

Prevalence of Sexual Risk Behaviors Among U.S. High School Students Declined Between 1991 and 2007

In 2007, 48% of U.S. high school students had ever had sexual intercourse, according to findings from the national Youth Risk Behavior Survey (YRBS).¹ The proportion of students who had ever had sex was higher among blacks than among Hispanics and whites (67% vs. 52% and 44%, respectively). Between 1991 and 2007, the proportion of students who had ever had sex decreased, as did the proportions of those who had had four or more partners during their life and who had had sex at least once in the three months before the survey.²

Conducted by the Centers for Disease Control and Prevention, the national YRBS monitors priority health risk behaviors among adolescents and young adults. Data collected in the survey are used to determine the prevalence and co-occurrence of risk behaviors, and to monitor trends in behaviors over time. They also are used to measure the nation's progress in achieving 15 national health objectives for Healthy People 2010.

The school-based survey has been conducted among students in grades 9–12 every two years since 1991. For the 2007 survey, 14,103 self-administered surveys were completed by a nationally representative sample of students in 157 schools; the final sample comprised 14,041 students. All data were weighted; prevalence estimates were computed for all variables. Analysts used *t* tests to assess differences in prevalence, and logistic regression to assess changes over time.

2007 Data

Nationally, 48% of students had ever had sex, 15% had had four or more partners during their lifetime and 35% had had sex in the three months before the survey (i.e., were sexually active). Among sexually active students, 62% had used a condom and 16% had used the pill at last sex; 23% reported drug or alcohol use before last sex. Ninety percent of all students had ever been taught about AIDS or HIV in school.

Similar proportions of males and females were sexually active (34% and 36%, respec-

tively). Male students were more likely than female students to have ever had sex (50% vs. 46%), to have had sex for the first time before age 13 (10% vs. 4%), to have had four or more partners (18% vs. 12%) and to have been hit, slapped or physically hurt on purpose by a boyfriend or girlfriend in the year preceding the survey (11% vs. 9%). Male students were less likely than female students to have been tested for HIV (11% vs. 15%) and to have been taught about AIDS or HIV in school (89% vs. 90%). Among sexually active students, males were more likely than females to have used alcohol or drugs before last sex (28% vs. 18%). Female students were more likely than male students to report ever having been physically forced to have sex (11% vs. 5%); sexually active females were less likely than males to report condom use at last sex (55% vs. 69%).

Black students were significantly more likely than Hispanic or white students to have ever had sex (67% vs. 52% and 44%), to have had sex before age 13 (16% vs. 8% and 4%), to have had four or more partners (28% vs. 17% and 12%) and to be sexually active (46% vs. 37% and 33%). Black students overall also were more likely than Hispanic or white students to have been physically hurt by a boyfriend or girlfriend in the year before the survey (14% vs. 11% and 8%). Black and Hispanic students were more likely than white students to ever have been forced to have sex (11% and 9% vs. 7%). Twenty-two percent of blacks had been tested for HIV, compared with 13% of Hispanics and 11% of whites. Sexually active black students were significantly less likely than comparable Hispanic or white students to have used alcohol or drugs before last sex (16% vs. 21% and 25%).

Time Trends

Between 1991 and 2007, the proportion of students who had ever had sexual intercourse decreased (from 54% to 48%), as did the proportions reporting four or more lifetime partners (from 19% to 15%) and

current sexual activity (from 38% to 35%). The proportion of currently sexually active students who drank or used drugs before last sex increased between 1991 and 2001 (from 22% to 26%), but then decreased until 2007 (to 23%). Similarly, the proportion of all students who had been taught about AIDS or HIV in school increased between 1991 and 1997 (from 83% to 92%), but then decreased to 90% in 2007. The proportion of currently sexually active students reporting condom use at last sex increased between 1991 and 2003 (from 46% to 63%), but did not change in the subsequent survey years.

Among whites, changes between 1991 and 2007 generally mirror those among the full sample.³ One notable exception is that the proportion of sexually active white students reporting condom use at last sex increased throughout the period (from 47% to 60%).

While the proportion of all black students reporting four or more lifetime sex partners decreased between 1991 and 2007 (from 43% to 28%), the proportion who had ever had sex decreased between 1991 and 2001 (from 82% to 61%) and then remained unchanged through 2007.⁴ The proportion of blacks who had been taught about AIDS or HIV in school changed from 84% in 1991 to 90% in 2007; the proportion of sexually active black students reporting condom use at last sex increased from 48% in 1991 to 70% in 1999 and stabilized at that level.

Relatively little change occurred in sexual risk behaviors among Hispanics.⁵ Between 1991 and 2007, the proportions of Hispanic students who had ever had sex, who had had four or more lifetime sexual partners and who had been taught about AIDS or HIV in school were stable. However, the proportion of sexually active Hispanic students reporting condom use at last sex increased from 37% to 61%, which about matches the proportion among all students.

The analysts note that although the prevalence of a number of health risk behaviors has fallen substantially among U.S. high school students since 1991, many young

people “continue to engage in behaviors that place them at risk for the leading causes of mortality and morbidity.”¹ They suggest that “more effective school health programs and other policy and programmatic interventions are needed to reduce risk and improve health outcomes among youth.”—*L. Melhado*

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Past Academic, Drug-Related And Sexual Behaviors Predict Risky Sex After High School

Behavioral patterns formed in high school may foreshadow sexual risk-taking in the months after young people leave high school, according to a study of 19-year-olds in the Pacific Northwest.¹ In contrast with literature that associates college attendance and living away from home with increases in risk behaviors, the study shows that in the fall after high school, college attendance predicted a decreased probability of sexual risk behaviors, while living arrangement was not associated with the likelihood of participating in sexual risk behaviors. Academic performance, risky sexual behaviors and drug use during high school, however, were highly associated with post-high school behaviors.

The data came from a longitudinal study of students from 10 public schools in a suburban district. Students were enrolled in the study as first and second graders in 1993, and were interviewed each subsequent year.

At baseline, the sample was 47% female and 81% white; no other racial or ethnic group represented more than 7% of the total. The final interview, held in the fall after the 12th grade, was completed by 865 participants, whose average age was 18.4. Data from the 834 unmarried high school graduates in this sample were analyzed.

In the fall after high school, 60% of participants lived with a parent and 45% were attending college. Twenty-five percent lived with a parent and attended college, and 19% did neither. In the month prior to the interview, 63% had been sexually active, 30% had used condoms inconsistently and 23% had engaged in casual sex (defined as having had sex outside of a relationship or with someone they had known for less than two weeks, or having had multiple partners). Eleven percent reported especially high-risk behaviors: sex that was both unprotected and casual, or sex with men who have sex with men, HIV-positive partners or injection-drug users.

The prevalence of each type of sexual risk behavior was significantly lower among participants in college than among those who were not in college. For instance, only 5% of college students had engaged in high-risk sex in the previous month, compared with 16% of those who were not in college. Living with a parent, whether or not the participant also attended college, was not associated with risk behaviors in bivariate analyses. Correlational analysis confirmed these findings and showed that sexual risk behaviors were negatively related to high school grade point average and positively related to having used drugs and having had risky sex in high school.

In an analysis controlling for demographic variables, college status and living situation, college attendance was associated with decreased odds of inconsistent condom use (odds ratio, 0.6), casual sex (0.4) and high-risk sex (0.3). Young people who were in a romantic relationship were more likely than their unattached counterparts to have used condoms inconsistently (6.9), but were less likely to have had casual sex (0.5). Hispanic and black participants were more likely than whites to have had casual sex (2.1 and 2.4, respectively).

In a second multivariate model, the researchers controlled for three additional variables—grade point average, drug use and sexual risk behavior in high school—to

determine whether past behavior was associated with correlates of recent sexual risk behaviors. College attendance was no longer associated with condom use or casual sex, but it continued to predict a lower probability of engaging in high-risk sex (odds ratio, 0.5). Living with a parent was insignificant in all cases.

High school behavior, on the other hand, was a powerful predictor of many recent behaviors. The odds of inconsistent condom use and casual sex among participants declined as high school grade point average rose (odds ratios, 0.7 and 0.8, respectively). Having had risky sex in high school was associated with elevated odds of participants' having performed each of the three sexual risk behaviors—inconsistent condom use (5.1), casual sex (3.0) and high-risk sex (3.4)—after leaving high school. Prior drug use was a strong predictor of casual sex (6.1) and high-risk sex (4.4).

Being in a relationship continued to be positively associated with using condoms inconsistently (6.1) and negatively associated with casual sex (0.3). Race ceased to predict casual sex, while black ethnicity emerged as protective against inconsistent condom use (0.3).

The researchers conclude that the increased freedom young people experience when they leave home or go to college does not necessarily translate into increased sexual risk-taking. In addition, they note that the reduced prevalence of sexual risk behaviors among young people in college is largely explained not by any protective effect of college itself, but by experience with risk and protective behaviors that may have simultaneously influenced sexual behavior and college ambitions. Thus, the researchers contend, "prevention efforts aimed at reducing substance abuse and risky sex and improving academic performance during high school among all youth should result in the reduction of [sexual risk behaviors] in the transition to adulthood." They emphasize the importance of programs that begin early in high school, focus on STD prevention and target non-college-bound youth.—*H. Ball*

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Internet Use Assists Men's Meeting of Male Sex Partners, but Does Not Promote Unprotected Sex

In a study of young men who have sex with men, online sex-seeking behavior was associated with having a greater number of partners, but not consistently with unprotected anal sex.¹ Men who reported using the Internet—either exclusively or not—to meet sexual partners reported greater numbers of recent partners than those who met partners only offline. Men who met partners both online and offline were more likely than those who met partners only offline to have unprotected anal sex; however, the odds of reporting unprotected anal sex were similar for men who met partners only online and those who did so only offline.

The study was based on data from U.S. men who have sex with men, collected via an online survey advertised for three months in 2005 on a gay, lesbian, bisexual and transgender community Web site. Respondents answered questions about their social and demographic characteristics, Internet use, and sexual attitudes and behaviors. Researchers limited their analytic sample to the 770 men aged 18–24 who completed the survey and reported having had sex with men in the preceding three months; the sample was then divided into three groups, by whether the men had met their recent sexual partners only online, only offline or both online and offline. Analyses assessed whether number of sexual partners and unprotected anal intercourse were associated with online sex-seeking behavior.

On average, respondents were 21.5 years old; 76% had had anal intercourse in the past three months, and 36% had had unprotected anal sex during that period. A significantly greater proportion of men who had met partners both online and offline (86%) than of those in the online-only group (69%) or the offline-only group (63%) had recently had anal intercourse. Forty-three percent of men who had met partners both online and offline had recently had unprotected anal sex, a significantly greater proportion than for the online-only group and offline-only group (29% and 34%, respectively).

Overall, men had had a median of three male sex partners and two male anal sex partners in the past three months; those who had met partners both online and offline had

had a significantly greater number of partners and anal sex partners (five and three, respectively) than those in the online-only (two and one, respectively) and offline-only (one each) groups. Men reported having had unprotected anal sex with about one-third of their anal sex partners; men in the offline-only group were unprotected with a greater proportion of their anal sex partners (49%) than were those in the other two groups (31% each).

At the bivariate level, increased number of male partners and unprotected anal sex were each associated with meeting partners both online and offline; the outcomes were also associated with spending more time online, spending more time online for sexual purposes and having sex after using drugs or alcohol. In multivariate analyses, the odds of having had multiple sex partners were significantly higher among men who had met partners both online and offline than among those in the online-only group (odds ratios, 3.4–58.4 in various comparisons); meeting partners both online and offline was also positively associated with having had unprotected anal sex (1.6). Men in the offline-only group were less likely than those in the online-only group to have had multiple partners (0.4), but no more or less likely to have had unprotected anal sex. In addition, being drunk and being high during sex were positively associated with having had multiple partners (1.6 and 2.2, respectively) and having unprotected anal sex (1.4 and 1.6, respectively); using the Internet four or more hours per week for sexual purposes was associated with having had multiple partners (2.2–3.0), but not unprotected anal sex.

The authors note that because of their methodology, their sample may not represent all young men who have sex with men and who use the Internet. Even so, they believe that their findings “add to the growing evidence that the Internet facilitates meeting sexual partners without necessarily promoting unprotected anal intercourse.” The authors suggest that future research should “recognize different subgroups of young [men who have sex with men] who use the Internet rather than dichotomizing Internet users and nonusers. They conclude

that “there is a need and a demand for online health promotion and disease prevention services,” and that such programs “should encourage young [men who have sex with men] who are at risk to reduce their numbers of sexual partners” and “decrease the frequency at which they engage in unprotected anal intercourse.”—J. Rosenberg

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STDs Among Young Adults Linked to Childhood And Teenage Risk Factors

A young adult's risk factors for STDs include not only risky sexual behaviors, such as inconsistent condom use, but also a variety of environmental and psychosocial factors from childhood and adolescence.¹ Findings from a nationally representative sample of young adults reveal that measures of past socioeconomic status, abuse, exposure to violence, substance use and depression are associated with current or recent STD diagnoses, and that disease risk increases with the number of these factors. Moreover, even after key sexual risk factors are taken into account, young adults have an elevated likelihood of a recent STD diagnosis if they were abused during childhood, have been in a gang, have used alcohol frequently or have been depressed (odds ratio, 1.5 for each).

Guided by the idea that disease transmission is influenced not just by individual behavior but also by one's exposure to social, economic and environmental factors, researchers used data from Wave 3 of the National Longitudinal Study of Adolescent Health to examine the association between STDs, sexual risk behaviors and 13 contextual risk factors. In 2001–2002, a nationally representative sample of more than 14,000 young adults aged 18–27 completed computer-assisted surveys and provided urine samples that were tested for gonorrhea, chlamydia and trichomoniasis; in addition, about 3,100 were tested for *Mycoplasma genitalium*.

Of the 13 contextual risk factors examined in the study, two concerned socioeconomic status: housing insecurity (having

ever been homeless, been ordered to move out or run away from home) and having lived before age 18 in a household where someone received public assistance. Four factors were related to sexual or physical abuse, and four concerned exposure to violence. Finally, participants were asked whether they had used alcohol frequently (at least three times per week) in the past year, whether they had used illegal drugs in the past 30 days and whether they had ever had a diagnosis of depression.

The researchers used logistic regression analyses that controlled for gender, race and ethnicity to determine whether these contextual factors were associated with prevalent STD (determined by urine testing) and with diagnosis of an STD (gonorrhea, chlamydia, trichomoniasis, syphilis, genital herpes, genital human papillomavirus or genital warts) in the past year. They also examined whether the contextual risk factors and STD outcomes were associated with four sexual risk factors: lifetime number of partners (classified in six categories, from 0 to 50 or more), age at sexual debut (classified as none or as one of five age-groups, from 10–13 to 20 or older), having ever been paid for sex and consistent, correct condom use in the past year.

The prevalence of the contextual risk factors was generally 10–20% but ranged from 5% (childhood sexual abuse) to 28% (childhood physical abuse). Six percent of respondents tested positive for an STD, in most cases chlamydia, and 6% had had an STD diagnosed in the past year. In univariate analyses, eight of the contextual risk factors were associated with prevalent STD, and 11 with an STD diagnosis in the past year.

Multivariate analyses revealed that young adults had increased odds of a prevalent STD if they had ever been a crime victim or witness, been arrested or had housing insecurity (odds ratios, 1.3–1.4). Their odds of having had an STD diagnosed in the past year were elevated if they had frequently used alcohol in the past year (2.3), ever been depressed (2.0), ever been a gang member (1.8), been sexually abused during childhood (1.7), been physically abused by a partner in the past year (1.6), used drugs in the past 30 days (1.6) or ever had housing insecurity (1.4). As young adults' number of risk factors increased, their disease risk rose steadily: The proportion of participants who tested positive for an STD was only 5%

among those without contextual factors, but it reached 15% among those with four or more. Findings were similar for STD diagnosis within the past year.

Moreover, the contextual risk factors were linked with the four sexual risk factors. Lifetime number of partners was positively associated with nine of the 13 contextual factors, and having been paid for sex with five; age at sexual debut was negatively associated with 10 factors, and condom use with six. Two contextual factors—housing insecurity and having ever been arrested—were associated with all four sexual risk factors.

Finally, to assess whether the four sexual risk factors accounted for the associations between contextual factors and STD outcomes, the researchers conducted a multivariate analysis incorporating both types of risk factors. None of the contextual factors were associated with prevalent STD when sexual factors were taken into account, although respondents' odds of a positive STD test declined by about 10% per category for age at sexual debut (odds ratio, 0.9). However, four contextual factors were associated with STD diagnosis within the past year: The odds of diagnosis were elevated among respondents who had been sexually abused during childhood, been in a gang, used alcohol frequently or been depressed (1.5 each). In addition, three sexual risk behaviors were associated with STD diagnosis in the past year: Odds were elevated among respondents who had ever been paid for sex (1.7) and those who had a greater lifetime number of partners (1.7 per category), and reduced among those who used condoms consistently and correctly (0.4).

The researchers note that because several contextual factors involved recent behavior, it is not possible to infer causality between these factors and STD outcomes. Nonetheless, the findings suggest that contextual factors “such as housing and safety contribute to the burden of [STDs] and that the number of these conditions present in an adolescent's environment increases the likelihood for high-risk behavior and exposure to and acquisition of [STD].” Thus, interventions that address problems such as homelessness and violence “may have a positive spillover effect on sexual health,” and the “national public health agenda may benefit from broadening... its conception of health interventions to address the physical, eco-

omic, and emotional security of adolescents.”—*P. Doskoč*

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Computer-Assisted Surveys May Expand Understanding Of STD Risks and Incidence

Telephone surveys administered through computer-assisted self-interviewing could yield a substantially better picture of Americans' STD-related experiences, and of disease incidence, than telephone surveys conducted by human interviewers. In a study designed to assess differences in reporting between the two survey modes, respondents participating in computer-administered interviews were significantly more likely than those speaking with an interviewer to say that they had had a variety of STD symptoms and that a recent main partner had had an STD. This group also had elevated odds of reporting ever having had chlamydia and marginally elevated odds of reporting that they had had gonorrhea.¹

The survey was conducted in 1999–2000 among a sample of 18–45-year-old U.S. residents; more than 2,000 eligible men and women agreed to participate and were randomly assigned to take a computer-administered survey or have the same questionnaire administered by an interviewer. Survey items covered respondents' communication with their partners about sexual behavior, STD-related knowledge and experiences, and demographic characteristics. Analysts used multivariate logistic regression to assess differences in responses by survey mode. They also calculated estimates of STD incidence nationwide on the basis of each sample's responses.

Among respondents who had had a main partner in the past year, those taking the computerized survey were significantly more likely than those speaking with an interviewer to say that their partner had ever had an STD (odds ratio, 2.4). They also had higher odds of saying that they had never talked with their partner about STD prevention (1.3) and reported more frequent

discussions with their partner about their sex life (1.4 on an ordered categorical measure).

Reports of several STD symptoms in the last year—painful urination, genital sores and genital discharge—were significantly more common in computerized surveys than in responses to an interviewer (odds ratios, 1.5–2.8). Nearly all participants in each survey group had heard of gonorrhea, but the odds of giving this response were reduced in the group taking the computerized interview (0.5). No differences were found in familiarity with chlamydia or pelvic inflammatory disease, but the sample taking the computer-administered survey had elevated odds of claiming that they had heard of a fictitious STD (1.5). The reported occurrence both of gonorrhea and of chlamydia in the past year appeared to be higher among respondents taking computerized surveys than among those speaking with an interviewer, but in the multivariate analysis, only the difference for chlamydia was significant (6.1).

Supplementary analyses revealed that differences by survey mode varied across population subgroups. Notably, respondents of all races and ages were more likely to report genital sores in computerized surveys than when speaking with an interviewer, but the differential was sharper for blacks than for respondents of other races (odds ratios, 9.2 and 1.9, respectively), and was greater for 18–25-year-olds than for older participants (13.5 vs. 1.9–2.2). The youngest respondents also showed a marginally greater difference in reporting a partner's STD than older participants. Although differences do not reach conventional levels of significance, the data suggest that the effect of survey mode on reporting of genital discharge was greater among married or cohabiting respondents than among others, and that the effect on reporting of genital sores declined with increasing level of education.

Projected to the national level, the data collected by interviewers suggest an annual gonorrhea incidence of 0.1% and an annual chlamydia incidence of 0.3%; data from the computerized interviews yield rates of 0.7% and 0.8%, respectively. Similarly, the lifetime incidence of gonorrhea estimated from the survey data is 2.8% if responses to an interviewer are used and 4.9% if based on information provided in a computerized

survey; for chlamydia, the incidence rates are 4.6% and 5.6%, respectively. The analysts emphasize that these estimates, which are not statistically reliable, are meant only to “provide...an appreciation of the likely understatement of populationwide STD burdens” that could result from use of interview-based surveys.

Some of the findings, the analysts acknowledge, were unexpected and are difficult to explain (e.g., the computerized survey's eliciting reports of more frequent discussions with partners about a couple's sex life, a desirable behavior in the context of STD prevention, and therefore one that respondents would likely not be reluctant to report). Yet, the researchers note that their findings overall “are consistent with a growing body of studies that find that [telephone computer-assisted self-interviewing] increases reporting of stigmatized and sensitive sexual behaviors.”—*D. Hollander*

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Vertical Transmission Rate Is Low When Pregnant Women Get HIV Therapy

In a national surveillance study of singleton births to HIV-infected women in the United Kingdom and Ireland, the rate of mother-to-child HIV transmission was 1.2% overall, and 0.8% for women who had received antiretroviral therapy for at least the last 14 days of pregnancy.¹ Transmission rates were 0.7% for women who had received highly active antiretroviral therapy (HAART) and had either a planned cesarean section or a planned vaginal delivery, and 0.0% for those who had received zidovudine monotherapy and had a planned cesarean delivery. After adjustment for maternal HIV viral load, delivery mode and infant's sex, each additional week of HAART was associated with a reduced risk of HIV transmission (odds ratio, 0.9).

Because HAART, appropriate management of delivery and avoidance of breastfeeding have virtually eliminated mother-to-child HIV transmission in resource-rich countries, researchers explored the influ-

ence of different treatments in the United Kingdom and Ireland, where 95% of infected women are identified before delivery. In a population-based study, using data on all reported pediatric and obstetric HIV infections, researchers examined mother-to-child transmission rates for women who had singleton births between 2000 and 2006. They considered only antepartum treatment, divided into four categories: none, zidovudine monotherapy, dual therapy and HAART. The analysis used logistic regression to assess characteristics associated with the risk of mother-to-child transmission.

Among the 5,930 infants included in the study, a large majority were born to black African women (79%) and to women who were asymptomatic (90%). Eighty-two percent of women had received HAART, 12% zidovudine monotherapy, 2% dual therapy and 3% no therapy. Fifty-seven percent had had an elective cesarean section, 21% an emergency cesarean and 22% a vaginal delivery. One-fourth of women receiving HAART had started it prior to getting pregnant, and among those who had begun treatment during pregnancy, the median gestational age at initiation was about 26 weeks; the median gestational age at initiation of monotherapy was 28 weeks. More than half of women on HAART had an undetectable viral load at about the time of delivery; for those on monotherapy, the median viral load was detectable but low.

The overall mother-to-child transmission rate was 1.2%, and the rate for women who had received any antiretroviral therapy for at least the last two weeks of pregnancy was 0.8%, regardless of delivery mode. The transmission rate was 0.7% for women who had received HAART and had either a planned cesarean section or a planned vaginal delivery, and 0.0% for those treated with zidovudine monotherapy who had a planned cesarean; among untreated women, the transmission rate was 9%.

In multivariable analysis of 4,892 births that controlled for therapy type, delivery mode, gestational age and sex of infant, women who had received no treatment had an increased risk of mother-to-child transmission compared with those who had received HAART, and women who had given birth to girls rather than boys also had an elevated risk of transmission (odds ratios, 9.1 and 1.9, respectively). Compared

with a gestational age of 37 weeks or more, a gestational age of less than 32 weeks was another significant risk factor for transmission (3.6); however, the women in all seven of these cases had received no treatment or less than three weeks of therapy, and all but one had delivered vaginally.

When multivariable analysis was further restricted to the 4,084 births for which maternal viral load was reported and controlled for, higher viral load was associated with an increased risk of transmission (odds ratio, 2.4). This model also found that women who had received no treatment were at greater risk than those who had received HAART, as were women who had had a vaginal delivery instead of a planned cesarean section (3.2 and 2.4, respectively). In an analysis that adjusted for viral load, delivery mode and infant's sex, women who had begun HAART during pregnancy had a decreased risk of transmission with each additional week of treatment that they received (0.9).

The researchers believe that their findings support the British national guidelines for HIV treatment of pregnant women, under which HAART is the recommended regimen for most women, and zidovudine monotherapy with an elective cesarean section is recommended for those with high CD4 cell counts and low viral loads. They suggest that a possible weakness of their study is that the HIV infection status was unavailable for 13% of infants; because these children's mothers are more likely than the others to have recognized risk factors for mother-to-child transmission, the overall transmission rate may be slightly underestimated.

Given the success of antiretroviral therapy in reducing the rate of mother-to-child transmission of HIV, the researchers recommend that Ireland and the United Kingdom continue to promote early antenatal HIV testing. Furthermore, they assert that "these population data provide important evidence to support the targeted use of different combinations of interventions for preventing [mother-to-child transmission]."—*J. Thomas*

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Hepatitis B Immunization Coverage Low Among Men Who Have Sex with Men

Immunization against hepatitis B virus (HBV) appears to be uncommon among young men who have sex with men, according to an analysis of findings from a survey conducted in six urban centers in 1998–2000.¹ Fewer than one in five respondents overall had been immunized; even among those who had a regular source of health care, the level of coverage was not substantially higher. Moreover, the data suggest that opportunities for men to be vaccinated often are missed: The vast majority of those who were susceptible to infection and had not been vaccinated had a regular source of care, had been tested for HIV infection or had had an STD diagnosis.

The 1998–2000 Young Men's Survey was conducted among men aged 23–29 in Baltimore, Dallas, Miami, New York, Los Angeles and Seattle. Potential respondents were recruited at venues frequented by men who have sex with men. Those who agreed to participate completed a questionnaire covering their socioeconomic characteristics, health care use and risk-related behaviors; they also received prevention counseling and provided blood specimens, which were tested for markers of HBV infection and immunization. An earlier round of the survey, identical in design to the 1998–2000 effort but conducted among 15–22-year-olds, provides a basis for assessing trends.

A total of 2,834 men were included in the analyses. The sample was about evenly split between men aged 23–25 and those aged 26–29. Forty-nine percent of participants were white, 23% Hispanic and 17% black; the rest came from a variety of racial and ethnic backgrounds. Close to half were college graduates, and seven in 10 worked full-time. Ninety-five percent had had anal sex with a man, and 7% had injected drugs. The majority of men had never had an STD (73%), had been tested for HIV (89%), were HIV-negative (88%) and had a regular source of health care (63%). Two-thirds said that they had revealed their sexual orientation to fewer than half of their acquaintances.

Laboratory results showed evidence of HBV immunization in 17% of respondents, but chi-square and trend analyses revealed some variation by men's characteristics. The

prevalence of immunization was higher in Seattle than elsewhere (25% vs. 14–17%) and was higher among men who had disclosed their sexual orientation to at least half of their acquaintances than among those who had told fewer (19% vs. 14%). Participants who were HIV-negative had a higher prevalence of coverage than did those with HIV infection (18% vs. 12%), and respondents who had a regular source of health care were more likely than those who did not to show evidence of immunization (14–21% vs. 13%). Prevalence fell with increasing age (from 19% among 23-year-olds to 14% among 29-year-olds) and rose with increasing levels of education (from 9% among men who had not graduated from high school to 30% among those with more than 16 years of schooling). Results of a multiple logistic regression analysis confirmed that the likelihood of immunization was positively associated with level of education and negatively associated with age, and that Asians, whites, Seattle residents and men with a regular health care source had elevated odds of having been immunized.

Twenty-one percent of men in the sample tested positive for HBV markers, indicating a history of infection (although not necessarily current or chronic infection). The proportion varied widely, however. It was as low as 9% among men who had never had anal sex, but it reached roughly 30–35% in several groups (blacks, men with less than a high school education, those who had had an STD, those who reported having had more than 50 male partners and those who had used injection drugs) and was 46% among respondents who had HIV infection. Except for education, these characteristics remained significant predictors of a history of infection in multivariate analysis; the odds of having had HBV infection were about 2–3 times as high for men reporting these risk factors as for others.

Comparisons of the two rounds of survey results show little improvement in immunization coverage and a continuing trend of increasing prevalence of a history of infection with increasing age. Thirteen percent of participants in the later survey both had serologic evidence of immunization and reported having been vaccinated, compared with 9% of those in the earlier round. The proportion with a history of infection climbed from 2% among the youngest men in the first phase to 17% among the oldest; it

went from 14% among 23-year-olds in the second phase to 31% among 29-year-olds.

Respondents whose bloodwork showed no markers for either HBV immunization or HBV infection were classified as susceptible to infection and unvaccinated; 62% of the sample were in this category. Among these men, 94% had a regular source of health care, 88% had had an HIV test and 22% had had an STD; in all, more than nine in 10 had had one of these potential opportunities to be vaccinated.

The analysts comment that the low prevalence of HBV immunization found in this sample belies many years of public health recommendations to vaccinate men who have sex with men against HBV and likely contributes to the trend of increasing prevalence of infection with increasing age. Given the links between sexual behavior and a history of infection among men who have sex with men, they conclude that the “ongoing failure” to prevent HBV infection in this population may result partly from “missed

opportunities in HIV/STD prevention systems.” Addressing such missed opportunities, they remark, could help eliminate transmission of this infection among men who have sex with men.—*D. Hollander*

REFERENCE

1. Weinbaum CM et al., The Young Men’s Survey phase II: hepatitis B immunization and infection among young men who have sex with men, *American Journal of Public Health*, 2008, 98(5): 839–845.