
Measuring Adolescent Sexual Behaviors and Related Health Outcomes

LEO MORRIS, PhD
CHARLES W. WARREN, PhD
SEVGI O. ARAL, PhD

The authors are with the Centers for Disease Control and Prevention (CDC). Dr. Morris is a Youth Risk Behavior Surveillance System

chairperson and Chief of the Behavioral Epidemiology and Demographic Research Branch, Division of Reproductive Health, of CDC's National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). Dr. Warren is a Sociologist, Surveillance and Evaluation Research Branch, Division of Adolescent and School Health, NCCDPHP. Dr. Aral is Assistant for Behavioral and Epidemiologic Intervention, Division of Sexually Transmitted Diseases and HIV Prevention, National Center for Prevention Services.

PREGNANCY AND SEXUALLY TRANSMITTED DISEASES (STD), including human immunodeficiency virus (HIV) infection, cause significant social and economic problems among adolescents in the United States.

Adolescents who become parents risk lifelong social and economic disadvantages. Compared to persons who begin childbearing in their 20s, adolescent parents are less likely to complete their educations or to be employed and are more likely to have lower incomes, larger families, more marital disruptions, and greater need for welfare assistance (1–5). Compared with children of mothers in their 20s and 30s, children of adolescent mothers have a higher risk of poor intellectual and academic achievement together with social and behavioral problems (6).

The total cost to society of STD prevention and treatment currently exceeds \$3.5 billion annually (7). The cumulative costs of treating all people with HIV infection will increase from \$10.3 billion in 1992 to \$15.2 billion in 1995 (8). STD will make major demands on the nation's health and social service systems through the 1990s.

Pregnancies and STD among adolescents largely are preventable through coordinated efforts among families, schools, health and education agencies, and community organizations. The development of effective school-based and community-based programs depends, in part, on gaining information about the nature and extent of sexual behaviors among adolescents (9, 10).

In this paper we describe the development of questions related to sexual behaviors for the Youth Risk Behavior Surveillance System (YRBSS) questionnaire. The YRBSS panel participants (for list, see Appendix I, page 56) first identified major health outcomes associated with pregnancy and STD among adolescents. Guided by national health objectives for the year 2000 (11), we developed questions that would elicit information on those adolescent sexual behaviors most related to negative health outcomes.

Health Outcomes Associated with Pregnancy

Each year since 1974, more than 1 million adolescents have become pregnant (12). Thirteen percent of their pregnancies end in miscarriage, 40 percent are electively aborted, and 46 percent produce a live birth (13). An estimated 87 percent of pregnancies among never-married adolescents are unintended (14).

Pregnancies that occur during adolescence place both mothers and infants at risk. The youngest mothers and their infants face greater risks than older adolescent mothers and their infants. Adolescents younger than 15 years have high rates of pregnancy complications, including toxemia, anemia, and prolonged labor (15). Young adolescents experience a maternal death rate 2.5 times greater than that of mothers ages 20 through 24 years and are twice as likely to give birth to premature or low birth weight infants. Miscarriages and stillbirths are more frequent among adolescents than older mothers (16, 17). Children of adolescent mothers are at greater risk of disease, physical disability, and infant death than are children of older mothers (6).

Abortion and birth rates among adolescents in the United States remain at alarmingly high levels compared to other developed countries (18). Adolescents younger than 20 years account for about 26 percent of all abortions and 13 percent of all births (13). Birth rates among adolescents changed little from 1980 through 1985. However, from 1986 through 1988, the overall rate for 15–17-year-olds increased 10 percent, from 30.6 to 33.8 births per 1,000 females (19).

Health Outcomes Associated with STD

An estimated 12 million persons are infected with STD each year (20). Eighty-six percent of those cases occur among persons ages 15–29 years (20). During the 1980s, the highest rates of STD among all population subgroups occurred among adolescents who were incar-

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cerated, pregnant, or with low incomes (21).

Adolescents physically are at higher risk for STD than persons in other age groups (22) for two reasons. First, during adolescence, columnar epithelia is more apparent on the cervix than during adulthood. Both chlamydia and gonorrhea have a predilection for this tissue. Second, adolescents often have a relatively unchallenged immune system, since they are less likely than older persons to have been exposed to STD (23).

The most common STDs are chlamydia, gonorrhea, syphilis, chancroid, herpes simplex virus infection, and HIV infection. Left untreated, pregnant women can transmit these STD to their infants either in utero or during birth (24).

Chlamydia infection of the lower genital tract is common among adolescents and surpasses gonococcal infections as the most prevalent STD among women. An estimated 3 to 4 million females suffer from chlamydia each year (25). Cultures obtained during pelvic examinations suggest that the prevalence of chlamydia among adolescent females is between 8 percent and 40 percent nationwide (26). Adolescent females may be at greater risk of chlamydia infection than adult females (24).

Gonorrhea is the most frequently reported STD. While the total number of cases reported annually is declining, gonorrhea rates for 15–19-year-olds increased during the 1980s (26). In 1989, 697,650 cases of gonorrhea were reported. Nearly 30 percent of those cases occurred among 10–19-year-olds (20). Rates of reported cases of gonorrhea are especially high for females who are non-white and 15–19 years old (26).

Untreated chlamydia and gonorrhea infections may progress to pelvic inflammatory disease (PID). Each year, more than 1 million females experience an episode of PID. Age-specific rates of PID are highest for adolescent females (27). About 16 to 20 percent of cases occur among adolescents (26, 28). Acute PID causes more morbidity among adolescents than all other serious infections combined (29). The risk of PID among

sexually active 15-year-old females is estimated to be 1 in 8 (23). Females who have had PID are at increased risk for recurrent PID, chronic pelvic pain, infertility, and ectopic pregnancy (23, 30). Among adolescents, the risk of involuntary infertility ranges from 9 percent after one episode of PID to 52 percent after three episodes (29).

Since 1986, the number of reported syphilis cases has been increasing. In 1989, 45,535 cases of primary and secondary syphilis were reported. Ten percent of those cases occurred among 10–19-year-olds (25). The number of reported cases of congenital syphilis also has increased in recent years. Thirty percent of infants with congenital syphilis are born to mothers younger than 20 years (28).

Nearly 20,000 cases of chancroid were reported in the past 5 years, predominantly among males, the highest number of cases in a 5-year period since 1953 (25). Chancroid outbreaks have occurred in Boston, Dallas, Los Angeles, New York, and several Florida cities (31).

The prevalence of herpes simplex virus infections of the lower genital tract increased during the 1970s. Among 15–19-year-old females, the number of physicians' visits for herpes simplex virus infection increased from about 15,000 in 1966 to more than 110,000 by 1980 (15). Before 20 years of age, about 4 percent of white adolescents and 17 percent of black adolescents are infected with herpes simplex virus (32). Herpes simplex virus infection may respond to treatment, but cannot be cured.

Herpes simplex virus infection and human papillomavirus (HPV) infections are considered risk factors for genital cancers (24, 31). Genital cancers effect about 72,000 females each year (33). Early age of initiation of sexual activity and multiple sexual partners both may increase the risk for genital cancers among females (34). In a prospective evaluation of the risk for cervical cancer after cytologic evidence of HPV infection, females younger than 25 years were found to be at greater risk than older women (35).

HIV infection eventually results in AIDS and is incurable. Rates of HIV infection among adolescents are available from specially selected, nonrepresentative populations. For example, HIV seroprevalence rates among 15–24-year-olds treated at 91 STD clinics throughout the country during 1988–89 ranged from less than 1 percent in 70 clinics, to 1 and 2 percent in 10 clinics, and to more than 2 percent in 11 clinics (36). HIV seroprevalence rates among males who were Job Corps entrants between October 1987 and November 1989 ranged from 1.2 per thousand among 16-year-olds to 5.9 per thousand among 19-year-olds (37). Seroprevalence rates among 15–19-year olds tested at 26 sentinel hospitals between January 1988 and June 1989 ranged from 0 percent to 3.8 percent (38).

More than 250,000 cases of AIDS have been reported to the Centers for Disease Control and Prevention since 1981. Of these cases, fewer than 1 percent occurred among 13–19-year-olds, and about 20 percent occurred among 20–29-year-olds (39). Because the median duration of the incubation period, between infection with HIV and onset of AIDS, is nearly 10 years, many 20–29-year-olds with AIDS may have been infected during adolescence (40). In 1989, AIDS ranked as the sixth leading cause of death among 15–24-year-olds (41).

Two-thirds of the reported AIDS cases among adolescents have resulted from sexual behavior. Adolescents with AIDS are less likely than adults to have acquired HIV from sex between men or by injected drug use. Instead, adolescents have been most likely to acquire HIV from heterosexual contact and, before 1985, from transfusion of blood products (42).

National Health Objectives

The national health objectives measured by the YRBSS are listed in Appendix III. Fourteen of the national health objectives for the year 2000, presented in “Healthy People 2000” (11), are relevant to sexual behaviors among adolescents. The objectives helped guide our selection of sexual behaviors most related to negative health outcomes.

Among the health status objectives that concern sexual behaviors, Objective 5.1 calls for reducing the number of pregnancies among females 17 years and younger. Specific goals are set for black and Hispanic adolescents. Objective 19.1 calls for reducing the number of cases of gonorrhea. A specific goal is set for adolescents ages 15 to 19. Objective 19.6 calls for reducing the incidence of PID among females ages 15–44 years.

Seven risk reduction objectives concern sexual behaviors among adolescents. Objectives 5.4, 18.3, and 19.9 call for reducing the proportion of adolescents who have engaged in sexual intercourse. Objective 5.5 calls for increasing the proportion of adolescents who have had sexual intercourse, but have abstained for the past 3 months. Objectives 5.6, 18.4, 18.4a, 18.4b, 19.10, 19.10a, and 19.10b call for increasing contraceptive use to prevent pregnancy and to protect against disease as well as for increasing condom use to prevent STD, including HIV infection.

Services and protection objectives call for increasing HIV education for 4th through 12th grade students (Objective 18.10), increasing HIV education for students and staff in colleges and universities (Objective 18.11), and increasing STD transmission prevention education in middle and secondary schools (Objective 19.12). Objective 5.8 calls for increasing the proportion

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of persons ages 10–18 years who have discussed human sexuality with their parents or received information through a parentally endorsed source.

Priority Behaviors and Health Outcomes

To focus our development of questions related to sexual behaviors for the YRBSS questionnaire, we selected, by priority, the following seven behaviors: learning about HIV infection, sexual intercourse, age at first sexual intercourse, number of sexual partners, use of alcohol or other drugs before sexual intercourse, use of contraceptives, and use of condoms.

We also selected two health outcomes, pregnancy and STD. We based our decisions on the relevance to national health objectives (11), the contribution to adverse health outcomes, the ability to measure a behavior reliably, and the need for information to develop effective risk reduction interventions.

Learning about HIV helps adolescents to gain the knowledge and skills they need to eliminate or reduce risks for HIV infection. Sexual intercourse is the primary risk factor for unintended pregnancy and STD, including HIV infection. Age at first sexual intercourse is important because early initiation is predictive of the number of lifetime sexual partners; increased risk for STD, including HIV infection (43); and increased risk for unintended pregnancy (44). The number of sexual partners is related to the risk for STD, including HIV infection, PID (43), and cervical cancer (24). Use of alcohol and other drugs before sexual intercourse can impair judgment and reduce inhibitions about engaging in sexual intercourse (45). Among adolescents who have engaged in sexual intercourse, their use of condoms and contraceptives reduces risk for STD, including HIV infection and unintended pregnancy. Pregnancy and STD are two of the most common sources of morbidity among adolescents.

YRBSS Questions

We developed 11 questions to measure the selected behaviors and health outcomes (see Appendix II, Youth Risk Behavior Surveillance System, page 60, for the specific questions). Learning about HIV infection is

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measured with two questions. One question (number 46) focuses on school-based HIV education, and the other (number 47) focuses on discussions about AIDS and HIV infection with parents or other adult family members. For most adolescents, these are two of the most common sources of health information (46, 47). Together, schools and families can provide complete and accurate HIV-related information that reflects community and family values. These two questions are relevant to Objectives 5.8 and 18.10 (11).

Sexual intercourse is measured with one question (number 48). We considered providing a technical definition for sexual intercourse, using slang or colloquial terms for sexual intercourse, and specifying types of sexual intercourse. However, no single definition or synonym for sexual intercourse is used, known, or accepted among adolescents nationwide. Many State education agency officials indicated that the use of slang or more explicit terms potentially could hinder clearance by school officials at the State, district, and local levels. Laboratory and field tests, conducted by the National Center for Health Statistics, indicated that adolescents understood and were familiar with the term "sexual intercourse," though some adolescents may consider only vaginal intercourse when responding to the YRBSS questions. This question can be used to measure progress toward achieving Objectives 5.4, 18.3, and 19.9 (11).

One question (number 49) was developed to measure age at first sexual intercourse. That question can be used to measure progress toward achieving Objectives 5.4, 18.3, and 19.9 (11).

Two questions (numbers 50 and 51) were developed to measure numbers of sexual partners. To be consistent with other data sets (48) and to measure Objective 5.5 (11), we chose lifetime and 3 months as the recall periods for these questions.

Use of alcohol and other drugs before sexual intercourse is measured with one question (number 52). Since alcohol and other drug use may not occur consis-

tently across instances of sexual intercourse, only use during last sexual intercourse is measured.

We developed a question to measure condom use (number 53) and another to measure contraceptive use (number 54). Both questions ask only about use during last sexual intercourse. Laboratory and field tests demonstrated that adolescents had difficulty summarizing condom or contraceptive use for even short periods, because these behaviors do not occur consistently. Adolescents may use condoms and contraceptives sporadically, depending on the situation and sexual partner. Those questions can be used to measure progress toward achieving Objectives 5.6, 18.4, 18.4a, 18.4b, 19.10, 19.10a, and 19.10b (11).

One question was developed to measure numbers of pregnancies (number 55). Since the questionnaire is used with males as well as females, a "not sure" response category was added because males may not always know whether sexual intercourse resulted in a pregnancy. The prevalence of STD is measured with one question (number 56). Data from those questions will not replace case reports of pregnancies or STD, but can provide a marker for the prevalence of unprotected sexual intercourse.

Since only a limited number of questions on sexual behaviors and related health outcomes could be included in the questionnaire, we could not measure other important behaviors and health outcomes, such as contraceptive use at first intercourse, sources of contraception, specific types of sexual intercourse, intendedness of pregnancies, prevalence of specific types of STD, and infertility.

Because the YRBSS was designed to focus primarily on behaviors, we did not include questions to measure topics such as knowledge and attitudes related to AIDS and HIV infection or the perceived need for contraceptive services.

Discussion

The YRBSS is the only surveillance system continually generating information about sexual behaviors and related health outcomes among adolescents throughout the United States. Other surveys of adolescent sexual behaviors, such as the National Survey of Family Growth (49, 50) and the National Survey of Adolescent Males (51), focus only on females or males and were conducted infrequently or only once.

The YRBSS also is the only national surveillance system to measure adolescent sexual behaviors in a school-based setting. Comparison of similar data suggests that school-based surveys are more likely than household-based surveys to reduce adolescents' concerns about privacy and confidentiality and to increase their willingness to report health risk behaviors (52).

Although the questions do not provide an in-depth description of sexual behaviors, the YRBSS can be used to describe differences among subgroups of adolescents by sex, age, school grade, race or ethnicity, and State and city. The YRBSS also can be used to describe relationships between sexual behaviors and other priority health risk behaviors, such as alcohol and other drug use.

Seventeen States and the District of Columbia require sexuality education, 20 States and the District of Columbia require STD education (53), and 31 States and the District of Columbia require HIV education programs in schools (54). Information on sexual behaviors among adolescents can help support and strengthen those policies and the development of effective educational interventions.

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