

Does Early Intervention Prevent Health-Risking Sexual Behaviors Related to HIV/AIDS?

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Adolescence and young adulthood are developmental stages full of social and economic opportunities and challenges, as young people learn about themselves and experiment with adult behaviors and roles. Unfortunately for many in these age groups, involvement with drugs and associated health-risking sexual behaviors (HRSB) becomes part of these important life transitions, interrupting the course of healthy development. For decades, families, schools, and communities have struggled to find the best ways to raise adolescents and support young adults toward happy, healthy, and productive lives. The National Institutes of Health (NIH) has also attended to this important public health issue through funding research dedicated to understanding the role of malleable risk and protective factors for drug use, abuse, and co-occurring mental, emotional, and behavioral (MEB) disorders and using that knowledge for research devoted to the testing of associated prevention intervention strategies. The results of these latter efforts have demonstrated that theory- and etiologically based interventions delivered in childhood can delay or prevent the onset of MEB disorders, including drug abuse and associated HRSB, among adolescents and young adults (National Research Council and Institute of Medicine 2009).

NIH funding has benefited the field of prevention science leading to tremendous gains in biopsychosocial behavioral research over the past 30 years. This Supplemental Issue of *Prevention Science* presents research supported through the Prevention Research Branch (PRB) at the National Institute on Drug Abuse (NIDA) from its portfolio of theory-based, developmentally grounded prevention interventions. This portfolio covers the lifespan from the prenatal period through

adulthood with interventions for universal, selective, and indicated levels of risk. The testing and replication of early childhood mental health and drug abuse prevention interventions have led to a growing body of long-term follow-up studies that examines differences in life-course outcomes of intervention and control group participants over time, some into late adolescence and adulthood. Evidence from this body of work indicates that (1) it is possible to intervene early in development on proximal risk and protective factors to have an impact on a broad array of distal outcomes; (2) interventions can have effects, some of which are unanticipated positive effects on outcomes not specifically targeted by the intervention; and (3) those at greatest risk can benefit the most from prevention interventions.

Background and Significance

According to the Centers for Disease Control and Prevention (CDC), ethnic/minority adolescent and young adult populations are at increased risk for HIV/AIDS, with African-Americans the most disproportionately affected (CDC 2008). In addition, CDC reports that the attributed cause for the majority of existing HIV/AIDS cases among adolescents and young adults differs by gender; for males, the major cause is male-to-male sexual contact, whereas for females, it is heterosexual contact (CDC 2008). Young African-American men who have sex with men are, in particular, at increased risk for HIV infection. Injection drug use also plays a role, accounting for 7 % of cases among males and 13 % of females at ages 20 to 24 years. However, drug use of any kind is an important risk factor for HIV infection for several reasons (Rotheram-Borus et al. 2000). First, drug use impairs decision making and contributes to loss of inhibitory control (Langer and Tubman 1997). Second, some drug users engage in sexual activities for the purpose of procuring drugs (Edwards et al.

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2006); however, very little is known about these practices. Third, sexual minority youth (e.g., lesbian, gay, bisexual, transgender (LGBT)) are more likely than heterosexual youth to have co-occurring drug abuse and psychosocial health problems, both of which are associated with sexual activity while under the influence of drugs (Herrick et al. 2011; Marshal et al. 2009). Finally, there are subgroups of very high-risk youth who use multiple drugs, intentionally use drugs before and during sexual activity, and engage in unprotected sex with known HIV-positive or unknown serostatus partners. These data clearly point to the need to gain a better understanding of the effects of behavioral prevention interventions on subsequent HRSB among adolescents and young adults.

The purpose of this Supplemental Issue is to expand the knowledge base on HRSB through examining the long-term effects of prevention interventions delivered early in life on outcomes in adolescence or young adulthood. Thus, the questions that inspired this supplement are the following: (1) Do drug abuse prevention interventions delivered in childhood have unintended positive effects on HRSB related to HIV/AIDS in adolescence and young adulthood? (2) If so, what is the nature of the effect (e.g., direct, indirect effect), for whom (gender, race) and under what conditions (e.g., level of risk and level of intervention)? (3) What are the mechanisms of effect of these early childhood interventions on proximal and distal mediators that protect adolescents and young adults at risk for HRSB from HIV/AIDS? The answers to these questions will help to determine whether intervening early in life on proximal and distal mediators for drug abuse is an important intervention strategy for the prevention of acquisition and transmission of HIV infection. These answers will also improve our understanding of the role of drug abuse prevention in the etiology of HIV-related HRSB. In sum, this Supplemental Issue seeks to determine whether there is sufficient support to conclude that drug abuse prevention interventions delivered during childhood do prevent HIV-related HRSB and for which populations, at what ages and at what levels of intervention. Finally, this Supplemental Issue will elucidate the next steps for research in this area. It is noted that the ability to ask these questions is serendipitous. None of these studies was conceived as a longitudinal study lasting into the adult years or as an intervention to prevent HRSB. Thus, it is fortuitous that these investigator-initiated longitudinal follow-up studies of prevention interventions were able to be funded and that the research scientists were able to engage participants over long periods.

To answer these questions, researchers associated with six prevention intervention trials delivered in childhood and that had long-term follow-up data related to HRSB for young people between the ages of 18 and 30 years were invited to submit papers. The studies varied as to stage of development when the intervention was administered (elementary through

middle school), level of intervention (e.g., universal, selective, tiered), intervention modality (e.g., parent training, child skills development, classroom management, as well as single versus combined modalities), geographic area (urban, rural), ethnicity of the sample (Caucasian, African-American, other), and age at follow-up. This Supplemental Issue provides an unprecedented collection of papers utilizing a biopsychosocial approach to development for examining whether and how prevention interventions delivered in childhood can interrupt negative trajectories toward HRSB.

Risk behaviors for negative health and behavioral outcomes (e.g., aggression, substance use and abuse, delinquency, precocious sexuality, unwanted pregnancy, intimate partner violence, and HRSB) tend to co-occur in childhood, adolescence, and adulthood (Bailey 2009; Ellickson et al. 2009). These negative behavioral outcomes share common antecedents and risk and protective factors (Bogart et al. 2006; Jessor and Jessor 1977). As noted by Ellickson and colleagues (2009), “Drug prevention programs that reduce substance use may also reduce the likelihood of engaging in risky sex because: (1) the two behaviors are linked via common predisposing factors; or (2) reducing drugs also reduces the likelihood of exposure to additional risk factors such as having sex while judgment is impaired, being in settings that encourage risky sexual behavior or being with deviant peers who facilitate such behavior” (pp. 111–112).

Overview of the Supplemental Issue

The six articles included in this Supplemental Issue focus on different prevention interventions delivered prior to the onset of adolescence. The following section provides a brief description of the interventions.

The Good Behavior Game (GBG; Kellam and Rebok 1992) is grounded in the life course/social field theory. This universal prevention intervention was delivered in Baltimore City public schools during the first and second grade by teachers trained in classroom behavior management. The intent of the program is to socialize children to the student role, thereby reducing aggressive, disruptive behaviors, which are confirmed antecedents of externalizing problem outcomes. This randomized controlled trial (RCT) followed these first- and second-grade children throughout childhood into adulthood; the data presented here are for participants at ages 19 to 21 years (Kellam et al. 2013).

The Seattle Social Development Project (SSDP; Hawkins et al. 1999) is a universal prevention intervention guided theoretically by the social development model. This intervention is delivered in elementary schools and focuses on classroom management and instruction, children’s social competence, and parenting practices. This nonrandomized controlled trial has three intervention conditions: a full intervention

group (grades 1 through 6); a late intervention group (grades 5 and 6 only); and a no-treatment control group. Participants were followed to age 30, 18 years after the intervention ended (Hill et al. 2013). Intervention targets include developing a prosocial family environment, bonding to school, reduction in antisocial peer affiliation, and prevention of drug use initiation.

Fast Track (Conduct Problems Prevention Research Group 1992, 2000) is based on the developmental pathway model associated with early starting conduct problems. This multicomponent prevention intervention targets children entering elementary school who show high rates of aggressive-disruptive behaviors, a known risk factor for antisocial behavior. In this RCT, aggressive-disruptive kindergarten children were followed into adulthood, with half exposed to the Fast Track multicomponent preventive intervention, which was implemented in grades 1 through 10 (Conduct Problems Prevention Research Group 2013). The data presented here are for participants through age 18.

The next study (Spath et al. 2013) reports on results from two universal, family-based prevention interventions, the Iowa Strengthening Families Program (ISFP; Spoth et al. 1998), and the Preparing for the Drug Free Years (PDFY; Kosterman et al. 1997) program. ISFP is based on the biopsychosocial vulnerability model, a resiliency model, and a family process model, and the PDFY program is based on the social development model. Both are interventions administered through RCTs involving sixth-grade students and their families enrolled in rural Midwestern schools. The study had three conditions (ISFP, PDFY, and control group); participants were followed through age 21 years.

The Family Check-Up (FCU; Dishion and Kavanagh 2003) uses a general intervention framework referred to as an Ecological Approach to Family Intervention and Treatment (EcoFIT), which acknowledges the influences of a child's immediate environment. This family-based prevention program links universal, selected, and indicated family interventions that titrates the intervention intensity to the needs and motivation of the family. Children and their families were randomly assigned to this gated, multilevel intervention in sixth grade and were followed into young adulthood (age 22 years) (Caruthers et al. 2013). The focus of the intervention was improving family relationship quality and parental monitoring.

The Focus on Families (FOF; Catalano et al. 1999) program is a selective prevention intervention family-based program for parents in methadone treatment; it is based on the social development model and combines relapse prevention and parenting and child skills training with home-based case management services. This study is a RCT that included 3- to 14-year-old children whose parents were enrolled in methadone treatment. Participants were interviewed 12 years later,

when they ranged in age from 15 to 29 years (Skinner et al. 2013).

Following the research articles, four scientists provide three commentaries for this special issue: (1) Dr. Deborah Capaldi, (2) Drs. Gilbert Botvin and Kenneth Griffin, and (3) Dr. Richard Jenkins. Dr. Capaldi is a Research Scientist at the Oregon Social Learning Center. Her work brings an etiological perspective as it examines the causes and consequences of conduct problem behaviors and associated health risk, including HRSB, across the life span from early childhood to midlife (Capaldi 2013). Dr. Botvin is Professor Emeritus of Psychology in Public Health, Department of Public Health, Weill Cornell Medical College, Cornell University, and the developer of the Life Skills Training program. Dr. Botvin is an internationally known expert in the field of drug abuse prevention. He provides comments based on his extensive knowledge of drug abuse prevention. Dr. Kenneth Griffin is a Professor of Public Health in the Division of Prevention and Health Behavior in the Department of Public Health at Weill Medical College of Cornell University. His research interests focus on the etiology and prevention of substance use and HIV risk behaviors among adolescents and young adults (Botvin and Griffin 2013). Dr. Jenkins is a Health Scientist Administrator in the Prevention Research Branch at NIDA. Dr. Jenkins is an expert in the area of HIV/AIDS both domestically and internationally; before joining NIDA, he was a behavioral scientist in the Division of HIV/AIDS Prevention at CDC. He provides an HIV/AIDS perspective in his Commentary (Jenkins 2013).

Limitations

As previously noted, none of the studies was conceived of as longitudinal with the capacity to address the types of outcomes examined in this issue. As a result, these studies do not necessarily include the optimal measures for examining HIV-related risk behaviors, including testing for HIV/AIDS. In addition, sexual minority youth are at heightened risk for HIV/AIDS; however, the studies in this Supplemental Issue either did not collect the data necessary to categorize youth by sexual identity or did not have sufficient numbers of LGBT youth to conduct sub-analyses. One opportunity for future research is to pool data from LGBT youth across studies to examine the impact of prevention interventions on HRSB in this subpopulation. African-Americans are the racial/ethnic group most affected by HIV/AIDS, and some of these studies have samples with insufficient numbers to conduct analyses on ethnicity; this is an additional issue for further research. Finally, absence of effects for some of the studies should not be construed as intervening early is not effective. Some of these null findings can be attributed to measurement, using specific measures, and the developmental period when the

data were collected, along with sample size, breadth of demographics, and age range.

Implications

This Supplemental Issue contains an unprecedented collection of papers looking at the long-term effects of prevention intervention delivered in childhood on HRSB related to HIV/AIDS. Despite the fact that these interventions were delivered prior to adolescence and did not focus on sexual behaviors or HRSB, there are results to support the conclusion that interventions delivered in childhood can prevent risk behaviors associated with the acquisition of HIV infection. This is consistent with the literature described in Patterson, Forgatch, and DeGarmo (2010) as collateral change due to intervention or long-term effects that were not anticipated in the original model. Second, these papers demonstrated that universal interventions are effective in reducing HRSB, leading to the conclusion that they could result in major public health benefit if they were widely implemented. Third, these studies illustrate that proximal contexts of development, first the family and then the school, play major roles in childhood socialization and prevention of risk behaviors. Families have essential roles in children's development as demonstrated by the findings that childhood interventions focused on aspects of family function (e.g., family communication, parental warmth, consistency, and monitoring) have measurable impacts during adolescence and adulthood on HRSB related to HIV/AIDS. These papers provide a better understanding of what targets for intervention are important for children and families. As children transition through adolescence, providing families with coping strategies helps them to deal appropriately with problems as they occur. Schools are also important contexts for child development; successful school-based interventions focus on proximal targets predictive of subsequent problems behaviors. Common strategies for interventions in school environments include classroom management and tools to help children self-regulate and control outbursts under challenging circumstances. As demonstrated here, these approaches successfully reduce risk factors related to HRSB. Fifth, drug use initiation and drug abuse were found to play an important role in two intervention studies. Spoth and colleagues (2013) found that their universal family-based interventions had significant indirect effects on number of partners, lifetime sexually transmitted diseases and substance use, and sex through adolescent substance initiation growth factors. In the study by Kellam and colleagues (2013), significant GBG impact was found in young adulthood in terms of reduced high-risk sexual behaviors and drug abuse and dependence disorders among males who in first grade and through middle school were more aggressive and disruptive. Finally, as pointed out earlier, moderators such as gender and ethnicity are

important to examine. Some of the studies showed positive effects in reducing HRSB among African-American subjects; this is encouraging, given their increased risk for HIV/AIDS.

This Supplemental Issue is an important first step in examining the hypothesis that intervening in childhood can reduce risk factors related to HRSB in adolescence and young adulthood. Given the strong associations between drug abuse and acquisition and transmission of HIV/AIDS, HRSB among young people is an important priority area for NIDA. NIDA's PRB is interested in research aimed at clarifying the role of early interventions in preventing HIV infection, including follow-up studies on samples of children who participated in biopsychosocial prevention interventions (prenatal through middle school age) into the adolescent and adulthood years with better measures related to HRSB. Other areas include studies focused on at-risk populations (e.g., African-Americans and Hispanics, children in child welfare, and children of parents in the criminal justice system and in drug abuse treatment) and interventions that were delivered very early in life, to see whether intervening even earlier (e.g., prenatal through preschool age) results in stronger positive effects. To accomplish this, measures of HRSB need to be integrated into long-term follow-up studies as early as possible; this includes measure of sexual identity and HIV testing in samples of very high-risk populations. In the absence of large samples within a single study, pooling of data across prevention trials may yield large enough samples of populations of interest (e.g., LGBT youth, racial/ethnic minority youth, and drug dependent youth engaging in sexual acts to procure drugs) to conduct analyses.

This body of work demonstrates that interventions delivered early in life can change children's trajectories in a positive manner, on a wide array of behaviors, including HRSB related to HIV/AIDS in adolescence and adulthood. We thank the researchers who contributed to this Supplemental Issue; each of the studies represents decades of work. Lastly, we are very appreciative of NIDA's support of this intervention portfolio, particularly the funding for long-term effects of the interventions over time. Without that support, we would not be able to answer the questions addressed in this Supplemental Issue of *Prevention Science*.

Disclaimer The views and opinions expressed in this report are those of the authors and should not be construed to represent the views of NIDA or any of the sponsoring organizations, agencies, or the US government.

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