Timing, Amount of Teenage Alcohol or Marijuana Use May Make Future Risky Sex More Likely

Specific patterns of substance use during adolescence can predict risky sexual behavior in young adulthood. Researchers in Seattle base this conclusion on their analysis of data from a longitudinal study of urban youths.[1] For example, compared with study participants reporting no teenage use of marijuana, persons reporting late-onset use of marijuana had significantly more sexual partners at age 21 and were less likely to use condoms consistently. However, unlike some previous studies, this study found no association between use of illicit hard drugs, such as cocaine or heroine, and risky sexual behavior.

The data come from a project that recruited fifth graders at 18 Seattle elementary schools located in high-crime areas in 1985; the youngsters were followed through 1996, when they were 21 years old. Of the 808 participants in this study, 52% lived in low-income households. The sample had a diverse racial and ethnic makeup (46% white, 24% black, 21% Asian American and 9% other) and roughly equal numbers of male and female participants.

The participants were surveyed about their substance use at multiple points during their adolescence: about their use of alcohol, cigarettes, marijuana and other illicit drugs at ages 13, 14, 15 and 16, and about their use of all these substances except hard drugs at age 18. The follow-up survey at age 21 asked participants about their sexual behavior in the past year (i.e., the number of partners they had had and whether they had used condoms in all sexual encounters), whether they were involved in a stable relationship (i.e., lived with a partner) and whether they had used condoms at first intercourse. In all of the surveys except those at ages 13 and 17, participants were asked their age at first sexual intercourse.

For each type of teenage substance use examined, the researchers used a statistical model to group participants according to patterns of use. The resultant categories distinguished participants' behaviors according to the onset and frequency of use and changes in use over time. The researchers used negative binomial regressions and logistic regressions, respectively, to assess whether patterns of substance use in adolescence were independently related to number of partners and consistency of condom use in young adulthood.

Statistical modeling resulted in the following categories of adolescent drinking: chronic (steady) bingeing (3% of participants), binge drinking begun during the mid-teens and then steadily increasing over time (4%), binge drinking begun in the middle to late teen years (23%) and no binge drinking (70%). For use of cigarettes, the patterns that emerged were chronic heavy smoking (1%), smoking that escalated over time (8%), smoking begun after age 14 (11%), experimental smoking (7%) and no smoking (73%). Categories of marijuana use were use that began in the early teen years (3%), use with sharply increasing frequency after age 15 (5%), use begun in the late teen years (19%) and nonuse (74%). Hard-drug use was categorized as having begun in the early teens (7%) or later in adolescence (4%), and nonuse (89%).

On average, at age 21, study participants reported having had 1.9 sexual partners in the previous year. Young adults whose teenage patterns of substance use reflected no alcohol bingeing reported the lowest number (1.7), and those with chronic binge drinking reported the highest (3.0). The mean had a smahller range within the other types of substance use: for cigarette smoking, 1.9 (for nonsmokers and experimental smokers) to 2.2 (for all other types of smokers); for marijuana use, 1.8 (nonusers) to 2.5 (those who began using in their late teens); and for hard-drug use, 1.8 (users beginning in late adolescence) to 2.3 (users beginning in the early teens). Participants whose first sexual intercourse occurred at or after age 13 (88% of the total sample) reported an average of 1.9 recent partners at age 21; participants younger than 13 at first intercourse reported an average of 2.4.

Eighty-two percent of the total sample reported not always using condoms for sexual intercourse at age 21. Ninety percent of participants who had been chronic adolescent binge drinkers reported inconsistent use, compared with 80% of those who had never binged. The level of inconsistent condom use was markedly lower among participants who had experimented with cigarette smoking (65%) than among nonsmokers (83%) or regular smokers (85–86%). Inconsistent condom use was reported by 88% of participants who started using marijuana in the late teen years, 81% of nonusers of marijuana and 77% of those who began using marijuana in their early teens. Eighty-eight percent of participants who started using illicit hard drugs in the late teen years, compared with 82% of nonusers, reported inconsistent condom use.

Among participants who had not used a condom at first intercourse, 92% reported not always using a condom as a young adult; for those who had used a condom for their first sexual experience, 78% reported inconsistent use. Ninety-two percent of participants in stable relationships, and 78% of others, had not consistently used condoms for recent intercourse.

In the multivariate analyses examining the associations between number of sexual partners and each type of substance use, the researchers controlled for the effects of the other types of substance use and early initiation of sexual intercourse (before age 13). They found that the number of sexual partners for participants who had been binge drinkers throughout adolescence or in their late teens was significantly larger than that for participants who had not binged (coefficients, 0.5 and 0.3, respectively). Participants who had begun using marijuana in their late teens had significantly more sexual partners than nonusers of marijuana (0.3).

The logistic regression analyses of substance use patterns and condom use were performed by controlling for the effects of other teenage substance use, condom use at first intercourse and involvement in a stable relationship at age 21. Compared with not smoking, experimental smoking in adolescence was associated with a significantly decreased risk of inconsistent condom use in young adulthood (odds ratio, 0.3). The authors suggest that the same sort of self-control that allowed some young peo-

ple to smoke cigarettes occasionally without escalating to chronic smoking may explain their relatively high rate of consistent condom use. For participants who began using marijuana in their late teens, the risk was nearly double (1.9) that for nonusers. Use of illicit hard drugs was not correlated with either measure of risky sexual behavior.

According to the authors, a limitation of this study is that it did not explore possible factors affecting both substance use and risky sexual behavior. In addition, the study sample included a higher proportion of low-income persons than would be found in the general population. Nonetheless, the authors believe that their findings can provide useful information for the design of programs to curb the risky sexual practices of young adults: "Specifically, interventions that prevent the onset of binge-drinking and marijuana use during high school may be of particular utility in preventing later risky sexual behavior."—*C. Coren*

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Complication Rate Is Lower For Surgical Than Medical Second-Trimester Abortion

Dilation and evacuation (D&E) is safer than medical abortion for second-trimester pregnancy termination, and among medical methods, misoprostol is safer than others.[1] A retrospective cohort study of women who had a second-trimester abortion found that complications occurred in 29% of women who had a medical abortion but only 4% of women who had a D&E. The higher rate in women in the medical group was primarily due to a higher rate of incomplete abortion requiring surgery; this complication occurred in one in every five women in this group. Women who had a medical abortion had 80% lower odds of having complications if they were given misoprostol than if they were given other medications.

Analyses for the study included 139 women who had a surgical abortion and 158 women who had a medical abortion (i.e., induction by administration of misoprostol, high-dose pitocin or prostaglandin suppository) at 14–24 weeks of gestation. The researchers identified the women by reviewing medical records and diagnostic codes at two university hospitals in Milwaukee for the seven-year period from January 1994 through February 2001. For all of the women, they recorded a range of background characteristics, including information on their reproductive history, and details about the abortion.

Women were classified as having complications if they had any of the following events: failed medical abortion (i.e., D&E was needed to complete the procedure), bleeding requiring transfusion, infection requiring intravenous antibiotics, retained products of conception requiring dilation and curettage, organ injury requiring additional surgery, cervical laceration requiring repair and hospital readmission.

On average, women in both the surgical and the medical abortion groups were about 30 years old and had a body mass index of about 26 kg/m^2. They had had similar numbers of pregnancies (2.6 and 3.0, respectively) and live births (1.0 and 1.2), and they were about equally likely already to have a uterine scar (14% and 13%) and to have had a D&E (0% and 1%). The average gestational age was significantly younger for women who had surgery than for those who had a medical abortion (18.4 vs. 20.3 weeks). Women who had a surgical abortion were significantly more likely to have any laminaria inserted (92% vs. 65%) and to have had the abortion for health reasons (4% vs. 1%). They also had significantly more laminaria inserted (4.5 vs. 3.3) and had a significantly shorter hospital stay (0.3 vs. 1.6 days).

The proportion of women experiencing complications was significantly higher in the medical abortion group than in the surgical group (29% vs. 4%). Women who had a medical abortion were significantly more likely than those who underwent surgery to have retained products of conception requiring dilation and curettage (21% vs. fewer than 1%). Seven percent of women in the medical abortion group required a D&E to complete the abortion.

Among women who had a medical abortion, 79% were given misoprostol. The likelihood of complications in these women (22%) was greater than that in women who had a D&E (4%), but considerably lower than the likelihood among women who had other types of medical abortion (55%).

In logistic regression analysis controlling for gestational age, number of pregnancies and length of hospital stay, women who had a D&E had a significant 90% reduction in the odds of complications relative to women who had a medical abortion (adjusted odds ratio, 0.1). In addition, as the number of laminaria inserted increased, a woman's odds of complications following a D&E declined by 10% (0.9). Women who lost more than 500 ml of blood had substantially increased odds of complications (6.4).

When the same factors plus the number of laminaria inserted were taken into account in a logistic regression analysis involving only the medical abortion group, women who were given misoprostol had a significant 80% reduction in the odds of complications relative to women who were given other medications first (adjusted odds ratio, 0.2). Women who had significant blood loss again had sharply increased odds of suffering complications (23.0).

The study's findings add important new information, the researchers note, because little research has compared the safety of surgical abortion with the safety of misoprostol induction during the second trimester. Because medical abortion might have been favored for women with more advanced pregnancies, it is noteworthy that the greater safety of D&E persisted after gestational age was taken into account, they add.

"When skilled operators are available, dilation and evacuation should be considered the preferred method for second trimester abortion," the researchers conclude, emphasizing that a woman's preference must also be considered. They recommend that laminaria be inserted before D&E to reduce the need for intraoperative cervical dilation and thereby reduce the risk of complications. Women should be advised that their odds of needing surgery are fairly high if they have a medical abortion, the researchers note, and if a woman and her physician select medical abortion, "misoprostol is the medication of choice."—*S. London*

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High Proportions of College Men Using Condoms Report Errors and Problems

Errors and problems associated with condom use are common among single, male college students, a cross-sectional survey shows.[1] Sizable proportions of college men who had used condoms in the three months before the survey reported that they had not checked a con-

dom for visible damage (75%) and had not checked the expiration date (61%). In contrast, they rarely reported that they had knowingly used a damaged or expired condom (1–2%), or reused a condom (1%). Three in five men had not discussed condom use with their partner before intercourse, and two in five had wanted to use a condom on an occasion when one was not available. Thirty-five percent of men reported that a condom had broken or slipped off during intercourse; respondents who encountered these problems reported significantly more errors in condom use than those who did not.

To investigate if college men use condoms correctly, researchers administered an anonymous questionnaire survey to male students attending introductory health science classes at Indiana University from November 2000 through January 2001. The survey included questions on demographic characteristics (including previous instruction about condom use), sexual history (e.g., frequency of intercourse and frequency of condom use) and a range of potential errors and problems related to condom use. The study evaluated mainly technical mistakes that occurred during condom use, but errors related to availability and partner communication also were assessed.

Among the respondents, the researchers identified 158 unmarried heterosexual men who had put condoms on themselves and had engaged in sexual intercourse (insertion of the penis into a partner's mouth, anus or vagina) during the three months before the study. The mean age of these respondents was 20, and most (90%) were white. Each man had had intercourse, on average, 17 times and had been fairly consistent in using a condom—doing so 74% of times he had sex. On most occasions of condom use (97%), the man had placed the condom on himself. Four in five respondents had ever received instruction on how to use a condom. Thirteen percent of men had ever unintentionally caused a partner to become pregnant, and just 3% had ever had a sexually transmitted disease (STD).

Large proportions of respondents reported that they had not inspected a condom for damage or checked the expiration date (75% and 61%, respectively). Other common technical mistakes were putting on a condom after starting sex (43%), not leaving a space at the tip (40%) and flipping over a condom that had been applied inside out (30%). Condom storage errors, however, were uncommon—for example, using a condom that had been in a wallet for more than one month or not storing a condom in a cool, dry place (8% and 3%, respectively). Other uncommon errors were using an oil-based lubricant, unrolling a condom before putting it on and touching a condom with a sharp object (2– 5%). Respondents also rarely reported that they had knowingly used a condom that had been damaged or expired (1–2%), or that they had reused a condom (1%).

Three in five men had not talked to their partner about condoms before having sex. Two in five respondents had wanted to use a condom but not had one available, and one in five had had a problem with a condom but could not find a replacement. More than half of respondents had ever switched between vaginal, anal and oral sex, but four-fifths of this group reported that they had not changed condoms before switching. Thirty-five percent of men reported condom breakage or slippage during sex, but a lower proportion (13%) reported slippage during withdrawal. One in three respondents reported having lost their erection either before putting on a condom or after putting one on and commencing intercourse.

By assigning one point to each of 23 specific errors occurring at least once and calculating summative error scores, the investigators were able to compare subgroups of men by their mean number of condom use errors. The overall mean score was 4.5 (range, 0–10). Men who had experienced condom breakage or slippage during sex reported a significantly higher number of errors than those who had not encountered these problems (5.5 vs. 4.1). In contrast, the number of errors was similar among men who had had an erection problem during condom use and those who had not (5.1 vs. 5.5), showing that erection problems may happen independently of condom application, according to the researchers. Furthermore, unintentional pregnancy but not STD history was associated with whether condoms were used correctly: Respondents who had ever unintentionally made a partner pregnant reported significantly more condom use errors than those who had not (5.5 vs. 4.4). Although men who had received any education about condom use made slightly fewer errors than those who had not (4.4 vs. 5.1), the difference did not reach significance. Finally, correlation analysis showed no significant association between the consistency of condom use and error scores.

The researchers conclude that a substantial proportion of college men experience "a variety of errors and problems that could contribute to condom failure," and that consistent condom use does not ensure correct use. They note, however, that the findings may not apply to other populations. The researchers recommend that college programs promoting correct condom use include education on partner communication and planning, and on condom use when switching between vaginal, oral and anal sex. Two potential implications cited are that clinic-based counseling and community-based education could be improved through the inclusion of instruction on correct condom use. Furthermore, according to the authors, "Given that condoms are an important means of preventing STD/HIV infection, substantial public health benefit could accrue from further research assessing condom use errors and problems."—*T. Lane*

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Despite Having Received Relevant Education, Youth Lack Knowledge of STDs

Adolescents lack specific knowledge of sexually transmitted diseases (STDs) other than HIV, even if they have received relevant sexuality education.[1] Nearly all adolescents (97%) canvassed in waiting areas at an urban pediatric hospital reported that they had received STD education—primarily from their school (70%), parents (52%) or friends (31%). Although the majority of respondents correctly identified HIV as a major STD (91%), just 2% could name all eight major STDs; 9% and 3% could name the four curable and four incurable ones, respectively. Levels of STD knowledge were only weakly correlated with respondents' age and perception of their STD knowledge.

With the help of adolescent peer sexuality educators, researchers assessed levels of STD knowledge among youth present in waiting areas at a children's hospital in Philadelphia from April 1996 through February 1998. In structured interviews, the peer educators asked respondents to provide demographic information, to state the sources of any STD education received and to rate their level of STD knowledge on a four-point scale. The interviewers also tested if respondents knew the eight main STDs (as defined by the Centers for

Disease Control and Prevention), which of these are curable and the most prevalent STD in Philadelphia.

The mean age of the 393 respondents was about 17; roughly two-thirds were females, and four-fifths were black. More than two in five respondents were Medicaid recipients (44%). The vast majority of adolescents said that they had received STD education (97%). The main educational sources were school (cited by 70% of respondents), parents (52%) and friends (31%). Other sources were health professionals (22%), relatives other than parents (21%) and peer educators (12%). Twenty-six percent of respondents rated their level of STD knowledge as "a lot," 56% as "average," 16% as "a little" and 2% as "nothing."

Only 2% of those interviewed identified all eight main STDs, although substantial proportions included HIV (91%), gonorrhea (77%), syphilis (65%), genital herpes (58%) and chlamydia (53%) in their answers. Fewer than one-quarter (15–22%) named trichomonas, human papillomavirus (HPV) and hepatitis B virus infections. Only 9% of respondents named all four curable STDs—gonorrhea, chlamydia, trichomoniasis and syphilis—and 3% knew that the other four STDs are incurable; fewer than 1% answered all three questions correctly. Nearly half of the adolescents identified HIV instead of chlamydia as the most prevalent STD in the area (46%).

Respondents named, on average, 4.0 of the eight main STDs, 1.5 of the four curable ones and 1.6 of the four incurable ones. When the researchers scored levels of STD knowledge by subtracting the number of incorrect answers from the number of correctly named STDs, the mean score was 3.5 for identifying the main STDs, 1.3 for the curable ones and 1.2 for the incurable ones. The mean score for main STD knowledge was higher among respondents who were Medicaid recipients than among those who did not know what type of health insurance they had (3.8 vs. 2.8). Adolescents who cited at least two sources of STD education scored higher on this question than did those who cited only one source (3.8 vs. 3.0); the number of sources was correlated with this score (r=0.3). In general, knowledge scores of adolescents aged 12–15 were lower than those of older adolescents, and respondents who rated their STD knowledge as "a lot" scored higher than those who rated their knowledge as "a little." Age and perceived level of STD knowledge were weakly correlated with all three knowledge scores (r=0.2–0.3).

Multiple linear regression analyses showed that older age, higher perceived level of STD knowledge, STD education from a relative and education from "other" sources (e.g., books or TV) predicted a higher score for main STD knowledge. Older age was linked with a higher score for knowledge of curable STDs, whereas older age, higher perceived level of knowledge and black and white race predicted a higher score for knowledge of incurable STDs. The researchers concede, however, that all of these associations were small.

Limitations of the study identified by the researchers include the lack of information about respondents' sexual and STD history, possible inconsistency between peer educators' ratings of responses and bias created by interviewing only youth who were seeking medical help (and thus more likely to know about STDs). Nevertheless, the researchers conclude that levels of STD knowledge among the adolescents interviewed are "unacceptably low" for their age. In particular, although the majority of adolescents identified HIV as an STD, their lack of knowledge about trichomonas and HPV infections leads the authors to suggest that "current STD education may be overemphasizing HIV infection at the expense of other STDs for which teens are at greater risk."—*T. Lane*

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Youngest Mothers' Infants Have Greatly Elevated Risk Of Dying by Age One

Healthy infants who survive their first month of life and who are born to adolescent mothers are at greater risk of dying within their first year than are comparable infants whose mothers are aged 23–29.[1] National data for 1996 and 1997 indicate that between 28 and 365 days after birth (i.e., in the postneonatal period), healthy infants died at a rate of 1.4 per 1,000 full-term births. Infants born to women aged 15 or younger had a substantially higher postneonatal mortality rate (3.2 per 1,000) than those born to 23–29-year-olds (0.8 per 1,000). As a result, the odds of postneonatal death, adjusted for a variety of factors that may affect infant health, were significantly increased among the former relative to the latter (odds ratio, 3.0). The risk declined steadily as mother's age increased.

Infant mortality rates are known to be higher than average among babies born to teenagers, often because of neonatal deaths related to preterm delivery and low birth weight. This is especially true for infants born to very young mothers (those aged 15 and younger). Past research has focused little, however, on mortality among babies born relatively healthy and surviving beyond the first month of life.

To address this shortcoming, investigators studied comprehensive birth data from 1996 and 1997 that linked birth certificates with infant death certificates. The analysis was restricted to singleton first births among mothers aged 12–29. To minimize the effects of infants' health status at birth, the researchers focused on babies who were born at 37 or more weeks of gestation and who weighed at least 2,500 g at birth; they eliminated those who did not survive the neonatal period and those with congenital anomalies. Analyses were limited to white, black and Mexican American infants. The researchers used logistic regression analysis to determine the risk of postneonatal mortality, after adjusting for the effects of a variety of potentially confounding factors.

Among more than 1.8 million births in the two years under study, a total of 2,516 infants died during the postneonatal period, for a mortality rate of 1.4 deaths per 1,000 births. This rate was highest among babies born to mothers aged 15 and younger (3.2 per 1,000) and lowest among those born to women aged 23–29 (0.8 per 1,000). Rates differed slightly among infants born to white, black and Mexican American women, but in each group, the general pattern of decreasing rates with increasing maternal age was seen.

Teenagers were considerably more likely than older women to be unmarried and to have had inadequate prenatal care. After adjusting for the effects of these factors, as well as race and ethnicity, the investigators found that relative to infants born to women aged 23–29, babies born to the youngest mothers had the highest odds of postneonatal mortality (odds ratio, 3.0). The risk also was significantly elevated in other maternal age-groups, although odds ratios decreased steadily, from 2.4 among infants born to women aged 16–17 to 2.0 among those born to women aged 18–19 and 1.5 among those born to women aged 20–22.

Hypothesizing that single mothers have less social support than married mothers, and that

this difference may affect their infants' health, the researchers also examined the risk of postneonatal death among infants born to unmarried women. After adjusting for the effects of adequacy of prenatal care and acknowledgment of the father on the birth certificate, they observed that for infants born to single white and black women, the risk of postneonatal mortality was elevated if the mothers were 15 or younger (odds ratios, 2.4 and 2.1, respectively), remained significantly elevated if the mothers were older teenagers (1.5–1.9) and were only marginally raised if the mothers were in their early 20s. Among infants born to Mexican Americans, the risk was significantly increased only for those with the youngest mothers (2.0).

To shed further light on the differences in postneonatal mortality by maternal age, the researchers focused on mortality resulting from potential neglect or abuse (56% of deaths during the study period).* Rates of postneonatal mortality from these causes followed the same pattern as overall rates, being highest among children of the youngest mothers (1.8 per 1,000) and falling steadily through older maternal age-groups. Among infants born to white and black women, the odds of postneonatal mortality from these causes (adjusted for use of prenatal care and marital status) were highest (odds ratios, 4.0 and 3.8, respectively) for offspring of the youngest women and declined but remained significantly elevated for those born to older teenagers and 20–22-year-olds. For children of Mexican American women, the risk was significantly elevated only if the mother was 17 or younger.

The researchers comment that relying on vital statistics gave their study substantially more analytic power than previous research, but left them unable to examine the effects of potentially important socioeconomic factors that are not routinely reported on birth certificates, particularly mothers' education and poverty status. Additionally, they note that because they studied only healthy infants, overall postneonatal mortality rates are likely to be higher than rates reported in the analysis.

"There is reason to be concerned about the children born to early adolescent mothers," the investigators conclude. They argue that because "a seemingly healthy infant born to an adolescent mother has a significantly lower chance of living to celebrate a first birthday than an infant born to an older mother," efforts to provide support to very young mothers and their infants should not be limited to prenatal and perinatal care, but should include broader postnatal support services.—*M. Klitsch*

*Causes of death judged possibly related to neglect or abuse were sudden infant death syndrome, respiratory obstruction or suffocation as a result of inhalation of food or some other object, accidental mechanical suffocation, accidental causes, child battering or maltreatment, and other types of homicide.

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Contraceptive Ring Found Safe, Effective; Most Users Would Recommend It

A self-administered monthly vaginal ring (NuvaRing) is an effective and reliable combined hormonal contraceptive that is well tolerated and accepted by users, according to a study by its manufacturer.[1] During the yearlong study, involving more than 2,000 healthy women from the United States, Canada and Europe, 21 pregnancies occurred; 11 were among women who did not adhere to the study protocol. On average, 99% of cycles included withdrawal bleeding during the fourth week of the cycle, when the ring is not used. Only 3% of women discontinued use for device-related reasons; most reported that they were satisfied with the method (85%) and would recommend it to others (90%).

The ring was designed to expose users to a lower dose of estrogen than other hormonal contraceptives while maintaining cycle control. Once in place, the device releases 15 mcg of ethinyl estradiol and 120 mcg of etonogestrel daily, at a constant rate, for 21 days; the woman removes it for the last seven days of her cycle and then inserts a new ring. Because the ring requires neither daily action on the user's part nor a visit to a health care provider for insertion or removal, it is also intended to be more convenient to use than other hormonal methods.

To evaluate the ring's efficacy, cycle control and acceptability to users, the manufacturer recruited healthy 18–40-year-old women requesting contraceptive services at 100 clinical centers. Women were eligible to participate if they had no contraindications to use of contraceptive steroids and were not recent users of hormonal implants, IUDs or injectables.

Participants were given a vaginal ring for each of the 13 cycles of the study, along with verbal and written instructions on how to insert, use and remove the device. They were told that during the three weeks of a cycle in which the ring was in place, they could remove it for up to three hours at a time, for sexual intercourse. The women underwent physical examination at the beginning of the study and a week after the third, sixth, ninth and 13th cycles. They also completed questionnaires about their level of satisfaction with the method; those who withdrew early from the study were asked to provide their reason for discontinuation. By using an interactive voice recording system or daily diary cards, participants recorded their bleeding patterns, dates of new ring insertions, and dates and duration of ring removals. Pregnancy, the study's measure of contraceptive efficacy, was assessed by tests taken at the beginning of the first cycle, the end of the last cycle and at any time pregnancy was suspected.

Of 2,322 women who began the treatment regimen, 35% discontinued use before the end of the study—15% because of adverse events and 19% for other reasons (e.g., no further need for birth control). In 86% of the 23,298 treatment cycles assessed, the women adhered to the dosing regimen—meaning that they used the ring continually for 19–23 days and then removed the device for the final 6–8 days of the cycle.

Among the 16,912 evaluated cycles in which the women had correctly followed the study protocol, 99% included withdrawal bleeding during the final week of the cycle (mean duration was about five days). Irregular bleeding (breakthrough bleeding or, more commonly, spotting in the first three weeks of the cycle) occurred in 6% of these cycles; a higher proportion of women experienced such bleeding in the first cycle than in the last cycle (6% vs. 4%). Thus, despite an ethinyl estradiol release of 15 mcg daily (a dosage at which combined oral pills have been shown to cause irregular menstrual periods), the authors comment that in general, the ring provided users with "sustained good cycle control."

Twenty-one pregnancies were documented over the course of the study. Using life-table analysis, the researchers found that the cumulative pregnancy rate was 1%. Eleven of the pregnancies occurred among women who did not adhere to the study regimen. Among women who followed the protocol, the Pearl Index revealed that 0.8 pregnancies occurred per 100 person-years of ring use.

Two-thirds of study participants reported at least one adverse event; 38% of the women

in the study reported events that the investigators considered potentially method-related. Of these, the most common were headache (reported at least once by 6% of all participants), vaginal infection (6%) and vaginal discharge (5%). Others were device-related events (foreign-body sensation, complications or interruption of sexual intercourse, or ejection of the ring), weight gain, nausea, breast tenderness and acne. Among the women who withdrew from the study because they experienced adverse events, the most common reasons for discontinuation were device-related events (for 3% of all the participants), headache (1%), changes in emotional state (1%) and weight gain (1%).

For more than 97% of the ring days, participants reported no temporary removal of the ring. On the questionnaires completed at the final study visit, 18% of participants reported that they felt the vaginal ring at least occasionally during intercourse, and 32% reported that their partner felt it at least occasionally. These proportions were higher among the women who stopped using the ring before the end of the study: 23% and 37%, respectively. Ten percent of women reported that their partner objected at least occasionally to use of the ring; among those who discontinued, the proportion was 16%. Most participants reported frequently or always finding the ring easy to insert (96%) and easy to remove (98%). Overall, throughout the study, most women reported that they were satisfied or very satisfied with this contraceptive method (85%) and that they would recommend the ring to others (90%).

According to the authors, the data show that the vaginal ring is an effective contraceptive that maintains excellent cycle control, is convenient and well tolerated, and has "a good safety profile." Moreover, they comment that the ring was "highly acceptable" to the women in this study, most of whom used it correctly. And, as the authors point out, "good compliance with a contraceptive method is essential to maintain contraceptive reliability."—*C. Coren*

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Availability of Emergency Contraception Through Student Health Centers Is Growing, but Gaps Remain

Obtaining emergency contraception on college and university campuses may be getting easier, but the method is still not universally available on campus, according to results of a 1999 survey of student health centers.[1] Half of participating centers offered emergency contraceptive pills, and more than half of these had done so for five years or less. Centers that did not offer emergency contraception typically said that they faced administrative or clinical objections, the school's religious affiliation prohibited it or the clinic was run by a nurse and could not provide medications. Most centers that did not offer the method referred students to other health care providers for it.

The sample consisted of 358 student health centers that responded to a survey mailed to institutional members of the American College Health Association. One-third were at colleges or universities in the Northeast, one-quarter each in the Midwest and South, and the rest in the West; half were at public institutions. Fifty-three percent reported that the student population at their school was fewer than 5,000, 38% were at schools with 5,000–24,999 students and 8% served larger populations. While 45% said that most students lived in university housing, 27% reported that the majority commuted and 27% said that equal numbers lived on campus and commuted.

Fifty-two percent of responding health centers offered emergency contraception. Of these, 54% had initiated the service within the previous five years, including 16% that had begun offering it only within the last year. Three-quarters of clinics that offered emergency contraceptive pills dispensed them directly to students, and half gave students prescriptions for the drug; two-thirds included information about the method in their routine contraceptive counseling.

Most centers that offered emergency contraception (60%) publicized its availability—predominantly through peer educators (57%) and brochures (56%), but also through posters or the campus Web site or newspaper. The main reason for not publicizing this service was concern about generating controversy on campus (53%); others were the desire to avoid promoting use of the method (17%) and insufficient funding (11%). Fewer than one-quarter of centers were listed with Princeton University's emergency contraception hot line.

Facilities that offered emergency contraception identified several benefits of doing so: Virtually all (97%) cited the prevention of unintended pregnancy, and sizable proportions mentioned students' appreciation of the service (71%) and the opportunity to link students with regular contraceptive methods (59%).

Restrictions on the provision of emergency contraceptive pills were common. Large majorities of centers reported that students could obtain the method only after having unprotected intercourse (73%) and in the absence of health conditions that contraindicate use (68%). In some cases, provision was restricted to students who had had another episode of unprotected intercourse during the same menstrual cycle (27%) or who had missed one or two doses of regular oral contraceptives (21%). Nine percent of facilities provided emergency contraceptive pills only if a woman had been sexually assaulted, and 8% limited provision to one time per student.

Of the 48% of health centers that did not offer emergency contraceptive pills, three-quarters referred students elsewhere for the method; one in six, however, did not refer for this service. Only 7% of these facilities were considering offering the method, and another 1% planned to begin offering it within the next year. Most (67%) either had not considered making emergency contraception available or had ruled it out; 2% had offered the method in the past but no longer did so.

One-quarter of health centers that did not offer emergency contraception reported that administrative objections prevented them from doing so, close to one in five cited clinical objections or liability concerns, and about one in eight said that they thought the practice would undermine regular contraceptive use; a negligible proportion denied the need. Seventy percent gave a variety of other reasons for not offering emergency contraception; one-third of these reported that their school's religious affiliation prevented it, one-fifth said that the clinic was run by a nurse and could not provide drug prescriptions.

Results of a logistic regression analysis revealed that schools in the Midwest and the South were less likely than those in the Northeast to offer emergency contraception (odds ratio, 0.4 for each). The odds were also reduced for private institutions (0.3). Compared with schools that had equal numbers of residential

and commuting students, those whose students mainly commuted were less likely to provide this service (0.2), and those whose students were mostly residential were more likely to do so (2.9). Size of the student body also influenced the provision of emergency contraception: Schools with enrollments of 10,000 or more had higher odds of offering the method than those with fewer than 5,000 students (odds ratios, 3.2–5.1).

The researcher notes that the survey findings are not generalizable to all college and university health centers in the United States. Nevertheless, she concludes that the results highlight a need to expand the availability of emergency contraception through student health centers. Contending that many barriers to provision of this method may owe more to a lack of education than to outright opposition, she encourages researchers to "determine the underpinnings of these barriers in order to develop appropriate interventions for change."—*D. Hollander*

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Mothers Exert More Influence on Timing of First Intercourse Among Daughters Than Among Sons

Mothers' influence on when their children initiate sexual intercourse appears to be greater for daughters than for sons, according to an analysis of longitudinal data from matched pairs of adolescents and their mothers.[1] Five maternal variables affected adolescent females' risk of becoming sexually active: Mothers' impression that their daughters had already kissed was associated with an elevated risk of early sexual initiation, while mothers' education, disapproval of their daughters' having sex, satisfaction with the mother-daughter relationship and frequency of conversations with the parents of their daughters' friends were all associated with a reduced risk. By contrast, the only maternal variable that mattered for young men was the mother's impression that her son had kissed.

The data come from the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative survey of in-school youth in grades 7–12. Investigators used Add Health information from 2,006 matched pairs of sexually inexperienced 14- and 15-year-olds and their mothers. The adolescents and their mothers were interviewed separately at home during the 1994–1995 school year (Wave 1); follow-up data were collected one year later from the adolescents only (Wave 2).

Using Cox proportional hazards models, the researchers assessed how adolescents' and mothers' characteristics affected young people's probability of initiating sexual activity in the year separating the surveys. Among the factors controlled for were social and demographic characteristics and both the adolescents' and their mothers' impressions of how far the adolescent had progressed in a romantic relationship. The models also included maternal communication variables about sex, as well as variables measuring the mother's values and her satisfaction with the mother-child relationship.

Overall, 74% of the respondents were white, 12% Hispanic, 10% black and 4% of other races and ethnicities. Sixty-three percent of the adolescents lived with both married biological parents, and one-quarter of the mothers had completed college. A significantly higher proportion of female than of male adolescents had initiated sexual activity by Wave 2 (16% vs. 11%); this result is consistent with the differences by gender in the proportions who said at Wave 1 that they were currently in a romantic relationship (24% of females vs. 18% of males) or had ever been in one (42% of females vs. 35% of males).

Mothers of daughters reported discussing sexual issues more often than did mothers of sons (i.e., 30% of mothers of daughters discussed sex a "great deal" with their child vs. 24% of mothers of sons), although women who had a daughter also felt more uncomfortable discussing sex with their child (i.e., 43% of mothers of daughters strongly agreed that they felt uncomfortable vs. 33% of mothers of sons). On the other hand, mothers of sons were significantly more likely than mothers of daughters to recommend a contraceptive method to their child (i.e., 35% of mothers of sons agreed or strongly agreed that they had recommended a specific method to their child vs. 22% of mothers of daughters). The remaining maternal variables did not differ significantly by the adolescent's gender.

For adolescent males, three variables independently affected the probability of having initiated intercourse by Wave 2, and only one was a maternal variable (i.e., the mother's views on whether her son was in a romantic relationship). Being black (hazards ratio, 3.4), having been in a romantic relationship in the past 18 months (2.0) and having a mother who believed that her son had kissed (2.0) were associated with an increased likelihood of early sexual debut.

Although this last variable—a mother's impression that her child had kissed—also proved significant for females (hazards ratio, 2.0), four additional maternal factors affected the likelihood of initiating sexual activity between the surveys among adolescent women, and all of these significantly reduced that likelihood. Adolescent females had a reduced risk of sexual initiation if their mothers had graduated from college (0.6), strongly disapproved of their having sex (0.6), were satisfied with the mother-daughter relationship (0.6) or talked with more parents of their friends (a proxy for paternal monitoring, 0.9).

The investigators caution that the short observation period prevents them from drawing conclusions about causality and that their data are limited by the exclusion of youth who are no longer in school (and who would be at a high risk of early sexual debut). Further, they warn that the lack of maternal influence on young men's early sexual activity might stem from sample selection, higher attrition among males than females and males' lower rates of sexual initiation over the study period.

Nonetheless, the investigators observe that mothers appear to directly influence their daughters' sexual behavior by communicating a strong disapproval of sex, by maintaining a close mother-daughter relationship and by staying in touch with the parents of their daughters' friends. The reasons why mothers' influence seems to matter more for daughters than for sons are unclear, but the researchers suggest that the messages (verbal and nonverbal) that mothers send to sons about sexual activity may be less clear than the ones they transmit to daughters. The authors assert that "parents need to be clear about their values and then clearly articulate them to their children." —*L. Remez*

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Pill Use Protects Against Ovarian Cancer; Hormone Therapy Increases Risk

Oral contraceptive use provides clear, long-term protection against epithelial ovarian cancer, according to results from a Swedish case-control study.[1] Analyses contrasting 655 women with ovarian cancer and 3,899 controls revealed that ever-users of the pill have a substantially reduced risk of developing any type of invasive ovarian cancer compared with never-users (odds ratio, 0.7). Moreover, pill use protects against ovarian cancer for up to 25 years after use ceases. In contrast, women who have used hormone replacement therapy are at significantly increased risk of ovarian cancer (odds ratio, 1.4).

Swedish women aged 50–74 were recruited for the study between October 1993 and December 1995. A total of 914 women with any type of ovarian cancer, identified through regional cancer registries, agreed to participate in the research; data on 655 with epithelial ovarian cancer were used for the analysis. The 3,899 controls were identified from a population register of all Swedish residents. On average, cases and controls were 62–63 years of age, had reached menopause at approximately age 50, had had two births, had been about 25 years of age at first birth and 30 at last birth, and had breastfed for around 10–11 months.

Thirty-two percent of women with cancer and 35% of controls had ever used oral contraceptives, while 26% and 21%, respectively, had ever used hormone replacement therapy (estrogen with or without progestin). Twelve percent of cases and 10% of controls had a family history of breast cancer; 6% and 3%, respectively, had a family history of ovarian cancer. Nineteen percent of those with cancer and 11% of controls had never given birth.

Women who had ever used the pill were at significantly reduced risk of epithelial ovarian cancer (odds ratio, 0.7). When the researchers conducted separate analyses by type of ovarian tumor, they found comparably reduced odds for the two most common ones (serous and endometrioid). However, the risk of developing a mucinous ovarian tumor (a type that constituted about 9% of all ovarian cancer cases) was significantly elevated among pill users, relative to nonusers (odds ratio, 2.0).

Duration of pill use was associated with the occurrence of ovarian cancer: The odds of developing epithelial ovarian cancer were not significantly affected among women who had used the pill for fewer than five years. However, these odds were substantially reduced among women who had used the pill for 5–9 years (0.5) or for 10 or more years (0.4).

The protective effect of past oral contraceptive use was evident for up to 25 years following cessation of use: Overall odds ratios were significantly reduced among women who had stopped using the pill fewer than 15 years before the study (odds ratio, 0.5), 15–19 years before (0.7) or 20–24 years before (0.7).

For women who had used hormone replacement therapy, the overall risk of epithelial ovarian cancer was elevated (odds ratio, 1.4), as were the risks of developing the two most common types of ovarian tumors, serous (1.5) and endometrioid (1.4). Ovarian cancer risk was most elevated among women who had used replacement hormones for 10 or more years (odds ratio, 2.0). However, there was no association between the recency of hormone replacement therapy and the risk of ovarian cancer.

Reproductive factors beside hormone exposure had a substantial impact on women's likelihood of developing epithelial ovarian cancer. The analyses confirmed the consistent protective effect of childbearing. The likelihood of developing ovarian cancer fell as women's number of births increased (odds ratios declined from 0.6 among women who had had one birth to 0.3 among those who had had five or more). In contrast, age at first birth was associated with the risk of ovarian cancer only among women who first delivered at age 35 or older (0.5). Duration of breastfeeding did not affect the overall risk of epithelial ovarian cancer, although the risk of clear-cell carcinoma (a relatively rare type of ovarian tumor) was substantially reduced among women who breastfed for at least six months (0.2).

There were no significant associations between cancer risk and women's age at menarche. However, women who reached menopause before age 49 were significantly less likely than those who did so at ages 49–52 to develop epithelial ovarian cancer (0.8). Women who had had irregular menstrual cycles were marginally more likely to develop ovarian cancer than were those who had not (1.2), and were significantly more likely to develop an endometrioid ovarian tumor (1.6).

Finally, as might be expected, one of the strongest factors in the incidence of ovarian cancer was a family history of it: Women whose mother or sister had had ovarian cancer were substantially more likely than other women to have developed any type of epithelial ovarian cancer (2.9). Such women also had a significantly elevated risk of serous (3.8) and endometrioid (2.9) cancers.

The investigators observe that while the causes of ovarian cancer have never been determined, a number of hypotheses have been advanced—incessant ovulation, high levels of circulating gonadotropins, ovarian exposure to contaminants via the fallopian tubes and low progesterone levels. They argue that their results, and those of other investigators, suggest that exposure to contaminants "seems compatible with most established epidemiologic associations."—*M. Klitsch*

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