

## Patterns of risk behavior change from adolescence to emerging adulthood and implications for sexually transmitted infections

Sexually transmitted infections are a significant health threat to adolescents and young adults. Nationally representative data indicate that approximately fifteen to thirty percent of all HIV infections occur in individuals younger than age 25.<sup>1</sup> Youth between the ages of 15-24 accounted for almost half of new cases of sexually transmitted infections (STIs) in 2000.<sup>2</sup> The majority of HIV infections among adolescents are contracted through sexual activity;<sup>3</sup> however, substance use also increases both the risk of HIV and other STI infection, either directly (through needle sharing) or indirectly (through its association with sexual risk-taking).<sup>4-6</sup>

A growing body of research seeks to identify the behavioral profiles of adolescents most at risk for HIV/STIs, but to date only a small minority examines changes in STI risk behavior patterns over time.<sup>7-10</sup> Although these latter studies can provide important information on how to best target interventions, their utility is limited because they generally rely on non-representative samples and either cross-sectional or short longitudinal designs (e.g., 6-18 months). Few studies have explored developmental trajectories in STI risk behaviors from adolescence through early adulthood. Those studies that do track risk behavior over this longer time span tend to focus on alcohol, marijuana, or cigarette use, even though risk behaviors in adolescence often covary.<sup>11-12</sup> For example, Guo et al. found that certain patterns of substance use between the ages of 10 and 21 were associated with multiple partners and inconsistent condom use in early adulthood but did not incorporate longitudinal measures of change in sexual risk behavior.<sup>13</sup> The lack of adequate longitudinal designs to track STI risk behaviors is especially problematic given that temporal patterns in adolescent risk behavior are dynamic,<sup>14</sup> and their implications for health may vary based upon behavioral context, age of initiation, and duration of persistence.

The goals of this study are to integrate person-centered and variable-centered analyses to:

1. describe longitudinal patterns of drug use and sexual behavior from adolescence to young adulthood, and how they do or do not differ by sex and race;
2. examine sex and race differences in the association between contemporaneous measures of young adult risk behavior profiles and HIV/STI infection;
3. determine whether the STI implications of contemporaneous adult behavior profiles vary depending on the individual's behavior profile during adolescence.

### Methods

*Sample.* This paper uses data from Waves I and III of the National Longitudinal Study of Adolescent Health (Add Health). Add Health is a large, nationally representative probability sample of adolescents who were in school in the 1994-1995 school year. This paper focuses on black and white respondents who appear at Waves I and III, have appropriate sampling weights, and who could be assigned to a behavioral risk cluster as defined below (n=8,674). In Add Health, interviews were conducted using laptop computers and audio computer-assisted self-interviewing (ACASI) technology (Wave I) and computer-assisted self-interviewing (CASI) technology (Wave III) to collect information on sensitive topics such as sexual activity and substance use.

*Sociodemographics.* Beyond sex, race, and chronological age, we will control for *Highest parental education* (the adolescent’s report of the highest education level attained by either resident parent, with categories of less than high school (referent), high school graduate/GED, some college, and college graduate or higher) and *family structure* (grouped into the following categories: Two Resident Parents (referent), Single Mother, and Other). All items were measured at Wave I.

*Cluster membership and trajectory patterns.* In earlier work<sup>15,16</sup> we used K-means cluster analysis to group respondents at each Wave into homogeneous clusters based on responses to twelve risk behavior items related to sexual behavior and substance use. Grouping individuals is based on the premise that risk behaviors often occur together and interact with each other. Clustering individuals parsimoniously captures multiple interactions and offers a holistic approach to developmental analysis of populations.

We originally created 16 clusters based on Wave I data and 16 clusters for Wave III . For the present paper, we grouped clusters into four levels of risk profiles (very high, high, medium, low) based on their risk of sexually transmitted infections (STI). An examination of individuals’ continuity or movement within and across levels of risk yielded 16 combinations of Wave I and III risk level membership. Because 5 patterns had very few members, we collapsed these into similar patterns (e.g., there were few “very high risk” at Wave I and “low risk” at Wave III, so we combined individuals showing this pattern with “high” at Wave I and “Low” at Wave III). Each respondent was assigned to only one risk-profile at each Wave but could move to any cluster (i.e., level of risk) between Wave I and Wave III except that non-Abstainers at Wave I could not become Abstainers at Wave III.

Clusters and risk levels at each Wave are shown in the table below.

<b>Risk Category</b>	<b>WAVE 1</b>	<b>WAVE 3</b>
very high	MSM	MSM
very high	IV Drug Users	IV Drug Users
very high	Marijuana & Other Drugs	Marijuana & Other Drugs
very high	Sex for Drugs or Money	Sex for Money
very high	Multiple Partners	Multiple Partners
very high	High Marijuana & Sex	High Marijuana & Sex
high	Marijuana Users	Marijuana Users
high	Heavy Substance Use & Sex	Substance Use & Sex
high	Sex & Drugs Combined	Regret related to AOD, High AOD
high		Regret related to AOD, Mod AOD
high	Binge Drinkers	Binge Drinkers
high	Alcohol & Sex	Light Alcohol & Sex
high	Smokers & Sex	Smokers & Sex
medium	Sex Experimenters	Few Partners, low ATOD
low	Drinkers	
low	Substance Experimenters	Low Risk Behavior
low	Abstainers	Abstainers

*Sexually transmitted infections.* At Wave III, respondents were asked to provide a specimen of first stream urine for STI testing. These specimens were analyzed for the presence of *C. trachomatis*, *N. gonorrhoeae*, and *T. vaginalis*. Tests used ligase chain reaction (LCR) to detect the presence of *C. trachomatis*, and *N. gonorrhoeae* DNA. PCR-ELISA tests were used to detect *T. vaginalis* DNA. A sample of oral mucosal transudate (OMT) was used for HIV testing [enzyme-linked immunosorbent assay (ELISA) followed by Western Blot confirmation]. In these analyses, we use a combined STI measure indicating a positive test for any of these STIs.

*Analyses.* We will provide descriptive statistics related to the prevalence of patterns of cluster movement over time, and indicate gender, race, and age differences in patterns of movement. We will also report the prevalence of STIs for each risk pattern trajectory. Finally, we will conduct a multivariate logistic regression model using presence of an STI as the outcome. Beyond the sociodemographics and controls noted above, we will include trajectory pattern membership as our key predictor. Patterns will be dummy coded with Low-Low as the referent trajectory pattern.

*Discussion.* Discussion will be framed in terms of population health disparities, and the contribution of developmental histories to young adult health.

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