CDC], 2000). In our study, about 34% of parents living with HIV (PWH) were injecting drug users and an additional 52% had partners who were known or probable injecting drug users (Rotheram-Borus, Lee, Gwadz, & Draimin, 2001). Because antiretroviral therapies and other improved treatment strategies are available for treating HIV (Eron et al., 1995; Kinloch-de Loes & Perrin, 1995), PWH have survived longer than anticipated, increasing the likelihood that parents may relapse into substance use (Rotheram-Borus et al., 2003). The goal of this study is to examine prospectively how parents' marijuana and hard drug use affects their children's emotional and behavioral outcomes over time.

In multiple contexts and across different developmental periods, parental substance use has been found to have a negative influence on parenting practices, family functioning and child adjustment (Boyd, Plemons, Schwartz, Johnson, & Pickens, 1999; Johnson & Leff, 1999). For example, parental drug use has been shown to influence child-rearing practices and, in turn, practices may negatively influence children's adjustment in toddlers (Brook, Tseng, & Cohen,

1996). In school age children, maternal drug use was found to increase children's behavioral problems (Kandel, 1990; Stein, Newcomb, & Bentler, 1993), as was paternal alcohol abuse (Peiponen, Laukkanen, Korhonen, Hintikka, & Lehtonen, 2006; Christensen & Bilenberg, 2000; Loukas, Fitzgerald, Zucker, & von Eye, 2001). Similarly, boys aged 10 to 12 years with substance abusing parents were more likely to have conduct problems and to initiate substance use early themselves (Kirisci, Dunn, Mezzich, & Tarter, 2001; Moss, Majumder, & Vanyukov, 1994). Overall, parents' substance use has been found to negatively influence the entire family system (Anderson & Henry, 1994; Kumpfer, Molgaard, & Spoth, 1996; Biederman, Faraone, Wozniak, & Monuteaux, 2000; Pandina & Johnson, 1989; Rotunda, Scherer, & Imm, 1995).

Parental substance use has been shown to negatively impact a wide range of adolescent outcomes, but especially to increase the risk for adolescent substance use (e.g. Wills, Schreiber, Benson, & Vaccaro, 1994; Fawzy, Coombs, & Gerber, 1983; Johnson, Shontz, & Locke, 1984; Miles et al., 1998; Kirisci, Vanyukov, & Tarter, 2005; Gfroerer, 1987; Li, Pentz, & Choi, 2002; Reinherz et al., 2000). Parental substance use in childhood and early adolescence has been shown to promote the development of drug abuse disorders in late adolescence (Reinherz et al., 2000). Moreover, parental substance use has been shown to negatively impact adolescent personality characteristics (Elkins, McGue, Malone, & Iacono, 2004). While many studies have found family transmission of substance use in general (Meller, Rinehard, Cardoret, & Troughton, 1988; Rounsaville et al., 1991; Gfroerer, 1987; Fawzy et al., 1983), the familial associations in marijuana use are consistently the most robust (Day, Goldschmidt, & Thomas, 2006; Gfroerer, 1987; Hopfer, Stallings, Hewitt, & Crowley, 2003; Li et al., 2002). Parental marijuana use affects not only adolescent marijuana use, but also it impacts other negative adolescent outcomes including adolescent smoking, alcohol use, and hard drug use (Li et al., 2002; Johnson et al., 1984).

Substance use among PWH may have an even greater impact on their children than does substance abuse in non-HIV infected parents. Having a parent with chronic illness increases a child's risk for emotional adjustment problems (see Romer, Barkmann, Schulte-Markwort, Thomalla, & Riedesser, 2002, for review). The impact of parental illness is likely to be greater when parents have a highly stigmatized condition such as HIV (Herek, Capitanio, & Widaman, 2002). Parents with HIV in the United States are predominantly single parents of African American or Latino descent (CDC, 2000; Schuster et al., 2000), members of subgroups that are already more likely to experience stigma and prejudice. Children of PWH live both with anticipatory fears about parental death, as well as the demands of fulfilling increased family responsibilities precipitated by parental illness (Rotheram-Borus, Weiss, Alber, & Lester, 2005; Stein, Rotheram-Borus, & Lester, 2007). Thus, the children of substance using PWH are expected to be particularly vulnerable to the negative impact of parental drug use over time.

We predict that for PWH, parental relapse into substance use will promote emotional distress among their adolescent children. Substance abuse has consistently been found to be associated with co-morbid mental health problems, indicating greater risk for emotional distress in substance-using PWH (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; McCloskey & Walker, 2000; Minkoff, 2001; Rounsaville, 2004). Substantial evidence suggests that there is a strong relationship between a parent's emotional distress and behavioral adjustment in their children (Rutter & Quinton, 1984; Beardslee, Bemporad, Keller, & Klerman, 1984; Rotheram-Borus, Lightfoot, & Shen, 1999; Steele, Forehand, & Armistead, 1997). Thus, we anticipated that adolescents of PWH who were actively using drugs would have higher levels of emotional distress than those youth whose parents were not using substances.

We also anticipated that for PWH, parental relapse into substance use will negatively impact the behaviors of their adolescent children. Because previous research has demonstrated that parental relapse may negatively affect the entire family system (e.g. Anderson & Henry,

1994; Kumpfer et al., 1996; Biederman et al., 2000; Pandina & Johnson, 1989; Rotunda et al., 1995) and because parental substance use has been clearly linked to adolescent substance use (Wills et al., 1994; Fawzy et al., 1983; Johnson et al., 1984; Miles et al., 1998; Kirisci et al., 2005; Gfroerer, 1987; Li et al., 2002; Reinherz et al., 2000), we expected that parental relapse into substance use would affect adolescent substance use over time. When exposed to parental substance use, adolescents may model their parent's risky behaviors, or, alternatively, adolescent perceptions of their parents' behaviors may serve as a release mechanism for the adolescent to engage in problem behaviors, such as peer conflict (Jessor, 1984). Previous studies have demonstrated that the adolescent children of alcohol abusing parents are more likely to have trouble with peers (Peiponen et al., 2006; Christensen & Bilenberg, 2000; Loukas et al., 2001). Thus, we predicted that parental relapse into substance use will promote trouble with peers among the adolescent children of PWH.

In this study, we utilize paired longitudinal parental and adolescent data over 5 years to examine the relationship between changing patterns of parental substance use and these key adolescent outcomes, providing a unique look at the changing impact of parental relapse among PWH. These data were collected as part of a randomized controlled trial of a family-based intervention for PWH and their adolescent children. Notably, in families randomized to the intervention, both parents and adolescents experienced reductions in emotional distress and problem behaviors over 2 years compared to those in the control group (Rotheram-Borus et al., 2001). Over 4 years, PWH relapsed into substance use significantly less often and adolescents became teenage parents themselves significantly less often in the intervention compared with the control condition (Rotheram-Borus et al., 2003). At the 6 year follow-up, adolescents were more likely to be employed, less likely to receive welfare, more likely to have a positive romantic relationship, less likely to use alcohol, and more likely to attempt to stop smoking (Rotheram-Borus, Lee, Lin, & Lester, 2004). Given the benefits previously associated with the intervention, we anticipated that the intervention might offer protection against the negative impact of parental substance abuse relapse on adolescent adjustment over time and we examined this relationship.

Method

Participants

From 1993 to 1995, financially needy persons diagnosed with AIDS were automatically referred to the Division of AIDS Services (DAS) in New York City (NYC). A log of 619 parents living with HIV (PWH) with at least one child aged 12 to 18 years old was created; 155 PWH died prior to potential recruitment into the study. In order to be eligible for the study, the PWH's case manager had to agree that it was in the PWH's clinical interest. Among the 464 PWH who lived through recruitment, there were 35 potential participants who were not referred by their case manager. With consent from the DAS case manager, the PWH's participation was solicited for this study. A total of 307 PWH were recruited with informed consent from among the 429 eligible parents (72%). Some PWH ($n = 25$) did not have custody of their children or the children refused to participate ($n = 8$) and were excluded from this analysis. A total of 412 adolescents were recruited from 274 PWH (average n per family = 1.5, $SD = 0.7$, range 1-5).

Interviews were conducted every 3 months for the first 2 years and every 6 months for the next 3 years ($n = 15$ potential assessments). Parents died over time and the follow-up rate was calculated by removing deceased parents; the number of parents who died was similar across intervention conditions. Because there were multiple assessments each year, at least one annual assessment was conducted at the following rates for years 1 to 5: (PWH: 88%, 94%, 98%, 92%, and 66%; adolescents: 88%, 91%, 91%, 88%, and 82%). When assessments were missed, families were re-contacted over time. The exact date of each follow-up interview was recorded and used in the current analysis. For inclusion in this analysis, the observations of parents and

adolescents were matched by linking assessment times. The parent interview had to occur with the 3 months before or up to 1 month after the date of the adolescent interview to be considered matched. There were 330 adolescents with at least one matching parent observation, and 220 parents with at least one matching adolescent observation.

For parents who died during the study, neither parent nor children contributed additional data 3 months after the final parent interview. All PWH interviews missing PWH substance use data were also omitted. A total of 2,034 observations were used in the analysis. The sample of PWH available for analysis varied over time: for the month 0 to 36 follow-up assessments, 131 to 178 PWH contributed data; for the month 42 to 54 assessments, from 61 to 110 PWH were monitored; and at the month 60 month assessment, there were 18 PWH. In total, 220 of the original 274 PWH and 330 of the 412 adolescents in the full study contributed to the analyses detailed in this report.

Intervention

The family based intervention focused on enhancing coping skills and was delivered over three modules using a manual and trained facilitators. Intervention sessions were held on Saturdays at a central location with two sessions each day. Lunch, childcare and transportation were provided. Module 1 was eight sessions for parents only and addressed making decisions about HIV disclosure, adjustment to HIV status, and parenting skills. Module 2 included twelve sessions for both parents and adolescents; the sessions focused on custody planning, reduction of risk acts, and parent-youth communication. Module 3 was eight sessions for bereaved youth and new caregivers after parental death. These sessions focused on grieving, setting life goals, and establishing a positive relationship with the guardian. The intervention manuals are available at <http://chipts.ucla.edu/interventions/manuals/index.html>.

Procedures

The PWH and their adolescent children were typically interviewed individually in their home in a 1.5 to 2 hour assessment. Similar to the participants, interviewers were predominantly African American or Latino (62%); about one-third were bilingual in Spanish and English. For the 3% of participants who spoke only Spanish, those assessments were conducted in Spanish. Interviewers were certified only after receiving training in ethics, confidentiality, child abuse, crisis protocols, HIV/AIDS, and conducting in-home assessments using laptop computers. Interviewer quality was assured by audio taping interviews and routinely monitoring randomly selected tapes (approximately 10%). PWH and adolescents each received \$25 per interview.

Measures: Outcomes

Adolescent emotional distress—These was examined using the Brief Symptom Inventory (BSI). The BSI is a 53-item measurement that assesses self reported symptoms of emotional distress, rated for the period of the previous week on a 0 (not at all) to 4 (extremely) Likert scale. With a global scale score (Cronbach's $\alpha = .96$), subscales are also calculated for anxiety ($\alpha = .77$) and depression ($\alpha = .79$). Normative data for adolescents are available (Derogatis & Melisaratos, 1983).

Adolescent problem behaviors—These were examined using three outcome measures: adolescent alcohol use, adolescent marijuana use, and trouble with peers. Alcohol and marijuana use were measured as the presence (1) or absence (0) of the use of the particular substance in the three months prior to a given interview. Hard drug use, which includes: amphetamines, inhalants, cocaine, crack, hallucinogens, heroin, and injected drugs was reported. Hard drug use was not analyzed due to low rates of use (2% at baseline). Trouble with peers was defined as having trouble with one or more classmates (1) or not reporting trouble (0) and assessed for adolescents attending school.

For the larger longitudinal study, a broad set of measures assessing parent and adolescent adjustment to parental HIV was collected. Only those measures used to test the study hypotheses are described here.

Parental Substance Use Relapse

Parental substance use—PWH self-reported substance use (marijuana and hard drugs) at baseline and for each 3 month assessment period. At each assessment, the prevalence and frequency of use were assessed for: 1) marijuana, and 2) hard drugs (amphetamines, inhalants, cocaine, crack, hallucinogens, heroin, and injected drugs). Non-prescription opioid analgesics, sedatives, crank, and speedball were included in the definition of hard drugs for follow-up assessments. We classified use of any substance other than alcohol or marijuana as hard drug use. For marijuana and hard drug use, three time-varying substance use variables were created. Overall, PWH were divided into two groups: *users* and *non-users*. Users were PWH who reported any marijuana use or hard drug use at any time during the study. Non-users reported no usage during the study. Users were further divided into two time-varying subcategories over time, either *active users* or *inactive users* depending on their current drug use. Thus, for each type of substance use, a relapse variable was categorized into three groups for each assessment point: *non-user*, *active user*, and *inactive user*.

Time-Invariant Covariates

1. *Adolescent gender*.
2. *Parent HIV status*. At baseline, parental HIV status was self-reported at recruitment as being HIV asymptomatic, HIV symptomatic, or having AIDS.
3. *Family intervention status*. After the baseline assessment, families were randomly assigned to the intervention condition (1) or the control condition (0) (see Rotheram-Borus et al., 2001 for 2 year outcomes; Rotheram-Borus et al., 2003 for four year outcomes; Rotheram-Borus et al., 2004 for outcomes over six years).
4. *Adolescent age*. This was also included as a time-varying covariate in all models.

Statistical Methods

Mixed-effect linear regression models (Weiss, 2005) were fit to continuous emotional distress outcomes and logistic regression models were fit for binary problem behavior outcomes. Because emotional distress outcomes were skewed with long right tails, a logarithmic transformation after adding a constant was performed which reduced the skewness. To successfully track changes in outcome measures, models included parameters to account for correlations between repeated observations over time. Continuous-outcome and binary-outcome models included a random intercept for each family since there were multiple children within some families; emotional distress outcome levels across time are allowed to shift higher or lower within a family. Continuous-outcome models for emotional distress measures included an autoregressive moving average (ARMA) covariance structure with three unknown parameters (1 variance and 2 correlation parameters) to account for repeated observations for each adolescent. This covariance structure had much higher data support than other covariance structures with similar numbers of parameters, including random intercept, random intercept and slope, and auto-regressive covariance structures. In an ARMA covariance structure, consecutive observations have correlation equal to ρ and observations with lag k have correlation equal to $\rho\gamma^{k-1}$. Binary-outcome models for problem behavior measures included an adolescent random intercept allowing problem behavior probabilities to be shifted higher or lower across repeated observations for a given child.

For both emotional distress and problem behavior models, covariates included time in months from baseline interview, parental relapse status for marijuana and hard drugs, and demographic and other adjustment measures. For continuous-outcome models we allowed for changes in the population slope at 18 and 36 months after baseline interview. A more curvilinear response pattern over time can be modeled. For example, emotional distress may increase more rapidly during the first 18 months and increase more gradually thereafter.

All multivariate analyses include parental relapse covariates and are adjusted for background characteristics, including adolescent age, gender, parent HIV status, and family intervention status. All longitudinal models were fit in SAS Proc Mixed (SAS Institute Inc., Cary, NC) for continuous outcomes and the SAS Glimmix macro for discrete outcomes.

Results

Sample

Parental and adolescent characteristics at the time of recruitment are shown in Table 1. Most PWH were mothers (82%) with a mean age of 37 years. Overall, the parents were aged 25 to 70 ($M = 38$; $SD = 6$). Most parents were African-American (34%) or Latino (47%); 19% were White or of other ethnicities. While an AIDS diagnosis was the criteria for being admitted to the Division of AIDS Services, only 20% of parents reported having AIDS at baseline, 45% were symptomatic for HIV, and 35% were asymptomatic for HIV. Almost half of parents (42%; $n = 93$) of parents died over 5 years. Half of the PWH were in the intervention ($n = 110$) and half were in the control condition ($n = 110$), indicating little selection bias in which participants were eligible for inclusion in the analyses.

Regarding substance use, about half of the parents did not use any hard drugs over the entire 5-year follow-up period (59%; $n = 129$). Figure 1 graphically presents parental hard drug use patterns over time. Figure 2 shows reported alcohol, marijuana, and hard drug use at the time of recruitment. There were no differences in the sociodemographic profiles of the parents who ever used hard drugs and those who did not, except that drug use was higher among participants above the BSI clinical cutoff at recruitment (46%) versus participants below the BSI cutoff (32%; Chi-square = 3.92, $df = 1$, $p = .05$). Parental relapse into hard drug use over time was unrelated to parental HIV status.

At baseline, about half the adolescents were male (47%; $n = 162$) and half were female (53%; $n = 183$), with a mean age of 15.2 years. Similar to their parents, youth ethnicity was predominantly either African-American (36%; $n = 125$) or Latino (52%; $n = 178$); only 3% were white, non-Latino. At baseline, the mean BSI was 0.6 ($SD = 0.6$), a score in the normative range for adolescents (Derogatis & Melisaratos, 1983). Problem behaviors varied considerably at baseline. Similar to their parents, about half were in the intervention condition (51%; $n = 175$) and control condition (49%; $n = 170$).

Emotional Distress

Results from the mixed effect regressions of parental relapse on adolescent emotional distress are shown in Table 2. Some socio-demographic differences in emotional distress were present. Adolescent females reported higher levels anxiety, depression, and overall distress ($t = 4.71$ to 5.55 , $df = 1976$, all $p < .01$). Moreover, older adolescents reported higher levels of depression than did younger adolescents ($t = 2.64$, $df = 1976$, $p < .01$).

Parental HIV disease status at baseline was associated with overall distress ($F = 3.95$, $df = 2$, 1976 , $p = .02$). Adolescents of parents who were HIV symptomatic ($t = 2.43$, $df = 1976$, $p = .02$) or had been diagnosed with AIDS ($t = 2.67$, $df = 1976$, $p < .01$) at baseline reported higher

overall distress levels compared to adolescents of parents who were HIV asymptomatic at baseline.

Over time, parental relapse into substance use had an impact on adolescent emotional distress. Overall, parental drug relapse showed a trend towards being associated with adolescent anxiety ($F = 2.52$, $df = 2$, 1976, $p = .08$) and adolescent depression ($F = 2.42$, $df = 2$, 1976, $p = .09$). Adolescents reported higher levels of global emotional distress ($t = 1.99$, $df = 1976$, $p = .05$), anxiety ($t = 2.19$, $df = 1976$, $p = .03$) and depression ($t = 2.14$, $df = 1976$, $p = .03$) when parents had been actively using versus inactively using parents.

Problem Behaviors

Results from the mixed effect regressions of parental relapse on adolescent problem behaviors (alcohol use, marijuana use, and trouble with peers) are shown in Table 3. Socio-demographic correlates had some impact on adolescent problem behaviors. Adolescent females had lower odds of marijuana use ($OR = .42$, 95% $CI = .23$ to $.79$, $p < .01$) compared to adolescent males. Older adolescents had greater odds of alcohol use ($OR = 1.30$, 95% $CI = 1.19$ to 1.43 , $p < .01$) compared to younger adolescents

Significant independent effects of parental relapse on adolescent problem behaviors emerged. Parental marijuana use was associated with adolescent marijuana use ($F = 4.44$, $df = 2$, 1862, $p = .01$). Adolescents had greater odds of marijuana use when they had active use parents versus inactive use parents ($OR = 1.65$, 95% $CI = 1.07$ to 2.54 , $p = .02$) or parents who were non-users ($OR = 2.67$, 95% $CI = 1.26$ to 5.62 , $p = .01$). Moreover, parental drug use was significantly associated with adolescent trouble with peers ($F = 9.22$, $df = 2$, 1089, $p < .01$). Adolescents had greater odds of trouble with peers when they had active use parents ($OR = 3.03$, 95% $CI = 1.68$ to 5.49 , $p < .01$) or non-use parents ($OR = 3.01$, 95% $CI = 1.66$ to 5.45 , $p < .01$) versus inactive use parents.

Discussion

Parental substance use has long been regarded as a significant stressor on children with a substantial negative impact on children's emotional adjustment and risk behaviors (Brook et al., 1996; Stein et al., 1993; Lynskey, Fergusson, & Horwood, 1994). By examining linked behaviors of parents and children over 5 years, this study provides information on specific impact of a parent's active substance use relative to periods of parental abstinence from marijuana and/or hard drugs.

Despite the expectation that they would be at high risk for behavioral problems and emotional adjustment, adolescents of PWH appear to have similar rates of substance use compared to reports of other low income African-American and Latino youth in NYC (Goodman & Cohall, 1989). In a national survey of adolescents, 48.3% of Americans aged 12 years or older reported being current users of alcohol in the past month (Substance Abuse and Mental Health Services Administration, 2002). In comparison, only about one quarter of adolescents of PWH reported recent alcohol use over the last three months at baseline. Overall, adolescents of PWH also report levels of emotional distress comparable to normative adolescent samples (Derogatis & Melisaratos, 1983).

Parental relapse into substance use did negatively impact adolescent emotional distress. Adolescents whose parents relapsed into active substance use were more distressed than youth whose parents were abstinent substance abusers over time. These results pertained to parental hard drug use, not marijuana use, for which parental relapse activities did not demonstrate a higher risk for teen emotional distress

In addition, parental relapse into substance use also increased the risk for problem behaviors in their adolescent offspring. In this case, both relapse into marijuana use as well as relapse into hard drug use negatively affected adolescents. The direct impact of parental substance use may reflect the impact of modeling in the home. In particular, an aggregation of intergenerational marijuana use among adolescents and their parents has been observed previously (e.g. Gfroerer, 1987; Li et al., 2002; Hopfer et al., 2003; Day et al., 2006). Parental relapse into hard drug use appears to have a wider impact, with a negative influence on teen peer relationships as well. As has been found in studies of adolescents of alcohol abusing parents (Peiponen et al., 2006; Christensen & Bilenberg, 2000; Loukas et al., 2001), PWH relapse into hard drug use had repercussions for their teens that extended beyond the confines of the household.

An important finding of this study is that emotional distress and problem behaviors in youth of PWH with a history of hard drug use, but who are not actively using hard drugs, appear similar to adolescents of parents who have never used hard drugs. Over time, the adolescents of inactive using parents were not more emotionally distressed nor engaged in more problem behaviors than those adolescents who had non-using parents for the duration of the five year period. The only exception to this trend was the enduring negative impact of parental hard drug use on trouble with peers. The general pattern, however, clearly demonstrated that reductions in parental substance (both marijuana and hard drugs) positively impacted adolescent emotional functioning and substance use. Active substance abuse may interfere with several key parenting domains, including emotional responsiveness, appropriate monitoring and maintaining stable routines (Rutter & Quinton, 1984; Beardslee et al., 1984; Rotheram-Borus et al., 1999; Steele et al., 1997). These results highlight the importance of continually striving to reduce parental substance use, even during adolescence, as children's emotional adjustment is likely to improve if their parents stop using hard drugs, and are particularly important given the increased rates of relapse over time for those parents living with HIV/AIDS. These findings also underscore the important role for preventative interventions for substance using PWH and their families in improving functioning across a second generation.

The design of this study is both a major strength and weakness. The sample was representative of families living with HIV in NYC, and NYC represents 30% of the families living with AIDS in the United States (CDC, 1994). PWH were predominantly low-income African Americans or Latinas who had significant histories of substance abuse, particularly injection drug use. The sample was retained and repeatedly assessed over 5 years, a relatively long period. Repeated assessments are likely to have a reactive effect (e.g., National Institute of Mental Health Multi-site HIV Prevention Trial Group, 1998), minimizing the negative impact of parental substance use that might have been observed. In addition, 43% of the parents in the study sample died over this period, resulting in the exclusion of observations after that point (Lee & Rotheram-Borus, 2001). Because of missing parent data, we have probably underestimated the rates of drug-using parents during the study period, which is likely to have made the groups more similar in our analysis than they should be. Further longitudinal research should be undertaken to clarify the impact of parental substance use and relapse on adolescent adjustment over time, as well as to determine risk and resiliency factors that may influence different domains of functioning and guide preventive interventions for high risk families and youth.

References

- Anderson AR, Henry CS. Family system characteristics and parental behaviors as predictors of adolescent substance use. *Adolescence* 1994;29(114):405–20. [PubMed: 8085491]
- Beardslee WR, Bemporad J, Keller MB, Klerman GL. Children of parents with major affective disorder: A review. *Annual Progress in Child Psychiatry & Child Development* 1984:390–404.

- Biederman J, Faraone S, Wozniak J, Monuteaux MC. Parsing the association between bipolar, conduct, and substance use disorders: A familial risk analysis. *Biological Psychiatry* 2000;48(11):1037–1044. [PubMed: 11094136]
- Boyd SJ, Plemons BW, Schwartz RP, Johnson JL, Pickens RW. The relationship between parental history and substance use severity in drug treatment patients. *American Journal of Addiction* 1999;8(1):15–23.
- Brook JS, Tseng LJ, Cohen P. Toddler adjustment: impact of parents' drug use, personality, and parent-child relations. *Journal of Genetics and Psychology* 1996;157(3):281–95.
- Centers for Disease Control and Prevention. HIV/AIDS Surveillance Report. Vol. 6. Atlanta, GA: U.S. Department of Health and Human Services; 1994 Jun.
- Centers for Disease Control and Prevention. HIV/AIDS Surveillance Report: US HIV and AIDS cases reported through December 1999. Atlanta, GA: Author; 2000.
- Christensen HB, Bilenberg N. Behavioural and emotional problems in children of alcoholic mothers and fathers. *European Child & Adolescent Psychiatry* 2000;9:219–226. [PubMed: 11095045]
- Day N, Goldschmidt L, Thomas C. Prenatal marijuana exposure contributes to the prediction of marijuana use at age 14. *Addiction* 2006;101:1313–1322. [PubMed: 16911731]
- Derogatis LR, Melisaratos N. The Brief Symptom Inventory: An introductory report. *Psychological Medicine* 1983;13(3):595–605. [PubMed: 6622612]
- Elkins I, McGue M, Malone S, Iacono W. The effect of parental alcohol and drug disorders on adolescent personality. *American Journal of Psychiatry* 2004;161(4):670–676. [PubMed: 15056513]
- Eron JJ, Benoit SL, Jemsek J, MacArthur RD, Santana J, Quinn JB, et al. Treatment with lamivudine, zidovudine, or both in HIV-positive patients with 200 to 500 CD4+ cells per cubic millimeter. North American HIV Working Party. *New England Journal of Medicine* 1995;333(25):1662–9. [PubMed: 7477218]
- Fawzy F, Coombs R, Gerber B. Generational continuity in the use of substances: The impact of parental substance use on adolescent substance use. *Addictive Behavior* 1983;8(2):109–114.
- Gfroerer J. Correlation between drug use by teenagers and drug use by older family members. *American Journal of Drug Alcohol Abuse* 1987;13(12):95–108.
- Glynn, MK.; Rhodes, P. Estimated HIV prevalence in the United States at the end of 2003 [Abstract T1-B1101]. Presented at the 2005 National HIV Prevention Conference; Atlanta, Georgia. 2005 Jun.
- Goodman E, Cohall AT. Acquired immunodeficiency syndrome and adolescents: knowledge, attitudes, beliefs, and behaviors in a New York City adolescent minority population. *Pediatrics* 1989;84(1):36–42. [PubMed: 2740176]
- Herek GM, Capitanio JP, Widaman KF. HIV-related stigma and knowledge in the United States: Prevalence and trends, 1991-1999. *American Journal of Public Health* 2002;92(3):371–7. [PubMed: 11867313]
- Hopfer C, Stallings M, Hewitt J, Crowley T. Family transmission of marijuana use, abuse, and dependence. *Journal of American Academy of Child & Adolescent Psychiatry* 2003;42(7):834–841.
- Jessor, R. Adolescent development and behavioral health. In: Matarazzo, JD.; Perry, CL., editors. *Behavioral health: A handbook of health enhancement and disease prevention*. New York: Wiley; 1984. p. 69-90.
- Johnson JL, Leff M. Children of substance abusers: Overview of research findings. *Pediatrics* 1999;103(5 Pt 2):1085–99. [PubMed: 10224196]
- Johnson G, Shontz F, Locke T. Relationships between adolescent drug use and parental drug behaviors. *Adolescence* 1984;19(74):295–299. [PubMed: 6331712]
- Kandel DB. Parenting styles, drug use, and children's adjustment in families of young adults. *Journal of Marriage & the Family* 1990;52(1):183–196.
- Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB. Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry* 1995;52(12):1048–60. [PubMed: 7492257]
- Kinloch-de Loes S, Perrin L. Therapeutic interventions in primary HIV infection. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology* 1995;10(Suppl 1):S69–76. [PubMed: 8595514]

- Kirisci L, Dunn MG, Mezzich AC, Tarter RE. Impact of parental substance use disorder and child neglect severity on substance use involvement in male offspring. *Prevention Science* 2001;2(4):241–55. [PubMed: 11833927]
- Kirisci L, Vanyukov M, Tarter R. Detection of youth at high risk for substance use disorders: A longitudinal study. *Psychology of Addictive Behaviors* 2005;19(3):243–252. [PubMed: 16187802]
- Kumpfer, KL.; Molgaard, V.; Spoth, R. The Strengthening Families Program for the prevention of delinquency and drug use. In: Peters, RD.; McMahon, RJ., editors. *Preventing childhood disorders, substance abuse, and delinquency*. Thousand Oaks, CA: Sage Publications, Inc.; 1996. p. 241–267.
- Lee M, Rotheram-Borus MJ. Challenges associated with increased survival among parents living with HIV. *American Journal of Public Health* 2001;91(8):1303–9. [PubMed: 11499123]
- Li C, Pentz M, Choi C. Parental substance use as a modifier of adolescent substance use risk. *Addiction* 2002;97:1537–1550. [PubMed: 12472638]
- Loukas A, Fitzgerald H, Zucker R, von Eye A. Parental alcoholism and co-occurring antisocial behavior: Prospective relationships to externalizing behavior problems in their young sons. *Journal of Abnormal Child Psychology* 2001;29(2):91–106. [PubMed: 11321632]
- Lynskey MT, Fergusson DM, Horwood LJ. The effect of parental alcohol problems on rates of adolescent psychiatric disorders. *Addiction* 1994;89(10):1277–86. [PubMed: 7804088]
- McCloskey LA, Walker M. Posttraumatic stress in children exposed to family violence and single-event trauma. *Journal of the American Academy of Child and Adolescent Psychiatry* 2000;39(1):108–15. [PubMed: 10638074]
- Meller WH, Rinehard R, Cardoret RJ, Troughton E. Specific familial transmission in substance abuse. *International Journal of Addiction* 1988;23(10):1029–1039.
- Miles D, Stallings M, Young S, Hewitt J, Crowley T, Fulkner D. A family history and direct interview study of the familial aggregation of substance abuse: The adolescent substance abuse study. *Drug and Alcohol Dependence* 1998;49:105–114. [PubMed: 9543647]
- Minkoff K. Developing standards of care for individuals with co-occurring psychiatric and substance use disorders. *Psychiatric Services* 2001;52(5):597–9. [PubMed: 11331791]
- Moss HB, Majumder PP, Vanyukov M. Familial resemblance for psychoactive substance use disorders: Behavioral profile of high risk boys. *Addictive Behaviors* 1994;19(2):199–208. [PubMed: 8036966]
- National Institute of Mental Health (NIMH) Multisite HIV Prevention Trial Group. The NIMH Multisite HIV Prevention Trial: Reducing HIV Sexual Risk Behavior. *Science* 1998;280:1889–1894. [PubMed: 9632382]
- Pandina RJ, Johnson V. Familial drinking history as a predictor of alcohol and drug consumption among adolescent children. *Journal of Studies on Alcohol* 1989;50(3):245–253. [PubMed: 2724972]
- Peiponen S, Laukkanen E, Korhonen V, Hintikka U, Lehtonen J. The association of parental alcohol abuse and depression with severe emotional and behavioural problems in adolescents: A clinical study. *International Journal of Social Psychiatry* 2006;52(5):395–407. [PubMed: 17278341]
- Reinherz H, Giaconia R, Hauf A, Carmola B, Wasserman M, Paradis A. General and specific factors for depression and drug disorders by early adulthood. *Journal of the American Academy of Child & Adolescent Psychiatry* 2000;39(2):223–231. [PubMed: 10673834]
- Romer G, Barkmann C, Schulte-Markwort M, Thomalla G, Riedesser P. Children of somatically ill parents: A methodological review. *Clinical Child Psychology and Psychiatry* 2002;7(1):17–38.
- Rotheram-Borus MJ, Lee MB, Gwadz M, Draimin B. An intervention for parents with AIDS and their adolescent children. *American Journal of Public Health* 2001;91(8):1294–302. [PubMed: 11499122]
- Rotheram-Borus MJ, Lee M, Leonard N, Lin YY, Franzke L, Turner E, et al. Four-year behavioral outcomes of an intervention for parents living with HIV and their adolescent children. *AIDS* 2003;17(8):1217–25. [PubMed: 12819524]
- Rotheram-Borus MJ, Lee M, Lin YY, Lester P. Six-year intervention outcomes for adolescent children of parents with the human immunodeficiency virus. *Archives of Pediatrics and Adolescent Medicine* 2004;158(8):742–8. [PubMed: 15289245]
- Rotheram-Borus MJ, Lightfoot M, Shen H. Levels of emotional distress among parents living with AIDS and their adolescent children. *AIDS and Behavior* 1999;3(4):367–372.

- Rotheram-Borus MJ, Weiss R, Alber S, Lester P. Adolescent adjustment before and after HIV-related parental death. *Journal of Consulting and Clinical Psychology* 2005;73(2):221–8. [PubMed: 15796629]
- Rotunda RJ, Scherer DG, Imm PS. Family systems and alcohol misuse: Research on the effects of alcoholism on family functioning and effective family interventions. *Professional Psychology: Research and Practice* 1995;26(1):95–104.
- Rounsaville BJ. Treatment of cocaine dependence and depression. *Biological Psychiatry* 2004;56(10):803–9. [PubMed: 15556126]
- Rounsaville BJ, Kosten TR, Weissman MM, Prusoff B, Pauls D, Anton SF, et al. Psychiatric disorders in relatives of probands with opiate addiction. *Archives of General Psychiatry* 1991;48(1):33–42. [PubMed: 1984760]
- Rutter M, Quinton D. Parental psychiatric disorder: Effects on children. *Psychological Medicine* 1984;14(4):853–880. [PubMed: 6545419]
- Schuster MA, Kanouse DE, Morton SC, Bozzette SA, Miu A, Scott GB, et al. HIV-infected parents and their children in the United States. *American Journal of Public Health* 2000;90(7):1074–81. [PubMed: 10897185]
- Steele RG, Forehand R, Armistead L. The role of family processes and coping strategies in the relationship between parental chronic illness and childhood internalizing problems. *Journal of Abnormal Child Psychology* 1997;25(2):83–94. [PubMed: 9109025]
- Stein J, Newcomb MD, Bentler PM. Differential effects of parent and grandparent drug use on behavior problems of male and female children. *Developmental Psychology* 1993;29(1):31–43.
- Stein JA, Rotheram-Borus MJ, Lester P. Impact of parentification on long-term outcomes among children of parents with HIV/AIDS. *Family Process* 2007;46:317–333. [PubMed: 17899856]
- Substance Abuse and Mental Health Services Administration. Summary of Findings from the 2001 National Household Survey on Drug Abuse: Volume II Technical Appendices and Selected Data Tables. Rockville MD: Department of Health and Human Services; 2002. Office of Applied Studies, NHSDA Series H-18, DHHS Publication No. SMA 02-3759
- Weiss, R. Modeling longitudinal data. New York: Springer; 2005.
- Wills T, Schreibman D, Benson G, Vaccaro D. Impact of parental substance use on adolescents: A test of a mediational model. *Journal of Pediatric Psychology* 1994;19(5):537–556. [PubMed: 7807289]

Figure 1.
PWH use of hard drugs over 5 years.

Figure 2.
Substance use of PWH over their lifetime and recently (past 3 months) at the time of recruitment.

Table 1

Descriptive statistics for PWH and adolescents at time of recruitment.

Parents		N=220
		% (n)
Race		
Black		34% (74)
Latino		47% (103)
White		9% (20)
Other/don't know		10% (23)
Gender		
Female		82% (181)
Male		18% (39)
Mean age (SD)		37.9 (5.9)
Diagnosis		
Diagnosed with AIDS		20% (45)
Symptomatic		45% (100)
Asymptomatic		34% (75)
PLH died		
No		58% (127)
Yes		42% (93)
Mean time in years until death (SD)		2.4 (1.6)
BSI Global Symptom Index *		
Mean (SD)		1.0 (.7)
>= Clinical cutoff		67% (148)
< Clinical cutoff		33% (72)
Treatment		
Control		50% (111)
Intervention		50% (109)
Adolescents		N=329
		% (n)
Race		
Black		36% (119)
Latino		52% (170)
White		2% (8)
Other/don't know		10% (32)
Gender		
Female		53% (173)
Male		47% (156)
Mean age (SD)		15.3 (2.1)
Treatment		
Control		51% (167)

Parents		N=220
		% (<i>n</i>)
Intervention		49% (162)
Outcomes		
Mean BSI (SD)		
GSI		.5 (.6)
Anxiety		.4 (.6)
Depression		.5 (.7)
MPB, percent 'Yes'		
Alcohol use		23% (74)
Marijuana use		20% (64)
Trouble with peers ^a		15% (34)

^a N=221; Only assessed if adolescent was in school.

Table 2

Parameter estimates (B) and standard errors (SE) for predictors of adolescent emotional distress.

	Overall Distress (GSI)		Anxiety		Depression	
	B	SE	B	SE	B	SE
Marijuana						
IU - N	.25	.22	.20	.12	.12	.14
AU - N	.18	.23	.08	.13	.15	.14
AU - IU	-.07	.16	-.12	.10	.04	.10
Hard Drugs						
IU - N	.06	.20	-.07	.11	.10	.12
AU - N	.36	.22	.14	.12	.31	.13*
AU - IU	.30	.14*	.21	.09*	.21	.09*
Age	.06	.04	.02	.02	.07	.02**
Female vs. male gender	.68	.16**	.37	.09**	.49	.10**
Disease status						
Symptomatic vs. asymp.	.63	.25*	.15	.14	.20	.15
AIDS vs. asymptomatic	.70	.26**	.23	.14	.28	.16
Intervention versus control	.01	.19	.02	.10	.00	.11

*
p < .05;
**
p < .01

Note: N = Non-User; IU = Inactive User; AU = Active User.

Table 3

Adolescent Problem Behavior: Odds ratios (OR) and 95% confidence intervals (CI) from random effect logistic models fit to peer problem behavior outcomes.

	Adolescent Alcohol Use		Adolescent Marijuana Use		Trouble with Peers	
	OR	95% CI	OR	95% CI	OR	95% CI
Marijuana						
IU - N	1.75	(1.02, 3.01) *	1.80	(.84, 3.87)	1.81	(1.02, 3.23) *
AU - N	1.40	(.79, 2.50)	4.03	(1.85, 8.76) **	1.49	(.79, 2.82)
AU - IU	.80	(.51, 1.25)	2.24	(1.35, 3.69) **	.82	(.47, 1.45)
Drug						
IU - N	1.00	(1.00, 1.00)				
	1.19	(.73, 1.94)	1.51	(.75, 3.03)	.38	(.22, .66) **
AU - N	1.07	(.60, 1.89)	.96	(.45, 2.07)	1.30	(.72, 2.35)
AU - IU	.90	(.59, 1.38)	.64	(.40, 1.01)	3.47	(1.99, 6.03) **
Age	1.35	(1.13, 1.60) **	.83	(.66, 1.04)	1.16	(.89, 1.50)
Female vs. male	.76	(.48, 1.20)	.41	(.21, .79) **	1.26	(.78, 2.03)
Disease status						
Symp. vs. asymp.	1.42	(.76, 2.66)	1.84	(.74, 4.62)	1.38	(.70, 2.71)
AIDS vs. asymp.	1.28	(.67, 2.44)	1.69	(.65, 4.36)	1.56	(.79, 3.09)
Intervention vs. control	.63	(.40, 1.00) *	.65	(.33, 1.27)	1.47	(.90, 2.39)

*
p < .05;

**
p < .01

Note: N = Non-User; IU = Inactive User; AU = Active User.